

Keysight Wireless Connectivity Test Set

This help file provides documentation for the following products:
E6650A EXF Wireless Test Set for Femtocell

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V9071B
GSM/EDGE
Measurement
Application User's &
Programmer's
Reference

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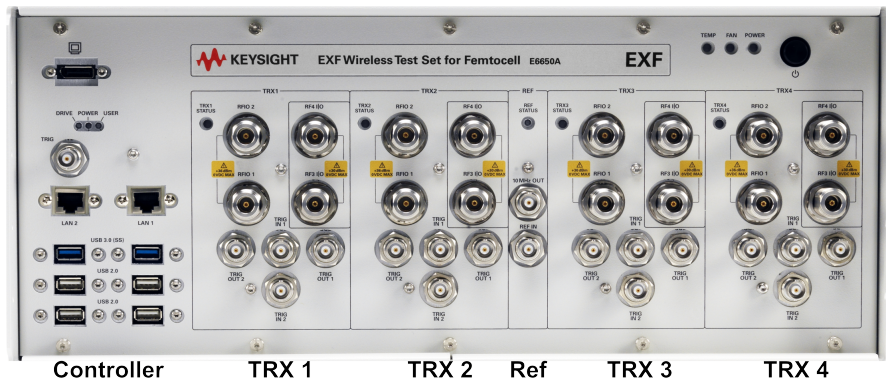
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1 About the Test Set

The X-Series E6650A EXF Wireless Test Set for Femtocell is a one-box tester consisting of instruments loaded into a M9018A PXI mainframe with a front impact cover. The mainframe has a common PC controller (located on the far left) and M9300A PXI Frequency Reference (located in the center of the rack). The test set has one to four Keysight M9440A TRX (transmit/receive) instruments installed.

Each TRX includes a signal analyzer and a signal source, both of which interface with the front panel of the test set through an input/output matrix, and is run by its own instance of the XSA firmware application (a fully loaded test set shows four independent XSA windows on its monitor display).

The E6650A can be configured to test cellular products with a standard 40 MHz of analysis bandwidth. It could also be configured to test Wireless products with 80 or 160 MHz of analysis bandwidth. If your requirement is to test both, the TRX instruments can be configured to test both products.



Installing Application Software

If you want to install a measurement application after your initial hardware purchase, you need only to license it. All of the available applications are loaded in your test set at the time of purchase.

Thus, when you purchase a new application, you will receive an entitlement certificate that you can use to obtain a license key for that application. To activate the new measurement application, enter the license key that you obtain into the test set.

For the latest information on Keysight X-series measurement applications and upgrade kits, visit the following internet URL.

<http://www.keysight.com/find/e6650a>

Viewing a License Key

Measurement applications that you purchased with your instrument have been installed and activated at the factory before shipment. The instrument requires a unique License Key for every measurement application purchased. The license key is a hexadecimal string that is specific to your measurement application, instrument model number and serial number. It enables you to install, or reactivate, that particular application.

Press **System, Show, System** to display the measurement applications that are currently licensed in your analyzer.

Go to the following location to view the license keys for the installed measurement applications:

`C:\Program Files\Agilent\Licensing`

You may want to keep a copy of your license key in a secure location. To do this, you can print out a copy of the display showing the license numbers. If you should lose your license key, call your nearest Keysight Technologies service or sales office for assistance.

Obtaining and Installing a License Key

If you purchase an additional application that requires installation, you will receive an "Entitlement Certificate", which may be redeemed for a license key for one instrument. To obtain your license key, follow the instructions that accompany the certificate.

Installing a license key for the selected application can be done automatically using a USB memory device. To do this, you copy the license file to the USB memory device, at the root level. Follow the instructions that come with your software installation kit.

Installing a license key can also be done manually using the built-in license management application, which may be found via the instrument front panel keys at **System, Licensing. . .**, or on-disk at:

`C:\Programming Files\Agilent\Licensing`

You can also use these procedures to reinstall a license key that has been accidentally deleted, or lost due to a memory failure.

Updating Measurement Application Software

All the software applications were loaded at the time of original instrument manufacture. It is a good idea to regularly update your software with the latest available version. This helps to ensure that you receive

any improvements and expanded functionality.

Because the software was loaded at the initial purchase, further additional measurement applications may now be available. If the application you are interested in licensing is not available, you will need to do a software update. (To display a list of installed applications, press **System, Show, System.**)

Check the appropriate page of the Keysight web site for the latest available software versions, according to the name of your instrument, as follows:

http://www.keysight.com/find/E6650A_software

You can load the updated software package into the analyzer either from a USB drive or directly from the internet. An automatic loading program is included with the files.

EXF Options and Accessories

You can view an online list of available Options and Accessories for your instrument as follows:

1. Browse to one of the following URLs, according to the product name of your analyzer:
www.keysight.com/find/e6650a
2. The home page for your instrument appears (in some cases, you may see an initial splash screen containing a button named View the Webpage, which you should click to display the home page).
3. Locate the **Options & Accessories** tab, as highlighted in the example below, which shows the home page for the E6650A.
4. Click the **Options & Accessories** tab, to display a list of available options and accessories for your instrument.

Front-Panel Features

The instrument Front-panel features are fully detailed in the section "Front-Panel Features" (under the chapter "Front and Rear Panel Features") of the document:

Latest available on line document: [E6650A Getting Started Guide](#)

Embedded PDF installed with the latest firmware revision:

If you are viewing this information as a Help file in the instrument, then you can click on the link above to open the PDF document.

Display Annotations

Display Annotations are fully detailed under the chapter "Front and Rear Panel Features" of the document:

Latest available on line document: [E6640A Getting Started Guide](#)

Embedded PDF installed with the latest firmware revision:

If you are viewing this information as a Help file in the instrument, then you can click on the links above to open the PDF document.

Rear-Panel Features

The instrument's Rear-panel features are fully detailed in the section "Rear-Panel Features" (under the chapter "Front and Rear Panel Features") of the document:

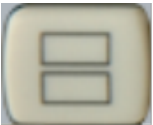
Latest available on line document: [E6650A Getting Started Guide](#)

Embedded PDF installed with the latest firmware revision:

If you are viewing this information as a Help file in the instrument, then you can click on the link above to open the PDF document.

Window Control Keys

Multi-Window



The **Multi Window** front-panel key will toggle you back and forth between the Normal View and the last Multi Window View (Zone Span, Trace Zoom or Spectrogram) that you were in, when using the Swept SA measurement of the Spectrum Analyzer Mode. It remembers which View you were in through a Preset. This “previous view” is set to Zone Span on a Restore Mode Defaults.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Zoom

Zoom is a toggle function. Pressing this key once increases the size of the selected window. Pressing the key again returns the window to the original size.

When Zoom is on for a window, that window will get the entire primary display area. The zoomed window, since it is the selected window, is outlined in green.

Zoom is local to each Measurement. Each Measurement remembers its Zoom state. The Zoom state of each Measurement is part of the Mode’s state.

NOTE

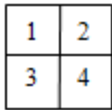
Data acquisition and processing for the other windows continues while a window is zoomed, as does all SCPI communication with the other windows.

Remote Command	:DISPlay:WINDow:FORMat:ZOOM
Remote Command	:DISPlay:WINDow:FORMat:TILE
Example	:DISP:WIND:FORM:ZOOM sets zoomed :DISP:WIND:FORM:TILE sets un-zoomed
Preset	TILE
Initial S/W Revision	Prior to A.02.00

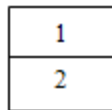
Next Window

Selects the next window of the current view. When the Next Window key is pressed, the next window in the order of precedence becomes selected. If the selected window was zoomed, the next window will also be zoomed.

The window numbers are as follows. Note that these numbers also determine the order of precedence (that is, Next Window goes from 1 to 2, then 2 to 3, etc.):



Four window display



Two window display

RTSA measurements:

Only two windows are available in the Spectrogram view under the Spectrum measurement and up to three windows are available in the Power vs. Time measurement, depending on the view set up.

Remote Command	:DISPlay:WINDow[:SElect] <number> :DISPlay:WINDow[:SElect]?
Example	:DISP:WIND 1
Preset	1
Min	1
Max	If <number> is greater than the number of windows, limit to <number of windows>
Initial S/W Revision	Prior to A.02.00

One and only one window is always selected. The selected window has the focus; this means that all window-specific key presses apply only to that window. You can tell which window is selected by the thick green border around it. If a window is not selected, its boundary is gray.

If a window in a multi-window display is zoomed it is still outlined in green. If there is only one window, the green outline is not used. This allows the user to distinguish between a zoomed window and a display with only one window.

The selected window is local to each Measurement. Each Measurement remembers which window is selected. The selected window for each Measurement is remembered in Mode state.

NOTE

When this key is pressed in Help Mode, it toggles focus between the table of contents window and the topic pane window.

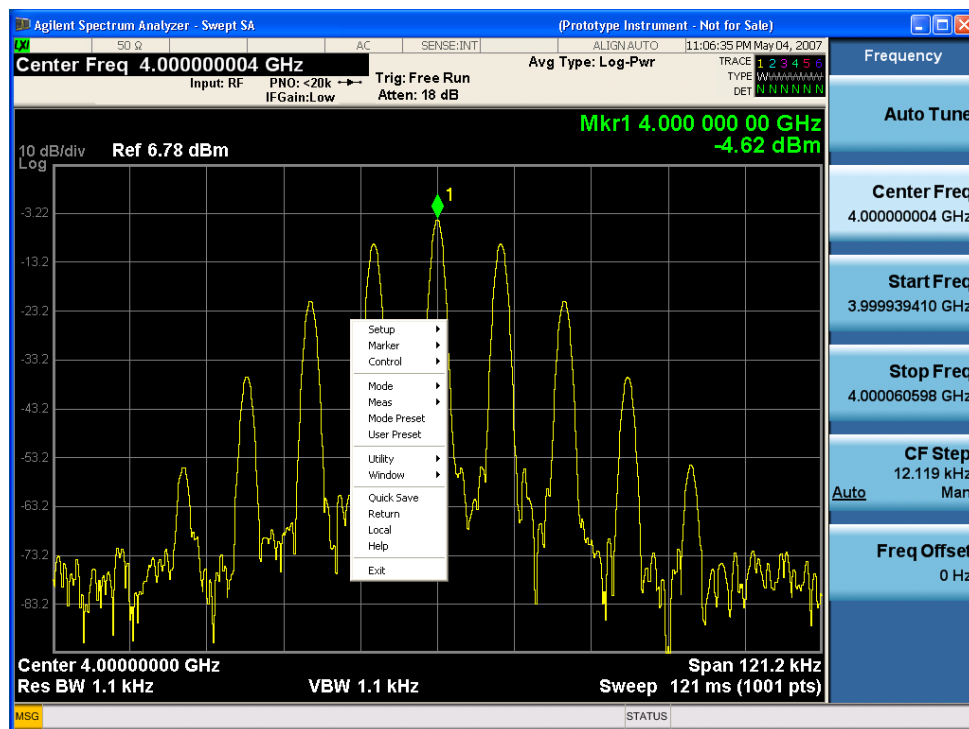
Mouse and Keyboard Control

If you do not have access to the instrument front-panel, there are several ways that a mouse and PC Keyboard can give you access to functions normally accessed using the front-panel keys.

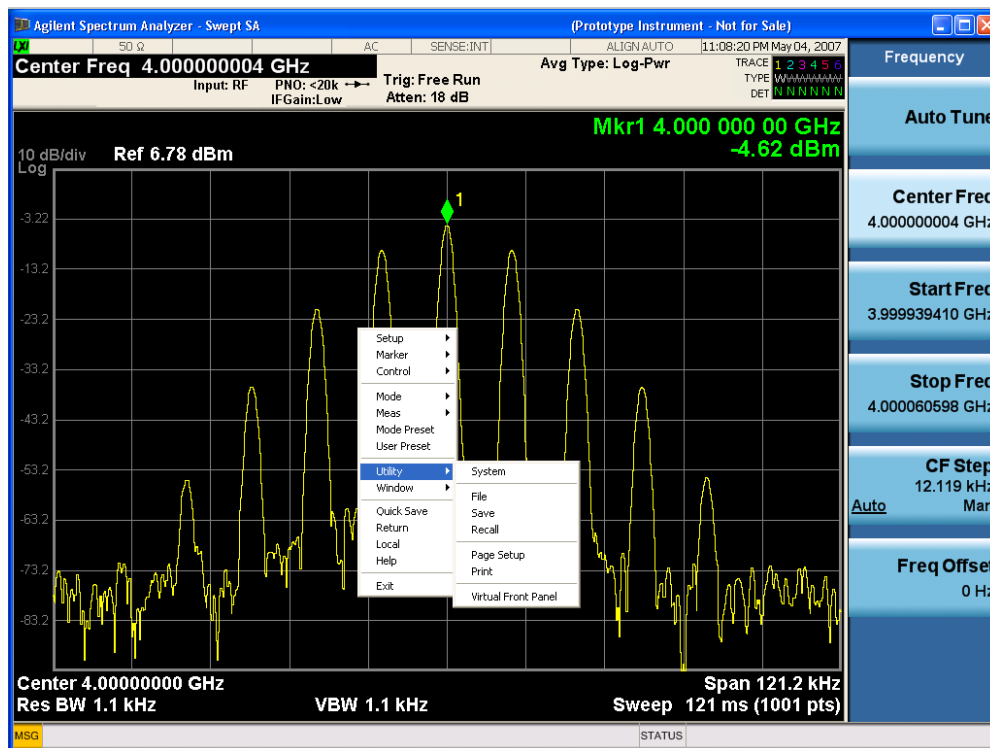
For instrument lacking a physical front panel display, you can watch the instrument display via external monitor or remote desktop connection

Right-Click

If you plug in a mouse and right-click on the analyzer screen, a menu will appear as below:



Placing the mouse on one of the rows marked with a right arrow symbol will cause that row to expand, as for example below where the mouse is hovered over the “Utility” row:



This method can be used to access any of the front-panel keys by using a mouse; as for example if you are accessing the instrument through Remote Desktop.

The array of keys thus available is shown below:

PC Keyboard

If you have a PC keyboard plugged in (or via Remote Desktop), certain key codes on the PC keyboard map to front-panel keys on the GPSA front panel. These key codes are shown below:

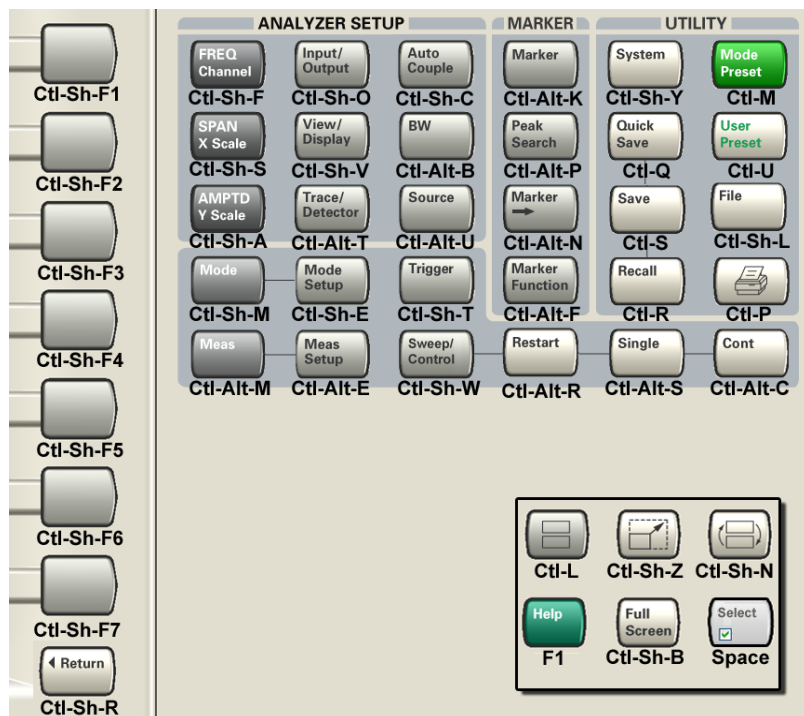
Front-panel key	Key code
Frequency	CTRL+SHIFT+F
Span	CTRL+SHIFT+S
Amplitude	CTRL+SHIFT+A
Input/Output	CTRL+SHIFT+O
View/Display	CTRL+SHIFT+V
Trace/Detector	CTRL+ALT+T
Auto Couple	CTRL+SHIFT+C
Bandwidth	CTRL+ALT+B
Source	CTRL+ALT-U
Marker	CTRL+ALT+K
Peak Search	CTRL+ALT+P
Marker To	CTRL+ALT+N

Front-panel key	Key code
Marker Function	CTRL+ALT+F
System	CTRL+SHIFT+Y
Quick Save	CTRL+Q
Save	CTRL+S
Recall	CTRL+R
Mode Preset	CTRL+M
User Preset	CTRL+U
Print	CTRL+P
File	CTRL+SHIFT+L
Mode	CTRL+SHIFT+M
Measure	CTRL+ALT+M
Mode Setup	CTRL+SHIFT+E
Meas Setup	CTRL+ALT+E
Trigger	CTRL+SHIFT+T
Sweep/Control	CTRL+SHIFT+W
Restart	CTRL+ALT+R
Single	CTRL+ALT+S
Cont	CTRL+ALT+C
Zoom	CTRL+SHIFT+Z
Next Window	CTRL+SHIFT+N
Split Screen	CTRL+L
Full Screen	CTRL+SHIFT+B
Return	CTRL+SHIFT+R
Mute	Mute
Inc Audio	Volume Up
Dec Audio	Volume Down
Help	F1
Control	CTRL
Alt	ALT
Enter	Return
Cancel	Esc
Del	Delete
Backspace	Backspace
Select	Space
Up Arrow	Up
Down Arrow	Down

Front-panel key	Key code
Left Arrow	Left
Right Arrow	Right
Menu key 1	CTRL+SHIFT+F1
Menu key 2	CTRL+SHIFT+F2
Menu key 3	CTRL+SHIFT+F3
Menu key 4	CTRL+SHIFT+F4
Menu key 5	CTRL+SHIFT+F5
Menu key 6	CTRL+SHIFT+F6
Menu key 7	CTRL+SHIFT+F7
Backspace	BACKSPACE
Enter	ENTER
Tab	Tab
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
0	0

This is a pictorial view of the table:

1 About the Test Set Mouse and Keyboard Control



Instrument Security & Memory Volatility

If you are using the instrument in a secure environment, you may need details of how to clear or sanitize its memory, in compliance with published security standards of the United States Department of Defense, or other similar authorities.

For X-Series test sets, this information is contained in the document "Security Features and Document of Volatility". This document is not included in the instrument on-disk library, but it may be downloaded from the Keysight web site.

To obtain a copy of the document, click on or browse to the following URL:

<http://www.keysight.com/find/security>

To locate and download the document, select Model Number, for example "E6607A", then click "Submit". Then, follow the on-screen instructions to download the file.

2 About the GSM/EDGE Measurement Application

This document provides information on using the GSM/EDGE Measurement Application in the Keysight X series Wireless Communications Test Set.

What Does GSM/EDGE Application Do?

This Mode includes five measurements:

- EDGE Power vs. Time
- EDGE EVM
- EDGE RF Output Spectrum
- GMSK Phase & Frequency
- Burst Power

3 Programming the Test Set

This section provides introductory information about the programming documentation included with your product.

"What Programming Information is Available?" on page 66

"STATus Subsystem " on page 88

"Common Commands" on page 117

What Programming Information is Available?

The X-Series Documentation can be accessed through the Additional Documentation page in the instrument Help system. It can also be found online at: <http://www.keysight.com/find/exf>.

The following resources are available to help you create programs for automating your X-Series measurements:

Resource	Description
X-Series Programmer's Guide	Provides general SCPI programming information on the following topics: • Programming the X-Series Applications • Programming fundamentals • Programming examples Note that SCPI command descriptions for measurement applications are not in this book, but are in the User's and Programmer's Reference.
User's and Programmer's Reference manuals	Describes all front-panel keys and softkeys, including SCPI commands for a measurement application. Note that: • Each measurement application has its own User's and Programmer's Reference. • The content in this manual is duplicated in the analyzer's Help (the Help that you see for a key is identical to what you see in this manual).
Embedded Help in your instrument	Describes all front-panel keys and softkeys, including SCPI commands, for a measurement application. Note that the content that you see in Help when you press a key is identical to what you see in the User's and Programmer's Reference.
X-Series Getting Started Guide	Provides valuable sections related to programming including: • Licensing New Measurement Application Software - After Initial Purchase • Configuring instrument LAN Hostname, IP Address, and Gateway Address • Using the Windows XP Remote Desktop to connect to the instrument remotely • Using the Embedded Web Server Telnet connection to communicate SCPI This printed document is shipped with the instrument.
Keysight Application Notes	Printable PDF versions of pertinent application notes.
Keysight VISA User's Guide	Describes the Keysight Virtual Instrument Software Architecture (VISA) library and shows how to use it to develop I/O applications and instrument drivers on Windows PCs.

List of SCPI Commands

```
*CAL?
*CLS
*ESE <integer>
*ESE?
*ESR?
*IDN?
*OPC
*OPC?
*OPT?
*RCL <register#>
*RST
*SAV <register#>
*SRE <integer>
*SRE?
*STB?
*TRG
*TST?
*WAI
ABORT
CALCulate:BPOWer:MARKer:AOff
CALCulate:BPOWer:MARKer[1]|2|...12:FUNctIon:RESult?
CALCulate:BPOWer:MARKer[1]|2|...12:MODE
CALCulate:BPOWer:MARKer[1]|2|...12:TRACe
CALCulate:BPOWer:MARKer[1]|2|...12:X:POSition
CALCulate:BPOWer:MARKer[1]|2|...12:Y?
CALCulate:CLIMits:FAIL?
CALCulate:DATA<n>:COMPress? BLOCK | CFIT | MAXimum | MINimum | MEAN |
DMEan | RMS | RMSCubed | SAMPLE | SDEVIation | PPHase[, <soffset>[,
<length>[, <roffset>[, <rlimit>]]]]
CALCulate:DATA[n]?
CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>, <excursion>[, AMPLitude |
FREQuency | TIME[, ALL | GTDLine | LTDLine]]
CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>, <excursion>[, AMPLitude |
FREQuency | TIME]
CALCulate:EEVM:LIMit:BTS:EXTRemE:EVMP95 <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:EVMP95?
CALCulate:EEVM:LIMit:BTS:EXTRemE:FERRor <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:FERRor?
CALCulate:EEVM:LIMit:BTS:EXTRemE:IQOOffset <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:IQOOffset?
CALCulate:EEVM:LIMit:BTS:EXTRemE:PEVM <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:PEVM?
CALCulate:EEVM:LIMit:BTS:EXTRemE:PPERror GMSK, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:PPERror? GMSK
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM?
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:HSRate QAM16, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:HSRate QAM32, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:HSRate QPSK, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:HSRate? QAM16
```

```
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:HSRate? QPSK
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:HSRate? QAM32
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate QAM32, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate AQPSK1, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate AQPSK, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate AQPSK2, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate QAM16, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate? QAM16
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate? AQPSK2
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate? QAM32
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate? AQPSK1
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate? AQPSK
CALCulate:EEVM:LIMit:BTS:EXTRemE:RPError GMSK, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:RPError? GMSK
CALCulate:EEVM:LIMit:BTS:NORMal:EVMP95 <real>
CALCulate:EEVM:LIMit:BTS:NORMal:EVMP95?
CALCulate:EEVM:LIMit:BTS:NORMal:FError <real>
CALCulate:EEVM:LIMit:BTS:NORMal:FError?
CALCulate:EEVM:LIMit:BTS:NORMal:IQOOffset <real>
CALCulate:EEVM:LIMit:BTS:NORMal:IQOOffset?
CALCulate:EEVM:LIMit:BTS:NORMal:PEVM <real>
CALCulate:EEVM:LIMit:BTS:NORMal:PEVM?
CALCulate:EEVM:LIMit:BTS:NORMal:PPError GMSK, <real>
CALCulate:EEVM:LIMit:BTS:NORMal:PPError? GMSK
CALCulate:EEVM:LIMit:BTS:NORMal:REVM <real>
CALCulate:EEVM:LIMit:BTS:NORMal:REVM?
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CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate? QAM32
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate? QPSK
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate? QAM16
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CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? QAM16
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? QAM32
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? AQPSK
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? AQPSK1
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? AQPSK2
CALCulate:EEVM:LIMit:BTS:NORMal:RPError GMSK, <real>
CALCulate:EEVM:LIMit:BTS:NORMal:RPError? GMSK
CALCulate:EEVM:LIMit:MBTS:EXTRemE:FError <real>
CALCulate:EEVM:LIMit:MBTS:EXTRemE:FError?
CALCulate:EEVM:LIMit:MBTS:NORMal:FError <real>
CALCulate:EEVM:LIMit:MBTS:NORMal:FError?
CALCulate:EEVM:LIMit:MS:EXTRemE:EVMP95 <real>
CALCulate:EEVM:LIMit:MS:EXTRemE:EVMP95?
CALCulate:EEVM:LIMit:MS:EXTRemE:FError <real>
CALCulate:EEVM:LIMit:MS:EXTRemE:FError?
CALCulate:EEVM:LIMit:MS:EXTRemE:IQOOffset <real>
```



```

CALCulate:EEVM:LIMit:MS:EXTReme:IQOOffset?
CALCulate:EEVM:LIMit:MS:EXTReme:PEVM <real>
CALCulate:EEVM:LIMit:MS:EXTReme:PEVM?
CALCulate:EEVM:LIMit:MS:EXTReme:PPERror GMSK, <real>
CALCulate:EEVM:LIMit:MS:EXTReme:PPERror? GMSK
CALCulate:EEVM:LIMit:MS:EXTReme:REVM <real>
CALCulate:EEVM:LIMit:MS:EXTReme:REVM?
CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate QAM32, <real>
CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate QPSK, <real>
CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate QAM16, <real>
CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate? QAM32
CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate? QPSK
CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate? QAM16
CALCulate:EEVM:LIMit:MS:EXTReme:REVM:NSRate QAM16, <real>
CALCulate:EEVM:LIMit:MS:EXTReme:REVM:NSRate QAM32, <real>
CALCulate:EEVM:LIMit:MS:EXTReme:REVM:NSRate? QAM32
CALCulate:EEVM:LIMit:MS:EXTReme:REVM:NSRate? QAM16
CALCulate:EEVM:LIMit:MS:EXTReme:RPERror GMSK, <real>
CALCulate:EEVM:LIMit:MS:EXTReme:RPERror? GMSK
CALCulate:EEVM:LIMit:MS:NORMal:EVMP95 <real>
CALCulate:EEVM:LIMit:MS:NORMal:EVMP95?
CALCulate:EEVM:LIMit:MS:NORMal:FERRor <real>
CALCulate:EEVM:LIMit:MS:NORMal:FERRor?
CALCulate:EEVM:LIMit:MS:NORMal:IQOOffset <real>
CALCulate:EEVM:LIMit:MS:NORMal:IQOOffset?
CALCulate:EEVM:LIMit:MS:NORMal:PEVM <real>
CALCulate:EEVM:LIMit:MS:NORMal:PEVM?
CALCulate:EEVM:LIMit:MS:NORMal:PPERror GMSK, <real>
CALCulate:EEVM:LIMit:MS:NORMal:PPERror? GMSK
CALCulate:EEVM:LIMit:MS:NORMal:REVM <real>
CALCulate:EEVM:LIMit:MS:NORMal:REVM?
CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate QAM32, <real>
CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate QPSK, <real>
CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate QAM16, <real>
CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate? QAM32
CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate? QAM16
CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate? QPSK
CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate QAM16, <real>
CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate QAM32, <real>
CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate? QAM32
CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate? QAM16
CALCulate:EEVM:LIMit:MS:NORMal:RPERror GMSK, <real>
CALCulate:EEVM:LIMit:MS:NORMal:RPERror? GMSK
CALCulate:EEVM:LIMit:PBTS:EXTReme:FERRor <real>
CALCulate:EEVM:LIMit:PBTS:EXTReme:FERRor?
CALCulate:EEVM:LIMit:PBTS:NORMal:FERRor <real>
CALCulate:EEVM:LIMit:PBTS:NORMal:FERRor?
CALCulate:EEVM:LIMit:TEST[:STATe] OFF | ON | 0 | 1
CALCulate:EEVM:LIMit:TEST[:STATe]?
CALCulate:EEVM:LIMit:TYPE NORMal | EXTReme
CALCulate:EEVM:LIMit:TYPE?
CALCulate:EEVM:MARKer:AOff
CALCulate:EEVM:MARKer:COUPle[:STATe] ON | OFF | 1 | 0

```

```
CALCulate:EEVM:MARKer:COUPle[:STATe]?
CALCulate:EEVM:MARKer[1]|2|...4:FUNCTION:RESult?
CALCulate:EEVM:MARKer[1]|2|...12:MAXimum
CALCulate:EEVM:MARKer[1]|2|...12:MINimum
CALCulate:EEVM:MARKer[1]|2|...12:MODE POSition | DELTa | OFF
CALCulate:EEVM:MARKer[1]|2|...12:MODE?
CALCulate:EEVM:MARKer[1]|2|...12:REFerence <integer>
CALCulate:EEVM:MARKer[1]|2|...12:REFerence?
CALCulate:EEVM:MARKer[1]|2|...12:STATe OFF | ON | 0 | 1
CALCulate:EEVM:MARKer[1]|2|...12:STATe?
CALCulate:EEVM:MARKer[1]|2|...12:TRACE POLar | MERRor | PERRor | EVM |
MAXMerror | MINMerror | MAXPerror | MINPerror | MAXEvm | MINEvm
CALCulate:EEVM:MARKer[1]|2|...12:TRACE?
CALCulate:EEVM:MARKer[1]|2|...12:X <real>
CALCulate:EEVM:MARKer[1]|2|...12:X?
CALCulate:EEVM:MARKer[1]|2|...12:X:POSition <integer>
CALCulate:EEVM:MARKer[1]|2|...12:X:POSition?
CALCulate:EEVM:MARKer[1]|2|...12:Y?
CALCulate:EORFspectr:MARKer:AOFF
CALCulate:EORFspectr:MARKer:COUPle[:STATe] ON | OFF | 1 | 0
CALCulate:EORFspectr:MARKer:COUPle[:STATe]?
CALCulate:EORFspectr:MARKer[1]|2|...|4:FUNCTION:RESult?
CALCulate:EORFspectr:MARKer[1]|2|...|12:MAXimum
CALCulate:EORFspectr:MARKer[1]|2|...|12:MINimum
CALCulate:EORFspectr:MARKer[1]|2|...|12:MODE POSition | DELTa | OFF
CALCulate:EORFspectr:MARKer[1]|2|...|12:MODE?
CALCulate:EORFspectr:MARKer[1]|2|...|12:REFerence <integer>
CALCulate:EORFspectr:MARKer[1]|2|...|12:REFerence?
CALCulate:EORFspectr:MARKer[1]|2|...|12:STATe OFF | ON | 0 | 1
CALCulate:EORFspectr:MARKer[1]|2|...|12:STATe?
CALCulate:EORFspectr:MARKer[1]|2|...|12:TRACE RFEMod | RFESwitching |
SPEMod | LIMMod
CALCulate:EORFspectr:MARKer[1]|2|...|12:TRACE?
CALCulate:EORFspectr:MARKer[1]|2|...|12:X <real>
CALCulate:EORFspectr:MARKer[1]|2|...|12:X?
CALCulate:EORFspectr:MARKer[1]|2|...|12:X:POSition <integer>
CALCulate:EORFspectr:MARKer[1]|2|...|12:X:POSition?
CALCulate:EORFspectr:MARKer[1]|2|...|12:Y?
CALCulate:FPOWER:POWER[1,2,...,999]?
CALCulate:FPOWER:POWER[1,2,...,999]:CONFigure
CALCulate:FPOWER:POWER[1,2,...,999]:DEFine "configurationstring"
CALCulate:FPOWER:POWER[1,2,...,999]:DEFine?
CALCulate:FPOWER:POWER[1,2,...,999]:FETCh?
CALCulate:FPOWER:POWER[1,2,...,999]:INITiate
CALCulate:FPOWER:POWER[1,2,...,999]:READ2?
CALCulate:FPOWER:POWER[1,2,...,999]:READ1?
CALCulate:FPOWER:POWER[1,2,...,999]:READ?
CALCulate:FPOWER:POWER[1,2,...,999]:RESet
CALCulate:PFERRor:LIMit:BTS:FERRor <real>
CALCulate:PFERRor:LIMit:BTS:FERRor?
CALCulate:PFERRor:LIMit:BTS:PPHase <real>
CALCulate:PFERRor:LIMit:BTS:PPHase?
CALCulate:PFERRor:LIMit:BTS:RPHase <real>
```

```

CALCulate:PFError:LIMit:BTs:RPHase?
CALCulate:PFError:LIMit:MBTs:FERRor <real>
CALCulate:PFError:LIMit:MBTs:FERRor?
CALCulate:PFError:LIMit:MS:FERRor <real>
CALCulate:PFError:LIMit:MS:FERRor?
CALCulate:PFError:LIMit:MS:PPHase <real>
CALCulate:PFError:LIMit:MS:PPHase?
CALCulate:PFError:LIMit:MS:RPHase <real>
CALCulate:PFError:LIMit:MS:RPHase?
CALCulate:PFError:LIMit:PBTS:FERRor <real>
CALCulate:PFError:LIMit:PBTS:FERRor?
CALCulate:PFError:LIMit:TEST[:STATe] OFF | ON | 0 | 1
CALCulate:PFError:LIMit:TEST[:STATe]?
CALCulate:PFError:MARKer:AOff
CALCulate:PFError:MARKer:COUPle[:STATe] ON | OFF | 1 | 0
CALCulate:PFError:MARKer:COUPle[:STATe]?
CALCulate:PFError:MARKer[1]|2|...|4:FUNCTION:RESult?
CALCulate:PFError:MARKer[1]|2|...|12:MAXimum
CALCulate:PFError:MARKer[1]|2|...|12:MODE POSition | DELTa | OFF
CALCulate:PFError:MARKer[1]|2|...|12:MODE?
CALCulate:PFError:MARKer[1]|2|...|12:REFerence <integer>
CALCulate:PFError:MARKer[1]|2|...|12:REFerence?
CALCulate:PFError:MARKer[1]|2|...|12:TRACE PERRor | PFError | RFENvelope |
POLar
CALCulate:PFError:MARKer[1]|2|...|12:TRACE?
CALCulate:PFError:MARKer[1]|2|...|12:X <real>
CALCulate:PFError:MARKer[1]|2|...|12:X?
CALCulate:PFError:MARKer[1]|2|...|12:X:POSition <integer>
CALCulate:PFError:MARKer[1]|2|...|12:X:POSition?
CALCulate:PFError:MARKer[1]|2|...|12:Y?
CALCulate:TXPower:MARKer:AOff
CALCulate:TXPower:MARKer:COUPle[:STATe] ON | OFF | 1 | 0
CALCulate:TXPower:MARKer:COUPle[:STATe]?
CALCulate:TXPower:MARKer[1]|2|...|12:FUNCTION:RESult?
CALCulate:TXPower:MARKer[1]|2|...|12:MAXimum
CALCulate:TXPower:MARKer[1]|2|...|12:MODE POSition | DELTa | OFF
CALCulate:TXPower:MARKer[1]|2|...|12:MODE?
CALCulate:TXPower:MARKer[1]|2|...|12:REFerence <integer>
CALCulate:TXPower:MARKer[1]|2|...|12:REFerence?
CALCulate:TXPower:MARKer[1]|2|...|12:TRACE RFENvelope | MAXHold | MINHold
CALCulate:TXPower:MARKer[1]|2|...|12:TRACE?
CALCulate:TXPower:MARKer[1]|2|...|12:X:POSition <real>
CALCulate:TXPower:MARKer[1]|2|...|12:X:POSition?
CALCulate:TXPower:MARKer[1]|2|...|12:Y?
CALibration[:ALL]
CALibration[:ALL]?
CALibration[:ALL]:NPENding
CALibration:EXPIred?
CALibration:IF
CALibration:IF?
CALibration:IF:NPENding
CALibration:INTernal:SOURce[:ALL]
CALibration:INTernal:SOURce[:ALL]?

```

```
CALibration:INTernal:SOURce[:ALL]:NPENding
CALibration:NRF
CALibration:NRF?
CALibration:NRF:NPENding
CALibration:RF
CALibration:RF?
CALibration:RF:NPENding
CALibration:TEMPerature:CURRent?
CALibration:TEMPerature:LALL?
CALibration:TEMPerature:LIF?
CALibration:TEMPerature:LRF?
CALibration:TIME:LALL?
CALibration:TIME:LIF?
CALibration:TIME:LRF?
CONF FSC
CONFigure?
CONFigure:EEVM
CONFigure:EEVM
CONFigure:EEVM:NDEFault
CONFigure:EORFspectr
CONFigure:EORFspectr
CONFigure:EORFspectr:NDEFault
CONFigure:EPVTime
CONFigure:EPVTime:NDEFault
CONFigure:PFError
CONFigure:PFError
CONFigure:PFError:NDEFault
CONFigure:TXPower
CONFigure:TXPower|BPOWer
CONFigure:TXPower|BPOWer:NDEFault
COUPle ALL | NONE
DISPlay:<measurement>:ANNotation:TITLe:DATA <string>
DISPlay:<measurement>:ANNotation:TITLe:DATA?
DISPlay:ACTivefunc[:STATe] ON | OFF | 1 | 0
DISPlay:ACTivefunc[:STATe]?
DISPlay:ANNotation:MBAR[:STATe] OFF | ON | 0 | 1
DISPlay:ANNotation:MBAR[:STATe]?
DISPlay:ANNotation:SCReen[:STATe] OFF | ON | 0 | 1
DISPlay:ANNotation:SCReen[:STATe]?
DISPlay:EEVM:SDERotation[:STATe] OFF | ON | 0 | 1
DISPlay:EEVM:SDERotation[:STATe]?
DISPlay:EEVM:SDOTs[:STATe] OFF | ON | 0 | 1
DISPlay:EEVM:SDOTs[:STATe]?
DISPlay:EEVM:TEXT:TFUNit SEConD | SYMBol
DISPlay:EEVM:TEXT:TFUNit?
DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MAXHold[:STATe] ON | OFF | 1 | 0
DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MAXHold[:STATe]?
DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MINHold[:STATe] ON | OFF | 1 | 0
DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MINHold[:STATe]?
DISPlay:EEVM:VIEW[1]:WINDow2:TRACe:POLar VC | VECTOR | CONSTln
DISPlay:EEVM:VIEW[1]:WINDow2:TRACe:POLar?
DISPlay:EORFspectr:VIEW:NSElect <integer>
DISPlay:EORFspectr:VIEW:NSElect?
```

```

DISPlay:EORFspectr:VIEW[:SElect] RSUMmary | CINformation
DISPlay:EORFspectr:VIEW[:SElect]?
DISPlay:PFErrorr:BDOTs[:STATe] ON | OFF | 1 | 0
DISPlay:PFErrorr:BDOTs[:STATe]?
DISPlay:PFErrorr:VIEW:NSElect <integer>
DISPlay:PFErrorr:VIEW:NSElect?
DISPlay:PFErrorr:VIEW[:SElect] POLar | ERRor | DBITs
DISPlay:PFErrorr:VIEW[:SElect]?
DISPlay:PFErrorr:VIEW[1]:WINDow2:TRACe:POLar VC | VECTor | CONSTln
DISPlay:PFErrorr:VIEW[1]:WINDow2:TRACe:POLar?
DISPlay:PFErrorr:VIEW[1]:WINDow[1]|2|3:TRACe:X[:SCALe]:COUPle ON | OFF | 1
| 0
DISPlay:PFErrorr:VIEW[1]:WINDow[1]|2|3:TRACe:X[:SCALe]:COUPle?
DISPlay:PFErrorr:VIEW[1]:WINDow3:TRACe:X[:SCALe]:PDIVision <time>
DISPlay:PFErrorr:VIEW[1]:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision <real>
DISPlay:PFErrorr:VIEW[1]:WINDow3:TRACe:X[:SCALe]:PDIVision?
DISPlay:PFErrorr:VIEW[1]:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision?
DISPlay:PFErrorr:VIEW[1]:WINDow3:TRACe:X[:SCALe]:RLEVel <time>
DISPlay:PFErrorr:VIEW[1]:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel <real>
DISPlay:PFErrorr:VIEW[1]:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel?
DISPlay:PFErrorr:VIEW[1]:WINDow3:TRACe:X[:SCALe]:RLEVel?
DISPlay:PFErrorr:VIEW[1]:WINDow[1]|2|3:TRACe:X[:SCALe]:RPOSition LEFT |
CENTER | RIGHT
DISPlay:PFErrorr:VIEW[1]:WINDow[1]|2|3:TRACe:X[:SCALe]:RPOSition?
DISPlay:PFErrorr:VIEW[1]:WINDow[1]|2|3:TRACe:Y[:SCALe]:COUPle ON | OFF | 1 |
0
DISPlay:PFErrorr:VIEW[1]:WINDow[1]|2|3:TRACe:Y[:SCALe]:COUPle?
DISPlay:PFErrorr:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision <real>
DISPlay:PFErrorr:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:PDIVision <rel_ampl>
DISPlay:PFErrorr:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:PDIVision?
DISPlay:PFErrorr:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision?
DISPlay:PFErrorr:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:RLEVel <real>
DISPlay:PFErrorr:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel <real>
DISPlay:PFErrorr:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel?
DISPlay:PFErrorr:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:RLEVel?
DISPlay:PFErrorr:VIEW[1]:WINDow[1]|2|3:TRACe:Y[:SCALe]:RPOSition TOP |
CENTER | BOTTom
DISPlay:PFErrorr:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition?
DISPlay:TXPower:BARGraph[:STATe] ON | OFF | 1 | 0
DISPlay:TXPower:BARGraph[:STATe]?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe] ON | OFF | 1 | 0
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe]?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe] ON | OFF | 1 | 0
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe]?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle 0 | 1 | OFF | ON
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT | CENTER
| RIGHT

```

```
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0 | 1 | OFF | ON
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP | CENTER |
BOTTom
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?
DISPlay:WINDow[1]:ANNOtation[:ALL] OFF | ON | 0 | 1
DISPlay:WINDow[1]:ANNOtation[:ALL]?
DISPlay:WINDow:FORMat:TILE
DISPlay:WINDow:FORMat:ZOOM
DISPlay:WINDow[:SElect] <number>
DISPlay:WINDow[:SElect]?
DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATE] OFF | ON | 0 | 1
DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATE]?
FETCh:EEVM[n]?
FETCh:EORFspectr[n]?
FETCh:EPVTime[n]?
FETCh:PFERror[n]?
FETCh:TXPower|BPOWER[n]?
FORMat:BORDER NORMAL | SWAPped
FORMat:BORDER?
FORMat[:TRACe][:DATA] ASCii | INTeger, 32 | REAL, 32 | REAL, 64
FORMat[:TRACe][:DATA]?
GLOBal:DEFault
GLOBal:FREQuency:CENTer[:STATE] 1 | 0 | ON | OFF
GLOBal:FREQuency:CENTer[:STATE]?
HCOpy:ABORT
HCOpy[:IMMediate]
INITiate:CONTinuous OFF | ON | 0 | 1
INITiate:CONTinuous?
INITiate:EEVM
INITiate:EORFspectr
INITiate:EPVTime
INITiate[:IMMediate]
INITiate:PAUSE
INITiate:PFERror
INITiate:REStArt
INITiate:RESume
INITiate:TXPower|BPOWER
INPut[1]|2:LISN:FILTer:HPAS[:STATE] ON | OFF
INPut[1]|2:LISN:FILTer:HPAS[:STATE]?
INPut[1]|2:LISN:PEARth GROunded | FLOating
INPut[1]|2:LISN:PEARth?
INPut[1]|2:LISN:PHASe L1 | L2 | L3 | N
INPut[1]|2:LISN:PHASe?
INPut[1]|2:LISN[:TYPE] FOURphase | ESH2Z5 | ENV216 | OFF
INPut[1]|2:LISN[:TYPE]?
INPut:MIXer EXTernal | INTernal
INPut:MIXer?
```

```

INST:NSEL 105
INST:NSEL 102
INSTrument:CATalog?
INSTrument:COUPle:DEFault
INSTrument:COUPle:FREQuency:CENTer ALL | NONE
INSTrument:COUPle:FREQuency:CENTer?
INSTrument:DEFault
INSTrument:NSElect <integer>
INSTrument:NSElect?
INSTrument[:SElect] GSM
INSTrument[:SElect] SA | RTSA | SEQAN | EMI | BASIC | WCDMA | EDGE | GSM |
WIMAXOFDMA | VSA | PNOISE | NFIGure | ADEMOD | BTooth | TDSCDMA | CDMA2K |
CDMA1XEV | LTE | LTETDD | LTEAFDD | LTEATDD | MSR | DVB | DTMB | DCTV |
ISDBT | CMMB | WLAN | CWLAN | CWIMAXOFDM | WIMAXFIXED | IDEN | RLC |
SCPILC | VSA89601
INSTrument[:SElect] SANalyzer
INSTrument[:SElect] 'SA' | 'PNOISE' | 'EDGE' | 'GSM' | 'BASIC'
INSTrument[:SElect] RECeiver
INSTrument[:SElect]?
INST:SEL LTE
INST:SEL EMI
INST:SEL SCPILC
INST:SEL LTETDD
MEASure:EEVM[n]?
MEASure:EORFspectr[n]?
MEASure:EPVTime[n]?
MEASure:PFError[n]?
MEASure:TXPower|BPOWer[n]?
MMEMemory:CATalog? [<directory_name>]
MMEMemory:CDIRectory [<directory_name>]
MMEMemory:CDIRectory?
MMEMemory:COPY <string>, <string>[, <string>, <string>]
MMEMemory:COPY:DEvIce <source_string>, <dest_string>
MMEMemory:DATA <file_name>, <data>
MMEMemory:DATA? <file_name>
MMEMemory:DELeTe <file_name>[, <directory_name>]
MMEMemory:HEADer:ID? "<filename>"
MMEMemory:LOAD:SEQuences:| SLIST | ALIST | SAALIST | "MySequence.txt"
MMEMemory:LOAD:STATe 1, <filename>
MMEMemory:LOAD:STATe <filename>
MMEMemory:MDIRectory <directory_name>
MMEMemory:MOVE <string>, <string>[, <string>, <string>]
MMEMemory:RDIRectory <directory_name>
MMEMemory:REGister:STATe:LABel <regnumber>, "label"
MMEMemory:REGister:STATe:LABel? <regnumber>
MMEMemory:STORe:RESults <string>
MMEMemory:STORe:RESults:MTABLE|PTABLE|SPECTrogram <filename>
MMEMemory:STORe:SCReen <filename>
MMEMemory:STORe:SCReen:THEMe TDCOLOR | TDMonochrome | FCOLOR | FMONochrome
MMEMemory:STORe:SCReen:THEMe?
MMEMemory:STORe:STATe 1, <filename>
MMEMemory:STORe:STATe <filename>

```

```
MMEM:STOR:SEquences:| SList | AList | SAAList | SStep"MySequence.txt"
OUTPut[:EXternal][:STATe] ON | OFF | 1 | 0
OUTPut[:EXternal][:STATe]?
OUTPut:MODulation[:STATe] ON | OFF | 1 | 0
OUTPut:MODulation[:STATe]?
READ:EEVM[n]?
READ:EORFspectr[n]?
READ:EPVTime[n]?
READ:PFERror[n]?
READ:TXPower|BPOWer[n]?
[:SENSe]:<measurement>:TRIGger:SOURce
[:SENSe]:<measurement>:TRIGger:SOURce IF
[:SENSe]:ACPR:TRIGger:SOURce
[:SENSe]:BPOWer:AVERAge:COUNt
[:SENSe]:BPOWer:AVERAge:TCONtrol
[:SENSe]:BPOWer:AVERAge:TYPE
[:SENSe]:BPOWer:METHod
[:SENSe]:BPOWer:THReshold
[:SENSe]:CHANnel:ARFCn|RFCHannel <integer>
[:SENSe]:CHANnel:ARFCn|RFCHannel?
[:SENSe]:CHANnel:ARFCn|RFCHannel:BOTTom
[:SENSe]:CHANnel:ARFCn|RFCHannel:MIDDLE
[:SENSe]:CHANnel:ARFCn|RFCHannel:TOP
[:SENSe]:CHANnel:BURSt NORMAl | SYNC | ACCess | HSRate | MIXed
[:SENSe]:CHANnel:BURSt?
[:SENSe]:CHANnel:CARRier:BASE:CLASs SC | MC
[:SENSe]:CHANnel:CARRier:BASE:CLASs?
[:SENSe]:CHANnel:CARRier:BASE:CLASs:AUTO ON | OFF | 1 | 0
[:SENSe]:CHANnel:CARRier:BASE:CLASs:AUTO?
[:SENSe]:CHANnel:CARRier:COUNt <integer>
[:SENSe]:CHANnel:CARRier:COUNt?
[:SENSe]:CHANnel:CARRier:FALLocation
[:SENSe]:CHANnel:CARRier:FALLocation?
[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:ABPoint <integer>
[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:ABPoint?
[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:FSEParation <freq>
[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:FSEParation?
[:SENSe]:CHANnel:CARRier:LIST:COUPle OFF | ON | 0 | 1, ...
[:SENSe]:CHANnel:CARRier:LIST:COUPle?
[:SENSe]:CHANnel:CARRier:LIST:INTerval <freq>, ...
[:SENSe]:CHANnel:CARRier:LIST:INTerval?
[:SENSe]:CHANnel:CARRier:LIST:PPResent YES | NO, ...
[:SENSe]:CHANnel:CARRier:LIST:PPResent?
[:SENSe]:CHANnel:CARRier:RCARRier <integer>
[:SENSe]:CHANnel:CARRier:RCARRier?
[:SENSe]:CHANnel:SLOT <integer>
[:SENSe]:CHANnel:SLOT?
[:SENSe]:CHANnel:SLOT:AUTO OFF | ON | 0 | 1
[:SENSe]:CHANnel:SLOT:AUTO?
[:SENSe]:CHANnel:TSCode <integer>
[:SENSe]:CHANnel:TSCode?
[:SENSe]:CHANnel:TSCode:AUTO OFF | ON | 0 | 1
[:SENSe]:CHANnel:TSCode:AUTO?
```



```
[ :SENSe]:EEVM:AVERAge:COUNT <integer>
[ :SENSe]:EEVM:AVERAge:COUNT?
[ :SENSe]:EEVM:AVERAge[:STATe] OFF | ON | 0 | 1
[ :SENSe]:EEVM:AVERAge[:STATe]?
[ :SENSe]:EEVM:AVERAge:TCONtrol EXPonential | REPeat
[ :SENSe]:EEVM:AVERAge:TCONtrol?
[ :SENSe]:EEVM:BSYNc:PMODulation:ALIGNment OFF | ON | 0 | 1
[ :SENSe]:EEVM:BSYNc:PMODulation:ALIGNment?
[ :SENSe]:EEVM:BSYNc:SOURce TSEQuence | RFBurst | PMODulation | NONE
[ :SENSe]:EEVM:BSYNc:SOURce?
[ :SENSe]:EEVM:DROop OFF | ON | 0 | 1
[ :SENSe]:EEVM:DROop?
[ :SENSe]:EEVM:FERRor:TRANge WIDE | NORMal
[ :SENSe]:EEVM:FERRor:TRANge?
[ :SENSe]:EEVM:SDOTs[:STATe]
[ :SENSe]:EORFspectr:AVERAge:COUNT <integer>
[ :SENSe]:EORFspectr:AVERAge:COUNT?
[ :SENSe]:EORFspectr:AVERAge:FAST[:STATe] OFF | ON | 0 | 1
[ :SENSe]:EORFspectr:AVERAge:FAST[:STATe]?
[ :SENSe]:EORFspectr:AVERAge:MODulation:TYPE LOG | RMS
[ :SENSe]:EORFspectr:AVERAge:MODulation:TYPE?
[ :SENSe]:EORFspectr:AVERAge:MODulation:TYPE:LOG[:BTS]
[ :SENSe]:EORFspectr:AVERAge:MODulation:TYPE:LOG[:BTS]?
[ :SENSe]:EORFspectr:AVERAge:MODulation:TYPE:LOG:MS
[ :SENSe]:EORFspectr:AVERAge:MODulation:TYPE:LOG:MS?
[ :SENSe]:EORFspectr:AVERAge[:STATe] OFF | ON | 0 | 1
[ :SENSe]:EORFspectr:AVERAge[:STATe]?
[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:CARRier <freq>
[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:CARRier?
[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:CARRier:AUTO OFF |
ON | 0 | 1
[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:CARRier:AUTO?
[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:CLOSe <freq>
[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:CLOSe?
[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:FAR[1] <freq>
[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:FAR[1]?
[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:IM:FAR2
<freq>
[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:IM:FAR2?
[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:CARRier <freq>
[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:CARRier?
[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:CLOSe <freq>
[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:CLOSe?
[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:FAR <freq>
[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:FAR?
[ :SENSe]:EORFspectr:BFRequency <freq>
[ :SENSe]:EORFspectr:BFRequency?
[ :SENSe]:EORFspectr:BWIDth[:RESolution]:MODulation:CARRier
[ :SENSe]:EORFspectr:BWIDth[:RESolution]:MODulation:OFFSet:CLOSe
[ :SENSe]:EORFspectr:BWIDth[:RESolution]:MODulation:OFFSet:FAR
[ :SENSe]:EORFspectr:BWIDth[:RESolution]:SWITching:CARRier
[ :SENSe]:EORFspectr:BWIDth[:RESolution]:SWITching:OFFSet:CLOSe
[ :SENSe]:EORFspectr:BWIDth[:RESolution]:SWITching:OFFSet:FAR
```

```
[:SENSe]:EORFspectr:CARRier:PREFerence:TYPE REF | MAX
[:SENSe]:EORFspectr:CARRier:PREFerence:TYPE?
[:SENSe]:EORFspectr:DETEctor:SWITching:FAST[:STATe] ON | OFF | 1 | 0
[:SENSe]:EORFspectr:DETEctor:SWITching:FAST[:STATe]?
[:SENSe]:EORFspectr:IMPOrder <integer>
[:SENSe]:EORFspectr:IMPOrder?
[:SENSe]:EORFspectr:LIST:MODulation:APPLy RELative|BOTH|ABSolute, ...
[:SENSe]:EORFspectr:LIST:MODulation:APPLy?
[:SENSe]:EORFspectr:LIST:MODulation:BANDwidth <freq>, ...
[:SENSe]:EORFspectr:LIST:MODulation:BANDwidth?
[:SENSe]:EORFspectr:LIST:MODulation:BWIDth
[:SENSe]:EORFspectr:LIST:MODulation[:FREQuency] <freq>, ...
[:SENSe]:EORFspectr:LIST:MODulation[:FREQuency]?
[:SENSe]:EORFspectr:LIST:MODulation:LOFFset:ABSolute <rel_ampl>, ...
[:SENSe]:EORFspectr:LIST:MODulation:LOFFset:ABSolute?
[:SENSe]:EORFspectr:LIST:MODulation:LOFFset[:RCARrier] <rel_ampl>, ...
[:SENSe]:EORFspectr:LIST:MODulation:LOFFset[:RCARrier]?
[:SENSe]:EORFspectr:LIST:MODulation:STATE OFF|ON|0|1, ...
[:SENSe]:EORFspectr:LIST:MODulation:STATE?
[:SENSe]:EORFspectr:LIST:SELEct CUSTom | SHORT | STANDARD | LCUSTom
[:SENSe]:EORFspectr:LIST:SELEct?
[:SENSe]:EORFspectr:LIST:SWITching:APPLy RELative|BOTH|ABSolute, ...
[:SENSe]:EORFspectr:LIST:SWITching:APPLy?
[:SENSe]:EORFspectr:LIST:SWITching:BANDwidth <freq>, ...
[:SENSe]:EORFspectr:LIST:SWITching:BANDwidth?
[:SENSe]:EORFspectr:LIST:SWITching:BWIDth
[:SENSe]:EORFspectr:LIST:SWITching[:FREQuency] <freq>, ...
[:SENSe]:EORFspectr:LIST:SWITching[:FREQuency]?
[:SENSe]:EORFspectr:LIST:SWITching:LOFFset:ABSolute <rel_ampl>, ...
[:SENSe]:EORFspectr:LIST:SWITching:LOFFset:ABSolute?
[:SENSe]:EORFspectr:LIST:SWITching:LOFFset[:RCARrier] <rel_ampl>, ...
[:SENSe]:EORFspectr:LIST:SWITching:LOFFset[:RCARrier]?
[:SENSe]:EORFspectr:LIST:SWITching:STATE OFF|ON|0|1, ...
[:SENSe]:EORFspectr:LIST:SWITching:STATE?
[:SENSe]:EORFspectr:MCARrier:BEXTension <freq>
[:SENSe]:EORFspectr:MCARrier:BEXTension?
[:SENSe]:EORFspectr:MCARrier:LCUSTom:LIST:COFREquency <freq>, ...
[:SENSe]:EORFspectr:MCARrier:LCUSTom:LIST:COFREquency?
[:SENSe]:EORFspectr:MCARrier:LEXception:LIST:FREQuency <freq>, ...
[:SENSe]:EORFspectr:MCARrier:LEXception:LIST:FREQuency?
[:SENSe]:EORFspectr:MCARrier:LEXception:RULE FIXEd | CUSTom
[:SENSe]:EORFspectr:MCARrier:LEXception:RULE?
[:SENSe]:EORFspectr:MCARrier:LEXception[:STATe] OFF | ON | 0 | 1
[:SENSe]:EORFspectr:MCARrier:LEXception[:STATe]?
[:SENSe]:EORFspectr:MEASure MULTiple | SINGLE | SWEPT
[:SENSe]:EORFspectr:MEASure?
[:SENSe]:EORFspectr:MODulation:RPOWER <ampl>
[:SENSe]:EORFspectr:MODulation:RPOWER?
[:SENSe]:EORFspectr:MODulation:RPOWER:AUTO[:STATe] OFF | ON | 0 | 1
[:SENSe]:EORFspectr:MODulation:RPOWER:AUTO[:STATe]?
[:SENSe]:EORFspectr:NCONTiguous:REGion INNER | OUTER
[:SENSe]:EORFspectr:NCONTiguous:REGion?
[:SENSe]:EORFspectr:OFREquency <freq>
```

```
[ :SENSe]:EORFspectr:OFRequency?
[ :SENSe]:EORFspectr:REFeRence:AVErAge[:AUtO] ON | OFF | 1 | 0
[ :SENSe]:EORFspectr:REFeRence:AVErAge[:AUtO]?
[ :SENSe]:EORFspectr:REFeRence:AVErAge:COUnT <integer>
[ :SENSe]:EORFspectr:REFeRence:AVErAge:COUnT?
[ :SENSe]:EORFspectr:SWITching:RPOWer
[ :SENSe]:EORFspectr:SWITching:RPOWer <ampl>
[ :SENSe]:EORFspectr:SWITching:RPOWer:AUTO[:STATe] OFF | ON | 0 | 1
[ :SENSe]:EORFspectr:SWITching:RPOWer:AUTO[:STATe]?
[ :SENSe]:EORFspectr:SWITching:RPOWer:TYPE AVErAge | MAXHold
[ :SENSe]:EORFspectr:SWITching:RPOWer:TYPE?
[ :SENSe]:EORFspectr:TYPE MODulation | MSWitching | SWITching |
FFModulation
[ :SENSe]:EORFspectr:TYPE?
[ :SENSe]:EORFspectr:TYPE:MODulation[:METHod] DISCrete | SWEEp
[ :SENSe]:EORFspectr:TYPE:MODulation[:METHod]?
[ :SENSe]:EORFspectr:WBNoise ON | OFF | 1 | 0
[ :SENSe]:EORFspectr:WBNoise?
[ :SENSe]:FEED RF | AIQ | EMIXer
[ :SENSe]:FEED IQ | IONLy | QONLy
[ :SENSe]:FEED AREFeRence
[ :SENSe]:FEED?
[ :SENSe]:FEED?
[ :SENSe]:FREQuency:CENTer <freq>
[ :SENSe]:FREQuency:CENTer?
[ :SENSe]:FREQuency:EMIXer:CENTer <freq>
[ :SENSe]:FREQuency:EMIXer:CENTer?
[ :SENSe]:FREQuency:IQ:CENTer <freq>
[ :SENSe]:FREQuency:IQ:CENTer?
[ :SENSe]:FREQuency:RF:CENTer <freq>
[ :SENSe]:FREQuency:RF:CENTer?
[ :SENSe]:PFERror:AVErAge:COUnT <integer>
[ :SENSe]:PFERror:AVErAge:COUnT?
[ :SENSe]:PFERror:AVErAge[:STATe] OFF | ON | 0 | 1
[ :SENSe]:PFERror:AVErAge[:STATe]?
[ :SENSe]:PFERror:AVErAge:TCONtrol EXPOntial | REPeat
[ :SENSe]:PFERror:AVErAge:TCONtrol?
[ :SENSe]:PFERror:AVErAge:TYPE MEAN | MAXimum
[ :SENSe]:PFERror:AVErAge:TYPE?
[ :SENSe]:PFERror:BSYNc:SOURce RFBurst | TSEquence
[ :SENSe]:PFERror:BSYNc:SOURce?
[ :SENSe]:POWer[:RF]:RANGe <real>
[ :SENSe]:POWer[:RF]:RANGe?
[ :SENSe]:POWer[:RF]:RANGe:MIXer:OFFSet <real>
[ :SENSe]:POWer[:RF]:RANGe:MIXer:OFFSet?
[ :SENSe]:POWer[:RF]:RANGe:OPTimize IMMEDIATE
[ :SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation OFF | ON | ELEctrical |
COMBined
[ :SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation?
[ :SENSe]:POWer[:RF]:RANGe:PARatio <real>
[ :SENSe]:POWer[:RF]:RANGe:PARatio?
[ :SENSe]:RADio:CARRier:NUMBer SINGLE | MULTiple
[ :SENSe]:RADio:CARRier:NUMBer?
```

```
[ :SENSe]:RADio:CARRier:NUMBER:AUTO ON | OFF | 1 | 0
[ :SENSe]:RADio:CARRier:NUMBER:AUTO?
[ :SENSe]:TXPower:AVERAge:COUNT <integer>
[ :SENSe]:TXPower:AVERAge:COUNT?
[ :SENSe]:TXPower:AVERAge[:STATe] OFF | ON | 0 | 1
[ :SENSe]:TXPower:AVERAge[:STATe]?
[ :SENSe]:TXPower:AVERAge:TCONtrol EXPonential | REPeat
[ :SENSe]:TXPower:AVERAge:TCONtrol?
[ :SENSe]:TXPower:AVERAge:TYPE LOG | MAXimum | MINimum | RMS
[ :SENSe]:TXPower:AVERAge:TYPE?
[ :SENSe]:TXPower:BANDwidth[:RESolution] <bandwidth>
[ :SENSe]:TXPower:BANDwidth[:RESolution]?
[ :SENSe]:TXPower:BANDwidth:TYPE GAUSSian | FLATtop
[ :SENSe]:TXPower:BANDwidth:TYPE?
[ :SENSe]:TXPower:BURSt:AUTO ON | OFF | 1 | 0
[ :SENSe]:TXPower:BURSt:AUTO?
[ :SENSe]:TXPower:BURSt:WIDTh <time>
[ :SENSe]:TXPower:BURSt:WIDTh?
[ :SENSe]:TXPower:BWIDth[:RESolution]
[ :SENSe]:TXPower:BWIDth:TYPE
[ :SENSe]:TXPower:METHod THReshold | BWIDth
[ :SENSe]:TXPower:METHod?
[ :SENSe]:TXPower:SWEep:TIME <integer>
[ :SENSe]:TXPower:SWEep:TIME?
[ :SENSe]:TXPower:THReshold <real>
[ :SENSe]:TXPower:THReshold?
[ :SENSe]:TXPower:THReshold:TYPE ABSolute | RELative
[ :SENSe]:TXPower:THReshold:TYPE?
SOURce:AM[:DEPTh][:LINear]
SOURce:AM[:DEPTh][:LINear]?
SOURce:AM:INTernal:FREQuency
SOURce:AM:INTernal:FREQuency?
SOURce:AM:STATe
SOURce:AM:STATe?
SOURce:FM[:DEViation]
SOURce:FM[:DEViation]?
SOURce:FM:INTernal:FREQuency
SOURce:FM:INTernal:FREQuency?
SOURce:FM:STATe
SOURce:FM:STATe?
SOURce:FREQuency:CHANnels:BAND NONE | PGSM | EGSM | RGSM | DCS1800 |
PCS1900 | TGSM810 | GSM450 | GSM480 | GSM700 | GSM850 | BANDI | BANDII |
BANDIII | BANDIV | BANDV | BANDVI | BANDVII | BANDVIII | BANDIX | BANDX |
BANDXI | BANDXII | BANDXIII | BANDXIV | BANDXIX | USCELL | USPCS | JAPAN |
KOREAN | NMT | IMT2K | UPPER | SECOND | PAMR400 | PAMR800 | IMTEXT |
PCS1DOT9G | AWS | US2DOT5G | PUBLIC | LOWER | BAND1 | BAND2 | BAND3 |
BAND4 | BAND5 | BAND6 | BAND7 | BAND8 | BAND10 | BAND11 | BAND12 | BAND13 |
BAND14 | BAND17 | BAND18 | BAND19 | BAND20 | BAND21 | BAND24 | BAND25 |
BAND26 | BAND27 | BAND28 | BAND29 | BAND30 | BAND31 | BAND33 | BAND34 |
BAND35 | BAND36 | BAND37 | BAND38 | BAND39 | BAND40 | BAND41 | BAND42 |
BAND43 | BAND44 | BANDA | BANDB | BANDC | BANDD | BANDE | BANDF
SOURce:FREQuency:CHANnels:BAND?
```

```

SOURce:FREQuency:CHANnels:NUMBer <int>
SOURce:FREQuency:CHANnels:NUMBer?
SOURce:FREQuency[:CW] <freq>
SOURce:FREQuency[:CW]?
SOURce:FREQuency:OFFSet <freq>
SOURce:FREQuency:OFFSet?
SOURce:FREQuency:REFeRence <freq>
SOURce:FREQuency:REFeRence?
SOURce:FREQuency:REFeRence:SEt
SOURce:FREQuency:REFeRence:StAte OFF | ON | 0 | 1
SOURce:FREQuency:REFeRence:StAte?
SOURce:LIST:INITiation:ARMed?
SOURce:LIST:NUMBer:StEPs <integer>
SOURce:LIST:NUMBer:StEPs?
SOURce:LIST:SEtUp:AMPLitude <ampl>, <ampl>, <ampl>, ...
SOURce:LIST:SEtUp:AMPLitude?
SOURce:LIST:SEtUp:CLear
SOURce:LIST:SEtUp:CNFRequency <double>, <double>, <double>, ...
SOURce:LIST:SEtUp:CNFRequency?
SOURce:LIST:SEtUp:DURation:TYPE <enum>, <enum>, <enum>, ...
SOURce:LIST:SEtUp:DURation:TYPE?
SOURce:LIST:SEtUp:INPut:TRIGger <enum>, <enum>, <enum>, ...
SOURce:LIST:SEtUp:INPut:TRIGger?
SOURce:LIST:SEtUp:OUTPut:TRIGger ?
SOURce:LIST:SEtUp:OUTPut:TRIGger <bool>, <bool>, <bool>, ...
SOURce:LIST:SEtUp:RADio:BAND <enum>, <enum>, <enum>, ...
SOURce:LIST:SEtUp:RADio:BAND?
SOURce:LIST:SEtUp:RADio:BAND:LINK <enum>, <enum>, <enum>, ...
SOURce:LIST:SEtUp:RADio:BAND:LINK?
SOURce:LIST:SEtUp:TOCount <time/int>, <time/int>, <time/int>, ...
SOURce:LIST:SEtUp:TOCount?
SOURce:LIST:SEtUp:TRANSition:TIME <time>, <time>, <time>, ...
SOURce:LIST:SEtUp:TRANSition:TIME?
SOURce:LIST:SEtUp:WAVEform <string>, <string>, <string>, ...
SOURce:LIST:SEtUp:WAVEform?
SOURce:LIST[:StAte] ON | OFF | 1 | 0
SOURce:LIST[:StAte]?
SOURce:LIST:StEP[1]|2|...|4..1000:SEtUp IMMEdiate | INTernal | KEY | BUS |
EXtErnal2, <time>, NONE | PGSM | EGSM | RGSM | DCS1800 | PCS1900 | TGSM810
| GSM450 | GSM480 | GSM700 | GSM850 | BANDI | BANDII | BANDIII | BANDIV |
BANDV | BANDVI | BANDVII | BANDVIII | BANDIX | BANDX | BANDXI | BANDXII |
BANDXIII | BANDXIV | BANDXIX | USCELL | USPCS | JAPAN | KOREAN | NMT |
IMT2K | UPPER | SECOND | PAMR400 | PAMR800 | IMTEXT | PCS1DOT9G | AWS |
US2DOT5G | PUBLIC | LOWER | NONE | BAND1 | BAND2 | BAND3 | BAND4 | BAND5 |
BAND6 | BAND7 | BAND8 | BAND10 | BAND11 | BAND12 | BAND13 | BAND14 |
BAND17 | BAND18 | BAND19 | BAND20 | BAND21 | BAND24 | BAND25 | BAND26 |
BAND33 | BAND34 | BAND35 | BAND36 | BAND37 | BAND38 | BAND39 | BAND40 |
BAND41 | BAND42 | BAND43 | BANDA | BANDB | BANDC | BANDD | BANDE | BANDF,
DOWN | UP, <freq>, <ampl>, <string>, TIME | COUNT | CONTinuous, <time>, ON
| OFF | 1 | 0, [<int>],
SOURce:LIST:StEP[1]|2|...|4..1000:SEtUp?
SOURce:LIST:StEP[1]|2|3...1000:SEtUp:AMPLitude <double>

```

```
SOURce:LIST:STEP[1]|2|3...1000:SETup:AMPLitude?
SOURce:LIST:STEP[1]|2|3...1000:SETup:CNFRequency <double>
SOURce:LIST:STEP[1]|2|3...1000:SETup:CNFRequency <double>
SOURce:LIST:STEP[1]|2|3...1000:SETup:CNFRequency?
SOURce:LIST:STEP[1]|2|3...1000:SETup:CNFRequency?
SOURce:LIST:STEP[1]|2|3...1000:SETup:DURation:TCOunt <double>
SOURce:LIST:STEP[1]|2|3...1000:SETup:DURation:TCOunt?
SOURce:LIST:STEP[1]|2|3...1000:SETup:DURation:TYPE TIME | COUNT |
CONTinuous | CABort
SOURce:LIST:STEP[1]|2|3...1000:SETup:DURation:TYPE?
SOURce:LIST:STEP[1]|2|3...1000:SETup:INPut:TRIGger IMMEDIATE | INTERNAL |
EXtERnal2 | KEY | BUS | EXtERnal4
SOURce:LIST:STEP[1]|2|3...1000:SETup:INPut:TRIGger?
SOURce:LIST:STEP[1]|2|3...1000:SETup:OUTPut:TRIGger ON | OFF | 1 | 0
SOURce:LIST:STEP[1]|2|3...1000:SETup:OUTPut:TRIGger
SOURce:LIST:STEP[1]|2|3...1000:SETup:RADio:BAND NONE | PGSM | EGSM | RGSM
| DCS1800 | PCS1900 | TGSM810 | GSM450 | GSM480 | GSM700 | GSM850 | BANDI
| BANDII | BANDIII | BANDIV | BANDV | BANDVI | BANDVII | BANDVIII | BANDIX
| BANDX | BANDXI | BANDXII | BANDXIII | BANDXIV | BANDXIX | USCELL | USPCS
| JAPAN | KOREAN | NMT | IMT2K | UPPER | SECOND | PAMR400 | PAMR800 |
IMTEXT | PCS1DOT9G | AWS | US2DOT5G | PUBLIC | LOWER | NONE | BAND1 |
BAND2 | BAND3 | BAND4 | BAND5 | BAND6 | BAND7 | BAND8 | BAND10 | BAND11 |
BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 | BAND21 |
BAND24 | BAND25 | BAND26 | BAND27 | BAND28 | BAND29 | BAND30 | BAND31 |
BAND33 | BAND34 | BAND35 | BAND36 | BAND37 | BAND38 | BAND39 | BAND40 |
BAND41 | BAND42 | BAND43 | BAND44 | BANDA | BANDB | BANDC | BANDD | BANDE
| BANDF
SOURce:LIST:STEP[1]|2|3...1000:SETup:RADio:BAND?
SOURce:LIST:STEP[1]|2|3...1000:SETup:RADio:BAND:LINK DOWN | UP
SOURce:LIST:STEP[1]|2|3...1000:SETup:RADio:BAND:LINK?
SOURce:LIST:STEP[1]|2|3...1000:SETup:TRANSition:TIME <time>
SOURce:LIST:STEP[1]|2|3...1000:SETup:TRANSition:TIME?
SOURce:LIST:STEP[1]|2|3...1000:SETup:WAVEform <string>
SOURce:LIST:STEP[1]|2|3...1000:SETup:WAVEform?
SOURce:LIST:TRIGger[:IMMEDIATE]
SOURce:LIST:TRIGger:INITiate[:IMMEDIATE]
SOURce:LIST:TRIGgerout:TYPE BEGINningofstep | DATAmarker
SOURce:PM[:DEViation]
SOURce:PM[:DEViation]?
SOURce:PM:INTernal:FREQuency
SOURce:PM:INTernal:FREQuency?
SOURce:PM:STATe
SOURce:PM:STATe?
SOURce:POWER[:LEVel][:IMMEDIATE][:AMPLitude] <ampl>
SOURce:POWER[:LEVel][:IMMEDIATE][:AMPLitude]?
SOURce:POWER[:LEVel][:IMMEDIATE]:OFFSet <rel_ampl>
SOURce:POWER[:LEVel][:IMMEDIATE]:OFFSet?
SOURce:POWER:REFerence <ampl>
SOURce:POWER:REFerence?
SOURce:POWER:REFerence:STATe OFF | ON | 0 | 1
SOURce:POWER:REFerence:STATe?
SOURce:PRESet
```

```

SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq>
SOURce:RADio:ARB:BASEband:FREQuency:OFFSet?
SOURce:RADio:ARB:CATalog?
SOURce:RADio:ARB:DEFault:DIRection <string>
SOURce:RADio:ARB:DEFault:DIRection?
SOURce:RADio:ARB:DELeTe <string>
SOURce:RADio:ARB:DELeTe:ALL
SOURce:RADio:ARB:FCATalog?
SOURce:RADio:ARB:HEADer:CLEAr
SOURce:RADio:ARB:HEADer:SAVE
SOURce:RADio:ARB:LOAD <string>
SOURce:RADio:ARB:LOAD:ALL <string>
SOURce:RADio:ARB:MDEStination:ALCHold NONE | M1 | M2 | M3 | M4
SOURce:RADio:ARB:MDEStination:ALCHold?
SOURce:RADio:ARB:MDEStination:PULSe NONE | M1 | M2 | M3 | M4
SOURce:RADio:ARB:MDEStination:PULSe?
SOURce:RADio:ARB:MPLicensed:NAME:LOCKed?
SOURce:RADio:ARB:MPLicensed:UID:LOCKed?
SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive | NEGative
SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive | NEGative
SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive | NEGative
SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive | NEGative
SOURce:RADio:ARB:MPOLarity:MARKer1?
SOURce:RADio:ARB:MPOLarity:MARKer2?
SOURce:RADio:ARB:MPOLarity:MARKer3?
SOURce:RADio:ARB:MPOLarity:MARKer4?
SOURce:RADio:ARB:NOISe:BANDwidth <freq>
SOURce:RADio:ARB:NOISe:BANDwidth?
SOURce:RADio:ARB:NOISe:CBWidth <freq>
SOURce:RADio:ARB:NOISe:CBWidth?
SOURce:RADio:ARB:NOISe:CN <ampl>
SOURce:RADio:ARB:NOISe:CN?
SOURce:RADio:ARB:NOISe:POWer:CONTRol[:MODE] TOTal | CARRier | NOISe |
NCHannel
SOURce:RADio:ARB:NOISe:POWer:CONTRol[:MODE]?
SOURce:RADio:ARB:NOISe[:STATe] ON | OFF | 1 | 0
SOURce:RADio:ARB:NOISe[:STATe]?
SOURce:RADio:ARB:RETRigger ON | OFF | IMMEDIATE
SOURce:RADio:ARB:RETRigger?
SOURce:RADio:ARB:RMS <float>
SOURce:RADio:ARB:RMS?
SOURce:RADio:ARB:RMS:CALCulate
SOURce:RADio:ARB:RMS:CALCulation:MODE AUTO | M1 | M2 | M3 | M4
SOURce:RADio:ARB:RMS:CALCulation:MODE?
SOURce:RADio:ARB:RSCaling <real>
SOURce:RADio:ARB:RSCaling?
SOURce:RADio:ARB:SCLock:RATE <freq>
SOURce:RADio:ARB:SCLock:RATE?
SOURce:RADio:ARB:SEQuence[:MWAVEform] <filename>, <waveform1>, <reps>,
NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 |
M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, {<waveform2>, <reps>,

```

```
NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 |  
M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, }...  
SOURce:RADio:ARB:SEQuence[:MWAVeform]? <filename>  
SOURce:RADio:ARB[:STATe] ON | OFF | 1 | 0  
SOURce:RADio:ARB[:STATe]?  
SOURce:RADio:ARB:TRIGger:INITiate  
SOURce:RADio:ARB:TRIGger[:SOURce] KEY | BUS | EXTeRnal2  
SOURce:RADio:ARB:TRIGger[:SOURce]?  
SOURce:RADio:ARB:TRIGger:TYPE CONTinuous | SINGle | SADVance  
SOURce:RADio:ARB:TRIGger:TYPE?  
SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE] FREE | TRIGger | RESet  
SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE]?  
SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGle | CONTinuous  
SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE]?  
SOURce:RADio:ARB:WAVEform <string>  
SOURce:RADio:ARB:WAVEform?  
SOURce:RADio:BAND:LINK DOWN | UP  
SOURce:RADio:BAND:LINK?  
SOURce:RADio:DEVIce BTS | MS  
SOURce:RADio:DEVIce?  
STATus:OPERation:CONDition?  
STATus:OPERation:ENABle <integer>  
STATus:OPERation:ENABle?  
STATus:OPERation[:EVENT]?  
STATus:OPERation:NTRansition <integer>  
STATus:OPERation:NTRansition?  
STATus:OPERation:PTRansition <integer>  
STATus:OPERation:PTRansition?  
STATus:PRESet  
STATus:QUEStionable:CALibration:CONDition?  
STATus:QUEStionable:CALibration:ENABle <integer>  
STATus:QUEStionable:CALibration:ENABle?  
STATus:QUEStionable:CALibration[:EVENT]?  
STATus:QUEStionable:CALibration:NTRansition <integer>  
STATus:QUEStionable:CALibration:NTRansition?  
STATus:QUEStionable:CALibration:PTRansition <integer>  
STATus:QUEStionable:CALibration:PTRansition?  
STATus:QUEStionable:CONDition?  
STATus:QUEStionable:ENABle <integer>  
STATus:QUEStionable:ENABle?  
STATus:QUEStionable[:EVENT]?  
STATus:QUEStionable:FREQuency:CONDition?  
STATus:QUEStionable:FREQuency:ENABle <integer>  
STATus:QUEStionable:FREQuency:ENABle?  
STATus:QUEStionable:FREQuency[:EVENT]?  
STATus:QUEStionable:FREQuency:NTRansition <integer>  
STATus:QUEStionable:FREQuency:NTRansition?  
STATus:QUEStionable:FREQuency:PTRansition <integer>  
STATus:QUEStionable:FREQuency:PTRansition?  
STATus:QUEStionable:INTegrity:CONDition?  
STATus:QUEStionable:INTegrity:ENABle <integer>  
STATus:QUEStionable:INTegrity:ENABle?  
STATus:QUEStionable:INTegrity[:EVENT]?
```



```

STATus:QUESTionable:INTEgrity:NTRansition <integer>
STATus:QUESTionable:INTEgrity:NTRansition?
STATus:QUESTionable:INTEgrity:PTRansition <integer>
STATus:QUESTionable:INTEgrity:PTRansition?
STATus:QUESTionable:NTRansition <integer>
STATus:QUESTionable:NTRansition?
STATus:QUESTionable:POWer:CONDition?
STATus:QUESTionable:POWer:ENABle <integer>
STATus:QUESTionable:POWer:ENABle?
STATus:QUESTionable:POWer[:EVENT]?
STATus:QUESTionable:POWer:NTRansition <integer>
STATus:QUESTionable:POWer:NTRansition?
STATus:QUESTionable:POWer:PTRansition <integer>
STATus:QUESTionable:POWer:PTRansition?>
STATus:QUESTionable:PTRansition <integer>
STATus:QUESTionable:PTRansition?
STATus:QUESTionable:TEMPerature:CONDition?
STATus:QUESTionable:TEMPerature:ENABle <integer>
STATus:QUESTionable:TEMPerature:ENABle?
STATus:QUESTionable:TEMPerature[:EVENT]?
STATus:QUESTionable:TEMPerature:NTRansition <integer>
STATus:QUESTionable:TEMPerature:NTRansition?
STATus:QUESTionable:TEMPerature:PTRansition <integer>
STATus:QUESTionable:TEMPerature:PTRansition?
SYSTem:APPLication:CATalog[:NAME]?
SYSTem:APPLication:CATalog[:NAME]:COUNT?
SYSTem:APPLication:CATalog:OPTion? <model>
SYSTem:APPLication:CATalog:REVision? <model>
SYSTem:APPLication[:CURRent][:NAME]?
SYSTem:APPLication[:CURRent]:OPTion?
SYSTem:APPLication[:CURRent]:REVision?
SYSTem:COMMunicate:LAN:SCPI:HISLip:ENABle OFF | ON | 0 | 1
SYSTem:COMMunicate:LAN:SCPI:HISLip:ENABle?
SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle OFF | ON | 0 | 1
SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle?
SYSTem:COMMunicate:LAN:SCPI:SOCKet:CONTRol?
SYSTem:COMMunicate:LAN:SCPI:SOCKet:ENABle OFF | ON | 0 | 1
SYSTem:COMMunicate:LAN:SCPI:SOCKet:ENABle?
SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle OFF | ON | 0 | 1
SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle?
SYSTem:CONFigure[:SYSTem]?
SYSTem:CSYSTem?
SYSTem:DATE "<year>, <month>, <day>"
SYSTem:DATE?
SYSTem:DEFault [ALL] | ALIGn | INPut | MISC | MODes | PON
SYSTem:ERRor[:NEXT]?
SYSTem:ERRor:OVERload[:STATe] 0 | 1 | OFF | ON
SYSTem:ERRor:PUP?
SYSTem:ERRor:VERBoSe OFF | ON | 0 | 1
SYSTem:ERRor:VERBoSe?
SYSTem:HELP:HEADers?
SYSTem:HID?
SYSTem:IDN <string>

```

```
SYSTem:IDN?
SYSTem:KLOCK OFF | ON | 0 | 1
SYSTem:KLOCK?
SYSTem:LiCense[:FPACK]:WAVeform:ADD <string>
SYSTem:LiCense[:FPACK]:WAVeform:CLear <int>
SYSTem:LiCense[:FPACK]:WAVeform:FREE?
SYSTem:LiCense[:FPACK]:WAVeform:LOCK <int>
SYSTem:LiCense[:FPACK]:WAVeform:NAME? <int>
SYSTem:LiCense[:FPACK]:WAVeform:REPLace <int>, <string>
SYSTem:LiCense[:FPACK]:WAVeform:STATUs? <int>
SYSTem:LiCense[:FPACK]:WAVeform:UID? <int>
SYSTem:LiCense[:FPACK]:WAVeform:USED?
SYSTem:LKEY <"OptionInfo">, <"LicenseInfo">
SYSTem:LKEY? <"OptionInfo">
SYSTem:LKEY:DELeTe <"OptionInfo">, <"LicenseInfo">
SYSTem:LKEY:LIST?
SYSTem:LKEY:WAVeform:ADD <string>
SYSTem:LKEY:WAVeform:CLear <int>
SYSTem:LKEY:WAVeform:FREE?
SYSTem:LKEY:WAVeform:LOCK <int>
SYSTem:LKEY:WAVeform:NAME? <int>
SYSTem:LKEY:WAVeform:REPLace <int>, <string>
SYSTem:LKEY:WAVeform:STATUs? <int>
SYSTem:LKEY:WAVeform:UID? <int>
SYSTem:LKEY:WAVeform:USED?
SYSTem:MODule:DEFault "<mnemonic>"
SYSTem:MODule:DEFault?
SYSTem:MODule:ENABLe "<mnemonic>", 0 | 1
SYSTem:MODule:ENABLe? "<mnemonic>"
SYSTem:MODule:INDEx?
SYSTem:MODule:LIST?
SYSTem:MODule:MNEMONic?
SYSTem:MODule:MODEl?
SYSTem:MODule:NAME?
SYSTem:MODule:SERial?
SYSTem:OPTions?
SYSTem:PDOWN [NORMAL | FORCE]
SYSTem:PON:APPLication:LLIST <stringofINSTRument:SElectnames>
SYSTem:PON:APPLication:LLIST?
SYSTem:PON:APPLication:VMEMory[:AVAIlable]?
SYSTem:PON:APPLication:VMEMory:TOTAL?
SYSTem:PON:APPLication:VMEMory:USED?
SYSTem:PON:APPLication:VMEMory:USED:NAME? <INSTRument:SElectname>
SYSTem:PON:MODE SA | BASIC | ADEMOD | NFIGURE | PNOISE | CDMA2K | TDSCDMA
| VSA | VSA89601 | WCDMA | WIMAXOFDMA
SYSTem:PON:MODE?
SYSTem:PON:TIME?
SYSTem:PON:TYPE PRESet
SYSTem:PON:TYPE MODE | USER | LAST
SYSTem:PON:TYPE?
SYSTem:PRESet
SYSTem:PRESet:TYPE FACTory | MODE | USER
SYSTem:PRESet:TYPE?
```

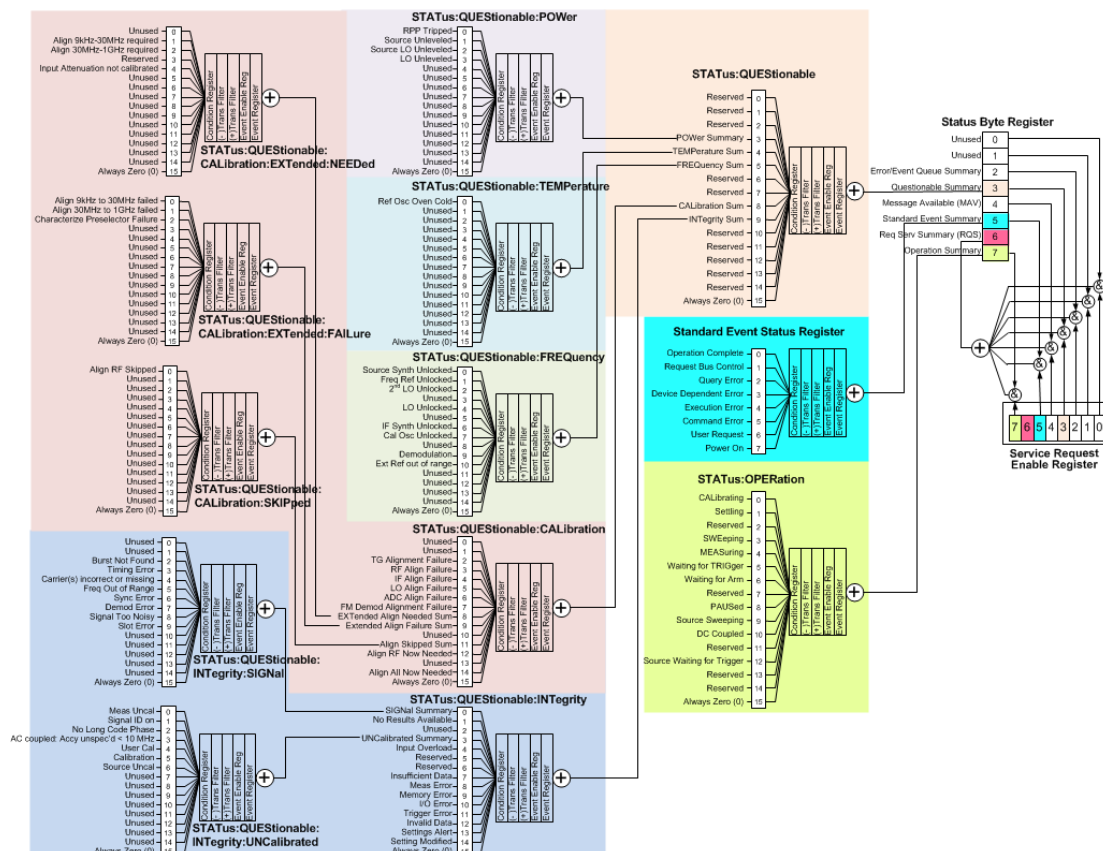
```

SYSTem:PRESet:USER
SYSTem:PRESet:USER:ALL
SYSTem:PRESet:USER:SAVE
SYSTem:PRINT:THEME TDCOLOR | TDMonochrome | FCOLOR | FMONochrome
SYSTem:PRINT:THEME?
SYSTem:PUP:PROcess
SYSTem:SECurity:USB:WPRotect[:ENABLE] ON | OFF | 0 | 1
SYSTem:SECurity:USB:WPRotect[:ENABLE]?
SYSTem:SHOW OFF | ERROR | SYSTem | HARDware | LXI | HWStatistics |
ALIGNment | SOFTware | CAPplication
SYSTem:SHOW?
SYSTem:TEST:WCTS:[ALL]
SYSTem:TEST:WCTS:FEC
SYSTem:TEST:WCTS:FEC:RESult?
SYSTem:TEST:WCTS:SHOW:RESult FEC
SYSTem:TIME "<hour>, <minute>, <second>"
SYSTem:TIME?
SYSTem:VERSion?
TRIGger:<measurement>[:SEQUence]:IQ:SOURce EXTernal1 | EXTernal2 |
IMMediate | IQMag | IDEMod | QDEMod | IINPut | QINPut | AIQMag
TRIGger:<measurement>[:SEQUence]:IQ:SOURce?
TRIGger:<measurement>[:SEQUence]:RF:SOURce EXTernal1 | EXTernal2 |
IMMediate | LINE | FRAME | RFBurst | VIDEO | IF | ALARm | LAN | TV
TRIGger:<measurement>[:SEQUence]:RF:SOURce?
TRIGger:<measurement>[:SEQUence]:SOURce EXTernal1 | EXTernal2 | IMMediate
| LINE | FRAME | RFBurst | VIDEO | IF | ALARm | LAN | IQMag | IDEMod |
QDEMod | IINPut | QINPut | AIQMag | TV
TRIGger:<measurement>[:SEQUence]:SOURce?
TRIGger[:SEQUence]:EXTernal1:DELay <time>
TRIGger[:SEQUence]:EXTernal:DELay
TRIGger[:SEQUence]:EXTernal1:DELay?
TRIGger[:SEQUence]:EXTernal1:DELay:COMPensation OFF | ON | 0 | 1
TRIGger[:SEQUence]:EXTernal1:DELay:COMPensation?
TRIGger[:SEQUence]:EXTernal1:DELay:STATe OFF | ON | 0 | 1
TRIGger[:SEQUence]:EXTernal1:DELay:STATe?
TRIGger[:SEQUence]:EXTernal:LEVel
TRIGger[:SEQUence]:EXTernal1:LEVel <level>
TRIGger[:SEQUence]:EXTernal1:LEVel?
TRIGger[:SEQUence]:EXTernal:SLOPe
TRIGger[:SEQUence]:EXTernal1:SLOPe POSitive | NEGative
TRIGger[:SEQUence]:EXTernal1:SLOPe?
TRIGger[:SEQUence]:FRAME:EXTernal1:LEVel
TRIGger[:SEQUence]:FRAME:EXTernal1:SLOPe
TRIGger[:SEQUence]:SOURCe EXTernal

```

STATus Subsystem

The following diagram shows the entire Status Register Subsystem implementation of the X Series instruments.



Detailed Description

The STATus subsystem remote commands set and query the status hardware registers. This system of registers monitors various events and conditions in the instrument. Software written to control the instrument may need to monitor some of these events and conditions.

NOTE

All status register commands are sequential. Most commands can be started immediately and will overlap with any existing commands that are already running. This is not true of status commands. All the commands in the spectrum analyzer are assumed to be overlapped unless a command description specifically says that it is sequential.

What Are Status Registers

The status system contains multiple registers that are arranged in a hierarchical order. The lower-level status registers propagate their data to the higher-level registers in the data structures by means of summary bits. The status byte register is at the top of the hierarchy and contains general status information for the instrument's events and conditions. All other individual registers are used to determine the specific events or conditions. For a diagram of the registers and their interconnections, see above.

The operation and questionable status registers are sets of registers that monitor the overall instrument condition. They are accessed with the STATus:OPERation and STATus:QUEStionable commands in the STATus command subsystem. Each register set is made up of five registers:

- Condition Register—It reports the real-time state of the signals monitored by this register set. There is no latching or buffering for a condition register.
- Positive Transition Register—This filter register controls which signals will set a bit in the event register when the signal makes a low to high transition (when the condition bit changes from 0 to 1).
- Negative Transition Register—This filter register controls which signals will set a bit in the event register when the signal makes a high to low transition (when the condition bit changes from 1 to 0).
- Event Register—It latches any signal state changes, in the way specified by the filter registers. Bits in the event register are never cleared by signal state changes. Event registers are cleared when read. They are also cleared by *CLS and by presetting the instrument.
- Event Enable Register—It controls which of the bits, being set in the event register, will be summarized as a single output for the register set. Summary bits are then used by the next higher register.

The STATus:QUEStionable registers report abnormal operating conditions. The status register hierarchy is:

1. The summary outputs from the six STATus:QUEStionable:<keyword> detail registers are inputs to the STATus:QUEStionable register.
2. The summary output from the STATus:QUEStionable register is an input to the Status Byte Register. See the overall system in Figure at the beginning of this section.

The STATus:OPERation register set has no summarized inputs. The inputs to the STATus:OPERation:CONDition register indicate the real time state of the instrument. The STATus:OPERation:EVENT register summary output is an input to the Status Byte Register.

What Are Status Register SCPI Commands

Most monitoring of the instrument conditions is done at the highest level using the IEEE common commands indicated below. Complete command descriptions are available in the IEEE commands section at the beginning of the language reference. Individual status registers can be set and queried using the commands in the STATus subsystem of the language reference.

- *CLS (clear status) clears the status byte by emptying the error queue and clearing all the event registers.
- *ESE, *ESE? (event status enable) sets and queries the bits in the enable register part of the standard event status register.
- *ESR? (event status register) queries and clears the event register part of the standard event status register.
- *OPC, *OPC? (operation complete) sets the standard event status register to monitor the completion of all commands. The query stops any new commands from being processed until the current processing is complete, then returns a '1'.
- *PSC, *PSC? (power-on state clear) sets the power-on state so that it clears the service request enable register and the event status enable register at power on.
- *SRE, *SRE? (service request enable) sets and queries the value of the service request enable register.

- *STB? (status byte) queries the value of the status byte register without erasing its contents.

How to Use the Status Registers

A program often needs to be able to detect and manage error conditions or changes in instrument status. There are two methods you can use to programmatically access the information in status registers:

- The polling method
- The service request (SRQ) method

In the polling method, the instrument has a passive role. It only tells the controller that conditions have changed when the controller asks the right question. In the SRQ method, the instrument takes a more active role. It tells the controller when there has been a condition change without the controller asking. Either method allows you to monitor one or more conditions.

The polling method works well if you do not need to know about changes the moment they occur. The SRQ method should be used if you must know immediately when a condition changes. To detect a change using the polling method, the program must repeatedly read the registers.

Use the SRQ method when:

- you need time-critical notification of changes
- you are monitoring more than one device which supports SRQs
- you need to have the controller do something else while waiting
- you can't afford the performance penalty inherent to polling

Use polling when:

- your programming language/development environment does not support SRQ interrupts
- you want to write a simple, single-purpose program and don't want the added complexity of setting up an SRQ handler
- To monitor a condition:
 - a. Determine which register contains the bit that reports the condition.
 - b. Send the unique SCPI query that reads that register.
 - c. Examine the bit to see if the condition has changed.

You can monitor conditions in different ways.

- Check the current instrument hardware and firmware status.

Do this by querying the condition registers which continuously monitor status. These registers represent the current state of the instrument. Bits in a condition register are updated in real time. When the condition monitored by a particular bit becomes true, the bit is set to 1. When the condition becomes false, the bit is reset to 0.

- Monitor a particular condition (bit).

You can enable a particular bit(s), using the event enable register. The instrument will then monitor that particular condition(s). If the bit becomes true (0 to 1 transition) in the event register, it will stay set until the

event register is cleared. Querying the event register allows you to detect that this condition occurred even if the condition no longer exists. The event register can only be cleared by querying it or sending the *CLS command.

- Monitor a particular type of change in a condition (bit).
 - The transition registers are preset to register if the condition goes from 0 to 1 (false to true, or a positive transition).
 - This can be changed so the selected condition is detected if the bit goes from 1 to 0 (true to false, or a negative transition).
 - It can also be set for both types of transitions occurring.
 - Or it can be set for neither transition. If both transition registers are set to 0 for a particular bit position, that bit will not be set in the event register for either type of change.

Using a Status Register

Each bit in a register is represented by a numerical value based on its location. See figure below. This number is sent with the command to enable a particular bit. If you want to enable more than one bit, you would send the sum of all the bits that you want to monitor.

Figure: Status Register Bit Values

Decimal Value	32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1
Bit Number	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

STATUS:OPERation:ENABLE < num >
STATUS:OPERation:ENABLE?

Standard Operation Event Enable Register

ck730a

Bit 15 is not used to report status.

Example 1:

1. To enable bit 0 and bit 6 of standard event status register, you would send the command *ESE 65 because $1 + 64 = 65$.
2. The results of a query are evaluated in a similar way. If the *STB? command returns a decimal value of 140, ($140 = 128 + 8 + 4$) then bit 7 is true, bit 3 is true and bit 2 is true.

Example 2:

1. Suppose you want to know if an Auto-trigger Timeout occurs, but you only cared about that specific condition. So you would want to know what was happening with bit 10 in the Status Questionable Integrity register, and not about any other bits.
2. It's usually a good idea to start by clearing all the status registers with *CLS.

3. Sending the `STAT:QUES:INT:ENAB 1024` command lets you monitor only bit 10 events, instead of the default monitoring all the bits in the register. The register default is for positive transition events (0 to 1 transition). That is, when an auto-trigger timeout occurs. If instead, you wanted to know when the Auto-trigger timeout condition is cleared, then you would set the `STAT:QUES:INT:PTR 0` and the `STAT:QUES:INT:NTR 32767`.
4. So now the only output from the Status Questionable Integrity register will come from a bit 10 positive transition. That output goes to the Integrity Sum bit 9 of the Status Questionable register.
5. You can do a similar thing with this register to only look at bit 9 using, `STAT:QUES:ENAB 512`.
6. The Status Questionable register output goes to the “Status Questionable Summary” bit 3 of the Status Byte Register. The output from this register can be enabled using the `*SRE 8` command.
7. Finally, you would use the serial polling functionality available for the particular bus/software that you are using to monitor the Status Byte Register. (You could also use `*STB?` to poll the Status Byte Register.)

Using the Service Request (SRQ) Method

Your language, bus, and programming environment must be able to support SRQ interrupts. (For example, BASIC used with VXI-11.3 (GPIB over LAN). When you monitor a condition with the SRQ method, you must:

1. Determine which bit monitors the condition.
2. Determine how that bit reports to the request service (RQS) bit of the status byte.
3. Send SCPI commands to enable the bit that monitors the condition and to enable the summary bits that report the condition to the RQS bit.
4. Enable the controller to respond to service requests.

When the condition changes, the instrument sets its RQS bit. The controller is informed of the change as soon as it occurs. As a result, the time the controller would otherwise have used to monitor the condition can be used to perform other tasks. Your program determines how the controller responds to the SRQ.

Generating a Service Request

To use the SRQ method, you must understand how service requests are generated. Bit 6 of the status byte register is the request service (RQS) bit. The `*SRE` command is used to configure the RQS bit to report changes in instrument status. When such a change occurs, the RQS bit is set. It is cleared when the status byte register is queried using `*SRE?` (with a serial poll.) It can be queried without erasing the contents with `*STB?`.

When a register set causes a summary bit in the status byte to change from 0 to 1, the instrument can initiate the service request (SRQ) process. However, the process is only initiated if both of the following conditions are true:

- The corresponding bit of the service request enable register is also set to 1.
- The instrument does not have a service request pending. (A service request is considered to be pending between the time the instrument's SRQ process is initiated and the time the controller reads the status byte register.)

The SRQ process sets the SRQ true. It also sets the status byte's request service (RQS) bit to 1. Both actions are necessary to inform the controller that the instrument requires service. Setting the SRQ line only informs the controller that some device on the bus requires service. Setting the RQS bit allows the controller to determine which instrument requires service.

If your program enables the controller to detect and respond to service requests, it should instruct the controller to perform a serial poll when the SRQ is set true. Each device on the bus returns the contents of its status byte register in response to this poll. The device who's RQS bit is set to 1 is the device that requested service.

When you read the instrument's status byte register with a serial poll, the RQS bit is reset to 0. Other bits in the register are not affected.

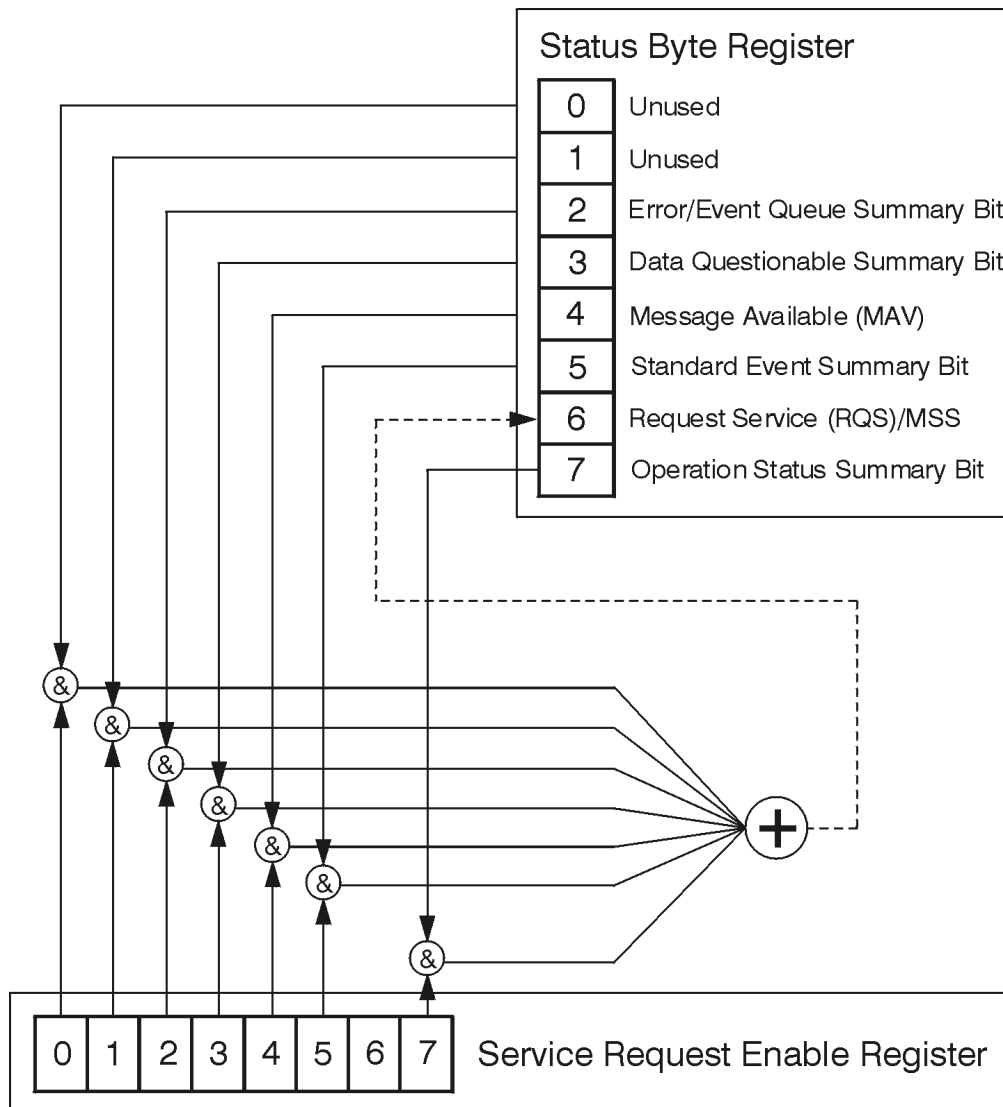
If the status register is configured to SRQ on end-of-measurement and the measurement is in continuous mode, then restarting a measurement (INIT command) can cause the measuring bit to pulse low. This causes an SRQ when you have not actually reached the "end-of-measurement" condition. To avoid this:

1. Set INITiate:CONTinuous off.
2. Set/enable the status registers.
3. Restart the measurement (send INIT).

Status Register System

The hardware status registers are combined to form the instrument status system. Specific status bits are assigned to monitor various aspects of the instrument operation and status. See the diagram of the status system above for information about the bit assignments and status register interconnections.

The Status Byte Register



ck776a

The RQS bit is read and reset by a serial poll. The same bit position (MSS) is read, non-destructively by the *STB? command. If you serial poll bit 6 it is read as RQS, but if you send *STB it reads bit 6 as MSS. For more information refer to IEEE 488.2 standards, section 11.

Description		Standard Operation Status Summary Bit		Request Service (RQS) Summary Bit		Standard Event Status Summary Bit		Message Available (MAV)		Data Questionable Status Summary Bit		Error/Event Queue Summary Bit		Unused		Unused	
Bit Number	7	6	5	4	3	2	1	0									

*STB?

Status Byte Register

ck725a

Bit	Description
0, 1	These bits are always set to 0.
2	A 1 in this bit position indicates that the SCPI error queue is not empty which means that it contains at least one error message.
3	A 1 in this bit position indicates that the data questionable summary bit has been set. The data questionable event register can then be read to determine the specific condition that caused this bit to be set.
4	A 1 in this bit position indicates that the instrument has data ready in the output queue. There are no lower status groups that provide input to this bit.
5	A 1 in this bit position indicates that the standard event summary bit has been set. The standard event status register can then be read to determine the specific event that caused this bit to be set.
6	A 1 in this bit position indicates that the instrument has at least one reason to report a status change. This bit is also called the master summary status bit (MSS).
7	A 1 in this bit position indicates that the standard operation summary bit has been set. The standard operation event register can then be read to determine the specific condition that caused this bit to be set.

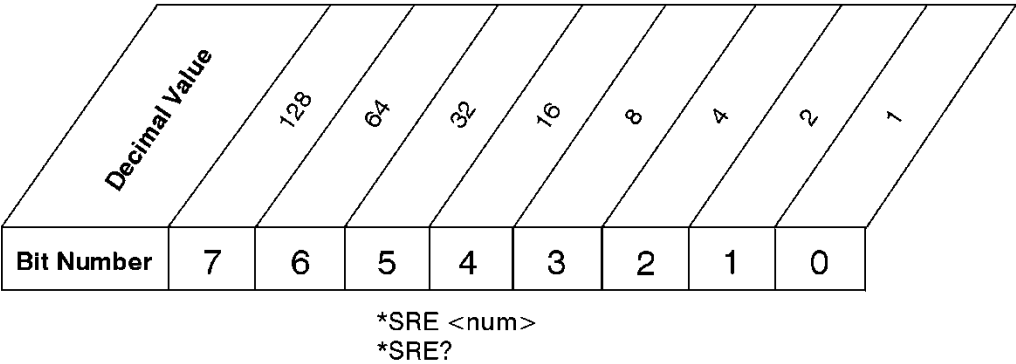
To query the status byte register, send the command *STB?. The response will be the decimal sum of the bits which are set to 1. For example, if bit number 7 and bit number 3 are set to 1, the decimal sum of the 2 bits is 128 plus 8. So the decimal value 136 is returned. The *STB command does not clear the status register.

In addition to the status byte register, the status byte group also contains the service request enable register. This register lets you choose which bits in the status byte register will trigger a service request.

Send the *SRE <integer> command where <integer> is the sum of the decimal values of the bits you want to enable plus the decimal value of bit 6. For example, assume that you want to enable bit 7 so that whenever the standard operation status register summary bit is set to 1 it will trigger a service request. Send the command *SRE 192 (because $192 = 128 + 64$). You must always add 64 (the numeric value of RQS

bit 6) to your numeric sum when you enable any bits for a service request. The command *SRE? returns the decimal value of the sum of the bits previously enabled with the *SRE <integer> command.

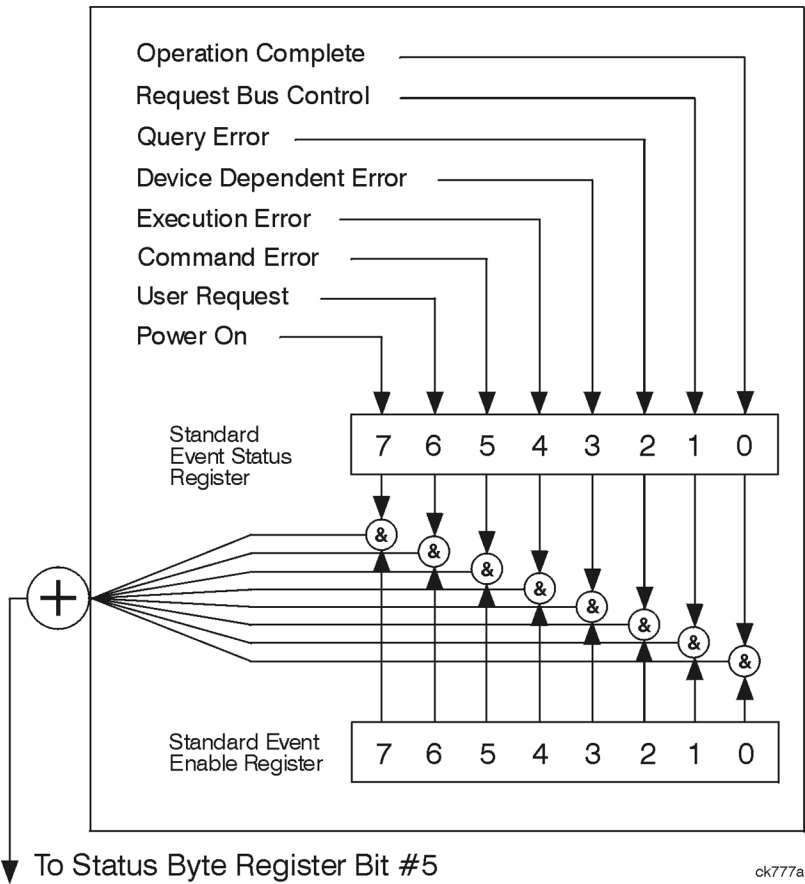
The service request enable register presets to zeros (0).



Service Request Enable Register

ck726a

Standard Event Status Register



ck777a

The standard event status register contains the following bits:

Description								
	Power On	User Request Key (Local)	Command Error	Execution Error	Device Dependent Error	Query Error	Request Control	Operation Complete
Bit Number	7	6	5	4	3	2	1	0

*ESR?

Standard Event Status Register

ck727a

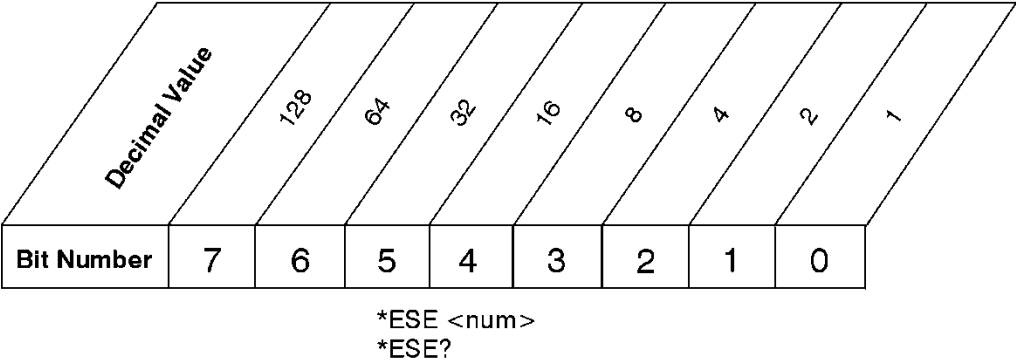
Bit	Description
0	A 1 in this bit position indicates that all pending operations were completed following execution of the *OPC command.
1	This bit is for GPIB handshaking to request control. Currently it is set to 0 because there are no implementations where the spectrum analyzer controls another instrument.
2	A 1 in this bit position indicates that a query error has occurred. Query errors have SCPI error numbers from -499 to -400.
3	A 1 in this bit position indicates that a device dependent error has occurred. Device dependent errors have SCPI error numbers from -399 to -300 and 1 to 32767.
4	A 1 in this bit position indicates that an execution error has occurred. Execution errors have SCPI error numbers from -299 to -200.
5	A 1 in this bit position indicates that a command error has occurred. Command errors have SCPI error numbers from -199 to -100.
6	A 1 in this bit position indicates that the LOCAL key has been pressed. This is true even if the instrument is in local lockout mode.
7	A 1 in this bit position indicates that the instrument has been turned off and then on.

The standard event status register is used to determine the specific event that set bit 5 in the status byte register. To query the standard event status register, send the command *ESR?. The response will be the decimal sum of the bits which are enabled (set to 1). For example, if bit number 7 and bit number 3 are enabled, the decimal sum of the 2 bits is 128 plus 8. So the decimal value 136 is returned.

In addition to the standard event status register, the standard event status group also contains a standard event status enable register. This register lets you choose which bits in the standard event status register will set the summary bit (bit 5 of the status byte register) to 1. Send the *ESE <integer> command where <integer> is the sum of the decimal values of the bits you want to enable. For example, to enable bit 7 and bit 6 so that whenever either of those bits is set to 1, the standard event status summary bit of the status

byte register will be set to 1, send the command *ESE 192 (128 + 64). The command *ESE? returns the decimal value of the sum of the bits previously enabled with the *ESE <integer> command.

The standard event status enable register presets to zeros (0).



Standard Event Status Enable Register

ck728a

Operation and Questionable Status Registers

The operation and questionable status registers are registers that monitor the overall instrument condition. They are accessed with the STATus:OPERation and STATus:QUEStionable commands in the STATus command subsystem. See the figure at the beginning of this chapter.

Operation Status Register

The operation status register monitors the current instrument measurement state. It checks to see if the instrument is calibrating, sweeping, or waiting for a trigger. For more information see the *OPC? command located in the IEEE Common Commands section.

Bit	Condition	Operation
0	Calibrating	The instrument is busy executing its Align Now process
3	Sweeping	The instrument is busy taking a sweep.
4	Measuring	The instrument is busy making a measurement. Measurements often require multiple sweeps. They are initiated by keys under the MEASURE key or with the MEASure group of commands. The bit is valid for most X-Series Modes.
5	Waiting for trigger	The instrument is waiting for the trigger conditions to be met, then it will trigger a sweep or measurement.

Questionable Status Register

The questionable status register monitors the instrument's condition to see if anything questionable has happened to it. It is looking for anything that might cause an error or a bad measurement like a hardware problem, an out of calibration situation, or a unusual signal. All the bits are summary bits from lower-level event registers.

Bit	Condition	Operation

3	Power summary	The instrument hardware has detected a power unlevelled condition.
4	Temperature summary	The instrument is still warming up.
5	Frequency summary	The instrument hardware has detected an unlocked condition or a problem with the external frequency reference.
8	Calibration summary	The instrument has detected a hardware problem while doing the automatic internal alignment process.
9	Integrity summary	The instrument has detected a questionable measurement condition such as: bad timing, bad signal/data, timeout problem, signal overload, or "meas uncal".

STATus Subsystem Command Descriptions

The STATus subsystem controls the SCPI-defined instrument status reporting structures. Each status register has a set of five commands used for querying or masking that particular register.

Numeric values for bit patterns can be entered using decimal or hexadecimal representations. (i.e. 0 to 32767 is equivalent to #H0 to #H7FFF. It is also equal to all ones, 11111111111111) See the SCPI Basics information about using bit patterns for variable parameters.

Operation Register

"Operation Condition Query" on page 99

"Operation Enable" on page 100

"Operation Event Query" on page 100

"Operation Negative Transition" on page 100

"Operation Positive Transition" on page 101

Operation Condition Query

This query returns the decimal value of the sum of the bits in the Status Operation Condition register.

NOTE The data in this register is continuously updated and reflects the current conditions.

Mode	All
Remote Command	:STATus:OPERation:CONDition?
Example	STAT:OPER:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Operation Enable

This command determines which bits in the Operation Event register, will set the Operation Status Summary bit (bit 7) in the Status Byte Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

NOTE

The preset condition is to have all bits in this enable register set to 0. To have any Operation Events reported to the Status Byte Register, one or more bits need to be set to 1.

Mode	All
Remote Command	:STATus:OPERation:ENABle <integer> :STATus:OPERation:ENABle?
Example	STAT:OPER:ENAB 1 Sets the register so that Align Now operation will be reported to the Status Byte Register.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Operation Event Query

This query returns the decimal value of the sum of the bits in the Operation Event register.

NOTE

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
Remote Command	:STATus:OPERation[:EVENTt]?
Example	STAT:OPER?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Operation Negative Transition

This command determines which bits in the Operation Condition register will set the corresponding bit in the Operation Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
Remote Command	:STATus:OPERation:NTRansition <integer> :STATus:OPERation:NTRansition?
Example	STAT:OPER:NTR 1 Align Now operation complete will be reported to the Status Byte Register.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Operation Positive Transition

This command determines which bits in the Operation Condition register will set the corresponding bit in the Operation Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
Remote Command	:STATus:OPERation:PTRansition <integer> :STATus:OPERation:PTRansition?
Example	STAT:OPER:PTR 1 Align Now operation beginning will be reported to the Status Byte Register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Preset the Status Byte

Sets bits in most of the enable and transition registers to their default state. It presets all the Transition Filters, Enable Registers, and the Error/Event Queue Enable. It has no effect on Event Registers, Error/Event QUEUE, IEEE 488.2 ESE, and SRE Registers as described in IEEE Standard 488.2–1992, IEEE Standard Codes, Formats, Protocols, and Common Commands for Use with ANSI/IEEE Std 488.1–1987. New York, NY, 1992.

Remote Command	:STATus:PRESet
Example	STAT:PRES
Initial S/W Revision	Prior to A.02.00

Questionable Register

"Questionable Condition " on page 102

"Questionable Enable " on page 102

"Questionable Event Query " on page 103

"Questionable Negative Transition " on page 103

"Questionable Positive Transition" on page 103

Questionable Condition

This query returns the decimal value of the sum of the bits in the Questionable Condition register.

NOTE

The data in this register is continuously updated and reflects the current conditions.

Mode	All
Remote Command	:STATus:QUEStionable:CONDition?
Example	STAT:QUES:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Enable

This command determines which bits in the Questionable Event register will set the Questionable Status Summary bit (bit3) in the Status Byte Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

NOTE

The preset condition is all bits in this enable register set to 0. To have any Questionable Events reported to the Status Byte Register, one or more bits need to be set to 1. The Status Byte Event Register should be queried after each measurement to check the Questionable Status Summary (bit 3). If it is equal to 1, a condition during the test may have made the test results invalid. If it is equal to 0, this indicates that no hardware problem or measurement problem was detected by the analyzer.

Mode	All
Remote Command	:STATus:QUEStionable:ENABle <integer> :STATus:QUEStionable:ENABle?
Example	STAT:OPER:PTR 1 Align Now operation beginning will be reported to the Status Byte Register.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command

Initial S/W Revision	Prior to A.02.00

Questionable Event Query

This query returns the decimal value of the sum of the bits in the Questionable Event register.

NOTE

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
Remote Command	:STATus:QUEStionable[:EVENT]?
Example	STAT:QUES?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Negative Transition

This command determines which bits in the Questionable Condition register will set the corresponding bit in the Questionable Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
Remote Command	:STATus:QUEStionable:NTRansition <integer> :STATus:QUEStionable:NTRansition?
Example	STAT:QUES:NTR 16 Temperature summary 'questionable cleared' will be reported to the Status Byte Register.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Positive Transition

This command determines which bits in the Questionable Condition register will set the corresponding bit in the Questionable Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
Remote Command	:STATus:QUESTionable:PTRansition <integer> :STATus:QUESTionable:PTRansition?
Example	STAT:QUES:PTR 16 Temperature summary 'questionable asserted' will be reported to the Status Byte Register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Calibration Register

"Questionable Calibration Condition " on page 104

"Questionable Calibration Enable " on page 104

"Questionable Calibration Event Query " on page 105

"Questionable Calibration Negative Transition " on page 105

"Questionable Calibration Positive Transition " on page 106

Questionable Calibration Condition

This query returns the decimal value of the sum of the bits in the Questionable Calibration Condition register.

NOTE

The data in this register is continuously updated and reflects the current conditions.

Mode	All
Remote Command	:STATus:QUESTionable:CALibration:CONDition?
Example	STAT:QUES:CAL:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Calibration Enable

This command determines which bits in the Questionable Calibration Condition Register will set bits in the Questionable Calibration Event register, which also sets the Calibration Summary bit (bit 8) in the

Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All
Remote Command	:STATus:QUESTionable:CALibration:ENABle <integer> :STATus:QUESTionable:CALibration:ENABle?
Example	STAT:QUES:CAL:ENAB 16384 Can be used to query if an alignment is needed, if you have turned off the automatic alignment process.
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Calibration Event Query

This query returns the decimal value of the sum of the bits in the Questionable Calibration Event register.

NOTE

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
Remote Command	:STATus:QUESTionable:CALibration[:EVENT]?
Example	STAT:QUES:CAL?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Calibration Negative Transition

This command determines which bits in the Questionable Calibration Condition register will set the corresponding bit in the Questionable Calibration Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
Remote Command	:STATus:QUESTionable:CALibration:NTRansition <integer> :STATus:QUESTionable:CALibration:NTRansition?
Example	STAT:QUES:CAL:NTR 16384 Alignment is not required.
Preset	0

Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Calibration Positive Transition

This command determines which bits in the Questionable Calibration Condition register will set the corresponding bit in the Questionable Calibration Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
Remote Command	:STATus:QUES:CALibration:PTRansition <integer> :STATus:QUES:CALibration:PTRansition?
Example	STAT:QUES:CAL:PTR 16384 Alignment is required.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Calibration Skipped Register

Questionable Calibration Skipped Condition

Questionable Calibration Skipped Enable

Questionable Calibration Skipped Event Query

Questionable Calibration Skipped Negative Transition

Questionable Calibration Skipped Positive Transition

Questionable Calibration Extended Failure Register

Questionable Calibration Extended Failure Condition

Questionable Calibration Extended Failure Enable

Questionable Calibration Extended Failure Event Query

Questionable Calibration Extended Failure Negative Transition

Questionable Calibration Extended Failure Positive Transition

Questionable Frequency Register

"Questionable Frequency Condition " on page 107

"Questionable Frequency Enable " on page 107

"Questionable Frequency Event Query " on page 108

"Questionable Frequency Negative Transition " on page 108

"Questionable Frequency Positive Transition " on page 108

Questionable Frequency Condition

This query returns the decimal value of the sum of the bits in the Questionable Frequency Condition register.

NOTE

The data in this register is continuously updated and reflects the current conditions.

Mode	All
Remote Command	:STATus:QUESTionable:FREQuency:CONDition?
Example	STAT:QUES:FREQ:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Frequency Enable

This command determines which bits in the Questionable Frequency Condition Register will set bits in the Questionable Frequency Event register, which also sets the Frequency Summary bit (bit 5) in the Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All
Remote Command	:STATus:QUESTionable:FREQuency:ENABle <integer> :STATus:QUESTionable:FREQuency:ENABle?
Example	STAT:QUES:FREQ:ENAB 2 Frequency Reference Unlocked will be reported to the Frequency Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Frequency Event Query

This query returns the decimal value of the sum of the bits in the Questionable Frequency Event register.

NOTE

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
Remote Command	:STATus:QUESTionable:FREQuency[:EVENT]?
Example	STAT:QUES:FREQ?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Frequency Negative Transition

This command determines which bits in the Questionable Frequency Condition register will set the corresponding bit in the Questionable Frequency Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
Remote Command	:STATus:QUESTionable:FREQuency:NTRansition <integer> :STATus:QUESTionable:FREQuency:NTRansition?
Example	STAT:QUES:FREQ:NTR 2 Frequency Reference 'regained lock' will be reported to the Frequency Summary of the Status Questionable register.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Frequency Positive Transition

This command determines which bits in the Questionable Frequency Condition register will set the corresponding bit in the Questionable Frequency Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All

Remote Command	:STATus:QUEStionable:FREQuency:PTRansition <integer> :STATus:QUEStionable:FREQuency:PTRansition?
Example	STAT:QUES:FREQ:PTR 2 Frequency Reference 'became unlocked' will be reported to the Frequency Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Integrity Register

"Questionable Integrity Condition " on page 109

"Questionable Integrity Enable " on page 109

"Questionable Integrity Event Query " on page 110

"Questionable Integrity Negative Transition " on page 110

"Questionable Integrity Positive Transition " on page 111

Questionable Integrity Condition

This query returns the decimal value of the sum of the bits in the Questionable Integrity Condition register.

NOTE

The data in this register is continuously updated and reflects the current conditions.

Mode	All
Remote Command	:STATus:QUEStionable:INTEgrity:CONDition?
Example	STAT:QUES:INT:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Integrity Enable

This command determines which bits in the Questionable Integrity Condition Register will set bits in the Questionable Integrity Event register, which also sets the Integrity Summary bit (bit 9) in the Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All

Remote Command	<code>:STATus:QUEStionable:INTEgrity:ENABle <integer></code> <code>:STATus:QUEStionable:INTEgrity:ENABle?</code>
Example	STAT:QUES:INT:ENAB 8 Measurement Uncalibrated Summary will be reported to the Integrity Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Integrity Event Query

This query returns the decimal value of the sum of the bits in the Questionable Integrity Event register.

NOTE

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
Remote Command	<code>:STATus:QUEStionable:INTEgrity[:EVENT]?</code>
Example	STAT:QUES:INT?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Integrity Negative Transition

This command determines which bits in the Questionable Integrity Condition register will set the corresponding bit in the Questionable Integrity Event register when the condition register bit has a negative transition (1 to 0)

The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
Remote Command	<code>:STATus:QUEStionable:INTEgrity:NTRansition <integer></code> <code>:STATus:QUEStionable:INTEgrity:NTRansition?</code>
Example	STAT:QUES:INT:NTR 8 Measurement 'regained calibration' Summary will be reported to the Integrity Summary of the Status Questionable register.
Preset	0

Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Integrity Positive Transition

This command determines which bits in the Questionable Integrity Condition register will set the corresponding bit in the Questionable Integrity Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
Remote Command	:STATus:QUEStionable:INTEgrity:PTRansition <integer> :STATus:QUEStionable:INTEgrity:PTRansition?
Example	STAT:QUES:INT:PTR 8 Measurement 'became uncalibrated' Summary will be reported to the Integrity Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Integrity Signal Register

Questionable Integrity Signal Condition

Questionable Integrity Signal Enable

Questionable Integrity Signal Event Query

Questionable Integrity Signal Negative Transition

Questionable Integrity Signal Positive Transition

Questionable Integrity Uncalibrated Register

Questionable Integrity Uncalibrated Condition

Questionable Integrity Uncalibrated Enable

Questionable Integrity Uncalibrated Event Query

Questionable Integrity Uncalibrated Negative Transition

Questionable Integrity Uncalibrated Positive Transition

Questionable Power Register

"Questionable Power Condition " on page 112

"Questionable Power Enable " on page 112

"Questionable Power Event Query " on page 113

"Questionable Power Negative Transition " on page 113

"Questionable Power Positive Transition " on page 113

Questionable Power Condition

This query returns the decimal value of the sum of the bits in the Questionable Power Condition register.

NOTE

The data in this register is continuously updated and reflects the current conditions.

Mode	All
Remote Command	:STATus:QUEStionable:POWer:CONDition?
Example	STAT:QUES:POW:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Power Enable

This command determines which bits in the Questionable Power Condition Register will set bits in the Questionable Power Event register, which also sets the Power Summary bit (bit 3) in the Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All
Remote Command	:STATus:QUEStionable:POWer:ENABle <integer> :STATus:QUEStionable:POWer:ENABle?
Example	STAT:QUES:POW:ENAB 32 50 MHz Input Pwr too High for Cal will be reported to the Power Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Power Event Query

This query returns the decimal value of the sum of the bits in the Questionable Power Event register.

NOTE

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
Remote Command	:STATus:QUESTionable:POWer[:EVENT]?
Example	STAT:QUES:POW?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Power Negative Transition

This command determines which bits in the Questionable Power Condition register will set the corresponding bit in the Questionable Power Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
Remote Command	:STATus:QUESTionable:POWer:NTRansition <integer> :STATus:QUESTionable:POWer:NTRansition?
Example	STAT:QUES:POW:NTR 32 50 MHz Input Power became OK for Cal will be reported to the Power Summary of the Status Questionable register.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Power Positive Transition

This command determines which bits in the Questionable Power Condition register will set the corresponding bit in the Questionable Power Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All

Remote Command	<code>:STATus:QUEStionable:POWer:PTRansition <integer></code> <code>:STATus:QUEStionable:POWer:PTRansition?></code>
Example	STAT:QUES:POW:PTR 32 50 MHz Input Power became too high for Cal will be reported to the Power Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Temperature Register

"Questionable Temperature Condition" on page 114

"Questionable Temperature Enable" on page 114

"Questionable Temperature Event Query" on page 115

"Questionable Temperature Negative Transition" on page 115

"Questionable Temperature Positive Transition" on page 116

Questionable Temperature Condition

This query returns the decimal value of the sum of the bits in the Questionable Temperature Condition register.

NOTE

The data in this register is continuously updated and reflects the current conditions.

Mode	All
Remote Command	<code>:STATus:QUEStionable:TEMPerature:CONDition?</code>
Example	STAT:QUES:TEMP:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Temperature Enable

This command determines which bits in the Questionable Temperature Condition Register will set bits in the Questionable Temperature Event register, which also sets the Temperature Summary bit (bit 4) in the Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All
Remote Command	:STATus:QUESTionable:TEMPerature:ENABle <integer> :STATus:QUESTionable:TEMPerature:ENABle?
Example	STAT:QUES:TEMP:ENAB 1 Reference Oscillator Oven Cold will be reported to the Temperature Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Temperature Event Query

This query returns the decimal value of the sum of the bits in the Questionable Temperature Event register.

NOTE

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared

Mode	All
Remote Command	:STATus:QUESTionable:TEMPerature[:EVENT]?
Example	STAT:QUES:TEMP?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Temperature Negative Transition

This command determines which bits in the Questionable Temperature Condition register will set the corresponding bit in the Questionable Temperature Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
Remote Command	:STATus:QUESTionable:TEMPerature:NTRansition <integer> :STATus:QUESTionable:TEMPerature:NTRansition?
Example	STAT:QUES:TEMP:NTR 1 Reference Oscillator Oven not cold will be reported to the Temperature Summary of the Status Questionable register.
Preset	0

Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Temperature Positive Transition

This command determines which bits in the Questionable Temperature Condition register will set the corresponding bit in the Questionable Temperature Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
Remote Command	:STATus:QUEStionable:TEMPerature:PTRansition <integer> :STATus:QUEStionable:TEMPerature:PTRansition?
Example	STAT:QUES:TEMP:PTR 1 Reference Oscillator Oven became cold will be reported to the Temperature Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Common Commands

"All (Daily use)" on page 184
 "Clear Status " on page 119
 "Standard Event Status Enable " on page 120
 "Standard Event Status Register Query " on page 120
 "Identification Query " on page 121
 "Operation Complete " on page 121
 "Query Instrument Options " on page 122
 "Recall Instrument State " on page 122
 "**RST (Remote Command Only)" on page 123
 "Save Instrument State " on page 123
 "Service Request Enable " on page 124
 "Status Byte Query " on page 124
 "Trigger " on page 124
 "Self Test Query " on page 125
 "Wait-to-Continue " on page 125

All (Daily use)

Immediately executes an alignment of all subsystems which includes both the source and the analyzer in the TRX module. The "All" alignment is sufficient to maintain specified performance, provided that (1) the TRX's internal temperature has not drifted more than ± 5 degree C since the previous alignment, and (2) no more than 8 hours have elapsed since the previous "All" alignment., and (3) no more than 1 week has elapsed since these three alignments have all been run: IF, RF, and Source, and (4) a 45 minute warm-up period between power-up of the TRX and invoking the "All" alignment. The instrument stops any measurement currently underway, performs the alignment, then restarts the measurement from the beginning (similar to pressing the **Restart** key).

If an interfering user signal is present at the RF Input, the alignment is performed on all subsystems except the RF. After completion, the Error Condition message "Align skipped: 50 MHz interference" or "Align skipped: 4.8 GHz interference" is generated. In addition the Error Condition message "Align Now, RF required" is generated, and bits 11 and 12 are set in the Status Questionable Calibration register.

The query form of the remote commands (:CALibration[:ALL]? or *CAL?) invokes the alignment of all subsystems and returns a success or failure value. An interfering user signal is not grounds for failure; if the alignment was able to succeed on all portions but unable to align the RF because of an interfering signal, the resultant will be the success value.

Successful completion of **Align Now, All** will clear the "Align Now, All required" Error Condition, and clear bit 14 in the Status Questionable Calibration register. It will also begin the elapsed time counter for Last Align Now, All Time, and capture the Last Align Now, All Temperature.

If the Align RF subsystem succeeded in aligning (no interfering signal present), the elapsed time counter begins for Last Align Now, RF Time, and the temperature is captured for the Last Align Now, RF Temperature. In addition the Error Conditions “Align skipped: 50 MHz interference” and “Align skipped: 4.8 GHz interference” are cleared, the Error Condition “Align Now, RF required” is cleared, and bits 11 and 12 are cleared in the Status Questionable Calibration register

Align Now, All can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs the Error Condition message “Align Now, All required” is generated, and bit 14 is set in the Status Questionable Condition register. This is because new alignment data may be employed for an individual subsystem, but not a cohesive set of data for all subsystems.

In many cases, you might find it more convenient to change alignments to Normal, instead of executing Align Now, All. When the Auto Align process transitions to Normal, the analyzer will immediately start to update only the alignments that have expired, thus efficiently restoring the alignment process.

NOTE

In EXF, Source ARB play will be turned off and the source states will not be restored after **Align Now, All**.

Key Path	System, Alignments, Align Now
Mode	All
Remote Command	:CALibration[:ALL] :CALibration[:ALL]?
Example	:CAL
Notes	:CALibration[:ALL]? returns 0 if successful :CALibration[:ALL]? returns 1 if failed :CALibration[:ALL]? is the same as *CAL? While Align Now, All is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion will clear bit 14 in the Status Questionable Calibration register. An interfering user signal is not grounds for failure of Align Now, All. However, bits 11 and 12 are set in the Status Questionable Calibration register to indicate Align Now, RF is required. An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed.
Couplings	Initializes the time for the Last Align Now, All Time. Records the temperature for the Last Align Now, All Temperature. If Align RF component succeeded, initializes the time for the Last Align Now, RF Time. If Align RF component succeeded, records the temperature for the Last Align Now, RF Temperature.
Status Bits/OPC dependencies	Bits 11, 12, or 14 may be set in the Status Questionable Calibration register.
Initial S/W Revision	Prior to A.02.00

Mode	All
Remote Command	*CAL?
Example	*CAL?
Notes	*CAL? returns 0 if successful *CAL? returns 1 if failed :CALibration[:ALL]? is the same as *CAL? See additional remarks described with :CALibration[:ALL]? Everything about :CALibration[:ALL]? is synonymous with *CAL? including all conditions, status register bits, and couplings
Initial S/W Revision	Prior to A.02.00

Mode	All
Remote Command	:CALibration[:ALL]:NPENding
Example	CAL:NPEN
Notes	:CALibration[:ALL]:NPENding is the same as :CALibration[:ALL] including all conditions, status register bits, except this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not. Typical usage is: 1) :CALibration:ALL:NPENding (Start a calibration) 2) :STATus:OPERation:CONDition? (Check if the calibration is completed or not, If bit 0 is set, then the system is doing calibration, the user should repeat this scpi query until the bit is cleared) 3) :STATus:QUESTionable:CALibration:CONDition? (Check if there are any errors/failures in previous calibration procedure)
Initial S/W Revision	X.14.20

Clear Status

Clears the status byte register. It does this by emptying the error queue and clearing all bits in all of the event registers. The status byte register summarizes the states of the other registers. It is also responsible for generating service requests.

Key Path	No equivalent key. Related key System, Show Errors, Clear Error Queue
Remote Command	*CLS
Example	*CLS Clears the error queue and the Status Byte Register.
Notes	For related commands, see the SYSTem:ERRor[:NEXT]? command. See also the STATus:PRESet command and all commands in the STATus subsystem.
Status Bits/OPC dependencies	Resets all bits in all event registers to 0, which resets all the status byte register bits to 0 also.
Backwards Compatibility Notes	In general the status bits used in the X-Series status system will be backwards compatible with ESA and PSA. However, note that all conditions will generate events that go into the event log, and some

	will also generate status bits.
Initial S/W Revision	Prior to A.02.00

Standard Event Status Enable

Selects the desired bits from the standard event status enable register. This register monitors I/O errors and synchronization conditions such as operation complete, request control, query error, device dependent error, status execution error, command error, and power on. The selected bits are OR'd to become a summary bit (bit 5) in the byte register which can be queried.

The query returns the state of the standard event status enable register.

Key Path	No equivalent key. Related key System, Show Errors, Clear Error Queue
Remote Command	*ESE <integer> *ESE?
Example	*ESE 36 Enables the Standard Event Status Register to monitor query and command errors (bits 2 and 5). *ESE? Returns a 36 indicating that the query and command status bits are enabled.
Notes	For related commands, see the STATus subsystem and SYSTem:ERRor[:NEXT]? commands.
Preset	255
State Saved	Not saved in state.
Min	0
Max	255
Status Bits/OPC dependencies	Event Enable Register of the Standard Event Status Register.
Initial S/W Revision	Prior to A.02.00

Standard Event Status Register Query

Queries and clears the standard event status event register. (This is a destructive read.) The value returned is a hexadecimal number that reflects the current state (0/1) of all the bits in the register.

Remote Command	*ESR?
Example	*ESR? Returns a 1 if there is either a query or command error, otherwise it returns a zero.
Notes	For related commands, see the STATus subsystem commands.
Preset	0
Min	0
Max	255
Status Bits/OPC dependencies	Standard Event Status Register (bits 0 – 7).
Initial S/W Revision	Prior to A.02.00

Identification Query

Returns a string of instrument identification information. The string will contain the model number, serial number, and firmware revision.

The response is organized into four fields separated by commas. The field definitions are as follows:

- Manufacturer
- Model
- Serial number
- Firmware version

Key Path	No equivalent key. See related key System, Show System.
Remote Command	*IDN?
Example	*IDN? Returns instrument identification information, such as: Keysight Technologies, E6650A, US01020004, E.14.50
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	x.14.50

Operation Complete

The *OPC command sets bit 0 in the standard event status register (SER) to “1” when pending operations have finished, that is when all overlapped commands are complete. It does not hold off subsequent operations. You can determine when the overlapped commands have completed either by polling the OPC bit in SER, or by setting up the status system such that a service request (SRQ) is asserted when the OPC bit is set.

The *OPC? query returns a “1” after all the current overlapped commands are complete. So it holds off subsequent commands until the “1” is returned, then the program continues. This query can be used to synchronize events of other instruments on the external bus.

Remote Command	*OPC *OPC?
Example	INIT:CONT 0 Selects single sweeping. INIT:IMM Initiates a sweep. *OPC? Holds off any further commands until the sweep is complete.
Status Bits/OPC dependencies	Not global to all remote ports or front panel. *OPC only considers operation that was initiated on the same port as the *OPC command was issued from. *OPC is an overlapped command, but *OPC? is sequential.
Backwards Compatibility Notes	1. The ESA/PSA/VSA products do not meet all the requirements for the *OPC command specified by IEEE 488.2. This is corrected for X-Series. This will sometimes cause behavior that is not backward compatible, but it will work as customers expect.

	2. Commands such as, *OPC/*OPC?/*WAI/*RST used to be global. They considered front panel operation in conjunction with the GPIB functionality. Now they are evaluated on a per channel basis. That is, the various rear panel remote ports and the front panel i/o are all considered separately. Only the functionality initiated on the port where the *OPC was sent, is considered for its operation. 3. *OPC used to hold off until the operation bits were cleared. Now it holds off until all overlapping commands are completed. Also, earlier instruments did not wait for completion of all processes, only the ones identified here (in the STATus:OPERation register): Calibrating: monitored by PSA, ESA, VSA (E4406A) Sweeping: monitored by PSA, ESA, VSA (E4406A) Waiting for Trigger: monitored by PSA, ESA, VSA (E4406A) Measuring: monitored by PSA and ESA (but not in all Modes). Paused: monitored by VSA (E4406A). Printing: monitored by VSA (E4406A). Mass memory busy: monitored by VSA (E4406A).
Initial S/W Revision	Prior to A.02.00

Query Instrument Options

Returns a string of all the installed instrument options. It is a comma separated list with quotes, such as: "503,P03,PFR".

To be IEEE compliant, this command should return an arbitrary ascii variable that would not begin and end with quotes. But the quotes are needed to be backward compatible with previous SA products and software. So, the actual implementation will use arbitrary ascii. But quotes will be sent as the first and last ascii characters that are sent with the comma-separated option list.

Remote Command	*OPT?
Initial S/W Revision	Prior to A.02.00

Recall Instrument State

This command recalls the instrument state from the specified instrument memory register.

- If the state being loaded has a newer firmware revision than the revision of the instrument, no state is recalled and an error is reported
- If the state being loaded has an equal firmware revision than the revision of the instrument, the state will be loaded.
- If the state being loaded has an older firmware revision than the revision of the instrument, the instrument will only load the parts of the state that apply to the older revision.

Remote Command	*RCL <register #>
Example	*RCL 7 Recalls the instrument state that is currently stored in register 7.

Notes	Registers 0 through 6 are accessible from the front panel in menu keys for Recall Registers.
Min	0
Max	127
Status Bits/OPC dependencies	The command is sequential.
Initial S/W Revision	Prior to A.02.00

*RST (Remote Command Only)

*RST is equivalent to :SYST:PRES::INIT:CONT OFF, which is a Mode Preset in the Single measurement state. This remote command is preferred over Mode Preset remote command - :SYST:PRES, as optimal remote programming occurs with the instrument in the single measurement state.

Remote Command	*RST
Example	*RST
Notes	Sequential Clears all pending OPC bits and the Status Byte is set to 0.
Couplings	A *RST will cause the currently running measurement to be aborted and cause the default measurement to be active. *RST gets the mode to a consistent state with all of the default couplings set.
Backwards Compatibility Notes	In legacy analyzers *RST did not set the analyzer to Single, but in the X-Series it does, for compliance with the IEEE 488.2 specification. In the X-Series, *RST does not do a *CLS (clear the status bits and the error queue). In legacy analyzers, *RST used to do the equivalent of SYSTem:PRESet, *CLS and INITiate:CONTinuous OFF. But to be 488.2 compliant, *RST in the X-Series does not do a *CLS.
Initial S/W Revision	Prior to A.02.00

Save Instrument State

This command saves the current instrument state and mode to the specified instrument memory register.

Remote Command	*SAV <register #>
Example	*SAV 9 Saves the instrument state in register 9.
Notes	Registers 0 through 6 are accessible from the front panel in menu keys for Save Registers.
Min	0
Max	127
Status Bits/OPC dependencies	The command is sequential.
Initial S/W Revision	Prior to A.02.00

Service Request Enable

This command enables the desired bits of the service request enable register.

The query returns the value of the register, indicating which bits are currently enabled.

Remote Command	*SRE <integer> *SRE?
Example	*SRE 22 Enables bits 1, 2, and 4 in the service request enable register.
Notes	For related commands, see the STATus subsystem and SYSTem:ERRor[:NEXT]? commands.
Preset	0
Min	0
Max	255
Status Bits/OPC dependencies	Service Request Enable Register (all bits, 0 – 7).
Initial S/W Revision	Prior to A.02.00

Status Byte Query

Returns the value of the status byte register without erasing its contents.

Remote Command	*STB?
Example	*STB? Returns a decimal value for the bits in the status byte register. For example, if a 16 is returned, it indicates that bit 5 is set and one of the conditions monitored in the standard event status register is set.
Notes	See related command *CLS.
Status Bits/OPC dependencies	Status Byte Register (all bits, 0 – 7).
Initial S/W Revision	Prior to A.02.00

Trigger

This command triggers the instrument. Use the :TRIGger[:SEQuence]:SOURce command to select the trigger source.

Key Path	No equivalent key. See related keys Single and Restart.
Remote Command	*TRG
Example	*TRG Triggers the instrument to take a sweep or start a measurement, depending on the current instrument settings.
Notes	See related command :INITiate:IMMediate.
Initial S/W Revision	Prior to A.02.00

Self Test Query

This query performs the internal self-test routines and returns a number indicating the success of the testing. A zero is returned if the test is successful, 1 if it fails.

Remote Command	*TST?
Example	*TST? Runs the self-test routines and returns 0=passed, 1=some part failed.
Initial S/W Revision	Prior to A.02.00

Wait-to-Continue

This command causes the instrument to wait until all overlapped commands are completed before executing any additional commands. There is no query form for the command.

Remote Command	*WAI
Example	INIT:CONT OFF; INIT;*WAI Sets the instrument to single sweep. Starts a sweep and waits for its completion.
Status Bits/OPC dependencies	Not global to all remote ports or front panel. *OPC only considers operation that was initiated on the same port as the *OPC command was issued from.
Initial S/W Revision	Prior to A.02.00

4 Input/Output Functions

Input/Output

The Input/Output features are common across multiple Modes and Measurements. These common features are described in this section. See the Measurement description for information on features that are unique.

The Input/Output key accesses the keys that control the Input/Output parameters of the instrument. In general, these are functions associated with external connections to the analyzer, either to the inputs or the outputs. Since these connections tend to be fairly stable within a given setup, in general, the input/output settings do not change when you Preset the analyzer.

Other functions related to the input/output connections, but which tend to change on a measurement by measurement basis, can be found under the **Trigger** and **AMPTD Y Scale** keys. In addition, some of the digital I/O bus configurations can be found under the **System** key.

NOTE

The functions in the Input/Output menu are "global" (common) to all Modes (applications). But individual Input/Output functions only appear in a Mode if they apply to that Mode. Functions that apply to a Mode but not to all measurements in the Mode may be grayed-out in some measurements.

"Input/Output variables – Preset behavior" on page 129

The Input Port selection is the first menu under the **Input/Output** key:

Key Path	Front-panel key
Remote Command	[:SENSe] :FEED RF AIQ EMIXer [:SENSe] :FEED?
Example	:FEED RF :FEED?
Couplings	The [:SENSe] :FEED RF command turns the calibrator OFF
Preset	This setting is unaffected by a Preset or power cycle. It survives a Mode Preset and mode changes. It is set to RF on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state
Backwards Compatibility SCPI	[:SENSe] :FEED AREference In the PSA the calibrator was one of the inputs and selected using the AREF parameter to the same :FEED command that switched the inputs. In the X-Series it is controlled in a separate menu and overrides the input selection. For code compatibility the [:SENSe] :FEED AREference command is provided, and is aliased to [:SENSe] :FEED :AREF REF50, which causes the input to be switched to the 50 MHz calibrator. The [:SENSe] :FEED RF command switches the input back to the RF port and turns the calibrator OFF, thus providing full compatibility with the PSA calibrator function. Note that after sending this, the query [:SENSe] :FEED? will NOT return "AREF" but instead the currently selected input.
Backwards Compatibility SCPI	[:SENSe] :FEED IQ IONLy QONLy [:SENSe] :FEED? The parameters IQ IONLy QONLy are supported for backwards compatibility with the E44406A. [:SENSe] :FEED IQ aliases to [:SENSe] :FEED :IQ :TYPE IQ [:SENSe] :FEED IONLy aliases to [:SENSe] :FEED :IQ :TYPE IONLy

	[SENSe]:FEED QONLY aliases to [SENSe]:FEED:IQ:TYPE QONLY The query [SENSe]:FEED? will always returns AIQ whatever the type of legacy parameters IQ IONLY QONLY has been used.
Backwards Compatibility Notes	Most of the settings in the X-Series Input/Output system, including External Gain, Amplitude Corrections settings and data, etc., are shared by all modes and are not changed by a mode switch. Furthermore, most variables in the Input/Output system key are not affected by Mode Preset. Both of these behaviors represent a departure from legacy behavior. In the X-Series. Input/Output settings are reset by using the "Restore Input/Output Defaults" function. They can also be reset to their default values through the System->Restore System Defaults-> In/Out Config key or through the System ->Restore System Defaults -> All key (and corresponding SCPI). While this matches most use cases better, it does create some code compatibility issues. For example, Amplitude Corrections are no longer turned off by a Mode Preset, but instead by using the "Restore Input/Output Defaults" key/SCPI. Although Input/Output settings are not part of each Mode's State, they are saved in the Save State files, so that all of the instrument settings can be recalled with Recall State, as in legacy instruments.
Initial S/W Revision	Prior to A.02.00
Remote Command	:INPut:MIXer EXTernal INTernal :INPut:MIXer?
Example	INP:MIX INT INP:MIX?
Notes	In legacy analyzers you choose between the Internal mixer or an External Mixer. In the X-Series, the External Mixer is one of the choices for the Input and is selected using the FEED command (:SENSe:FEED EXTMixer). For compatibility, the INPut:MIXer EXTernal INTernal legacy command is mapped as follows: 1. When INPut:MIXer EXTernal is received, SENSe:FEED EMIXer is executed. 2. When INPut:MIXer INTernal is received, SENSe:FEED RF is executed. 3. When INPut:MIXer? is received, the response will be INT if any input other than the external mixer is selected and EXT if the external mixer is selected
Preset	INT
Backwards Compatibility Notes	PSA supports the following SCPI Command : :INPut:MIXer:TYPE PRESelected UNPReselect :INPut:MIXer:TYPE? PXA does not support the :INPut:MIXer:TYPE command.
Initial S/W Revision	A.08.01

Input/Output variables - Preset behavior

Virtually all the input/output settings are NOT a part of mode preset. They can be set to their default value

by one of the three ways:

- by using the Restore Input/Output Defaults key on the first page of the input/output menu,
- by using the System->Restore System Defaults->Input/Output Settings or,
- by using the System -> Restore System Defaults->All. Also, they survive a Preset and a Power cycle.

A very few of the Input/Output settings do respond to a Mode Preset; for example, if the Calibrator is on it turns off on a Preset, and if DC coupling is in effect it switches to AC on a Preset. These exceptions are made in the interest of reliability and usability, which overrides the need for absolute consistency. Exceptions are noted in the SCPI table for the excepted functions.

RF Input

Selects the front-panel RF input port to be the analyzer signal input. If RF is already selected, pressing this key accesses the RF input setup functions.

Key Path	Input/Output
Example	[::SENSe]:FEED RF
Couplings	The act of connecting the U7227A USB Preamplifier to one of the analyzer's USB ports will cause the Input to automatically switch to the RF Input. If the RF Calibrator is on, it is turned off. Subsequently disconnecting the USB Preamp from USB does not change the Input selection nor restore the previous selection.
Readback	The RF input port, RF coupling, and current input impedance settings appear on this key as: "XX, YY, ZZ" where XX is RF, RF2, RFIO1, RFIO2, depending on what input is selected (only appears on analyzers with multiple RF inputs) YY is AC or DC ZZ is 50Ω or 75Ω
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.14.00

External Gain

Compensates for gain or loss in the measurement system outside the spectrum analyzer. The External Gain is subtracted from the amplitude readout (or the loss is added to the amplitude readout). So, the displayed signal level represents the signal level at the output of the device-under-test, which can be the input of an external device that provides gain or loss.

Entering an External Gain value does not affect the Reference Level, therefore the trace position on screen changes, as do all of the values represented by the trace data. Thus, the values of exported trace data, queried trace data, marker amplitudes, trace data used in calculations such as N dB points, trace math, peak threshold, etc., are all affected by External Gain. Changing the External Gain, even on a trace that is not updating, will immediately change all of the above, without new data needing to be taken.

NOTE

Changing the External Gain causes the analyzer to immediately stop the current sweep and prepare to begin a new sweep. The data will not change until the trace data updates because the offset is applied to the data as it is taken. If a trace is exported with a nonzero External Gain, the exported data will contain the trace data with the offset applied.

In the Spectrum Analyzer mode, a Preamp is the common external device providing gain or loss. In a measurement application mode like GSM or W-CDMA, the gain or loss could be from a BTS (Base Transceiver Station) or an MS (Mobile Station). So in the Spectrum Analyzer mode MS and BTS would be grayed out and the only choice would be Ext Preamp. Similarly in some of the digital communications applications, Ext Preamp will be grayed out and you would have a choice of MS or BTS.

Key Path	Input/Output
Couplings	The Ext Preamp, MS, and BS keys may be grayed out depending on which measurement is currently selected. If any of the grayed out keys are pressed, or the equivalent SCPI command is sent, an advisory message is generated.
Readback	1-of-N selection [variable]
Initial S/W Revision	Prior to A.02.00

Restore Input/Output Defaults

This selection causes the group of settings and data associated with the **Input/Output** key to be a reset to their default values. In addition, when a Source is installed, licensed and selected, Restore Input/Output defaults will initiate a Source Preset.

This level of Restore System Defaults does not affect any other system settings or mode settings and does not cause a mode switch. All the features described in this section are reset using this key, including Input Corrections and Data (described in the Corrections section).

Key Path	Input/Output
Example	:SYST:DEF INP presets all the Input/Output variables to their factory default values.
Notes	Refer to the Utility Functions for information about Restore System Defaults and the complete description of the :SYSTem:DEFAult INPut: command.
Initial S/W Revision	Prior to A.02.00

LISN Control

Enables you to access LISN related functions. LISN control is only available with option LSN indicating that the LISN IO board is installed. This is a remote query command only.

V-network (Remote Command Only)

Enables you to select the V-network that is controlled via the AUX IO port.

Remote Command	INPut [1] 2:LISN[:TYPE] FOURphase ESH2Z5 ENV216 OFF INPut [1] 2:LISN[:TYPE] ?

Example	:INP:LISN FOUR
Notes	FOURPhase and ESH2-Z5 R&S ESH2-Z5 (four phases and protective earth are controllable) ENV216 R&S ENV216 (two phases and highpass are controllable) OFF Remote control deactivated This query will return :- FOUR when ESH2-Z5 is selected.
Preset	Set to off on a "Restore Input/Output Defaults"
State Saved	Saved in instrument state
Initial S/W Revision	A.14.50

Phase (Remote Command Only)

This command enables you to select the phase of the V-network that is used, which is controlled via the AUX IO port. The permissible selection depends on the selected V-network.

Remote Command	INPut [1] 2:LISN:PHASe L1 L2 L3 N INPut [1] 2:LISN:PHASe?
Example	:INP:LISN:PHAS L1
Couplings	L2, L3 keys are grayed out when ENV216 is selected. If the grayed out key is pressed, an advisory message is generated. If the equivalent SCPI command is sent, this same message is generated as part of a "-224, Illegal parameter value; must apply ESH2Z5 to make this phase available" warning.
Preset	Set to N on a "Restore Input/Output Defaults"
State Saved	Saved in instrument state
Range	Phase N Phase L1 Phase L2 Phase L3 Only one phase can be selected.
Initial S/W Revision	A.14.50

150 kHz Highpass (Remote Command Only)

Controls highpass setting on the V-network.

Remote Command	INPut [1] 2:LISN:FILTer:HPAS[:STATe] ON OFF INPut [1] 2:LISN:FILTer:HPAS[:STATe] ?
Example	:INP:LISN:FILT:HPAS ON
Dependencies	Only available for ENV216 V-network . This key is grayed out when a V-network that is not ENV216 is selected. If the grayed out key is pressed, an advisory message is generated. If the equivalent SCPI command is sent, this same message is generated as part of a "-221, Settings conflicts; LISN function not available" warning.

Preset	Set to off on a "Restore Input/Output Defaults"
State Saved	Saved in instrument state
Range	ON OFF
Initial S/W Revision	A.14.50

Protective Earth (Remote Command Only)

Enables you to set the Protective Earth setting that is controlled via the AUX IO port.

Remote Command	INPut[1] 2:LISN:PEARth GROunded FLOating INPut[1] 2:LISN:PEARth?
Example	:INP:LISN:PEAR GRO
Dependencies	Only available for ESH2Z5. This key is grayed out when a v-network other than ESH2Z5 is selected. If the grayed out key is pressed, an advisory message is generated. If the equivalent SCPI command is sent, this same message is generated as part of a "-221, Settings conflict; LISN function not available" warning.
Preset	Set to GRO on a "Restore Input/Output Defaults"
State Saved	Saved in instrument state
Range	GRO FLO
Initial S/W Revision	A.14.50

5 Mode Functions

Mode

The Mode key allows you to select the available measurement applications or “Modes”. Modes are a collection of measurement capabilities packaged together to provide an instrument personality that is specific to your measurement needs. Each application software product is ordered separately by Model Number and must be licensed to be available. Once an instrument mode is selected, only the commands that are valid for that mode can be executed.

NOTE

Key operation can be different between modes. The information displayed in Help is about the current mode.

To access Help for a different Mode you must first exit Help (by pressing the Cancel (Esc) key). Then select the desired mode and re-access Help.

For more information on Modes, preloading Modes, and memory requirements for Modes,

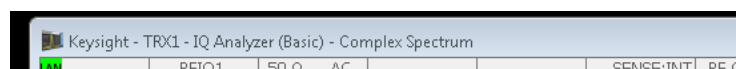
see ["More Information" on page 137](#)

Key Path	Front-panel key
Remote Command	:INSTrument[:SElect] SA RTSA SEQAN EMI BASIC WCDMA EDGE GSM WIMAXOFDMA VSA PNOISE NFIGure ADEMOD BTooth TDSCDMA CDMA2K CDMA1XEV LTE LTE TDD LTEAFDD LTEATDD MSR DVB DTMB DCTV ISDBT CMMB WLAN CWLAN CWIMAXOFDM WIMAXFIXED IDEN RLC SCPILC VSA89601 :INSTrument[:SElect]?
Example	:INST SA
Notes	The available parameters are dependent upon installed and licensed applications resident in the instrument. Parameters given here are an example, specific parameters are in the individual Application. A list of the valid mode choices is returned with the INST:CAT? Query.
Preset	This is unaffected by a Preset but is set on a “Restore System Defaults->All” to:
State Saved	Saved in instrument state
Backwards Compatibility SCPI	:INSTrument[:SElect] GSM provided for backwards compatibility. Mapped to EDGE GSM.
Backwards Compatibility SCPI	:INSTrument[:SElect] SANalyzer provided for ESU compatibility. When this command is received, the analyzer aliases it to the following: INST:SEL SCPILC This results in the analyzer being placed in SCPI Language Compatibility Mode, in order to emulate the ESU Spectrum Analyzer Mode.
Backwards Compatibility SCPI	:INSTrument[:SElect] RECeiver provided for ESU compatibility. When this command is received, the analyzer aliases it to the following: :INST:SEL EMI :CONF FSC

	This results in the analyzer being placed in the EMI Receiver Mode, running the Frequency Scan measurement, in order to emulate the ESU Receiver Mode.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.13.00
Example	:INST 'SA'
Notes	The query is not a quoted string. It is an enumeration as indicated in the Instrument Select table above. The command must be sequential: i.e. continued parsing of commands cannot proceed until the instrument select is complete and the resultant SCPI trees are available.
Backwards Compatibility SCPI	:INSTrument[:SElect] 'SA' 'PNOISE' 'EDGE' 'GSM' 'BASIC'
Initial S/W Revision	Prior to A.02.00

More Information

The Mode name appears on the banner after the word “Keysight” followed by the Measurement Title. For example, for the IQ Analyzer mode with the Complex Spectrum measurement running:



It is possible to specify the order in which the Modes appear in the Mode menu, using the Configure Applications utility (**System, Power On, Configure Applications**). It is also possible, using the same utility, to specify a subset of the available applications to load into memory at startup time, which can significantly decrease the startup time of the analyzer. During runtime, if an application that is not loaded into memory is selected (by either pressing that applications Mode key or sending that applications :INST:SEL command over SCPI), there will be a pause while the Application is loaded. During this pause a message box that says “Loading application, please wait...” is displayed.

Each application (Mode) that runs in the X-Series signal analyzers consumes virtual memory. The various applications consume varying amounts of virtual memory, and as more applications run, the memory consumption increases. Once an application is run, some of its memory remains allocated even when it is not running, and is not released until the analyzer program (xSA.exe) is shut down.

Keysight characterizes each Mode and assigns a memory usage quantity based on a conservative estimate. There is a limited amount of virtual memory available to applications (note that this is virtual memory and is independent of how much physical RAM is in the instrument). The instrument keeps track of how much memory is being used by all loaded applications – which includes those that preloaded at startup, and all of those that have been run since startup.

When you request a Mode that is not currently loaded, the instrument looks up the memory estimate for that Mode, and adds it to the residual total for all currently loaded Modes. If there is not enough virtual memory to load the Mode, a dialog box and menu will appear that gives you four options:

1. Close and restart the analyzer program without changing your configured preloads. This may free up enough memory to load the requested Mode, depending on your configured preloads
2. Clear out all preloads and close and restart the analyzer program with only the requested application preloaded, and with that application running. This choice is guaranteed to allow you to run the requested application; but you will lose your previously configured preloads. In addition, there may be little or no room for other applications, depending on the size of the requested application.
3. Bring up the Configure Applications utility in order to reconfigure the preloaded apps to make room for the applications you want to run (this will then require restarting the analyzer program with your new configuration). This is the recommended choice because it gives you full flexibility to select exactly what you want.
4. Exit the dialog box without doing anything, which means you will be unable to load the application you requested.

In each case except 4, this will cause the analyzer software to close, and you will lose all unsaved traces and results.

If you attempt to load a mode via SCPI that will exceed memory capacity, the Mode does not load and an error message is returned:

```
-225, "Out of memory; Insufficient resources to load Mode (mode name) "
```

where "mode name" is the SCPI parameter for the Mode in question, for example, SA for Spectrum Analyzer Mode.

Sequence Analyzer

Selects the Sequence Analyzer mode for sequenced measurements. Depending on licensed applications there may be a number of different measurements available in this mode. These measurements are all done on IQ captured data and can be set up to calculated on any part of the capture.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
Example	INST:SEL SEQAN INST:NSEL 400
Initial S/W Revision	A.05.01

IQ Analyzer (Basic)

The IQ Analyzer Mode makes general purpose frequency domain and time domain measurements. These measurements often use alternate hardware signal paths when compared with a similar measurement in the Signal Analysis Mode using the Swept SA measurement. These frequency domain and time domain measurements can be used to output I/Q data results when measuring complex modulated digital signals.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
Example	INST:SEL BASIC INST:NSEL 8
Initial S/W Revision	Prior to A.02.00

W-CDMA with HSPA+

Selects the W-CDMA with HSPA+ mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
Example	INST:SEL WCDMA INST:NSEL 9
Initial S/W Revision	Prior to A.02.00

GSM/EDGE/EDGE Evo

Selects the GSM with EDGE mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
Example	INST:SEL EDGE GSM INST:NSEL 13
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

802.16 OFDMA (WiMAX/WiBro)

Selects the OFDMA mode for general purpose measurements of WiMAX signals. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
Example	INST:SEL WIMAX OFDMA

	INST:NSEL 75
Initial S/W Revision	Prior to A.02.00

Application Mode Number Selection (Remote Command Only)

Select the measurement mode by its mode number. The actual available choices depend upon which applications are installed in your instrument. The modes appear in this table in the same order they appear in the Mode menu (if the order is not changed by the Configure Applications utility found in the **System, Power On** menu). See ["Detailed List of Modes" on page 144](#) for Mode details.

The Mode Number is the parameter for use with the :INSTrument:NSElect command. The Mode Parameter is the parameter for use with the :INSTrument[:SElect] command.

Mode	Mode Number	Mode Parameter
Sequence Analyzer	400	SEQAN
I/Q Analyzer (Basic)	8	BASIC
WCDMA with HSPA+	9	WCDMA
GSM/EDGE/EDGE Evo	13	EDGE GSM
Analog Demod	234	ADEMOD
Bluetooth	228	BTtooth
TD-SCDMA with HSPA/8PSK	211	TDSCDMA
cdma2000	10	CDMA2K
1xEV-DO	15	CDMA1XEV
LTE	102	LTE
LTE TDD	105	LTETDD
LTE-Advanced FDD	107	LTEAFDD
LTE-Advanced TDD	108	LTEATDD
WLAN	217	WLAN
802.16 OFDM (Fixed WiMAX)	104	WIMAXFIXED

Remote Command	:INSTrument:NSElect <integer> :INSTrument:NSElect?
Example	:INST:NSEL 1
Notes	SA mode is 1 The command must be sequential: i.e. continued parsing of commands cannot proceed until the instrument select is complete and the resultant SCPI trees are available.

Preset	Not affected by Preset. Set to default mode (1 for SA mode) following Restore System Defaults.
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Application Mode Catalog Query (Remote Command Only)

Returns a string containing a comma separated list of names of all the installed and licensed measurement modes (applications). These names can only be used with the :INSTrument[:SElect] command.

Remote Command	:INSTrument:CATalog?
Example	:INST:CAT?
Notes	Query returns a quoted string of the installed and licensed modes separated with a comma. Example: "SA,PNOISE,WCDMA"
Backwards Compatibility Notes	VSA (E4406A) :INSTrument:CATalog? returned a list of installed INSTrument:SELECT items as a comma separated list of string values: "BASIC","GSM","EDGEgsm","CDMA","NADC","PDC","WCDMA","CDMA2K","CDMA1XEV","IDEN","WIDEN","WLAN","SERVICE" X-Series uses the ESA/PSA compatible query of a string contain comma separated values: "SA,PNOISE,NFIGURE,BASIC,CDMA,CDMA2K,WCDMA,CDMA1XEV,EDGEgsm,GSM,NADC,PDC,TDSCDMA,DMODULATION,WLAN"
Initial S/W Revision	Prior to A.02.00

Application Identification (Remote Commands Only)

Each entry in the Mode Menu will have a Model Number and associated information: Version, and Options.

This information is displayed in the Show System screen. The corresponding SCPI remote commands are defined here.

"Current Application Model " on page 141

"Current Application Revision" on page 142

"Current Application Options" on page 142

Current Application Model

Returns a string that is the Model Number of the currently selected application (mode).

Remote Command	:SYSTem:APPLication[:CURRent] [:NAME] ?
Example	:SYST:APPL?
Notes	Query returns a quoted string that is the Model Number of the currently selected application (Mode).

	Example: "N9060A" String length is 6 characters.
Preset	Not affected by Preset
State Saved	Not saved in state, the value will be the selected application when a Save is done.
Initial S/W Revision	Prior to A.02.00

Current Application Revision

Returns a string that is the Revision of the currently selected application (mode).

Remote Command	:SYSTem:APPLication[:CURRent]:REVision?
Example	:SYST:APPL:REV?
Notes	Query returns a quoted string that is the Revision of the currently selected application (Mode). Example: "1.0.0.0" String length is a maximum of 23 characters. (each numeral can be an integer + 3 decimal points)
Preset	Not affected by a Preset
State Saved	Not saved in state, the value will be the selected application when a Save is done.
Initial S/W Revision	Prior to A.02.00

Current Application Options

Returns a string that is the Options list of the currently selected application (Mode).

Remote Command	:SYSTem:APPLication[:CURRent]:OPTion?
Example	:SYST:APPL:OPT?
Notes	Query returns a quoted string that is the Option list of the currently selected application (Mode). The format is the name as the *OPT? or SYSTem:OPTion command: a comma separated list of option identifiers. Example: "1FP,2FP" String length is a maximum of 255 characters.
Preset	Not affected by a Preset
State Saved	Not saved in state per se, the value will be the selected application when a Save is invoked.
Initial S/W Revision	Prior to A.02.00

Application Identification Catalog (Remote Commands Only)

A catalog of the installed and licensed applications (Modes) can be queried for their identification.

"Application Catalog Number of Entries" on page 143

"Application Catalog Model Numbers" on page 143

"Application Catalog Revision" on page 143

"Application Catalog Options" on page 144

Application Catalog Number of Entries

Returns the number of installed and licensed applications (Modes).

Remote Command	:SYSTem:APPLication:CATalog[:NAME]:COUNT?
Example	:SYST:APPL:CAT:COUN?
Preset	Not affected by Preset
State Saved	Not saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Application Catalog Model Numbers

Returns a list of Model Numbers for the installed and licensed applications (Modes).

Remote Command	:SYSTem:APPLication:CATalog[:NAME]?
Example	:SYST:APPL:CAT?
Notes	Returned value is a quoted string of a comma separated list of Model Numbers. Example, if SAMS and Phase Noise are installed and licensed: "N9060A,N9068A" String length is COUNT * 7 - 1. (7 = Model Number length + 1 for comma. -1 = no comma for the 1st entry.)
Preset	Not affected by a Preset
State Saved	Not saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Application Catalog Revision

Returns the Revision of the provided Model Number.

Remote Command	:SYSTem:APPLication:CATalog:REVision? <model>
Example	:SYST:APPL:CAT:REV? 'N9060A'
Notes	Returned value is a quoted string of revision for the provided Model Number. The revision will be a null-string ("") if the provided Model Number is not installed and licensed. Example, if SAMS is installed and licensed: "1.0.0.0"

Preset	Not affected by a Preset.
State Saved	Not saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Application Catalog Options

Returns a list of Options for the provided Model Number

Remote Command	:SYSTem:APPLication:CATalog:OPTion? <model>
Example	:SYST:APPL:CAT:OPT? 'N9060A'
Notes	Returned value is a quoted string of a comma separated list of Options, in the same format as *OPT? or :SYSTem:OPTion?. If the provided Model Number is not installed and licensed a null-string ("") will be returned. Example, if SAMS is installed and licensed: "2FP" String length is a maximum of 255 characters.
Preset	Not affected by a Preset
State Saved	Not saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Detailed List of Modes

This section contains an alphabetical list of Modes available in the X-Series, along with a brief description of each Mode.

89601 VSA

Selecting the 89601 VSA mode will start the 89600 VSA software. The 89600 VSA software is powerful, PC-based software, offering the industry's most sophisticated general purpose and standards specific signal evaluation and troubleshooting tools for R&D engineers. Even for proprietary and non-standard signals in SATCOM or MILCOM applications, you can make signal quality measurements with customized IQ constellation. Reach deeper into signals, gather more data on signal problems, and gain greater insight.

- Over 35 general-purpose analog and digital demodulators ranging from 2FSK to 4096QAM
- Flexible and custom IQ and OFDM signal analysis for single carrier
- Standards specific modulation analysis including:
 - Cellular: GSM/EDGE, cdma2000, W-CDMA, TD-SCDMA, LTE(FDD/TDD),
 - LTE-Advanced and more
 - Wireless networking: 802.11a/b/g, 802.11n, 802.ac, 802.16 WiMAX (fixed/mobile), WiSUN (MR-FSK PHY)
 - RFID
 - Digital satellite video and other satellite signals, radar, LMDS

- Up to 400K bin FFT, for the highest resolution spectrum analysis
- A full suite of time domain analysis tools, including signal capture and playback, time gating, and CCDF measurements
- 20 simultaneous trace displays and the industry's most complete set of marker functions
- Easy-to-use Microsoft Windows graphical user interface

For more information see the Keysight 89600 Series VSA web site at www.keysight.com/find/89600vsa

To learn more about how to use the 89600 VSA running in the X-Series, after the 89600 VSA software is running, open the 89600 VSA Help and open the "About Keysight X-Series Signal Analyzer with 89600 VSA Software" help topic.

Key Path	Mode
Example	INST:SEL VSA89601 INST:NSEL 101
Initial S/W Revision	Prior to A.02.00

GSM/EDGE/EDGE Evo

Selects the GSM with EDGE mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
Example	INST:SEL EDGEGSM INST:NSEL 13
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

IQ Analyzer (Basic)

The IQ Analyzer Mode makes general purpose frequency domain and time domain measurements. These measurements often use alternate hardware signal paths when compared with a similar measurement in the Signal Analysis Mode using the Swept SA measurement. These frequency domain and time domain measurements can be used to output I/Q data results when measuring complex modulated digital signals.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
Example	INST:SEL BASIC INST:NSEL 8

Initial S/W Revision	Prior to A.02.00

LTE

Selects the LTE mode for general purpose measurements of signals following the LTE FDD standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
Example	INST:SEL LTE INST:NSEL 102
Initial S/W Revision	Prior to A.02.00

LTE TDD

Selects the LTE TDD mode for general purpose measurements of signals following the LTE TDD standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
Example	INST:SEL LTETDD INST:NSEL 105
Initial S/W Revision	A.03.00

LTE-Advanced FDD

As LTE-Advanced FDD and LTE modes are converged into one single application, the single softkey under Mode menu is designed to select the covered mode. The display mode of the LTE and LTE-Advanced FDD are distinguished by the licenses.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
Example	INST:SEL LTEAFDD INST:NSEL 107
Notes	When the N9080A/80B-1FP exists, the display mode name is LTE. When the N9080A/80B-1FP and N9080B-2FP all exist, the display mode name is LTE FDD & LTE-A FDD.

Backwards Compatibility SCPI	INST:SEL LTE
	INST:NSEL 102
Initial S/W Revision	A.14.00
Modified at S/W Revision	A.14.50

LTE-Advanced TDD

As LTE-Advanced TDD and LTE TDD modes are converged into one single application, the single softkey under Mode menu is designed to select the converged mode. The display mode of the LTE TDD and LTE-Advanced TDD are distinguished by the licenses.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
Example	INST:SEL LTEATDD INST:NSEL 108
Notes	When the N9082A/82B-1FP exists, the display mode name is LTE TDD. When the N9082A/82B-1FP and N9082B-2FP all exist, the display mode name is LTE TDD & LTE-A TDD.
Backwards Compatibility SCPI	INST:SEL LTETDD INST:NSEL 105
Initial S/W Revision	A.14.00
Modified at S/W Revision	A.14.50

Sequence Analyzer

Selects the Sequence Analyzer mode for sequenced measurements. Depending on licensed applications there may be a number of different measurements available in this mode. These measurements are all done on IQ captured data and can be set up to calculated on any part of the capture.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
Example	INST:SEL SEQAN INST:NSEL 400
Initial S/W Revision	A.05.01

TD-SCDMA with HSPA/8PSK

Selects the TD-SCDMA mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
Example	INST:SEL TDSCDMA INST:NSEL 211
Initial S/W Revision	Prior to A.02.00

W-CDMA with HSPA+

Selects the W-CDMA with HSPA+ mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
Example	INST:SEL WCDMA INST:NSEL 9
Initial S/W Revision	Prior to A.02.00

WLAN

Selects the WLAN mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
Example	INST:SEL WLAN INST:NSEL 217
Initial S/W Revision	A.09.491

Global Settings

Opens a menu that allows you to switch certain Meas Global parameters to a Mode Global state. These switches apply to all Modes that support global settings. No matter what Mode you are in when you set the “Global Center Frequency” switch to on, it applies to all Modes that support Global Settings.

Key Path	Mode Setup
Initial S/W Revision	Prior to A.02.00

Global Center Freq

The software maintains a Mode Global value called “Global Center Freq”.

When the **Global Center Freq** key is switched to **On** in any mode, the current mode’s center frequency is copied into the Global Center Frequency, and from then on all modes that support global settings use the Global Center Frequency. So you can switch between any of these modes and the Center Freq will remain unchanged.

Adjusting the Center Freq of any mode which supports Global Settings, while **Global Center Freq** is **On**, will modify the Global Center Frequency.

When **Global Center Freq** is turned **Off**, the Center Freq of the current mode is unchanged, but now the Center Freq of each mode is once again independent.

When **Mode Preset** is pressed while **Global Center Freq** is **On**, the Global Center Freq is preset to the preset Center Freq of the current mode.

This function is reset to Off when the Restore Defaults key is pressed in the Global Settings menu, or when **System, Restore Defaults, All Modes** is pressed.

Key Path	Mode Setup, Global Settings
Scope	Mode Global
Remote Command	:INSTrument:COUPle:FREQuency:CENTer ALL NONE :INSTrument:COUPle:FREQuency:CENTer?
Example	INST:COUP:FREQ:CENT ALL INST:COUP:FREQ:CENT?
Preset	Set to Off on Global Settings, Restore Defaults and System, Restore Defaults, All Modes
Range	On Off
Initial S/W Revision	Prior to A.02.00

Remote Command	:GLOBal:FREQuency:CENTer[:STATe] 1 0 ON OFF :GLOBal:FREQuency:CENTer[:STATe]?
Preset	Off
Initial S/W Revision	Prior to A.02.00

Restore Defaults

This key resets all of the functions in the Global Settings menu to Off. This also occurs when **System, Restore Defaults, All Modes** is pressed.

Key Path	Mode Setup, Global Settings
Remote Command	:INSTrument:COUPle:DEFault
Example	INST:COUP:DEF
Backwards Compatibility SCPI	:GLOBal:DEFault
Initial S/W Revision	Prior to A.02.00

Mode Setup

Opens a menu of keys that allows you to specify parameters of the mode.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Radio

Accesses the Radio setup menu.

Key Path	Mode Setup
Initial S/W Revision	Prior to A.02.00

Demod

Accesses the Demod setup menu.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Carrier BPF

This functionality is the same as the Carrier BPF key in the FREQ/Channel menu. See ["Carrier BPF" on page 1417](#) for details.

Key Path	Mode Setup, Demod
Initial S/W Revision	Prior to A.02.00

Carrier BPF

Selects whether to use the carrier bandpass filter.

Key Path	FREQ Channel, Multi Carrier SetupMode Setup, Demod
Mode	GSM
Remote Command	<code>[:SENSe]:RADio:CARRier:NUMBer:AUTO ON OFF 1 0</code> <code>[:SENSe]:RADio:CARRier:NUMBer:AUTO?</code>
Example	<code>RAD:CARR:NUMB:AUTO 1</code> <code>RAD:CARR:NUMB:AUTO?</code>
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned

Couplings	ON automatically changes to OFF when Multiple or Single is selected as Carrier BPF Type.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.06.00

Carrier BPF Type

Opens a menu of keys that allows you to select the type of the bandpass filter. When carriers other than the signal of interest are present, especially if they are strong, they can interfere with the measurement, making it difficult to sync and producing artificially high EVM results. When this condition exists, toggle from Single to Multi. A band-limited filter will help reduce the measurement interference.

BPF Type	Description
MULTiple	Enable multi carrier tolerance filter.
SINGLE	Disable multi carrier tolerance filter

This parameter applies only to the following measurements:

- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement
- GMSK Power vs. Time
- EDGE Power vs. Time

Key Path	FREQ Channel, Multi Carrier Setup, Carrier BPFMode Setup, Demod, Carrier BPF
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:RADio:CARRier:NUMBer SINGLE MULTiple [:SENSe]:RADio:CARRier:NUMBer?
Example	RAD:CARR:NUMB SING RAD:CARR:NUMB?
Notes	The Carrier Bandpass Filter key is in the Mode Setup menu, but only EDGE EVM and GSM PFER measurements support this feature. In other measurements, this setting is not applicable. You must be in the GSM mode to use this command. Use INSTrument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	SINGLE
State Saved	Saved in instrument state.
Range	Single Multi

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

Restore Mode Defaults

Resets the state for the currently active mode by resetting the mode persistent settings to their factory default values, clearing mode data and by performing a Mode Preset. This function will never cause a mode switch. This function performs a full preset for the currently active mode; whereas, Mode Preset performs a partial preset. Restore Mode Defaults does not affect any system settings. System settings are reset by the Restore System Defaults function. This function does reset mode data; as well as settings.

Key Path	Mode Setup
Remote Command	:INSTrument:DEFault
Example	:INST:DEF
Notes	Clears all pending OPC bits. The Status Byte is set to 0. A message comes up saying: "If you are sure, press key again".
Couplings	A Restore Mode Defaults will cause the currently running measurement to be aborted and causes the default measurement to be active. It gets the mode to a consistent state with all of the default couplings set.
Initial S/W Revision	Prior to A.02.00

Preset Type (Remote Command Only)

As stated in the Backward Compatibility section, to be compatible with ESA/PSA the PRESet:TYPE command will be implemented as a no-op.

Mode	All
Remote Command	:SYSTem:PRESet:TYPE FACTory MODE USER :SYSTem:PRESet:TYPE?
Example	:SYST:PRES:TYPE FACT
Notes	This command is supported for backward compatibility only. It is a no-op which does not change the behavior of any preset operation.
Preset	This is unaffected by Preset but is set to Mode on a "Restore System Defaults->All"
State Saved	No
Initial S/W Revision	Prior to A.02.00

6 System Functions

File

Opens a menu that enables you to access various standard and custom Windows functions. Press any other front-panel key to exit

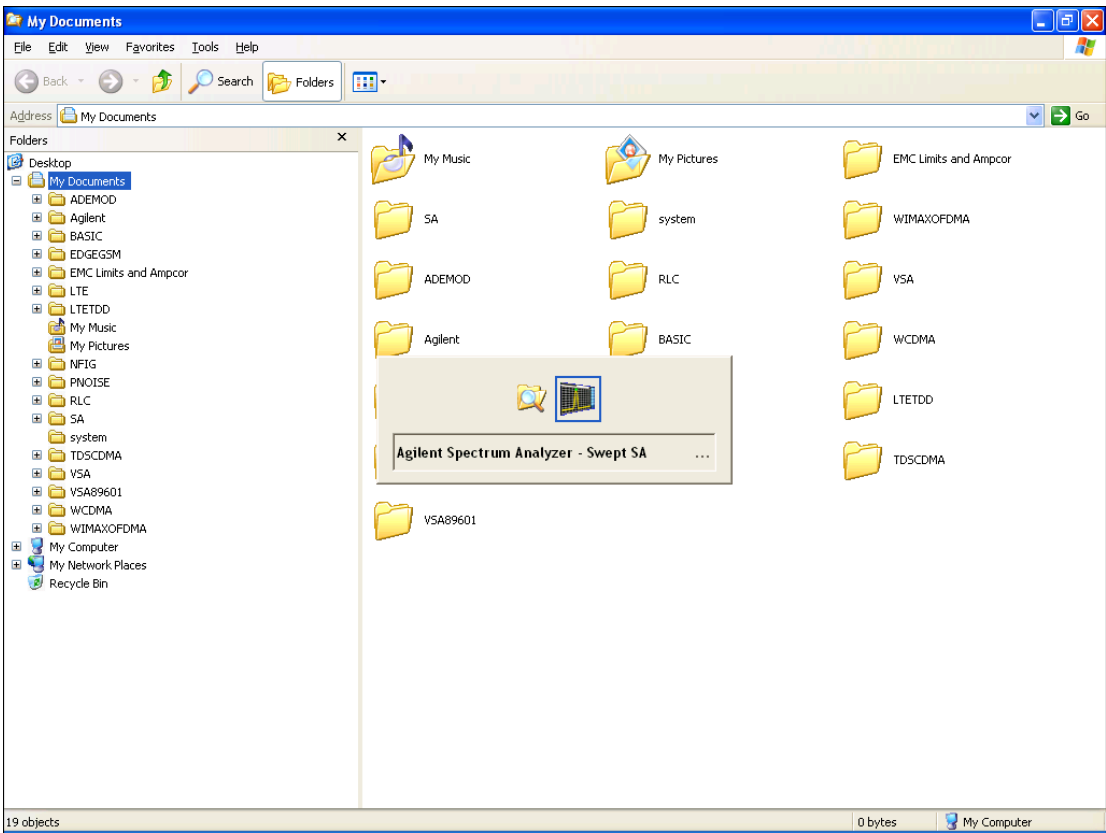
Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

File Explorer

Opens the standard Windows File Explorer. The File Explorer opens in the My Documents directory for the current user.

The File Explorer is a separate Windows application, so to return to the analyzer once you are in the File Explorer, you may either:

Exit the File Explorer by clicking on the red X in the upper right corner, with a mouse



Or use Alt-Tab: press and hold the Alt key and press and release the Tab key until the Analyzer logo is showing in the window in the center of the screen, as shown above, then release the Alt key.

The ability to access File Explorer is not available if Option SF1 is installed.

Key Path	File
Initial S/W Revision	Prior to A.02.00

Print

The Print key opens a Print dialog for configured printing (for example, to the printer of your choice). Refer to your Microsoft Windows Operating System manual for more information.

Maximize/Restore Down

These keys allow the Instrument Application to be maximized and then restored to its prior state. Only one of the two keys is visible at a time. When not already maximized the Maximize Application key is visible, and when maximized, the Restore Down Application key is visible and replaces the Maximize Application key.

Maximize

This key allows you to Maximize the Instrument Application, which causes the analyzer display to fill the screen. Once the application is maximized, this key is replaced by the Restore Down key.

Key Path	File
Mode	All
Notes	No equivalent remote command for this key.
State Saved	No
Initial S/W Revision	A.05.01

Restore Down

This key allows you to Restore Down the Instrument Application and reverses the action taken by Maximize. This key is only visible when the application has been maximized, and after the Restore Down action has been completed this key is replaced by the Maximize key.

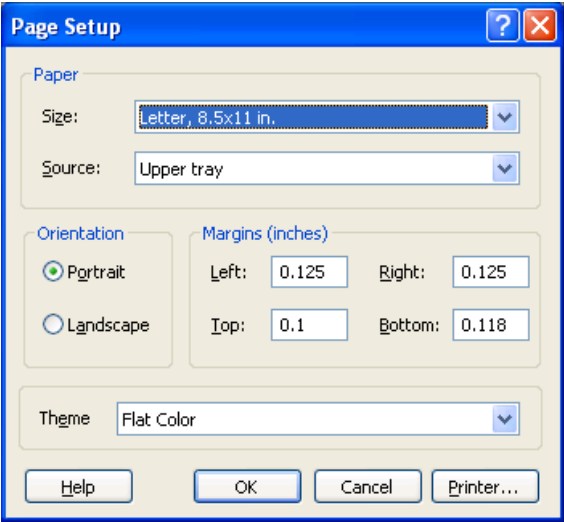
Key Path	File
Mode	All
Notes	No equivalent remote command for this key.
State Saved	No
Initial S/W Revision	A.05.01

Page Setup

The Page Setup key brings up a Windows Page Setup dialog that allows you to control aspects of the pages sent to the printer when the PRINT hardkey is pressed.

Key Path	File
Initial S/W Revision	Prior to A.02.00

Paper size, the printer paper source, the page orientation and the margins are all settable. Just like any standard Windows dialog, you may navigate the dialog using the front-panel keys, or a mouse. There are no SCPI commands for controlling these parameters.



Also contained in this dialog is a drop-down control that lets you select the Theme to use when printing. For more on Themes, see information under View/Display, Display, System Display Settings, Theme. The Theme control has a corresponding SCPI command.

Parameter Name	Print Themes
Parameter Type	Enum
Mode	All
Remote Command	:SYSTem:PRINT:THEMe TDCOLOR TDMonochrome FCOLOR FMONochrome :SYSTem:PRINT:THEMe?
Example	:SYST:PRIN:THEM FCOL
Setup	: SYSTem:DEFault MISC
Preset	FCOL; not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Print

This front-panel key is equivalent to performing a File, Print, OK. It immediately performs the currently configured Print to the Default printer.

The :HCOPy command is equivalent to pressing the PRINT key. The HCOPy:ABORt command can be used to abort a print which is already in progress. Sending HCOPy:ABORt will cause the analyzer to stop sending data to the printer, although the printer may continue or even complete the print, depending on how much data was sent to the printer before the user sent the ABORt command.

Key Path	Front-panel key
Remote Command	:HCOPy[:IMMediate]
Initial S/W Revision	Prior to A.02.00

Key Path	SCPI command only
Remote Command	:HCOPy:ABORt
Initial S/W Revision	Prior to A.02.00

Restore Down

This key allows you to Restore Down the Instrument Application and reverses the action taken by Maximize. This key is only visible when the application has been maximized, and after the Restore Down action has been completed this key is replaced by the Maximize key.

Key Path	File
Mode	All
Notes	No equivalent remote command for this key.
State Saved	No
Initial S/W Revision	A.05.01

Minimize

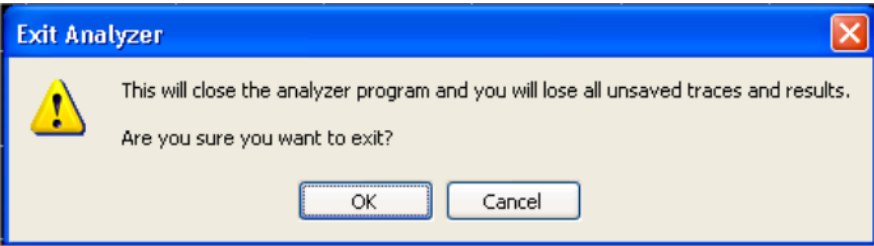
The Minimize key causes the analyzer display to disappear down into the task bar, allowing you to see the

Windows Desktop. You can use Alt-Tab (press and hold the Alt  key and press and release the Tab key) to restore the analyzer display.

Key Path	File
Mode	All
Notes	No equivalent remote command for this key.
State Saved	No
Initial S/W Revision	A.05.01

Exit

This key, when pressed, will exit the Instrument Application. A dialog box is used to confirm that you intended to exit the application:



Key Path	File
Mode	All
Notes	The Instrument Application willclose. No further SCPI commands can be sent. Use with caution!
Initial S/W Revision	Prior to A.02.00

Print

This front-panel key is equivalent to performing a File, Print, OK. It immediately performs the currently configured Print to the Default printer.

The :HCOPy command is equivalent to pressing the PRINT key. The HCOPy:ABORt command can be used to abort a print which is already in progress. Sending HCOPy:ABORt will cause the analyzer to stop sending data to the printer, although the printer may continue or even complete the print, depending on how much data was sent to the printer before the user sent the ABORt command.

Key Path	Front-panel key
Remote Command	:HCOPy[:IMMediate]
Initial S/W Revision	Prior to A.02.00

Key Path	SCPI command only
Remote Command	:HCOPy:ABORt
Initial S/W Revision	Prior to A.02.00

System

Opens a menu of keys that access various configuration menus and dialogs.

Key Path	Front-panel key
Notes	No remote command for this key specifically.
Initial S/W Revision	Prior to A.02.00

Show

Accesses a menu of choices that enable you to select the information window you want to view.

Key Path	System
Mode	All
Remote Command	:SYSTem:SHOW OFF ERRor SYSTem HARDware LXI HWSTatistics ALIGNment SOFTware CAPplication :SYSTem:SHOW?
Example	:SYST:SHOW SYST
Notes	This command displays (or exits) the various System information screens.
Preset	OFF
State Saved	No
Range	OFF ERRor SYSTem HARDware LXI HWSTatistics ALIGNment SOFTware CAPplication
Initial S/W Revision	Prior to A.02.00

Errors

There are two modes for the Errors selection, History and Status.

The list of errors displayed in the Errors screen does not automatically refresh. You must press the Refresh key or leave the screen and return to it to refresh it.

History brings up a screen displaying the event log in chronological order, with the newest event at the top. The history queue can hold up to 100 messages (if a message has a repeat count greater than 1 it only counts once against this number of 100). Note that this count bears no relation to the size of the SCPI queue. If the queue extends onto a second page, a scroll bar appears to allow scrolling with a mouse. Time is displayed to the second.

Status brings up a screen summarizing the status conditions currently in effect. Note that the time is displayed to the second.

The fields on the Errors display are:

Type (unlabeled) - Displays the icon identifying the event or condition as an error or warning.

ID - Displays the error number.

Message - Displays the message text.

Repeat (RPT) – This field shows the number of consecutive instances of the event, uninterrupted by other events. If an event occurs 5 times with no other intervening event, the value of repeat will be 5.

If the value of Repeat is 1 the field does not display. If the value of Repeat is >1, the time and date shown are those of the most recent occurrence. If the value of repeat reaches 999,999 it stops there.

Time – Shows the most recent time (including the date) at which the event occurred.

Key Path	System, Show
Mode	All
Remote Command	:SYSTem:ERRor[:NEXT]?
Example	:SYST:ERR?
Notes	The return string has the format: “<Error Number>,<Error>” Where <Error Number> and <Error> are those shown on the Show Errors screen
Backwards Compatibility Notes	In some legacy analyzers, the Repeat field shows the number of times the message has repeated since the last time the error queue was cleared. In the X-Series, the Repeat field shows the number of times the error has repeated since the last intervening error. So the count may very well be different than in the past even for identical signal conditions Unlike previous analyzers, in the X-Series all errors are reported through the Message or Status lines and are logged to the event queue. They never appear as text in the graticule area (as they sometimes do in previous analyzers) and they are never displayed in the settings panel at the top of the screen (as they sometimes do, by changing color, in previous analyzers). As a consequence of the above, the user can only see one status condition (the most recently generated) without looking at the queue. In the past, at least in the Spectrum Analyzer, multiple status conditions might display on the right side of the graticule. In general, there is no backwards compatibility specified or guaranteed between the error numbers in the X-Series and those of earlier products. Error, event, and status processing code in customers' software will probably need to be rewritten to work with X-Series. In the legacy analyzers, some conditions report as errors and others simply turn on status bits. Conditions that report as errors often report over and over as long as the condition exists. In the X-series, all conditions report as start and stop events. Consequently, software that repeatedly queries for a condition error until it stops reporting will have to be rewritten for the X-series.
Initial S/W Revision	Prior to A.02.00

Previous Page

See ["Next Page" on page 164.](#)

Key Path	System, Show, Errors
Initial S/W Revision	Prior to A.02.00

Next Page

Next Page and Previous Page menu keys move you between pages of the log, if it fills more than one page. These keys are grayed out in some cases:

- If on the last page of the log, the Next Page key is grayed-out
- If on the first page of the log, the Previous Page key is grayed-out.
- If there is only one page, both keys are grayed out.

Key Path	System, Show, Errors
Initial S/W Revision	Prior to A.02.00

History

The History and Status keys select the Errors view. The Status key has a second line that shows a number in [square brackets]. This is the number of currently open status items.

Key Path	System, Show, Errors
Initial S/W Revision	Prior to A.02.00

Verbose SCPI On/Off

When you turn Verbose SCPI on, additional information is returned when you send the :SYSTem:ERRor? query. The additional information consists of the characters that stimulated the error. This can aid you in debugging your test programs by indicating where in the parsing of a SCPI command the instrument encountered an invalid command or query.

Specifically, with Verbose SCPI on, the SYSTem:ERRor? query is expanded to show the SCPI data received, with the indicator <Err> at the point in the stream that the error occurred.

Verbose SCPI has no effect on the Show Errors screen or front panel Message Line; it only changes the response to the :SYST:ERR? query.

See the example below, where the invalid command "SENS:BOGUS" is sent:

Normal response to :SYST:ERR (using the Telnet window):

```
SCPI> SENS:BOGUS
```

```
SCPI> SYST:ERR?
```

```
-113,"Undefined header"
```

Now after turning on Verbose SCPI:

```
SCPI> SYST:BOGUS
```

```
SCPI> SYST:ERR?
```

```
-113,"Undefined header;SYST:BOGUS<Err>"
```


Key Path	System, Show, Errors
Mode	All
Remote Command	:SYSTem:ERRor:VERBoSe OFF ON 0 1 :SYSTem:ERRor:VERBoSe?
Example	:SYST:ERR:VERB ON
Preset	This is unaffected by Preset but is set to OFF on a "Restore System Defaults->Misc"
State Saved	No
Range	On Off
Initial S/W Revision	Prior to A.02.00

Refresh

When pressed, refreshes the Show Errors display.

Key Path	System, Show, Errors
Initial S/W Revision	Prior to A.02.00

Clear Error Queue

This clears all errors in all error queues.

Note the following:

- Clear Error Queue does not affect the current status conditions.
- Mode Preset does not clear the error queue.
- Restore System Defaults will clear all error queues.
- *CLS only clears the queue if it is sent remotely and *RST does not affect any error queue.
- Switching modes does not affect any error queues.

Key Path	System, Show, Errors
Initial S/W Revision	Prior to A.02.00

Status

See "History" on page 164.

Input Overload Enable (Remote Command Only)

Input Overload errors are reported using the Input Overload status bit (bit 12 in the Measurement Integrity status register). Input Overloads (for example, ADC Overload errors) can come and go with great frequency, generating many error events (for example, for signals just on the verge of overload), and so are

not put into the SCPI error queue by default. Normally the status bit is the only way for detecting these errors remotely.

It is possible to enable Input Overload reporting to the SCPI queue, by issuing the :SYSTem:ERRor:OVERload ON command. To return to the default state, issue the :SYSTem:ERRor:OVERload OFF command. In either case, Input Overloads always set the status bit.

NOTE

For versions of firmware before A.10.01, the Input Overload was only a Warning and so was never available in the SCPI queue, although it did set the status bit. For A.10.01 and later, the Input Overload is an error and can be enabled to the SCPI queue using this command.

Key Path	SCPI only
Remote Command	:SYSTem:ERRor:OVERload[:STATe] 0 1 OFF ON
Example	:SYST:ERR:OVER 1 Enable overload errors
Preset	Set to OFF by Restore Misc Defaults (no Overload errors go to SCPI)
State Saved	Saved in instrument state.
Initial S/W Revision	A.10.01

Power Up (Remote Command Only)

This serves to show the errors encountered during the application boot-up, such as: mismatch FW-FPGA, missing Calibration data, missing hardware and construction errors.

Remote Command	:SYSTem:ERRor:PUP?
Notes	If no error occurs, the return value will be: "No Power Up Errors." Return Value: <list of error strings>. <List of error strings> is an <IEEE488 Block> format. Return Value Example: "Power up errors, see details in Windows Event Log" "Unmatched FPGA Version(s), See details in Windows Event Log"
Initial S/W Revision	E.14.30

System

The System screen is formatted into three groupings: product descriptive information, options tied to the hardware, and software products:

```

<Product Name> <Product Description>
Product Number: N9020A
Serial Number: US46220924
Firmware Revision: A.01.01
Computer Name: <hostname>
Host ID: N9020A,US44220924

N9020A-503      Frequency Range to 3.6 GHz
N9020A-PFR      Precison Frequency Reference
N9020A-P03      Preamp 3.6 GHz

N9060A-2FP      Spectrum Analysis Measurement Suite  1.0.0.0
N9073A-1FP      WCDMA                               1.0.0.0
N9073A-2FP      WCDMA with HSDPA                     1.0.0.0

```

The Previous Page is grayed-out if the first page of information is presently displayed. The Next Page menu key is grayed-out if the last page is information is presently displayed.

Key Path	System, Show
Mode	All
Example	SYST:SHOW SYST
Backwards Compatibility Notes	The hardware statistics that are displayed in the PSA Show System screen have been moved to a dedicated Show Hardware Statistics screen in the Service Menu.
Initial S/W Revision	Prior to A.02.00

Show System contents (Remote Command Only)

A remote command is available to obtain the contents of the Show System screen (the entire contents, not just the currently displayed page).

Remote Command	:SYSTem:CONFIgure[:SYSTem]?
Example	:SYST:CONF?
Notes	The output is an IEEE Block format of the Show System contents. Each line is separated with a new-line character.
Initial S/W Revision	Prior to A.02.00

Computer System description (Remote Command Only)

A remote command is available to obtain the Computer System description. The Computer System is the operating system and patch level as reported by operating system.

Remote Command	:SYSTem:CSYSTem?
Example	:SYST:CSYS?
Notes	The return value is the Computer System name and service pack level.
Initial S/W Revision	Prior to A.12.00

Hardware

The show hardware screen is used to view details of the installed hardware. This information can be used to determine versions of hardware assemblies and field programmable devices, in the advent of future upgrades or potential repair needs.

The screen is formatted into two groupings: product descriptive information and hardware information. The hardware information is listed in a table format:

Hardware Information									
Agilent EXM Wireless Test Set Product Number: E6640A Serial Number: US12341234 Instrument S/W Revision: E_14.00_R0133 Revision Date: 1/23/2014 10:33:35 AM									
Assembly Name	Part #	Serial #	Mfg Rev	Rev	OF Rev	Hw Id	Cal Date	Cal Interval	Misc
Reference	M9300A	MY53000146				0165			
Reference Carrier	M9300A	W1312-63281-23-1306-00076		01	1.2.1	0166			
Reference Plugin	M9300A	W1312-63386-30-1306-00038		01	1.3.0	0167			
Wideband Digitizer	M943063005	111111111111	001	0	0	138			
Downconverter	M943063006	111111111111	001	0	A	139			
RFO	M943063009	111111111111	001	0	A	140			
Power Supply	M943063002	111111111111	001	0	A	141			
M9430 TRX	1234567890	SN12344321	0	0	0	142	2013.10.02	2 years	
Baseband Generator	M943063007	111111111111	002	0	0	136			
ModulatorSrcOutput	M943063008	111111111111	001	0	A	137			

The Previous Page is grayed-out if the first page of information is presently displayed. The Next Page menu key is grayed-out if the last page of information is presently displayed.

Key Path	System, Show
Mode	All
Example	SYST:SHOW HARD
Initial S/W Revision	Prior to A.02.00

System Remote Commands (Remote Commands Only)

The commands in this section have no front-panel key equivalent.

"System Powerdown (Remote Command Only)" on page 169

System Log Off (Remote Command Only)

"List installed Options (Remote Command Only)" on page 169

"Lock the Front-panel keys (Remote Command Only)" on page 169

"List SCPI Commands (Remote Command Only)" on page 170

"SCPI Version Query (Remote Command Only)" on page 170

"Date (Remote Command Only)" on page 170

"Time (Remote Command Only)" on page 171

Initial S/W Revision	Prior to A.02.00

System Powerdown (Remote Command Only)

Remote Command	<code>SYSTem:PDOWn [NORMal FORCe]</code>
Notes	Shuts down the instrument in the normal way (NORMal) or forced way (FORCe). In case there is another application with modified data pending for saving, the application prompt the user. The system waits until the user responds in the normal mode. It will go off after 20 seconds of wait in the force mode and all data will be lost.

List installed Options (Remote Command Only)

Lists the installed options that pertain to the instrument (signal analyzer). .

Mode	All
Remote Command	<code>:SYSTem:OPTions?</code>
Example	<code>:SYST:OPT?</code>
Notes	The return string is a comma separated list of the installed options. For example: "503,P03,PFR" :SYSTem:OPTions? and *OPT? are the same.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Lock the Front-panel keys (Remote Command Only)

Disables the instrument keyboard to prevent local input when the instrument is controlled remotely. Annunciation showing a "K" for "Klock" (keyboard lock) alerts the local user that the keyboard is locked. Klock is similar to the GPIB Local Lockout function; namely that no front-panel keys are active with the exception of the Power Standby key. (The instrument is allowed to be turned-off if Klock is ON.) The Klock command is used in remote control situations where Local Lockout cannot be used.

Although primary intent of Klock is to lock-out the front panel, it will lock-out externally connected keyboards through USB. Klock has no effect on externally connected pointing devices (mice).

The front panel 'Local' key (Cancel/Esc) has no effect if Klock is ON.

Mode	All
Remote Command	:SYSTem:KLOCK OFF ON 0 1 :SYSTem:KLOCK?
Example	:SYST:KLOC ON
Notes	Keyboard lock remains in effect until turned-off or the instrument is power-cycled
Preset	Initialized to OFF at startup, unaffected by Preset
State Saved	No
Initial S/W Revision	Prior to A.02.00

List SCPI Commands (Remote Command Only)

Outputs a list of the valid SCPI commands for the currently selected Mode.

Remote Command	:SYSTem:HELP:HEADers?
Example	:SYST:HELP:HEAD?
Notes	The output is an IEEE Block format with each command separated with the New-Line character (hex 0x0A)
Initial S/W Revision	Prior to A.02.00

SCPI Version Query (Remote Command Only)

Returns the SCPI version number with which the instrument complies. The SCPI industry standard changes regularly. This command indicates the version used when the instrument SCPI commands were defined.

Remote Command	:SYSTem:VERSion?
Example	:SYST:VERS?
Initial S/W Revision	Prior to A.02.00

Date (Remote Command Only)

The recommended access to the Date, Time, and Time zone of the instrument is through the Windows native control (Control Panel or accessing the Task Bar). You may also access this information remotely, as shown in this command and Time (below).

Sets or queries the date in the instrument.

Mode	All

Remote Command	:SYSTem:DATE "<year>,<month>,<day>" :SYSTem:DATE?
Example	:SYST:DATE "2006,05,26"
Notes	<year> is the four digit representation of year. (for example, 2006) <month> is the two digit representation of year. (for example. 01 to 12) <day> is the two digit representation of day. (for example, 01 to 28, 29, 30, or 31) depending on the month and year Unless the current account has Power User or Administrator privileges, an error will be generated by this command and no action will be taken.
Initial S/W Revision	Prior to A.02.00

Time (Remote Command Only)

Sets or queries the time in the instrument.

Mode	All
Remote Command	:SYSTem:TIME "<hour>,<minute>,<second>" :SYSTem:TIME?
Example	:SYST:TIME "13,05,26"
Notes	<hour> is the two digit representation of the hour in 24 hour format <minute> is the two digit representation of minute <second> is the two digit representation of second Unless the current account has Power User or Administrator privileges, an error will be generated by this command and no action will be taken.
Initial S/W Revision	Prior to A.02.00

Module Name (Remote Command Only)

Query only. This will return the name of the instance as displayed on the xSA main window.

Mode	All
Remote Command	:SYSTem:MODule:NAME?
Example	:SYST:MOD:NAME?
Notes	If the first instance displays on the xSA main window, the return string is "TRX1". If the second instance displays on the main window, the return string is "TRX2". If the third instance displays on the main window, the return string is "TRX3". If the fourth instance displays on the main window, the return string is "TRX4".
Preset	Not affected by Preset, reset to "Left" with Restore System Defaults Misc.

State Saved	No
Initial S/W Revision	A.13.80

Module Index (Remote Command Only)

Query only. This will return the index of this xSA instance. This index is used as the device number in a VISA address ("hlistip#").

Mode	All
Remote Command	:SYSTem:MODule:INdex?
Example	:SYST:MOD:IND?
Notes	It returns 0 if this instance's device number in a VISA address is 0. It returns 1 if this instance's device number in a VISA address is 1.
Preset	Not affected by Preset, reset to 0 with Restore System Defaults Misc.
State Saved	No
Initial S/W Revision	A.13.80

Module Mnemonic (Remote Command Only)

Query only. This will return the mnemonic of the instance as used in the command line "/Process:<mnemonic>" argument.

Mode	All
Remote Command	:SYSTem:MODule:MNEMonic?
Example	:SYST:MOD:MNEM?
Notes	This will return the mnemonic of the instance as used in the command line "/Process:<mnemonic>" argument.
Preset	Not affected by Preset and Restore System Defaults Misc.
State Saved	No
Initial S/W Revision	A.13.80

Module List (Remote Command Only)

Query only. This will return the list of defined mnemonics that can be used in the command line "/Process:<mnemonic>" argument with corresponding configuration information. The comma separated return values are: mnemonic, display name, Enabled/Disabled, VISA device id (instr# or hislip#), telnet port, socket port, Physics port, Physics configuration tag.

Mode	All

Remote Command	:SYSTem:MODule:LIST?
Example	:SYST:MOD:LIST?
Notes	Example: it returns: TRX1,TRX1,Enabled,0,5023,5025,3574,E6650AModules.config#TRX1 TRX2,TRX2,Disabled,1,5123,5125,3575,E6650AModules.config#TRX2 TRX3,TRX3,Disabled,2,5223,5225,3576,E6650AModules.config#TRX3 TRX4,TRX4,Disabled,3,5323,5325,3577,E6650AModules.config#TRX4
Preset	Not affected by Preset, reset to 0 with Restore System Defaults Misc.
State Saved	No
Initial S/W Revision	A.13.80

Module Enable (Remote Command Only)

Query and command. The query SYST:MOD:ENAB? "<mnemonic>" returns "0" for disabled, "1" for enabled. The command SYST:MOD:ENAB "<mnemonic>" 0|1 will disable/enable the configuration.

Notes: Enabling a configuration that does not have a HW will result in run-time errors when trying to start that configuration. Trying to disable the default configuration will result in the error: -221, "Setting conflict:Cannot disable default process configuration '<mnemonic>'".

Example:

```
}
```

```
SCPI>>syst:mod:enab? "TRX1"
```

```
<<1
```

```
SCPI>>syst:mod:enab? "TRX2"
```

```
<<0
```

```
SCPI>>syst:err?
```

```
<<+0,"No error"
```

```
SCPI>>syst:mod:enab "TRX1",0
```

```
SCPI>>syst:err?
```

```
<<-221,"Settings conflict;Cannot disable default process configuration 'TRX1'"
```

Mode	All
Remote Command	:SYSTem:MODule:ENABle? "<mnemonic>" :SYSTem:MODule:ENABle "<mnemonic>","0 1"
Example	

	:SYST:MOD:ENAB? "TRX1"
	:SYST:MOD:ENAB "TRX4",0
Preset	Not affected by Preset and Restore System Defaults Misc.
State Saved	No
Initial S/W Revision	A.13.80

Module Default (Remote Command Only)

Query and command. The query SYST:MOD:DEF? returns the mnemonic of the default configuration. The command SYST:MOD:DEF "mnemonic" will set that configuration as the default. If the configuration was disabled, the module default command on it will enable this configuration.

Example:

```
SCPI>>syst:mod:def?
<<"TRX1"
SCPI>>syst:mod:enab "TRX2",0
SCPI>>syst:mod:enab? "TRX2"
<<0
SCPI>>syst:mod:def "TRX2"
SCPI>>syst:mod:enab? "TRX2"
<<1
SCPI>>syst:mod:def?
<<"TRX2"
```

Mode	All
Remote Command	:SYSTem:MODule:DEFault? :SYSTem:MODule:DEFault "<mnemonic>"
Example	:SYST:MOD:DEF? :SYST:MOD:DEF "TRX1"
Preset	Not affected by Preset, reset to "Left" with Restore System Defaults Misc.
State Saved	No
Initial S/W Revision	A.13.80

Module Model Number (Remote Command Only)

Query only. The query ":SYST:MODule:MODEL?" will return model number of the current module.

Mode	All
Remote Command	:SYSTem:MODule:MODe1?
Example	:SYSTem:MODule:MODe1?
Notes	This query will return model number. e.g. "M9430A"
Preset	Not affected by Preset,
State Saved	No
Initial S/W Revision	E.14.14

Module Model Serial Number (Remote Command Only)

Query only. The query ":SYST: MODule:SERial?" will return model serial number of the current module.

Mode	All
Remote Command	:SYSTem:MODule:SERial?
Example	:SYSTem:MODule:SERial?
Notes	This query will return model serial number like "SN12344321"
Preset	Not affected by Preset
State Saved	No
Initial S/W Revision	E.14.14

Power On

Enables you to select how the instrument should power on. The options are: Mode and Input/Output Defaults, User Preset and Last State.

Key Path	System
Mode	All
Remote Command	:SYSTem:PON:TYPE MODE USER LAST :SYSTem:PON:TYPE?
Example	:SYST:PON:TYPE MODE
Preset	This is unaffected by a Preset but is set to Mode on a "Restore System Defaults->All"
State Saved	No
Backwards Compatibility SCPI	:SYSTem:PON:TYPE PRESet the "PRESet" parameter is supported for backward compatibility only and behaves the same as MODE.
Backwards Compatibility Notes	The Preset Type key in legacy analyzers has been removed, and the Power On toggle key has been replaced by this 1-of-N key in the System menu.
Initial S/W Revision	Prior to A.02.00

Mode and Input/Output Defaults

When the analyzer is powered on in Mode and Input/Output Defaults, it performs a Restore Mode Defaults to all modes in the instrument and also performs a Restore Input/Output Defaults.

Persistent parameters (such as Amplitude Correction tables or Limit tables) are not affected at power on, even though they are normally cleared by Restore Input/Output Defaults and/or Restore Mode Defaults.

Key Path	System, Power On
Mode	All
Example	SYST:PON:TYPE MODE
Readback Text	Defaults
Initial S/W Revision	Prior to A.02.00

User Preset

Sets **Power On** to **User Preset**. When the analyzer is powered on in User Preset, it will User Preset each mode and switch to the power-on mode. Power On User Preset will not affect any settings beyond what a normal User Preset affects.

NOTE

An instrument could never power up for the first time in User Preset.

Key Path	System, Power On
Mode	All
Example	SYST:PON:TYPE USER
Readback Text	User Preset
Backwards Compatibility Notes	Power On User Preset will cause the instrument to power up in the power-on mode, not the last mode the instrument was in prior to shut down. Also, Power On User Preset will User Preset all modes. This does not exactly match legacy behavior.
Initial S/W Revision	Prior to A.02.00

Last State

Sets **Power On** to **Last**. When the analyzer is powered on, it will put all modes in the last state they were in prior to when the analyzer was put into Power Standby and it will wake up in the mode it was last in prior to powering off the instrument. The saving of the active mode prior to shutdown happens behind the scenes when a controlled shutdown is requested by using the front panel power **Standby** key or by using the remote command `SYSTem:PDOWn`. The non-active modes are saved as they are deactivated and recalled by Power On Last State.

NOTE

An instrument can never power up for the first time in Last.

If line power to the analyzer is interrupted, for example by pulling the line cord plug or by switching off power to a test rack, Power On Last State may not work properly. For proper operation, Power On Last State depends on you shutting down the instrument using the Standby key or the SYSTem:PDOWn SCPI command. This will ensure the last state of each mode is saved and can be recalled during a power up.

Key Path	System, Power On
Mode	All
Example	SYST:PON:TYPE LAST
Notes	Power on Last State only works if you have done a controlled shutdown prior to powering on in Last. If a controlled shutdown is not done when in Power On Last State, the instrument will power up in the last active mode, but it may not power up in the active mode's last state. If an invalid mode state is detected, a Mode Preset will occur. To control the shutdown under remote control use the :SYSTem:PDOWn command.
Readback Text	Last State
Backwards Compatibility Notes	It is no longer possible to power-up the analyzer in the last mode the analyzer was running with that mode in the preset state. (ESA/PSA SYST:PRESET:TYPE MODE with SYST:PON:PRESET) You can power-on the analyzer in the last mode the instrument was running in its last state (SYST:PON:TYPE LAST), or you can specify the mode to power-up in its preset state (SYST:PON:MODE <mode>).
Initial S/W Revision	Prior to A.02.00

Power On Application

Accesses a menu that lists the available Modes and lets you select which Mode is to be the power-on application.

This application is used for Power On Type “Mode and Input/Output Defaults” and Restore System Defaults All.

Key Path	System, Power On
Mode	All
Remote Command	:SYSTem:PON:MODE SA BASIC ADEMOD NFIGURE PNOISE CDMA2K TDSCDMA VSA VSA89601 WCDMA WIMAXOFDMA :SYSTem:PON:MODE?
Example	SYST:PON:MODE SA
Notes	The list of possible modes (and remote parameters) to choose from is dependent on which modes are installed in the instrument.
Preset	This is unaffected by a Preset but is set on a “Restore System Defaults->All” to:
State Saved	No
Initial S/W Revision	Prior to A.02.00

Configure Applications

The Configure Applications utility can be used to:

- select applications for preload
- determine how many applications can fit in memory at one time
- specify the order of the Modes in the Mode menu.

This utility consists of a window with instructions, a set of “Select Application” checkboxes, a “fuel bar” style memory gauge, and keys that help you set up your configuration.

For more information, see the following topics:

["Preloading Applications" on page 178](#)

["Access to Configure Applications utility" on page 178](#)

["Virtual memory usage" on page 179](#)

Key Path	System, Power On
Example	:SYST:SHOW CAPP Displays the Config Applications screen
Initial S/W Revision	A.02.00

Preloading Applications

During runtime, if a Mode that is not preloaded is selected using the Mode menu or sending SCPI commands, there will be a pause while the Application is loaded. During this pause a message that says “Loading application, please wait ...” is displayed. Once loaded, the application stays loaded, so the next time you select it during a session, there is no delay.

Preloading enables you to “preload” at startup, to eliminate the runtime delay. Preloading an application will cause it to be loaded into the analyzer’s memory when the analyzer program starts up. If you do this, the delay will increase the time it takes to start up the analyzer program, but this may be preferable to having to wait the first time you select an application. Note that, once an application is loaded into memory, it cannot be unloaded without exiting and restarting the analyzer program.

Note that there are more applications available for the X-Series than can fit into Windows Virtual Memory. By allowing you to choose which licensed applications to load at startup, the Configure Applications utility allows you to make optimal use of your memory.

Access to Configure Applications utility

A version of the utility runs the first time you power up the analyzer after purchasing it from Keysight. The utility automatically configures preloads so that as many licensed applications as possible are preloaded while keeping the total estimated virtual memory usage below the limit. This auto-configuration only takes place at the very first run, and after analyzer software upgrades.

You may, at any time, manually call up the Configure Applications utility by pressing System, Power On, Configure Applications, to find a configuration that works best for you, and then restart the analyzer program.

The utility may also be called if, during operation of the analyzer, you attempt to load more applications than can fit in memory at once.

Virtual memory usage

There are more applications available for the X-Series than can fit into memory at any one time, so the Configure Applications utility includes a memory tracker that serves two purposes:

1. It will not let you preload more applications than will fit into memory at once.
2. You can determine how many of your favorite applications can reside in memory at one time.

The utility provides a graphical representation of the amount of memory (note that the memory in question here is Virtual memory and is a limitation imposed by the operating system, not by the amount of physical memory you have in your analyzer). You select applications to preload by checking the boxes on the left. Checked applications preload at startup. The colored fuel bar indicates the total memory required when all the checked applications are loaded (either preloaded or selected during runtime).

Here is what the fuel bar colors mean:

RED: the applications you have selected cannot all fit into the analyzer's memory. You must deselect applications until the fuel bar turns yellow.

YELLOW: the applications you have selected can all fit into the analyzer's memory, but there is less than 10% of the memory left, probably not enough to load any other applications, either via preload or by selecting a Mode while the analyzer is running..

GREEN: The indicator is green when <90% of the memory limit is consumed. This means the applications you have selected can all fit into the analyzer's memory with room to spare. You will likely be able to load one or more other applications without running out of memory.

Select All

Marks all applications in the selection list. This allows you to enable all applications licensed on the instrument for pre-loading, or is a convenience for selecting all applications in one operation and then letting you deselect individual applications.

Key Path	System, Power On, Configure Applications
Initial S/W Revision	A.02.00

Deselect All

Clears the marks from all applications in the selection list, except the Power On application. The Power On application cannot be eliminated from the pre-load list.

Key Path	System, Power On, Configure Applications
Initial S/W Revision	A.02.00

Move Up

The application list is the order that applications appear in the Mode Menu. This key enables you to shift the selected application up in the list, thus moving the selected application earlier in the Mode Menu.

Key Path	System, Power On, Configure Applications
Initial S/W Revision	A.02.00

Move Down

The application list is the order that applications appear in the Mode Menu. This key enables you to shift the selected application down in the list, thus moving the selected application later in the Mode Menu.

Key Path	System, Power On, Configure Applications
Initial S/W Revision	A.02.00

Select/Deselect

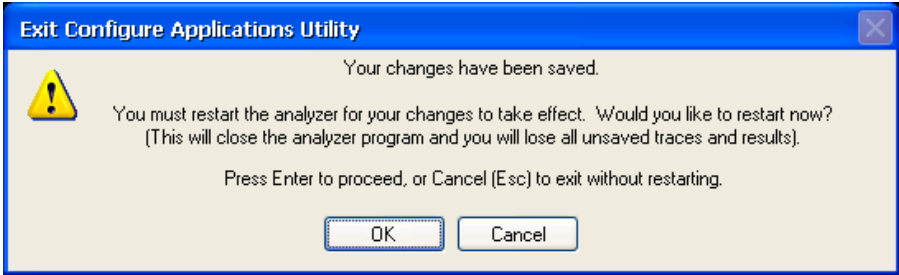
Toggles the currently highlighted application in the list.

Key Path	System, Power On, Configure Applications
Initial S/W Revision	A.02.00

Save Changes and Exit

Applies the configuration of the applications list. The marked applications will be pre-loaded in memory the next time the instrument application is started, and the order of the applications in the list will be the order of the applications in the Mode Menu.

After saving your changes, the analyzer asks you if you would like it to restart so that your changes can take effect (see dialog box, below). If you choose not to restart, the changes will not take affect until the next time you shut down and restart the analyzer.



Key Path	System, Power On, Configure Applications
Remote Command	:SYSTem:PUP:PROcEss
Example	:SYST:PUP:PROC This is the SCPI command for restarting the analyzer. You must Wait after this

	command for the instrument application to restart
Notes	The softkey will be grayed-out when the virtual memory of the selected applications exceeds 100% of the limit.
Notes	You cannot use *WAI or *OPC? to synchronize operation after a restart. This command stops and restarts the instrument application, thus the SCPI operation is terminated and restarted. A remote program must use fixed wait time to resume sending commands to the instrument. The wait time will be dependent upon which applications are pre-loaded.
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.04.00

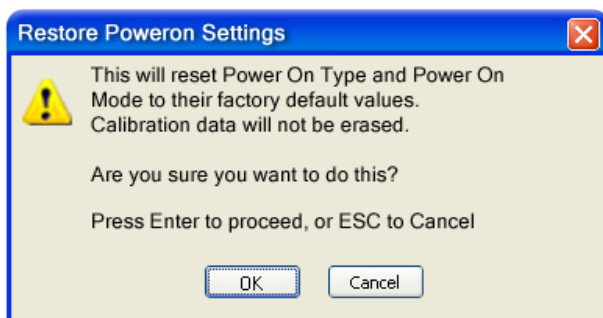
Exit Without Saving

Pressing this key will exit the Configure Applications utility without saving your changes.

Key Path	System, Power On, Configure Applications
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.04.00

Restore Power On Defaults

This selection causes the Power On Type and Power On Application settings to be a reset to their default values. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. The Power On key, under the Restore System Defaults menu, causes the same action.



If you press any key other than OK or Enter, it is construed as a Cancel, because the only path that will actually cause the reset to be executed is through OK or Enter.

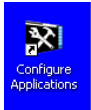
Key Path	System, Power On
Example	:SYST:DEF PON
Initial S/W Revision	Prior to A.02.00

Configure Applications - Instrument boot-up

At start-up of the analyzer program a dialog box similar to the one under the **System, Power On, Configure Applications** key will be displayed allowing you to choose which licensed applications are to be loaded. This dialog will only be displayed if the memory required to pre-load all of the licensed applications exceeds the Virtual Memory available.

Configure Applications - Windows desktop

The Configure Applications Utility may be run from the Windows Desktop. The utility is launched by double-



clicking the icon on the desktop, which brings-up a dialog box similar to the one under the **System, Power On, Configure Applications** key, allowing you to choose which licensed applications are to be loaded when the analyzer program starts up. This dialog box has mouse buttons on it that do the job the softkeys normally do in the **System, Power On, Configure Applications** menu.

Configure Applications - Remote Commands

The following topics provide details on using remote commands to configure the list of applications you want to load into the instrument memory or query the Virtual Memory utilization for your applications.

- "Configuration list (Remote Command Only)" on page 182
- "Configuration Memory Available (Remote Command Only)" on page 183
- "Configuration Memory Total (Remote Command Only)" on page 183
- "Configuration Memory Used (Remote Command Only)" on page 183
- "Configuration Application Memory (Remote Command Only)" on page 183

Configuration list (Remote Command Only)

This remote command is used to set or query the list of applications to be loaded in-memory.

Remote Command	<code>:SYSTem:PON:APPLication:LLIS <string of INSTRument:SElect names></code> <code>:SYSTem:PON:APPLication:LLIS?</code>
Example	<code>:SYST:PON:APPL:LLIS "SA,BASIC,WCDMA"</code>
Notes	<string of INSTRument:SElect names> are from the enums of the :INSTRument:SElect command. The order of the <INSTRument:SElect names> is the order that the applications are loaded into memory, and the order that they appear in the Mode Menu. Error message -225 "Out of Memory" is reported when more applications are listed than can reside in Virtual Memory. When this occurs, the existing applications load list is unchanged.
Preset	Not affected by Preset
State Saved	Not saved in instrument state
Initial S/W Revision	A.02.00

Configuration Memory Available (Remote Command Only)

This remote command is used to query the amount of Virtual Memory remaining.

Remote Command	<code>:SYSTem:PON:APPLication:VMEMory[:AVailable]?</code>
Example	<code>:SYST:PON:APPL:VMEM?</code>
Preset	Not affected by Preset
Initial S/W Revision	A.02.00

Configuration Memory Total (Remote Command Only)

This remote command is used to query the limit of Virtual Memory allowed for applications.

Remote Command	<code>:SYSTem:PON:APPLication:VMEMory:TOTal?</code>
Example	<code>:SYST:PON:APPL:VMEM:TOT?</code>
Preset	Not affected by Preset
Initial S/W Revision	A.02.00

Configuration Memory Used (Remote Command Only)

This remote command is a query of the amount of Virtual Memory used by all measurement applications.

Remote Command	<code>:SYSTem:PON:APPLication:VMEMory:USED?</code>
Example	<code>:SYST:PON:APPL:VMEM:USED?</code>
Preset	Not affected by Preset
Initial S/W Revision	A.02.00

Configuration Application Memory (Remote Command Only)

This remote command is used to query the amount of Virtual Memory a particular application consumes.

Remote Command	<code>:SYSTem:PON:APPLication:VMEMory:USED:NAME? <INSTRument:SElect name></code>
Example	<code>:SYST:PON:APPL:VMEM:USED:NAME? CDMA2K</code>
Notes	<INSTRument:SElect name> is from the enums of the :INSTRument:SElect command Value returned will be 0 (zero) if the name provided is invalid.
Preset	Not affected by Preset
Initial S/W Revision	Prior to A.02.00

Alignments

The Alignments Menu controls and displays the automatic alignment of the instrument, and provides the ability to restore the default alignment values.

The current setting of the alignment system is displayed in the system Settings Panel along the top of the display, including a warning icon for conditions that may cause specifications to be impacted.



Key Path	System
Initial S/W Revision	Prior to A.02.00

Align Now

Accesses alignment processes that are immediate action operations. They perform complete operations and run until they are complete.

Key Path	System, Alignments
Initial S/W Revision	Prior to A.02.00

All (Daily use)

Immediately executes an alignment of all subsystems which includes both the source and the analyzer in the TRX module. The “All” alignment is sufficient to maintain specified performance, provided that (1) the TRX’s internal temperature has not drifted more than +/-5 degree C since the previous alignment, and (2) no more than 8 hours have elapsed since the previous “All” alignment., and (3) no more than 1 week has elapsed since these three alignments have all been run: IF, RF, and Source, and (4) a 45 minute warm-up period between power-up of the TRX and invoking the “All” alignment. The instrument stops any measurement currently underway, performs the alignment, then restarts the measurement from the beginning (similar to pressing the **Restart** key).

If an interfering user signal is present at the RF Input, the alignment is performed on all subsystems except the RF. After completion, the Error Condition message “Align skipped: 50 MHz interference” or “Align skipped: 4.8 GHz interference” is generated. In addition the Error Condition message “Align Now, RF required” is generated, and bits 11 and 12 are set in the Status Questionable Calibration register.

The query form of the remote commands (:CALibration[:ALL]? or *CAL?) invokes the alignment of all subsystems and returns a success or failure value. An interfering user signal is not grounds for failure; if the alignment was able to succeed on all portions but unable to align the RF because of an interfering signal, the resultant will be the success value.

Successful completion of **Align Now, All** will clear the “Align Now, All required” Error Condition, and clear bit 14 in the Status Questionable Calibration register. It will also begin the elapsed time counter for Last Align Now, All Time, and capture the Last Align Now, All Temperature.

If the Align RF subsystem succeeded in aligning (no interfering signal present), the elapsed time counter begins for Last Align Now, RF Time, and the temperature is captured for the Last Align Now, RF Temperature. In addition the Error Conditions “Align skipped: 50 MHz interference” and “Align skipped: 4.8 GHz interference” are cleared, the Error Condition “Align Now, RF required” is cleared, and bits 11 and 12 are cleared in the Status Questionable Calibration register

Align Now, All can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORT SCPI command. When this occurs the Error Condition message “Align Now, All required” is generated, and bit 14 is set in the Status Questionable Condition register. This is because new alignment data may be employed for an individual subsystem, but not a cohesive set of data for all subsystems.

In many cases, you might find it more convenient to change alignments to Normal, instead of executing Align Now, All. When the Auto Align process transitions to Normal, the analyzer will immediately start to update only the alignments that have expired, thus efficiently restoring the alignment process.

NOTE

In EXF, Source ARB play will be turned off and the source states will not be restored after **Align Now, All**.

Key Path	System, Alignments, Align Now
Mode	All
Remote Command	:CALibration[:ALL] :CALibration[:ALL]?
Example	:CAL
Notes	:CALibration[:ALL]? returns 0 if successful :CALibration[:ALL]? returns 1 if failed :CALibration[:ALL]? is the same as *CAL? While Align Now, All is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORT command. Successful completion will clear bit 14 in the Status Questionable Calibration register. An interfering user signal is not grounds for failure of Align Now, All. However, bits 11 and 12 are set in the Status Questionable Calibration register to indicate Align Now, RF is required. An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed.
Couplings	Initializes the time for the Last Align Now, All Time. Records the temperature for the Last Align Now, All Temperature. If Align RF component succeeded, initializes the time for the Last Align Now, RF Time. If Align RF component succeeded, records the temperature for the Last Align Now, RF Temperature.
Status Bits/OPC dependencies	Bits 11, 12, or 14 may be set in the Status Questionable Calibration register.
Initial S/W Revision	Prior to A.02.00

Mode	All
Remote Command	*CAL?
Example	*CAL?
Notes	*CAL? returns 0 if successful *CAL? returns 1 if failed :CALibration[:ALL]? is the same as *CAL? See additional remarks described with :CALibration[:ALL]? Everything about :CALibration[:ALL]? is synonymous with *CAL? including all conditions, status register bits, and couplings
Initial S/W Revision	Prior to A.02.00

Mode	All
Remote Command	:CALibration[:ALL]:NPENding
Example	CAL:NPEN
Notes	:CALibration[:ALL]:NPENding is the same as :CALibration[:ALL] including all conditions, status register bits, except this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not. Typical usage is: 1) :CALibration:ALL:NPENding (Start a calibration) 2) :STATus:OPERation:CONDition? (Check if the calibration is completed or not, If bit 0 is set, then the system is doing calibration, the user should repeat this scpi query until the bit is cleared) 3):STATus:QUEStionable:CALibration:CONDition? (Check if there are any errors/failures in previous calibration procedure
Initial S/W Revision	X.14.20

All but RF

Immediately executes an alignment of all subsystems except the RF subsystem which includes both the source and the analyzer in the TRX module . The instrument will stop any measurement currently underway, perform the alignment, and then restart the measurement from the beginning (similar to pressing the Restart key). This can be used to align portions of the instrument that are not impacted by an interfering user input signal.

This operation might be chosen instead of **All** if you do not want the device under test to experience a large change in input impedance, such as a temporary open circuit at the analyzer input.

The query form of the remote commands (:CALibration:NRF?) will invoke the alignment and return a success or failure value.

Successful completion of Align Now, All but RF will clear the “Align Now, All required” Error Condition, and clear bit 14 in the Status Questionable Calibration register. If “Align Now, All required” was in effect prior to executing the All but RF, the Error Condition message “Align Now, RF required” is generated and bit 12 in

the Status Questionable Calibration register is set. It will also begin the elapsed time counter for Last Align Now, All Time, and capture the Last Align Now, All Temperature.

Align Now, All but RF can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs the Error Condition message “Align Now, All required” is generated, and bit 14 is set in the Status Questionable Condition register. This is because new alignment data may be used for an individual subsystem, but not a full new set of data for all subsystems.

NOTE

In EXF, Source ARB play will be turned off and the source states will not be restored after **Align Now, All but RF**.

Key Path	System, Alignments, Align Now
Mode	All
Remote Command	:CALibration:NRF :CALibration:NRF?
Example	:CAL:NRF
Notes	:CALibration:NRF? returns 0 if successful :CALibration:NRF? returns 1 if failed While Align Now, All but RF is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion will clear bit 14 in the Status Questionable Calibration register and set bit 12 if invoked with “Align Now, All required”.
Couplings	Initializes the time for the Last Align Now, All Time. Records the temperature for the Last Align Now, All Temperature.
Status Bits/OPC dependencies	Bits 12 or 14 may be set in the Status Questionable Calibration register.
Initial S/W Revision	Prior to A.02.00

Mode	All
Remote Command	:CALibration:NRF:NPENding
Example	CAL:NRF:NPEN
Notes	:CALibration:NRF:NPENding is the same as :CALibration:NRF including all conditions, status register bits, except that this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not. Typical usage is: 1):CALibration:NRF:NPENding (start theAll but RF calibration) 2):STATus:OPERation:CONDition? (If bit 0 is set, then the system is doing calibration, the user should do re-query until this bit is cleared)

	3):STATus:QUEStionable:CALibration:CONDition? (to check if there are any errors/failures in previous calibration procedure)
Initial S/W Revision	X.14.20

RF (Weekly use)

Immediately executes an alignment of the RF subsystem which includes both the source and the analyzer in the TRX module . The instrument stops any measurement currently underway, performs the alignment, then restarts the measurement from the beginning (similar to pressing the **Restart** key).

This alignment corrects slow-rate drift which does not impair specifications for time periods shorter than one week. Thus, it is required to perform this alignment on a weekly basis to maintain specifications. This alignment typically takes >2 minutes to complete.

This operation might be desirable if the alignments had been set to not include RF alignments, or if previous RF alignments could not complete because of interference which has since been removed.

If an interfering user signal is present at the RF Input, the alignment will terminate and generate the Error Condition message “Align skipped: 50 MHz interference” or “Align skipped: 4.8 GHz interference”, and Error Condition “Align Now, RF required”. In addition, bits 11 and 12 will be set in the Status Questionable Calibration register.

The query form of the remote commands (:CALibration:RF?) will invoke the alignment of the RF subsystem and return a success or failure value. An interfering user signal is grounds for failure.

Successful completion of Align Now, RF will begin the elapsed time counter for Last Align Now, RF Time, and capture the Last Align Now, RF Temperature.

Align Now, RF can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs, the Error Condition message “Align Now, RF required” is generated, and bit 12 is set in the Status Questionable Condition register. None of the new alignment data is used.

NOTE

In EXF, Source ARB play will be turned off and the source states will not be restored after **Align Now, All but RF**.

Key Path	System, Alignments, Align Now
Mode	All
Remote Command	:CALibration:RF :CALibration:RF?
Example	:CAL:RF
Notes	:CALibration:RF? returns 0 if successful :CALibration:RF? returns 1 if failed (including interfering user signal) While Align Now, RF is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the

	:ABORt command. Successful completion clears the Error Conditions “Align skipped: 50 MHz interference” and “Align skipped: 4800 MHz interference” and the Error Conditions “Align RF failed” and “Align Now, RF required”, and clears bits 3, 11, and 12 in the Status Questionable Calibration register. A failure encountered during alignment will generate the Error Condition message “Align RF failed” and set bit 3 in the Status Questionable Calibration register. An interfering user signal will result in bits 11 and 12 to be set in the Status Questionable Calibration register to indicate Align Now, RF is required. An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed.
Couplings	Initializes the time for the Last Align Now, RF Time. Records the temperature for the Last Align Now, RF Temperature.
Status Bits/OPC dependencies	Bits 11, 12, or 14 may be set in the Status Questionable Calibration register.
Initial S/W Revision	Prior to A.02.00

Mode	All
Remote Command	:CALibration:RF:NPENding
Example	CAL:RF:NPEN
Notes	:CALibration:RF:NPENding is the same as :CALibration:RF including all conditions, status register bits, except that this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not. Typical usage is: 1):CALibration:RF:NPENding (Start a RF calibration) 2):STATus:OPERation:CONDition? (If bit 0 is set, then the system is doing calibration, the user should do re-query until this bit is cleared) 3):STATus:QUESTionable:CALibration:CONDition? (to check if there are any errors/failures in previous calibration procedure)
Initial S/W Revision	X.14.20

Source (Weekly use)

Accesses source alignment processes that are immediate action operations. They perform complete operations and run until they are complete.

Immediately executes an IQ alignment, and power level alignment. The instrument stops any sequence of the source, performs the alignment, then restarts the sequence from the beginning.

This alignment corrects slow-rate drift which does not impair specifications for time periods shorter than one week. Thus, it is required to perform this alignment on a weekly basis to maintain specifications. This alignment typically takes >2 minutes to complete.

There is no alert available for the source alignment. The operators have the responsibility to check temperature shift since last Align Now, Source to determine if the source alignment needs to be executed.

Key Path	System, Alignments, Align Now
Mode	All
Remote Command	:CALibration:INTernal:SOURce[:ALL] :CALibration:INTernal:SOURce[:ALL] ?
Example	:CAL:INT:SOUR
Notes	:CAL:SOUR? Initiates an Alignment and returns 0 if successful :CAL:SOUR? Initiates an Alignment and returns 1 if failed
Couplings	Initializes the time for the Last Align Source Now, All Time. Records the temperature for the Last Align Source Now, All Temperature.
Initial S/W Revision	A.05.00

Mode	All
Remote Command	:CALibration:INTernal:SOURce[:ALL]:NPending
Example	CAL:INT:SOUR:NPEN
Notes	:CALibration:INTernal:SOURce[:ALL]:NPending is the same as :CALibration:INTernal:SOURce[:ALL] including all conditions, status register bits, except that this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not. Typical usage is: 1):CALibration:INTernal:SOURce:NPending (start an internal source calibration) 2):STATus:OPERation:CONDition? (Check if the calibration is completed or not, If bit 0 is set, then the system is doing calibration, the user should repeat this scpi query until the bit is cleared) 3):STATus:QUESTionable:CALibration:EXTended:FAILure:CONDition? (Check if bit 14 is set or not. If this bit is set, that means there are some errors in previous internal source calibration)
Initial S/W Revision	X.14.20

IF Alignment (Weekly use)

Immediately executes an alignment of the IF subsystem which includes both the source and the analyzer in the TRX module. The instrument stops any measurement currently underway, perform the alignment, and then restart the measurement from the beginning (similar to pressing the Restart key). This alignment corrects slow-rate which the drift does not impair specifications for time periods shorter than one week. Thus, it is required to perform this alignment on a weekly basis to maintain specifications. This alignment typically takes >4 minutes to complete.

A failure of IF will set the Error Condition “Align IF failed” and set bit 4 in the Status Questionable Calibration register. A failure will not employ new IF alignment data.

Successful completion of IF will clear the Error Condition “Align IF failed” and clear bit 6 in the Status Questionable Calibration register.

Align IF can be interrupted by pressing the Cancel (ESC) front-panel key or from remote with Device Clear followed by the :ABORt SCPI command. When this occurs, no new IF alignment data will be employed.

The query form of the remote commands (:CALibration:IF?) will invoke the alignment of the IF subsystem and return a success or failure value.

Note: In EXF, Source ARB play will be turned off and the source states will not be restored after IF Alignment.

Key Path	System, Alignments, Align Now
Mode	All
Remote Command	:CALibration:IF :CALibration:IF?
Example	:CAL:IF
Notes	:CALibration:IF? returns 0 if successful :CALibration:IF? returns 1 if failed While Align Now, IF is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion will clear bit 14 in the Status Questionable Calibration register.
Preset	Not affected by Preset and Restore System Defaults Misc.
State Saved	No
Initial S/W Revision	E.14.00

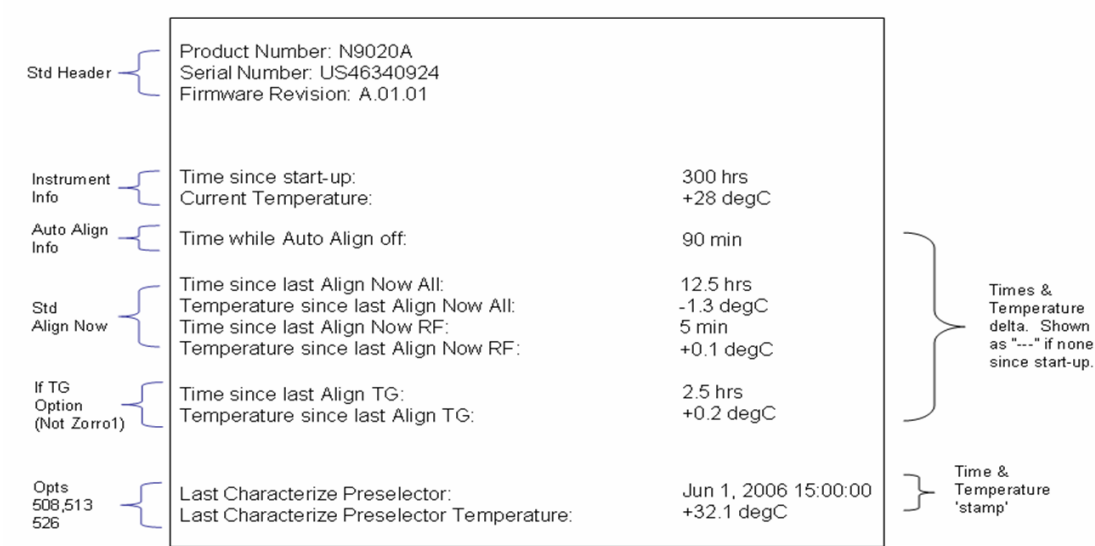
Mode	All
Remote Command	:CALibration:IF:NPENding
Example	CAL:IF:NPEN
Notes	:CALibration:IF:NPENding is the same as :CALibration:IF including all conditions, status register bits, except that this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not. Typical usage is: 1) :CALibration:IF:NPENding (Start a IF calibration) 2) :STATus:OPERation:CONDition? (Check if the calibration is completed or not, If bit 0 is set, then the system is doing calibration, the user should repeat this scpi query until the bit is cleared) 3):STATus:QUESTionable:CALibration:CONDition? (Check if bit 4 is set or not. If this bit is set, that means there are some errors in previous internal source calibration)
Initial S/W Revision	X.14.20

Show Alignment Statistics

Shows alignment information you can use to ensure that the instrument is operating in a specific manner. The Show Alignment Statistics screen is where you can view time and temperature information.

Values which are displayed are only updated when the Show Alignment Statistics screen is invoked, they are not updated while the Show Alignment Statistics screen is being displayed. The remote commands that access this information obtain current values.

An example of the Show Alignment Statistics screen would be similar to:



A successful Align Now, RF will set the Last Align RF temperature to the current temperature, and reset the Last Align RF time. A successful Align Now, All or Align Now, All but RF will set the Last Align Now All temperature to the current temperature, and reset the Last Align Now All time. A successful Align Now, All will also reset the Last Align RF items if the RF portion of the Align Now succeeded.

Key Path	System, Alignments
Mode	All
Notes	The values displayed on the screen are only updated upon entry to the screen and not updated while the screen is being displayed.
Initial S/W Revision	Prior to A.02.00

Key Path	Visual annotation in the Show Alignment Statistics screen
Mode	All
Remote Command	:SYSTem:PON:TIME?
Example	:SYST:PON:TIME?
Notes	Value is the time since the most recent start-up in seconds.

State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	Visual annotation in the Show Alignment Statistics screen
Mode	All
Remote Command	:CALibration:TEMPerature:CURRent?
Example	:CAL:TEMP:CURR?
Notes	Value is in degrees Centigrade. Value is invalid if using default alignment data (Align Now, All required)
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	Visual annotation in the Show Alignment Statistics screen
Mode	All
Remote Command	:CALibration:TIME:LALL?
Example	:CAL:TIME:LALL?
Notes	Value is the elapsed time, in seconds, since the last successful Align Now, All or Align Now, All but RF was executed.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	Visual annotation in the Show Alignment Statistics screen
Mode	All
Remote Command	:CALibration:TEMPerature:LALL?
Example	:CAL:TEMP:LALL?
Notes	Value is in degrees Centigrade at which the last successful Align Now, All or Align Now, All but RF was executed.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	Visual annotation in the Show Alignment Statistics screen
Mode	All
Remote Command	:CALibration:TIME:LRF?
Example	:CAL:TIME:LRF?

Notes	Value is the elapsed time, in seconds, since the last successful Align Now, RF was executed, either individually or as a component of Align Now, All.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	Visual annotation in the Show Alignment Statistics screen
Mode	All
Remote Command	:CALibration:TEMPerature:LRF?
Example	:CAL:TEMP:LRF?
Notes	Value is in degrees Centigrade at which the last successful Align Now, RF was executed, either individually or as a component of Align Now, All.
State Saved	No
Initial S/W Revision	Prior to A.02.00

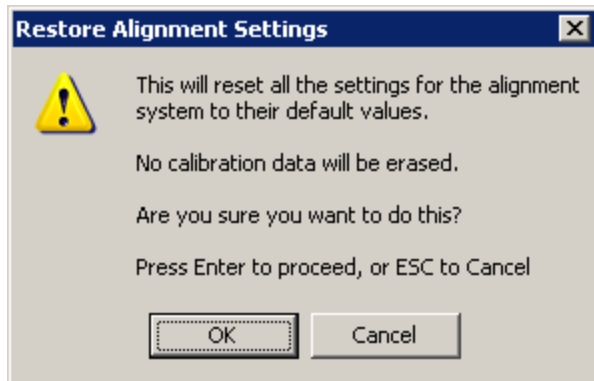
Key Path	SCPI Only
Mode	All
Remote Command	:CALibration:TIME:LIF?
Example	:CAL:TIME:LIF?
Notes	Value is the elapsed time, in seconds, since the last successful Align IF was executed.
State Saved	No
Initial S/W Revision	A.14.50

Key Path	SCPI Only
Mode	All
Remote Command	:CALibration:TEMPerature:LIF?
Example	:CAL:TEMP:LIF?
Notes	Value is in degrees Centigrade at which the last successful Align IF was executed.
State Saved	No
Initial S/W Revision	A.14.50

Restore Align Defaults

Initializes the alignment user interface settings, not alignment data, to the factory default values. Align Now, All must be executed if the value of the Timebase DAC results in a change.

For front panel operation, you are prompted to confirm action before setting the alignment parameters to factory defaults:



The parameters affected are:

Parameter	Setting
Timebase DAC	Calibrated
Timebase DAC setting	Calibrated value
Auto Align State	Normal (if the instrument is not operating with default alignment data, Off otherwise)
Auto Align All but RF	Off
Auto Align Alert	Time & Temperature

Key Path	System, Alignments
Mode	All
Example	:SYST:DEF ALIG
Notes	Alignment processing that results as the transition to Auto Alignment Normal will be executed sequentially; thus *OPC? or *WAI will wait until the alignment processing is complete.
Initial S/W Revision	Prior to A.02.00

Execute Expired Alignments (Remote Command Only)

Alignments can be expired in the situation where Auto Align is in the state of Partial or Off. This feature runs the alignments that have expired. This is different than performing an Align All, Now operation. Align All, Now performs an alignment of all subsystems regardless of whether they are needed or not, with Execute Expired Alignments, only the individual subsystems that have become due are aligned.

Mode	All
Remote Command	:CALibration:EXPIred?
Example	:CAL:EXP?
Notes	:CALibration:EXPIred? returns 0 if successful

	:CALibration:EXPIred? returns 1 if failed
Initial S/W Revision	Prior to A.02.00

I/O Config

Activates a menu for identifying and changing the I/O configuration for remote control.

Key Path	System
Initial S/W Revision	Prior to A.02.00

SCPI LAN

Activates a menu for identifying and changing the SCPI over a LAN configuration. There are a number of different ways to send SCPI remote commands to the instrument over LAN. It can be a problem to have multiple users simultaneously accessing the instrument over the LAN. These keys limit that somewhat by disabling the telnet, socket, and/or SICL capability.

Key Path	System, I/O Config
Initial S/W Revision	Prior to A.02.00

SCPI Telnet

Turns the SCPI LAN telnet capability On or Off allowing you to limit SCPI access over LAN through telnet.

Key Path	System, I/O Config, SCPI LAN
Mode	All
Remote Command	:SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle OFF ON 0 1 :SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle?
Example	:SYST:COMM:LAN:SCPI:TELN:ENAB OFF
Preset	This is unaffected by Preset but is set to ON with a "Restore System Defaults->Misc"
State Saved	No
Range	On Off
Initial S/W Revision	Prior to A.02.00

SCPI Socket

Turns the capability of establishing Socket LAN sessions On or Off. This allows you to limit SCPI access over LAN through socket sessions.

Key Path	System, I/O Config, SCPI LAN
Mode	All
Remote Command	:SYSTem:COMMunicate:LAN:SCPI:SOCKet:ENABle OFF ON 0 1 :SYSTem:COMMunicate:LAN:SCPI:SOCKet:ENABle?
Example	:SYST:COMM:LAN:SCPI:SOCK:ENAB OFF
Preset	This is unaffected by a Preset but is set to ON with a “Restore System Defaults->Misc”
State Saved	No
Range	On Off
Initial S/W Revision	Prior to A.02.00

SICL Server

Turns the SICL server capability On or Off, enabling you to limit SCPI access over LAN through the SICL server. (SICL IEEE 488.2 protocol.)

Parameter	Description	Setting
Maximum Connections	The maximum number of connections that can be accessed simultaneously	5
Instrument Name	The name (same as the remote SICL address) of your analyzer	inst0
Instrument Logical Unit	The unique integer assigned to your analyzer when using SICL LAN	8
Emulated GPIB Name	The name (same as the remote SICL address) of the device used when communicating with your analyzer	gpib7
Emulated GPIB Logical Unit	The unique integer assigned to your device when it is being controlled using SICL LAN	8
Emulated GPIB Address	The emulated GPIB address assigned to your transmitter tester when it is a SICL server (the same as your GPIB address)	18

Key Path	System, I/O Config, SCPI LAN
Mode	All
Remote Command	:SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle OFF ON 0 1 :SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle?
Example	:SYST:COMM:LAN:SCPI:SICL:ENAB OFF
Preset	This is unaffected by Preset, but is set to ON with a “Restore System Defaults->Misc”
State Saved	No
Range	On Off
Initial S/W Revision	Prior to A.02.00

HiSLIP Server

Turns the HiSLIP server capability On or Off, enabling you to limit SCPI access over LAN through the HiSLIP server.

HiSLIP stands for High Speed LAN Instrument Protocol and is part of the IVI-6.1 specification.

Here is an example of a VISA connection string used to connect to the HiSLIP Server on an X-Series Spectrum Analyzer:

TCPIP0::a-n9030a-93016::hislip0::INSTR

In the example above, hislip0 is the HiSLIP device name that VISA users must include in their HiSLIP VISA Address strings. Your HiSLIP device name may be different depending on your VISA settings.

Key Path	System, I/O Config, SCPI LAN
Mode	All
Remote Command	:SYSTem:COMMunicate:LAN:SCPI:HISLip:ENABle OFF ON 0 1 :SYSTem:COMMunicate:LAN:SCPI:HISLip:ENABle?
Example	:SYST:COMM:LAN:SCPI:HISL:ENAB OFF
Preset	This is unaffected by Preset, but is set to ON with a “Restore System Defaults->Misc”
State Saved	No
Range	On Off
Initial S/W Revision	A.11.00

SCPI Socket Control Port (Remote Command Only)

Returns the TCP/IP port number of the control socket associated with the SCPI socket session. This query enables you to obtain the unique port number to open when a device clear is to be sent to the instrument. Every time a connection is made to the SCPI socket, the instrument creates a peer control socket. The port number for this socket is random. The user must use this command to obtain the port number of the control socket. To force a device clear on this socket, open the port and send the string “DCL” to the instrument.

If this SCPI command is sent to a non SCPI Socket interface, then 0 is returned.

Mode	All
Remote Command	:SYSTem:COMMunicate:LAN:SCPI:SOCKet:CONTrol?
Example	:SYST:COMM:LAN:SCPI:SOCK:CONT?
Preset	This is unaffected by Preset or “Restore System Defaults->Misc”.
State Saved	No
Range	0 to 65534
Min	0
Max	65534
Initial S/W Revision	Prior to A.02.00

System IDN Response

This key allows you to specify a response to the *IDN? query, or to return the analyzer to the Factory response if you have changed it.

To choose the factory-set response, press the **Factory** key.

To specify your own response, press the **User** key, and enter your desired response.

If your test software is expecting the response to indicate Agilent Technologies as the Manufacturer, you can conveniently configure the response by pressing the Agilent key.

Key Path	System, I/O Config
Mode	All
Remote Command	
Notes	• This affects the response given in all Modes of the Analyzer, unless the current Mode has also specified a custom response, in which case the current Mode's custom IDN response takes precedence over the System's, but only while that Mode is the current Mode.. • It survives shutdown and restart of the software and therefore survives a power cycle
Preset	This is unaffected by Preset but is set to Factory on a "Restore System Defaults-> Misc"
State Saved	No
Initial S/W Revision	A.06.00
Modified at S/W Revision	x.14.50

Factory

This key selects the factory setting, for example:

"Keysight Technologies,E6650A,MY00012345,E.14.50"

where the fields are manufacturer, model number, serial number, firmware revision.

Key Path	System, I/O Config, IDN Response
Example	:SYST:IDN:CONF FACT
Initial S/W Revision	A.06.0

User

This key allows you to specify your own response to the *IDN? query. You may enter your desired response with the Alpha Editor or a plugin PC keyboard.

When you press this key, the active function becomes the current User string with the cursor at the end. This makes it easy to edit the existing string.

If you enter a null string (for example, by clearing the User String while editing and then pressing **Done**) the analyzer automatically reverts to the Factory setting.

Key Path	System, I/O Config, IDN Response
Example	:SYST:IDN:CONF USER
Initial S/W Revision	A.06.00

SYSTem:IDN Response setting (Remote command)

This SCPI command is used to set or clear the User SYSTem:IDN response.

Remote Command	:SYSTem:IDN <string> :SYSTem:IDN?
Notes	- The format of the <string> must be four fields each separated by a comma, example: :SYST:IDN "XYZ Corp,Model 12,012345,A.01.01" - The four fields are <manufacturer>, <model number>, <serial number>, <firmware revision>. Thus, the text within a field cannot contain a comma. - This affects the response given in all Modes of the Analyzer, unless the current Mode has also specified a custom response, in which case the current Mode's custom IDN response takes precedence over the System's, but only while that Mode is the current Mode.. - It survives shutdown and restart of the software and therefore survives a power cycle - Null string as parameter restores the Factory setting, example: :SYST:IDN ""
Preset	This is unaffected by Preset but is set to the original factory setting on a "Restore System Defaults->Misc"
Initial S/W Revision	A.06.00

Restore Defaults

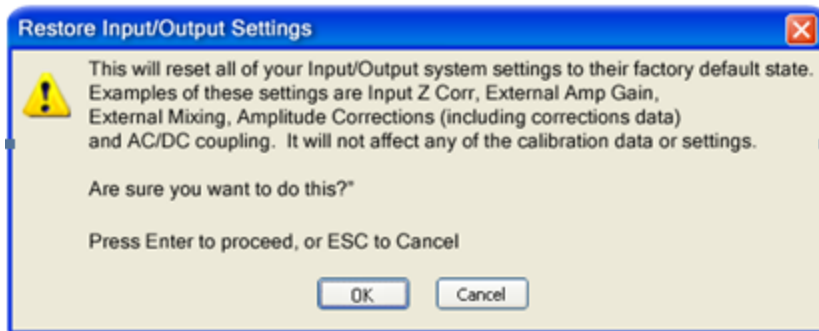
Provides incremental initialization of the system setting groups along with supporting a comprehensive reset of the entire instrument back to a factory default state. The menu selections are the groups of system settings and when one is selected, that particular group of system settings is reset back to their default values.

Key Path	System
Mode	All
Remote Command	:SYSTem:DEFault [ALL] ALIGn INPut MISC MODes PON
Example	SYST:DEF
State Saved	No
Initial S/W Revision	Prior to A.02.00

Restore Input/Output Defaults

Causes the group of settings and data associated with Input/Output front-panel key to be a reset to their default values. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. .

Confirmation is required to restore the Input/Output setting. The confirmation dialog is:

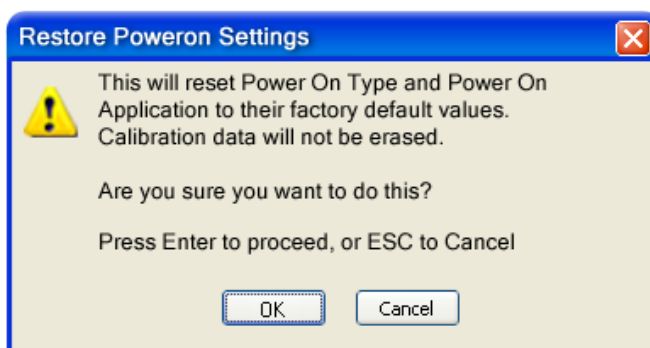


Key Path	System, Restore System Defaults
Example	:SYST:DEF INP
Initial S/W Revision	Prior to A.02.00

Restore Power On Defaults

This selection causes the Power On settings to be a reset to their default value. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. The Power On settings and their default values are Power On Type reset to Mode and Input/Output Defaults and Power On Application reset to whatever the factory set as its default value.

Confirmation is required to restore the factory default values. The confirmation dialog is:



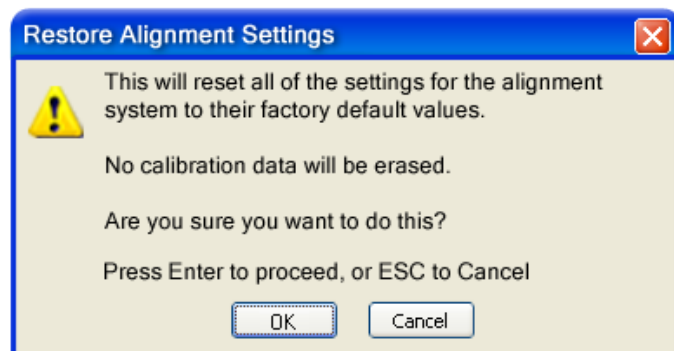
Key Path	System, Restore System Defaults
Example	:SYST:DEF PON
Initial S/W Revision	Prior to A.02.00

Restore Align Defaults

This selection causes the Alignment system settings to be a reset to their default values. This does not affect any Alignment data stored in the system. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch.

After performing this function, it may impact the auto-alignment time of the instrument until a new alignment baseline has been established.

Confirmation is required to restore the factory default values. The confirmation dialog is:



Key Path	System, Restore System Defaults
Example	:SYST:DEF ALIG
Initial S/W Revision	Prior to A.02.00

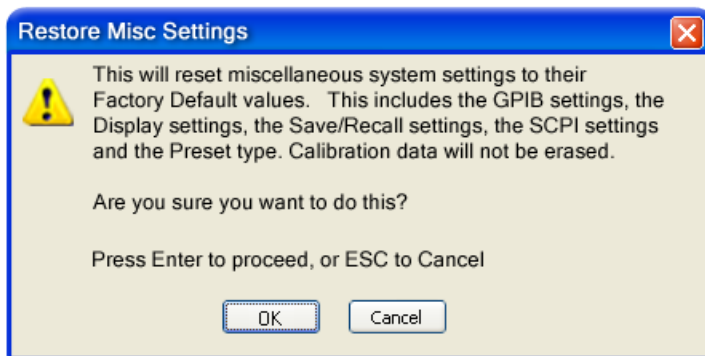
Restore Misc Defaults

This selection causes miscellaneous system settings to be reset to their default values. With this reset, you lose the GPIB address and it is reset to 18, so this should be used with caution. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. This miscellaneous group contains the rest of the settings that have not been part of the other Restore System Defaults groups. The following table is a complete list of settings associated with this group:

Miscellaneous Setting	Default Value
Verbose SCPI	Off
The SYST:PRES:TYPE	MODE
Auto File Name Number	000
Save Type	State
State Save To	Register 1
Screen Save To	SCREEN000.png
DISP:ENABle	ON
Full Screen	Off

Miscellaneous Setting	Default Value
SCPI Telnet	ON
SCPI Socket	ON
SICL Server	ON
Softkey Language	English
System Annotation	ON
Display Theme	TDColor
System IDN Response	Factory result of *IDN?
System IDN Response selection	Factory

Confirmation is required to restore the factory default values. The confirmation dialog is:

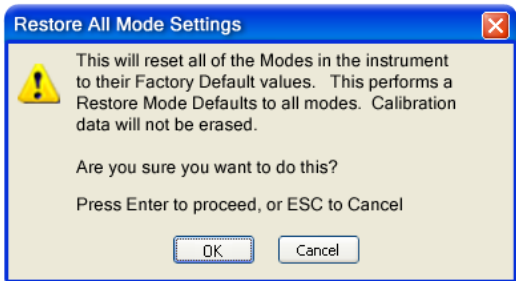


Key Path	System, Restore System Defaults
Example	:SYST:DEF MISC
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	x.14.50

Restore Mode Defaults (All Modes)

This selection resets all of the modes in the instrument back to their default state just as a Restore Mode Defaults does and it switches the instrument to the power-on mode and causes the default measurement for the power-on mode to be active. This level of Restore System Defaults does not affect any system settings, but it does affect the state of all modes and does cause a mode switch unless the instrument was already in the power-on mode.

Confirmation is required to restore the factory default values. The confirmation dialog is:

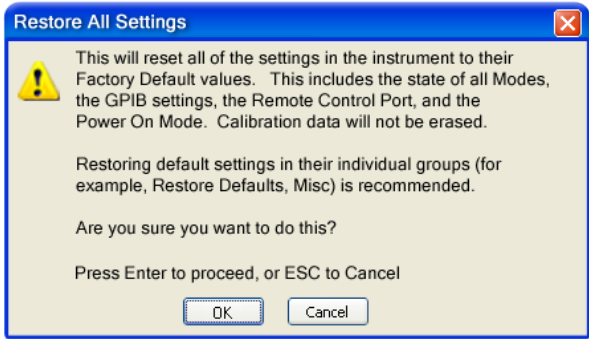


Key Path	System, Restore System Defaults
Example	:SYST:DEF MOD
Couplings	An All Mode will cause the currently running measurement to be aborted, mode switch to the power-on mode and activate the default measurement for the power-on mode.. It gets the mode to a consistent state with all of the default couplings set.
Initial S/W Revision	Prior to A.02.00

All

This performs a comprehensive reset of ALL analyzer settings to their factory default values. It resets all of the system setting groups, causes a Restore Mode Defaults for all modes in the instrument, and switches back to the power-on mode. It does not affect the User Preset file or any user saved files.

Confirmation is required to restore the factory default values. The confirmation dialog is:



NOTE	If you are using an Keysight USB External Mixer, then you will need to perform a Refresh USB Mixer Connection after Restoring All Defaults.

Key Path	System, Restore System Defaults
Example	:SYST:DEF ALL
Notes	If using Keysight USB External Mixer, perform a Refresh USB Mixer Connection (SCPI command :MIX:BAND USB) following a Restore All Defaults.
Couplings	An All will cause the currently running measurement to be aborted and get all modes to a consistent state, so it is unnecessary to couple any settings.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.14.00

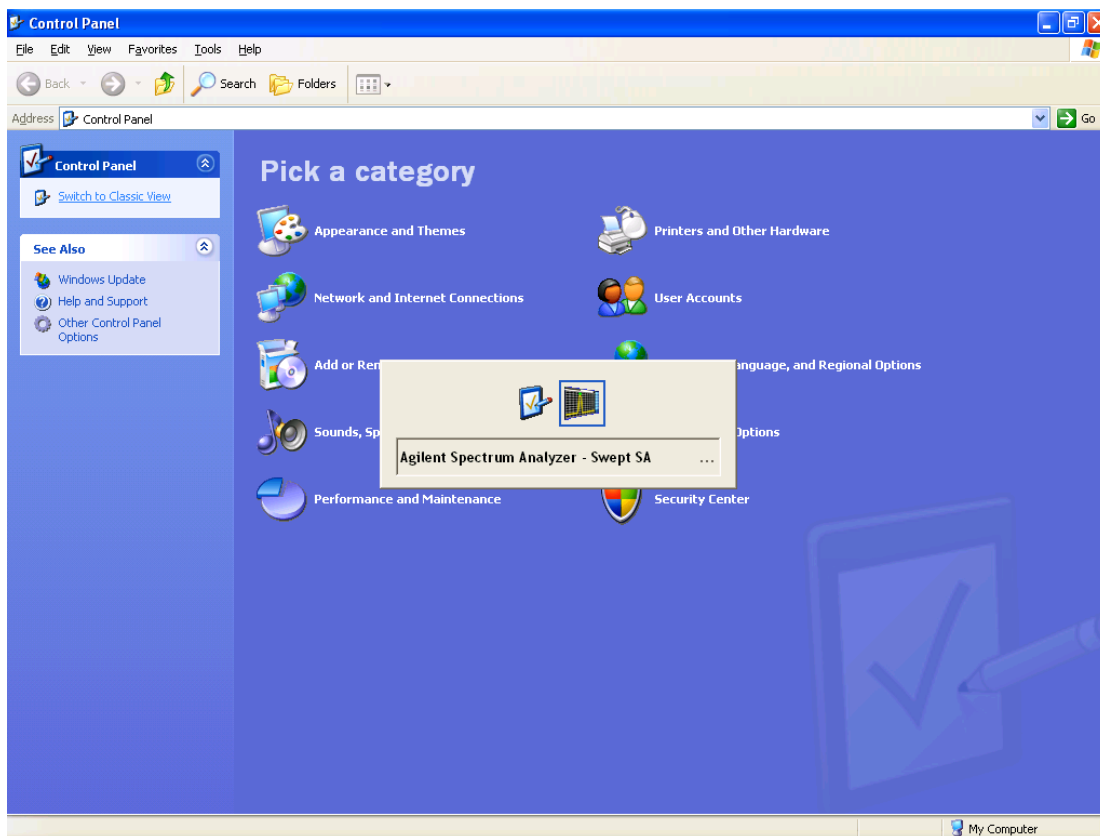
Control Panel...

Opens the Windows Control Panel. The Control Panel is used to configure certain elements of Windows that are not configured through the hardkey/softkey System menus.

NOTE This feature is not available if option SF1 is installed.

The Control Panel is a separate Windows application, so to return to the analyzer once you are in the Control Panel, you may either:

Exit the Control Panel by clicking on the red X in the upper right hand corner, with a mouse



Or use Alt-Tab: press and hold the Alt key and press and release the Tab key until the Analyzer logo is showing in the window in the center of the screen, as above, then release the Alt key.

Key Path	System
Notes	No remote command for this key.
Initial S/W Revision	Prior to A.02.00

Licensing...

Opens the license explorer.

NOTE This feature is not available if option SF1 is installed.

For Help on this key, select Help in the menu bar at the top of the license explorer window.

Key Path	System
Notes	No equivalent remote command for this key.
Backwards Compatibility Notes	In ESA the SCPI command for displaying the Show Licenses screen is: :SYSTem:CONFigure:LKEY:STATe OFF ON 0 1:SYSTem:CONFig- ure:LKEY:STATe? There are no equivalent SCPI commands in the X-Series for displaying the License Explorer.
Initial S/W Revision	Prior to A.02.00

Remote Command	:SYSTem:LKEY <"OptionInfo">, <"LicenseInfo">
Example	SYST:LKEY "N9073A-1FP", "027253AD27F83CDA5673A9BA5F427FDA5E4F25AEB1017638211AC9F60D9C639FE539735909C551DE0A91"
Notes	The <"OptionInfo"> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one, since the system knows which version is supported for each feature. The <"LicenseInfo"> contains the signature, the expiration date, and serial number for transport if transportable. You must specify the signature, but you can omit the other information. If you omit the expiration date, the system regards it as permanent. If you omit the serial number, the system regards it as non-transportable. As a result, this supports reverse compatibility.
Initial S/W Revision	Prior to A.02.00

Remote Command	:SYSTem:LKEY:DELeTe <"OptionInfo">,<"LicenseInfo">
Example	SYST:LKEY:DEL 'N9073A-1FP', "027253AD27F83CDA5673A9BA5F427FDA5E4F25AEB1017638211AC9F60D9C639FE539735909C551DE0A91"
Notes	The <"OptionInfo"> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one, if more than one version is installed. The <"LicenseInfo"> contains the signature, the expiration date, and whether or not be transportable. You must specify the signature, but you can omit the other information. If you omit the expiration date, the system regards it as permanent. If you omit the transportability, the system regards it as non-transportable. As a result, this supports reverse compatibility.

Initial S/W Revision Prior to A.02.00

Remote Command :SYSTem:LKEY:LIST?

Notes

Return Value:

An <arbitrary block data> of all the installed instrument licenses.

The format of each license is as follows.

<Feature>,<Version>,<Signature>,<Expiration Date>,<Serial Number for Transport>

Return Value Example:

#3136

N9073A-1FP,1.000,B043920A51CA

N9060A-2FP,1.000,4D1D1164BE64

N9020A-508,1.000,389BC042F920

N9073A-1F1,1.000,5D71E9BA814C,13-aug-2005

<arbitrary block data> is:

#NMMM<data>

Where:

N is the number of digits that describes the number of MMM characters. For example if the data was 55 bytes, N would be 2.

MMM would be the ASCII representation of the number of bytes. In the previous example, N would be 55.

<data> ASCII contents of the data

Initial S/W Revision Prior to A.02.00

Remote Command :SYSTem:LKEY? <"OptionInfo">

Example SYST:LKEY? "N9073A-1FP"

Notes The <"OptionInfo"> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one.

Return Value:

<"LicenseInfo"> if the license is valid, null otherwise.

<"LicenseInfo"> contains the signature, the expiration date, and serial number if transportable.

Return Value Example:

"B043920A51CA"

Initial S/W Revision Prior to A.02.00

Remote Command :SYSTem:HID?

Notes	Return value is the host ID as a string
Initial S/W Revision	Prior to A.02.00

Security

Accesses capabilities for operating the instrument in a security controlled environment.

Key Path	System
Initial S/W Revision	A.04.00

USB

The Windows operating system can be configured to disable write access to the USB ports for users who are in a secure environment where transferring data from the instrument is prohibited. This user interface is a convenient way for the customer to disable write access to USB.

Key Path	System, Security
Mode	All
Scope	Mode Global
Remote Command	:SYSTem:SECurity:USB:WProtect[:ENABLE] ON OFF 0 1 :SYSTem:SECurity:USB:WProtect[:ENABLE]?
Example	:SYST:SEC:USB:WPR ON Will set USB ports to Read-only
Notes	When the USB ports are in Read-only mode then no data can be stored to USB, including the internal USB memory used for a back-up location for the calibration data.
Dependencies	This key is grayed-out unless the current user has administrator privileges.
Preset	This is unaffected by Preset or any Restore System Defaults. An Agilent Recovery will set the USB to write protect OFF
State Saved	No
Range	Read-Write Read only
Initial S/W Revision	A.04.00

Read-Write

Selection for allowing full read-write access to the USB ports.

Key Path	System, Security, USB
Example	:SYST:SEC:USB:WPR OFF Will set USB ports to Read-Write
Initial S/W Revision	A.04.00

Read only

Selection for disabling write access to the USB ports.

Key Path	System, Security, USB	
Example	:SYST:SEC:USB:WPR ON	Will set USB ports to Read only
Initial S/W Revision	A.04.00	

Diagnostics

The Diagnostics key in the System menu gives you access to basic diagnostic capabilities of the instrument.

Key Path	System
Initial S/W Revision	Prior to A.02.00

Show Hardware Statistics

Provides a display of various hardware statistics. The statistics include the following:

- High and Low temperature extremes
- Elapsed time that the instrument has been powered-on (odometer)

The display should appear listing the statistics, product number, serial number, and firmware revision.

Hardware Statistical Information		
Agilent MXA Signal Analyzer		
Product Number: N9020A		
Serial Number: US00061145		
Instrument S/W Revision: A.12.00		
Revision Date: 7/11/2012 12:11:10 PM		
Component Name	Value	
MechAtten #1 Count Total	457304	
Calibrator Switch Cycles	105953	
AC/DC Switch Cycles	114240	In some CXA models this field is called "Fixed Atten"
2 dB #1 Mechanical Atten Cycles	112655	
2 dB #2 Mechanical Atten Cycles	124456	
MechAtten #2 Count Total	472265	
6 dB Mechanical Atten Cycles	115302	Some CXA models omit these fields
10 dB Mechanical Atten Cycles	93602	
20 dB Mechanical Atten Cycles	144781	
30 dB Mechanical Atten Cycles	118580	
Low Noise Path Switch	Only shown if LNP installed 45668	
Preselector Bypass Cycles	Only shown if MPB installed 31133	
High temperature operating extreme	45.75	
Low temperature operating extreme	-23.9375	
Elapsed Time (On-Time)(hours)	134164	

The CXA models in which the AC/DC Switch field is called Fixed Atten and that omit the mechanical attenuation fields are the N9000A–503/507 models.

Modular HWs only have time and temperature information in Show Hardware Statistics.

The data will be updated only when the Show Hardware Statistics menu key is pressed, it will not be updated while the screen is displayed.

The tabular data should be directly printable.

Key Path	System, Diagnostics
Mode	All
Notes	The values displayed on the screen are only updated upon entry to the screen and not updated while the screen is being displayed.
Initial S/W Revision	Prior to A.02.00

SCPI for Show Hardware Statistics (Remote Commands Only)

Each of the hardware statistic items can be queried via SCPI.

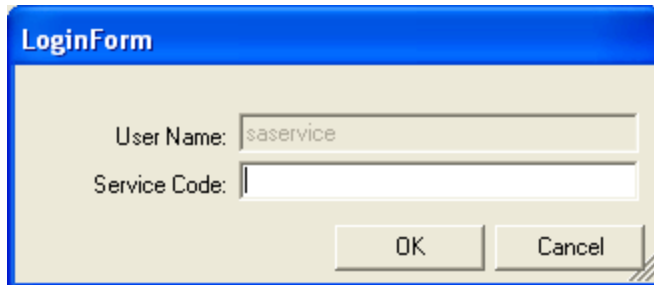
- Error! Reference source not found.
- Error! Reference source not found.
- Error! Reference source not found.

Advanced

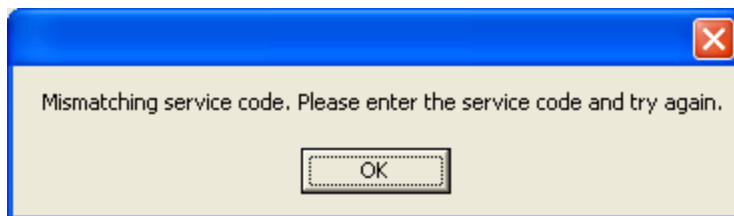
Accesses advanced diagnostic capabilities performed in the factory or under instructions from repair procedures. This menu key is only visible when the logged-in user is “saservice”.

NOTE This feature is not available if option SF1 is installed.

The first access to the Advanced Diagnostic Menu after invoking the instrument application will require an authentication, which is to enter the Service Code. Subsequent accesses to the Advanced Diagnostic Menu are unimpeded. The Authentication dialog looks like:

A Windows-style dialog box titled "LoginForm" with a blue header bar. It contains two text input fields: "User Name:" with the text "saservice" entered, and "Service Code:" which is empty. Below the fields are two buttons: "OK" and "Cancel".

“OK” is the default key thus the Enter key is used to complete the entry. If invalid Service Code is entered authentication is not granted and you are provided the following dialog:

A Windows-style error dialog box with a blue header bar and a red "X" icon in the top right corner. The text inside reads: "Mismatching service code. Please enter the service code and try again." Below the text is a single "OK" button.

Key Path	System, Diagnostics
Notes	Password is required to access this menu.
Initial S/W Revision	Prior to A.02.00

Key Recorder

Access the Key Recorder feature. The full details to the Key Recorder are in the [Key Recorder How-to document](#).

Key Path	System, Diagnostics, Advanced
Initial S/W Revision	Prior to A.02.00

Key Recorder On/Off

See the [Key Recorder How-to document](#), listed here is the table information for LP/SEP use:

Key Path	System, Diagnostics, Advanced, Key Recorder
Mode	All
Notes	The startup of the key recorder is controlled by a registry entry, refer to the key recorder document listed above.
Preset	Not affected by Preset.
State Saved	No
Range	On Off
Initial S/W Revision	Prior to A.02.00

Show Keystroke History...

Launches Notepad with the key recorder history file loaded. See the [Key Recorder How-to document](#), listed here is the table information for LP/SEP use:

Key Path	System, Diagnostics, Advanced, Key Recorder
Notes	Operator is responsible for exiting Notepad and returning focus to the Instrument Application.
Initial S/W Revision	Prior to A.02.00

Self test

This key gives you access to diagnostic capabilities for self tests of the instrument.

Key Path	System, Diagnostics
Initial S/W Revision	Prior to A.10.00

All Self Test

This key invokes all the self tests defined in the Diagnostics Self Test section.

Key Path	System, Diagnostics, Self Test
Remote Command	<code>SYSTem:TEST:WCTS:[ALL]</code>
Example	<code>SYST:TEST:WCTS:[ALL]</code>
Initial S/W Revision	A.12.50

FEC Self Test

This key invokes the EXT E6607C front end control self test. When operation is complete, the generated test summary information is appended to log file E:\Agilent\Instrument\FECTestLog.txt. This test summary

file can be retrieved from the instrument using the MMEM set of SCPI command, once you have the fully qualified the path and file name.

If the self test fails, the following error message will be generated:

“-330, Self-test failed, see log file E:\Agilent\Instrument\FECTestLog.txt”

If the self test passes, an advisory message “FEC self-test completed successfully” is generated.

Key Path	System, Diagnostics, Self Test
Remote Command	SYSTem:TEST:WCTS:FEC
Example	SYST:TEST:WCTS:FEC
Notes	Access log with command : MMEM:DATA? "E:\ Agilent\Instrument\FECTestLog.txt"
Initial S/W Revision	A.12.50

Show Result

This key gives you access to show results of the following self tests:

- Source self-test results
- E6607C embedded MPA or E6640A/E6650A RFIO self-test results
- E6607C FEC self-test results

Key Path	System, Diagnostics, Self Test
Initial S/W Revision	A.12.50

FEC Self Test Results

Provides a display of last FEC test results, the display should appear listing model number, serial number and test time at the top of display, and then list test date/time, test name, measured value, valid range and pass/fail of each FEC test item, the tabular data should be directly printable.

Key Path	System, Diagnostics, Self Test,Show Results
Remote Command	SYSTem:TEST:WCTS:SHOW:RESult FEC
Example	SYST:TEST:WCTS:SHOW:RES FEC
Initial S/W Revision	A.12.50

The example of FEC self test result display is as follows:

```
FEC Self Test Results
Produce Number: E6607C
Serial Number: MY51380437
```

Instrument S/W: 11/16/2012 2:51:19 PM					
FpgaVersionTest					
Date	Time(GMT)	Name	MeasValue	ValidRange	Result
11/23/2012	16:13:56	Analog_FPGA	16.000	>= 16.000	Pass
11/23/2012	16:13:56	Digital_FPGA	50.000	>= 46.000	Pass
11/23/2012	16:13:56	CRFS_FPGA	38.000	>= 38.000	Pass
PowerSupplyTest					
Date	Time(GMT)	Name	MeasValue	ValidRange	Result
11/23/2012	16:13:56	ABUS_+32CHK	31.904	30.900 - 32.900	Pass
11/23/2012	16:13:56	ABUS_+12CHK	12.296	10.800 - 13.200	Pass
11/23/2012	16:13:56	+10VA	9.935	9.600 - 10.200	Pass
11/23/2012	16:13:56	+5VA	4.995	4.900 - 5.100	Pass
11/23/2012	16:13:56	+3.3VA	3.299	3.200 - 3.400	Pass
11/23/2012	16:13:56	-3.3VA	-3.311	-3.400 - -3.200	Pass
11/23/2012	16:13:56	ACOM	0.00	-0.200 - 0.200	Pass
11/23/2012	16:13:56	-5VA	-5.036	-5.100 - -4.900	Pass
11/23/2012	16:13:56	-6.1VA	-5.880	-6.200 - -5.700	Pass
11/23/2012	16:13:56	-10VA	-10.116	-10.200 - -9.800	Pass
11/23/2012	16:13:56	ABUS_-2.5V_REF	-2.508	-2.520 - -2.470	Pass
11/23/2012	16:13:56	ABUS_+2.5V_REF	2.508	2.480 - 2.520	Pass
11/23/2012	16:13:56	ABUS_-10VPALC	-10.047	-10.200 - -9.800	Pass
11/23/2012	16:13:57	ABUS_DET_MOD_FLT	18.000	7.800 - 100.000	Pass

Show FEC Self Test Results contents (Remote Command Only)

A remote command is available to obtain the contents of the Show FEC Self Test Results screen (the entire contents, not just the currently displayed page).

Remote Command	SYSTem:TEST:WCTS:FEC:RESult?
Example	SYST:TEST:WCTS:FEC:RES?

Notes	The output is an IEEE Block format of the Show FEC Self Test Results contents. Each line is separated with a new-line character.
Initial S/W Revision	A.12.50

	Keysight Converged	PSA
IP Address	SYSTem:COMMunicate:LAN:ADDRes <string>	:SYSTem:COMMunicate:LAN[:SELF]:IP <string>
	SYSTem:COMMunicate:LAN:ADDRes?	:SYSTem:COMMunicate:LAN[:SELF]:IP?
Gateway	SYSTem:COMMunicate:LAN:DGATeway <string>	:SYSTem:COMMunicate:LAN[:SELF]:GATeway <string>
	SYSTem:COMMunicate:LAN:DGATeway?	:SYSTem:COMMunicate:LAN[:SELF]:GATeway?
Subnet Mask	SYSTem:COMMunicate:LAN:SMASk <string>	:SYSTem:COMMunicate:LAN[:SELF]:SUBNetmask <string>
	SYSTem:COMMunicate:LAN:SMASk?	:SYSTem:COMMunicate:LAN[:SELF]:SUBNetmask?

Internet Explorer...

This key launches Microsoft Internet Explorer. A mouse and external keyboard are highly desired for using Internet Explorer. When Internet Explorer is running, close Internet Explorer to return focus to the Instrument Application (or use Alt-Tab).

Key Path	System
Mode	All
Notes	No equivalent remote command for this key.
Initial S/W Revision	A.05.01

7 Trigger Functions

Trigger

Accesses a menu of keys to control the selection of the trigger source and the setup of each of the trigger sources. The analyzer is designed to allow triggering from a number of different sources, for example, Free Run, Video, External, RF Burst, and so forth.

The TRIG:SOURCe command (below) will specify the trigger source for the currently selected input (RF or I/Q). If you change inputs, the new input remembers the trigger source it was last programmed to for the current measurement, and uses that trigger source. You can directly set the trigger source for each input using the TRIGger:RF:SOURce and TRIGger:IQ:SOURce commands (later in this section). When in External Mixing, the analyzer uses the RF trigger source.

Note the inclusion of the <measurement> parameter in the command below. Because each measurement remembers its own Trigger Source, the command must be qualified with the measurement name. Note that for the Swept SA measurement this is not the case; for backwards compatibility, no <measurement> parameter is used when setting the Trigger Source for the Swept SA measurement.

See ["Trigger Source Presets" on page 219](#)

See ["RF Trigger Source" on page 222](#)

See ["I/Q Trigger Source" on page 223](#)

See ["More Information" on page 224](#)

Key Path	Front-panel key
Remote Command	<pre>:TRIGger:<measurement>[:SEquence]:SOURce EXTernal1 EXTernal2 IMMediate LINE FRAMe RFBurst VIDeo IF ALARm LAN IQMag IDEMod QDEMod IINPut QINPut AIQMag TV :TRIGger:<measurement>[:SEquence]:SOURce?</pre> where <measurement> is the measurement for which you wish to set the Source (blank for the Swept SA measurement)
Example	TRIG:ACP:SOUR EXT1 Selects the external 1 trigger input for the ACP measurement and the selected input TRIG:SOUR VID Selects video triggering for the Swept SA (SAnalyzer) measurement in the Spectrum Analyzer mode. For SAN, do not use the <measurement> keyword. Only send this form in the Spectrum Analyzer mode or you will get an Undefined Header error
Notes	Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available. Not all trigger sources are available for each input. See the "RF Trigger Source" on page 222 and "I/Q Trigger Source" on page 223 commands for detailed information on which trigger sources are available for each input. Other trigger-related commands are found in the INITiate and ABORt SCPI command subsystems. *OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned. Available ranges and presets can vary from mode to mode.
Dependencies	In some models, there is no second External input. In these models, the External 2 key is blanked and

	the EXternal2 parameter will generate a "Hardware missing; Not available for this model number" message.
Preset	See table below
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Backwards Compatibility SCPI	:TRIGger[:SEquence]:SOURCe EXternal For backward compatibility, the parameter EXternal is mapped to EXternal1
Backwards Compatibility SCPI	[:SENSe] :<measurement>:TRIGger:SOURce This backwards compatibility alias command is provided for ESA/PSA compatibility This backwards compatibility command does not apply to the Swept SA measurement, for that just use :TRIGger:SOURCe This backwards compatibility command does not apply to the monitor spectrum, log plot and spot frequency measurements
Backwards Compatibility SCPI	[:SENSe] :<measurement>:TRIGger:SOURce IF In earlier instruments, the parameter IF was used by apps for the video trigger, so using the IF parameter selects VIDEO triggering. Sending IF in the command causes VID to be returned to a query.
Backwards Compatibility SCPI	[:SENSe] :ACPr:TRIGger:SOURce This backwards Compatibility SCPI command is provided to support the same functionality as [:SENSe]:ACPr:TRIGger:SOURce (PSA W-CDMA, PSA cdma2000 and PSA 1xEVDO) due to the fact that the ACPr node conflicts with the ACPower node.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Trigger Source Presets

Here are the Trigger Source Presets for the various measurements:

Meas	Mode	Preset for RF	Preset for IQ	Notes
Swept SA	SA	IMM	IQ not supported	
CHP	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR	IMM	IQ not supported	
OBW	SA, WCDMA, C2K, WIMAX OFDMA,	1xEVDO: EXT1 others: IMM	IQ not supported	For 1xEVDO mode, the trigger source is coupled with the gate state, as well as the gate

	TD-SCDMA, 1xEVDO, LTE, LTETDD, CMMB, ISDB-T, MSR			source. When the trigger source changes to RFBurst, External1 or External2, the gate state is set to on, and the gate source is set identically with the trigger source. When the trigger source changes to IMMEDIATE, VIDEO, LINE, FRAME or IF, the gate state is set to off.
CCDF	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB- T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR	WIMAX OFDMA: RFBurst LTETDD: BTS: External 1 MS: Periodic Timer TD-SCDMA and 1xEV-DO: BTS: External 1 MS: RFBurst SA, WCDMA, C2K, LTE, CMMB, ISDB- T, DVB-T/H, DTMB, Digital Cable TV, MSR: IMMEDIATE	TD-SCDMA and 1xEV-DO: BTS: External 1 MS: IQMag LTETDD: BTS: External 1 MS: Periodic Timer Others: IMM	For TD-SCDMA: Trigger source is coupled with radio device. When radio device changes to BTS, trigger source will be changed to EXTERNAL1. When radio device changes to MS, trigger source will be set as RFBurst for RF or IQ Mag for BBIQ. When TriggerSource is RFBurst or IQ Mag, Measure Interval is grayed out.
ACP	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB- T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR	IMM	IQ not supported	
Tx Power	SA, GSM, TD- SCDMA	SA, GSM: RFBurst TD-SCDMA: EXTERNAL	IMM	TD-SCDMA doesn't support the Line and Periodic Timer parameters. When the mode is TD-SCDMA, if the Radio Device is switched to BTS, the value will be changed to External 1 and if the Radio device is switched to MS, the value will be changed to RFBurst
SPUR	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV- DO, DVB-T/H, LTE, LTETDD, MSR	IMM	IQ not supported	
SEM	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-	1xEVDO(BTS): EXTERNAL1 All others: IMMEDIATE	IQ not supported	

	T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR			
CDP	WCDMA	IMM	IMM	
RHO	WCDMA	IMM	IMM	
PCON	WCDMA	IMM	IMM	
QPSK	WCDMA, C2K, 1xEVDO	All except CDMA1xEVDO: IMMEDIATE CDMA1xEVDO: EXT1	IMM	
MON	All except SA and BASIC	IMM	IQ not supported	
WAV		LTETDD: BTS: External 1 MS: Periodic Timer GSM/EDGE: RFBurst All others: IMMEDIATE	LTETDD: BTS: External 1 MS: Periodic Timer GSM/EDGE: IQMag All others: IMMEDIATE	
PVT	WIMAXOFDMA	RFB	IMM	
EVM	WIMAXOFDMA, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV	All but CMMB: IMM CMMB: Periodic Timer	All but CMMB: IMM CMMB: External 1	LTE, LTETDD supports Free Run, Video and External 1 only.
SPEC	BASIC	IMM	IMM	
LOG Plot	PN	IMM	IQ not supported	
Spot Freq	PN	IMM	IQ not supported	
GMSK PVT	EDGE/GSM	RFB	IMM	
GMSK PFER	EDGE/GSM	RFB	IQMag	
GMSK ORFS	EDGE/GSM	RF Burst	IQ not supported	
EDGE PVT	EDGE/GSM	RFB	IMM	

EDGE EVM	EDGE/GSM	RFB	IQMag
EDGE ORFS	EDGE/GSM	Periodic Timer	IQ not supported
Combined WCDMA	WCDMA	IMM	IQ not supported
Combined GSM	EDGE/GSM	RFB	IQ not supported
List Power Step	WCDMA, EDGE/GSM	IMM	IQ not supported
Transmit On/Off Power	LTETDD	LTETDD: BTS: External 1 MS: Periodic Timer	LTETDD: BTS: External 1 MS: Periodic Timer
Transmit Analysis	BLUETOOTH	RFB	IQ not supported
Adjacent Channel Power	BLUETOOTH	IMM	IQ not supported
LE In-band Emissions	BLUETOOTH	IMM	IQ not supported
EDR In-band Spurious Emissions	BLUETOOTH	Periodic Timer	IQ not supported
Conformance EVM	LTE, LTETDD, MSR	IMM	IMM

RF Trigger Source

The **RF Trigger Source** command selects the trigger to be used for the specified measurement when RF is the selected input. The RF trigger source can be queried and changed even while another input is selected, but it is inactive until RF becomes the selected input.

Note the inclusion of the <measurement> parameter in the command below. Because each measurement remembers its own Trigger Source, the command must be qualified with the measurement name. Note that for the Swept SA measurement this is not the case; for backwards compatibility, no <measurement> parameter is used when setting the Trigger Source for the Swept SA measurement.

Remote Command	<code>:TRIGger:<measurement>[:SEquence]:RF:SOURce EXTernal1 EXTernal2 IMMEDIATE LINE FRAME RFBurst VIDEO IF ALARm LAN TV</code> <code>:TRIGger:<measurement>[:SEquence]:RF:SOURce?</code>
Example	<code>TRIG:ACP:RF:SOUR EXT1</code> Selects the external 1 trigger input for the ACP measurement and the RF input

	TRIG:RF:SOUR VID Selects video triggering for the SANalyzer measurement and the RF input. For SAN, do not use the <measurement> keyword.
Notes	Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available. Not all trigger sources are available for each input. For the RF Trigger Source , the following trigger sources are available: –IMMediate - free run triggering –VIDeo - triggers on the video signal level –LINE - triggers on the power line signal –EXTernal1 (or EXTernal) - triggers on an externally connected trigger source marked “Trigger 1 In” on the rear panel –EXTernal2 - triggers on an externally connected trigger source marked “Trigger 2 In” on the front panel. In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a “Hardware missing; Not available for this model number” message –RFBurst - triggers on the bursted frame –FRAMe - triggers on the periodic timer –IF (video) - same as video, for backwards compatibility only *OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned. Available ranges, and presets can vary from mode to mode.
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00

I/Q Trigger Source

This command selects the trigger to be used for the specified measurement when I/Q (which requires option BBA) is the selected input. The I/Q trigger source can be queried and changed even while another input is selected, but it is inactive until I/Q becomes the selected input.

Remote Command	<pre> :TRIGger:<measurement>[:SEquence]:IQ:SOURce EXTernal1 EXTernal2 IMMediate IQMag IDEMod QDEMod IINPut QINPut AIQMag :TRIGger:<measurement>[:SEquence]:IQ:SOURce? </pre>
Example	TRIG:WAVeform:SOUR IQM Selects I/Q magnitude triggering for the IQ Waveform measurement and the I/Q input
Notes	Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available. Not all trigger sources are available for each input. For the I/Q Trigger Source , the following trigger sources are available:

	–IMMediate - free run triggering –EXternal1 (or EXternal) - triggers on an externally connected trigger source on the rear panel –EXternal2 - triggers on an externally connected trigger source on the front panel –IQMag - triggers on the magnitude of the I/Q signal –IDEMod - triggers on the I/Q signal's demodulated I voltage –QDEMod - triggers on the I/Q signal's demodulated Q voltage –IINPut - triggers on the I channel's ADC voltage –QINPut - triggers on the Q channel's ADC voltage –AIQMag - triggers on the magnitude of the auxiliary receiver channel I/Q signal *OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned. Available ranges, and from mode to mode presets can vary
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00

More Information

The trigger menus let you select the trigger source and trigger settings for a sweep or measurement. In triggered operation (basically, any trigger source other than Free Run), the analyzer will begin a sweep or measurement only with the selected trigger conditions are met, generally when your trigger source signal meets the specified trigger level and polarity requirements. (In FFT measurements, the trigger controls when the data acquisition begins for FFT conversion.)

For each of the trigger sources, you may define a set of operational parameters or settings which will be applied when that source is selected as the current trigger source. Examples of these settings are Trigger Level, Trigger Delay, and Trigger Slope. You may apply different settings for each source; so, for example, you could have a Trigger Level of 1v for External 1 trigger and –10 dBm for Video trigger.

Once you have established the settings for a given trigger source, they generally will remain unchanged for that trigger source as you go from measurement to measurement within a Mode (although the settings do change as you go from Mode to Mode). Furthermore, the trigger settings within a Mode are the same for the **Trigger** menu, the **Gate Source** menu, and the **Sync Source** menu that is part of the **Periodic Timer Trigger Setup** menu. That is, if **Ext1** trigger level is set to 1v in the **Trigger** menu, it will appear as 1v in both the **Gate Source** and the **Sync Source** menus. For these reasons the trigger settings commands are not qualified with the measurement name, the way the trigger source commands are.

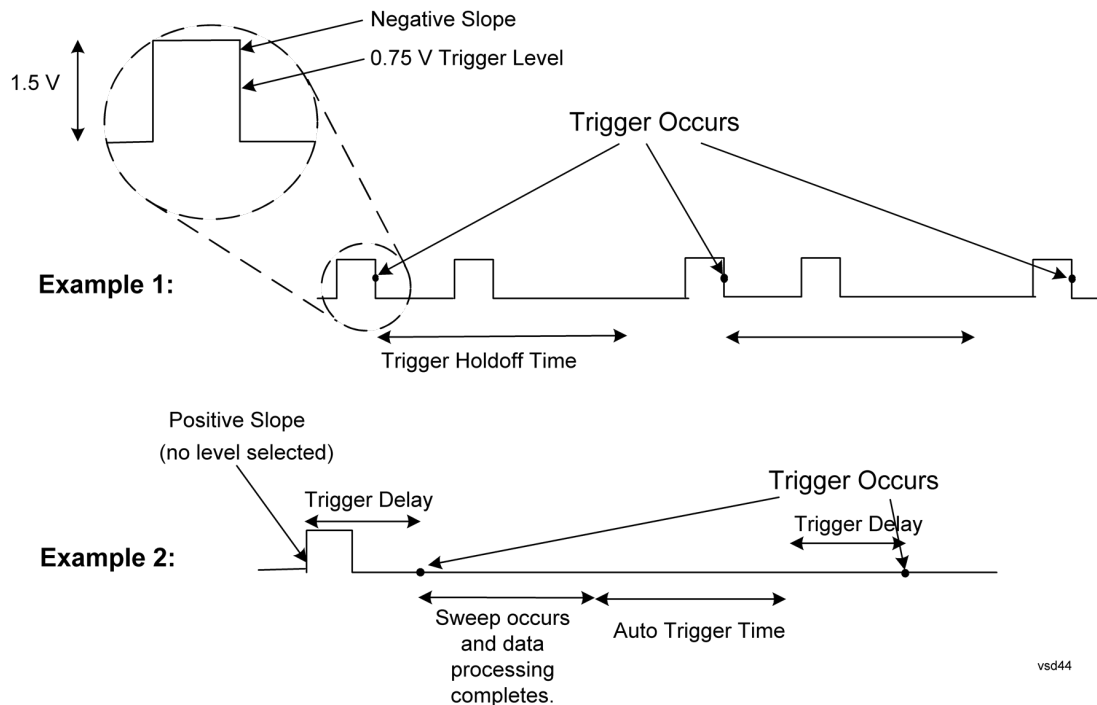
The settings setup menu can be accessed by pressing the key for the current trigger source a second time. For example, one press of Video selects the Video trigger as the source. The Video key becomes highlighted and the hollow arrow on the key turns black. Now a second press of the key takes you into the Video Trigger Setup menu.

Trigger Setup Parameters:

The following examples show trigger setup parameters using an external trigger source.

Example 1 illustrates the trigger conditions with negative slope and no trigger occurs during trigger Holdoff time.

Example 2 illustrates the trigger conditions with positive slope, trigger delay, and auto trigger time.



vsd44

Free Run

Pressing this key, when it is not selected, selects free-run triggering. Free run triggering occurs immediately after the sweep/measurement is initiated.

Key Path	Trigger
Example	TRIG:SOUR IMM Swept SA measurement TRIG:<meas>:SOUR IMM Measurements other than Swept SA
State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00

Video (IF Envelope)

Pressing this key, when it is not selected, selects the video signal as the trigger. The Video trigger condition is met when the video signal (the filtered and detected version of the input signal, including both RBW and VBW filtering) crosses the video trigger level.

NOTE

When the detector selected for all active traces is the average detector, the video signal for triggering does not include any VBW filtering.

The video trigger level is shown as a labeled line on the display. The line is displayed as long as video is the selected trigger source.

Pressing this key, when it is already selected, accesses the video trigger setup functions.

Key Path	Trigger
Example	TRIG:SOUR VID Swept SA measurement TRIG:<meas>:SOUR VID Measurements other than Swept SA
Notes	Log Plot and Spot Frequency measurements do not support Video Trigger
Dependencies	Video trigger is allowed in average detector mode.
State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Backwards Compatibility Notes	In the past, the Average detector was not available when Video triggering was on, and consequently, functions that set the detector to average (such as Marker Noise or Band/Intvl Power) were not available when the video trigger was on. Similarly, Video triggering was not available when the detector was Average. In the X-Series, these restrictions are removed.
Initial S/W Revision	Prior to A.02.00

External 1

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 1 input connector on the rear panel.

Pressing this key, when it is already selected, accesses the external 1 trigger setup menu.

Key Path	Trigger
Example	TRIG:SOUR EXT1 Swept SA measurement TRIG:<meas>:SOUR EXT1 Measurements other than Swept SA
Dependencies	Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 1.

State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00

Trigger Level

Sets the value where the external 1 trigger input will trigger a new sweep/measurement.

Key Path	Trigger, External 1
Remote Command	:TRIGger[:SEquence]:EXTernal1:LEVel <level> :TRIGger[:SEquence]:EXTernal1:LEVel?
Example	TRIG:EXT1:LEV 0.4 V
Couplings	This same level is used for the Ext1 trigger source in the Trigger menu, for the Ext1 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext1 selection in the Gate Source menu.
Preset	1.2 V
State Saved	Saved in instrument state
Min	-5 V
Max	5 V
Default Unit	V
Backwards Compatibility SCPI	:TRIGger[:SEquence]:EXTernal:LEVel For backward compatibility, the parameter EXTernal is mapped to EXTernal1
Backwards Compatibility SCPI	:TRIGger[:SEquence]:FRaME:EXTernal1:LEVel
Initial S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	Trigger, External 1
Remote Command	:TRIGger[:SEquence]:EXTernal1:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal1:SLOPe?
Example	TRIG:EXT1:SLOP NEG

Couplings	This same slope is used in the Ext1 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu).
Preset	POSitive
State Saved	Saved in instrument state
Backwards Compatibility SCPI	:TRIGger[:SEquence]:EXTernal:SLOPe For backward compatibility, the parameter EXTernal is mapped to EXTernal1
Backwards Compatibility SCPI	:TRIGger[:SEquence]:FRAMe:EXTernal1:SLOPe
Backwards Compatibility Notes	The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers.
Initial S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

Key Path	Trigger, External 1
Remote Command	:TRIGger[:SEquence]:EXTernal1:DELay <time> :TRIGger[:SEquence]:EXTernal1:DELay? :TRIGger[:SEquence]:EXTernal1:DELay:STATe OFF ON 0 1 :TRIGger[:SEquence]:EXTernal1:DELay:STATe?
Example	TRIG:EXT1:DEL:STAT ON TRIG:EXT1:DEL 100 ms
Notes	Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set.
Preset	Off, 1.000 us
State Saved	Saved in instrument state
Min	-150 ms
Max	+500 ms
Default Unit	s
Backwards Compatibility SCPI	:TRIGger[:SEquence]:EXTernal:DELay For backward compatibility, the parameter EXTernal is mapped to EXTernal1
Backwards Compatibility Notes	The legacy :TRIGger[:SEquence]:DELay command affects the delay for the VID, LINE, EXT1, EXT2, and RFB triggers. The legacy :TRIGger[:SEquence]:OFFSet command is supported for the VIDeO, LINE, EXT1, and EXT2 triggers.

Initial S/W Revision	Prior to A.02.00

Zero Span Delay Comp On/Off

In zero span, there is a natural delay in the signal path, which comes from the RBW filter. This is usually desirable, as it allows you to trigger on events and also see those events, because the signal is delayed from the trigger event. However, in some cases it is desirable to eliminate this delay, so that trigger events line up exactly with the zero time point in zero span. You can use the **Zero Span Delay Comp On/Off** feature to enable or disable zero span delay compensation.

Key Path	Trigger, External 1
Remote Command	:TRIGger[:SEquence]:EXTernal1:DElay:COMPensation OFF ON 0 1 :TRIGger[:SEquence]:EXTernal1:DElay:COMPensation?
Example	TRIG:EXT1:DEL:COMP ON
Dependencies	No effect except in zero-span, but not locked out in nonzero spans. Blanked in modes that do not support zero-span measurements. If the SCPI command is sent when the key is blanked, an error is returned: -221, "Settings conflict; Feature not supported for this measurement" In analyzers shipping N9060A, this feature requires N9060A-7FP.
Preset	OFF
State Saved	Saved in instrument state
Initial S/W Revision	A.11.00

External 2

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 2 input connector. The external trigger 2 input connector is on the rear panel.

Pressing this key, when it is already selected, accesses the external 2 trigger setup menu.

Key Path	Trigger
Example	TRIG:SOUR EXT2 Swept SA measurement TRIG:<meas>:SOUR EXT2 Measurements other than Swept SA
Dependencies	In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTERNAL2 parameter will generate a "Hardware missing; Not available for this model number" message. Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 2.
State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or

	Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

RF Burst

Pressing this key, when it is not selected, selects the RF Burst as the trigger. A new sweep/measurement will start when an RF burst envelope signal is identified from the signal at the RF Input connector. Pressing this key, when it is already selected, accesses the RF Burst trigger setup menu.

In some models, a variety of burst trigger circuitry is available, resulting in various available burst trigger bandwidths. The analyzer automatically chooses the appropriate trigger path based on the hardware configuration and other settings of the analyzer.

Key Path	Trigger
Example	TRIG:SOUR RFB Swept SA measurement TRIG:<meas>:SOUR RFB Measurements other than Swept SA
State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Backwards Compatibility Notes	The legacy command: :TRIGger[:SEQuence]:RFBurst:FSElectivity[:STATe] OFF ON 0 1 is not supported in the X-Series, as the hardware to do Frequency Selective burst triggers does not exist in X-Series.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.04.00

8 EDGE Power vs Time Measurement

Power vs. Time measures the mean transmit power during the “useful” part of bursts, and verifies that the power ramp fits within the defined mask. The “useful “ part of the burst is defined as, the 147 bits centered on the transition from bit 13 to bit 14 (the “TO” time point) of the 26 bit training sequence. The Power vs. Time measurement also lets you view the rise, fall, and the “useful” part of the bursts. Using the Multi-Slot function, up to eight slots in a frame can be viewed at one time.

This topic contains the following sections:

["Measurement Commands for EDGE Power vs Time" on page 232](#)

["Remote Command Results for EDGE Power vs Time" on page 233](#)

See also: [Custom Limit Mask \(Remote Commands Only\)](#)

Measurement Commands for EDGE Power vs Time

The following commands and queries are used to retrieve the measurement results:

```
:CONFigure:EPVTime  
:CONFigure:EPVTime:NDEFault  
:INITiate:EPVTime  
:FETCh:EPVTime[n]?  
:READ:EPVTime[n]?  
:MEASure:EPVTime[n]?
```

For more measurement related commands, see the section ["Remote Measurement Functions" on page 1430](#).

Remote Command Results for EDGE Power vs Time

For the queries listed above, the results returned depend on the value of n, as follows.

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
not specified or n = 1	Returns the following comma-separated scalar results: 1. Sample time is a floating point number that represents the time between samples when using the trace queries (n=0,2,etc.). 2. Power single burst is the mean power (in dBm) across the useful part of the selected burst in the most recently acquired data, or in the last data acquired at the end of a set of averages. If averaging is on, the power is for the last burst. 3. Power averaged is the power (in dBm) of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. Average m is a single burst from the acquired trace. If there are multiple bursts in the acquired trace, only one burst is used for average m. This means that N traces are acquired to make the complete average. If averaging is off, the value of power averaged is the same as the power single burst value. 4. Number of samples is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0,2,etc.). 5. Start is the index of the data point at the start of the useful part of the burst 6. Stop is the index of the data point at the end of the useful part of the burst 7. T0 is the index of the data point where t0 occurred 8. Burst width is the width of the burst measured at .3dB below the mean power in the useful part of the burst. 9. Maximum value is the maximum value of the most recently acquired data (in dBm). 10. Minimum value is the minimum value of the most recently acquired data (in dBm). 11. Burst search threshold is the value (in dBm) of the threshold where a valid burst is identified, after the data has been acquired. 12. IQ point delta is the number of data points offset that are internally applied to the useful data in traces n=2,3,4. You must apply this correction value to find the actual location of the Start, Stop, or T0 values. (e.g. for n=2, Start (for the IQ trace data) = Start + IQ_point_delta)
2	Returns comma-separated trace points of the Measure Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.
3	Returns comma-separated points of the upper mask (in dBm) of the measured slots configured by Meas Time. The measured slots can be seen in Multi Slot view in View/Display.
4	Returns comma-separated points of the lower mask (in dBm) of the measured slots configured by Meas Time. The measured slots can be seen in Multi Slot view in View/Display.
7	Returns useful part power level values for the 8 slots in the current frame (in dBm).
8	Returns comma-separated trace points of the Max Hold Trace data (in dBm) of the measured slots configured by Meas Time. The measured slots can be seen in Multi Slot view in View/Display. There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.

n	Results Returned
	This command is available only when the Max Hold Trace State is ON.
9	Returns comma-separated trace points of the Min Hold Trace data (in dBm) of the measured slots configured by Meas Time. The measured slots can be seen in Multi Slot view in View/Display. There are N data points, where N is the number of samples. The period between the samples is defined by the sample time. This command is available only when the Min Hold Trace State is ON.
10	Returns the following comma-separated scalar results: 13. Sample time is a floating point number that represents the time between samples when using the trace queries (n=0,2,etc.). 14. Power single burst is the mean power (in dBm) across the useful part of the selected burst in the most recently acquired data, or in the last data acquired at the end of a set of averages. If averaging is on, the power is for the last burst. 15. Power averaged is the power (in dBm) of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. Average m is a single burst from the acquired trace. If there are multiple bursts in the acquired trace, only one burst is used for average m. This means that N traces are acquired to make the complete average. If averaging is off, the value of power averaged is the same as the power single burst value. 16. Number of samples is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0,2,etc.). 17. Start is the index of the data point at the start of the useful part of the burst 18. Stop is the index of the data point at the end of the useful part of the burst 19. T0 is the index of the data point where t0 occurred 20. Burst width is the width of the burst measured at .3dB below the mean power in the useful part of the burst. 21. Maximum value is the maximum value of the most recently acquired data (in dBm). 22. Minimum value is the minimum value of the most recently acquired data (in dBm). 23. Burst search threshold is the value (in dBm) of the threshold where a valid burst is identified, after the data has been acquired. 24. IQ point delta is the number of data points offset that are internally applied to the useful data in traces n=2,3,4. You must apply this correction value to find the actual location of the Start, Stop, or T0 values. (e.g. for n=2, Start (for the IQ trace data) = Start + IQ_point_delta) 25. 1st Error point is the time (in second) which indicates the point on the X Scale where the first failure of a signal was detected. Use a marker to locate this point in order to examine the nature of the failure. If the limit passes, returned data has no meaning. 26. Detected TSC is the most recently detected TSC. The returned value is 0~7 (Burst Type : Normal/Higher Symbol Rate (HSR)) if TSC detected. If TSC not detected, the returned value is -999.0. If Amptd or NONE(Power vs Time only) specified in Sync Type, the returned value is -999.0. In multi slot condition, the returned value is the detected TSC of the specified slot(Time Slot ON) or the first evaluated slot(Time Slot OFF).

n	Results Returned
NOTE	The returned value in Sync (Synchronization Burst) is: 10 if (BN42, BN43..BN105) = (1,0,1,1,1,0,0,1,0,1,1,0,0,0,1,0,0,0,0,0,1,0,0,0,0,0,1, 1,1,1,0,0,1,0,1,1,0,1,0,0,0,1,0,1,0,1,1,1,0,1,1,0,0,0,0,1,1,0,1,1) 11 if (BN42, BN43..BN105) = (1,1,1,0,1,1,1,0,0,1,1,0,1,0,1,1,0,0,1,0,1,0,0,0,0,0,1,1,1,1,0,1, 1,1,1,0,1,0,0,0,1,1,1,1,1,0,1,1,0,0,1,0,1,1,0,0,0,1,0,1,0,1) 12 if (BN42, BN43..BN105) = (1,1,1,0,1,1,0,0,0,0,1,1,0,1,1,1,0,1,0,1,0,0,0,1,0,1,0,1,1,0, 1,0,0,1,1,1,1,0,0,0,0,0,1,0,0,0,0,0,1,0,0,0,1,1,0,1,0,0,1,1,1,0) The returned value in Access (Access Burst) is: 20 if (BN8, BN9..BN48) = (0,1,0,0,1,0,1,1,0,1,1,1,1,1,1,1,0,0,1,1,0,0,1,1,0,1,0,1,0,0,0,1,1,1,1,0,0,0) 21 if (BN8, BN9..BN48) = (0,1,0,1,0,1,0,0,1,1,1,1,1,0,0,0,1,0,0,0,0,1,1,0,0,0,1,0,1,1,1,0,0,1,0,0,1,1,0,1) 22 if (BN8, BN9..BN48) = (1,1,1,0,1,1,1,1,0,0,1,0,0,1,1,1,0,1,0,1,0,1,1,0,0,0,0,1,1,0,1,1,0,1,1,1,0,1,1,1) The returned value in AQPSK is more than or equal to 100100. Its first three digits represent TSC of VAMOS subchannel A. The second three digits represent VAMOS subchannel B. TSCs of TSC set 1 and TSC set 2 correspond to 100 to 107 and 200 to 207 respectively. Thus the returned value is ([TSC num of VAMOS subchannel A] * 1000 + [TSC num of VAMOS subchannel B]). For example, if measured AQPSK signal has TSC 3 of set1 on VAMOS subchannel A and TSC 5 of TSC set2 on VAMOS B, returned value is 103205.
27. Detected Mod scheme is the most recently detected modulation scheme. The returned value is as follows: 0 for GMSK, 1 for Normal Burst (NB) 8PSK, 2 for NB 16QAM, 3 for NB 32QAM, 10 for AQPSK, 11 for Higher symbol rate Burst (HB) QPSK, 12 for HB 16QAM, 13 for HB 32QAM	
28. Estimated Carrier Power (ECP) in dBm	
29. Midamble Power Averaged is the midamble power (in dBm) of N averaged bursts, if averaging is on. The power is averaged across the training sequence part of the burst.	
30. Mask Ref Power is the reference power (in dBm) of PVT mask of the selected burst.	
31. Reserved for future use – the value returned is -999.0 (floating point)	
12	Returns comma-separated trace points of the Measure Trace data. These data points are floating point numbers representing the power of the signal (in dBm). The slot is identified by Time Slot if its state is on. Or it is the first measured slot if Time Slot state is off. This single slot can be seen in Burst view in View/Display.
13	Returns comma-separated points of the upper mask (in dBm) of the single slot. The slot is identified by Time Slot if its state is on. Or it is the first measured slot if Time Slot state is off. This single slot can be seen in Burst view in View/Display.
14	Returns comma-separated points of the lower mask (in dBm) of the single slot. The slot is identified by Time Slot if its state is on. Or it is the first measured slot if Time Slot state is off. This single slot can be seen in Burst view in View/Display.

n	Results Returned
17	Returns Estimated Carrier Power (ECP) level values for the eight slots in the current frame (in dBm)
18	Returns comma-separated trace points of the Max Hold Trace data (in dBm) of the single slot. The slot is identified by Time Slot if its state is on. Or it is the first measured slot if Time Slot state is off. This single slot can be seen in Burst view in View/Display. There are N data points, where N is the number of samples. The period between the samples is defined by the sample time. This command is available only when the Max Hold Trace State is ON.
19	Returns comma-separated trace points of the Min Hold Trace data (in dBm) of the single slot. The slot is identified by Time Slot if its state is on. Or it is the first measured slot if Time Slot state is off. This single slot can be seen in Burst view in View/Display. There are N data points, where N is the number of samples. The period between the samples is defined by the sample time. This command is available only when the Min Hold Trace State is ON.
20	Returns comma-separated integer numbers which represent modulation scheme of last measured slots. The returned value is as follows. 0 for GMSK, 1 for Normal Burst (NB) 8PSK, 2 for NB 16QAM, 3 for NB 32QAM, 10 for AQPSK, 11 for Higher symbol rate Burst (HB) QPSK, 12 for HB 16QAM, 13 for HB 32QAM
21	Returns comma-separated integer numbers of TSC of last measured slots. Returned values are translated to integer numbers in the same way as 14th element of n=10, Detected TSC.
22	Returns comma-separated numbers of midamble part power values for the eight slots in the current frame (in dBm).
23	Returns comma-separated numbers of mask reference power values for the eight slots (in dBm). Returned values depend on Ref Pwr Type selection and can be either useful part, midamble, estimated or tail bit powers averaged over N bursts.
24	Returns the following scalar results: 1. Detected TSC on VAMOS subchannel A is the most recently detected TSC on VAMOS subchannel A. The returned value is 0~7 if TSC of AQPSK burst detected. If not detected, the returned value is -999.0. If Amptd or NONE (Power vs Time only) specified in Sync Type, the returned value is -999.0. In multi slot condition, the returned value is the detected TSC of the specified slot(Time Slot ON) or the first evaluated slot(Time Slot OFF). 2. Detected TSC on VAMOS subchannel B is the most recently detected TSC on VAMOS subchannel B. The returned value is 0~7 if TSC of TSC set 1 detected and 200 ~ 207 if TSC of TSC set 2 detected. If not detected, the returned value is -999.0. If Amptd or NONE (Power vs Time only) specified in Sync Type, the returned value is -999.0. In multi slot condition, the returned value is the detected TSC of the specified slot(Time Slot ON) or the first evaluated slot(Time Slot OFF).

Key Path	Meas
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. Many of the parameter values are measurement dependent. Attenuation values, and the Internal Preamplifier selection are measurement global, so they are common across all measurements. Functions with operation unique to this measurement are described below. See ["AMPTD Y Scale" on page 1085](#) for more information.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Y Ref Value

Sets the absolute power reference.

Key Path	AMPTD Y Scale
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real> :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
Example	DISP:TXP:VIEW:WIND:TRAC:Y:RLEV 5dbm DISP:TXP:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Preset	10.00
State Saved	Saved in instrument state.
Min	-250.0
Max	250.0
Initial S/W Revision	Prior to A.02.00

Range

The Range menu allows setting amplitude controls of the instrument.

Key Path	AMPTD Y Scale
Scope	Meas Global
Initial S/W Revision	A.12.50

Scale/Division

Enables you to enter a numeric value to change the vertical display sensitivity.

Key Path	AMPTD Y Scale
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl> :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
Example	DISP:TXP:VIEW:WIND:TRAC:Y:PDIV 10dB DISP:TXP:VIEW:WIND:TRAC:Y:PDIV?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When the Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets a value manually, Y Auton Scaling automatically changes to Off.
Preset	10.00 dB
State Saved	Saved in instrument state.
Min	0.1 dB
Max	20.00 dB
Initial S/W Revision	Prior to A.02.00

Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple key actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See ["More Information" on page 239](#)

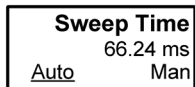
Key Path	Front-panel key
Remote Command	:COUPle ALL NONE
Example	:COUP ALL
Notes	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements.
Initial S/W Revision	Prior to A.02.00

More Information

There are two types of functions that have Auto/Manual modes.

Auto/Man Active Function keys

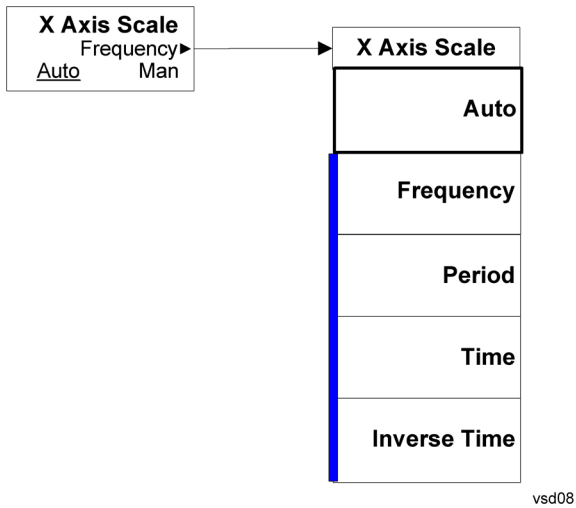
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between **Auto** (where the parameter is automatically coupled to the other parameters it is dependent upon) and **Man** (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either **Auto** or **Man** underlined as illustrated below.



vsd07

Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.



BW

Accesses a menu of functions that enable you to specify and control the video and resolution bandwidths. You can also select the type of filter for the measurement and set the filter bandwidth.

NOTE If the selected mode is TD-SCDMA, this function is **not** available.

Key Path	Front-panel key
Mode	SA, EDGE/GSM
Initial S/W Revision	Prior to A.02.00

Res BW

Sets the resolution bandwidth. This is the bandwidth used for the power measurement. The bandwidth is ideally wide enough to pass all the power of the burst signal, while not being so wide that it passes noise that reduces dynamic range and the accuracy of low level measurements.

Key Path	BW
Mode	SA, GSM
Remote Command	[:SENSe]:TXPower:BANDwidth[:RESolution] <bandwidth> [:SENSe]:TXPower:BANDwidth[:RESolution]?
Example	TXP:BAND 1000 TXP:BAND?
Notes	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	GSM: 510 kHz SA: 3 MHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	Hardware Dependent: No Option = 10 MHz WB (25 MHz or wider) = Hardware Option Limit
Backwards Compatibility SCPI	[:SENSe]:TXPower:BWIDth[:RESolution]
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

Filter Type

Besides the familiar Gaussian filter shape, there are certain special filter types, such as Flat Top, that are desirable under certain conditions.

Key Path	BW
Mode	SA, GSM
Remote Command	[:SENSe] :TXPower:BANDwidth:TYPE GAUSSian FLATtop [:SENSe] :TXPower:BANDwidth:TYPE?
Example	TXP:BAND:TYPE GAUS TXP:BAND:TYPE?
Notes	Selects the type of filter: either Gaussian or Flat (Flattop). Gaussian is the best choice when looking at the overall burst or the rising and falling edges, as it has excellent pulse response. This measurement does not trade off time domain accuracy vs. noise, just total power accuracy vs. noise level. If you want to precisely examine just the useful part of the burst, choose Flat. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default may cause invalid measurement results. FLATtop – a filter with a flat amplitude response, which provides the best amplitude accuracy. GAUSSian – a filter with Gaussian characteristics, which provides the best pulse response. You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	GAUSSian
State Saved	Saved in instrument state.
Range	Gaussian (Normal) Flattop
Backwards Compatibility SCPI	[:SENSe] :TXPower:BWIDth:TYPE
Initial S/W Revision	Prior to A.02.00

Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing **Cont** does a Resume.

Key Path	Front-panel key
Remote Command	:INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous?
Example	:INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation
Preset	ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF)
State Saved	Saved in instrument state
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold . The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON) switches to continuous measurement, but never restarts a measurement and never resets a sweep.
Initial S/W Revision	Prior to A.02.00

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of **Trace Average**, **Max Hold**, or **Min Hold**.

In Other Measurements/Modes:

With **Avg/Hold Num** (in the **Meas Setup** menu) set to **Off** or set to **On** with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with **Avg/Hold Num** set to **On** with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the **Cont** key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until $k = N$, at which point the current sequence will stop and the instrument will go to the idle state.

File

See "File" on page 156

FREQ/Channel

Accesses a menu of keys that allows you to control the Frequency parameters of the instrument.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

ARFCN

Sets the analyzer to a frequency that corresponds to the ARFCN (Absolute RF Channel Number). Used to enter the channel to be measured for the selected band. If the Center Freq value entered does not exactly correlate with an ARFCN, the softkey label changes to display the closest ARFCN to the selected frequency, along with a > or < symbol indicating whether the frequency is above or below that ARFCN.

Key Path	FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel:ARFCn RFCHannel <integer> [:SENSe] :CHANnel:ARFCn RFCHannel?
Example	CHAN:ARFC 3 CHAN:ARFC?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	Coupled with Center Frequency . Setting ARFCN sets Center Freq to the value corresponding to that ARFCN. BMT Freq choice changes this parameter.
Preset	1
State Saved	Saved in instrument state.
Range	Different for each BAND as follows: E-GSM: 0 to 124, and 975 to 1023 P-GSM: 1 to 124 R-GSM: 0 to 124(MS), and 955 to 1023(BTS) DCS1800: 512 to 885 PCS1900: 512 to 810 GSM450: 259 to 293 GSM480: 306 to 340 GSM700: 438 to 516 GSM850: 128 to 251 T-GSM 810: 350 to 425

Min	Different for each BAND as follows: E-GSM: 0(MS), and 975(BTS) P-GSM: 1 R-GSM: 0(MS), and 955(BTS) DCS1800: 512 PCS1900: 512 GSM450: 259 GSM480: 306 GSM700: 438 GSM850: 128 T-GSM 810: 350
Max	Different for each BAND as follows: E-GSM: 124(MS), and 1023(BTS) P-GSM: 124 R-GSM: 124(MS), and 1023(BTS) DCS1800: 885 PCS1900: 810 GSM450: 293 GSM480: 340 GSM700: 516 GSM850: 251 T-GSM 810: 425
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.07.00

Center Freq

Sets the center frequency to be measured for the selected band. It is coupled with ARFCN – setting Center Freq sets ARFCN to the channel corresponding to that frequency.

For more information, see the section ["Center Freq" on page 1399](#).

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

Time Slot

This functionality is the same as that of the corresponding key in the Demod menu. See ["Time Slot" on page 1418](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

Burst Type

This functionality is the same as that of the corresponding key in the Demod menu. See ["Burst Type" on page 1419](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

TSC (Std)

This functionality is the same as that of the corresponding key in the Demod menu. See ["TSC \(Std\)" on page 1420](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is **Center Freq**.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a **Global Settings** key in its **Mode Setup** menu.

The **Center Freq** function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 251](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 253](#)

See ["Center Frequency Presets" on page 250](#)

Key Path	FREQ Channel
Scope	Meas Global
Remote Command	<code>[:SENSe]:FREQuency:CENTer <freq></code> <code>[:SENSe]:FREQuency:CENTer?</code>
Example	FREQ:CENT 50 MHz FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT?
Notes	This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated.
Dependencies	The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit.
Couplings	When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range
Preset	Depends on instrument maximum frequency, mode, measurement, and selected input. See "Center Frequency Presets" on page 250 and "RF Center Freq" on page 251 and Ext Mix Center Freq and "I/Q Center Freq" on page 253 .
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 250 and "RF Center Freq" on page 251 and "I/Q Center Freq" on page 253 .
Max	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 250 and "RF Center Freq" on page 251 and "I/Q Center Freq" on page 253 .
Default Unit	Hz
Status Bits/OPC	Non-overlapped
Dependencies	
Initial S/W Revision	Prior to A.02.00

Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

Freq Option	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
503 (all but N9000A)	1.805 GHz	3.6 GHz	3.7 GHz
503 (N9000A)	1.505 GHz	3.0 GHz	3.08 GHz
507 (all but N9000A)	3.505 GHz	7.0 GHz	7.1 GHz
507 (N9000A)	3.755 GHz	7.5 GHz	7.58 GHz
508 (all but N9038A)	1.805 GHz	3.6 GHz	8.5 GHz
508 (N9038A)	4.205 GHz	8.4 GHz	8.5 GHz
513	6.805 GHz	13.6 GHz	13.8 GHz
526 (all but N9000A and N9038A)	13.255 GHz	26.5 GHz	27.0 GHz
526 (N9000A)	13.255 GHz	26.5 GHz	26.55 GHz
526 (N9038A)	1.805 GHz	3.6 GHz	27.0 GHz
532	16.005 GHz	32.0 GHz	32.5 GHz
543	21.505 GHz	43.0 GHz	TBD
544	22.005 GHz	44.0 GHz	44.5 GHz
550	25.005 GHz	50.0 GHz	51 GHz

Input 2:

Model	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
N9000A opt C75	0.7505GHz	1.5 GHz	1.58 GHz
N9038A	505 MHz	1 GHz	1.000025 GHz

Tracking Generator Frequency Limits (N9000A only):

Tracking Generator Option	Min Freq (clips to this freq when turn TG on and can't tune below while TG on)	If above this Freq, Stop Freq clipped to this Freq when TG turned on	Max Freq (can't tune above) while TG on
T03	9 kHz	3.0 GHz	3.08 GHz
T06	9 kHz	6.0 GHz	6.05 GHz

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

Mode	CF Preset for RF
WCDMA	1 GHz
WIMAXOFDMA,	1 GHz
BASIC	1 GHz
ADEMOD	1 GHz
VSA	1 GHz
TDSCDMA	1 GHz
PNOISE	1 GHz
LTE	1 GHz
LTETDD	1 GHz
MSR	1 GHz
GSM	935.2 MHz
NFIGURE	1.505 GHz

RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	<code>[:SENSe] :FREQuency:RF:CENTer <freq></code> <code>[:SENSe] :FREQuency:RF:CENTer?</code>
Example	FREQ:RF:CENT 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Dependencies	If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop

	Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep.
Preset	See table above
State Saved	Saved in instrument state.
Min	-79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source
Max	See table above. Basically instrument maximum frequency - 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	[:SENSe] :FREQuency:EMIXer:CENTer <freq> [:SENSe] :FREQuency:EMIXer:CENTer?
Example	:FREQ:EMIX:CEN 60 GHz :FREQ:EMIX:CEN?
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Couplings	When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup.
Preset	When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies.

	If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table (Span=Stop Freq – Start Freq), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table. When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is 33.25 GHz. Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz.
State Saved	Saved in instrument state.
Min	The minimum frequency in the currently selected mixer band + 5 Hz
Max	The maximum frequency in the currently selected mixer band – 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	A.08.01

I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	<pre>[:SENSe]:FREQuency:IQ:CENTer <freq></pre> <pre>[:SENSe]:FREQuency:IQ:CENTer?</pre>
Example	FREQ:IQ:CEN: 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Preset	0 Hz
State Saved	Saved in instrument state.
Min	–40.049995 MHz
Max	40.049995 MHz
Initial S/W Revision	Prior to A.02.00

BMT Freq

Enables quick selection from a subset of the available ARFCN numbers for the Top, Middle, or Bottom frequency in the selected band.

Key Path	FREQ Channel

Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	BMT choice changes ARFCN and Center Freq. Chosen ARFCN will be displayed on each menu key.
Range	Top Middle Bottom
Initial S/W Revision	Prior to A.02.00

Carrier Setup

Allows you to set carrier parameters.

Key Path	FREQ Channel
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.14.00

Time Slot

Selects On or Off for slot searching. Generally, this feature is only valid in external and periodic timer trigger source modes that triggers every frame since another trigger source does not have the information that identifies the head of the frame. When Timeslot is set to On, the demodulation measurement is made on the nth timeslot specified by the trigger point + n timeslots, where n is the selected timeslot value 0 to 7.

This functionality is the same as Time Slot under the Freq/Channel menu.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:SLOT <integer> [:SENSe]:CHANnel:SLOT? [:SENSe]:CHANnel:SLOT:AUTO OFF ON 0 1 [:SENSe]:CHANnel:SLOT:AUTO?
Example	CHAN:SLOT 0 CHAN:SLOT? CHAN:SLOT:AUTO OFF CHAN:SLOT:AUTO?

Notes	This functionality does not affect Combined GSM/EDGE measurement. You must be in the GSM mode to use this command. Use INSTrument:SElect to set the mode.
Preset	0 OFF
State Saved	Saved in instrument state.
Min	0
Max	7
Initial S/W Revision	Prior to A.02.00

Burst Type

Sets the burst type that the analyzer will search for and to which it will synchronize.

This functionality is the same as Burst Type under the FREQ Channel menu.

Key	SCPI	Description
Sync (SCH)	SYNC	Burst length = 142 symbols Extended training sequences for CTS and COMPACT synchronization bursts are not supported.
Access (RACH)	ACCEss	Burst length = 88 symbols Alternative training (synchronization) sequence "TS1" and "TS2" are supported only in GSMK Power vs. Time.
Normal - NB (TCH & CCH)	NORMAL	Burst length = 142 symbols Softkey label will be changed to 'Normal - NB' form 'Normal'
Higher Symbol Rate - HB (TCH & CCH)	HSRate	Burst length = 169 symbols This selection key is only shown when theN9071A-3FP license is installed.
Mixed (NB/HB for TSC sync)	MIXed	Enables auto detection between Normal (NB) and HSR (HB) TCH & CCH EDGE Burst. This selection key is only shown when theN9071A-3FP license is installed.

Measurement synchronization capability (Burst Sync = Training Seq)

	GMSK		8PSK		
					16QAM
					32QAM
					AQPSK
GMSK Phase & Freq Error measurement	Yes	Yes	Yes	No	N/A
GMSK Power vs. Time measurement	Yes	Yes	Yes	No	(measures as Normal GMSK when selected)

GMSK Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off)	No	No	Yes	No		
EDGE EVM measurement	No	No	No	Yes	Yes	Yes
EDGE Power vs. Time measurement	Yes	Yes	Yes	Yes	Yes	Yes
EDGE Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off.)	No	No	Yes	Yes	Yes	Yes

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :BURSt NORMal SYNC ACCess HSRate MIXed [:SENSe] :CHANnel :BURSt?
Example	CHAN:BURS NORM CHAN:BURS?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. Higher Symbol Rate and Mixed selections are only available when the N9071A-3FP license is installed. Otherwise these menu keys are blank. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Higher Symbol Rate and Mixed selection keys are not shown unless N9071A-3FP is installed. When unlicensed and SCPI is sent, an undefined header error is returned. When "Mixed" is selected, the Burst Sync menu key under the Meas Setup menu will be grayed out and Training Sequence (TSC) will be used for synchronization. The sync algorithm always runs in Training Sequence (TSC) synchronization because the Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync will become effective again when the Burst Type selection is changed from "Mixed" to another one.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Sync (SCH) Access (RACH) Normal - NB (TCH & CCH) Higher Symbol Rate - HB (TCH & CCH) Mixed (NB/HB for TSC sync)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

TSC (Std)

Allows you to select the Training Sequence Code that determines which burst is to be measured. Applicable only when Burst Sync is set to Training Sequence in the measurement. In the case of AQPSK, this parameter specifies TSC number of VAMOS sub-channel A. TSC of VAMOS sub-channel B is ignored.

This functionality is the same as TSC under the FREQ Channel menu.

This parameter applies only to the following measurements:

- GSMK/EDGE Power vs. Time measurement
- GSMK Phase & Frequency Error measurement
- EDGE EVM measurement

Selection	SCPI	Description
AutoDet	ON 1	The measurement is made on the first burst found to have any one of the valid TSCs in the range of 0 to 7. The measurement may be made on various timeslots if more than one timeslot has one of the 8 valid TSCs.
Man	OFF 0	The measurement is made on the first burst found to have the selected TSC. TSC numbers in the range of 0 to 7 can be selected. The measurement may be made on various timeslots if more than one timeslot has this same TSC.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:TSCode <integer> [:SENSe]:CHANnel:TSCode? [:SENSe]:CHANnel:TSCode:AUTO OFF ON 0 1 [:SENSe]:CHANnel:TSCode:AUTO?
Example	CHAN:TSC 3 CHAN:TSC? CHAN:TSC:AUTO 1 CHAN:TSC:AUTO?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When Sync or Access is selected as Burst Type, this key is grayed out.
Preset	0 ON
State Saved	Saved in instrument state.
Min	0
Max	7
Initial S/W Revision	Prior to A.02.00

Input/Output

See ["Input/Output" on page 128](#)

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Marker Type

Sets the marker control mode as described under **Normal**, **Delta**, **Fixed** and **Off**, below. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Key Path	Marker
Mode	GSM, SA, TD-SCDMA
Remote Command	:CALCulate:TXPower:MARKer[1] 2 ...12:MODE POSition DELTA OFF :CALCulate:TXPower:MARKer[1] 2 ...12:MODE?
Example	CALC:TXP:MARK:MODE OFF CALC:TXP:MARK:MODE?
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area will display the marker value to its full entered precision. You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal Delta Off
Backwards Compatibility SCPI	:CALCulate:BPOwer:MARKer[1] 2 ...12:MODE
Initial S/W Revision	Prior to A.02.00

Properties

Accesses a menu that enables you to set marker properties and to access the marker trace menu.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Marker Function

There is no ‘Marker Function’ supported in Burst (Tx) Power, so this front-panel key displays a blank menu key when pressed.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Marker To

There is no 'Marker To' functionality supported in Burst (Tx) Power, so this front-panel key displays a blank menu key when pressed.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

NOTE

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Remote Measurement Functions

This section contains the following topics:

"Measurement Group of Commands" on page 1431

"Current Measurement Query (Remote Command Only)" on page 1433

"Limit Test Current Results (Remote Command Only)" on page 1433

"Data Query (Remote Command Only)" on page 1433

"Calculate/Compress Trace Data Query (Remote Command Only)" on page 1434

"Calculate Peaks of Trace Data (Remote Command Only)" on page 1439

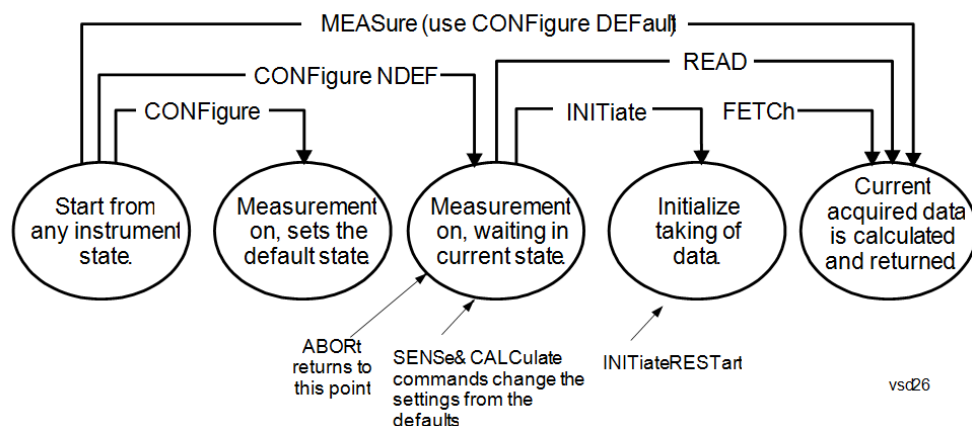
"Hardware-Accelerated Fast Power Measurement (Remote Command Only)" on page 1440

"Format Data: Numeric Data (Remote Command Only)" on page 1454

"Format Data: Byte Order (Remote Command Only)" on page 1455

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Measurement Group of Commands



Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSE:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSE:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEfault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

Fetch Commands:

:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

INITiate Commands:

:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
 - Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
 - If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.
-

READ Commands:

:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
-

measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
 - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
 - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
-

Initial S/W Revision	Prior to A.02.00

Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

Remote Command	:CONFigure?

Example	CONF?

Initial S/W Revision	Prior to A.02.00

Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

Remote Command	:CALCulate:CLIMits:FAIL?

Example	CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails.

Initial S/W Revision	Prior to A.02.00

Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

Remote Command	<code>:CALCulate:DATA[n]?</code>
Notes	The return trace depends on the measurement. In <code>CALCulate:<meas>:DATA[n]</code>, <code>n</code> is any valid subopcode for the current measurement. It returns the same data as the <code>FETCH:<measurement>?</code> query where <code><measurement></code> is the current measurement.
Initial S/W Revision	Prior to A.02.00

Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [`n`].

`n` = any valid sub-opcode for that measurement. See the `MEASure:<measurement>?` command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode `<n>` (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or `Update=Off`.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire `N` frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

Remote Command	<code>:CALCulate:DATA<n>:COMPRESS? BLOCK CFIT MAXimum MINimum MEAN DMEan RMS RMSCubed SAMPLE SDEVIation PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]]</code>
Example	To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, <code>CALC:DATA2:COMP? MEAN, 24e-6, 526e-6</code> (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.)
Notes	The command supports 5 parameters. Note that the last 4 (<code><soffset></code>, <code><length></code>, <code><roffset></code>, <code><rlimit></code>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <code><length></code>, then you must also specify <code><soffset></code>. See details below for a definition of each of these parameters. This command uses the data in the format specified by <code>FORMat:DATA</code>, returning either binary or ASCII data.
Initial S/W Revision	Prior to A.02.00

- **BLOCK** or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

•

NOTE

If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where $|X_i|$ is the magnitude of an I/Q pair, and n is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$\text{DME} = 10 \times \log_{10} \left(\frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

NOTE

For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPlE - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEViation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$SDEV = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where X_i is a data point value, $\bar{X}$ is the arithmetic mean of the data point values for the specified region (s), and n is the number of data points in the specified region(s).

$$SDEV = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where $|X_i|$ is the magnitude of an I/Q pair, $\bar{X}$ is the mean of the magnitudes for the specified region(s), and n is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector ($n=0$) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

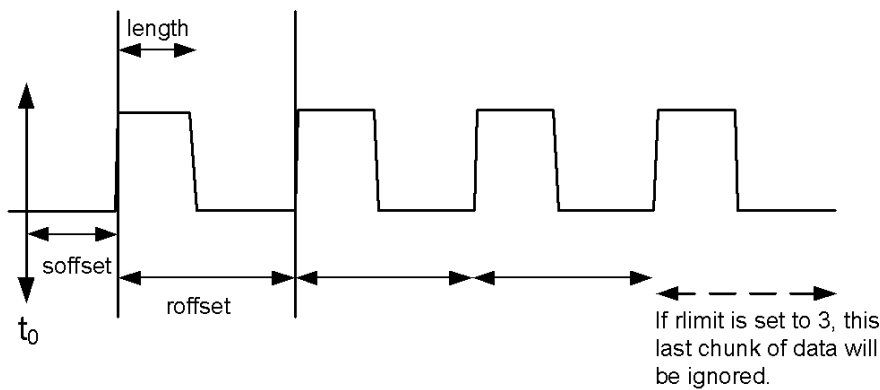
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where Y_i is the unwrapped phase of I/Q pair with applying frequency correction and n is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

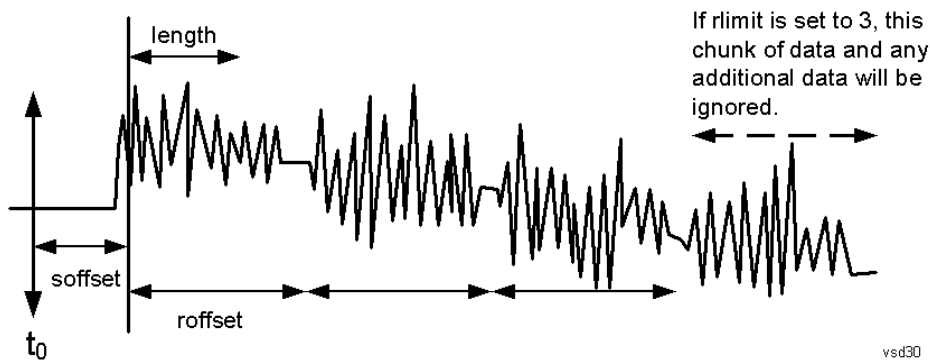
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

Remote Command	For Swept SA measurement: <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME[,ALL GTDLine LTDLine]]</pre> For most other measurements: <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME]</pre>
Example	Example for Swept SA measurement in Spectrum Analyzer Mode: CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned. Query Results 1: With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time). If no peaks are found the peak list will consist of only the number of peaks, (0).
Notes	<n> - is the trace that will be used <threshold> - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu. <excursion> - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the

excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported. Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQUENCY - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

Initial S/W Revision	Prior to A.02.00

Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

Mode	All
Remote Command	:CALCulate:FPOW:Power[1,2,...,999]:RESet
Example	:CALC:FPOW:POW1:RES

Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:DEFine "configuration string"
Example	:CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005"
Notes	See below for a list of measurement variables that can be defined in the configuration string.
Initial S/W Revision	A.14.00

Acquisition Time

Example	CALC:FPOW:POW1:DEF "AcquisitionTime=0.002"
Notes	The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability.
Preset	0.001 s
Range	0 s to 1 s
Default Unit	Time (s)
Initial S/W Revision	A.14.00

Center Frequency

Example	CALC:FPOW:POW1:DEF "CenterFrequency=2e9"
Notes	The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency.
Preset	1 GHz
Range	0 Hz to maximum instrument frequency
Default Unit	Frequency (Hz)
Initial S/W Revision	A.14.00

DC Coupled

Example	CALC:FPOW:POW1:DEF "DCCoupled=True"
Notes	The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz.
Preset	False
Range	True (DC Coupled) or False (AC Coupled)
Default Unit	Boolean
Initial S/W Revision	A.14.00

DetectorType

Example	CALC:FPOW:POW1:DEF "DetectorType=Peak"
Notes	Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement.
Preset	RmsAverage
Range	RmsAverage, Peak
Initial S/W Revision	A.14.00

Do Noise Correction

Example	CALC:FPOW:POW1:DEF "DoNoiseCorrection=True"
Notes	When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured.
Preset	False
Range	True (enable noise correction) or False (disable noise correction)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Do Spur Suppression

Example	CALC:FPOW:POW1:DEF "DoSpurSuppression=True"
Notes	When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals. When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method. Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.
Preset	False
Range	True (enable spur suppression) or False (disable spur suppression)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Electronic Attenuator Bypass

Example	CALC:FPOW:POW1:DEF "ElecAttBypass =False"
Notes	The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp.
Preset	True
Range	True (bypass electronic attenuator) or False (use electronic attenuator)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Electronic Attenuation

Example	CALC:FPOW:POW1:DEF "ElecAttenuation=10"
Notes	Option EA3 is required. The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps). Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.
Preset	0 dB
Range	0 – 24 dB (1 dB steps)

Default Unit	dB
Initial S/W Revision	A.14.00

IF Gain

Example	CALC:FPOW:POW1:DEF "IFGain=10"
Notes	The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB.
Preset	0 dB
Range	-6 - 16 dB (1 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

IF Type

Example	CALC:FPOW:POW1:DEF "IFType=B25M"
Notes	The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path.
Preset	B40M
Range	B10M, B25M, B40M
Initial S/W Revision	A.14.00

Include Power Spectrum

Example	CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True"
Notes	The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response.
Preset	False
Range	True (return both channel power and full power spectrum) or False (returns only channel power)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Mechanical Attenuation

Example	CALC:FPOW:POW1:DEF "MechAttenuation=10"
Notes	The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps).
Preset	0 dB
Range	0 – 70 dB (2 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

Preamplifier Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps.
Preset	Off
Range	Off, Low, Full
Initial S/W Revision	A.14.00

Resolution Bandwidth Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value.
Preset	BestSpeed
Range	BestSpeed, Narrowest, Explicit
Initial S/W Revision	A.14.00

Resolution Bandwidth

Example	CALC:FPOW:POW1:DEF "ResolutionBW=25e3"
Notes	The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW.

Preset	0 Hz
Default Unit	Hz
Initial S/W Revision	A.14.00

Trigger Delay

Example	CALC:FPOW:POW1:DEF "TriggerDelay=0.025"
Notes	The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed.
Preset	0 s
Range	0 – 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

Trigger Level

Example	CALC:FPOW:POW1:DEF "TriggerLevel=2"
Notes	The trigger level parameter sets the voltage value at which an external trigger is detected.
Preset	1.2 V
Range	–5 to 5 V
Default Unit	Volts
Initial S/W Revision	A.14.00

Trigger Slope

Example	CALC:FPOW:POW1:DEF "TriggerSlope=Negative"
Notes	The trigger slope parameter indicates the direction of the edge trigger voltage for detection.
Preset	Positive
Range	Positive, Negative
Initial S/W Revision	A.14.00

Trigger Source

Example	CALC:FPOW:POW1:DEF "TriggerSource=Ext1"
Notes	The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively.
Preset	Free
Range	Free, Ext1, Ext2
Initial S/W Revision	A.14.00

Trigger Timeout

Example	CALC:FPOW:POW1:DEF "TriggerTimeout=0.1"
Notes	The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement.
Preset	1 s
Range	0 – 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

Signal Input

Example	CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW"
Notes	The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz.
Preset	FpMainRf
Range	FpMainRf, Fp50MHzCW
Initial S/W Revision	A.14.00

Use Preselector

Example	CALC:FPOW:POW1:DEF "UsePreSelector=True"
Notes	The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases.
Preset	False
Range	True (use preselector above 3.6 GHz), or False (preselector bypassed)

Default Unit	Boolean
Initial S/W Revision	A.14.00

Channel Bandwidth Array

Example	CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]"
Notes	The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[1 e6]
Range	0 to 40 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

Channel Filter Type Array

Example	CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]"
Notes	The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.
Preset	[IBW]
Range	IBW, RRC
Initial S/W Revision	A.14.00

Channel Filter Alpha Array

Example	CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]"
Notes	The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[0.22]
Range	0.0 – 1.0

Initial S/W Revision	A.14.00

Channel Measurement Function Array

Example	CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]"
Notes	This parameter array defines what measurement is being made for each individually-specified channel: BandPower: Total power within the specified bandwidth of the channel (dBm) BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz) PeakPower: The peak power value within the specified bandwidth of the channel (dBm) PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz) XdbBbandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdbBbandwidth parameter OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.
Preset	[BandPower]
Range	BandPower, BandDensity, PeakPower, PeakFrequency, XdbBbandwidth, OccupiedBandwidth
Initial S/W Revision	A.14.00

Channel Offset Frequency Array

Example	CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]"
Notes	The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel. All array parameters should have the same number of elements.
Preset	[0]
Range	0 to 20 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

Channel Occupied Bandwidth Percent Array

Example	CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]"
Notes	This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied

	bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power.
Preset	[0.99]
Range	0 – 1.0
Initial S/W Revision	A.14.00

Channel x-dB Bandwidth Array

Example	CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]"
Notes	This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number.
Preset	[-3.01]
Range	-200 to 0 dB
Default Unit	dB
Initial S/W Revision	A.14.00

Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

M	All
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R	:CALCulate:FPOWER:POWer[1,2,...,999]:DEFine?
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E	:CALC:FPOW:POW1:DEF?

x a m p l e	
N o t e s	This command query is used to retrieve a list of all defined parameters in an ASCII format. The following is an example of the returned results: "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=10000000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1000000000,ResolutionBW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1000000],OffsetFrequency=[0],Function=[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False,TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"
I n i t i a l	A.14.00
S / W	
R e v i s i o n	

Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:CONFigure
Example	:CALC:FPOW:POW1:CONF
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:INITiate
Example	:CALC:FPOW:POW1:INIT
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:FETCh?
Example	:CALC:FPOW:POW1:FETC?
Notes	Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel.
Initial S/W Revision	A.14.00

Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]?
Example	:CALC:FPOW:POW1?

Notes	Option FP2 is required. See notes for Fast Power Fetch for return format.
Initial S/W Revision	A.14.00

Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

Mode	All
Remote Command	:CALCulate:FPOWER:POWer[1,2,...,999]:READ? :CALCulate:FPOWER:POWer[1,2,...,999]:READ1?
Example	:CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1?
Notes	Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined.
Initial S/W Revision	A.14.00

Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

Mode	All
Remote Command	:CALCulate:FPOWER:POWer[1,2,...,999]:READ2?
Example	:CALC:FPOW:POW1:READ2?
Notes	Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float]

	3. Declared function result for the 2nd specified channel [4 byte float]
	...
	(m + 1). Declared function result for the last (mth) specified channel [4 byte float]
	ADC Over Range
	1. ADC over-range occurred (1: true, 0: false) [2 byte short]
	Spectrum Data
	1. Number of points in the spectrum data, k [4 byte int]
	2. Start frequency of spectrum data (Hz) [8 byte double]
	3. Step frequency of spectrum data (Hz) [8 byte double]
	4. FFT bin at 1st point (dBm) [4 byte float]
	5. FFT bin at 2nd point (dBm) [4 byte float]
	...
	(k + 3). FFT bin at last (kth) point (dBm) [4 byte float]
Initial S/W Revision	A.14.00

Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

Remote Command	:FORMat[:TRACe][:DATA] ASCii INTEger,32 REAL,32 REAL,64 :FORMat[:TRACe][:DATA]?
Notes	The query response is: ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTEger,32: INT,32 When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTEger, data is output in units of m dBm (.001 dBm). The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block.
Dependencies	Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTEger, 32 for REAL). Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number".
Preset	ASCii
Backwards Compatibility	Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves

Notes	backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32.
Initial S/W Revision	Prior to A.02.00

The specs for each output type follow:

ASCIi - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMal order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

Remote Command	:FORMat:BORDer NORMal SWAPped :FORMat:BORDer?
Preset	NORMal
Initial S/W Revision	Prior to A.02.00

Meas Setup

Displays the setup menu for the currently selected measurement. Many of the lower-level menu keys operate the same in all measurements. Unique functions are described below.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Avg/Hold Num

Specifies the number of data acquisition that will be averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

- On - Sets measurement averaging on.
- Off - Sets measurement averaging off.

Key Path	Meas Setup
Mode	SA, GSM, TD-SCDMA
Remote Command	[:SENSe]:TXPower:AVERage:COUNT <integer> [:SENSe]:TXPower:AVERage:COUNT? [:SENSe]:TXPower:AVERage[:STATe] OFF ON 0 1 [:SENSe]:TXPower:AVERage[:STATe]?
Example	TXP:AVER:COUN 100 TXP:AVER:COUN? TXP:AVER:0 TXP:AVER?
Notes	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	50 ON
State Saved	Saved in instrument state.
Min	1
Max	10000
Backwards Compatibility SCPI	[:SENSe]:BPOWer:AVERage:COUNT
Initial S/W Revision	Prior to A.02.00

Avg Mode

Selects the type of termination control used for the averaging function. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

Key	SCPI	Mode
Exponential	EXPonential	After the average count is reached, each successive data acquisition is exponentially weighted and combined with the existing average.
Repeat	REPeat	After reaching the average count, the averaging is reset and a new average is started.

Key Path	Meas Setup
Mode	SA, GSM, TD-SCDMA
Remote Command	[:SENSe] :TXPower:AVERage:TCONtrol EXPonential REPeat [:SENSe] :TXPower:AVERage:TCONtrol?
Example	TXP:AVER:TCON REP TXP:AVER:TCON?
Notes	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	EXPonential
State Saved	Saved in instrument state.
Range	Exp Repeat
Backwards Compatibility SCPI	[:SENSe] :BPOWer:AVERage:TCONtrol
Initial S/W Revision	Prior to A.02.00

Avg Type

Specifies the type of trace and result averaging to use.

Key	SCPI	Type
Pwr Avg (RMS)	RMS	True power averaging that is equivalent to taking the RMS value of the voltage. It is the most accurate type of averaging.
Log-Pwr Avg (Video)	LOG	Simulates the traditional spectrum analyzer type of averaging by averaging the log of the power.
None	MAXimum	The maximum values are retained during the averaging cycle.
None	MINimum	The minimum values are retained during the averaging cycle.

SA, GSM Mode

Key Path	Meas Setup
Mode	SA, GSM
Remote Command	[:SENSe]:TXPower:AVERage:TYPE LOG MAXimum MINimum RMS [:SENSe]:TXPower:AVERage:TYPE?
Example	TXP:AVER:TYPE LOG TXP:AVER:TYPE?
Notes	Maximum Minimum are selected only via SCPI. You must be in the Spectrum Analyzer or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Selecting MAXimum MINimum force to visible Max Hold Trace or Min Hold Trace . Measure Trace stays in RMS or Video average state.
Preset	RMS
State Saved	Saved in instrument state.
Range	Pwr Avg (RMS) Log-Pwr Avg(Video) Maximum Minimum
Backwards Compatibility SCPI	[:SENSe]:BPOwer:AVERage:TYPE
Initial S/W Revision	Prior to A.02.00

Threshold Lvl

When Meas Method is set to Above Threshold Lvl, the mean carrier power is calculated based on the trace above the threshold level. The threshold level is displayed in dB (relative to the measured carrier) or dBm (absolute).

A green line in the grid is displayed at the y-position associated with the current threshold level value. Its state is controlled by the On/Off state of the 'Display Line' under the View/Display menu.

Key Path	Meas Setup
Mode	SA, GSM, TD-SCDMA
Remote Command	[:SENSe]:TXPower:THReshold <real> [:SENSe]:TXPower:THReshold? [:SENSe]:TXPower:THReshold:TYPE ABSolute RELative [:SENSe]:TXPower:THReshold:TYPE?
Example	TXP:THR 0 TXP:THR?
Example	TXP:THR:TYPE ABS TXP:THR:TYPE?
Notes	You must be in the TD-SCDMA mode, Spectrum Analyzer mode or GSM mode to use this command. Use INSTRument:SElect to set the mode. BAF SCPI Command determines whether this command is setting an absolute or a relative power

	level. Suffix dB and dBm are allowed, but it does not change the state of Threshold Type. Suffix may not be send. If Threshold Type is set to Relative, the positive value of Threshold level was allowed to +100dB and it treated as a negative value. Now max value of Threshold level is changed to 0dB. To keep the backward compatibility, the input from SCPI command allows to +100dB.
Preset	GSM: -20.0 SA: -30.0 TD-SCDMA : -60.0 RELative
State Saved	Saved in instrument state.
Min	-100
Max	GSM, SA: Relative : 0dB Absolute : 100dBm TD-SCDMA: Relative : 0dB Absolute : 60dBm
Backwards Compatibility SCPI	[:SENSe] :BPOWer:THReshold
Initial S/W Revision	Prior to A.02.00

Meas Method

When the selected mode is SA or GSM, there are two options for this parameter: .

- **Above Threshold Level** measurement algorithm is used to capture a time record, and average only those points in the time record that exceed the user-specified threshold level. No attempt is made to position the burst, or to calculate/display burst widths. This can be used to measure continuous signals, or bursted signals where the Measured Burst Width algorithm is too restrictive.
- **Measured Burst Width** measurement algorithm uses the threshold level to calculate the burst center, and average those points that lie within a user-specified burst width that is centered upon the burst. The burst width parameter is described in more detail below.

When the selected mode is TD-SCDMA, there is a third option:

- **Single Time Slot** measurement algorithm is to capture a single time slot record, and calculate the start and stop position of the time slot in terms of the trigger position theoretically. No attempt is made to position the burst, or to calculate/display burst widths. The burst width drawn in the screen is considered to be the theoretical width of the slot. This method is recommended to measure the mean transmit power in a single slot when trigger source is External Front/Rear while the Measured Burst Width algorithm is too restrictive.

SA, GSM mode

Key Path	Meas Setup
Mode	SA, GSM
Remote Command	[:SENSe]:TXPower:METHod THReshold BWIDth [:SENSe]:TXPower:METHod?
Example	TXP:METH BWID TXP:METH?
Preset	THReshold
State Saved	Saved in instrument state.
Range	Above Threshold Lvl Measured Burst Width
Backwards Compatibility SCPI	[:SENSe]:BPOWer:METHod
Initial S/W Revision	Prior to A.02.00

Burst Width

When Burst Width Mode is set to manual, the user may enter a fixed-time value in seconds, or alternatively specify the burst width as a percentage of the last measured burst width (result in bottom-left corner of second window).

Key Path	Meas Setup
Mode	SA, GSM, TD-SCDMA
Remote Command	[:SENSe]:TXPower:BURSt:WIDTh <time> [:SENSe]:TXPower:BURSt:WIDTh? [:SENSe]:TXPower:BURSt:AUTO ON OFF 1 0 [:SENSe]:TXPower:BURSt:AUTO?
Example	TXP:BURS:WIDT 10 TXP:BURS:WIDT? TXP:BURS:AUTO 1 TXP:BURS:AUTO?
Example	TXP:BURS:AUTO 0 TXP:BURS:AUTO? TXP:BURS:AUTO 1 TXP:BURS:AUTO?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Burst Width will be grayed out if " Meas Method " on page 1459 is set to 'Above Threshold Lvl'.
Couplings	SA, GSM

	Max value depends on Sweep Time, Res BW and RBW filter type. TD-SCDMA: If the measure method is not "Measured Burst Width", this key will be grayed out. The default value is depending on the Burst type: If Burst Type = Traffic, Burst Width = 662.5us If Burst Type = Downlink Pilot, Burst Width = 50us If Burst Type = Uplink Pilot, Burst Width = 100us
Preset	SA, GSM: 255.6 us TD-SCDMA: 662.5us ON
State Saved	Saved in instrument state.
Min	100.0 ns
Max	50 s
Initial S/W Revision	Prior to A.02.00

Meas Preset

Returns parameters for this measurement to those set by the factory.

Key Path	Meas Setup
Mode	SA, GSM, TD-SCDMA
Remote Command	:CONFigure:TXPower
Example	CONF:TXP
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

Mode

See "Mode" on page 136

Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See ["How-To Preset" on page 297](#) for more information.

Key Path	Front-panel key
Remote Command	:SYSTem:PRESet
Example	:SYST:PRES
Notes	*RST is preferred over :SYST:PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0.
Couplings	A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set.
Backwards Compatibility Notes	In the X-Series, the legacy "Factory Preset" has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no "Preset Type" as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using

	User Preset.
Initial S/W Revision	Prior to A.02.00

How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

Type Of Preset	SCPI Command	Front Panel Access
Auto Couple	:COUPLe ALL	Auto Couple front-panel key
Meas Preset	:CONFigure:<Measurement>	Meas Setup Menu
Mode Preset	:SYSTem:PRESet	Mode Preset (green key)
Restore Mode Defaults	:INSTrument:DEFault	Mode Setup Menu
Restore All Mode Defaults	:SYSTem:DEFault MODEs	System Menu; Restore System Default Menu
*RST	*RST	not possible (Mode Preset with Single)
Restore Input/Output Defaults	:SYSTem:DEFault INPut	System Menu; Restore System Default Menu
Restore Power On Defaults	:SYSTem:DEFault PON	System Menu; Restore System Default Menu
Restore Alignment Defaults	:SYSTem:DEFault ALIGn	System Menu; Restore System Default Menu
Restore Miscellaneous Defaults	:SYSTem:DEFault MISC	System Menu; Restore System Default Menu
Restore All System Defaults	:SYSTem:DEFault [ALL] :SYSTem:PRESet:PERSistent	System Menu; Restore System Default Menu
User Preset	:SYSTem:PRESet:USER	User Preset Menu
User Preset All Modes	:SYSTem:PRESet:USER:ALL	User Preset Menu

Power On Mode Preset	:SYSTem:PON:TYPE MODE	System Menu
Power On User Preset	:SYSTem:PON:TYPE USER	System Menu
Power On Last State	:SYSTem:PON:TYPE LAST	System Menu

Mode Setup

See "Mode Setup" on page 151

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace. Pressing Peak Search with the selected marker off causes the selected marker to be set to Normal, then a peak search is immediately performed.

Key Path	Front-panel key
Mode	GSM, SA, TD-SCDMA
Remote Command	:CALCulate:TXPower:MARKer[1] 2 ...12:MAXimum
Example	CALC:TXP:MARK2:MAX
Initial S/W Revision	Prior to A.02.00

Print

See "Print " on page 161

Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

Type	Default Prefix	Menu
State	State_	(Save/Recall)
Trace + State	State_	(Save/Recall)
Screen	Screen_	(Save/Recall)
Amplitude Corrections	Ampcor_	(Import/Export)
Traces	Trace_	(Import/Export)
Limit Lines	LLine_	(Import/Export)
Measurement Result	MeasR_	(Import/Export)
Capture Buffer	CapBuf_	(Import/Export)

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State_0000.state. The next is State_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State_0010.state there is already a State_0010.state file in the current directory, it advances the counter to State_0011.state to ensure that no conflict will exist (and then it verifies that State_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred_0000.csv.

NOTE

Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

NOTE

If the filename you entered ends with _dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

Key Path	Front-panel key
Notes	No remote command for this key specifically.
Initial S/W Revision	Prior to A.02.00

Recall

The **Recall** menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an **Import (Data)** option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	Front-panel key
Notes	No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATe <filename>. If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.
Backwards Compatibility Notes	In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data. In the X-Series, "state" always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.
Backwards Compatibility Notes	Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows. Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible. It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user. Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.
Initial S/W Revision	Prior to A.02.00

State

The **Recall State** menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the

additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. **Recall State** will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or "Recalled State Register <register number>" is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See ["More Information" on page 306](#).

Key Path	Recall
Mode	All
Remote Command	:MMEMory:LOAD:STATe <filename>
Example	:MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path
Example	MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state.
Notes	When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled. • If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number. After recalling the state, the Recall State function does the following: • Makes the saved measurement for the mode the active measurement. • Clears the input and output buffers. • Status Byte is set to 0. • Executes a *CLS If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If

	there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away. After the Recall, the analyzer exits the Recall menu and returns to the previous menu.
Backwards Compatibility SCPI	:MMEMory:LOAD:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored.
Initial S/W Revision	Prior to A.02.00

More Information

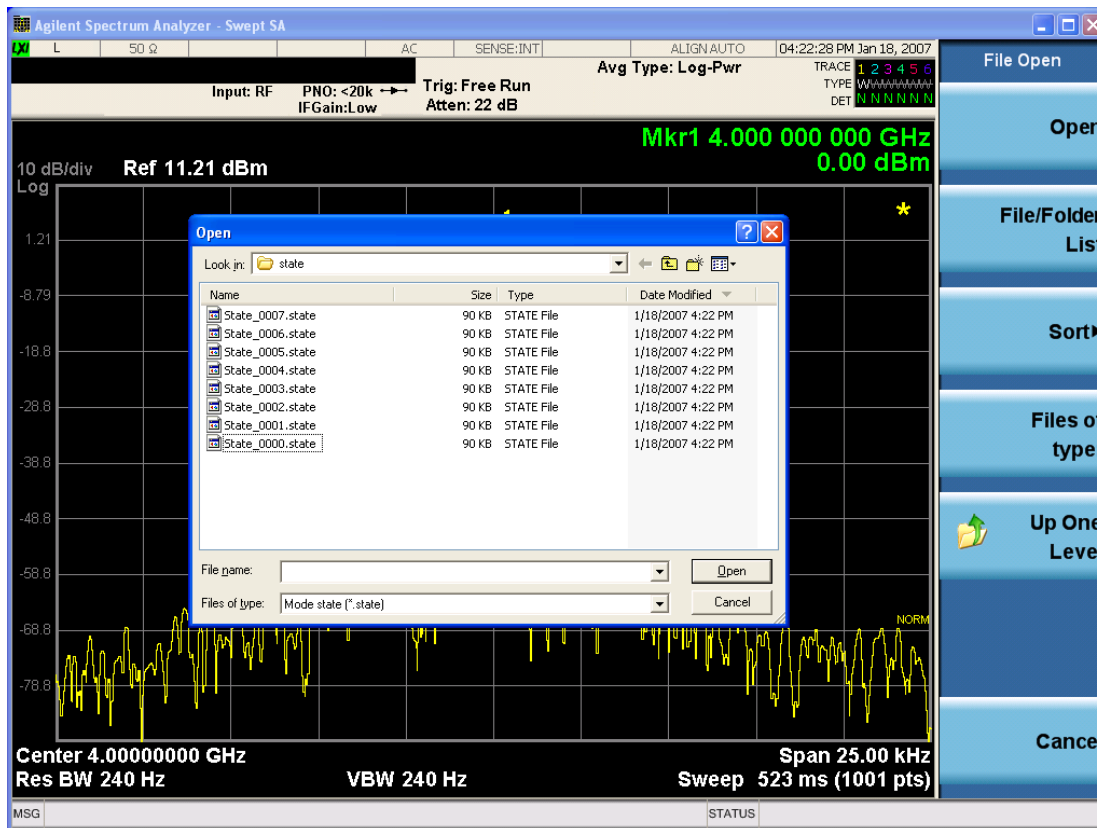
In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

The following table describes the Trace Save and Recall possibilities:

You want to recall state and one trace's data, leaving other traces unaffected.	Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed.	On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed.
You want to recall all traces	Save Trace+State from ALL traces.	On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved)
You want all traces to load exactly as they were when saved.	Save State	On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten.

From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

Look In

The **Look In** field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are **By Date**, **By Name**, **By extension**, and **By Size**.

Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

Key Path	Recall, State
Notes	Brings up the Open dialog for recalling a State Save Type
Initial S/W Revision	Prior to A.02.00

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the **Save, State** function.

Key Path	Recall, State
Mode	All
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available"
Initial S/W Revision	A.11.00

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
Example	*RCL 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State, Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
Example	*RCL 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

Key Path	Recall, Sequences
Mode	All
Remote Command	:MMEMory:LOAD:SEquences: SLIS ALIS SAALIS "MySequence.txt"
Example	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Notes	Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt)
Initial S/W Revision	A.05.00

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Recall, Sequences
Example	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Dependencies	Only available in XGBT
Initial S/W Revision	A.05.00

Open...

When you press “Open”, the analyzer brings up a Windows dialog and a menu entitled “**File Open.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "From File..." on page 1473 in **Recall, State**, for a full description of this dialog and menu.

Key Path	Recall, Data
Notes	The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type
Initial S/W Revision	Prior to A.02.00

Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMediate
- Sending the remote command INIT:REStart

See ["More Information" on page 312](#)

Key Path	Front-panel key
Remote Command	:INITiate[:IMMediate] :INITiate:REStart
Example	:INIT:IMM :INIT:REST
Notes	:INITiate:REStart and :INITiate:IMMediate perform exactly the same function.
Couplings	Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement.
Status Bits/OPC dependencies	This is an Overlapped command. The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUESTionable register bit 9 (INTEgrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set.
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:REStart command restart trace averages (displayed average count reset to 1) for a trace in Clear Write , but did not restart Max Hold and Min Hold . In the X-Series, the Restart hardkey and the INITiate:REStart command restart not only Trace Average , but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:REStart command restart every measurement, which includes all traces and numeric results. There is no change to this operation.
Initial S/W Revision	Prior to A.02.00

More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** > 1 and at least one trace set to **Trace Average**, **Max Hold**, or **Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count k equals the number N set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command **CALC: AVER: TCON UP**.

Save

The **Save** menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an **Export (Data)** option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

Key Path	Front-panel key
Mode	All
Notes	No remote command for this key specifically, but the :MMEM:STOR:STATe command is available for specific file types. An example is :MMEM:STOR:STATe <filename>.
Initial S/W Revision	Prior to A.02.00

State

The Save State menu lets you choose a register or file for saving the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent **System** settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<mode name>\state

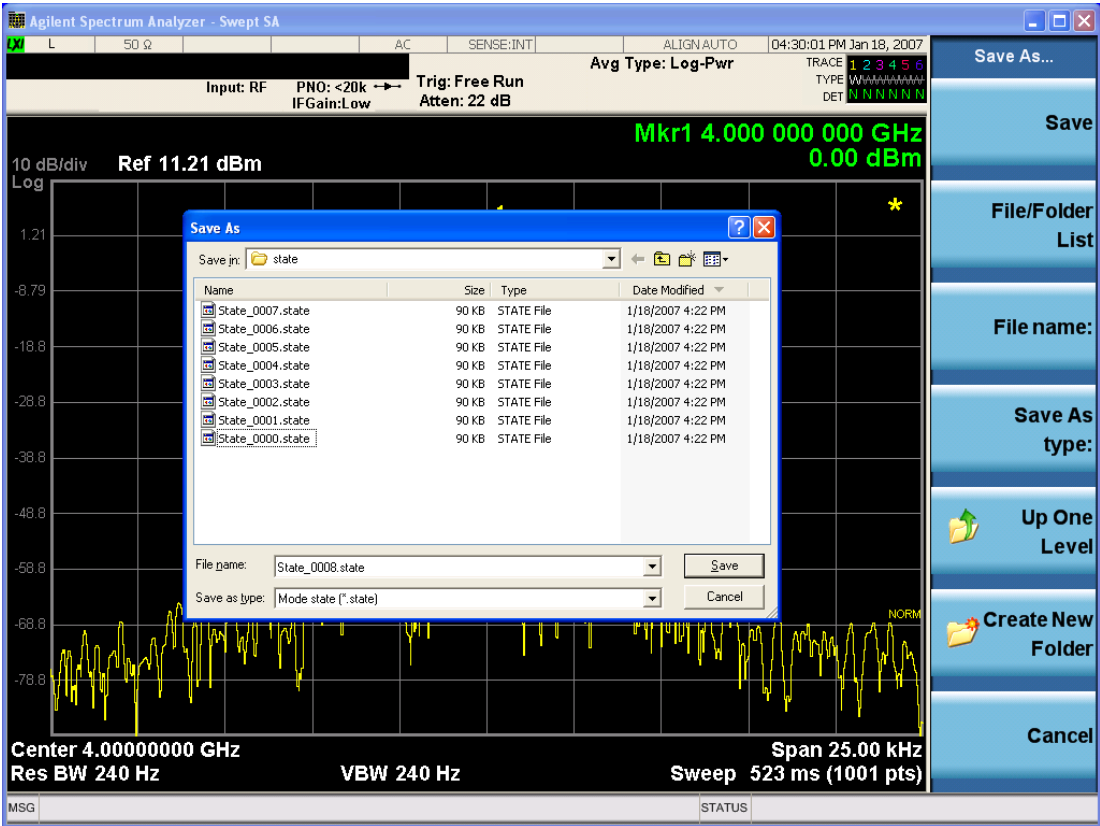
where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save
Mode	All
Remote Command	:MMEMory:STORe:STATe <filename>
Example	MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory.
Notes	Both single and double quotes are supported for any filename parameter over remote. After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key. After saving to a register, you remain in the Save State menu, so that you can see the Register key

	update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.
Backwards Compatibility SCPI	:MMEMory:STORe:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.
Initial S/W Revision	Prior to A.02.00

To File . . .

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



The Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting **OK**, or you can **Cancel** the request. If you select **OK**, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

File Name

The **File Name** field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 1469](#) documentation for more on the automatic file naming algorithm.

When you press the **File Name** key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the **Done** softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Create New Folder

This key corresponds to the icon of a folder with the "*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

Key Path	Save, State
Mode	All
Notes	Brings up Save As dialog for saving a State Save Type
Initial S/W Revision	Prior to A.02.00

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See ["More Information" on page 317](#)

Key Path	Save, State
Mode	All
Remote Command	:MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number>
Example	:MMEM:REG:STAT:LAB 1,"my label"
Notes	<reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,""
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available"
Preset	The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc"
Initial S/W Revision	A.11.00

More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The *SAV and *RCL commands will not be affected by the custom register names, nor will the MMEM commands.

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
Example	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
Example	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

Mass Storage Catalog (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:CATalog? [<directory_name>]
Notes	The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty
Initial S/W Revision	Prior to A.02.00

Mass Storage Change Directory (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory?

Notes	The string must be a valid logical path. Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value. At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal. Query returns full path of the default directory.
Initial S/W Revision	Prior to A.02.00

Mass Storage Copy (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:COpy <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Copies an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists. This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

Key path	SCPI Only
Remote Command	:MMEMory:COpy:DEvice <source_string>,<dest_string>
Notes	The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device. Valid device keywords are: SNS (smart noise source) An error is generated if the file or device is not found.

Mass Storage Delete (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:DELeTe <file_name>[,<directory_name>]

Notes	The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an “access denied” error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

Key path	SCPI Only
Remote Command	:MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name>
Notes	The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format.
Initial S/W Revision	Prior to A.02.00

Mass Storage Make Directory (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:MDIRectory <directory_name>
Notes	The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an “access denied” error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Mass Storage Move (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:MOVE <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source.

	The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists. This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Mass Storage Remove Directory (Remote Command Only)

Key path	SCPI Only
Remote Command	<code>:MMEMory:RDIRectory <directory_name></code>
Notes	The string must be a valid logical path. Removes a directory. The <directory_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed. This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

Key Path	Save, Sequences
Mode	All
Remote Command	<code>:MMEM:STOR:SEquences: SLISt ALISt SAALISt SSTep "MySequence.txt"</code>
Example	<code>:MMEM:STOR:SEQ:SLISt "MySequence.txt"</code>
Notes	Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt)
Initial S/W Revision	A.05.00

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Save, Sequences
Example	:MMEM:STOR:SEQ:SLIS "MySequence.txt"
Dependencies	Only available in XOBT
Initial S/W Revision	A.05.00

Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

Key Path	Save, Sequences
Mode	All
Notes	Brings up Save As dialog for saving a Sequence Save Type
Initial S/W Revision	A.05.00

Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

Key Path	Save
Mode	All
Notes	The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in

	the MMEM:STOR commands.
Dependencies	If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it.
Preset	Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults
Readback	The data type that is currently selected
Initial S/W Revision	Prior to A.02.00

Measurement Results

Pressing this key selects Meas Results as the data type to be exported.

The Meas Results file contains information which describes the current state of the analyzer. It is detailed in ["Meas Results File Contents" on page 324](#) below.

Key Path	Save, Data
Remote Command	:MMEMory:STORe:RESults <string>
Example	:MMEM:STOR:RES "MeasR_0000.csv"
Notes	If the save is initiated via SCPI and the file already exists, the file will be overwritten. The SCPI command exports Burst Power (Transmit Power) measurement results to the file specified as the parameter in the current path. The default path is My Documents\<current mode>\data\TXP\results. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. The SCPI parameter is a quoted string that specifies the filename. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	The current active measurement must be the Burst Power (Transmit Power) measurement to use this command.
Status Bits/OPC dependencies	Sequential – waits for the previous measurement to complete
Initial S/W Revision	Prior to A.02.00

Meas Results File Contents

A Meas Results File contains measurement results with the following information.

- File ID string, which is "MeasResult"
- Measurement ID following Mode ID, which is "SA:TXP" for example.
- Firmware rev and model number
- Option string
- Center Frequency
- TXP_InfoBw

- TXP_Used_CaptureTime

The file contains these data followed by MeasResult1 to MeasResult4 that flag the start of the measurement results. Each line of Measurement Results consists of four comma separated values from MeasResult1 value to MeasResult4 value. MeasResult1 contains the same results as MEAS/READ/FETCH:TXPower|BPOWer1; MeasResult2, MEAS/READ/FETCH:TXPower|BPOWer2;... (continues in the same manner)

Exported file is .csv file. The Meas Results file, when imported into Excel, will show the following data:

MeasResult			
SA:TXP			
A.10.53	N9030A		
526 ALV ATP B1X B1Y B25 B40 BBA CR3 CRP DCF DDA DP2 DRD EA3 EDP EMC EP1 ERC ESC ESP EXM FSA LFE LNP MAT MPB NFE NUL P26 PFR PNC RTL RTS S40 SB1 SEC SM1 TVT YAS YAV	1		
Center Frequency	1.33E+10		
TXP_InfoBw	3000000		
TXP_Used_CaptureTime	0.00064		
MeasResult1	MeasResult2	MeasResult3	MeasResult4
0			
-999			

Save As . . .

When you press “Save As”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See ["To File . . ." on page 1482](#) in **Save, State** for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<mode name>\data\limits

For all of the Measurement Results Data Files:

My Documents\<mode name>\data\<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<mode name>\data\captureBuffer

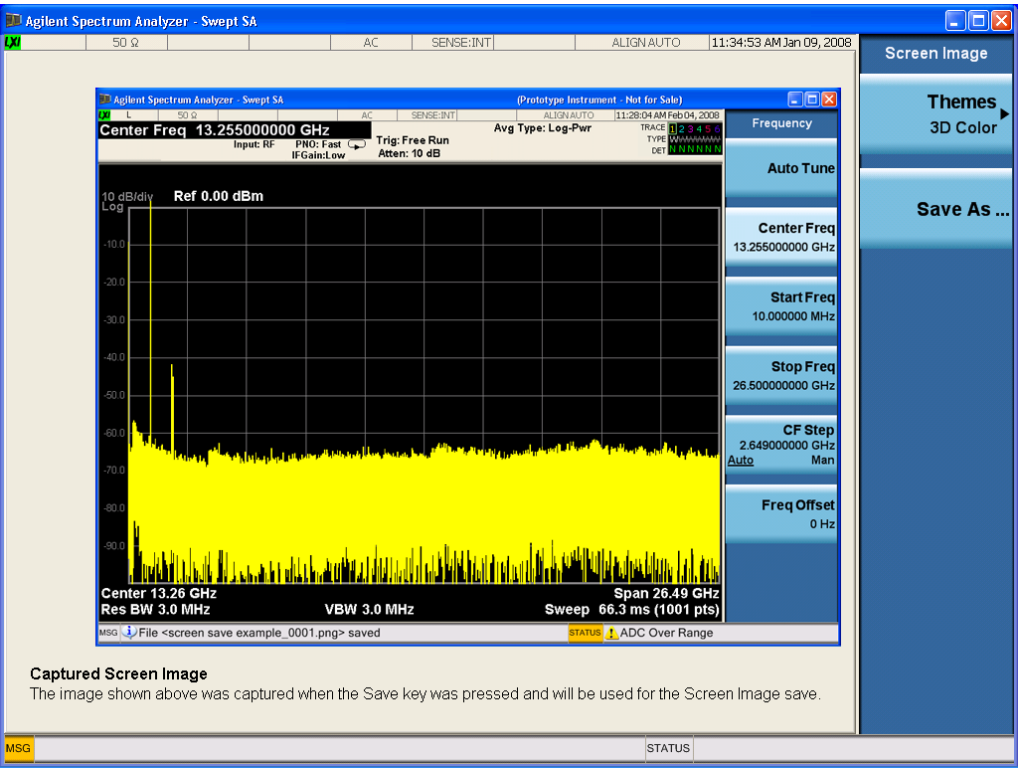
Key Path	Save, Data
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision	Prior to A.02.00

Screen Image

Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the **Save** front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the **Save As** menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the **Save** menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the **Quick Save** front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

NOTE

For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

Key Path	Save
Mode	All
Remote Command	:MMEMory:STORe:SCReen <filename>
Example	:MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory.
Initial S/W Revision	Prior to A.02.00

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

Key Path	Save, Screen Image
Remote Command	:MMEMory:STORe:SCReen:THEMe TDColor TDMonochrome FCOLOR FMONochrome :MMEMory:STORe:SCReen:THEMe?
Example	:MMEM:STOR:SCR:THEM TDM
Preset	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
Readback	3D Color 3D Mono Flat Color Flat Mono
Backwards Compatibility Notes	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
Initial S/W Revision	Prior to A.02.00

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDC

Readback	3D Color
Initial S/W Revision	Prior to A.02.00

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDM
Readback	3D Mono
Initial S/W Revision	Prior to A.02.00

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 1482 in **Save, State** for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\<mode name>\screen.

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save, Screen Image
Notes	Brings up Save As dialog for saving a Screen Image Save Type
Initial S/W Revision	Prior to A.02.00

Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing **Single** does a Resume.

See ["More Information" on page 330](#)

Key Path	Front-panel key
Example	:INIT:CONT OFF
Notes	See Cont key description.
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold. For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state. INIT[:IMM] in ESA & PSA Spectrum Analysis Mode does an implied ABORT. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.
Initial S/W Revision	Prior to A.02.00

More Information

See ["Restart" on page 1479](#) for details on the INIT:IMMediate (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the **Single** key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the **Single** key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the **Single** key in the middle of a sweep does not restart the sweep, sending INIT:IMMediate does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

Key Path	Front-panel key

RF Output

This parameter sets the source RF power output state.

Key Path	Source
Remote Command	:OUTPut[:EXTernal][:STATe] ON OFF 1 0 :OUTPut[:EXTernal][:STATe]?
Example	OUTP OFF OUTP?
Notes	The EXTERNAL node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source. This setting is for the independent mode and has no effect on the "List Sequencer" on page 1584. If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately. When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the "Sequencer" on page 1585 is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

Amplitude

Allows you to access the Amplitude sub-menu.

Key Path	Source
Notes	The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 1584. If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set "Sequencer" on page 1585 to Off will make source leave list sequencer and this button will be black out.
Initial S/W Revision	A.05.00

Modulation

Allows you to toggle the state of the modulation.

Key Path	Source
Remote Command	:OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]?
Example	:OUTP:MOD OFF
Notes	This setting is for independent mode and has no effect on "List Sequencer" on page 1584 . If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately. When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the "Sequencer" on page 1585 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer.
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

Frequency

Allows you to access the Frequency sub-menu.

Key Path	Source
Notes	The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 1584 . If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out.
Initial S/W Revision	A.05.00

Modulation Setup

Allows access to the menus for setting up the available modulation types: ["ARB" on page 1534](#), ["AM" on page 1580](#), ["FM" on page 1582](#), and ["PM" on page 1583](#).

Key Path	Source
Initial S/W Revision	A.05.00

ARB

Allows you access to the ARB sub-menus.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a “MOD” annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe] ?
Example	:SOUR:RAD:ARB OFF :SOUR:RAD:ARB?
Notes	If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Dependencies	This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 1585 Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 1585 Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately. The ARB can only be turned on when there is a waveform file selected for playback. On the GUI If no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. "- When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported

Couplings

If **"Real-Time AWGN" on page 1545** AWGN State is On and this setting is On, **"RF Power" on page 1499** RF Power will be adjusted to the value to maintain the AWGN power relationship defined by **"Power Control Mode" on page 1546** Power Control Mode and other noise settings

Preset	Off
Range	On Off
Initial S/W Revision	A.05.00
Modified at S/W Revision	A.16.00 (Add couplings with AWGN state)

Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Remote Command	:SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform?
Example	:SOUR:RAD:ARB:WAV "test_waveform.bin"
Notes	If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB. When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated . When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and none of the waveform segments is loaded. If the ARB is ON, and you attampt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On. If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generatedand the file selection remains unchanged. If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.error is generated. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
Notes	<string> - specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error. When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated. If you specify a directory over SCPI, but the directory does not exist, an error is generated. If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles"

	:SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated. It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated. When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory

Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 1584 and "Sequencer" on page 1585 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

NOTE

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use "[Query ARB Memory Full File List \(Remote Command Only\)](#)" on page 1539.

Remote Command	:SOURce:RADio:ARB:CATalog?
Example	:SOUR:RAD:ARB:CATalog?
Notes	The return data is in the following format: <integer> - memory used <integer> - memory free <string> ... - comma separated list of waveform segments within ARB memory
Initial S/W Revision	A.05.00

Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

Remote Command	:SOURce:RADio:ARB:FCATalog?
Example	:SOUR:RAD:ARB:FCATalog?
Notes	The return data is in the following format: <integer> - memory used <integer> - memory free <integer> - file count in ARB memory <string>, <string>, ... <string> - comma separated string list of waveform segments within ARB

	memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm"
Initial S/W Revision	A.09.00

ARB Setup

Allows access to the ARB setup sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Sample Rate

Allows you to set the ARB waveform playback sample rate.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE?
Example	:SOUR:RAD:ARB:SCL:RATE 48.00 MHz
Notes	If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing.
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	125.00 MHz
Min	1.00 kHz
Max	125.00 MHz
Initial S/W Revision	A.05.00

Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling?

Example	:SOUR:RAD:ARB:RSC 100.00
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	70.00 %
Min	1.00 %
Max	100.00 %
Initial S/W Revision	A.05.00

Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet?
Example	:SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	0.00 Hz
Min	-50.00 MHz
Max	50.00 MHz
Initial S/W Revision	A.05.00

Edit RMS

Allows you to edit or calculate current RMS of selected waveform.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Initial S/W Revision	A.14.50

Current RMS

Allows you to directly specify current RMS value used to playback currently selected waveform. Please note incorrect RMS value may cause inaccurate power output in E6640A that is sensitive to RMS value.

This setting is also updated by RMS in waveform header or updated when invoking RMS calculation operation.

This setting can be saved to the header of currently selected waveform by invoking ["Save Setup To Header" on page 1579](#) "Save Setup To Header".

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS
Remote Command	:SOURce:RADio:ARB:RMS <float> :SOURce:RADio:ARB:RMS?
Example	:SOUR:RAD:ARB:HEAD:RMS 0.7 :SOUR:RAD:ARB:HEAD:RMS?
Notes	Valid range is 0 to 1.414, values outside the range will be clipped to the closest boundary. Note this value does not affect "List Sequencer" on page 1584 Source List Sequencer that always uses RMS value resides in each ARB header. If want this value to take effect in list sequencer, use "Save Setup To Header" on page 1579 "Save Setup to Header" to save current RMS value to header first, then play the ARB in source list sequencer.
Dependencies	When a new waveform is selected for playback, this setting is updated by the RMS value defined in associated waveform header file. If selected waveform has no associated header file or header file does not specify RMS value, then instrument will try to calculate out one automatically. Calculating RMS can also update this setting.
Preset	0
Range	0 ~ 1.414
Initial S/W Revision	A.14.50

RMS Calculation Mode

Allows you to specify the mode to calculate the current RMS.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS
Remote Command	:SOURce:RADio:ARB:RMS:CALCulation:MODE AUTO M1 M2 M3 M4 :SOURce:RADio:ARB:RMS:CALCulation:MODE?
Example	:SOUR:RAD:ARB:RMS:CALC:MODE AUTO
Notes	If no waveform is selected, or selected waveform is waveform sequence, the key will grey out.
Preset	AUTO
Range	AUTO M1 M2 M3 M4
Initial S/W Revision	A.14.50

Auto

RMS will be calculated based on the whole sample range of current selected waveform.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode
Example	:SOUR:RAD:ARB:RMS:CALC:MODE AUTO

Initial S/W Revision	A.14.50

Marker 1

Selects marker 1 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker

Example	:SOUR:RAD:ARB:RMS:CALC:MODE M1

Initial S/W Revision	A.14.50

Marker 2

Selects marker 2 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker

Example	:SOUR:RAD:ARB:RMS:CALC:MODE M2

Initial S/W Revision	A.14.50

Marker 3

Selects marker 3 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker

Example	:SOUR:RAD:ARB:RMS:CALC:MODE M3

Initial S/W Revision	A.14.50

Marker 4

Selects marker 4 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker

Example	:SOUR:RAD:ARB:RMS:CALC:MODE M4

Initial S/W Revision	A.14.50

Calculate RMS

Allows you to calculate current RMS based on mode selected. This will update ["Current RMS" on page 1542](#) Current RMS setting.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS
Remote Command	:SOURce:RADio:ARB:RMS:CALCulate
Example	:SOUR:RAD:ARB:RMS:CALC
Notes	If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”. If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 1542 “RMS Calculation Mode” is set to marker, under this circumstance, invoking calculation operation will get error “-221 Setting conflict; There is no marker for currently selected waveform, auto RMS calculation mode is used instead”, and "RMS Calculation Mode" on page 1542 “RMS Calculation Mode” will be coupled to “Auto” mode automatically. RMS calculation does not suit for waveform sequence. If selected waveform is waveform sequence file, invoking this operation will get error “-221 Setting conflict; RMS calculation does not apply to waveform sequence”. But users can still edit current RMS as play parameter, and can save current RMS to waveform sequence header for later use.
Initial S/W Revision	A.14.50

Use Header RMS

Allows you to quickly set RMS in ARB header to ["Current RMS" on page 1542](#) Current RMS setting.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS,
Notes	No remote command, front panel only. If no waveform is selected, the key will grey out. If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.
Initial S/W Revision	A.14.50

Real-Time AWGN Setup

The source allows you to apply additive white Gaussian noise (AWGN) to a carrier in real time while the modulating waveform plays in the dual ARB player. Pressing this key allows access to the real time AWGN sub-menus and changes the central display area to show the AWGN Setup view.

This feature is controlled by E6650A-AW1 option

Key Path	Source, Modulation Setup, ARB, ARB Setup
Notes	This menu only appears and related SCPIs are only available when E6650A-AW1 option presents.
Initial S/W Revision	A.16.00

Real-Time AWGN

Allows you to enable or disable adding real-time AWGN to the carrier modulated by the waveform currently being played by the dual ARB.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe[:STATe] ON OFF 1 0 :SOURce:RADio:ARB:NOISe[:STATe]?
Example	:SOUR:RAD:ARB:NOIS OFF
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN state is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN state is updated with the value from the header file. The AWGN state will remain unchanged if the newly selected waveform does not have an associated header file.
Couplings	If this setting is On and "ARB" on page 1534 ARB State is On, "RF Power" on page 1499 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 1546 Power Control Mode and other noise settings
Preset	Off
Range	On Off
Initial S/W Revision	A.16.00

Carrier To Noise Ratio

Allows you to specify the carrier to noise ratio (C/N) in dB. The carrier power is defined as the total modulated signal power without noise power added. The noise power is applied over the specified bandwidth of the carrier signal.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:CN <ampl> :SOURce:RADio:ARB:NOISe:CN?
Example	:SOUR:RAD:ARB:NOIS:CN 0.00 dB
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN C/N ratio is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN C/N ratio is updated with the value from the header file. The AWGN C/N ratio will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	0.00 dB
Min	-100.00 dB
Max	100.00 dB
Initial S/W Revision	A.16.00

Carrier Bandwidth

Allows you to specify the bandwidth over which the AWGN is applied. The carrier RMS power and the noise power are integrated over the selected carrier bandwidth for the purpose of calculating carrier to noise ratio (C/N).

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:CBWidth <freq> :SOURce:RADio:ARB:NOISe:CBWidth?
Example	:SOUR:RAD:ARB:NOIS:CBW 1.00 Hz
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file.
Min	1.00 Hz
Max	200.00 MHz
Initial S/W Revision	A.16.00

Noise Bandwidth

Allows you to specify the flat noise bandwidth of the real-time noise for an ARB waveform.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:BANDwidth <freq> :SOURce:RADio:ARB:NOISe:BANDwidth?
Example	:SOUR:RAD:ARB:NOIS:BAND 1.00 Hz
Notes	Generally, flat noise bandwidth should be set slightly wider than the carrier bandwidth (typically 1.6 times wider)
Notes	Max Noise Bandwidth equals $0.8 * \text{Maximum ARB Sample Rate}$ reported in HW capability
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	1.00 Hz
Min	1.00 Hz
Max	160.00 MHz
Initial S/W Revision	A.16.00

Power Control Mode

This setting offers four ways to control the RF output power when adding AWGN to a signal.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:POWeR:CONTRol[:MODE] TOTal CARRier NOISe NCHannel :SOURce:RADio:ARB:NOISe: POWer:CONTRol[:MODE]?
Example	:SOUR:RAD:ARB:NOIS:POW:CONT NCHannel :SOUR:RAD:ARB:NOIS:POW:CONT?
Preset	TOTal
Range	Total Power Carrier Power Total Noise Power Noise Power in Channel
Initial S/W Revision	A.16.00

Total

Set the power control mode as total power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT TOTal
Couplings	Set to this value will make Carrier Power Carrier Power, Total Noise Power Total Noise Power, and Channel Noise Power Channel Noise Power buttons invisible on menu. Selecting Total as the power control mode makes the total power and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the total power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the total power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Carrier

Set the power control mode as carrier power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT CARRier
Couplings	Set to this value will make Carrier Power Carrier Power button visible, while Total Noise Power Total Noise Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Carrier as the power control mode makes the carrier power and C/N independent variables while making the total power and total noise power dependent variables. The dependent variables total power and total noise power are set by the carrier power, C/N, and the rest of the Noise settings. The total power and total noise power change as any noise parameter is adjusted to keep the carrier power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Total Noise

Set the power control mode as total noise power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT NOISe
Couplings	Set to this value will make Total Noise Power Total Noise Power button visible, while Carrier Power Carrier Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Total Noise as the power control mode makes the total noise power and C/N independent variables while making the total power and carrier power dependent variables. The dependent variables total power and carrier power are set by the total noise power, C/N, and the rest of the Noise settings. The total power and carrier power change as any noise parameter is adjusted to keep the total noise power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Channel Noise

Set the power control mode as channel noise power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT NChannel
Couplings	Set to this value will make Channel Noise Power Channel Noise Power button visible, while Total Noise Power Total Noise Power and Carrier Power Carrier Power buttons invisible from menu. Selecting Channel Noise as the power control mode makes the noise power in channel and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the channel noise power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the channel noise power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE CONTInuous SINGLE SADVance :SOURce:RADio:ARB:TRIGger:TYPE?
Example	:SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE?
Notes	Gated trigger type will be implemented at a later release
Preset	CONTInuous
Range	Continuous Single Seg Adv
Initial S/W Revision	A.05.00

Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE] FREE TRIGger RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE]?
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Preset	FREE
Range	Free Run Trigger + Run Reset + Run
Initial S/W Revision	A.05.00

Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Initial S/W Revision	A.05.00

Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG
Initial S/W Revision	A.05.00

Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT RES
Initial S/W Revision	A.05.00

Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:RETRigger ON OFF IMMediate :SOURce:RADio:ARB:RETRigger?
Example	:SOUR:RAD:ARB:RETR OFF
Notes	ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1.
Preset	ON
Range	No Retrigger Buffered Trigger Restart on Trigger
Initial S/W Revision	A.05.00

No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
Example	:SOUR:RAD:ARB:RETR OFF
Initial S/W Revision	A.05.00

Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
Example	:SOUR:RAD:ARB:RETR ON
Initial S/W Revision	A.05.00

Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
Example	:SOUR:RAD:ARB:RETR IMM
Initial S/W Revision	A.05.00

Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE CONTinuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] ?
Example	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
Preset	CONTinuous
Range	Single Continuous
Initial S/W Revision	A.05.00

Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
Example	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
Initial S/W Revision	A.05.00

Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
Example	:SOUR:RAD:ARB:TRIG:TYPE:SADV CONT
Initial S/W Revision	A.05.00

Trigger Source

The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 :SOURce:RADio:ARB:TRIGger[:SOURce]?
Example	:SOUR:RAD:ARB:TRIGger KEY
Dependencies	This key is grayed out if the current trigger type is Continuous, Free Run.
Preset	EXTernal2
Range	Trigger Key Bus External 2
Initial S/W Revision	A.05.00

Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger KEY
Initial S/W Revision	A.05.00

Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger BUS
Initial S/W Revision	A.05.00

External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger EXT2
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

Key Path	Source, Modulation Setup , ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty.
Initial S/W Revision	A.05.00

Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the

same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMORY:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
Notes	<string> - specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error. When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated. If you specify a directory over SCPI, but the directory does not exist, an error is generated. If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated. It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated. When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated. If you attempt to delete all files from ARB memory when there are waveform files used in "List

"Sequencer" on page 1584 and **"Sequencer" on page 1585** state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as **"Segments on Hard Disk" on page 1610**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as **"Load Segment To ARB Memory" on page 1610**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as **"Load All To ARB Memory" on page 1611**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as **"Change Directory..." on page 1612**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as **"Default Directory..." on page 1612**

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 1612](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Initial S/W Revision	Prior to A.09.00

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 1613](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 1613](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 1539](#).

Initial S/W Revision	Prior to A.09.00

Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, SCPI front panel only.
Preset	1
Min	1
Max	65535
Initial S/W Revision	A.05.00

Marker 1

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Delete Segment

Allows you to delete the selected segment from the waveform sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Save Sequence...

Pressing this key displays the “Save As” dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Initial S/W Revision	A.05.00

Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in ["Build New Sequence" on page 1553](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) "NVWFM" or use a real full path representation. See the example below. MSUS "NVWFM" is mapped to D: VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

Remote Command	<pre>:SOURce:RADio:ARB:SEquence[:MWAVeform] <filename>, <waveform1>, <reps>, NONE M1 M2 M3 M4 M1M2 M1M3 M1M4 M2M3 M2M4 M3M4 M1M2M3 M1M2M4 M1M3M4 M2M3M4 M1M2M3M4 ALL, {<waveform2>, <reps>, NONE M1 M2 M3 M4 M1M2 M1M3 M1M4 M2M3 M2M4 M3M4 M1M2M3 M1M2M4 M1M3M4 M2M3M4 M1M2M3M4 ALL, } ...</pre>

(For additional description of each item, see Notes below ["For Setup SCPI" on page 361](#) "For Setup SCPI".)

```
:SOURce:RADio:ARB:SEquence[:MWAVeform]? <filename>
```

(For additional description of each item, see Notes ["For Query SCPI" on page 362](#) below.)

Example

For setup:

```
>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4,
"NVWFM:wfmSegment2.wfm", 20, M1M3
```

Or

```
>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", "D: VARB\wfmSegment1.wfm", 10, M2M3M4, "D:
VARB\wfmSegment2.wfm", 20, M1M3
```

For query, must specify which waveform sequence file to query.

```
>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"
```

Or

```
>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",
```

Notes**For Setup SCPI**

For the Setup SCPI command, the parameters are:

<filename> - String Type

This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.

<waveform1> - String Type

This variable specifies the path and name of the first existing waveform segment. The path supports

MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE - This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 - these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL - This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not ".seq", error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq",

<"wfmSegment1.wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3",

Error Checks for Query SCPI command:

If you do not specify a filename, an error is generated.
 If the waveform sequence file name is empty, an error is generated.
 If the specified waveform sequence file cannot be found, an error is generated.

Initial S/W Revision	A.05.00

Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Waveform Utilities

Allows you access to the waveform utilities sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. “Left” module for E6630A or “TRX1” module for E6640A.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities
Dependencies	This key is only available if there is at least one Multi-pack license installed on the instrument.
Initial S/W Revision	A.05.00

Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if there is at least one slot available within at least one multi-pack license.
Initial S/W Revision	A.05.00

Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
Remote Command	:SYSTem:LKEY:WAVeform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVeform:ADD <string>
Example	SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm"
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:ADD is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. .
Dependencies	This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable.
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD “D: VARB\testwaveform.bin” or :SOUR:RAD:ARB:LOAD “NVWFM:testwaveform.bin”
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operation is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
Notes	<string> - specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error. When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated. If you specify a directory over SCPI, but the directory does not exist, an error is generated. If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles"

	:SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1611](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as ["Change Directory..." on page 1612](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as ["Default Directory..." on page 1612](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision	A.05.00

Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Remote Command	:SYSTem:LKEY:WAVeform:REPLace <int>, <string> or :SYSTem:LIcense[:FPACK]:WAVeform:REPLace <int>, <string>
Example	SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" or :SYST:LIC:WAV:REPL 1, "myotherwaveform.wfm"
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Keysight signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.
Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1611](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as ["Change Directory..." on page 1612](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as ["Default Directory..." on page 1612](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Remote Command	<code>:SYSTem:LKEY:WAVEform:CLEar <int></code> or <code>:SYSTem:LICense[:FPACK]:WAVEform:CLEar <int></code>
Example	<code>SYST:LKEY:WAV:CLE 1</code> or <code>:SYST:LIC:WAV:CLE 1</code>
Notes	The second SCPI <code>:SYSTem:LICense[:FPACK]:WAVEform:CLEar</code> is provided to be consistent with the style of Keysight signal sources. You can use either one of them.

	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.
Dependencies	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision	A.05.00

Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Remote Command	:SYSTem:LKEY:WAVeform:LOCK <int> or :SYSTem:LICense[:FPACK]:WAVeform:LOCK <int>
Example	SYST:LKEY:WAV:LOCK 1 or SYST:LIC:WAV:LOCK 1
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.
Dependencies	This key is only available if the currently selected slot is in the trial state or the lock required state.
Initial S/W Revision	A.05.00

Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

Remote Command	:SYSTem:LKEY:WAVeform:STATus? <int> or :SYSTem:LICense[:FPACK]:WAVeform:STATus? <int>
Example	:SYST:LKEY:WAV:STAT? 1 <"Locked" or :SYST:LIC:WAV:STAT? 1 <"Locked"
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

	error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.
Range	"Locked" "Available" "Trail" "LockRequired" "Nonexistent"
Initial S/W Revision	A.05.00

Slots Free Query (Remote Command Only)

Returns the number of license slots free.

Remote Command	:SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LIcense[:FPACK]:WAVeform:FREE?
Example	:SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE?
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Initial S/W Revision	A.05.00

Slot Used Query (Remote Command Only)

Returns the number of license slots used.

Remote Command	:SYSTem:LKEY:WAVeform:USED? or :SYSTem:LIcense[:FPACK]:WAVeform:USED?
Example	:SYST:LKEY:WAV:USED? or :SYST:LIC:WAV:USED?
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Initial S/W Revision	A.05.00

Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

Remote Command	:SYSTem:LKEY:WAVeform:NAME? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int>

Example	:SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm" or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then empty string is returned.
Initial S/W Revision	A.12.00

Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

Remote Command	:SYSTem:LKEY:WAVeform:UID? <int> or :SYSTem:LICense[:FPACK]:WAVeform:UID? <int>
Example	:SYST:LKEY:WAV:UID? 2 <"1346752140" or :SYST:LIC:WAV:UID? 2 <"1346752140"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then "0" is returned
Initial S/W Revision	A.12.00

Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

Remote Command	:SOURce:RADio:ARB:MPLicensed:NAME:LOCKed?
Example	SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm"
Initial S/W Revision	A.11.00

Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

Remote Command	:SOURce:RADio:ARB:MPLicensed:UID:LOCKed?
Example	SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136","3812603511","3710986266"
Notes	Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list
Initial S/W Revision	A.11.00

Marker Utilities

Allows access to the marker utilities sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

Key Path	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

Mkr 1 Polarity

Allows you to set the polarity of marker 1.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1?
Example	:SOUR:RAD:ARB:MPOL:MARK1 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Mkr 2 Polarity

Allows you to set the polarity of marker 2.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2?
Example	:SOUR:RAD:ARB:MPOL:MARK2 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Mkr 3 Polarity

Allows you to set the polarity of marker 3.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3?
Example	:SOUR:RAD:ARB:MPOL:MARK3 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Mkr 4 Polarity

Allows you to set the polarity of marker 4.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4?

Example	:SOUR:RAD:ARB:MPOL:MARK4 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

Key Path	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting maker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
Remote Command	:SOURce:RADio:ARB:MDEStination:PULSe NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:PULSe?
Example	:SOUR:RAD:ARB:MDES:PULS NONE
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range	None M1 M2 M3 M4
Initial S/W Revision	A.05.00

None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision	A.05.00

Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision	A.05.00

Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision	A.05.00

Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
Remote Command	:SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold?
Example	:SOUR:RAD:ARB:MDES:ALCH NONE
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range	None M1 M2 M3 M4
Initial S/W Revision	A.05.00

None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision	A.05.00

Marker 1

Sets marker 1 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision	A.05.00

Marker 2

Sets marker 2 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision	A.05.00

Marker 3

Sets marker 3 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

Marker 4

Sets marker 4 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

Key Path	Source, Modulation Setup, ARB, Header Utilities
Remote Command	:SOURce:RADio:ARB:HEADer:CLEar
Example	:SOUR:RAD:ARB:HEAD:CLE
Notes	Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error.
Initial S/W Revision	A.05.00

Save Setup To Header

Allows you to save new file header information details to the file.

Key Path	Source, Modulation Setup, ARB, Header Utilities
Remote Command	:SOURce:RADio:ARB:HEADer:SAVE
Example	:SOUR:RAD:ARB:HEAD:SAVE
Notes	Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error.
Initial S/W Revision	A.05.00
Modified at S/W Revision	A.16.00 (AWGN settings will be saved to header as well)

Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

Remote Command	:MMEMory:HEADer:ID? "<file name>"
Example	:MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS)
Notes	SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk. If the file cannot be found in ARB memory or on hard disk, an error is generated and value -1 is returned
Initial S/W Revision	A.09.00

Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

Remote Command	:SOURce:RADio:ARB:TRIGger:INITiate
Example	:SOUR:RAD:ARB:TRIG:INIT
Initial S/W Revision	A.05.00

AM

Allows access to the menu for configuring the Amplitude Modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, AM
Remote Command	:SOURce:AM:STATe :SOURce:AM:STATe?
Example	:SOUR:AM:STAT OFF
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

AM Depth

Allows you to set the amplitude modulation depth in percent.

Key Path	Source, Modulation Setup, AM
Remote Command	:SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear] ?
Example	:SOUR:AM 0.1
Preset	0.1 %
Min	0.1 %
Max	95.0 %
Initial S/W Revision	A.05.00

AM Rate

Allows you to set the internal amplitude modulation rate.

Key Path	Source, Modulation Setup, AM
Remote Command	:SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency?
Example	:SOUR:AM:INT:FREQ 40.0 Hz

Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

FM

Allows access to the menu for configuring the frequency modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, FM
Remote Command	:SOURce:FM:STATe :SOURce:FM:STATe?
Example	:SOUR:FM:STAT OFF
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

FM Deviation

Allows you to set the frequency modulation deviation.

Key Path	Source, Modulation Setup, FM
Remote Command	:SOURce:FM[:DEViation] :SOURce:FM[:DEViation]?
Example	:SOUR:FM 1.00 kHz
Preset	1.00 Hz
Min	1.00 Hz
Max	100.00 kHz
Initial S/W Revision	A.05.00

FM Rate

Allows you to set the internal frequency modulation rate.

Key Path	Source, Modulation Setup, FM
Remote Command	:SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency?
Example	:SOUR:FM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

PM

Allows access to the menu for configuring the phase modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM:STATe :SOURce:PM:STATe?
Example	:SOUR:PM:STAT OFF
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

PM Deviation

Allows you to set the phase modulation deviation.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM[:DEViation] :SOURce:PM[:DEViation]?

Example	:SOUR:PM 1.00 rad
Preset	0.1 rad
Min	0.1 rad
Max	20.0 rad
Initial S/W Revision	A.05.00

PM Rate

Allows you to set the internal phase modulation rate.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency?
Example	:SOUR:PM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a tabular form. The details of the SCPI for configuring the list sequencer can be found in ["Step Configuration \(Remote Command Only\)" on page 1618](#).

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

Key Path	Source
Initial S/W Revision	A.05.00

Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe] ?
Example	:SOUR:LIST OFF
Notes	When the sequencer is set to ON, the list sequencer controls the output of the source.
Couplings	When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected.
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST:TRIGger[:IMMediate]
Example	:SOUR:LIST:TRIG
Notes	When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " Query List Sequence Initiation Armed Status (Remote Command Only) " on page 1629 Query Source List Sequence Armed Status)
Dependencies	Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled.
Initial S/W Revision	A.05.00

List Sequencer Setup

Allows you access to the list sequencer setup menus.

Key Path	Source, List Sequencer

Number of Steps

Allows you to specify the number of steps within the list sequence.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:NUMBer:STEPs <integer> :SOURce:LIST:NUMBer:STEPs?
Example	:SOUR:LIST:NUMB:STEP 1
Notes	Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps.
Dependencies	The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer.
Preset	1
Min	1
Max	1000
Initial S/W Revision	A.05.00

Current Step

Allows you to select the step number you wish to view or edit.

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only.
Preset	1
Min	1
Max	Step Count
Initial S/W Revision	A.05.00

Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of

1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key.
Initial S/W Revision	A.05.00

Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key
Initial S/W Revision	A.05.00

Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

Key Path	Source, List Sequencer, List Sequencer Setup
Initial S/W Revision	A.05.00

Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE INTERNAL EXTERNAL2 KEY BUS EXTERNAL4 :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger?
Example	:SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Free Run
Range	Free Run Internal Manual (Trigger Key) Bus External 2 EXTERNAL4
Initial S/W Revision	A.05.00

Free Run

Sets the trigger input for the current step to Free Run.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG IMM
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Internal

Sets the trigger input for the current step to Internal.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG INT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG KEY
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG BUS
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

External 2

Sets the trigger input for the current step to External 2.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG EXT2
Notes	SCPI is supported after A.09.40
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

Value Changed	Recommended Transition Time
Frequency	500 μ s
Amplitude	100 μ s to within 0.1 dB 20 μ s to within 1.0 dB

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME?
Example	:SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME?

Notes	SCPI is supported after A.09.40
Preset	1.0 ms
Min	0.0 ms
Max	4.0 ks
Initial S/W Revision	A.05.00

Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
Remote Command	:SOURCE:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND27 BAND28 BAND29 BAND30 BAND31 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BAND44 BANDA BANDB BANDC BANDD BANDE BANDF :SOURCE:LIST:STEP[1] 2 3...1000:SETup: RADio:BAND?
Example	:SOUR:LIST:STEP2:SET:RAD:BAND PGSM :SOUR:LIST:STEP2:SET:RAD:BAND?
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

None

Selects no radio standard for use on the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Example	:SOUR:LIST:STEP2:SET:RAD:BAND NONE
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

P-GSM

Selects P-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

E-GSM

Selects E-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

R-GSM

Selects R-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

DCS 1800

Selects DCS 1800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

PCS 1900

Selects PCS 1900 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 450

Selects GSM 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 480

Selects GSM 480 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 850

Selects GSM 850 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 700

Selects GSM 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

T-GSM 810

Selects T-GSM 810 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

Band I

Selects Band I as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band II

Selects Band II as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band III

Selects Band III as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band IV

Selects Band IV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band V

Selects Band V as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band VI

Selects Band VI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band VII

Selects Band VII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band VIII

Selects Band VIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band IX

Selects Band IX as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band X

Selects Band X as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XI

Selects Band XI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XII

Selects Band XII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XIII

Selects Band XIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XIV

Selects Band XIV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

US CELL

Selects US Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

US PCS

Selects US PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Japan Cell

Selects Japan Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Korean PCS

Selects Korean PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

NMT 450

Selects NMT 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

IMT 2000

Selects IMT 2000 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Upper 700

Selects Upper 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Secondary 800

Selects Secondary 800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

400 Euro PAMR

Selects 400 Euro PAMR as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

800 PAMR

Selects 800 PAMR as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

AWS

Selects AWS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

700 Public Safety

Selects 700 Public Safety as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

LTE

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

BAND 1

Selects BAND 1 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 2

Selects BAND 2 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 3

Selects BAND 3 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 4

Selects BAND 4 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 5

Selects BAND 5 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 6

Selects BAND 6 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 7

Selects BAND 7 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 8

Selects BAND 8 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 9

Selects BAND 9 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 10

Selects BAND 10 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 11

Selects BAND 11 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 12

Selects BAND 12 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 13

Selects BAND 13 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 14

Selects BAND 14 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 17

Selects BAND 17 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 18

Selects BAND 18 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 19

Selects BAND 19 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 20

Selects BAND 20 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 21

Selects BAND 21 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 24

Selects BAND 24 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 25

Selects BAND 25 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 26

Selects BAND 26 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.12.53

BAND 27

Selects BAND 27 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

BAND 28

Selects BAND 28 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

BAND 31

Selects BAND 31 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND 33

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

BAND 34

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

BAND 35

Selects BAND 35 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

BAND 36

Selects BAND 36 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

BAND 37

Selects BAND 37 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

BAND 38

Selects BAND 38 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

BAND 39

Selects BAND 39 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

BAND 40

Selects BAND 40 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

BAND 41

Selects BAND 41 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

BAND 42

Selects BAND 42 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

BAND 43

Selects BAND 43 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

BAND 44

Selects BAND 44 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD
Initial S/W Revision	A.14.00

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND A

Selects BAND A as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

BAND B

Selects BAND B as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

BAND C

Selects BAND C as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

BAND D

Selects BAND D as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

BAND E

Selects BAND E as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

BAND F

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK?

Example	:SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK?
Notes	SCPI is supported after A.09.40
Preset	DOWN
Range	DOWN UP
Initial S/W Revision	A.05.00

Channel

Allows you to specify the frequency of the current step via a channel number.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRrequency?
Example	:SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	0 (Please refer to for valid ranges.)
Max	10838 (Please refer to for valid ranges.)
Initial S/W Revision	A.05.00

Frequency

Allows you to specify a frequency value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRFrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRFrequency?
Example	:SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40.

	This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated.
Preset	1.00 GHz
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

Power

Allows you to specify a power value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude?
Example	:SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL?
Notes	SCPI is supported after A.09.40
Notes	Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON.
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Preset	-100 dBm

Min	The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 1499 and the table RF Power Range for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 1499 and the table RF Power Range for the valid ranges.
Initial S/W Revision	A.05.00

Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform <string> :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform?
Example	:SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV?
Notes	SCPI is supported after A.09.40
Remote Command Notes	String type, takes "Off" "CW" "Cont" "waveform name"
Preset	CW
Range	Waveform Continue Previous CW Off
Initial S/W Revision	A.05.00

CW

Sets the current step to output a CW tone.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "CW"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "waveform name"
Notes	SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list

sequence will automatically apply header settings of the selected waveform in that step.

Initial S/W Revision	A.05.00

Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform

Example	:SOUR:LIST:STEP2:SET:WAV "Cont"

Notes	SCPI is supported after A.09.40

Initial S/W Revision	A.05.00

Off

Disable RF output of the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform

Example	:SOUR:LIST:STEP2:SET:WAV "Off"

Notes	SCPI is supported after A.09.40

Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform

Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

"NVWFM" (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. "NVWFM" MSUS will be mapped to the

default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD “D: VARB\testwaveform.bin” or :SOUR:RAD:ARB:LOAD “NVWFM:testwaveform.bin”
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPI command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL “D: varb”
Notes	<string> – specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a

directory to ARB memory is rejected with an error.

When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.

If you specify a directory over SCPI, but the directory does not exist, an error is generated.

If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated. It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated. When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 1584 and "Sequencer" on page 1585 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1610](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1610](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1611](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as ["Change Directory..." on page 1612](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as ["Default Directory..." on page 1612](#)

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 1612](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory
Initial S/W Revision	Prior to A.09.00

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 1613](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 1613](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME COUNT CONTinuous CABort :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE?
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE?
Notes	SCPI is supported after A.09.40
Notes	If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query Error! Reference source not found. Source Sweeping Condition Message to find out if the current list sequence is complete or not.
Range	Time Play Count Continuous Continuous Abort
Initial S/W Revision	A.05.00

Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found.** List Sequence Step Validation.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration, Time
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOUNT <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOUNT?
Example	:SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO?
Notes	SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #"
Notes	If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not.
Preset	1.00 ms
Min	100 μ s
Max	1800 s
Initial S/W Revision	A.05.00

Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE COUN
Notes	SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform.
Initial S/W Revision	A.05.00

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE CONT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select “On”, trigger event will occur on both Internal and External2 paths. Select “Off” will turn off trigger output.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON OFF 1 0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger
Example	:SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Off

Range	On Off
Initial S/W Revision	A.05.00

Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMediate INTernal KEY BUS EXTernal2, <time>, NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF, DOWN UP, <freq>, <ampl>, <string>, TIME COUNT CONTinuous, <time>, ON OFF 1 0, [<int>], :SOURce:LIST:STEP[1] 2 ... 4..1000:SETup?</pre>
Example	:SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM_Test1.bin", TIME, 10ms, OFF, 255
Notes	The parameters are: (There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.) 1. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 1587. 2. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 1589. 3. Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 1590. 4. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 1606. 5. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 1607 and "Frequency" on page 1607. 6. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 1608. 7. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The

	options for specifying these are: <filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated. CONT - continues playback of the ARB file from the previous step CW - outputs a CW tone OFF - disable RF output 8. Step Duration <enum> - specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 1615. 9. Time or Count <time/int> - specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "Time" on page 1615 and "Play Count" on page 1616. 10. Output Trigger <Boolean> - specifies the output trigger for the step. For details of the ranges for this setting see "Output Trigger" on page 1617.
Dependencies	The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586. If you attempt to remotely set or query a subopcode that is out of range, an error is generated.
Initial S/W Revision	A.05.00

Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Step Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:INPut:TRIGger?</pre>
Example	<pre>:SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG?</pre>
Notes	The command is to setup below parameter array of whole list sequence. Step Trigger <enum> - specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 1587. If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes	IMMEDIATE INTERNAL KEY BUS EXTERNAL2
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586.
Initial S/W Revision	A.09.40

Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:TRANsition:TIME <time>, <time>, <time>, ... :SOURce:LIST:SETup:TRANsition:TIME?
Example	:SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms :SOUR:LIST:SET:TRAN:TIME?
Notes	The command is to setup below parameter array of whole list sequence. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 1589 If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

R e m o t e C o m m a n d	:SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND?
E x a m p l	:SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM :SOUR:LIST:SET:RAD:BAND?

e	
N	The command is to setup below parameter array of whole list sequence.
o	Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 1590.
t	If input parameter number exceeds the step number defined by "Number of Steps" on page 1586Number of Steps then
e	generate error ", and only those parametes whose index number falls in number of steps will be updated.
s	
R	NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDI
e	V BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KO
m	REAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1
o	BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND1
t	9 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAN
e	D41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF
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D	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on
e	page 1586.
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Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK?
Example	:SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK?
Notes	The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 1606 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes	DOWN UP
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:CNFrequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFrequency?
Example	:SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR?

Notes	The command is to setup below parameter array of whole list sequence. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 1607 and "Frequency" on page 1607 This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?</pre>
Example	<pre>:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?</pre>
Notes	The command is to setup below parameter array of whole list sequence. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 1608. If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:SETup:WAVEform <string>, <string>, <string>, ...</pre>

	:SOURce:LIST:SETup:WAVeform?
Example	:SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV?
Notes	The command is to setup below parameter array of whole list sequence. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are: <filename> – plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it is does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated. CONT – continues playback of the ARB file from the previous step CW – outputs a CW tone OFF – disable RF output If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586.
Range	"filename" "CW" "Off" "CONT"
Initial S/W Revision	A.09.40

Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 1586 Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:DURation:TYPE <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:DURation:TYPE?
Example	:SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE?
Notes	The command is to setup below parameter array of whole list sequence. Step Duration <enum> – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 1615. If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes	TIME COUNT CONTinuous
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details

	see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure “Duration Time” or “Play Count” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:TOCount <time/int>, <time/int>, <time/int>, ... :SOURce:LIST:SETup:TOCount?
Example	:SOUR:LIST:SET:TOC 1s,2s,3s :SOUR:LIST:SET:TOC? :SOUR:LIST:SET:TOC 5,6,7 :SOUR:LIST:SET:TOC?
Notes	The command is to setup below parameter array of whole list sequence. Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "Time" on page 1615 and "Play Count" on page 1616 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. If current "Step Duration" on page 1615 is “Continuous”, then generate error -221, "Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Output Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ... :SOURce:LIST:SETup:OUTPut:TRIGger ?
Example	:SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON :SOUR:LIST:SET:OUTP:TRIG?
Notes	The command is to setup below parameter array of whole list sequence. Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see "Output Trigger" on page 1617 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in

	legal step number will be updated.
Remote Command Notes	ON OFF 1 0
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI feature described in.

Remote Command	:SOURce:LIST:SETup:CLEar
Example	:SOUR:LIST:SETup:CLE
Initial S/W Revision	A.05.00

Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST:TRIGgerout:TYPE BEGinningofstep DATamarker
Example	:SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP?
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer
Preset	BEGinningofstep
Range	BEGinningofstep DATamarker
Initial S/W Revision	A.14.00

BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type
Example	:SOUR:LIST:TRIG:TYP BEG
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP

Initial S/W Revision	A.14.00

DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

Key Path	Source, List Sequencer, Trigger Type
Example	:SOUR:LIST:TRIG:TYP DAT
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE MARKer

Initial S/W Revision	A.14.00

Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M1
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1

Initial S/W Revision	A.14.00

Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M2
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2

Initial S/W Revision	A.14.00

Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M3
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3
Initial S/W Revision	A.14.00

Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M4
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4
Initial S/W Revision	A.14.00

Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

Key Path	Source, List Sequencer
Remote Command	No remote command, front panel only.
Initial S/W Revision	A.05.00

Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to “Bus”. Sending this command will trigger the step and continue the sequence.

Remote Command	:SOURce:LIST:TRIGger:INITiate[:IMMediate]
Example	:SOUR:LIST:TRIG:INIT
Initial S/W Revision	A.05.00

Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

Remote Command	:SOURce:LIST:INITiation:ARMed?
Example	:SOUR:LIST:INIT:ARMed?
Notes	The return data is in the following format: Integer
Notes	Query only SCPI. Returning “1” if list sequence has been initiated successfully, returning “0” if not. Once get “0”, you can use :SYST:ERR? to query what error happened. Just like “*OPC?”, this command can be blocked until event/status “IsSourceSweeping” happens, and then returns. Doing so can help user’s script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI “:SOUR:LIST:TRIGger[:IMMediate]” (see "Initiate Sequence" on page 1585 Initiate Sequence), the right usage of this command is to use it after “:SOUR:LIST:TRIG”. If not, this command will return “1” immediately.
Notes	There is an alias SCPI “:SOURce:LIST:TRIGger:INITiation:ARMed?”.
Initial S/W Revision	A.09.40

Source Preset

Allows you to preset the source settings to their default values.

Key Path	Source
Remote Command	:SOURce:PRESet
Example	:SOUR:PRES

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Sweep/Control

Accesses a menu of functions that enable you to set up and control the sweep for the current measurement. For details about this key, see ["Sweep/Control" on page 1347](#).

Key Path	Front-panel key
Mode	SA, EDGE GSM, TDSCDMA
Initial S/W Revision	Prior to A.02.00

Sweep Time (for GSM mode)

Sets the number of slots which are used in each data acquisition. Each slot is approximately to 600 s.

Key Path	Sweep/Control
Mode	GSM
Remote Command	[:SENSe] :TXPower:SWEep:TIME <integer> [:SENSe] :TXPower:SWEep:TIME?
Example	TXP:SWE:TIME 4 TXP:SWE:TIME?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	50
Initial S/W Revision	Prior to A.02.00

Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing **Restart**, **Single** or **Cont** does a Resume.

Key Path	Sweep/Control
Remote Command	:INITiate:PAUSE
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

Key Path	Sweep/Control
Remote Command	:INITiate:RESume
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

Abort (Remote Command Only)

This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state. If the analyzer is in the process of aligning when ABORT is sent, the alignment finishes before the abort function is performed. So ABORT does not abort an alignment.

If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is set for Single measurement, it remains in the "idle" state until an :INIT:IMM command is received.

Remote Command	:ABORt
Example	:ABOR
Notes	If :INITiate:CONTinuous is ON, then a new continuous measurement will start immediately; with sweep (data acquisition) occurring once the trigger condition has been met. If :INITiate:CONTinuous is OFF, then :INITiate:IMMediate is used to start a single measurement; with sweep (data acquisition) occurring once the trigger condition has been met.
Dependencies	For continuous measurement, ABORt is equivalent to the Restart key. Not all measurements support the abort command.
Status Bits/OPC dependencies	The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUESTionable register bit 9 (INTEgrity sum) is cleared. Since all the bits that feed into OPC are cleared by the ABORt, the ABORt will cause the *OPC query to return true.
Initial S/W Revision	Prior to A.02.00

System

See ["System" on page 162](#)

Trace/Detector

Accesses a menu of functions that enable you to control the detectors for the current measurement.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Max Hold Trace

This key enables you to select visible/invisible Max Hold Trace.

Key Path	Trace/Detector
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe] ON OFF 1 0 :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe] ?
Example	:DISP:TXP:VIEW:WIND:TRAC:MAXH ON :DISP:TXP:VIEW:WIND:TRAC:MAXH?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Selecting [:SENSe]:TXPower:AVERage:TYPE MAXimum forces this parameter to ON.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Min Hold Trace

This key enables you to select visible/invisible Min Hold Trace.

Key Path	Trace/Detector
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe] ON OFF 1 0 :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe] ?
Example	:DISP:TXP:VIEW:WIND:TRAC:MINH ON :DISP:TXP:VIEW:WIND:TRAC:MINH?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Selecting [:SENSe]:TXPower:AVERage:TYPE MINimum forces this parameter to ON.

8 EDGE Power vs Time Measurement
Trace/Detector

Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Trigger

See "Trigger" on page 218

Free Run

See "Free Run " on page 225

Video

See "Video (IF Envelope) " on page 226

External 1

See "External 1 " on page 226

External 2

See "External 2 " on page 229

RF Burst

See "RF Burst " on page 230

External 1

See "External 1 " on page 226

Trigger Level

See "Trigger Level " on page 227

Trig Slope

See "Trig Slope " on page 227

Trig Delay

See "Trig Delay " on page 228

Zero Span Delay Comp

See "Zero Span Delay Comp On/Off" on page 229

External 2

See "External 2 " on page 229

Trigger Level

See ____ on page X

Trig Slope

See ____ on page X

Trig Delay

See ___ on page X

Zero Span Delay Comp

See ___ on page X

RF Burst

See "RF Burst " on page 230

Absolute Trigger

See ___ on page X

Relative Trigger

See ___ on page X

Trig Slope

See ___ on page X

Trig Delay

See ___ on page X

User Preset

Accesses a menu that gives you the following three choices:

- **User Preset** – recalls a state previously saved using the Save User Preset function.
- **User Preset All Modes** – presets all of the modes in the analyzer
- **Save User Preset**– saves the current state for the current mode

Key Path	Front-panel key
Backwards Compatibility Notes	User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data. In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users. On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode. User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.
Initial S/W Revision	Prior to A.02.00

User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, `SYST:PRE:USER:SAV`. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER
Example	:SYST:PRES:USER:SAVE:SYST:PRES:USER
Notes	:SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed
Couplings	A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.
Initial S/W Revision	Prior to A.02.00

User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

NOTE

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER:ALL
Example	:SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL
Notes	Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state.
Couplings	A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.

Initial S/W Revision	Prior to A.02.00

Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER:SAVE
Example	:SYST:PRES:USER:SAVE
Notes	:SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM: STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file.
Initial S/W Revision	Prior to A.02.00

View/Display

The View/Display key opens up the View menu for the current measurement. The views that are available are specific to the current measurement selected under the **Meas** key. Many of the lower-level menu keys are also the same across all measurements. Unique functions are described below.

This measurement has one view, which consists of two windows.

- "RF Envelope view for TX Power Measurement(Above Threshold)" on page 440
- "RF Envelope view with Bar Graph for TX Power Measurement (Measured Burst Width)" on page 441
- "RF Envelope view with Bar Graph for TX Power Measurement (Single TimeSlot)" on page 442

RF Envelope view for TX Power Measurement(Above Threshold)

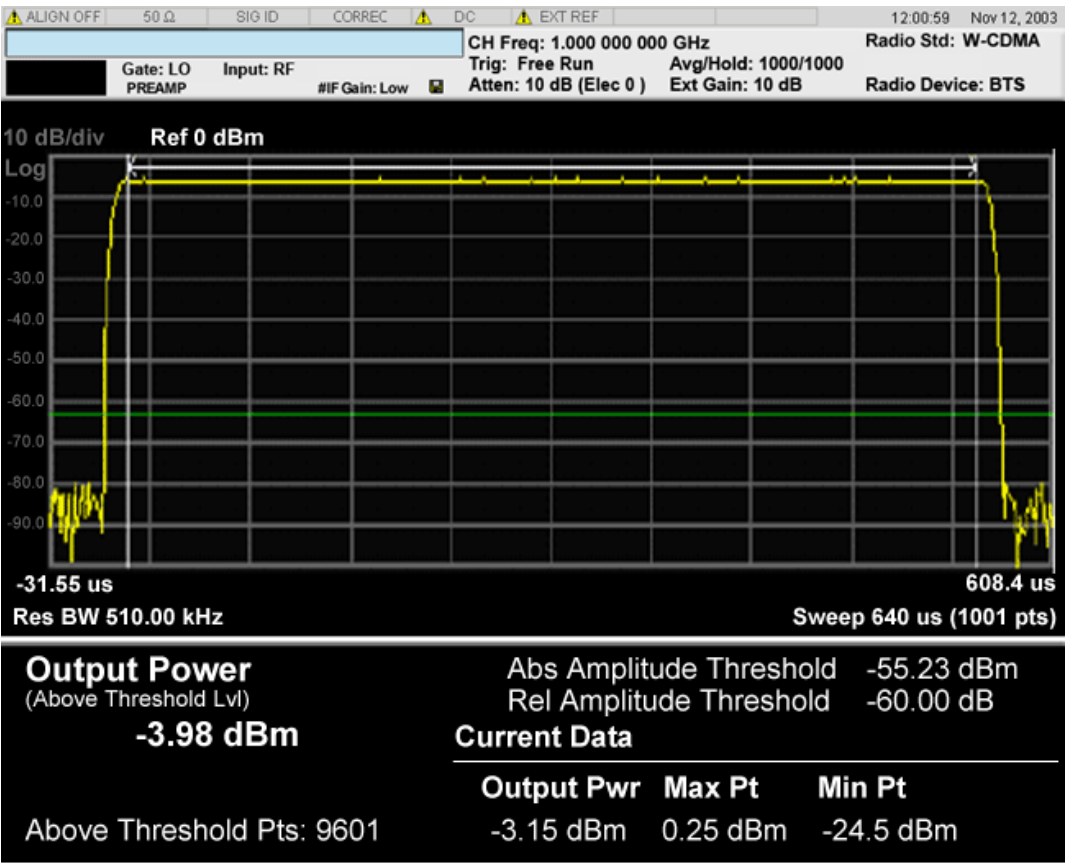


Figure 0-1 RF Envelope view for TX Power Measurement(Above Threshold)

RF Envelope view with Bar Graph for TX Power Measurement (Measured Burst Width)

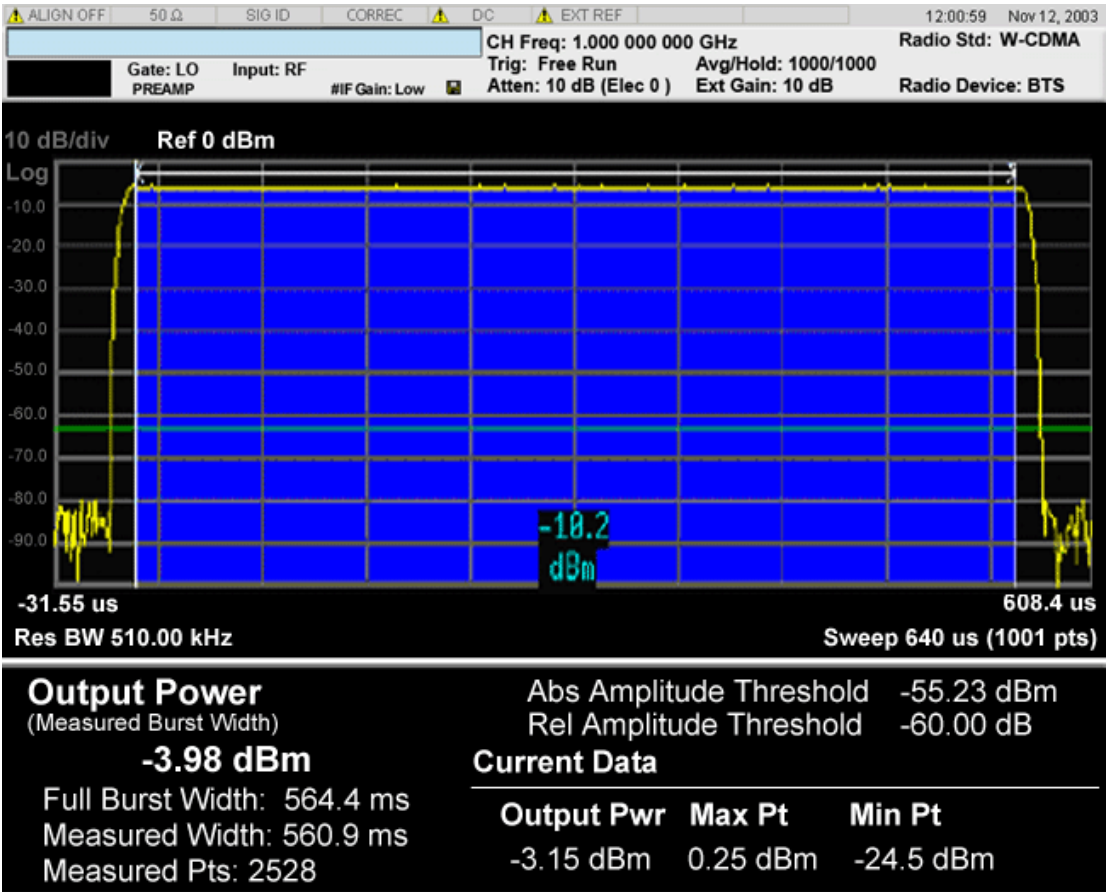


Figure 0-2 RF Envelope view with Bar Graph for TX Power Measurement (Measured Burst Width)

RF Envelope view with Bar Graph for TX Power Measurement (Single TimeSlot)

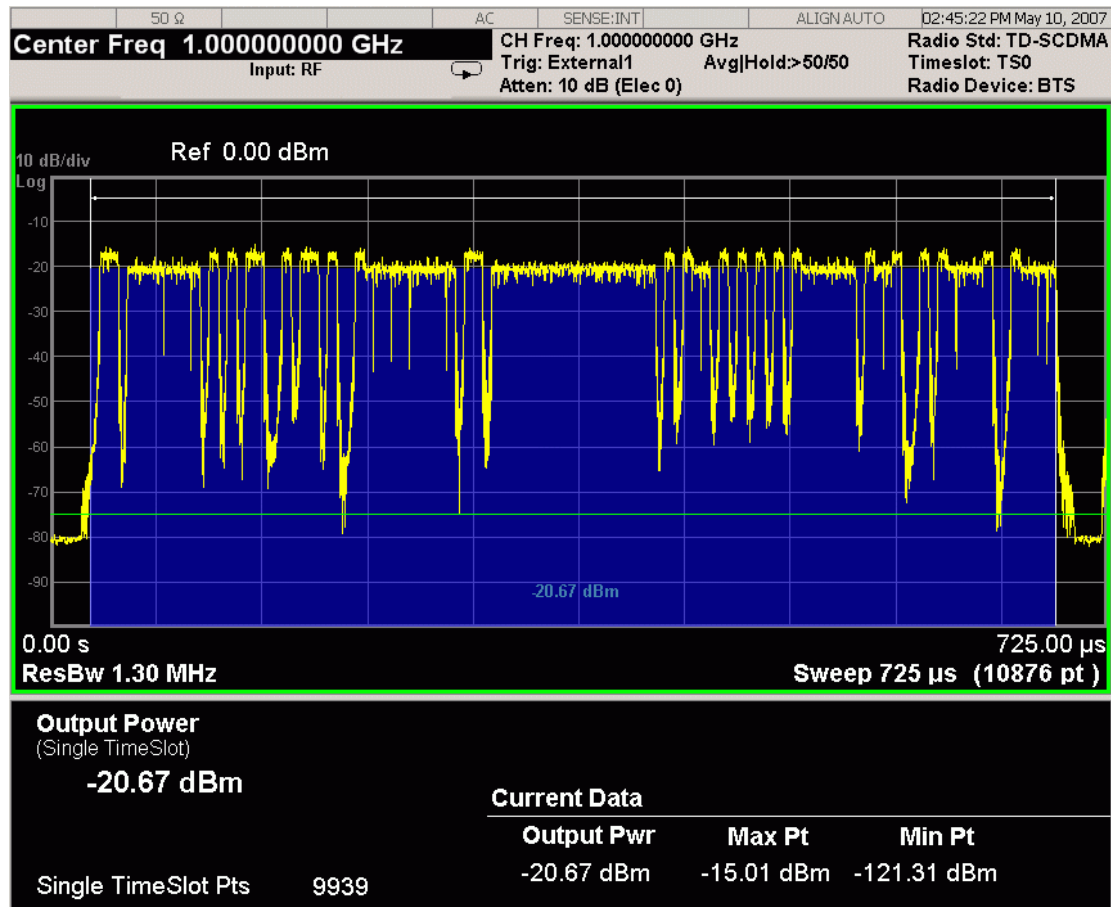


Figure 0-3 RF Envelope view with Bar Graph for TX Power Measurement (Single TimeSlot)

The bar graph represents the measured portion of the trace. It is the blue bar in the second figure. Its state (On/Off) is controlled by the **Bar Graph** key under the View/Display key.

RF Envelope window

Marker Operation	Yes
Corresponding Trace	Corrected measured trace (n=2,3,4)

Metrics window

Name	Corresponding Results	Display Format
Mean Transmit Power	n=1 3rd	99.99 dBm
Above Threshold or Measured Burst Width	Power Value above the threshold or measured burst width for N averages, if averaging is on. An average consists of N acquisitions of data which represents the current trace. If averaging is off, the value of power averaged is the same as the Mean Transmit Power of Current Data.	

Name	Corresponding Results	Display Format
Full Burst Width	n=1 9th Burst width that is determined by the Threshold Lvl.	999.9 us
Measured Width	n=1 10th Time length that is used to calculate Mean Transmit Power when Meas Method is Measured Burst Width. If Meas Method is set to Above Threshold, disappear from the window.	999.9 us
Above Thresh Pts	n=1 6th Number of points that were above the threshold level and were used for the power calculation when Meas Method is Above Threshold Level.	9999
Thresh Pts	N=1 6th Number of points that were used for the power calculation when Meas Method is Measured Burst Width.	9999
Abs Amplitude Threshold	n=1 5th Threshold value is the threshold (in dBm) above which the power is calculated.	99.99 dBm
Rel Amplitude Threshold	Threshold (in dB) relative to the peak carrier level above which the power is calculated	99.99 dB
Mean Transmit power (Current data)	n=1 2nd Power value above the threshold or measured burst width. If averaging is on, the power is for the latest acquisition.	99.99 dBm
Max Pt	n=1 7th Maximum peak level of the most recently acquired trace data.	99.99 dBm
Min Pt	n=1 8th Minimum peak level of the most recently acquired trace data.	99.99 dBm

Key Path	Front-panel key
Mode	SA, EDGE GSM, TDSCDMA
Initial S/W Revision	Prior to A.02.00

Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the **System Display Settings** key apply to all measurements in all modes.

Key Path	Display
Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

Bar Graph

Enables you to select visible/invisible Bar Graph.

Key Path	View/Display
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:BARGraph[:STATe] ON OFF 1 0 :DISPlay:TXPower:BARGraph[:STATe]?
Example	DISP:TXP:BARG ON DISP:TXP:BARG?
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

9 EDGE EVM Measurement

EVM (Error Vector Magnitude) is the measure of modulation quality for EDGE. Since EDGE uses $3\pi/8$ PSK modulation, the transmitter's phase, frequency, and amplitude accuracy are critical to the communications system's performance. EVM also ultimately affects range.

For more details, see ["EDGE EVM Measurement Description" on page 453](#).

This topic contains the following sections:

["Measurement Commands for EDGE EVM" on page 446](#)

["Remote Command Results for EDGE EVM" on page 447](#)

Measurement Commands for EDGE EVM

The following commands and queries can be used to retrieve the measurement results:

```
:CONFigure:EEVM  
:CONFigure:EEVM:NDEfault  
:INITiate:EEVM  
:FETCh:EEVM[n]?  
:READ:EEVM[n]?  
:MEASure:EEVM[n]?
```

For more measurement related commands, see the section ["Remote Measurement Functions" on page 1430](#).

Remote Command Results for EDGE EVM

For the queries listed above, the results returned depend on the value of n, as follows.

n	Results Returned
0	Returns unprocessed I/Q trace data, as a data array of comma-separated trace points, in volts. The sample rate is 637.5 kHz when Option DP2, B40 or wider IF Bandwidth option is installed. Otherwise the sample rate is 2.5 MHz.
1 (default)	Returns the following scalar results: 1. RMS 95th %ile EVM – a floating point number (in percent) of EVM over 95% of the entire measurement area. 2. Average RMS EVM – a floating point number (in percent) of EVM over the entire measurement area. 3. Maximum RMS EVM – a floating point number (in percent) of highest EVM over the entire measurement area. 4. Average Peak EVM – a floating point number (in percent) of the average of the peak EVMs. Take the peak EVMs from each burst and average them together. 5. Maximum Peak EVM – a floating point number (in percent) of the maximum peak EVM. Take the peak EVMs from each burst and identify the highest peak. 6. Symbol position of the peak EVM – an integer number of the symbol position where the peak EVM error is detected. 7. Average Magnitude error – a floating point number (in percent) of average magnitude error over the entire measurement area. 8. Maximum Magnitude error – a floating point number (in percent) of maximum magnitude error over the entire measurement area. 9. Average Phase error – a floating point number (in degree) of average phase error over the entire measurement area. 10. Maximum Phase error – a floating point number (in degree) of maximum phase error over the entire measurement area. 11. Average Frequency error – a floating point number (in Hz) of the frequency error in the measured signal. 12. Maximum Frequency error – a floating point number (in Hz) of the highest frequency error in the measured signal. 13. Average I/Q origin offset – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. 14. Amplitude Droop Error – a floating point number (in dB) of the amplitude droop measured across the 142 symbol burst. 15. Trigger to T0 – a floating-point number (in sec) of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot.
2	Returns a series of floating point numbers (in percent) that represent each sample in the EVM vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol.
3	Returns a series of floating point numbers (in percent) that represent each sample in the

n	Results Returned
	magnitude error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol.
4	Returns a series of floating point numbers (in degree) that represent each sample in the phase error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol.
5	Returns a series of floating point numbers that alternately represent I and Q pairs of the final corrected measured data for the last slot. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. As in the EVM, there is 1 point per symbol, so the series of numbers is: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point ... (2) + 1 (or 3rd) number = I of the symbol 1 decision point (2) + 2 (or 4th) number = Q of the symbol 1 decision point ... (2) x N + 1 number = I of the symbol N decision point (2) x N + 2 number = Q of the symbol N decision point
6	Returns comma-separated scalar values of pass/fail (0.0 = passed, 1.0 = failed) results determined by testing EVM. 1. Test results of RMS EVM 2. Test results of Peak EVM 3. Test results of 95%ile EVM 4. Test results of I/Q Origin Offset 5. Test results of Frequency Error
7	Returns a series of integer values that represent the demoded symbols of the final corrected measured data for the last slot. bit/symbol is represented as a value between 0 – 7 (octal) : 8PSK 142 symbols 0 – 3 (octal) : QPSK 169 symbols 0 – 15 (decimal) : 16QAM 169 symbols 0 – 31 (decimal) : 32QAM 169 symbols When AQPSK, it returns a series of floating point numbers that alternately represent demod bits of VAMOS subchannel pairs measured for the last slot. The first number is the VAMOS subchannel A bit and the second is the subchannel B bit of symbol 0. The series of numbers is: 1st number = Subchannel A symbol 0 bit 2nd number = Subchannel B symbol 0 bit 3rd number = Subchannel A symbol 1 bit 4th number = Subchannel B symbol 1 bit ... 2 x 141 + 1 = Subchannel A symbol 141 bit

n	Results Returned
	2 x 141+2 = Subchannel B symbol 141 bit
8	Returns the following scalar results: 1. RMS 95th %ile EVM – a floating point number (in percent) of EVM over 95% of the entire measurement area. 2. Average RMS EVM – a floating point number (in percent) of EVM over the entire measurement area. 3. Maximum RMS EVM – a floating point number (in percent) of highest EVM over the entire measurement area. 4. Average Peak EVM – a floating point number (in percent) of the average of the peak EVMs. Take the peak EVMs from each burst and average them together. 5. Maximum Peak EVM – a floating point number (in percent) of the maximum peak EVM. Take the peak EVMs from each burst and identify the highest peak. 6. Symbol position of the peak EVM – an integer number of the symbol position where the peak EVM error is detected. 7. Average RMS Magnitude error – a floating point number (in percent) of average RMS magnitude error over the entire measurement area. 8. Maximum RMS Magnitude error – a floating point number (in percent) of maximum RMS magnitude error over the entire measurement area. 9. Average RMS Phase error – a floating point number (in degree) of average RMS phase error over the entire measurement area. 10. Maximum RMS Phase error – a floating point number (in degree) of maximum RMS phase error over the entire measurement area. 11. Average Frequency error – a floating point number (in Hz) of the frequency error in the measured signal. 12. Maximum Frequency error – a floating point number (in Hz) of the highest frequency error in the measured signal. 13. Averagel/Q origin offset – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. 14. Amplitude Droop Error – a floating point number (in dB) of the amplitude droop measured across the 142 symbol burst. 15. Trigger to T0 – a floating-point number (in sec) of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot. 16. Timing Offset of AM/PM path – a floating number (in sec) of the averaged time interval between Amplitude Modulation path and Phase Modulation path. When GMSK is measured, this timing offset value is 0, which will be included in the average calculation. 17. Detected TSC is the most recently detected TSC. The returned value is 0~7 (Burst Type : Normal), 10 (Burst Type : Sync), 20 (Burst Type :Access) if TSC detected. If TSC not detected, the returned value is -999.0. If Amptd or NONE (Power vs Time only) specified in Sync Type, the returned value is -999.0. In multi slot condition, the returned value is the detected TSC of the specified slot (Time Slot ON) or the first evaluated slot (Time Slot OFF). The returned value in AQPSK is more than or equal to 100100. Its first three digits

n	Results Returned
	represent TSC of VAMOS subchannel A. The second three digits represent VAMOS subchannel B. TSCs of TSC set 1 and TSC set 2 correspond to 100 to 107 and 200 to 207 respectively. Thus the returned value is $([\text{TSC num of VAMOS subchannel A}] * 1000 + [\text{TSC num of VAMOS subchannel B}])$. For example, if measured AQPSK signal has TSC 3 of set1 on VAMOS subchannel A and TSC 5 of TSC set2 on VAMOS B, returned value is 103205. The returned value is 200 ~ 207, $([\text{TSC num}] + 200)$, if one of Set2 TSCs is detected. 18. Detected Mod Scheme (0:GMSK, 1:NB 8PSK, 2:NB 16QAM, 3:NB 32QAM, 10:NB AQPSK, 11:HB QPSK, 12:HB 16QAM, 13:HB 32QAM) Note that values except for GMSK and 8PSK return only when N/W9071A-3FP is installed. 19. Maximum I/Q origin offset – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. If averaging is ON, this is the max hold number of the individual IQ Offset 20. Average Absolute Peak Phase error – a floating point number (in percent) of the average of the absolute peak phase errors. Take the peak phase error from each burst and average them together. 21. Maximum Absolute Peak Phase error – a floating point number (in percent) of the maximum absolute peak phase error. Take the peak phase errors from each burst and identify the highest peak. 22. Reserved for future use (floating point) – the value returned is -999.0.
9	Returns series of floating point numbers that alternately represent I and Q pairs of the final corrected derotated measured data for the last slot. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. As in the EVM, there is 1 point per symbol, so the series of numbers is: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point... (2) +1 (or 3rd) number = I of the symbol 1 decision point (2) +2 (or 4th) number = Q of the symbol 1 decision point... (2) * N + 1 number = I of the symbol N decision point (2) * N + 2 number = Q of the symbol N decision point
10	Returns series of floating point numbers (in percent) that represent each sample in Max Hold of the EVM vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Max Hold Trace State is ON.
11	Returns series of floating point numbers (in percent) that represent each sample in Min Hold of the EVM vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Min Hold Trace State is ON.
12	Returns series of floating point numbers (in percent) that represent each sample in Max Hold of the magnitude error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Max Hold Trace State is ON.
13	Returns series of floating point numbers (in percent) that represent each sample in Min

n	Results Returned
	Hold of the magnitude error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Min Hold Trace State is ON.
14	Returns series of floating point numbers (in degree) that represent each sample in Max Hold of the phase error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Max Hold Trace State is ON.
15	Returns series of floating point numbers (in degree) that represent each sample in Min Hold of the phase error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Min Hold Trace State is ON.
16	Returns series of integer values that represent the demoded symbols of VAMOS subchannel A of the final corrected measured data for the last slot.
17	Returns series of integer values that represent the demoded symbols of VAMOS subchannel B of the final corrected measured data for the last slot.
18	Reserved for future use
19	Reserved for future use
20	Returns series of integer values that represent the demoded payload symbols of VAMOS subchannel A of the final corrected measured data for the last slot.
21	Returns series of integer values that represent the demoded payload symbols of VAMOS subchannel B of the final corrected measured data for the last slot.
22	Reserved for future use
23	Reserved for future use
24	Returns the following scalar results: 1. Detected TSC on VAMOS subchannel A is the most recently detected TSC on VAMOS subchannel A. The returned value is 0~7 if TSC of AQPSK burst detected. If not detected, the returned value is -999.0. If Amptd or NONE (Power vs Time only) is specified in Sync Type, the returned value is -999.0. In multi slot condition, the returned value is the detected TSC of the specified slot (Time Slot ON) or the first evaluated slot (Time Slot OFF). 2. Detected TSC on VAMOS subchannel B is the most recently detected TSC on VAMOS subchannel B. The returned value is 0~7 if TSC of TSC set 1 detected and 200 ~ 207 if TSC of TSC set 2 detected. If not detected, the returned value is -999.0. If Amptd or NONE (Power vs Time only) is specified in Sync Type, the returned value is -999.0. In multi slot condition, the returned value is the detected TSC of the specified slot (Time Slot ON) or the first evaluated slot (Time Slot OFF).
25	Returns comma-separated scalar values of pass/fail (0.0 = passed, 1.0 = failed) results determined by testing EVM. 1. Test results of RMS EVM 2. Test results of Peak EVM 3. Test results of 95%ile EVM 4. Test results of I/Q Origin Offset 5. Test results of Frequency Error

n	Results Returned
	6. Test results of RMS Phase Error 7. Test results of Peak Phase Error The tests for RMS and Peak Phase Errors are done only when mod scheme of last measured slot is GMSK. When not GMSK, pass value is returned.

EDGE EVM Measurement Description

EDGE receivers rely on the quality of the $3\pi/8$ PSK modulation signal to achieve the expected carrier to noise ratio. A transmitter with high EVM will often still be able to support phone calls during a functional test. However, it will tend to provide difficulty for mobiles trying to maintain service at the edge of the cell with low signal levels or under difficult fading and Doppler conditions.

Key Path	Meas
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Range

Accesses the Range menu to change baseband I/Q gain settings. This key has a readback text that describes gain range value.

This is only available when the selected input is IQ. For more details, see [Range@29880](#).

Key Path	AMPTD/Y Scale
Initial S/W Revision	Prior to A.02.00

Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

Key Path	Range
Mode	BASIC
Remote Command	<code>[:SENSe] :POWeR [:RF] :RANGe <real></code> <code>[:SENSe] :POWeR [:RF] :RANGe?</code>
Example	<code>:POW:RANG 10.0</code> <code>:POW:RANG?</code>
Notes	The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.)
Preset	0
State Saved	Saved in instrument state.
Min	-100
Max	100
Initial S/W Revision	A.12.50

Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

Key Path	AMPTD Y Scale, Attenuation
Remote Command	<code>[:SENSe]:POWer[:RF]:RANGe:OPTimize IMMEDIATE</code>
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

Key Path	AMPTD Y Scale, Attenuation
Remote Command	<code>[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation OFF ON ELECtrical COMBined</code> <code>[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation?</code>
Notes	This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELECtrical and COMBined still can be used. Then, upon receiving ELECtrical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned.
Preset	OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

Key Path	AMPTD Y Scale, Range
Remote Command	<code>[:SENSe]:POWer[:RF]:RANGe:PARatio <real></code>

	<code>[:SENSe] :POWeR [:RF] :RANGe :PARatio ?</code>
Example	POW:RANG:PAR 12 dB
Notes	In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out. Attempting to change the value via SCPI will be ignored and no error message will be generated.
Preset	10 dB
State Saved	Saved in instrument state
Min	0 dB
Max	20 dB
Initial S/W Revision	A.13.00

Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

Key Path	AMPTD Y Scale, Range
Remote Command	<code>[:SENSe] :POWeR [:RF] :RANGe :MIXer :OFFSet <real></code> <code>[:SENSe] :POWeR [:RF] :RANGe :MIXer :OFFSet ?</code>
Example	POW:RANG:MIX:OFFS -5 dB
Preset	0 dB
State Saved	Saved in instrument state
Min	-35 dB
Max	30 dB
Initial S/W Revision	A.13.00

Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple keyactions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See "More Information" on page 457

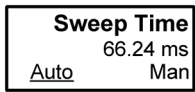
Key Path	Front-panel key
Remote Command	:COUPle ALL NONE
Example	:COUP ALL
Notes	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements.
Initial S/W Revision	Prior to A.02.00

More Information

There are two types of functions that have Auto/Manual modes.

Auto/Man Active Function keys

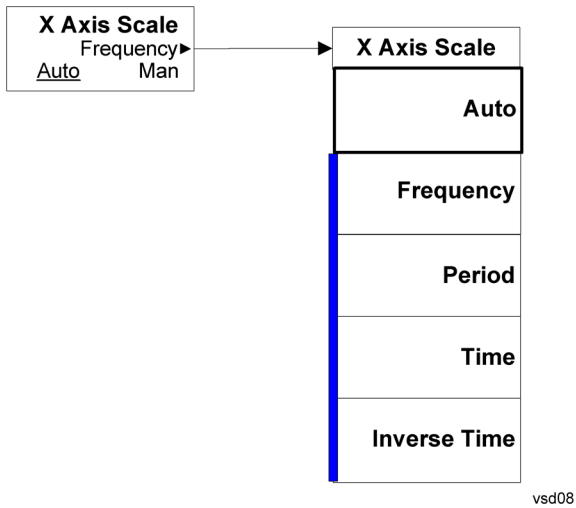
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between **Auto** (where the parameter is automatically coupled to the other parameters it is dependent upon) and **Man** (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either **Auto** or **Man** underlined as illustrated below.



vsd07

Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.



BW

There is no functionality for this front-panel key in this measurement. Pressing this key displays a blank key menu.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing **Cont** does a Resume.

Key Path	Front-panel key
Remote Command	:INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous?
Example	:INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation
Preset	ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF)
State Saved	Saved in instrument state
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold . The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON) switches to continuous measurement, but never restarts a measurement and never resets a sweep.
Initial S/W Revision	Prior to A.02.00

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of **Trace Average**, **Max Hold**, or **Min Hold**.

In Other Measurements/Modes:

With **Avg/Hold Num** (in the **Meas Setup** menu) set to **Off** or set to **On** with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with **Avg/Hold Num** set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the **Cont** key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until $k = N$, at which point the current sequence will stop and the instrument will go to the idle state.

File

See "File" on page 156

FREQ/Channel

Accesses a menu of keys that allows you to control the Frequency parameters of the instrument.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

ARFCN

Sets the analyzer to a frequency that corresponds to the ARFCN (Absolute RF Channel Number). Used to enter the channel to be measured for the selected band. If the Center Freq value entered does not exactly correlate with an ARFCN, the softkey label changes to display the closest ARFCN to the selected frequency, along with a > or < symbol indicating whether the frequency is above or below that ARFCN.

Key Path	FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:ARFCn RFChannel <integer> [:SENSe]:CHANnel:ARFCn RFChannel?
Example	CHAN:ARFC 3 CHAN:ARFC?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	Coupled with Center Frequency . Setting ARFCN sets Center Freq to the value corresponding to that ARFCN. BMT Freq choice changes this parameter.
Preset	1
State Saved	Saved in instrument state.
Range	Different for each BAND as follows: E-GSM: 0 to 124, and 975 to 1023 P-GSM: 1 to 124 R-GSM: 0 to 124(MS), and 955 to 1023(BTS) DCS1800: 512 to 885 PCS1900: 512 to 810 GSM450: 259 to 293 GSM480: 306 to 340 GSM700: 438 to 516 GSM850: 128 to 251 T-GSM 810: 350 to 425

Min	Different for each BAND as follows: E-GSM: 0(MS), and 975(BTS) P-GSM: 1 R-GSM: 0(MS), and 955(BTS) DCS1800: 512 PCS1900: 512 GSM450: 259 GSM480: 306 GSM700: 438 GSM850: 128 T-GSM 810: 350
Max	Different for each BAND as follows: E-GSM: 124(MS), and 1023(BTS) P-GSM: 124 R-GSM: 124(MS), and 1023(BTS) DCS1800: 885 PCS1900: 810 GSM450: 293 GSM480: 340 GSM700: 516 GSM850: 251 T-GSM 810: 425
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.07.00

Center Freq

Sets the center frequency to be measured for the selected band. It is coupled with ARFCN – setting Center Freq sets ARFCN to the channel corresponding to that frequency.

For more information, see the section ["Center Freq" on page 1399](#).

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

Time Slot

This functionality is the same as that of the corresponding key in the Demod menu. See ["Time Slot" on page 1418](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

Burst Type

This functionality is the same as that of the corresponding key in the Demod menu. See ["Burst Type" on page 1419](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

TSC (Std)

This functionality is the same as that of the corresponding key in the Demod menu. See ["TSC \(Std\)" on page 1420](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is **Center Freq**.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a **Global Settings** key in its **Mode Setup** menu.

The **Center Freq** function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 468](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 470](#)

See ["Center Frequency Presets" on page 467](#)

Key Path	FREQ Channel
Scope	Meas Global
Remote Command	[:SENSe] :FREQuency:CENTer <freq> [:SENSe] :FREQuency:CENTer?
Example	FREQ:CENT 50 MHz FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT?
Notes	This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated.
Dependencies	The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit.
Couplings	When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range
Preset	Depends on instrument maximum frequency, mode, measurement, and selected input. See "Center Frequency Presets" on page 467 and "RF Center Freq" on page 468 and Ext Mix Center Freq and "I/Q Center Freq" on page 470 .
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 467 and "RF Center Freq" on page 468 and "I/Q Center Freq" on page 470 .
Max	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 467 and "RF Center Freq" on page 468 and "I/Q Center Freq" on page 470 .
Default Unit	Hz
Status Bits/OPC Dependencies	Non-overlapped
Initial S/W Revision	Prior to A.02.00

Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

Freq Option	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
503 (all but N9000A)	1.805 GHz	3.6 GHz	3.7 GHz
503 (N9000A)	1.505 GHz	3.0 GHz	3.08 GHz
507 (all but N9000A)	3.505 GHz	7.0 GHz	7.1 GHz
507 (N9000A)	3.755 GHz	7.5 GHz	7.58 GHz
508 (all but N9038A)	1.805 GHz	3.6 GHz	8.5 GHz
508 (N9038A)	4.205 GHz	8.4 GHz	8.5 GHz
513	6.805 GHz	13.6 GHz	13.8 GHz
526 (all but N9000A and N9038A)	13.255 GHz	26.5 GHz	27.0 GHz
526 (N9000A)	13.255 GHz	26.5 GHz	26.55 GHz
526 (N9038A)	1.805 GHz	3.6 GHz	27.0 GHz
532	16.005 GHz	32.0 GHz	32.5 GHz
543	21.505 GHz	43.0 GHz	TBD
544	22.005 GHz	44.0 GHz	44.5 GHz
550	25.005 GHz	50.0 GHz	51 GHz

Input 2:

Model	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
N9000A opt C75	0.7505GHz	1.5 GHz	1.58 GHz
N9038A	505 MHz	1 GHz	1.000025 GHz

Tracking Generator Frequency Limits (N9000A only):

Tracking Generator Option	Min Freq (clips to this freq when turn TG on and can't tune below while TG on)	If above this Freq, Stop Freq clipped to this Freq when TG turned on	Max Freq (can't tune above) while TG on
T03	9 kHz	3.0 GHz	3.08 GHz
T06	9 kHz	6.0 GHz	6.05 GHz

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

Mode	CF Preset for RF
WCDMA	1 GHz
WIMAXOFDMA,	1 GHz
BASIC	1 GHz
ADEMOD	1 GHz
VSA	1 GHz
TDSCDMA	1 GHz
PNOISE	1 GHz
LTE	1 GHz
LTETDD	1 GHz
MSR	1 GHz
GSM	935.2 MHz
NFIGURE	1.505 GHz

RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	<code>[:SENSe] :FREQuency:RF:CENTer <freq></code> <code>[:SENSe] :FREQuency:RF:CENTer?</code>
Example	FREQ:RF:CENT 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Dependencies	If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop

	Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep.
Preset	See table above
State Saved	Saved in instrument state.
Min	-79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source
Max	See table above. Basically instrument maximum frequency - 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	<code>[:SENSe] :FREQuency:EMIXer:CENTer <freq></code> <code>[:SENSe] :FREQuency:EMIXer:CENTer?</code>
Example	<code>:FREQ:EMIX:CEN 60 GHz</code> <code>:FREQ:EMIX:CEN?</code>
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Couplings	When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup.
Preset	When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies.

	If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table (Span=Stop Freq – Start Freq), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table. When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is 33.25 GHz. Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz.
State Saved	Saved in instrument state.
Min	The minimum frequency in the currently selected mixer band + 5 Hz
Max	The maximum frequency in the currently selected mixer band – 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	A.08.01

I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	<pre>[:SENSe] :FREQuency:IQ:CENTer <freq></pre> <pre>[:SENSe] :FREQuency:IQ:CENTer?</pre>
Example	FREQ:IQ:CEN: 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Preset	0 Hz
State Saved	Saved in instrument state.
Min	–40.049995 MHz
Max	40.049995 MHz
Initial S/W Revision	Prior to A.02.00

BMT Freq

Enables quick selection from a subset of the available ARFCN numbers for the Top, Middle, or Bottom frequency in the selected band.

Key Path	FREQ Channel

Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	BMT choice changes ARFCN and Center Freq. Chosen ARFCN will be displayed on each menu key.
Range	Top Middle Bottom
Initial S/W Revision	Prior to A.02.00

BMT Freq Top

Sets the analyzer to the frequency of the highest ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel:ARFCn RFCHannel:TOP
Example	CHAN:ARFC:TOP
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 124 P-GSM: 124 R-GSM: 124 DCS 1800: 885 PCS 1900: 810 GSM 450: 293 GSM 480: 340 GSM 700: 516 GSM 850: 251 T-GSM 810: 425 Change BMT ARFCN to BMT FreqTOP. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 959.800 MHz P-GSM: 959.800 MHz R-GSM: 959.800 MHz

	DCS 1800: 1879.80 MHz
	PCS 1900: 1989.80 MHz
	GSM 450: 467.400 MHz
	GSM 480: 495.800 MHz
	GSM 700: 792.800 MHz
	GSM 850: 893.800 MHz
	T-GSM810: 866.000 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

BMT Freq Middle

Sets the analyzer to the frequency of the middle ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :ARFCn RFCHannel :MIDDLE
Example	CHAN:ARFC:MIDD
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 38 P-GSM: 63 R-GSM: 28 DSC 1800: 699 PCS 1900: 661 GSM 450: 276 GSM 480: 323 GSM 700: 477 GSM 850: 190 T-GSM 810: 388 Change BMT ARFCN to BMT FreqMIDDLE. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 942.600 MHz P-GSM: 947.600 MHz R-GSM: 940.600 MHz

	DCS 1800: 1842.60 MHz PCS 1900: 1960.00 MHz GSM 450: 464.000 MHz GSM 480: 492.400 MHz GSM 700: 755.000 MHz GSM 850: 881.600 MHz T-GSM 810: 858.600 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

BMT Freq Bottom

Sets the analyzer to the frequency of the lowest ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel:ARFCn RFChannel:BOTTom
Example	CHAN:ARFC:BOTT
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFChannel as follows: E-GSM: 975 P-GSM: 1 R-GSM: 955 DCS 1800: 512 PCS 1900: 512 GSM 450: 259 GSM 480: 306 GSM 700: 438 GSM 850: 128 T-GSM 810: 350 Change BMT ARFCN to BMT FreqBOTTOM. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 925.200 MHz P-GSM: 935.200 MHz R-GSM: 921.200 MHz

	DCS 1800: 1805.20 MHz PCS 1900: 1930.20 MHz GSM 450: 460.600 MHz GSM 480: 489.000 MHz GSM 700: 747.2 MHz GSM 850: 869.200 MHz T-GSM 810: 851.000 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

Carrier Setup

Allows you to set carrier parameters.

Key Path	FREQ Channel
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.14.00

BTS Class

Selects a BTS class.

BTS Class	Definition
MC	Multicarrier BTS is defined as a class of BTS, characterized by the ability to, in addition to single carrier operation, process two or more carriers in common active RF components simultaneously, either in multicarrier transmitter only or, in both multicarrier transmitter and multicarrier receiver.
SC	Single carrier BTS is defined as a class of BTS, characterized by the ability to process one carrier in single carrier BTSs, not belonging to a Multicarrier BTS class.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Remote Command	[:SENSe]:CHANnel:CARRier:BASE:CLASs:AUTO ON OFF 1 0 [:SENSe]:CHANnel:CARRier:BASE:CLASs:AUTO?
Example	CHAN:CARR:BASE:CLAS:AUTO 1 CHAN:CARR:BASE:CLAS:AUTO?
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is

	sent, an undefined header error or illegal parameter error is returned.
Couplings	ON automatically changes to OFF when Multicarrier Class (MC) or Single carrier Class (SC) is selected as BTS Class.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.14.00

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
Remote Command	<code>[:SENSe]:CHANnel:CARRier:BASE:CLASs SC MC</code> <code>[:SENSe]:CHANnel:CARRier:BASE:CLASs?</code>
Example	CHAN:CARR:BASE:CLAS MC CHAN:CARR:BASE:CLAS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Selection C1 and C2 are supported for backwards compatibility. When "C1" or "C2" is passed as SCPI command parameter, the BTS Class Auto is set to ON. As a result, it's converted to "SC" if the number of carriers is one, and otherwise "MC."
Dependencies	This parameter is available when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Preset	SC
State Saved	Saved in instrument state.
Range	Single Carrier Multi Carrier
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.10.01, A14.00

Carriers

Defines the number of carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
Remote Command	<code>[:SENSe]:CHANnel:CARRier:COUNt <integer></code> <code>[:SENSe]:CHANnel:CARRier:COUNt?</code>

Example	CHAN:CARR:COUN 3 CHAN:CARR:COUN?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	This can change when the SCPI command of the Carrier Power Present or the Carrier Interval is sent.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	16
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.13.00

Reference Carrier

Defines the reference active carrier. The Reference Carrier frequency point is always aligned with the Measurement Global Center Frequency. The minimum value 1 specifies the lowest frequency carrier among the active carriers. The maximum value specifies the highest frequency carrier among the active carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :CARRier :RCARrier <integer> [:SENSe] :CHANnel :CARRier :RCARrier?
Example	CHAN:CARR:RCAR 3 CHAN:CARR:RCAR?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. If you set it to more than the number of carriers, it's clipped to the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	When you decrease the number of carriers to a value which is less than this value, this is clipped to the value.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

Configure Carriers

Opens a menu of keys that allows you to configure carriers.

Key Path	FREQ Channel, Multi Carrier Setup
Dependencies	This key is grayed out when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00

Select Carrier

Selects a carrier to configure.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	No
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:CARRier:LIST:COUPle OFF ON 0 1, ... [:SENSe]:CHANnel:CARRier:LIST:COUPle?
Example	CHAN:CARR:LIST:COUP OFF CHAN:CARR:LIST:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	When Couple is selected, the carrier settings are coupled to carrier #1. Coupled parameters are

	Carrier Power Present, Carrier Interval. When a setting is changed, the couple is set to Man automatically. Carrier #1 is always set to couple and cannot be changed. Couple/Man selection on the Carrier key is not displayed when selected carrier number is #1.
Preset	ON
State Saved	No
Range	Couple Man
Initial S/W Revision	A.06.00

Carrier Power Present

Specifies whether each of carriers is active or not.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:CARRier:LIST:PPresent YES NO, ... [:SENSe]:CHANnel:CARRier:LIST:PPresent?
Example	CHAN:CARR:LIST:PPR YES CHAN:CARR:LIST:PPR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored.
Dependencies	This parameter is unavailable when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list.
Preset	YES
State Saved	Saved in instrument state.
Range	Yes No
Initial S/W Revision	A.06.00

Carrier Interval

Specifies the frequency interval between the Carrier #n and #n+1 center frequencies.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global

Remote Command	<code>[:SENSe]:CHANnel:CARRier:LIST:INTerval <freq>, ...</code> <code>[:SENSe]:CHANnel:CARRier:LIST:INTerval?</code>
Example	CHAN:CARR:LIST:INT 600k CHAN:CARR:LIST:INT?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. The softkey for the last carrier (say, #N) is grayed out.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list. Changing Carrier Interval might affect the Span.
Preset	600kHz
State Saved	Saved in instrument state.
Min	400 kHz
Max	100 MHz
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.07.00, A.08.00

Carrier Frequency Allocation

Specifies the carrier frequency allocation. There are two types of allocation, contiguous and non-contiguous. Non-Contiguous frequency allocation is defined as an allocation where two groups of frequencies are separated with at least [3.6] MHz carrier separation between the innermost carriers. In case of the non-contiguous frequency allocation, tests will be measured between the uppermost carrier A of the lower frequency group and the lowermost carrier B of the upper frequency group.

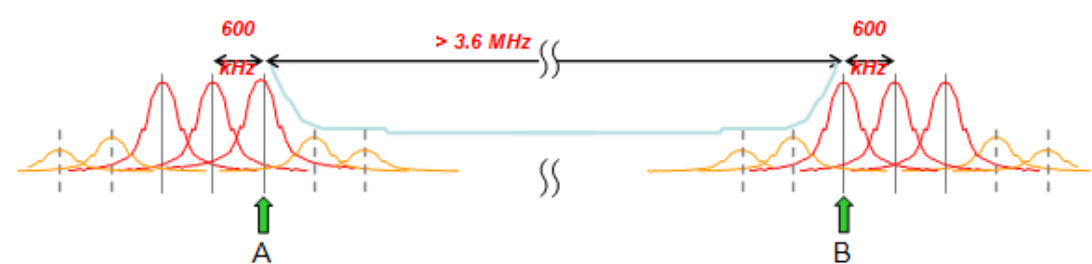
Error! Reference source not found.

See "An example of non-contiguous frequency allocation" on page 480

Key Path	FREQ Channel, Multi Carrier Setup
Mode	GSM
Scope	Meas Global
Remote Command	<code>[:SENSe]:CHANnel:CARRier:FALLocation</code> CONTiguous NCONTiguous <code>[:SENSe]:CHANnel:CARRier:FALLocation?</code>
Example	CHAN:CARR:FALL NCON CHAN:CARR:FALL?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This menu key is available only when the number of carriers is more than one.

	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	CONTiguous
State Saved	Saved in instrument state.
Range	Contiguous Non-Contiguous
Readback Text	CONTiguous NCONTiguous
Initial S/W Revision	A.07.00

An example of non-contiguous frequency allocation



Non-Contiguous

Opens a menu of keys that allows you to set non-contiguous frequency allocation parameters.

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Initial S/W Revision	A.07.00

Allocation Break Pt

Specifies an allocation break point that is a sequence (or index) number of the uppermost carrier in the lower frequency group.

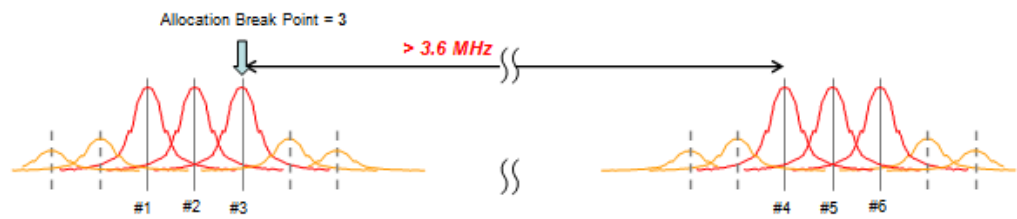
Error! Reference source not found.

See "An example of allocation break point" on page 482

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :CARRier :FALLocation :NCONtiguous :ABPoint <integer> [:SENSe] :CHANnel :CARRier :FALLocation :NCONtiguous :ABPoint?
Example	CHAN:CARR:FALL:NCON:ABP 3 CHAN:CARR:FALL:NCON:ABP?

Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers – 1
Initial S/W Revision	A.07.00
Modified at S/W Revision	A.13.00

An example of allocation break point



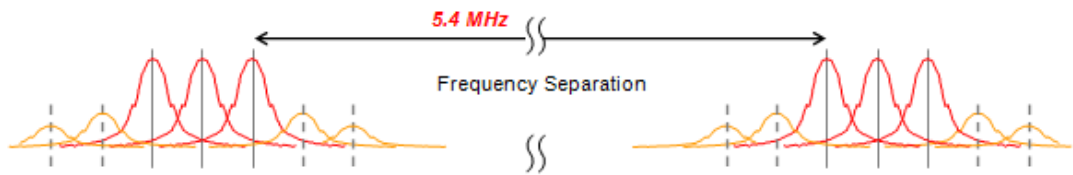
Freq Separation

Specifies frequency separation between the innermost of carriers.

See ["An example of frequency separation" on page 483](#)

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :CARRier :FALLocation :NCONtiguous :FSEParation <freq> [:SENSe] :CHANnel :CARRier :FALLocation :NCONtiguous :FSEParation?
Example	CHAN:CARR:FALL:NCON:FSEP 5.4M CHAN:CARR:FALL:NCON:FSEP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Changing Frequency Separation might affect the Span
Preset	5.4 MHz
State Saved	Saved in instrument state.
Min	3.6 MHz
Max	100 MHz
Initial S/W Revision	A.07.00

An example of frequency separation



Carrier BPF

Selects whether to use the carrier bandpass filter.

Key Path	FREQ Channel, Multi Carrier SetupMode Setup, Demod
Mode	GSM
Remote Command	[:SENSe]:RADio:CARRier:NUMBer:AUTO ON OFF 1 0 [:SENSe]:RADio:CARRier:NUMBer:AUTO?
Example	RAD:CARR:NUMB:AUTO 1 RAD:CARR:NUMB:AUTO?
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	ON automatically changes to OFF when Multiple or Single is selected as Carrier BPF Type.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.06.00

Carrier BPF Type

Opens a menu of keys that allows you to select the type of the bandpass filter. When carriers other than the signal of interest are present, especially if they are strong, they can interfere with the measurement, making it difficult to sync and producing artificially high EVM results. When this condition exists, toggle from Single to Multi. A band-limited filter will help reduce the measurement interference.

BPF Type	Description
MULTiple	Enable multi carrier tolerance filter.
SINGle	Disable multi carrier tolerance filter

This parameter applies only to the following measurements:

- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement
- GMSK Power vs. Time

- EDGE Power vs. Time

Key Path	FREQ Channel, Multi Carrier Setup, Carrier BPFMode Setup, Demod, Carrier BPF
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:RADio:CARRier:NUMBer SINGLE MULTiple [:SENSe]:RADio:CARRier:NUMBer?
Example	RAD:CARR:NUMB SING RAD:CARR:NUMB?
Notes	The Carrier Bandpass Filter key is in the Mode Setup menu, but only EDGE EVM and GSM PFER measurements support this feature. In other measurements, this setting is not applicable. You must be in the GSM mode to use this command. Use INSTrument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	SINGLE
State Saved	Saved in instrument state.
Range	Single Multi
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

Time Slot

Selects On or Off for slot searching. Generally, this feature is only valid in external and periodic timer trigger source modes that triggers every frame since another trigger source does not have the information that identifies the head of the frame. When Timeslot is set to On, the demodulation measurement is made on the nth timeslot specified by the trigger point + n timeslots, where n is the selected timeslot value 0 to 7.

This functionality is the same as Time Slot under the Freq/Channel menu.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:SLOT <integer> [:SENSe]:CHANnel:SLOT? [:SENSe]:CHANnel:SLOT:AUTO OFF ON 0 1 [:SENSe]:CHANnel:SLOT:AUTO?
Example	CHAN:SLOT 0 CHAN:SLOT? CHAN:SLOT:AUTO OFF CHAN:SLOT:AUTO?
Notes	This functionality does not affect Combined GSM/EDGE measurement.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.	
Preset	0	OFF
State Saved	Saved in instrument state.	
Min	0	
Max	7	
Initial S/W Revision	Prior to A.02.00	

Burst Type

Sets the burst type that the analyzer will search for and to which it will synchronize.

This functionality is the same as Burst Type under the FREQ Channel menu.

Key	SCPI	Description
Sync (SCH)	SYNC	Burst length = 142 symbols Extended training sequences for CTS and COMPACT synchronization bursts are not supported.
Access (RACH)	ACCess	Burst length = 88 symbols Alternative training (synchronization) sequence "TS1" and "TS2" are supported only in GSMK Power vs. Time.
Normal - NB (TCH & CCH)	NORMal	Burst length = 142 symbols Softkey label will be changed to 'Normal - NB' form 'Normal'
Higher Symbol Rate - HB (TCH & CCH)	HSRate	Burst length = 169 symbols This selection key is only shown when theN9071A-3FP license is installed.
Mixed (NB/HB for TSC sync)	MIXed	Enables auto detection between Normal (NB) and HSR (HB) TCH & CCH EDGE Burst. This selection key is only shown when theN9071A-3FP license is installed.

Measurement synchronization capability (Burst Sync = Training Seq)

	GMSK		8PSK		
					16QAM
					32QAM
					AQPSK
GMSK Phase & Freq Error measurement	Yes	Yes	Yes	No	N/A
GMSK Power vs. Time measurement	Yes	Yes	Yes	No	(measures as Normal GMSK when selected)

GMSK Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off)	No	No	Yes	No		
EDGE EVM measurement	No	No	No	Yes	Yes	Yes
EDGE Power vs. Time measurement	Yes	Yes	Yes	Yes	Yes	Yes
EDGE Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off.)	No	No	Yes	Yes	Yes	Yes

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :BURSt NORMal SYNC ACCess HSRate MIXed [:SENSe] :CHANnel :BURSt?
Example	CHAN:BURS NORM CHAN:BURS?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. Higher Symbol Rate and Mixed selections are only available when the N9071A-3FP license is installed. Otherwise these menu keys are blank. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Higher Symbol Rate and Mixed selection keys are not shown unless N9071A-3FP is installed. When unlicensed and SCPI is sent, an undefined header error is returned. When "Mixed" is selected, the Burst Sync menu key under the Meas Setup menu will be grayed out and Training Sequence (TSC) will be used for synchronization. The sync algorithm always runs in Training Sequence (TSC) synchronization because the Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync will become effective again when the Burst Type selection is changed from "Mixed" to another one.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Sync (SCH) Access (RACH) Normal - NB (TCH & CCH) Higher Symbol Rate - HB (TCH & CCH) Mixed (NB/HB for TSC sync)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

TSC (Std)

Allows you to select the Training Sequence Code that determines which burst is to be measured. Applicable only when Burst Sync is set to Training Sequence in the measurement. In the case of AQPSK, this parameter specifies TSC number of VAMOS sub-channel A. TSC of VAMOS sub-channel B is ignored.

This functionality is the same as TSC under the FREQ Channel menu.

This parameter applies only to the following measurements:

- GMSK/EDGE Power vs. Time measurement
- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement

Selection	SCPI	Description
AutoDet	ON 1	The measurement is made on the first burst found to have any one of the valid TSCs in the range of 0 to 7. The measurement may be made on various timeslots if more than one timeslot has one of the 8 valid TSCs.
Man	OFF 0	The measurement is made on the first burst found to have the selected TSC. TSC numbers in the range of 0 to 7 can be selected. The measurement may be made on various timeslots if more than one timeslot has this same TSC.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:TSCode <integer> [:SENSe]:CHANnel:TSCode? [:SENSe]:CHANnel:TSCode:AUTO OFF ON 0 1 [:SENSe]:CHANnel:TSCode:AUTO?
Example	CHAN:TSC 3 CHAN:TSC? CHAN:TSC:AUTO 1 CHAN:TSC:AUTO?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When Sync or Access is selected as Burst Type, this key is grayed out.
Preset	0 ON
State Saved	Saved in instrument state.
Min	0
Max	7
Initial S/W Revision	Prior to A.02.00

Input/Output

See ["Input/Output" on page 128](#)

Marker

Accesses the Marker menus.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Marker Type

Sets the marker control mode to **Normal**, **Delta** or **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Key Path	Marker
Mode	GSM
Remote Command	:CALCulate:EEVM:MARKer[1] 2 ...12:MODE POSition DELta OFF :CALCulate:EEVM:MARKer[1] 2 ...12:MODE?
Example	CALC:EEVM:MARK:MODE OFF CALC:EEVM:MARK:MODE?
Notes	When the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. Note that if the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal Delta Off
Initial S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

Mode	GSM
Remote Command	:CALCulate:EEVM:MARKer[1] 2 ...12:X <real> :CALCulate:EEVM:MARKer[1] 2 ...12:X?
Example	CALC:EEVM:MARK3:X 0 CALC:EEVM:MARK3:X?
Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error "Invalid suffix" is generated. The query returns the marker's absolute X Axis value if the control mode is Normal , or the offset from the marker's reference marker if the control mode is Delta . The query is returned in the fundamental units for the current marker X Axis scale: Hz for Frequency and Inverse Time , seconds for Period and Time . If the marker is Off the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Max value will be changed.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a Not A Number (NAN).
State Saved	No
Min	-9.9E37
Max	9.9E37
Initial S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	GSM
Remote Command	:CALCulate:EEVM:MARKer[1] 2 ...12:X:POStion <integer> :CALCulate:EEVM:MARKer[1] 2 ...12:X:POStion?
Example	CALC:EEVM:MARK10:X:POS 0 CALC:EEVM:MARK10:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is Normal , or the offset from the marker's reference marker in trace points if the control mode is Delta . If the marker is Off the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	After a preset, all markers are turned OFF, so a Marker X Axis Value query returns a Not A Number (NAN).

State Saved	No
Min	-9.9E37
Max	9.9E37
Initial S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command Only)

Returns the marker Y Axis value in the current marker Y Axis unit.

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer’s Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

- **Absolute result:** every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

- **Relative result:** if a marker’s control mode is Delta, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

Mode	GSM
Remote Command	:CALCulate:EEVM:MARKer[1] 2 ...12:Y?
Example	CALC:EEVM:MARK11:Y?
Notes	The query returns the marker Y-axis result. If the marker is Off the response is not a number. If ‘Polar’ is selected for Marker Trace, it returns the values of ‘I’ and ‘Q’ at the same time. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0
State Saved	No
Backwards Compatibility SCPI	:CALCulate:EEVM:MARKer[1] 2 ...4:FUNction:RESult?
Initial S/W Revision	Prior to A.02.00

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Relative To

Selects the marker the selected marker will be relative to (its reference marker).

Key Path	Marker, Properties
Mode	GSM
Remote Command	:CALCulate:EEVM:MARKer[1] 2 ...12:REFerence <integer> :CALCulate:EEVM:MARKer[1] 2 ...12:REFerence?
Example	CALC:EEVM:MARK:REF 2 CALC:EEVM:MARK:REF?
Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself." You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When queried a single value is returned (the specified marker number's relative marker).
Preset	2 3 4 5 6 7 8 9 10 11 12 1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Key Path	Marker, Properties
Mode	GSM
Remote Command	:CALCulate:EEVM:MARKer[1] 2 ...12:TRACe POLar MERRor PERRor EVM MAXMerror MINMerror MAXPerror MINPerror MAXEvm MINEvm :CALCulate:EEVM:MARKer[1] 2 ...12:TRACe?
Example	CALC:EEVM:MARK:TRAC PERR CALC:EEVM:MARK:TRAC?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	EVM

State Saved	Saved in instrument state.
Range	IQ Polar Mag Error Phase Error EVM Max Hold Mag Error Min Hold Mag Error Max Hold Phase Error Min Hold Phase Error Max Hold EVM Min Hold EVM
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Couple Markers

When this function is On, moving any marker causes an equal X Axis movement of every other marker which is not **Off**. By “equal X Axis movement” we mean that we preserve the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units). This may result in markers going off screen.

Key Path	Marker
Mode	GSM
Remote Command	:CALCulate:EEVM:MARKer:COUPle[:STATe] ON OFF 1 0 :CALCulate:EEVM:MARKer:COUPle[:STATe]?
Example	CALC:EEVM:MARK:COUP ON CALC:EEVM:MARK:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Key Path	Marker
Mode	GSM
Remote Command	:CALCulate:EEVM:MARKer:AOff
Example	CALC:EEVM:MARK:AOff
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

Marker State (Backward Compatibility/Remote Command Only)

Sets or queries the state of a marker. Setting a marker which is OFF to state ON or 1 puts it in Normal mode and places it at the center of the screen.

Mode	EDGE GSM
Remote Command	:CALCulate:EEVM:MARKer[1] 2 ...12:STATe OFF ON 0 1 :CALCulate:EEVM:MARKer[1] 2 ...12:STATe?
Example	CALC:EEVM:MARK3:STAT ON CALC:EEVM:MARK3:STAT?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Marker Function

There is no functionality for this front-panel key in this measurement. Pressing this key displays a blank key menu.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Marker To

There is no functionality for this front-panel key in this measurement. Pressing this key displays a blank key menu.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

NOTE

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

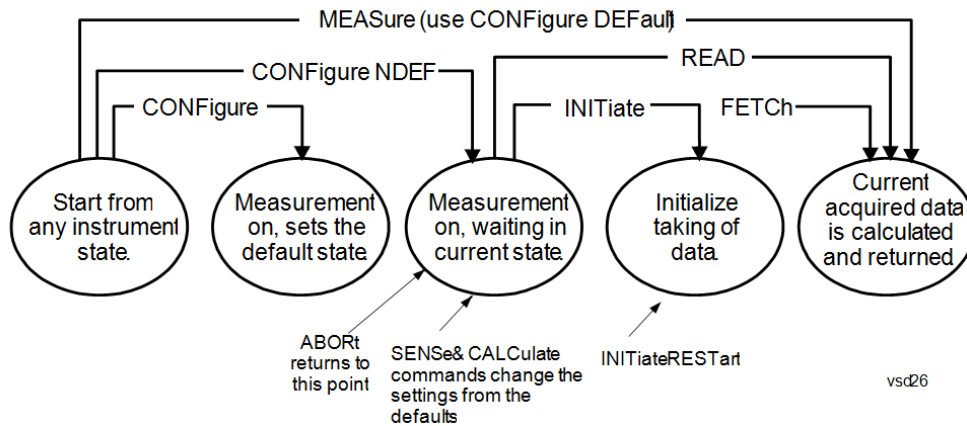
Remote Measurement Functions

This section contains the following topics:

- "Measurement Group of Commands" on page 1431
- "Current Measurement Query (Remote Command Only) " on page 1433
- "Limit Test Current Results (Remote Command Only)" on page 1433
- "Data Query (Remote Command Only)" on page 1433
- "Calculate/Compress Trace Data Query (Remote Command Only)" on page 1434
- "Calculate Peaks of Trace Data (Remote Command Only)" on page 1439
- "Hardware-Accelerated Fast Power Measurement (Remote Command Only) " on page 1440
- "Format Data: Numeric Data (Remote Command Only)" on page 1454
- "Format Data: Byte Order (Remote Command Only)" on page 1455

Initial S/W Revision	Prior to A.02.00

Measurement Group of Commands



Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFIGure command. Use the commands in the SENSE:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSE:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Configure Commands:

:CONFIGure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEfault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

Fetch Commands:

:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

INITiate Commands:

:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
 - Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
 - If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.
-

READ Commands:

:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
-

measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
 - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
 - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
-

Initial S/W Revision	Prior to A.02.00

Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

Remote Command	:CONFigure?

Example	CONF?

Initial S/W Revision	Prior to A.02.00

Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

Remote Command	:CALCulate:CLIMits:FAIL?

Example	CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails.

Initial S/W Revision	Prior to A.02.00

Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

Remote Command	<code>:CALCulate:DATA[n]?</code>
Notes	The return trace depends on the measurement. In <code>CALCulate:<meas>:DATA[n]</code>, <code>n</code> is any valid subopcode for the current measurement. It returns the same data as the <code>FETCH:<measurement>?</code> query where <code><measurement></code> is the current measurement.
Initial S/W Revision	Prior to A.02.00

Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode `[n]`.

`n` = any valid sub-opcode for that measurement. See the `MEASure:<measurement>?` command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode `<n>` (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or `Update=Off`.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire `N` frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

Remote Command	<code>:CALCulate:DATA<n>:COMPRESS? BLOCK CFIT MAXimum MINimum MEAN DMEan RMS RMSCubed SAMPLE SDEVIation PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]]</code>
Example	To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, <code>CALC:DATA2:COMP? MEAN, 24e-6, 526e-6</code> (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.)
Notes	The command supports 5 parameters. Note that the last 4 (<code><soffset></code>, <code><length></code>, <code><roffset></code>, <code><rlimit></code>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <code><length></code>, then you must also specify <code><soffset></code>. See details below for a definition of each of these parameters. This command uses the data in the format specified by <code>FORMat:DATA</code>, returning either binary or ASCII data.
Initial S/W Revision	Prior to A.02.00

- **BLOCK** or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is `x,y` pairs for trace data and `I,Q` pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

•

NOTE

If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where $|X_i|$ is the magnitude of an I/Q pair, and n is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$\text{DME} = 10 \times \log_{10} \left(\frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

NOTE

For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPlE - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEViation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where X_i is a data point value, $\bar{X}$ is the arithmetic mean of the data point values for the specified region (s), and n is the number of data points in the specified region(s).

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where $|X_i|$ is the magnitude of an I/Q pair, $\bar{X}$ is the mean of the magnitudes for the specified region(s), and n is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector ($n=0$) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

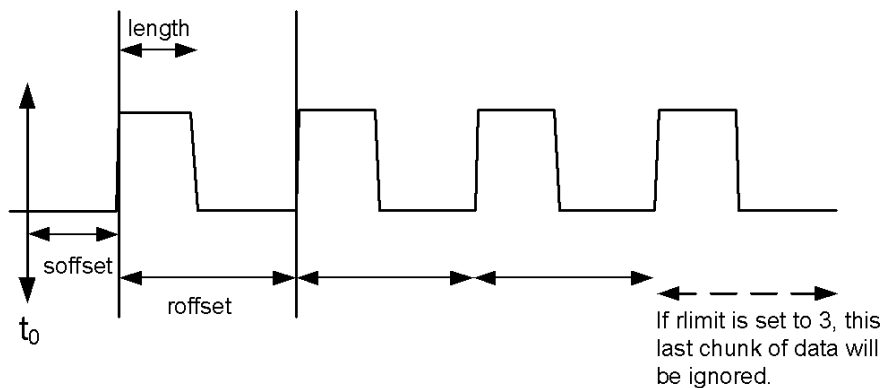
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where Y_i is the unwrapped phase of I/Q pair with applying frequency correction and n is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

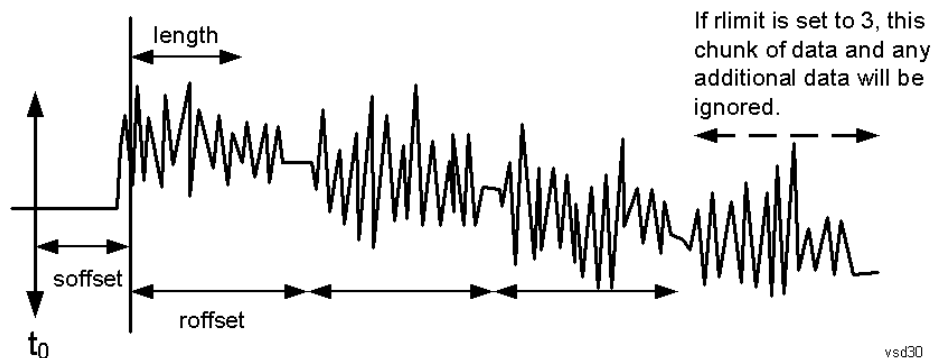
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

Remote Command	For Swept SA measurement: <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME[,ALL GTDLine LTDLine]]</pre> For most other measurements: <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME]</pre>
Example	Example for Swept SA measurement in Spectrum Analyzer Mode: CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned. Query Results 1: With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time). If no peaks are found the peak list will consist of only the number of peaks, (0).
Notes	<n> - is the trace that will be used <threshold> - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu. <excursion> - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the

excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported. Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQUENCY - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

Initial S/W Revision	Prior to A.02.00

Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

Mode	All
Remote Command	:CALCulate:FPOW:Power[1,2,...,999]:RESet
Example	:CALC:FPOW:POW1:RES

Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:DEFine "configuration string"
Example	:CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005"
Notes	See below for a list of measurement variables that can be defined in the configuration string.
Initial S/W Revision	A.14.00

Acquisition Time

Example	CALC:FPOW:POW1:DEF "AcquisitionTime=0.002"
Notes	The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability.
Preset	0.001 s
Range	0 s to 1 s
Default Unit	Time (s)
Initial S/W Revision	A.14.00

Center Frequency

Example	CALC:FPOW:POW1:DEF "CenterFrequency=2e9"
Notes	The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency.
Preset	1 GHz
Range	0 Hz to maximum instrument frequency
Default Unit	Frequency (Hz)
Initial S/W Revision	A.14.00

DC Coupled

Example	CALC:FPOW:POW1:DEF "DCCoupled=True"
Notes	The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz.
Preset	False
Range	True (DC Coupled) or False (AC Coupled)
Default Unit	Boolean
Initial S/W Revision	A.14.00

DetectorType

Example	CALC:FPOW:POW1:DEF "DetectorType=Peak"
Notes	Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement.
Preset	RmsAverage
Range	RmsAverage, Peak
Initial S/W Revision	A.14.00

Do Noise Correction

Example	CALC:FPOW:POW1:DEF "DoNoiseCorrection=True"
Notes	When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured.
Preset	False
Range	True (enable noise correction) or False (disable noise correction)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Do Spur Suppression

Example	CALC:FPOW:POW1:DEF "DoSpurSuppression=True"
Notes	When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals. When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method. Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.
Preset	False
Range	True (enable spur suppression) or False (disable spur suppression)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Electronic Attenuator Bypass

Example	CALC:FPOW:POW1:DEF "ElecAttBypass =False"
Notes	The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp.
Preset	True
Range	True (bypass electronic attenuator) or False (use electronic attenuator)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Electronic Attenuation

Example	CALC:FPOW:POW1:DEF "ElecAttenuation=10"
Notes	Option EA3 is required. The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps). Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.
Preset	0 dB
Range	0 – 24 dB (1 dB steps)

Default Unit	dB
Initial S/W Revision	A.14.00

IF Gain

Example	CALC:FPOW:POW1:DEF "IFGain=10"
Notes	The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB.
Preset	0 dB
Range	-6 - 16 dB (1 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

IF Type

Example	CALC:FPOW:POW1:DEF "IFType=B25M"
Notes	The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path.
Preset	B40M
Range	B10M, B25M, B40M
Initial S/W Revision	A.14.00

Include Power Spectrum

Example	CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True"
Notes	The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response.
Preset	False
Range	True (return both channel power and full power spectrum) or False (returns only channel power)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Mechanical Attenuation

Example	CALC:FPOW:POW1:DEF "MechAttenuation=10"
Notes	The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps).
Preset	0 dB
Range	0 – 70 dB (2 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

Preamp Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps.
Preset	Off
Range	Off, Low, Full
Initial S/W Revision	A.14.00

Resolution Bandwidth Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value.
Preset	BestSpeed
Range	BestSpeed, Narrowest, Explicit
Initial S/W Revision	A.14.00

Resolution Bandwidth

Example	CALC:FPOW:POW1:DEF "ResolutionBW=25e3"
Notes	The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW.

Preset	0 Hz
Default Unit	Hz
Initial S/W Revision	A.14.00

Trigger Delay

Example	CALC:FPOW:POW1:DEF "TriggerDelay=0.025"
Notes	The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed.
Preset	0 s
Range	0 – 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

Trigger Level

Example	CALC:FPOW:POW1:DEF "TriggerLevel=2"
Notes	The trigger level parameter sets the voltage value at which an external trigger is detected.
Preset	1.2 V
Range	–5 to 5 V
Default Unit	Volts
Initial S/W Revision	A.14.00

Trigger Slope

Example	CALC:FPOW:POW1:DEF "TriggerSlope=Negative"
Notes	The trigger slope parameter indicates the direction of the edge trigger voltage for detection.
Preset	Positive
Range	Positive, Negative
Initial S/W Revision	A.14.00

Trigger Source

Example	CALC:FPOW:POW1:DEF "TriggerSource=Ext1"
Notes	The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively.
Preset	Free
Range	Free, Ext1, Ext2
Initial S/W Revision	A.14.00

Trigger Timeout

Example	CALC:FPOW:POW1:DEF "TriggerTimeout=0.1"
Notes	The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement.
Preset	1 s
Range	0 – 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

Signal Input

Example	CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW"
Notes	The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz.
Preset	FpMainRf
Range	FpMainRf, Fp50MHzCW
Initial S/W Revision	A.14.00

Use Preselector

Example	CALC:FPOW:POW1:DEF "UsePreSelector=True"
Notes	The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases.
Preset	False
Range	True (use preselector above 3.6 GHz), or False (preselector bypassed)

Default Unit	Boolean
Initial S/W Revision	A.14.00

Channel Bandwidth Array

Example	CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]"
Notes	The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[1 e6]
Range	0 to 40 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

Channel Filter Type Array

Example	CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]"
Notes	The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.
Preset	[IBW]
Range	IBW, RRC
Initial S/W Revision	A.14.00

Channel Filter Alpha Array

Example	CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]"
Notes	The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[0.22]
Range	0.0 – 1.0

Initial S/W Revision	A.14.00

Channel Measurement Function Array

Example	CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]"
Notes	This parameter array defines what measurement is being made for each individually-specified channel: BandPower: Total power within the specified bandwidth of the channel (dBm) BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz) PeakPower: The peak power value within the specified bandwidth of the channel (dBm) PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz) XdbBbandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdbBbandwidth parameter OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.
Preset	[BandPower]
Range	BandPower, BandDensity, PeakPower, PeakFrequency, XdbBbandwidth, OccupiedBandwidth
Initial S/W Revision	A.14.00

Channel Offset Frequency Array

Example	CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]"
Notes	The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel. All array parameters should have the same number of elements.
Preset	[0]
Range	0 to 20 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

Channel Occupied Bandwidth Percent Array

Example	CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]"
Notes	This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied

	bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power.
Preset	[0.99]
Range	0 – 1.0
Initial S/W Revision	A.14.00

Channel x-dB Bandwidth Array

Example	CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]"
Notes	This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number.
Preset	[-3.01]
Range	-200 to 0 dB
Default Unit	dB
Initial S/W Revision	A.14.00

Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

M	All
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R	:CALCulate:FPOWER:POWER[1,2,...,999]:DEFine?
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E	:CALC:FPOW:POW1:DEF?

x a m p l e	
N o t e s	This command query is used to retrieve a list of all defined parameters in an ASCII format. The following is an example of the returned results: "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=10000000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1000000000,ResolutionBW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1000000],OffsetFrequency=[0],Function=[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False,TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"
I n i t i a l	A.14.00
S / W	
R e v i s i o n	

Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:CONFigure
Example	:CALC:FPOW:POW1:CONF
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:INITiate
Example	:CALC:FPOW:POW1:INIT
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:FETCh?
Example	:CALC:FPOW:POW1:FETC?
Notes	Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel.
Initial S/W Revision	A.14.00

Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]?
Example	:CALC:FPOW:POW1?

Notes	Option FP2 is required. See notes for Fast Power Fetch for return format.
Initial S/W Revision	A.14.00

Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

Mode	All
Remote Command	:CALCulate:FPOWER:POWer[1,2,...,999]:READ? :CALCulate:FPOWER:POWer[1,2,...,999]:READ1?
Example	:CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1?
Notes	Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined.
Initial S/W Revision	A.14.00

Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

Mode	All
Remote Command	:CALCulate:FPOWER:POWer[1,2,...,999]:READ2?
Example	:CALC:FPOW:POW1:READ2?
Notes	Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float]

	3. Declared function result for the 2nd specified channel [4 byte float]
	...
	(m + 1). Declared function result for the last (mth) specified channel [4 byte float]
	ADC Over Range
	1. ADC over-range occurred (1: true, 0: false) [2 byte short]
	Spectrum Data
	1. Number of points in the spectrum data, k [4 byte int]
	2. Start frequency of spectrum data (Hz) [8 byte double]
	3. Step frequency of spectrum data (Hz) [8 byte double]
	4. FFT bin at 1st point (dBm) [4 byte float]
	5. FFT bin at 2nd point (dBm) [4 byte float]
	...
	(k + 3). FFT bin at last (kth) point (dBm) [4 byte float]
Initial S/W Revision	A.14.00

Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

Remote Command	:FORMat[:TRACe][:DATA] ASCii INTEger,32 REAL,32 REAL,64 :FORMat[:TRACe][:DATA]?
Notes	The query response is: ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTEger,32: INT,32 When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTEger, data is output in units of m dBm (.001 dBm). The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block.
Dependencies	Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTEger, 32 for REAL). Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number".
Preset	ASCii
Backwards Compatibility	Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves

Notes	backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32.
Initial S/W Revision	Prior to A.02.00

The specs for each output type follow:

ASCIi - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMal order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

Remote Command	:FORMat:BORDER NORMal SWAPped :FORMat:BORDER?
Preset	NORMal
Initial S/W Revision	Prior to A.02.00

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Avg /Hold Num

Sets the number of data acquisitions that will be averaged. After the specified number of average counts, the average mode (termination control) setting determines the average action.

Key Path	Meas Setup
Mode	GSM
Remote Command	<pre>[:SENSe]:EEVM:AVERage:COUNT <integer></pre> <pre>[:SENSe]:EEVM:AVERage:COUNT?</pre> <pre>[:SENSe]:EEVM:AVERage[:STATe] OFF ON 0 1</pre> <pre>[:SENSe]:EEVM:AVERage[:STATe]?</pre>
Example	<pre>EEVM:AVER:COUN 3</pre> <pre>EEVM:AVER:COUN?</pre> <pre>EEVM:AVER ON</pre> <pre>EEVM:AVER?</pre>
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When this value is changed, Avg State is set to On.
Preset	10 OFF
State Saved	Saved in instrument state.
Min	1
Max	10000
Initial S/W Revision	Prior to A.02.00

Avg Mode

Selects the type of termination control used to averaging. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

- Exponential averaging – When Measure is set at Cont, data acquisitions continue indefinitely. After N averages, exponential averaging is used with a weighting factor of N (the displayed average count stops at N). Exponential averaging weights new data more than old data, which allows tracking of slow-changing signals. The weighting factor N is set using the Averages, Avg Bursts key.

- Repeat averaging – When Measure is set at Cont, data acquisitions continue indefinitely. After N averages is reached, all previous result data is cleared and the average count is set back to 1. This is equivalent to being in Measure Single and pressing the Restart key when the Single measurement finishes.

Key Path	Meas Setup
Mode	GSM
Remote Command	[:SENSe]:EEVM:AVERage:TCONtrol EXPonential REPeat [:SENSe]:EEVM:AVERage:TCONtrol?
Example	EEVM:AVER:TCON REP EEVM:AVER:TCON?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	REPeat
State Saved	Saved in instrument state.
Range	Exp Repeat
Initial S/W Revision	Prior to A.02.00

Burst Sync

Select the method of synchronizing the measurement to the bursts.

- Training Sequence (TSEquence) – The burst synchronization performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sync sequence.
- RFBurst – The burst synchronization approximates the start and stop of the useful part of the burst without demodulation of the burst.
- Polar Modulation –The burst synchronization performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sync sequence. (It's same as "Training Seq") The measurement start searching training sequence both on amplitude path and phase path to make synchronization
- None – The measurement is performed without searching burst.

Key Path	Meas Setup
Mode	GSM
Remote Command	[:SENSe]:EEVM:BSYNc:SOURce TSEquence RFBurst PMODulation NONE [:SENSe]:EEVM:BSYNc:SOURce?
Example	EEVM:BSYNC:SOUR RFB EEVM:BSYNC:SOUR?
Dependencies	When Burst Type in the Mode Setup menu is set to Mixed, this menu key is grayed out and Training Sequence (TSC) is used for synchronization. "Training Seq" is shown on the Meas Bar. The sync algorithm always runs in Training Sequence (TSC) synchronization mode in case of "Mixed" because the Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync

	becomes effective again when the Burst Type selection is changed from “Mixed” to another one. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	TSEquence
State Saved	Saved in instrument state.
Range	Training Seq RF Amptd Polar Modulation None
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Limits

Accesses a menu that enables you to set the Limit Test to on or off and the Test Condition to a normal or extreme limit table.

Key Path	Meas Setup
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Limit Test

Turns on or off limit pass/fail testing.

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:TEST[:STATe] OFF ON 0 1 :CALCulate:EEVM:LIMit:TEST[:STATe]?
Example	CALC:EEVM:LIM:TEST ON CALC:EEVM:LIM:TEST?
Notes	When set to Off, the PASS/FAIL indicator on the Meas Bar goes blank. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Test Condition

This measurement could have different limit tables for different test environment, Normal and Extreme. This parameter allows you to select which limit table to be modified and used for the judgement.

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:TYPE NORMal EXTreme :CALCulate:EEVM:LIMit:TYPE?
Example	CALC:EEVM:LIM:TYPE NORM CALC:EEVM:LIM:TYPE?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Norm Extreme
Initial S/W Revision	Prior to A.02.00

RMS EVM

Accesses the menu to set the limit for the RMS EVM measurement pass/fail test per burst.

Key Path	Meas Setup, Mode, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

NB 8PSK

Sets the limit of the 8PSK burst for the RMS EVM measurement pass/fail test.

Device is BTS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM?
Example	CALC:EEVM:LIM:BTS:NORM:REVM 12 CALC:EEVM:LIM:BTS:NORM:REVM?
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. But a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	7.0

State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Device is BTS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:EXTreme:REVM <real> :CALCulate:EEVM:LIMit:BTS:EXTreme:REVM?
Example	CALC:EEVM:LIM:BTS:EXTR:REVM 15 CALC:EEVM:LIM:BTS:EXTR:REVM?
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. But a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	8.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Device is MS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:NORMal:REVM <real> :CALCulate:EEVM:LIMit:MS:NORMal:REVM?
Example	CALC:EEVM:LIM:MS:NORM:REVM 20 CALC:EEVM:LIM:MS:NORM:REVM?
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. But a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	9.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Device is MS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:EXTreme:REVM <real> :CALCulate:EEVM:LIMit:MS:EXTreme:REVM?
Example	CALC:EEVM:LIM:MS:EXTR:REVM 15 CALC:EEVM:LIM:MS:EXTR:REVM?
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. But a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	10.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

NB 16QAM

Sets the limit of the normal symbol rate 16QAM burst for the RMS EVM Measurement pass/fail test.

Device is BTS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate QAM16, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? QAM16
Example	CALC:EEVM:LIM:BTS:NORM:REVM:NSR QAM16, 12

	CALC:EEVM:LIM:BTS:NORM:REVM:NSR? QAM16
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. But a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition.. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	5.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is BTS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:EXTreme:REVM:NSRate QAM16, <real> :CALCulate:EEVM:LIMit:BTS:EXTreme:REVM:NSRate? QAM16
Example	CALC:EEVM:LIM:BTS:EXTR:REVM:NSR QAM16, 15 CALC:EEVM:LIM:BTS:EXTR:REVM:NSR? QAM16
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	6.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is MS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate QAM16, <real>

	:CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate? QAM16
Example	CALC:EEVM:LIM:MS:NORM:REVM:NSR QAM16, 20 CALC:EEVM:LIM:MS:NORM:REVM:NSR? QAM16
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	7.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.04.00

Device is MS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:EXTRem:REVM:NSRate QAM16, <real> :CALCulate:EEVM:LIMit:MS:EXTRem:REVM:NSRate? QAM16
Example	CALC:EEVM:LIM:MS:EXTR:REVM:NSR QAM16, 15 CALC:EEVM:LIM:MS:EXTR:REVM:NSR? QAM16
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	8.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.04.00

NB 32QAM

Sets the limit of the normal symbol rate 32QAM burst for the RMS EVM Measurement pass/fail test.

Device is BTS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate QAM32, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? QAM32
Example	CALC:EEVM:LIM:BTS:NORM:REVM:NSR QAM32, 12 CALC:EEVM:LIM:BTS:NORM:REVM:NSR? QAM32
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	5.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is BTS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:EXTreme:REVM:NSRate QAM32, <real> :CALCulate:EEVM:LIMit:BTS:EXTreme:REVM:NSRate? QAM32
Example	CALC:EEVM:LIM:BTS:EXTR:REVM:NSR QAM32, 15 CALC:EEVM:LIM:BTS:EXTR:REVM:NSR? QAM32
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	6.0
State Saved	Saved in instrument state.
Min	0.0

Max	100.0
Initial S/W Revision	A.02.00

Device is MS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate QAM32, <real> :CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate? QAM32
Example	CALC:EEVM:LIM:MS:NORM:REVM:NSR QAM32, 20 CALC:EEVM:LIM:MS:NORM:REVM:NSR? QAM32
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	7.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.04.00

Device is MS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:EXTReme:REVM:NSRate QAM32, <real> :CALCulate:EEVM:LIMit:MS:EXTReme:REVM:NSRate? QAM32
Example	CALC:EEVM:LIM:MS:EXTR:REVM:NSR QAM32, 15 CALC:EEVM:LIM:MS:EXTR:REVM:NSR? QAM32
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.

Preset	8.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.04.00

HB QPSK

Sets the limit of the QPSK burst for the RMS EVM Measurement pass/fail test.

Device is BTS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate QPSK, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate? QPSK
Example	CALC:EEVM:LIM:BTS:NORM:REVM:HSR QPSK, 12 CALC:EEVM:LIM:BTS:NORM:REVM:HSR? QPSK
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	7.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is BTS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:EXTReMe:REVM:HSRate QPSK, <real> :CALCulate:EEVM:LIMit:BTS:EXTReMe:REVM:HSRate? QPSK
Example	CALC:EEVM:LIM:BTS:EXTR:REVM:HSR QPSK, 15 CALC:EEVM:LIM:BTS:EXTR:REVM:HSR? QPSK

Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	8.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is MS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate QPSK, <real> :CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate? QPSK
Example	CALC:EEVM:LIM:MS:NORM:REVM:HSR QPSK, 20 CALC:EEVM:LIM:MS:NORM:REVM:HSR? QPSK
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	9.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is MS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:EXTRem:REVM:HSRate QPSK, <real> :CALCulate:EEVM:LIMit:MS:EXTRem:REVM:HSRate? QPSK

Example	CALC:EEVM:LIM:MS:EXTR:REVM:HSR QPSK, 15 CALC:EEVM:LIM:MS:EXTR:REVM:HSR? QPSK
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	10.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

HB 16QAM

Sets the limit of the higher symbol rate 16QAM burst for the RMS EVM Measurement pass/fail test.

Device is BTS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate QAM16, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate? QAM16
Example	CALC:EEVM:LIM:BTS:NORM:REVM:HSR QAM16, 12 CALC:EEVM:LIM:BTS:NORM:REVM:HSR? QAM16
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition.. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	4.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is BTS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:EXTreme:REVM:HSRate QAM16, <real> :CALCulate:EEVM:LIMit:BTS:EXTreme:REVM:HSRate? QAM16
Example	CALC:EEVM:LIM:BTS:EXTR:REVM:HSR QAM16, 15 CALC:EEVM:LIM:BTS:EXTR:REVM:HSR? QAM16
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	5.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is MS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate QAM16, <real> :CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate? QAM16
Example	CALC:EEVM:LIM:MS:NORM:REVM:HSR QAM16, 20 CALC:EEVM:LIM:MS:NORM:REVM:HSR? QAM16
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	100% (TBD in 3GPP)
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is MS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:EXTRemE:REVM:HSRate QAM16, <real> :CALCulate:EEVM:LIMit:MS:EXTRemE:REVM:HSRate? QAM16
Example	CALC:EEVM:LIM:MS:EXTR:REVM:HSR QAM16, 15 CALC:EEVM:LIM:MS:EXTR:REVM:HSR? QAM16
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	100% (TBD in 3GPP)
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

HB 32QAM

Sets the limit of the higher symbol rate 32QAM burst for the RMS EVM Measurement pass/fail test.

Device is BTS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate QAM32, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate? QAM32
Example	CALC:EEVM:LIM:BTS:NORM:REVM:HSR QAM32, 12 CALC:EEVM:LIM:BTS:NORM:REVM:HSR? QAM32
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	4.0
State Saved	Saved in instrument state.
Min	0.0

Max	100.0
Initial S/W Revision	A.02.00

Device is BTS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:EXTreme:REVM:HSRate QAM32, <real> :CALCulate:EEVM:LIMit:BTS:EXTreme:REVM:HSRate? QAM32
Example	CALC:EEVM:LIM:BTS:EXTR:REVM:HSR QAM32, 15 CALC:EEVM:LIM:BTS:EXTR:REVM:HSR? QAM32
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	5.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is MS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate QAM32, <real> :CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate? QAM32
Example	CALC:EEVM:LIM:MS:NORM:REVM:HSR QAM32, 20 CALC:EEVM:LIM:MS:NORM:REVM:HSR? QAM32
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	100% (TBD in 3GPP)

State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is MS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate QAM32, <real> :CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate? QAM32
Example	CALC:EEVM:LIM:MS:EXTR:REVM:HSR QAM32, 15 CALC:EEVM:LIM:MS:EXTR:REVM:HSR? QAM32
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	100% (TBD in 3GPP)
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

NB AQPSK Low SCPIR

Sets the limit of the normal symbol rate AQPSK burst for the RMS EVM Measurement pass/fail test when the absolute value of Subchannel Power Imbalance Ratio, |SCPIR| is equal to or less than 8.0 dB.

Device is BTS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate AQPSK1, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? AQPSK1
Example	CALC:EEVM:LIM:BTS:NORM:REVM:NSR AQPSK1, 12 CALC:EEVM:LIM:BTS:NORM:REVM:NSR? AQPSK1
Notes	On MUI operation, for example, if the selected device is BTS and Test

	Condition is Extreme, test limits that can be set from the front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	Blanked when the EDGE Evolution N/W9071A-3FP license is not installed.
Preset	7.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Backwards Compatibility SCPI	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate AQPSK, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? AQPSK
Initial S/W Revision	A.11.01

Device is BTS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:EXTreme:REVM:NSRate AQPSK1, <real> :CALCulate:EEVM:LIMit:BTS:EXTreme:REVM:NSRate? AQPSK1
Example	CALC:EEVM:LIM:BTS:EXTR:REVM:NSR AQPSK1, 15 CALC:EEVM:LIM:BTS:EXTR:REVM:NSR? AQPSK1
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	8.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Backwards Compatibility SCPI	:CALCulate:EEVM:LIMit:BTS:EXTreme:REVM:NSRate AQPSK, <real> :CALCulate:EEVM:LIMit:BTS:EXTreme:REVM:NSRate? AQPSK
Initial S/W Revision	A.11.01

NB AQPSK High SCPIR

Sets the limit of the normal symbol rate AQPSK burst for the RMS EVM Measurement pass/fail test when the absolute value of Subchannel Power Imbalance Ratio, |SCPIR| is greater than 8.0 dB.

Device is BTS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate AQPSK2, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? AQPSK2
Example	CALC:EEVM:LIM:BTS:NORM:REVM:NSR AQPSK2, 12 CALC:EEVM:LIM:BTS:NORM:REVM:NSR? AQPSK2
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limits that can be set from the front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the EDGE Evolution N/W9071A-3FP license is not installed.
Preset	5.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.11.01

Device is BTS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate AQPSK2, <real> :CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate? AQPSK2
Example	CALC:EEVM:LIM:BTS:EXTR:REVM:NSR AQPSK2, 15 CALC:EEVM:LIM:BTS:EXTR:REVM:NSR? AQPSK2
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.

Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	6.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.11.01

Peak EVM

Sets the limit for the Peak EVM measurement pass/fail test.

Key Path	Meas Setup, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00

Peak EVM (Device is BTS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:NORMal:PEVM <real> :CALCulate:EEVM:LIMit:BTS:NORMal:PEVM?
Example	CALC:EEVM:LIM:BTS:NORM:PEVM 12 CALC:EEVM:LIM:BTS:NORM:PEVM?
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	22.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

Peak EVM (Device is BTS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:EXTReme:PEVM <real> :CALCulate:EEVM:LIMit:BTS:EXTReme:PEVM?

Example	CALC:EEVM:LIM:BTS:EXTR:PEVM 15 CALC:EEVM:LIM:BTS:EXTR:PEVM?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	22.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

Peak EVM (Device is MS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:NORMal:PEVM <real> :CALCulate:EEVM:LIMit:MS:NORMal:PEVM?
Example	CALC:EEVM:LIM:MS:NORM:PEVM 20 CALC:EEVM:LIM:MS:NORM:PEVM?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	30.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

Peak EVM (Device is MS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:EXTReme:PEVM <real> :CALCulate:EEVM:LIMit:MS:EXTReme:PEVM?
Example	CALC:EEVM:LIM:MS:EXTR:PEVM 15 CALC:EEVM:LIM:MS:EXTR:PEVM?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Extreme.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	30.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

95%ile EVM

Sets the limit for the 95%ile EVM measurement pass/fail test.

Key Path	Meas Setup, Mode, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00

95%ile EVM (Device is BTS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:NORMal:EVMP95 <real> :CALCulate:EEVM:LIMit:BTS:NORMal:EVMP95?
Example	CALC:EEVM:LIM:BTS:NORM:EVMP95 12 CALC:EEVM:LIM:BTS:NORM:EVMP95?
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	11.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

95%ile EVM (Device is BTS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:EXTreme:EVMP95 <real> :CALCulate:EEVM:LIMit:BTS:EXTreme:EVMP95?

Example	CALC:EEVM:LIM:BTS:EXTR:EVMP95 15 CALC:EEVM:LIM:BTS:EXTR:EVMP95?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	11.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

95%ile EVM (Device is MS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:NORMal:EVMP95 <real> :CALCulate:EEVM:LIMit:MS:NORMal:EVMP95?
Example	CALC:EEVM:LIM:MS:NORM:EVMP95 20 CALC:EEVM:LIM:MS:NORM:EVMP95?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	15.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

95%ile EVM (Device is MS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:EXTReme:EVMP95 <real> :CALCulate:EEVM:LIMit:MS:EXTReme:EVMP95?
Example	CALC:EEVM:LIM:MS:EXTR:EVMP95 15 CALC:EEVM:LIM:MS:EXTR:EVMP95?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Extreme.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	15.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

I/Q Origin Offset

Sets the limit for the I/Q Origin Offset measurement pass/fail test.

Key Path	Meas Setup, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00

I/Q Origin Offset (Device is BTS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:NORMal:IQOOffset <real> :CALCulate:EEVM:LIMit:BTS:NORMal:IQOOffset?
Example	CALC:EEVM:LIM:BTS:NORM:IQOO -12 CALC:EEVM:LIM:BTS:NORM:IQOO?
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	-35
State Saved	Saved in instrument state.
Min	-100.0
Max	0.0
Initial S/W Revision	Prior to A.02.00

I/Q Origin Offset (Device is BTS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:EXTReme:IQOOffset <real> :CALCulate:EEVM:LIMit:BTS:EXTReme:IQOOffset?

Example	CALC:EEVM:LIM:BTS:EXTR:IQ00 -15 CALC:EEVM:LIM:BTS:EXTR:IQ00?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	-35.0
State Saved	Saved in instrument state.
Min	-100.0
Max	0.0
Initial S/W Revision	Prior to A.02.00

I/Q Origin Offset (Device is MS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:NORMal:IQ0Offset <real> :CALCulate:EEVM:LIMit:MS:NORMal:IQ0Offset?
Example	CALC:EEVM:LIM:MS:NORM:IQ00 -20 CALC:EEVM:LIM:MS:NORM:IQ00?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	-30.0
State Saved	Saved in instrument state.
Min	-100.0
Max	0.0
Initial S/W Revision	Prior to A.02.00

I/Q Origin Offset (Device is MS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:EXTReme:IQ0Offset <real> :CALCulate:EEVM:LIMit:MS:EXTReme:IQ0Offset?
Example	CALC:EEVM:LIM:MS:EXTR:IQ00 -15 CALC:EEVM:LIM:MS:EXTR:IQ00?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Extreme.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	-30.0
State Saved	Saved in instrument state.
Min	-100.0
Max	0.0
Initial S/W Revision	Prior to A.02.00

Freq Error

Sets the limit for the Frequency Error measurement pass/fail test.

Key Path	Meas Setup, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00

Freq Error (Device is BTS, BTS Type is Normal, Test Condition is Normal)

Key Path	Meas Setup, Limit
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:NORMal:FERRor <real> :CALCulate:EEVM:LIMit:BTS:NORMal:FERRor?
Example	CALC:EEVM:LIM:BTS:NORM:FERR 0.1 CALC:EEVM:LIM:BTS:NORM:FERR?
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "BTS Type" is Normal or Micro and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Initial S/W Revision	Prior to A.02.00

Freq Error (Device is BTS, BTS Type is Normal, Test Condition is Extreme)

Key Path	Meas Setup, Limit
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:EXTReme:FERRor <real> :CALCulate:EEVM:LIMit:BTS:EXTReme:FERRor?

Example	CALC:EEVM:LIM:BTS:EXTR:FERR 0.1 CALC:EEVM:LIM:BTS:EXTR:FERR?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “BTS Type” is Normal or Micro and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Initial S/W Revision	Prior to A.02.00

Freq Error (Device is BTS, BTS Type is Micro, Test Condition is Normal)

Key Path	Meas Setup, Limit
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MBTS:NORMal:FERRor <real> :CALCulate:EEVM:LIMit:MBTS:NORMal:FERRor?
Example	CALC:EEVM:LIM:MBTS:NORM:FERR 0.1 CALC:EEVM:LIM:MBTS:NORM:FERR?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “BTS Type” is Normal or Micro and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Initial S/W Revision	Prior to A.02.00

Freq Error (Device is BTS, BTS Type is Micro, Test Condition is Extreme)

Key Path	Meas Setup, Limit
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MBTS:EXTReme:FERRor <real> :CALCulate:EEVM:LIMit:MBTS:EXTReme:FERRor?
Example	CALC:EEVM:LIM:MBTS:EXTR:FERR 0.1 CALC:EEVM:LIM:MBTS:EXTR:FERR?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “BTS Type” is Normal or Micro and the “Test Condition” is Extreme.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Initial S/W Revision	Prior to A.02.00

Freq Error (Device is BTS, BTS Type is Pico, Test Condition is Normal)

Key Path	Meas Setup, Limit
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:PBTS:NORMal:FERRor <real> :CALCulate:EEVM:LIMit:PBTS:NORMal:FERRor?
Example	CALC:EEVM:LIM:PBTS:NORM:FERR 0.1 CALC:EEVM:LIM:PBTS:NORM:FERR?
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "BTS Type" is Pico and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Initial S/W Revision	Prior to A.02.00

Freq Error (Device is BTS, BTS Type is Pico, Test Condition is Extreme)

Key Path	Meas Setup, Limit
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:PBTS:EXTReme:FERRor <real> :CALCulate:EEVM:LIMit:PBTS:EXTReme:FERRor?
Example	CALC:EEVM:LIM:PBTS:EXTR:FERR 0.2 CALC:EEVM:LIM:PBTS:EXTR:FERR?
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "BTS Type" is Pico and the "Test Condition" is Extreme. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.

Min	0.0
Max	50.0
Initial S/W Revision	Prior to A.02.00

Freq Error (Device is MS, Test Condition is Normal)

Key Path	Meas Setup, Limit
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:NORMal:FERRor <real> :CALCulate:EEVM:LIMit:MS:NORMal:FERRor?
Example	CALC:EEVM:LIM:MS:NORM:FERR 0.1 CALC:EEVM:LIM:MS:NORM:FERR?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Initial S/W Revision	Prior to A.02.00

Freq Error (Device is MS, Test Condition is Extreme)

Key Path	Meas Setup, Limit
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:EXTReMe:FERRor <real> :CALCulate:EEVM:LIMit:MS:EXTReMe:FERRor?
Example	CALC:EEVM:LIM:MS:EXTR:FERR 0.2 CALC:EEVM:LIM:MS:EXTR:FERR?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Initial S/W Revision	Prior to A.02.00

RMS Phase Error GMSK

Sets the limit of the normal symbol rate GMSK burst for the RMS Phase Error Measurement pass/fail test.

RMS Phase Error GMSK (Device is BTS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:NORMal:RPERror GMSK, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:RPERror? GMSK
Example	CALC:EEVM:LIM:BTS:NORM:RPER GMSK, 0.5 CALC:EEVM:LIM:BTS:NORM:RPER? GMSK
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	5
State Saved	Saved in instrument state.
Min	0
Max	180
Initial S/W Revision	A.06.00

RMS Phase Error GMSK (Device is BTS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:EXTreme:RPERror GMSK, <real> :CALCulate:EEVM:LIMit:BTS:EXTreme:RPERror? GMSK
Example	CALC:EEVM:LIM:BTS:EXTR:RPER GMSK, 5 CALC:EEVM:LIM:BTS:EXTR:RPER? GMSK
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "Test Condition" is Extreme. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	5.0
State Saved	Saved in instrument state.
Min	0
Max	180
Initial S/W Revision	A.06.00

RMS Phase Error GMSK (Device is MS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:NORMal:RPERror GMSK, <real> :CALCulate:EEVM:LIMit:MS:NORMal:RPERror? GMSK
Example	CALC:EEVM:LIM:MS:NORM:RPER GMSK, 7 CALC:EEVM:LIM:MS:NORM:RPER? GMSK
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	5.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.06.00

RMS Phase Error GMSK (Device is MS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:EXTReme:RPERror GMSK, <real> :CALCulate:EEVM:LIMit:MS:EXTReme:RPERror? GMSK
Example	CALC:EEVM:LIM:MS:EXTR:RPER GMSK, 5 CALC:EEVM:LIM:MS:EXTR:RPER? GMSK
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	5.0
State Saved	Saved in instrument state.
Min	0
Max	180
Initial S/W Revision	A.06.00

Peak Phase Error GMSK

Sets the limit of the normal symbol rate GMSK burst for the Peak Phase Error Measurement pass/fail test.

Peak Phase Error GMSK (Device is BTS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:NORMal:PPERror GMSK, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:PPERror? GMSK
Example	CALC:EEVM:LIM:BTS:NORM:PPER GMSK, 20 CALC:EEVM:LIM:BTS:NORM:PPER? GMSK
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	20
State Saved	Saved in instrument state.
Min	0
Max	180
Initial S/W Revision	A.06.00

Peak Phase Error GMSK (Device is BTS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:EXTreme:PPERror GMSK, <real> :CALCulate:EEVM:LIMit:BTS:EXTreme:PPERror? GMSK
Example	CALC:EEVM:LIM:BTS:EXTR:PPER GMSK, 20 CALC:EEVM:LIM:BTS:EXTR:PPER? GMSK
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "Test Condition" is Extreme. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	20.0
State Saved	Saved in instrument state.
Min	0
Max	180
Initial S/W Revision	A.06.00

Peak Phase Error GMSK (Device is MS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:NORMal:PPERror GMSK, <real>

	:CALCulate:EEVM:LIMit:MS:NORMal:PPERror? GMSK
Example	CALC:EEVM:LIM:MS:NORM:PPER GMSK, 7 CALC:EEVM:LIM:MS:NORM:PPER? GMSK
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	20.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.06.00

Peak Phase Error GMSK (Device is MS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:MS:EXTReme:PPERror GMSK, <real> :CALCulate:EEVM:LIMit:MS:EXTReme:PPERror? GMSK
Example	CALC:EEVM:LIM:MS:EXTR:PPER GMSK, 5 CALC:EEVM:LIM:MS:EXTR:PPER? GMSK
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	20.0
State Saved	Saved in instrument state.
Min	0
Max	180
Initial S/W Revision	A.06.00

Droop Compensation

Turns Droop Compensation on or off. Droop Compensation corrects amplitude variations across a burst. You may want to turn off this compensation so you can see the changes in the measured magnitude error. Droop can result from signal impairments like a power amplifier problem.

Key Path	Meas Setup, More
Mode	GSM
Remote Command	[:SENSe] :EEVM:DROop OFF ON 0 1 [:SENSe] :EEVM:DROop?

Example	EEVM:DRO ON EEVM:DRO?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Freq Error Tolerance Rng

Toggles between Wide and Normal settings for Frequency Error tolerance. To accurately demodulate complex signals which require more stringent tolerance for frequency error, Normal can be selected. For use with signals that are simpler with greater frequency error tolerance, Wide can be selected.

Key Path	Meas Setup
Mode	GSM
Remote Command	[:SENSe] :EEVM:FERRor:TRANge WIDE NORMal [:SENSe] :EEVM:FERRor:TRANge?
Example	EEVM:FERR:TRAN NORM EEVM:FERR:TRAN?
Preset	WIDE
State Saved	Saved in instrument state.
Range	Wide Normal
Initial S/W Revision	A.02.00

Polar Mod Align

Turns On/Off polar modulation alignment.

Key Path	Meas Setup, More
Mode	GSM
Remote Command	[:SENSe] :EEVM:BSYNc:PMODulation:ALIGNment OFF ON 0 1 [:SENSe] :EEVM:BSYNc:PMODulation:ALIGNment?
Example	EEVM:BSYNC:PMOD:ALIG OFF EEVM:BSYNC:PMOD:ALIG?
Notes	Available only when " Burst Sync " on page 524 is set to Polar Modulation. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	OFF

State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Meas Preset

Restores all the measurement parameters to their default values.

Key Path	Meas Setup, More
Mode	GSM
Remote Command	:CONFigure:EEVM
Example	CONF:EEVM
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

Mode

See ["Mode" on page 136](#)

Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See ["How-To Preset" on page 560](#) for more information.

Key Path	Front-panel key
Remote Command	:SYSTem:PRESet
Example	:SYST:PRES
Notes	*RST is preferred over :SYST: PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0.
Couplings	A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set.
Backwards Compatibility Notes	In the X-Series, the legacy “Factory Preset” has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no “Preset Type” as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using

	User Preset.
Initial S/W Revision	Prior to A.02.00

How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple – is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset – is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset – resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults – resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

Type Of Preset	SCPI Command	Front Panel Access
Auto Couple	:COUPle ALL	Auto Couple front-panel key
Meas Preset	:CONFigure:<Measurement>	Meas Setup Menu
Mode Preset	:SYSTem:PRESet	Mode Preset (green key)
Restore Mode Defaults	:INSTrument:DEFault	Mode Setup Menu
Restore All Mode Defaults	:SYSTem:DEFault MODes	System Menu; Restore System Default Menu
*RST	*RST	not possible (Mode Preset with Single)
Restore Input/Output Defaults	:SYSTem:DEFault INPut	System Menu; Restore System Default Menu
Restore Power On Defaults	:SYSTem:DEFault PON	System Menu; Restore System Default Menu
Restore Alignment Defaults	:SYSTem:DEFault ALIGn	System Menu; Restore System Default Menu
Restore Miscellaneous Defaults	:SYSTem:DEFault MISC	System Menu; Restore System Default Menu
Restore All System Defaults	:SYSTem:DEFault [ALL] :SYSTem:PRESet:PERSistent	System Menu; Restore System Default Menu
User Preset	:SYSTem:PRESet:USER	User Preset Menu
User Preset All Modes	:SYSTem:PRESet:USER:ALL	User Preset Menu

Power On Mode Preset	:SYSTem:PON:TYPE MODE	System Menu
Power On User Preset	:SYSTem:PON:TYPE USER	System Menu
Power On Last State	:SYSTem:PON:TYPE LAST	System Menu

Mode Setup

See "[Mode Setup](#)" on page 151

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace. Pressing Peak Search with the selected marker off causes the selected marker to be set to Normal, then a peak search is immediately performed.

If Marker Trace of selected marker is POL, peak search will not be performed.

Key Path	Front-panel key
Mode	GSM
Remote Command	:CALCulate:EEVM:MARKer[1] 2 ...12:MAXimum
Example	CALC:EEVM:MARK2:MAX
Initial S/W Revision	Prior to A.02.00

Min Peak Search (Backward Compatibility/Remote Command Only)

Mode	GSM
Remote Command	:CALCulate:EEVM:MARKer[1] 2 ...12:MINimum
Example	CALC:EEVM:MARK:MIN
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

Print

See "Print " on page 161

Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

Type	Default Prefix	Menu
State	State_	(Save/Recall)
Trace + State	State_	(Save/Recall)
Screen	Screen_	(Save/Recall)
Amplitude Corrections	Ampcor_	(Import/Export)
Traces	Trace_	(Import/Export)
Limit Lines	LLine_	(Import/Export)
Measurement Result	MeasR_	(Import/Export)
Capture Buffer	CapBuf_	(Import/Export)

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State_0000.state. The next is State_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State_0010.state there is already a State_0010.state file in the current directory, it advances the counter to State_0011.state to ensure that no conflict will exist (and then it verifies that State_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred_0000.csv.

NOTE Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

NOTE If the filename you entered ends with _dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

Key Path	Front-panel key
Notes	No remote command for this key specifically.
Initial S/W Revision	Prior to A.02.00

Recall

The **Recall** menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an **Import (Data)** option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	Front-panel key
Notes	No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATe <filename>. If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.
Backwards Compatibility Notes	In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data. In the X-Series, “state” always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.
Backwards Compatibility Notes	Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows. Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible. It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user. Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.
Initial S/W Revision	Prior to A.02.00

State

The **Recall State** menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the

additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. **Recall State** will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or "Recalled State Register <register number>" is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See ["More Information" on page 569](#).

Key Path	Recall
Mode	All
Remote Command	:MMEMory:LOAD:STATe <filename>
Example	:MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path
Example	MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state.
Notes	When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled. • If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number. After recalling the state, the Recall State function does the following: • Makes the saved measurement for the mode the active measurement. • Clears the input and output buffers. • Status Byte is set to 0. • Executes a *CLS If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If

	there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away. After the Recall, the analyzer exits the Recall menu and returns to the previous menu.
Backwards Compatibility SCPI	:MMEMory:LOAD:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored.
Initial S/W Revision	Prior to A.02.00

More Information

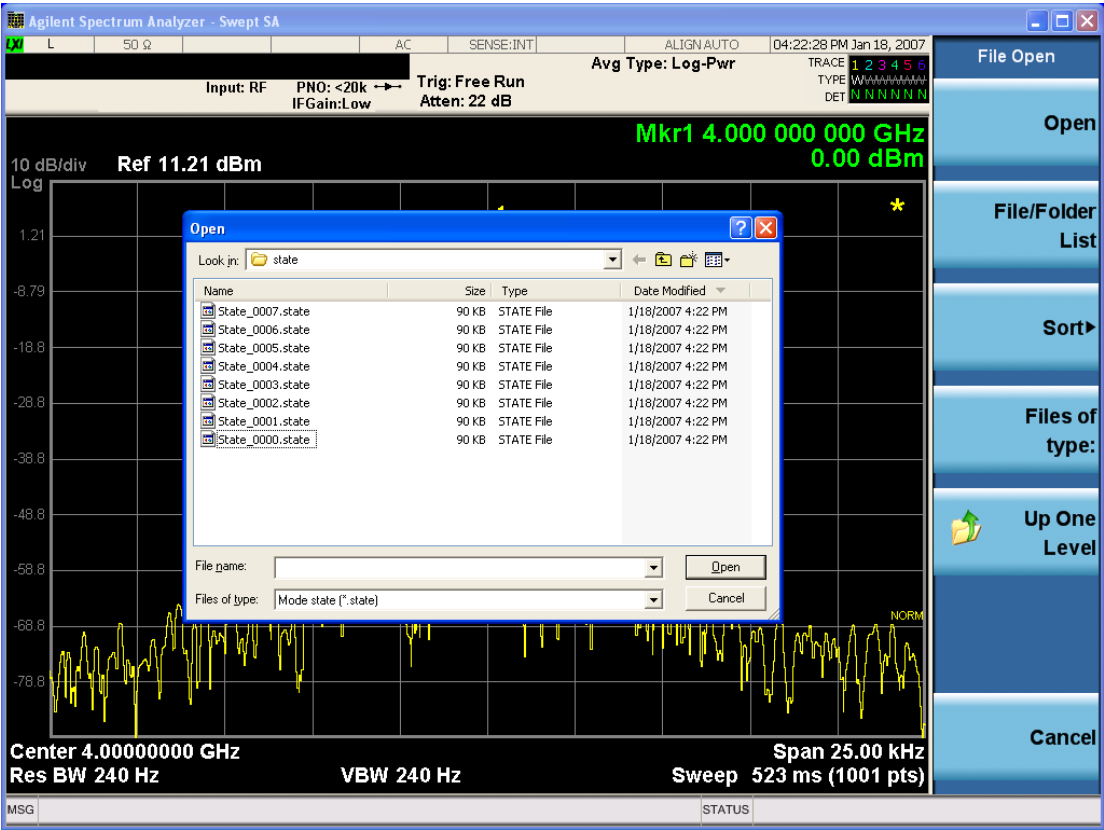
In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

The following table describes the Trace Save and Recall possibilities:

You want to recall state and one trace's data, leaving other traces unaffected.	Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed.	On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed.
You want to recall all traces	Save Trace+State from ALL traces.	On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved)
You want all traces to load exactly as they were when saved.	Save State	On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten.

From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "**File Open.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

Look In

The **Look In** field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are **By Date**, **By Name**, **By extension**, and **By Size**.

Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

Key Path	Recall, State
Notes	Brings up the Open dialog for recalling a State Save Type
Initial S/W Revision	Prior to A.02.00

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the **Save, State** function.

Key Path	Recall, State
Mode	All
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available"
Initial S/W Revision	A.11.00

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
Example	*RCL 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State, Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
Example	*RCL 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

Key Path	Recall, Sequences
Mode	All
Remote Command	:MMEMory:LOAD:SEquences: SLIS ALIS SAALIS "MySequence.txt"
Example	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Notes	Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt)
Initial S/W Revision	A.05.00

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Recall, Sequences
Example	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Dependencies	Only available in XOBT
Initial S/W Revision	A.05.00

Open...

When you press “Open”, the analyzer brings up a Windows dialog and a menu entitled “**File Open.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 1473 in **Recall, State**, for a full description of this dialog and menu.

Key Path	Recall, Data
Notes	The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type
Initial S/W Revision	Prior to A.02.00

Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMediate
- Sending the remote command INIT:REStart

See ["More Information" on page 575](#)

Key Path	Front-panel key
Remote Command	:INITiate[:IMMediate] :INITiate:REStart
Example	:INIT:IMM :INIT:REST
Notes	:INITiate:REStart and :INITiate:IMMediate perform exactly the same function.
Couplings	Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement.
Status Bits/OPC dependencies	This is an Overlapped command. The STATUS:OPERation register bits 0 through 8 are cleared. The STATUS:QUESTionable register bit 9 (INTEgrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set.
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:REStart command restart trace averages (displayed average count reset to 1) for a trace in Clear Write , but did not restart Max Hold and Min Hold . In the X-Series, the Restart hardkey and the INITiate:REStart command restart not only Trace Average , but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:REStart command restart every measurement, which includes all traces and numeric results. There is no change to this operation.
Initial S/W Revision	Prior to A.02.00

More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average**, **Max Hold**, or **Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count k equals the number N set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC: AVER: TCON UP.

Save

The **Save** menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an **Export (Data)** option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

Key Path	Front-panel key
Mode	All
Notes	No remote command for this key specifically, but the :MMEM:STOR:STATE command is available for specific file types. An example is :MMEM:STOR:STATE <filename>.
Initial S/W Revision	Prior to A.02.00

State

The Save State menu lets you choose a register or file for saving the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent **System** settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<mode name>\state

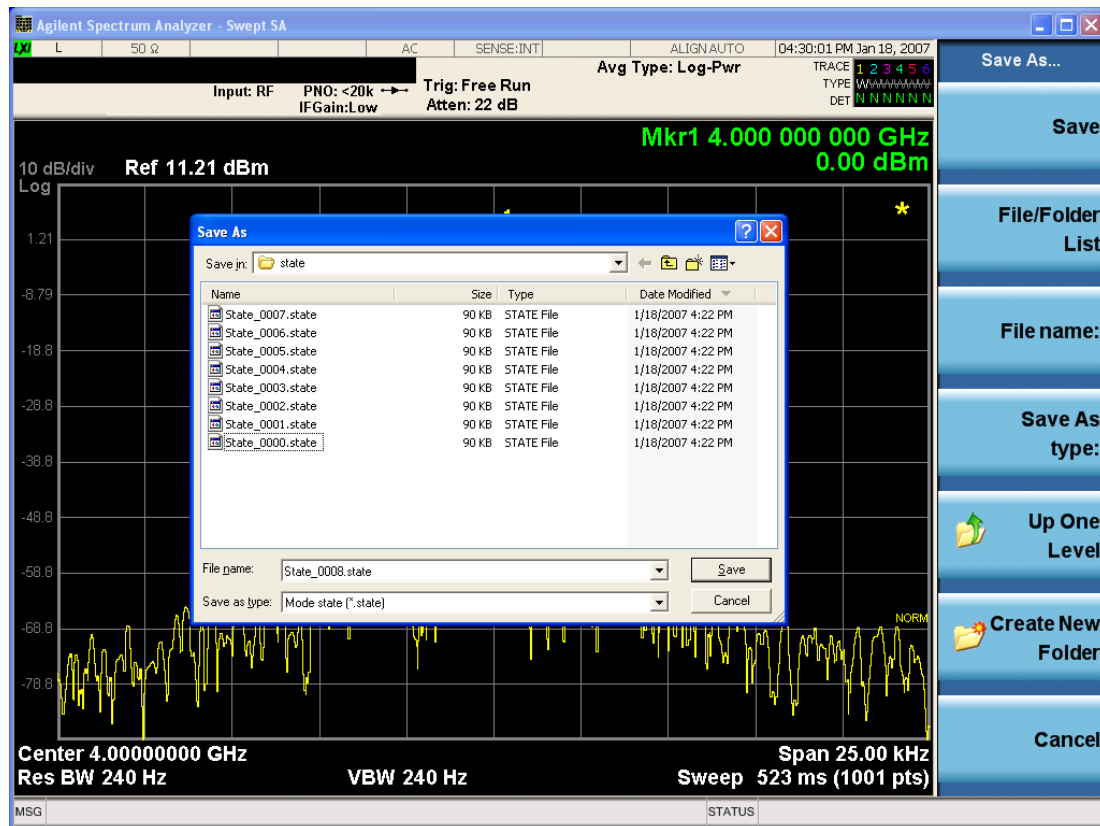
where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save
Mode	All
Remote Command	:MMEMory:STOR:STATE <filename>
Example	MMEM:STOR:STATE "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory.
Notes	Both single and double quotes are supported for any filename parameter over remote. After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key. After saving to a register, you remain in the Save State menu, so that you can see the Register key

	update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.
Backwards Compatibility SCPI	:MMEMory:STORe:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.
Initial S/W Revision	Prior to A.02.00

To File . . .

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



are the functions of the various fields in the dialog, and the corresponding softkeys:

Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting **OK**, or you can Cancel the request. If you select OK, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

File Name

The **File Name** field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 1469](#) documentation for more on the automatic file naming algorithm.

When you press the **File Name** key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the **Done** softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Create New Folder

This key corresponds to the icon of a folder with the "*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

Key Path	Save, State
Mode	All
Notes	Brings up Save As dialog for saving a State Save Type
Initial S/W Revision	Prior to A.02.00

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See ["More Information" on page 580](#)

Key Path	Save, State
Mode	All
Remote Command	:MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number>
Example	:MMEM:REG:STAT:LAB 1,"my label"
Notes	<reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,""
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available"
Preset	The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc"
Initial S/W Revision	A.11.00

More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The *SAV and *RCL commands will not be affected by the custom register names, nor will the MMEM commands.

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
Example	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
Example	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

Mass Storage Catalog (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:CATalog? [<directory_name>]
Notes	The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty
Initial S/W Revision	Prior to A.02.00

Mass Storage Change Directory (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory?

Notes	The string must be a valid logical path. Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value. At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal. Query returns full path of the default directory.
Initial S/W Revision	Prior to A.02.00

Mass Storage Copy (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:COpy <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Copies an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists. This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

Key path	SCPI Only
Remote Command	:MMEMory:COpy:DEvice <source_string>,<dest_string>
Notes	The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device. Valid device keywords are: SNS (smart noise source) An error is generated if the file or device is not found.

Mass Storage Delete (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:DELeTe <file_name>[,<directory_name>]

Notes	The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an “access denied” error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

Key path	SCPI Only
Remote Command	:MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name>
Notes	The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format.
Initial S/W Revision	Prior to A.02.00

Mass Storage Make Directory (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:MDIRectory <directory_name>
Notes	The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an “access denied” error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Mass Storage Move (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:MOVE <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source.

	The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists. This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Mass Storage Remove Directory (Remote Command Only)

Key path	SCPI Only
Remote Command	<code>:MMEMory:RDIRectory <directory_name></code>
Notes	The string must be a valid logical path. Removes a directory. The <directory_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed. This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

Key Path	Save, Sequences
Mode	All
Remote Command	<code>:MMEM:STOR:SEquences: SLISt ALISt SAALISt SSTep "MySequence.txt"</code>
Example	<code>:MMEM:STOR:SEQ:SLISt "MySequence.txt"</code>
Notes	Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt)
Initial S/W Revision	A.05.00

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Save, Sequences
Example	:MMEM:STOR:SEQ:SLIS "MySequence.txt"
Dependencies	Only available in XOBT
Initial S/W Revision	A.05.00

Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

Key Path	Save, Sequences
Mode	All
Notes	Brings up Save As dialog for saving a Sequence Save Type
Initial S/W Revision	A.05.00

Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

Key Path	Save
Mode	All
Notes	The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in

	the MMEM:STOR commands.
Dependencies	If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it.
Preset	Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults
Readback	The data type that is currently selected
Initial S/W Revision	Prior to A.02.00

Measurement Results

Pressing this key selects Meas Results as the data type to be exported. Pressing the key a second time brings up the Meas Results menu, which allows you to select which **Meas Result** to save. In the Swept SA measurement, there are three types of Measurement Results files: Peak Table, Marker Table and Spectrogram.

See ["Meas Results File Contents" on page 588](#).

See ["Marker Table" on page 588](#).

See ["Peak Table" on page 590](#).

See ["Spectrogram" on page 593](#)

Remote Command	:MMEMory:STORe:RESults:MTABle PTABle SPECtrogram <filename>
Example	:MMEM:STOR:RES:MTAB "myResults.csv" Saves the results from the current marker table to the file myResults.csv in the current path. :MMEM:STOR:RES:PTAB "myResults.csv" Saves the results from the current peak table to the file myResults.csv in the current path. :MMEM:STOR:RES:SPEC "myResults.csv" Saves the results from the current Spectrogram display to the file myResults.csv in the current path. The default path is My Documents\SA\data\SAN\results
Notes	If the save is initiated via SCPI, and the file already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	If a save of Marker Table results is requested and the Marker Table is not on, no file is saved and a message is generated If a save of Peak Table results is requested and the Peak Table is not on, no file is saved and a message is generated If a save of Spectrogram results is requested and the Spectrogram is not on, no file is saved and a message is generated. The Spectrogram choice only appears if option EDP is licensed.
Preset	Not part of Preset, but is reset to Peak Table by Restore Mode Defaults. Survives a shutdown.
Initial S/W Revision	Prior to A.02.00

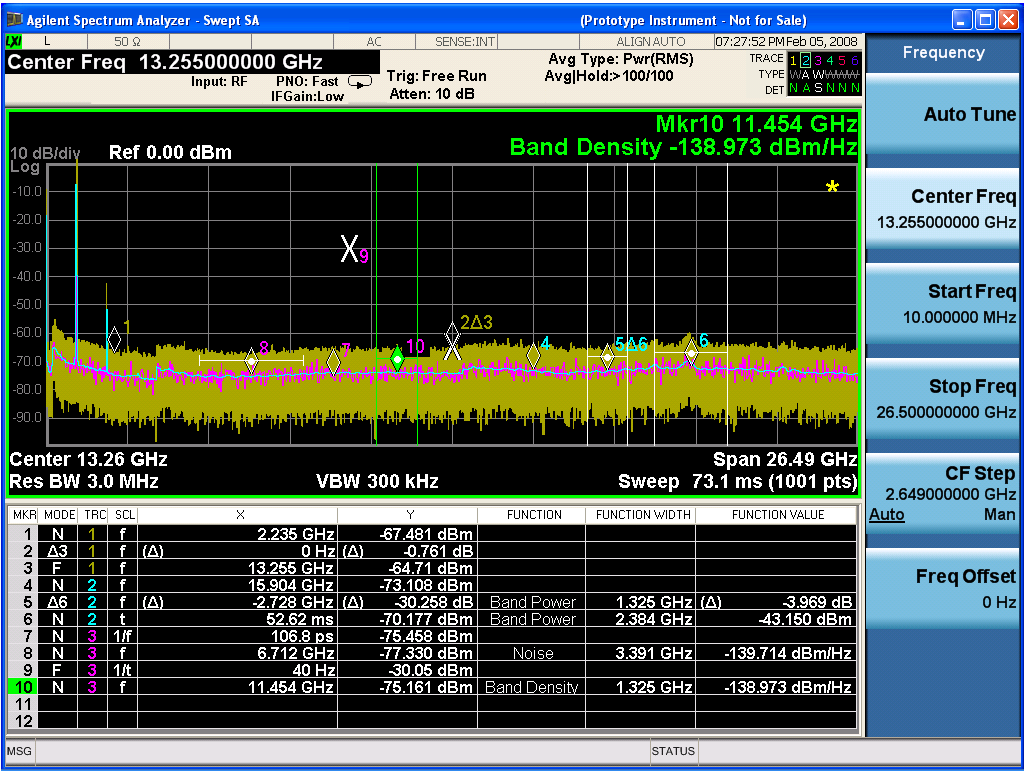
Meas Results File Contents

All files are .csv files. The following section details the data in each file type.

Marker Table

This section discusses the Marker Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:



Then the Meas Results file, when opened, would show the following data:

MeasurementR	
result	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR	1
P26 EA3	
Result Type	Marker Table
Ref Level	0
Number of Points	1001
Sweep Time	0.0662666
	67

Start Frequency	10000000								
Stop Frequency	26500000000								
Average Count	0								
Average Type	LogPower (Video)								
RBW	3000000								
RBW Filter	Gaussian								
RBW Filter BW	3dB								
VBW	3000000								
Sweep Type	Swept								
X Axis Scale	Lin								
PreAmp State	Off								
PreAmp Band	Low								
Trigger Source	Free								
Trigger Level	1.2								
Trigger Slope	Positive								
Trigger Delay	1.00E-06								
Phase Noise Optimization	Fast								
Swept If Gain	Low								
FFT If Gain	Autorange								
RF Coupling	AC								
FFT Width	411900								
Ext Ref	10000000								
Input	RF								
RF Calibrator	Off								
Attenuation	10								
Ref Level Offset	0								
External Gain	0								
X Axis Units	Hz								
Y Axis Units	dBm								
DATA									
MKR	MODE	TR C	SCL	X	Y	FUNCTI ON	FUNCTIO N WIDTH	FUNCTI ON VALUE	FUNCTI ON UNIT
1	Normal	1	Frequen cy	2.2350E+09	- 67.481	Off	0.0000E+00	0	None

2	Delta3	1	Frequency	0.0000E+00	-0.761	Off	0.0000E+00	0	None
3	Fixed	1	Frequency	1.3255E+10	-64.71	Off	0.0000E+00	0	None
4	Normal	2	Frequency	1.5904E+10	-73.108	Off	0.0000E+00	0	None
5	Delta7	2	Frequency	-2.7280E+09	-30.258	Band Power	1.3250E+06	-3.969	dB
6	Normal	2	Time	5.2620E-02	-70.177	Band Power	2.3840E+06	-43.15	dBm
7	Normal	3	Period	1.0680E-10	-75.458	Off	0.0000E+00	0	None
8	Normal	3	Frequency	6.7120E+09	-77.33	Noise	3.3910E+06	-139.714	dBm/Hz
9	Fixed	3	Inverse Time	4.0000E+01	-30.05	Off	0.0000E+00	0	None
10	Normal	3	Frequency	1.1454E+10	-75.161	Band Density	1.3250E+06	-138.973	dBm/Hz
11	Off	1	Frequency	0.0000E+00	0	Off	0.0000E+00	0	None
12	Off	1	Frequency	0.0000E+00	0	Off	0.0000E+00	0	None

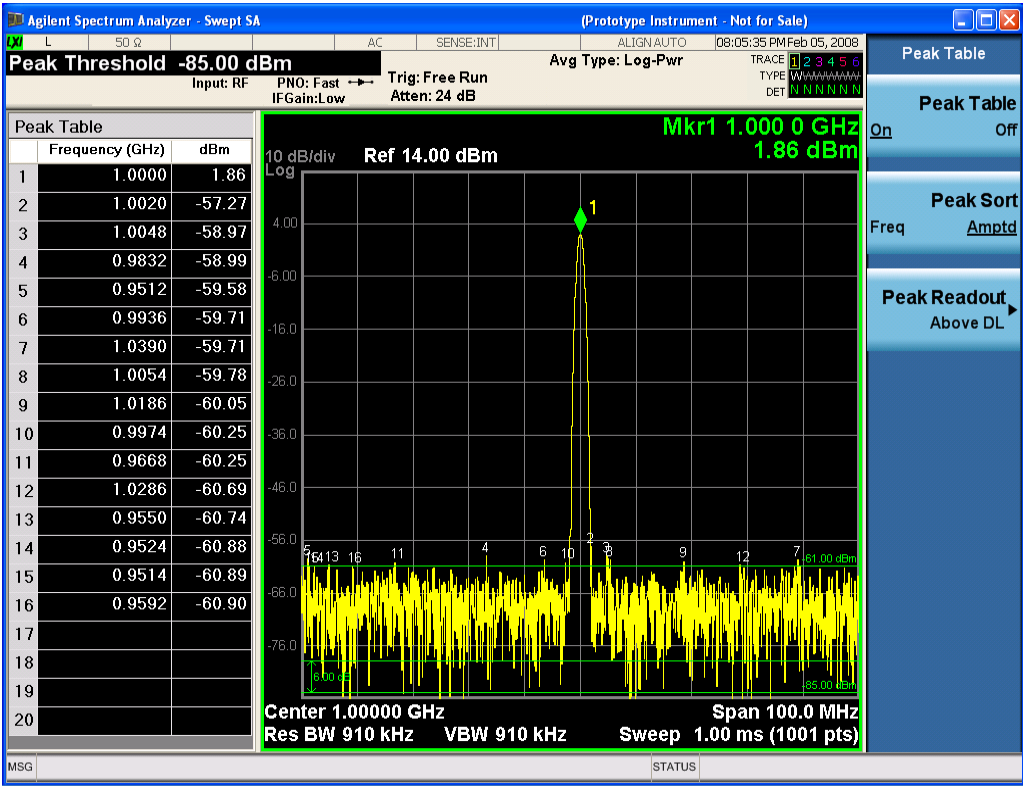
The numbers appear in the file exactly as they appear onscreen. If it says 11.454 GHz onscreen, then in the file it is 11.454E+09.

The metadata header is very similar to the metadata used in the trace data .csv files. See Trace File Contents. The only new information concerns the 1-of-N fields in the marker table itself.

Peak Table

This section discusses the Peak Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:



Then the Meas Results file, when opened, would show the header data (the same as for the Marker Table except that the Result Type is Peak Table) ending with a few fields of specific interest to Peak Table users:

- Peak Threshold
- Peak Threshold State (On|Off)
- Peak Excursion
- Peak Excursion State (On|Off)
- Display Line
- Peak Readout (All|AboveDL|BelowDL)
- Peak Sort (Freq|Amptd)

These fields are then followed by the data for the Peak Table itself.

Note that the label for the Frequency column changes to Time in 0 span.

Here is what the table for the above display looks like:

MeasurementResult	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR P26 EA3	1

Result Type	Peak Table
Ref Level	0
Number of Points	1001
Sweep Time	0.066266667
Start Frequency	10000000
Stop Frequency	26500000000
Average Count	0
Average Type	LogPower(Video)
RBW	3000000
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	3000000
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	1.00E-06
Phase Noise Optimization	Fast
Swept If Gain	Low
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	10
Ref Level Offset	0
External Gain	0
X Axis Units	Hz
Y Axis Units	dBm
Peak Threshold	-85
Peak Threshold State	On
Peak Excursion	6
Peak Excursion State	On

Display Line	-61	
Peak Readout	AboveDL	
Peak Sort	Amptd	
DATA		
Peak	Frequency	Amplitude
1	1.0000E+06	1.86
2	1.0020E+06	-57.27
3	1.0048E+06	-58.97
4	9.8320E+05	-58.99
5	9.5120E+05	-59.58
6	9.9360E+05	-59.71
7	1.0390E+06	-59.71
8	1.0054E+06	-59.78
9	1.1086E+06	-60.05
10	9.9740E+05	-60.25
11	9.6680E+05	-60.25
12	1.0286E+06	-60.69
13	9.5500E+05	-60.74
14	9.5240E+05	-60.88
15	9.5140E+05	-60.89
16	9.5920E+05	-60.90
17		
18		
19		
20		

Spectrogram

This section discusses the Spectrogram Results file format. The Spectrogram choice only appears if option EDP is licensed.

The Spectrogram results are the same as a Trace data export, except that instead of having just one trace's data, all 300 traces appear one after the other.

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Each trace has its own data mark; the data for Spectrogram Trace 0 follows the row marked DATA, the data for Spectrogram Trace 1 follows the row marked DATA1, for Spectrogram Trace 2 follows the row marked DATA2, and so on.

Each DATA row has a timestamp in the second column (as of firmware revision A.11.01). So, for example, if Trace 0 had a relative start time of 1729.523 sec, then the first DATA row would look like this:

DATA,1729.523

And if Trace 13 had a relative start time of 100.45 sec, then the fourteenth data row would look like:

DATA13,100.453

To find the absolute time for the relative timestamps of each trace, the last row before the first DATA row gives the absolute start time of the Spectrogram, in the form YYYYMMDDHHMMSS

So, for example, if the absolute start time is 13:23:45:678 on January 30, 2012, this row would look like:

Start Time,20120130132345678

NOTE:

NOTE

The resolution of the absolute time stored is 1 ms, which matches up with the fact that the fastest sweep time is also 1 ms. However, there is no specification for the absolute accuracy of the clock in the analyzer, nor is there any facility provided to allow the user to set this time to any particular degree of accuracy.

Traces that have not yet been filled in the Spectrogram display are empty; there is no DATA header for them. The file ends after the last non-empty trace.

Imagine that, at the point where a Spectrogram Meas Result is requested, the following screen is showing:



For the purpose of this example, we have set the Average/Hold Number to 10, thus we have only traces 0 thru 10. The Spectrogram was started at 02:28:08:700 pm on April 25, 2012 (that is, 700 ms after 2:28:08 pm), although the screen dump itself shows a different time, as it was taken ten minutes after the Spectrogram data. Trace 0 is showing a start time of 5.30 seconds, meaning 5.3 seconds after the Spectrogram started (trace 10 has a start time of 0, as it was the first trace taken but has now rolled up into the tenth trace slot).

The Meas Results file, when opened, shows the header data and ten traces of trace data. Below is an extract from the result file for the above display. Note the start time of 20120425142808700 showing in the last row before the first DATA row, and the relative time of 5.299231048 showing in the first DATA row:

Result Type	Spectrogram
MeasResult	
Swept SA	
A.11.00.01	N9020A
503 508 513 526 ALL ALV B1C B1X B25 B2X B40 BAB BBA CR3 CRP DP2 DRD EA3 EDP EMC EP1 ERC ESC ESP EXM FSA HBA K03 LFE MPB P03 P08 P13 P26 PFR RTL RTS S40 SB1 SEC SM1 UK6 YAS YAV	1
Segment	0
Number of Points	1001
Sweep Time	0.523333333
Start Frequency	5999984415
Stop Frequency	6000009415
Average Count	0
Average Type	LogPower(Video)
RBW	240
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	240
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	0
Phase Noise Optimization	Wide
Swept If Gain	Low

Result Type	Spectrogram
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	14
Ref Level Offset	0
External Gain	0
Trace Type	Clearwrite
Detector	Normal
Trace Math	Off
Trace Math Oper1	Trace5
Trace Math Oper2	Trace6
Trace Math Offset	0
Trace Name	Trace1
X Axis Units	Hz
Y Axis Units	dBm
Start Time	20120425142808700
DATA	5.299231048
5999984415	-76.34749519
5999984440	-77.28097006
5999984465	-75.32317869
5999984490	-73.64417681
5999984515	-72.67154604

O

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O

6000009315	-77.94423277
6000009340	-79.51829697
6000009365	-78.46108961
6000009390	-78.46108957
6000009415	-76.59570596
DATA2	4.708697055

5999984415	-80.98197882
5999984440	-80.98197879
5999984465	-75.83142132
5999984490	-74.02712079
5999984515	-73.57213005

O
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O

6000009315	-75.9183103
6000009340	-79.53787488
6000009365	-78.82602191
6000009390	-78.82602188
6000009415	-76.37486709
DATA10	0
5999984415	-75.56751112
5999984440	-75.76485645
5999984465	-76.67718717
5999984490	-78.79238489
5999984515	-83.72680212

O
O
O

6000009315	-71.3942461
6000009340	-72.28308332
6000009365	-73.92684489
6000009390	-75.45548832
6000009415	-75.17904815

Save As . . .

When you press “Save As”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See ["To File . . ." on page 1482](#) in **Save, State** for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<mode name>\data\limits

For all of the Measurement Results Data Files:

My Documents\<mode name>\data\<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<mode name>\data\captureBuffer

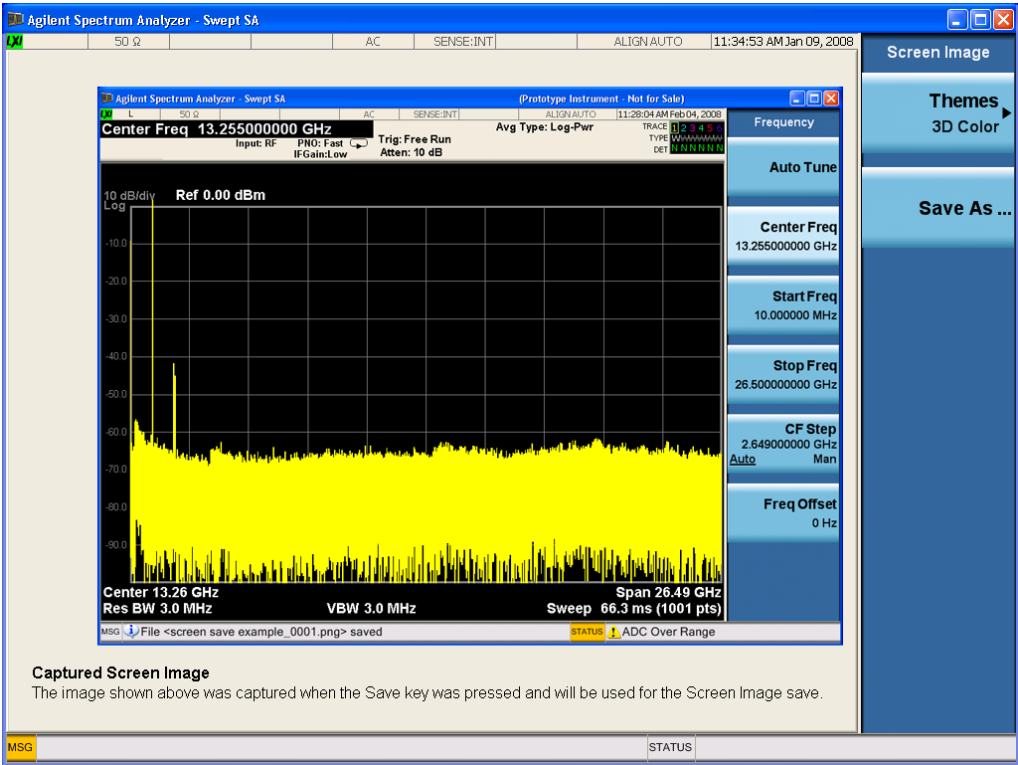
Key Path	Save, Data
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision	Prior to A.02.00

Screen Image

Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the **Save** front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the **Save As** menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the **Save** menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the **Quick Save** front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

NOTE For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

Key Path	Save
Mode	All
Remote Command	:MMEMory:STORe:SCReen <filename>
Example	:MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory.
Initial S/W Revision	Prior to A.02.00

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

Key Path	Save, Screen Image
Remote Command	:MMEMory:STORe:SCReen:THEMe TDCOLOR TDMonochrome FCOLOR FMONochrome :MMEMory:STORe:SCReen:THEMe?
Example	:MMEM:STOR:SCR:THEM TDM
Preset	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
Readback	3D Color 3D Mono Flat Color Flat Mono
Backwards Compatibility Notes	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
Initial S/W Revision	Prior to A.02.00

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDC
Readback	3D Color
Initial S/W Revision	Prior to A.02.00

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDM
Readback	3D Mono
Initial S/W Revision	Prior to A.02.00

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	Save, Screen Image, Themes

Example	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 1482 in **Save, State** for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\<mode name>\screen.

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save, Screen Image
Notes	Brings up Save As dialog for saving a Screen Image Save Type
Initial S/W Revision	Prior to A.02.00

Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing **Single** does a Resume.

See ["More Information" on page 602](#)

Key Path	Front-panel key
Example	:INIT:CONT OFF
Notes	See Cont key description.
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold. For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state. INIT[:IMM] in ESA & PSA Spectrum Analysis Mode does an implied ABORT. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.
Initial S/W Revision	Prior to A.02.00

More Information

See ["Restart" on page 1479](#) for details on the INIT:IMMediate (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the **Single** key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the **Single** key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the **Single** key in the middle of a sweep does not restart the sweep, sending INIT:IMMediate does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

Key Path	Front-panel key

RF Output

This parameter sets the source RF power output state.

Key Path	Source
Remote Command	:OUTPut[:EXternal][:STATe] ON OFF 1 0 :OUTPut[:EXternal][:STATe]?
Example	OUTP OFF OUTP?
Notes	The EXTERNAL node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source. This setting is for the independent mode and has no effect on the "List Sequencer" on page 1584. If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately. When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the "Sequencer" on page 1585 is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

Amplitude

Allows you to access the Amplitude sub-menu.

Key Path	Source
Notes	The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 1584. If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set "Sequencer" on page 1585 to Off will make source leave list sequencer and this button will be black out.
Initial S/W Revision	A.05.00

RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the ["RF Power Range " on page 605](#) table below for the valid ranges.

Key Path	Source, Amplitude
Remote Command	:SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]?
Example	:SOUR:POW -100 dBm
Notes	Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel. Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Couplings	If "Real-Time AWGN" on page 1545 AWGN State is On and "ARB" on page 1534 ARB State is On, this setting will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 1546 Power Control Mode and other noise settings
Preset	-100 dBm
Min	The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 605 table below for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 605 table below for the valid ranges.

Initial S/W Revision	A.05.00
Modified at S/W Revision	A.16.00 (Add couplings with AWGN state)

RF Power Range

RF Output Port	Frequency Range	Min Output Power	Max Output Power
High Power RF Out	10 MHz $\leq$ f $\leq$ 6 GHz	-150 dBm	20 dBm
RFIO 1 & RFIO 2	10 MHz $\leq$ f $\leq$ 6 GHz	-150 dBm	0 dBm
GPS (Note2)	10 MHz $\leq$ f $\leq$ 6 GHz	-150 dBm	0 dBm

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power – entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

Key Path	Source, Amplitude
Dependencies	This key is unavailable, and is grayed out when the "List Sequencer" on page 1584 is turned ON.
Initial S/W Revision	A.05.00

Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 1500](#)

Key Path	Source, Amplitude
Remote Command	:SOURce:POWer:REfERENCE <ampl> :SOURce:POWer:REfERENCE? :SOURce:POWer:REfERENCE:STATe OFF ON 0 1 :SOURce:POWer:REfERENCE:STATe?
Example	:SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATe ON
Dependencies	This setting is unavailable and is grayed out when the "List Sequencer" on page 1584 is turned ON.
Couplings	This value is coupled to the "Set Reference Power " on page 1500 key such that pressing the Set Reference Power key updates the reference power with the current output power.
Preset	0.00 dBm OFF
Min	-125.00 dBm
Max	10.00 dBm
Initial S/W Revision	A.05.00

Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

Key Path	Source, Amplitude
Remote Command	:SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_ampl> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet?
Example	:SOUR:POW:OFFS 0.00 dB
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0.00 dB
Min	-200.00 dB
Max	200.00 dB
Initial S/W Revision	A.05.00

Modulation

Allows you to toggle the state of the modulation.

Key Path	Source
Remote Command	:OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]?
Example	:OUTP:MOD OFF
Notes	This setting is for independent mode and has no effect on " List Sequencer " on page 1584 . If the " Sequencer " on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately. When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the " Sequencer " on page 1585 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer.
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

Frequency

Allows you to access the Frequency sub-menu.

Key Path	Source
Notes	The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 1584 . If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out.
Initial S/W Revision	A.05.00

Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW]?
Example	:SOUR:FREQ 1.00 GHz
Notes	Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency.
Couplings	The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency.
Preset	1.00 GHz
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: **"GSM/EDGE Channel Number Ranges" on page 609**,

"W-CDMA Channel Number Ranges" on page 610, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 611, and "LTE FDD Channel Number Ranges" on page 613.

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:CHANnels:NUMBer <int> :SOURce:FREQuency:CHANnels:NUMBer?
Example	:SOUR:FREQ:CHAN:NUMB 1
Notes	This key is grayed out when the "Radio Standard" on page 1512 is set to NONE. This key is grayed out on E6630A.
Dependencies	This key is grayed out when the "Radio Standard" on page 1512 is set to NONE. This key is grayed out on E6630A.
Couplings	The channel number is coupled to the frequency value when the "Radio Standard" on page 1512 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	Please refer to the tables below for the valid ranges.
Max	Please refer to the tables below for the valid ranges.
Initial S/W Revision	A.05.00

GSM/EDGE Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
P-GSM	Uplink (MS)	$1 \leq n \leq 124$	$890.0 + 0.2*n$
	Downlink (BS)	$1 \leq n \leq 124$	$935.0 + 0.2*n$
E-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$975 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$975 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
DCS 1800	Uplink (MS)	$512 \leq n \leq 885$	$1710.200 + 0.20*(n-512)$
	Downlink (BS)	$512 \leq n \leq 885$	$1805.200 + 0.20*(n-512)$
PCS 1900	Uplink (MS)	$512 \leq n \leq 810$	$1850.200 + 0.2*(n-512)$
	Downlink (BS)	$512 \leq n \leq 810$	$1930.200 + 0.2*(n-512)$
R-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$955 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$955 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
GSM 450	Uplink (MS)	$256 \leq n \leq 293$	$450.6 + 0.2*(n-259)$
	Downlink (BS)	$256 \leq n \leq 293$	$460.6 + 0.2*(n-259)$

Band	Link (Device)	Range	Frequency (MHz)
GSM 480	Uplink (MS)	$306 \leq n \leq 340$	$479.000 + 0.20*(n-306)$
	Downlink (BS)	$306 \leq n \leq 340$	$489.000 + 0.20*(n-306)$
GSM 850	Uplink (MS)	$128 \leq n \leq 251$	$824.200 + 0.20*(n-128)$
	Downlink (BS)	$128 \leq n \leq 251$	$869.200 + 0.20*(n-128)$
GSM 700	Uplink (MS)	$438 \leq n \leq 516$	$777.200 + 0.20*(n-438)$
	Downlink (BS)	$438 \leq n \leq 516$	$747.200 + 0.20*(n-438)$
T-GSM810	Uplink (MS)	$350 \leq n \leq 425$	$806.0 + 0.20*(n-350)$
	Downlink (BS)	$350 \leq n \leq 425$	$851.0 + 0.20*(n-350)$

W-CDMA Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
Band I	Downlink	$10562 \leq n \leq 10838$	$n \div 5$
	Uplink	$9612 \leq n \leq 9888$	$n \div 5$
Band II	Downlink	$412 \leq n \leq 687$	$n \div 5 + 1850.1$
		$9662 \leq n \leq 9938$	$n \div 5$
	Uplink	$12 \leq n \leq 287$	$n \div 5 + 1850.1$
		$350 \leq n \leq 425$	$n \div 5$
Band III	Downlink	$1162 \leq n \leq 1513$	$n \div 5 + 1575$
	Uplink	$937 \leq n \leq 1288$	$n \div 5 + 1525$
Band IV	Downlink	$537 \leq n \leq 1738$	$n \div 5 + 1805$
		$1887 \leq n \leq 2087$	$n \div 5 + 1735.1$
	Uplink	$1312 \leq n \leq 1513$	$n \div 5 + 1450$
		$1662 \leq n \leq 1862$	$n \div 5 + 1380.1$
Band V	Downlink	$1007 \leq n \leq 1087$	$n \div 5 + 670.1$
		$4357 \leq n \leq 4458$	$n \div 5$
	Uplink	$782 \leq n \leq 862$	$n \div 5 + 670.1$
		$4132 \leq n \leq 4233$	$n \div 5$
Band VI	Downlink	$1037 \leq n \leq 1062$	$n \div 5 + 670.1$
		$4387 \leq n \leq 4413$	$n \div 5$
	Uplink	$812 \leq n \leq 837$	$n \div 5 + 670.1$
		$4162 \leq n \leq 4188$	$n \div 5$
Band VII	Downlink	$2237 \leq n \leq 2563$	$n \div 5 + 2175$
		$2587 \leq n \leq 2912$	$n \div 5 + 2105.1$
	Uplink	$2012 \leq n \leq 2338$	$n \div 5 + 2100$
		$2362 \leq n \leq 2687$	$n \div 5 + 2030.1$
Band VIII	Downlink	$2937 \leq n \leq 3088$	$n \div 5 + 340$

Band	Link (Device)	Range	Frequency (MHz)
Band IX	Uplink	$2712 \leq n \leq 2863$	$n \div 5 + 340$
	Downlink	$9237 \leq n \leq 9387$	$n \div 5$
	Uplink	$8762 \leq n \leq 8912$	$n \div 5$
Band X	Downlink	$3112 \leq n \leq 3388$	$n \div 5 + 1490$
		$3412 \leq n \leq 3687$	$n \div 5 + 1430.1$
	Uplink	$2887 \leq n \leq 3163$	$n \div 5 + 1135$
		$3187 \leq n \leq 3462$	$n \div 5 + 1075.1$
Band XI	Downlink	$3712 \leq n \leq 3812$	$n \div 5 + 736$
	Uplink	$3487 \leq n \leq 3587$	$n \div 5 + 733$
Band XII	Downlink	$3837 \leq n \leq 3903$	$n \div 5 - 37$
		$3927 \leq n \leq 3992$	$n \div 5 - 54.9$
	Uplink	$3612 \leq n \leq 3678$	$n \div 5 - 22$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIII	Downlink	$4017 \leq n \leq 4043$	$n \div 5 - 55$
		$4067 \leq n \leq 4092$	$n \div 5 - 64.9$
	Uplink	$3792 \leq n \leq 3818$	$n \div 5 + 21$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIV	Downlink	$4117 \leq n \leq 4143$	$n \div 5 - 63$
		$4167 \leq n \leq 4192$	$n \div 5 - 72.9$
	Uplink	$3892 \leq n \leq 3918$	$n \div 5 + 12$
		$3942 \leq n \leq 3967$	$n \div 5 + 2.1$
Band XIX	Downlink	$712 \leq n \leq 763$	$n \div 5 + 735$
		$787 \leq n \leq 837$	$n \div 5 + 720.1$
	Uplink	$312 \leq n \leq 363$	$n \div 5 + 770$
		$387 \leq n \leq 437$	$n \div 5 + 755.1$

CDMA 2000 / 1xEVDO Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
US Cellular	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.030 \times N + 825.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 825.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 815.040$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.030 \times N + 870.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 870.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 860.040$
US PCS	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1850.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
Japan Cellular Band	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$1930.000 + 0.050 \times N$
		$1 \leq N \leq 799$	$0.0125 \times (N + 915.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 898.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 887.000$
	Downlink (BS, forward link)	$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 893.000$
		$1 \leq N \leq 799$	$0.0125 \times (N + 860.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 843.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 832.000$
Korean PCS Band	Uplink (MS, reverse link)	$0 \leq N \leq 599$	$0.050 \times N + 1750.000$
	Downlink (BS, forward link)	$0 \leq N \leq 599$	$0.050 \times N + 1840.000$
NMT-450 Band	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 450.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 410.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 451.010$
		$1536 \leq N \leq 1715$	$0.025 \times (N - 1536) + 479.000$
		$1792 \leq N \leq 2016$	$0.020 \times (N - 1792) + 479.000$
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 460.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 420.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 461.010$
		$1536 \leq N \leq 1715$	$0.025 \times (N - 1536) + 489.000$
		$1792 \leq N \leq 2016$	$0.020 \times (N - 1792) + 489.000$
IMT-2000 Band	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1920.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$2100.000 + 0.050 \times N$
Upper 700 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$776.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 240$	$746.000 + 0.050 \times N$
Secondary 800 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 719$	$0.025 \times N + 806.000$
		$720 \leq N \leq 919$	$0.025 \times (N - 720) + 896.000$
	Downlink (BS, forward link)	$0 \leq N \leq 719$	$0.025 \times N + 851.000$
		$720 \leq N \leq 919$	$0.025 \times (N - 720) + 935.000$
2.5 GHz IMT Extension	Uplink (MS, reverse link)	$0 \leq N \leq 1399$	$2500.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1399$	$2620.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
US PCS 1.9 GHz	Uplink (MS, reverse link)	$0 \leq N \leq 1299$	$1850.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1299$	$1930.000 + 0.050 \times N$
AWS	Uplink (MS, reverse link)	$0 \leq N \leq 899$	$1710.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 899$	$2100.000 + 0.050 \times N$
US 2.5 GHz	Uplink (MS, reverse link)	$140 \leq N \leq 1459$	$2495.000 + 0.050 \times N$
	Downlink (BS, forward link)	$140 \leq N \leq 1459$	$2617.000 + 0.050 \times N$
700 Public Safety	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$787.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 240$	$757.000 + 0.050 \times N$
C2K Lower 700	Uplink (MS, reverse link)	$0 \leq N \leq 360$	$698.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 360$	$728.000 + 0.050 \times N$
400 Euro PAMR	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 450.000$
		$472 \leq N \leq 871$	$0.025 \times (N-472) + 410.000$
	Uplink (MS, reverse link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 479.000$
	Uplink (MS, reverse link)		
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 460.000$
		$472 \leq N \leq 871$	$0.025 \times (N-472) + 420.000$
	Downlink (BS, forward link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 489.000$
	Downlink (BS, forward link)		
800 PAMR	Uplink (MS, reverse link)	$0 \leq N \leq 239$	$870.0125 + 0.025 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 239$	$915.0125 + 0.025 \times N$

LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier

frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOffs-UL)$$

Band	Downlink		Uplink			
FDL_low (MHz)	NOffs-DL	Range of NDL	FUL_low (MHz)	NOffs-UL	Range of NUL	
1	2110	0	0 - 599	1920	18000	18000 - 18599
2	1930	600	600 - 1199	1850	18600	18600 - 19199
3	1805	1200	1200 - 1949	1710	19200	19200 - 19949
4	2110	1950	1950 - 2399	1710	19950	19950 - 20399
5	869	2400	2400 - 2649	824	20400	20400 - 20649
6	875	2650	2650 - 2749	830	20650	20650 - 20749
7	2620	2750	2750 - 3449	2500	20750	20750 - 20449
8	925	3450	3450 - 3799	880	21450	21450 - 21799
9	1844.9	3800	3800 - 4149	1749.9	21800	21800 - 22149
10	2110	4150	4150 - 4749	1710	22150	22150 - 22749
11	1475.9	4750	4750 - 4949	1427.9	22750	22750 - 22949
12	729	5010	5010 - 5179	699	23010	23010 - 23179
13	746	5180	5180 - 5279	777	23180	23180 - 23279
14	758	5280	5280 - 5379	788	23280	23280 - 23379
...						
17	734	5730	5730 - 5849	704	23730	23730 - 23849
18	860	5850	5850 - 5999	815	23850	23850 - 23999

Band	Downlink	Uplink				
19	875	6000	6000 – 6149	830	24000	24000 – 24149
20	791	6150	6150 – 6449	832	24150	24150 – 24449
21	1495.9	6450	6450 – 6599	1447.9	24450	24450 – 24599
...						
24	1525	7700	7700 – 8039	1626.5	25700	25700 – 26039
25	1930	8040	8040 – 8689	1850	26040	26040 – 26689
26	859	8690	8690 – 9039	814	26690	26690 – 27039
...						

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4–1 and NDL is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4–1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOffs-UL)$$

Band	Downlink	Uplink				
FDL_low (MHz)	NOffs-DL	Range of NDL	FUL_low (MHz)	NOffs-UL	Range of NUL	
33	1900	36000	36000 – 36199	1900	36000	36000 – 36199
34	2010	36200	36200 – 36349	2010	36200	36200 – 36349
35	1850	36350	36350 – 36949	1850	36350	36350 – 36949
36	1930	36950	36950 – 37549	1930	36950	36950 – 37549

Band	Downlink	Uplink				
37	1910	37550	37550 – 37749	1910	37550	37550 – 37749
38	2570	37750	37750 – 38249	2570	37750	37750 – 38249
39	1880	38250	38250 – 38649	1880	38250	38250 – 38649
40	2300	38650	38650 – 39649	2300	38650	38650 – 39649
41	2496	39650	39650 – 41589	2496	39650	39650 – 41589
42	3400	41590	41590 – 43589	3400	41590	41590 – 43589
43	3600	43590	43590 – 45589	3600	43590	43590 – 45589

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

TDSCDMA Channel Number Ranges

1.28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 \cdot F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 \cdot (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

**Table: UTRA Absolute Radio
Frequency Channel Number 1.28
Mcps TDD Option**

Frequency Band	Frequency Range	UARFCN Uplink and Downlink transmission
For operation in frequency band as defined in subclause 5.2 (a)	1900–1920 MHz	9504 to 9596
	2010–2025 MHz	10054 to 10121
For operation in frequency band as defined in subclause 5.2 (b)	1850–1910 MHz	9254 to 9546
	1930–1990 MHz	9654 to 9946
For operation in frequency band as defined in subclause 5.2 (c)	1910–1930 MHz	9554 to 9646
For operation in frequency band as defined in subclause 5.2 (d)	2570–2620 MHz	12854 to 13096
For operation in frequency band as defined in subclause 5.2 (e)	2300–2400 MHz	11504 to 11996
For operation in frequency band as defined in subclause 5.2 (f)	1880–1920 MHz	9404 to 9596

Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

Key Path	Source, Frequency
Initial S/W Revision	A.05.00

Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

Key Path	Source, Frequency, Radio Setup
Remote Command	:SOURce:FREQuency:CHANnels:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10

	BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND27 BAND28 BAND29 BAND30 BAND31 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BAND44 BANDA BANDB BANDC BANDD BANDE BANDF :SOURce:FREQuency:CHANnels:BAND?
Example	:SOUR:FREQ:CHAN:BAND PGSM
Notes	Set this setting to "NONE" will grey out "Channel" on page 1503 Channel
Initial S/W Revision	A.05.00

None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

P-GSM

Selects P-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND PGSM
Initial S/W Revision	A.05.00

E-GSM

Selects E-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND EGSM
Initial S/W Revision	A.05.00

R-GSM

Selects R-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND RGSM
Initial S/W Revision	A.05.00

DCS 1800

Selects DCS 1800 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND DCS1800
Initial S/W Revision	A.05.00

PCS 1900

Selects PCS 1900 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND PCS1900
Initial S/W Revision	A.05.00

GSM 450

Selects GSM 450 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND GSM450
Initial S/W Revision	A.05.00

GSM 480

Selects GSM 480 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND GSM480
Initial S/W Revision	A.05.00

GSM 850

Selects GSM 850 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND GSM850
Initial S/W Revision	A.05.00

GSM 700

Selects GSM 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND GSM700
Initial S/W Revision	A.05.00

T-GSM 810

Selects T-GSM 810 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND T-GSM810
Initial S/W Revision	A.05.00

WCDMA

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

Band I

Selects Band I as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDI
Initial S/W Revision	A.05.00

Band II

Selects Band II as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDII
Initial S/W Revision	A.05.00

Band III

Selects Band III as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDIII
Initial S/W Revision	A.05.00

Band IV

Selects Band IV as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDIV
Initial S/W Revision	A.05.00

Band V

Selects Band V as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDV
Initial S/W Revision	A.05.00

Band VI

Selects Band VI as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDVI
Initial S/W Revision	A.05.00

Band VII

Selects Band VII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDVII
Initial S/W Revision	A.05.00

Band VIII

Selects Band VIII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDVIII
Initial S/W Revision	A.05.00

Band IX

Selects Band IX as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDIX
Initial S/W Revision	A.05.00

Band X

Selects Band X as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDX
Initial S/W Revision	A.05.00

Band XI

Selects Band XI as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDXI
Initial S/W Revision	A.05.00

Band XII

Selects Band XII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDXII
Initial S/W Revision	A.05.00

Band XIII

Selects band XIII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDXIII
Initial S/W Revision	A.05.00

Band XIV

Selects Band XIV as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDXIV
Initial S/W Revision	A.05.00

CDMA 2000 / 1xEVDO

Sets CDMA 2000 / 1xEVDO as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

US CELL

Selects US Cell as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND USCELL
Initial S/W Revision	A.05.00

US PCS

Selects US PCS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PCS
Initial S/W Revision	A.05.00

Japan Cell

Selects Japan Cell as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND JAPAN
Initial S/W Revision	A.05.00

Korean PCS

Selects Korean PCS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND KOREAN
Initial S/W Revision	A.05.00

NMT 450

Selects NMT 450 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND NMT
Initial S/W Revision	A.05.00

IMT 2000

Selects IMT 2000 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND IMT2K
Initial S/W Revision	A.05.00

Upper 700

Selects Upper 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND UPPER
Initial S/W Revision	A.05.00

Secondary 800

Selects Secondary 800 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND SECOND
Initial S/W Revision	A.05.00

400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PAMR400
Initial S/W Revision	A.05.00

800 PAMR

Selects 800 PAMR as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PAMR800
Initial S/W Revision	A.05.00

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND IMTEXT
Initial S/W Revision	A.05.00

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PCS1DOT9G
Initial S/W Revision	A.05.00

AWS

Selects AWS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND AWS
Initial S/W Revision	A.05.00

US 2.5GHz

Selects US 2.5 GHz as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND US2DOT5G
Initial S/W Revision	A.05.00

700 Public Safety

Selects 700 Public Safety as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PUBLIC
Initial S/W Revision	A.05.00

C2K Lower 700

Selects C2K Lower 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND LOWER
Initial S/W Revision	A.05.00

LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

BAND 1

Selects BAND 1 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND1
Initial S/W Revision	A.09.50

BAND 2

Selects BAND 2 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND2
Initial S/W Revision	A.09.50

BAND 3

Selects BAND 3 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND3
Initial S/W Revision	A.09.50

BAND 4

Selects BAND 4 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND4
Initial S/W Revision	A.09.50

BAND 5

Selects BAND 5 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND5
Initial S/W Revision	A.09.50

BAND 6

Selects BAND 6 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND6
Initial S/W Revision	A.09.50

BAND 7

Selects BAND 7 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND7
Initial S/W Revision	A.09.50

BAND 8

Selects BAND 8 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND8
Initial S/W Revision	A.09.50

BAND 9

Selects BAND 9 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND9
Initial S/W Revision	A.09.50

BAND 10

Selects BAND 10 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND10
Initial S/W Revision	A.09.50

BAND 11

Selects BAND 11 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND11
Initial S/W Revision	A.09.50

BAND 12

Selects BAND 12 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND12
Initial S/W Revision	A.09.50

BAND 13

Selects BAND 13 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND13
Initial S/W Revision	A.09.50

BAND 14

Selects BAND 14 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND14
Initial S/W Revision	A.09.50

BAND 17

Selects BAND 17 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND17
Initial S/W Revision	A.09.50

BAND 18

Selects BAND 18 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND18
Initial S/W Revision	A.09.50

BAND 19

Selects BAND 19 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND19
Initial S/W Revision	A.09.50

BAND 20

Selects BAND 20 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND20
Initial S/W Revision	A.09.50

BAND 21

Selects BAND 21 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND21
Initial S/W Revision	A.09.50

BAND 24

Selects BAND 24 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND24
Initial S/W Revision	A.09.50

BAND 25

Selects BAND 25 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND25
Initial S/W Revision	A.09.50

BAND 26

Selects BAND 26 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND26
Initial S/W Revision	A.12.53

BAND 27

Selects BAND 27 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND27
Initial S/W Revision	A.14.00

BAND 28

Selects BAND 28 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND28
Initial S/W Revision	A.14.00

BAND 31

Selects BAND 31 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND31
Initial S/W Revision	A.14.00

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND 33

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

BAND 34

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

BAND 35

Selects BAND 35 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

BAND 36

Selects BAND 36 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

BAND 37

Selects BAND 37 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

BAND 38

Selects BAND 38 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

BAND 39

Selects BAND 39 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

BAND 40

Selects BAND 40 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

BAND 41

Selects BAND 41 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

BAND 42

Selects BAND 42 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

BAND 43

Selects BAND 43 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

BAND 44

Selects BAND 44 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND44
Initial S/W Revision	A.14.00

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND A

Selects BAND A as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

BAND B

Selects BAND B as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

BAND C

Selects BAND C as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

BAND D

Selects BAND D as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

BAND E

Selects BAND E as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

BAND F

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

Radio Band Link

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the

source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number . When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

Key Path	Source, Frequency, Radio Setup
Remote Command	:SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK?
Example	:SOUR:RAD:BAND:LINK UP
Preset	DOWN
Range	DOWN UP
Backwards Compatibility SCPI	:SOURce:RADio:DEVIce BTS MS :SOURce:RADio:DEVIce?
Backwards Compatibility Notes	BTS maps to the Downlink frequency MS maps to the Uplink frequency
Initial S/W Revision	A.05.00

Set Reference Frequency

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency - entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

NOTE

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

Key Path	Source, Frequency

Remote Command	:SOURce:FREQuency:REFeRence:SET
Example	:SOUR:FREQ:REF:SET
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Initial S/W Revision	A.05.00

Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency + entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 1531](#)

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:REFeRence <freq> :SOURce:FREQuency:REFeRence? :SOURce:FREQuency:REFeRence:STATe OFF ON 0 1 :SOURce:FREQuency:REFeRence:STATe?
Example	:SOUR:FREQ:REF 0.00 Hz :SOUR:FREQ:REF:STATe ON
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Couplings	The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON.
Preset	0.00 Hz OFF
Min	0.00 Hz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source>Frequency>Frequency

offset value equals the value entered under Source>Frequency>Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source>Frequency>Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source>Frequency>Frequency

offset frequency equals the value previously entered and set under Source>Frequency>Freq Offset

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:OFFSet <freq> :SOURce:FREQuency:OFFSet?
Example	:SOUR:FREQ:OFFS 0 Hz
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0 Hz
Min	-100.00 GHz
Max	100.00 GHz
Initial S/W Revision	A.05.00

Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 1534, "AM" on page 1580, "FM" on page 1582, and "PM" on page 1583.

Key Path	Source
Initial S/W Revision	A.05.00

ARB

Allows you access to the ARB sub-menus.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a “MOD” annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe] ?
Example	:SOUR:RAD:ARB OFF :SOUR:RAD:ARB?
Notes	If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Dependencies	This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 1585 Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 1585 Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately. The ARB can only be turned on when there is a waveform file selected for playback. On the GUI If no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. "- When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported
Couplings	If "Real-Time AWGN" on page 1545 AWGN State is On and this setting is On, "RF Power" on page 1499 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 1546 Power Control Mode and other noise settings
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00
Modified at S/W Revision	A.16.00 (Add couplings with AWGN state)

Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Remote Command	:SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform?
Example	:SOUR:RAD:ARB:WAV "test_waveform.bin"
Notes	If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB. When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated . When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and none of the waveform segments is loaded. If the ARB is ON, and you attampt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On. If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generatedand the file selection remains unchanged. If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.error is generated. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this

	case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
Notes	<string> - specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error. When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated. If you specify a directory over SCPI, but the directory does not exist, an error is generated. If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for

selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated. It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated. When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 1584 and "Sequencer" on page 1585 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

NOTE

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use **"Query ARB Memory Full File List (Remote Command Only)" on page 1539**.

Remote Command	:SOURce:RADio:ARB:CATalog?
Example	:SOUR:RAD:ARB:CATalog?
Notes	The return data is in the following format: <integer> - memory used <integer> - memory free <string> ... - comma separated list of waveform segments within ARB memory
Initial S/W Revision	A.05.00

Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

Remote Command	:SOURce:RADio:ARB:FCATalog?
Example	:SOUR:RAD:ARB:FCATalog?
Notes	The return data is in the following format: <integer> - memory used

	<integer> - memory free <integer> - file count in ARB memory <string>,<string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm"
Initial S/W Revision	A.09.00

ARB Setup

Allows access to the ARB setup sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Sample Rate

Allows you to set the ARB waveform playback sample rate.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE?
Example	:SOUR:RAD:ARB:SCL:RATE 48.00 MHz
Notes	If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing.
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	125.00 MHz
Min	1.00 kHz
Max	125.00 MHz
Initial S/W Revision	A.05.00

Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

Key Path	Source, Modulation Setup, ARB, ARB Setup

Remote Command	:SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling?
Example	:SOUR:RAD:ARB:RSC 100.00
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	70.00 %
Min	1.00 %
Max	100.00 %
Initial S/W Revision	A.05.00

Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet?
Example	:SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	0.00 Hz
Min	-50.00 MHz
Max	50.00 MHz
Initial S/W Revision	A.05.00

Edit RMS

Allows you to edit or calculate current RMS of selected waveform.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Initial S/W Revision	A.14.50

Current RMS

Allows you to directly specify current RMS value used to playback currently selected waveform. Please note incorrect RMS value may cause inaccurate power output in E6640A that is sensitive to RMS value.

This setting is also updated by RMS in waveform header or updated when invoking RMS calculation operation.

This setting can be saved to the header of currently selected waveform by invoking ["Save Setup To Header" on page 1579](#) "Save Setup To Header".

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS
Remote Command	:SOURce:RADio:ARB:RMS <float> :SOURce:RADio:ARB:RMS?
Example	:SOUR:RAD:ARB:HEAD:RMS 0.7 :SOUR:RAD:ARB:HEAD:RMS?
Notes	Valid range is 0 to 1.414, values outside the range will be clipped to the closest boundary. Note this value does not affect "List Sequencer" on page 1584 Source List Sequencer that always uses RMS value resides in each ARB header. If want this value to take effect in list sequencer, use "Save Setup To Header" on page 1579 "Save Setup to Header" to save current RMS value to header first, then play the ARB in source list sequencer.
Dependencies	When a new waveform is selected for playback, this setting is updated by the RMS value defined in associated waveform header file. If selected waveform has no associated header file or header file does not specify RMS value, then instrument will try to calculate out one automatically. Calculating RMS can also update this setting.
Preset	0
Range	0 ~ 1.414
Initial S/W Revision	A.14.50

RMS Calculation Mode

Allows you to specify the mode to calculate the current RMS.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS
Remote Command	:SOURce:RADio:ARB:RMS:CALCulation:MODE AUTO M1 M2 M3 M4 :SOURce:RADio:ARB:RMS:CALCulation:MODE?
Example	:SOUR:RAD:ARB:RMS:CALC:MODE AUTO
Notes	If no waveform is selected, or selected waveform is waveform sequence, the key will grey out.
Preset	AUTO
Range	AUTO M1 M2 M3 M4
Initial S/W Revision	A.14.50

Auto

RMS will be calculated based on the whole sample range of current selected waveform.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode
Example	:SOUR:RAD:ARB:RMS:CALC:MODE AUTO
Initial S/W Revision	A.14.50

Marker 1

Selects marker 1 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker
Example	:SOUR:RAD:ARB:RMS:CALC:MODE M1
Initial S/W Revision	A.14.50

Marker 2

Selects marker 2 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker
Example	:SOUR:RAD:ARB:RMS:CALC:MODE M2
Initial S/W Revision	A.14.50

Marker 3

Selects marker 3 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker
Example	:SOUR:RAD:ARB:RMS:CALC:MODE M3
Initial S/W Revision	A.14.50

Marker 4

Selects marker 4 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker
Example	:SOUR:RAD:ARB:RMS:CALC:MODE M4
Initial S/W Revision	A.14.50

Calculate RMS

Allows you to calculate current RMS based on mode selected. This will update ["Current RMS" on page 1542](#) Current RMS setting.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS
Remote Command	:SOURce:RADio:ARB:RMS:CALCulate
Example	:SOUR:RAD:ARB:RMS:CALC
Notes	If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”. If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 1542 “RMS Calculation Mode” is set to marker, under this circumstance, invoking calculation operation will get error “-221 Setting conflict; There is no marker for currently selected waveform, auto RMS calculation mode is used instead”, and "RMS Calculation Mode" on page 1542 “RMS Calculation Mode” will be coupled to “Auto” mode automatically. RMS calculation does not suit for waveform sequence. If selected waveform is waveform sequence file, invoking this operation will get error “-221 Setting conflict; RMS calculation does not apply to waveform sequence”. But users can still edit current RMS as play parameter, and can save current RMS to waveform sequence header for later use.
Initial S/W Revision	A.14.50

Use Header RMS

Allows you to quickly set RMS in ARB header to ["Current RMS" on page 1542](#) Current RMS setting.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS,
Notes	No remote command, front panel only. If no waveform is selected, the key will grey out. If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.
Initial S/W Revision	A.14.50

Real-Time AWGN Setup

The source allows you to apply additive white Gaussian noise (AWGN) to a carrier in real time while the modulating waveform plays in the dual ARB player. Pressing this key allows access to the real time AWGN sub-menus and changes the central display area to show the AWGN Setup view.

This feature is controlled by E6650A-AW1 option

Key Path	Source, Modulation Setup, ARB, ARB Setup
Notes	This menu only appears and related SCPIs are only available when E6650A-AW1 option presents.
Initial S/W Revision	A.16.00

Real-Time AWGN

Allows you to enable or disable adding real-time AWGN to the carrier modulated by the waveform currently being played by the dual ARB.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe[:STATe] ON OFF 1 0 :SOURce:RADio:ARB:NOISe[:STATe]?
Example	:SOUR:RAD:ARB:NOIS OFF
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN state is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN state is updated with the value from the header file. The AWGN state will remain unchanged if the newly selected waveform does not have an associated header file.
Couplings	If this setting is On and "ARB" on page 1534 ARB State is On, "RF Power" on page 1499 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 1546 Power Control Mode and other noise settings
Preset	Off
Range	On Off
Initial S/W Revision	A.16.00

Carrier To Noise Ratio

Allows you to specify the carrier to noise ratio (C/N) in dB. The carrier power is defined as the total modulated signal power without noise power added. The noise power is applied over the specified bandwidth of the carrier signal.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:CN <ampl> :SOURce:RADio:ARB:NOISe:CN?
Example	:SOUR:RAD:ARB:NOIS:CN 0.00 dB
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN C/N ratio is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN C/N ratio is updated with the value from the header file. The AWGN C/N ratio will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	0.00 dB
Min	-100.00 dB
Max	100.00 dB
Initial S/W Revision	A.16.00

Carrier Bandwidth

Allows you to specify the bandwidth over which the AWGN is applied. The carrier RMS power and the noise power are integrated over the selected carrier bandwidth for the purpose of calculating carrier to noise ratio (C/N).

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:CBWidth <freq> :SOURce:RADio:ARB:NOISe:CBWidth?
Example	:SOUR:RAD:ARB:NOIS:CBW 1.00 Hz
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file.
Min	1.00 Hz
Max	200.00 MHz
Initial S/W Revision	A.16.00

Noise Bandwidth

Allows you to specify the flat noise bandwidth of the real-time noise for an ARB waveform.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:BANDwidth <freq> :SOURce:RADio:ARB:NOISe:BANDwidth?
Example	:SOUR:RAD:ARB:NOIS:BAND 1.00 Hz
Notes	Generally, flat noise bandwidth should be set slightly wider than the carrier bandwidth (typically 1.6 times wider)
Notes	Max Noise Bandwidth equals $0.8 * \text{Maximum ARB Sample Rate}$ reported in HW capability
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	1.00 Hz
Min	1.00 Hz
Max	160.00 MHz
Initial S/W Revision	A.16.00

Power Control Mode

This setting offers four ways to control the RF output power when adding AWGN to a signal.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:POWeR:CONTRol[:MODE] TOTal CARRier NOISe NCHannel :SOURce:RADio:ARB:NOISe: POWer:CONTRol[:MODE]?
Example	:SOUR:RAD:ARB:NOIS:POW:CONT NCHannel :SOUR:RAD:ARB:NOIS:POW:CONT?
Preset	TOTal
Range	Total Power Carrier Power Total Noise Power Noise Power in Channel
Initial S/W Revision	A.16.00

Total

Set the power control mode as total power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT TOTal
Couplings	Set to this value will make Carrier Power Carrier Power, Total Noise Power Total Noise Power, and Channel Noise Power Channel Noise Power buttons invisible on menu. Selecting Total as the power control mode makes the total power and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the total power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the total power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Carrier

Set the power control mode as carrier power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT CARRier
Couplings	Set to this value will make Carrier Power Carrier Power button visible, while Total Noise Power Total Noise Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Carrier as the power control mode makes the carrier power and C/N independent variables while making the total power and total noise power dependent variables. The dependent variables total power and total noise power are set by the carrier power, C/N, and the rest of the Noise settings. The total power and total noise power change as any noise parameter is adjusted to keep the carrier power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Total Noise

Set the power control mode as total noise power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT NOISe
Couplings	Set to this value will make Total Noise Power Total Noise Power button visible, while Carrier Power Carrier Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Total Noise as the power control mode makes the total noise power and C/N independent variables while making the total power and carrier power dependent variables. The dependent variables total power and carrier power are set by the total noise power, C/N, and the rest of the Noise settings. The total power and carrier power change as any noise parameter is adjusted to keep the total noise power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Channel Noise

Set the power control mode as channel noise power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT NChannel
Couplings	Set to this value will make Channel Noise Power Channel Noise Power button visible, while Total Noise Power Total Noise Power and Carrier Power Carrier Power buttons invisible from menu. Selecting Channel Noise as the power control mode makes the noise power in channel and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the channel noise power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the channel noise power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE CONTInuous SINGLE SADVance :SOURce:RADio:ARB:TRIGger:TYPE?
Example	:SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE?
Notes	Gated trigger type will be implemented at a later release
Preset	CONTInuous
Range	Continuous Single Seg Adv
Initial S/W Revision	A.05.00

Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE] FREE TRIGger RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE]?
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Preset	FREE
Range	Free Run Trigger + Run Reset + Run
Initial S/W Revision	A.05.00

Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Initial S/W Revision	A.05.00

Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG
Initial S/W Revision	A.05.00

Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT RES
Initial S/W Revision	A.05.00

Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:RETRigger ON OFF IMMediate :SOURce:RADio:ARB:RETRigger?
Example	:SOUR:RAD:ARB:RETR OFF
Notes	ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1.
Preset	ON
Range	No Retrigger Buffered Trigger Restart on Trigger
Initial S/W Revision	A.05.00

No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
Example	:SOUR:RAD:ARB:RETR OFF
Initial S/W Revision	A.05.00

Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
Example	:SOUR:RAD:ARB:RETR ON
Initial S/W Revision	A.05.00

Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
Example	:SOUR:RAD:ARB:RETR IMM
Initial S/W Revision	A.05.00

Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE CONTinuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] ?
Example	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
Preset	CONTinuous
Range	Single Continuous
Initial S/W Revision	A.05.00

Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
Example	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
Initial S/W Revision	A.05.00

Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
Example	:SOUR:RAD:ARB:TRIG:TYPE:SADV CONT
Initial S/W Revision	A.05.00

Trigger Source

The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 :SOURce:RADio:ARB:TRIGger[:SOURce]?
Example	:SOUR:RAD:ARB:TRIGger KEY
Dependencies	This key is grayed out if the current trigger type is Continuous, Free Run.
Preset	EXTernal2
Range	Trigger Key Bus External 2
Initial S/W Revision	A.05.00

Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger KEY
Initial S/W Revision	A.05.00

Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger BUS
Initial S/W Revision	A.05.00

External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger EXT2
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

Key Path	Source, Modulation Setup , ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty.
Initial S/W Revision	A.05.00

Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the

same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMORY:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
Notes	<string> - specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error. When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated. If you specify a directory over SCPI, but the directory does not exist, an error is generated. If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated. It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated. When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated. If you attempt to delete all files from ARB memory when there are waveform files used in "List

"Sequencer" on page 1584 and **"Sequencer" on page 1585** state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as **"Segments on Hard Disk" on page 1610**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform

Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as **"Load Segment To ARB Memory" on page 1610**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as **"Load All To ARB Memory" on page 1611**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as **"Change Directory..." on page 1612**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as **"Default Directory..." on page 1612**

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 1612](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Initial S/W Revision	Prior to A.09.00

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 1613](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 1613](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 1539](#).

Initial S/W Revision	Prior to A.09.00

Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, SCPI front panel only.
Preset	1
Min	1
Max	65535
Initial S/W Revision	A.05.00

Marker 1

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Delete Segment

Allows you to delete the selected segment from the waveform sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Save Sequence...

Pressing this key displays the “Save As” dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Initial S/W Revision	A.05.00

Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in ["Build New Sequence" on page 1553](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) "NVWFM" or use a real full path representation. See the example below. MSUS "NVWFM" is mapped to D: VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

Remote Command	<pre>:SOURce:RADio:ARB:SEquence[:MWAVeform] <filename>, <waveform1>, <reps>, NONE M1 M2 M3 M4 M1M2 M1M3 M1M4 M2M3 M2M4 M3M4 M1M2M3 M1M2M4 M1M3M4 M2M3M4 M1M2M3M4 ALL, {<waveform2>, <reps>, NONE M1 M2 M3 M4 M1M2 M1M3 M1M4 M2M3 M2M4 M3M4 M1M2M3 M1M2M4 M1M3M4 M2M3M4 M1M2M3M4 ALL, } ...</pre>

(For additional description of each item, see Notes below ["For Setup SCPI" on page 667](#) "For Setup SCPI".)

```
:SOURce:RADio:ARB:SEquence[:MWAVeform]? <filename>
```

(For additional description of each item, see Notes ["For Query SCPI" on page 668](#) below.)

Example

For setup:

```
>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4,
"NVWFM:wfmSegment2.wfm", 20, M1M3
```

Or

```
>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", "D: VARB\wfmSegment1.wfm", 10, M2M3M4, "D:
VARB\wfmSegment2.wfm", 20, M1M3
```

For query, must specify which waveform sequence file to query.

```
>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"
```

Or

```
>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",
```

Notes**For Setup SCPI**

For the Setup SCPI command, the parameters are:

<filename> - String Type

This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.

<waveform1> - String Type

This variable specifies the path and name of the first existing waveform segment. The path supports

MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE - This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 - these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL - This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not ".seq", error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq",

<"wfmSegment1.wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3",

Error Checks for Query SCPI command:

If you do not specify a filename, an error is generated.
 If the waveform sequence file name is empty, an error is generated.
 If the specified waveform sequence file cannot be found, an error is generated.

Initial S/W Revision	A.05.00

Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Waveform Utilities

Allows you access to the waveform utilities sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. “Left” module for E6630A or “TRX1” module for E6640A.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities
Dependencies	This key is only available if there is at least one Multi-pack license installed on the instrument.
Initial S/W Revision	A.05.00

Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if there is at least one slot available within at least one multi-pack license.
Initial S/W Revision	A.05.00

Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
Remote Command	:SYSTem:LKEY:WAVeform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVeform:ADD <string>
Example	SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm"
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:ADD is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. .
Dependencies	This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable.
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operation is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
Notes	<string> - specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error. When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated. If you specify a directory over SCPI, but the directory does not exist, an error is generated. If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles"

	:SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1611](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as ["Change Directory..." on page 1612](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as ["Default Directory..." on page 1612](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision	A.05.00

Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Remote Command	:SYSTem:LKEY:WAVeform:REPLace <int>, <string> or :SYSTem:LICense[:FPACK]:WAVeform:REPLace <int>, <string>
Example	SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" or :SYST:LIC:WAV:REPL 1, "myotherwaveform.wfm"
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Keysight signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.
Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as "Load All To ARB Memory" on page 1611.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as "Change Directory..." on page 1612.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as "Default Directory..." on page 1612

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Remote Command	:SYSTem:LKEY:WAVEform:CLEar <int> or :SYSTem:LICense[:FPACK]:WAVEform:CLEar <int>
Example	SYST:LKEY:WAV:CLE 1 or :SYST:LIC:WAV:CLE 1
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVEform:CLEar is provided to be consistent with the style of Keysight signal sources. You can use either one of them.

	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.
Dependencies	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision	A.05.00

Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Remote Command	:SYSTem:LKEY:WAVeform:LOCK <int> or :SYSTem:LICense[:FPACK]:WAVeform:LOCK <int>
Example	SYST:LKEY:WAV:LOCK 1 or SYST:LIC:WAV:LOCK 1
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.
Dependencies	This key is only available if the currently selected slot is in the trial state or the lock required state.
Initial S/W Revision	A.05.00

Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

Remote Command	:SYSTem:LKEY:WAVeform:STATus? <int> or :SYSTem:LICense[:FPACK]:WAVeform:STATus? <int>
Example	:SYST:LKEY:WAV:STAT? 1 <"Locked" or :SYST:LIC:WAV:STAT? 1 <"Locked"
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

	error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.
Range	"Locked" "Available" "Trail" "LockRequired" "Nonexistent"
Initial S/W Revision	A.05.00

Slots Free Query (Remote Command Only)

Returns the number of license slots free.

Remote Command	:SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LIcense[:FPACK]:WAVeform:FREE?
Example	:SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE?
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Initial S/W Revision	A.05.00

Slot Used Query (Remote Command Only)

Returns the number of license slots used.

Remote Command	:SYSTem:LKEY:WAVeform:USED? or :SYSTem:LIcense[:FPACK]:WAVeform:USED?
Example	:SYST:LKEY:WAV:USED? or :SYST:LIC:WAV:USED?
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Initial S/W Revision	A.05.00

Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

Remote Command	:SYSTem:LKEY:WAVeform:NAME? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int>

Example	:SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm" or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then empty string is returned.
Initial S/W Revision	A.12.00

Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

Remote Command	:SYSTem:LKEY:WAVeform:UID? <int> or :SYSTem:LICense[:FPACK]:WAVeform:UID? <int>
Example	:SYST:LKEY:WAV:UID? 2 <"1346752140" or :SYST:LIC:WAV:UID? 2 <"1346752140"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then "0" is returned
Initial S/W Revision	A.12.00

Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

Remote Command	:SOURce:RADio:ARB:MPLicensed:NAME:LOCKed?
Example	SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm"
Initial S/W Revision	A.11.00

Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

Remote Command	:SOURce:RADio:ARB:MPLicensed:UID:LOCKed?
Example	SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136","3812603511","3710986266"
Notes	Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list
Initial S/W Revision	A.11.00

Marker Utilities

Allows access to the marker utilities sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

Key Path	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

Mkr 1 Polarity

Allows you to set the polarity of marker 1.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1?
Example	:SOUR:RAD:ARB:MPOL:MARK1 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Mkr 2 Polarity

Allows you to set the polarity of marker 2.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2?
Example	:SOUR:RAD:ARB:MPOL:MARK2 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Mkr 3 Polarity

Allows you to set the polarity of marker 3.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3?
Example	:SOUR:RAD:ARB:MPOL:MARK3 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Mkr 4 Polarity

Allows you to set the polarity of marker 4.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4?

Example	:SOUR:RAD:ARB:MPOL:MARK4 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

Key Path	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting maker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
Remote Command	:SOURce:RADio:ARB:MDEStination:PULSe NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:PULSe?
Example	:SOUR:RAD:ARB:MDES:PULS NONE
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range	None M1 M2 M3 M4
Initial S/W Revision	A.05.00

None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision	A.05.00

Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision	A.05.00

Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision	A.05.00

Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
Remote Command	:SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold?
Example	:SOUR:RAD:ARB:MDES:ALCH NONE
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range	None M1 M2 M3 M4
Initial S/W Revision	A.05.00

None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision	A.05.00

Marker 1

Sets marker 1 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision	A.05.00

Marker 2

Sets marker 2 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision	A.05.00

Marker 3

Sets marker 3 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

Marker 4

Sets marker 4 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

Key Path	Source, Modulation Setup, ARB, Header Utilities
Remote Command	:SOURce:RADio:ARB:HEADer:CLEar
Example	:SOUR:RAD:ARB:HEAD:CLE
Notes	Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error.
Initial S/W Revision	A.05.00

Save Setup To Header

Allows you to save new file header information details to the file.

Key Path	Source, Modulation Setup, ARB, Header Utilities
Remote Command	:SOURce:RADio:ARB:HEADer:SAVE
Example	:SOUR:RAD:ARB:HEAD:SAVE
Notes	Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error.
Initial S/W Revision	A.05.00
Modified at S/W Revision	A.16.00 (AWGN settings will be saved to header as well)

Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

Remote Command	:MMEMory:HEADer:ID? "<file name>"
Example	:MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS)
Notes	SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk. If the file cannot be found in ARB memory or on hard disk, an error is generated and value -1 is returned
Initial S/W Revision	A.09.00

Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

Remote Command	:SOURce:RADio:ARB:TRIGger:INITiate
Example	:SOUR:RAD:ARB:TRIG:INIT
Initial S/W Revision	A.05.00

AM

Allows access to the menu for configuring the Amplitude Modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, AM
Remote Command	:SOURce:AM:STATe :SOURce:AM:STATe?
Example	:SOUR:AM:STAT OFF
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

AM Depth

Allows you to set the amplitude modulation depth in percent.

Key Path	Source, Modulation Setup, AM
Remote Command	:SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear] ?
Example	:SOUR:AM 0.1
Preset	0.1 %
Min	0.1 %
Max	95.0 %
Initial S/W Revision	A.05.00

AM Rate

Allows you to set the internal amplitude modulation rate.

Key Path	Source, Modulation Setup, AM
Remote Command	:SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency?
Example	:SOUR:AM:INT:FREQ 40.0 Hz

Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

FM

Allows access to the menu for configuring the frequency modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, FM
Remote Command	:SOURce:FM:STATe :SOURce:FM:STATe?
Example	:SOUR:FM:STAT OFF
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

FM Deviation

Allows you to set the frequency modulation deviation.

Key Path	Source, Modulation Setup, FM
Remote Command	:SOURce:FM[:DEViation] :SOURce:FM[:DEViation]?
Example	:SOUR:FM 1.00 kHz
Preset	1.00 Hz
Min	1.00 Hz
Max	100.00 kHz
Initial S/W Revision	A.05.00

FM Rate

Allows you to set the internal frequency modulation rate.

Key Path	Source, Modulation Setup, FM
Remote Command	:SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency?
Example	:SOUR:FM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

PM

Allows access to the menu for configuring the phase modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM:STATe :SOURce:PM:STATe?
Example	:SOUR:PM:STAT OFF
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

PM Deviation

Allows you to set the phase modulation deviation.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM[:DEViation] :SOURce:PM[:DEViation]?

Example	:SOUR:PM 1.00 rad
Preset	0.1 rad
Min	0.1 rad
Max	20.0 rad
Initial S/W Revision	A.05.00

PM Rate

Allows you to set the internal phase modulation rate.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency?
Example	:SOUR:PM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a tabular form. The details of the SCPI for configuring the list sequencer can be found in ["Step Configuration \(Remote Command Only\)" on page 1618](#).

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

Key Path	Source
Initial S/W Revision	A.05.00

Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe] ?
Example	:SOUR:LIST OFF
Notes	When the sequencer is set to ON, the list sequencer controls the output of the source.
Couplings	When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected.
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST:TRIGger[:IMMediate]
Example	:SOUR:LIST:TRIG
Notes	When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " Query List Sequence Initiation Armed Status (Remote Command Only) " on page 1629 Query Source List Sequence Armed Status)
Dependencies	Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled.
Initial S/W Revision	A.05.00

List Sequencer Setup

Allows you access to the list sequencer setup menus.

Key Path	Source, List Sequencer

Number of Steps

Allows you to specify the number of steps within the list sequence.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:NUMBer:STEPs <integer> :SOURce:LIST:NUMBer:STEPs?
Example	:SOUR:LIST:NUMB:STEP 1
Notes	Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps.
Dependencies	The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer.
Preset	1
Min	1
Max	1000
Initial S/W Revision	A.05.00

Current Step

Allows you to select the step number you wish to view or edit.

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only.
Preset	1
Min	1
Max	Step Count
Initial S/W Revision	A.05.00

Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of

1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key.
Initial S/W Revision	A.05.00

Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key
Initial S/W Revision	A.05.00

Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

Key Path	Source, List Sequencer, List Sequencer Setup
Initial S/W Revision	A.05.00

Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE INTERNAL EXTERNAL2 KEY BUS EXTERNAL4 :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger?
Example	:SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Free Run
Range	Free Run Internal Manual (Trigger Key) Bus External 2 EXTERNAL4
Initial S/W Revision	A.05.00

Free Run

Sets the trigger input for the current step to Free Run.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG IMM
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Internal

Sets the trigger input for the current step to Internal.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG INT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG KEY
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG BUS
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

External 2

Sets the trigger input for the current step to External 2.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG EXT2
Notes	SCPI is supported after A.09.40
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

Value Changed	Recommended Transition Time
Frequency	500 μ s
Amplitude	100 μ s to within 0.1 dB 20 μ s to within 1.0 dB

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME?
Example	:SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME?

Notes	SCPI is supported after A.09.40
Preset	1.0 ms
Min	0.0 ms
Max	4.0 ks
Initial S/W Revision	A.05.00

Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
Remote Command	<pre>:SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND27 BAND28 BAND29 BAND30 BAND31 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BAND44 BANDA BANDB BANDC BANDD BANDE BANDF :SOURce:LIST:STEP[1] 2 3...1000:SETup: RADio:BAND?</pre>
Example	<pre>:SOUR:LIST:STEP2:SET:RAD:BAND PGSM :SOUR:LIST:STEP2:SET:RAD:BAND?</pre>
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

None

Selects no radio standard for use on the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Example	:SOUR:LIST:STEP2:SET:RAD:BAND NONE
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

P-GSM

Selects P-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

E-GSM

Selects E-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

R-GSM

Selects R-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

DCS 1800

Selects DCS 1800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

PCS 1900

Selects PCS 1900 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 450

Selects GSM 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 480

Selects GSM 480 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 850

Selects GSM 850 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 700

Selects GSM 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

T-GSM 810

Selects T-GSM 810 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

Band I

Selects Band I as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band II

Selects Band II as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band III

Selects Band III as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band IV

Selects Band IV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band V

Selects Band V as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band VI

Selects Band VI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band VII

Selects Band VII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band VIII

Selects Band VIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band IX

Selects Band IX as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band X

Selects Band X as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XI

Selects Band XI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XII

Selects Band XII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XIII

Selects Band XIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XIV

Selects Band XIV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

US CELL

Selects US Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

US PCS

Selects US PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Japan Cell

Selects Japan Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Korean PCS

Selects Korean PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

NMT 450

Selects NMT 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

IMT 2000

Selects IMT 2000 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Upper 700

Selects Upper 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Secondary 800

Selects Secondary 800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

400 Euro PAMR

Selects 400 Euro PAMR as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

800 PAMR

Selects 800 PAMR as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

AWS

Selects AWS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

700 Public Safety

Selects 700 Public Safety as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

LTE

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

BAND 1

Selects BAND 1 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 2

Selects BAND 2 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 3

Selects BAND 3 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 4

Selects BAND 4 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 5

Selects BAND 5 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 6

Selects BAND 6 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 7

Selects BAND 7 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 8

Selects BAND 8 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 9

Selects BAND 9 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 10

Selects BAND 10 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 11

Selects BAND 11 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 12

Selects BAND 12 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 13

Selects BAND 13 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 14

Selects BAND 14 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 17

Selects BAND 17 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 18

Selects BAND 18 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 19

Selects BAND 19 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 20

Selects BAND 20 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 21

Selects BAND 21 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 24

Selects BAND 24 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 25

Selects BAND 25 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 26

Selects BAND 26 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.12.53

BAND 27

Selects BAND 27 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

BAND 28

Selects BAND 28 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

BAND 31

Selects BAND 31 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND 33

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

BAND 34

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

BAND 35

Selects BAND 35 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

BAND 36

Selects BAND 36 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

BAND 37

Selects BAND 37 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

BAND 38

Selects BAND 38 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

BAND 39

Selects BAND 39 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

BAND 40

Selects BAND 40 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

BAND 41

Selects BAND 41 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

BAND 42

Selects BAND 42 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

BAND 43

Selects BAND 43 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

BAND 44

Selects BAND 44 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD
Initial S/W Revision	A.14.00

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND A

Selects BAND A as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

BAND B

Selects BAND B as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

BAND C

Selects BAND C as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

BAND D

Selects BAND D as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

BAND E

Selects BAND E as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

BAND F

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK?

Example	:SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK?
Notes	SCPI is supported after A.09.40
Preset	DOWN
Range	DOWN UP
Initial S/W Revision	A.05.00

Channel

Allows you to specify the frequency of the current step via a channel number.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRrequency?
Example	:SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	0 (Please refer to for valid ranges.)
Max	10838 (Please refer to for valid ranges.)
Initial S/W Revision	A.05.00

Frequency

Allows you to specify a frequency value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRFrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRFrequency?
Example	:SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40.

	This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated.
Preset	1.00 GHz
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

Power

Allows you to specify a power value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude?
Example	:SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL?
Notes	SCPI is supported after A.09.40
Notes	Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON.
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Preset	-100 dBm

Min	The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 1499 and the table RF Power Range for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 1499 and the table RF Power Range for the valid ranges.
Initial S/W Revision	A.05.00

Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform <string> :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform?
Example	:SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV?
Notes	SCPI is supported after A.09.40
Remote Command Notes	String type, takes "Off" "CW" "Cont" "waveform name"
Preset	CW
Range	Waveform Continue Previous CW Off
Initial S/W Revision	A.05.00

CW

Sets the current step to output a CW tone.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "CW"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "waveform name"
Notes	SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list

sequence will automatically apply header settings of the selected waveform in that step.

Initial S/W Revision	A.05.00

Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "Cont"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Off

Disable RF output of the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "Off"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

"NVWFM" (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. "NVWFM" MSUS will be mapped to the

default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD “D: VARB\testwaveform.bin” or :SOUR:RAD:ARB:LOAD “NVWFM:testwaveform.bin”
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPI command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL “D: varb”
Notes	<string> – specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a

directory to ARB memory is rejected with an error.

When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.

If you specify a directory over SCPI, but the directory does not exist, an error is generated.

If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated. It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated. When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 1584 and "Sequencer" on page 1585 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1610](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1610](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1611](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as ["Change Directory..." on page 1612](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as ["Default Directory..." on page 1612](#)

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 1612](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory
Initial S/W Revision	Prior to A.09.00

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 1613](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 1613](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME COUNT CONTinuous CABort :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE?
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE?
Notes	SCPI is supported after A.09.40
Notes	If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query Error! Reference source not found . Source Sweeping Condition Message to find out if the current list sequence is complete or not.
Range	Time Play Count Continuous Continuous Abort
Initial S/W Revision	A.05.00

Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found.** List Sequence Step Validation.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration, Time
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCounT <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCounT?
Example	:SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO?
Notes	SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #"
Notes	If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not.
Preset	1.00 ms
Min	100 μ s
Max	1800 s
Initial S/W Revision	A.05.00

Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE COUN
Notes	SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform.
Initial S/W Revision	A.05.00

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE CONT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select “On”, trigger event will occur on both Internal and External2 paths. Select “Off” will turn off trigger output.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON OFF 1 0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger
Example	:SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Off

Range	On Off
Initial S/W Revision	A.05.00

Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMEDIATE INTernal KEY BUS EXTernal2, <time>, NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF, DOWN UP, <freq>, <ampl>, <string>, TIME COUNT CONTinuous, <time>, ON OFF 1 0, [<int>], :SOURce:LIST:STEP[1] 2 ... 4..1000:SETup?</pre>
Example	:SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM_Test1.bin", TIME, 10ms, OFF, 255
Notes	The parameters are: (There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.) 1. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 1587. 2. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 1589. 3. Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 1590. 4. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 1606. 5. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 1607 and "Frequency" on page 1607. 6. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 1608. 7. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The

	options for specifying these are: <filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated. CONT - continues playback of the ARB file from the previous step CW - outputs a CW tone OFF - disable RF output 8. Step Duration <enum> - specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 1615. 9. Time or Count <time/int> - specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "Time" on page 1615 and "Play Count" on page 1616. 10. Output Trigger <Boolean> - specifies the output trigger for the step. For details of the ranges for this setting see "Output Trigger" on page 1617.
Dependencies	The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586. If you attempt to remotely set or query a subopcode that is out of range, an error is generated.
Initial S/W Revision	A.05.00

Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Step Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:INPut:TRIGger?</pre>
Example	<pre>:SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG?</pre>
Notes	The command is to setup below parameter array of whole list sequence. Step Trigger <enum> - specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 1587. If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes	IMMEDIATE INTERNAL KEY BUS EXTERNAL2
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586.
Initial S/W Revision	A.09.40

Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:TRANsition:TIME <time>, <time>, <time>, ... :SOURce:LIST:SETup:TRANsition:TIME?
Example	:SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms :SOUR:LIST:SET:TRAN:TIME?
Notes	The command is to setup below parameter array of whole list sequence. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 1589 If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parameters whose index number falls in number of steps will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

R	:SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ...
e	:SOURce:LIST:SETup:RADio:BAND?
m	
o	
t	
e	
C	
o	
m	
m	
a	
n	
d	
E	:SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM
x	:SOUR:LIST:SET:RAD:BAND?
a	
m	
p	
l	

e	
N	The command is to setup below parameter array of whole list sequence.
o	Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 1590.
t	If input parameter number exceeds the step number defined by "Number of Steps" on page 1586Number of Steps then
e	generate error ", and only those parametes whose index number falls in number of steps will be updated.
s	
R	NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDI
e	V BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KO
m	REAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1
o	BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND1
t	9 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAN
e	D41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF
C	
o	
m	
m	
a	
n	
d	
N	
o	
t	
e	
s	
D	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on
e	page 1586.
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Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK?
Example	:SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK?
Notes	The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 1606 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes	DOWN UP
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:CNFrequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFrequency?
Example	:SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR?

Notes	The command is to setup below parameter array of whole list sequence. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 1607 and "Frequency" on page 1607 This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?</pre>
Example	<pre>:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?</pre>
Notes	The command is to setup below parameter array of whole list sequence. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 1608. If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:SETup:WAVEform <string>, <string>, <string>, ...</pre>

	:SOURce:LIST:SETup:WAVeform?
Example	:SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV?
Notes	The command is to setup below parameter array of whole list sequence. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are: <filename> – plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it is does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated. CONT – continues playback of the ARB file from the previous step CW – outputs a CW tone OFF – disable RF output If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586.
Range	"filename" "CW" "Off" "CONT"
Initial S/W Revision	A.09.40

Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 1586 Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:DURation:TYPE <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:DURation:TYPE?
Example	:SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE?
Notes	The command is to setup below parameter array of whole list sequence. Step Duration <enum> – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 1615. If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes	TIME COUNT CONTinuous
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details

	see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure “Duration Time” or “Play Count” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:TOCount <time/int>, <time/int>, <time/int>, ... :SOURce:LIST:SETup:TOCount?
Example	:SOUR:LIST:SET:TOC 1s,2s,3s :SOUR:LIST:SET:TOC? :SOUR:LIST:SET:TOC 5,6,7 :SOUR:LIST:SET:TOC?
Notes	The command is to setup below parameter array of whole list sequence. Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "Time" on page 1615 and "Play Count" on page 1616 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. If current "Step Duration" on page 1615 is “Continuous”, then generate error -221, "Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Output Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ... :SOURce:LIST:SETup:OUTPut:TRIGger ?
Example	:SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON :SOUR:LIST:SET:OUTP:TRIG?
Notes	The command is to setup below parameter array of whole list sequence. Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see "Output Trigger" on page 1617 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in

	legal step number will be updated.
Remote Command Notes	ON OFF 1 0
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI feature described in.

Remote Command	:SOURce:LIST:SETup:CLEar
Example	:SOUR:LIST:SETup:CLE
Initial S/W Revision	A.05.00

Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST:TRIGgerout:TYPE BEGinningofstep DATamarker
Example	:SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP?
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer
Preset	BEGinningofstep
Range	BEGinningofstep DATamarker
Initial S/W Revision	A.14.00

BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type
Example	:SOUR:LIST:TRIG:TYP BEG
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP

Initial S/W Revision	A.14.00

DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

Key Path	Source, List Sequencer, Trigger Type
Example	:SOUR:LIST:TRIG:TYP DAT
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE MARKer

Initial S/W Revision	A.14.00

Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M1
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1

Initial S/W Revision	A.14.00

Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M2
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2

Initial S/W Revision	A.14.00

Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M3
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3
Initial S/W Revision	A.14.00

Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M4
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4
Initial S/W Revision	A.14.00

Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

Key Path	Source, List Sequencer
Remote Command	No remote command, front panel only.
Initial S/W Revision	A.05.00

Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to “Bus”. Sending this command will trigger the step and continue the sequence.

Remote Command	:SOURce:LIST:TRIGger:INITiate[:IMMediate]
Example	:SOUR:LIST:TRIG:INIT
Initial S/W Revision	A.05.00

Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

Remote Command	:SOURce:LIST:INITiation:ARMed?
Example	:SOUR:LIST:INIT:ARMed?
Notes	The return data is in the following format: Integer
Notes	Query only SCPI. Returning “1” if list sequence has been initiated successfully, returning “0” if not. Once get “0”, you can use :SYST:ERR? to query what error happened. Just like “*OPC?”, this command can be blocked until event/status “IsSourceSweeping” happens, and then returns. Doing so can help user’s script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI “:SOUR:LIST:TRIGger[:IMMediate]” (see "Initiate Sequence" on page 1585 Initiate Sequence), the right usage of this command is to use it after “:SOUR:LIST:TRIG”. If not, this command will return “1” immediately.
Notes	There is an alias SCPI “:SOURce:LIST:TRIGger:INITiation:ARMed?”.
Initial S/W Revision	A.09.40

Source Preset

Allows you to preset the source settings to their default values.

Key Path	Source
Remote Command	:SOURce:PRESet
Example	:SOUR:PRES

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Sweep/Control

Accesses a menu that enables you to configure the Sweep and Control functions of the analyzer, such as Acquisition Time and Gating.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing **Restart**, **Single** or **Cont** does a Resume.

Key Path	Sweep/Control
Remote Command	:INITiate:PAUSE
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

Key Path	Sweep/Control
Remote Command	:INITiate:RESume
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

Abort (Remote Command Only)

This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state. If the analyzer is in the process of aligning when ABORT is sent, the alignment finishes before the abort function is performed. So ABORT does not abort an alignment.

If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is set for Single measurement, it remains in the "idle" state until an :INIT:IMM command is received.

Remote Command	:ABORT
Example	:ABOR

Notes	If :INITiate:CONTinuous is ON, then a new continuous measurement will start immediately; with sweep (data acquisition) occurring once the trigger condition has been met. If :INITiate:CONTinuous is OFF, then :INITiate:IMMediate is used to start a single measurement; with sweep (data acquisition) occurring once the trigger condition has been met.
Dependencies	For continuous measurement, ABORt is equivalent to the Restart key. Not all measurements support the abort command.
Status Bits/OPC dependencies	The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUESTionable register bit 9 (INTEgrity sum) is cleared. Since all the bits that feed into OPC are cleared by the ABORt, the ABORt will cause the *OPC query to return true.
Initial S/W Revision	Prior to A.02.00

System

See ["System" on page 162](#)

Trace/Detector

Accesses a menu that enables you to view or hide Max Hold Trace and Min Hold Trace.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Max Hold Trace

This key allows you to view or hide Max Hold Trace on the Mag Error/Phase Error/EVM window in I/Q Error view. Max Hold Traces will be held during the averaging cycle.

Key Path	Trace/Detector
Mode	GSM
Remote Command	:DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MAXHold[:STATe] ON OFF 1 0 :DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MAXHold[:STATe]?
Example	DISP:EEVM:VIEW2:WIND:TRAC:MAXH ON DISP:EEVM:VIEW2:WIND:TRAC:MAXH?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	A.02.00

Min Hold Trace

This key allows you to view or hide Min Hold Trace on the Mag Error/Phase Error/EVM window in I/Q Error view. Min Hold Traces will be held during the averaging cycle.

Key Path	Trace/Detector
Mode	GSM
Remote Command	:DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MINHold[:STATe] ON OFF 1 0 :DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MINHold[:STATe]?
Example	DISP:EEVM:VIEW2:WIND:TRAC:MINH ON DISP:EEVM:VIEW2:WIND:TRAC:MINH?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF

State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	A.02.00

Trigger

See "Trigger" on page 218

Free Run

See "Free Run " on page 225

Video

See "Video (IF Envelope) " on page 226

Trigger Level

See ____ on page X

Trig Slope

See ____ on page X

Trig Delay

See ____ on page X

External 1

See "External 1 " on page 226

Trigger Level

See "Trigger Level " on page 227

Trig Slope

See "Trig Slope " on page 227

Trig Delay

See "Trig Delay " on page 228

Zero Span Delay Comp

See "Zero Span Delay Comp On/Off" on page 229

External 2

See "External 2 " on page 229

Trigger Level

See ____ on page X

Trig Slope

See ____ on page X

Trig Delay

See ___ on page X

Zero Span Delay Comp

See ___ on page X

RF Burst

See "RF Burst " on page 230

Absolute Trigger

See ___ on page X

Relative Trigger

See ___ on page X

Trig Slope

See ___ on page X

Trig Delay

See ___ on page X

Periodic Timer

See ___ on page X

Period

See ___ on page X

Offset

See ___ on page X

Offset Adjust (Remote Command Only)

See ___ on page X

Reset Offset Display

See ___ on page X

Sync Source

See ___ on page X

Off

See ___ on page X

External 1

See "External 1 " on page 226

Trigger Level

See "Trigger Level " on page 227

Trig Slope

See "Trig Slope " on page 227

External 2

See "External 2 " on page 229

Trigger Level

See ____ on page X

Trig Slope

See ____ on page X

RF Burst

See "RF Burst " on page 230

Absolute Trigger

See ____ on page X

Trig Slope

See ____ on page X

Trig Delay

See ____ on page X

Auto/Holdoff

See ____ on page X

Auto Trig

See ____ on page X

Trig Holdoff

See ____ on page X

Holdoff Type

See ____ on page X

User Preset

Accesses a menu that gives you the following three choices:

- **User Preset** – recalls a state previously saved using the Save User Preset function.
- **User Preset All Modes** – presets all of the modes in the analyzer
- **Save User Preset**– saves the current state for the current mode

Key Path	Front-panel key
Backwards Compatibility Notes	User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data. In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users. On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode. User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.
Initial S/W Revision	Prior to A.02.00

User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, `SYST:PRES:USER:SAV`. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER
Example	:SYST:PRES:USER:SAVE:SYST:PRES:USER
Notes	:SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed
Couplings	A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.
Initial S/W Revision	Prior to A.02.00

User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

NOTE

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER:ALL
Example	:SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL
Notes	Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state.
Couplings	A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.

Initial S/W Revision	Prior to A.02.00

Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER:SAVE
Example	:SYST:PRES:USER:SAVE
Notes	:SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM:STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file.
Initial S/W Revision	Prior to A.02.00

View/Display

Accesses a menu of functions that enable you to set the display parameters and select the view.

See "Display" on page 1647 for the display settings.

See [View Selection](#) for details of view selection.

Key Path	Front-panel key
Mode	EDGE/GSM
Initial S/W Revision	Prior to A.02.00

Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the **System Display Settings** key apply to all measurements in all modes.

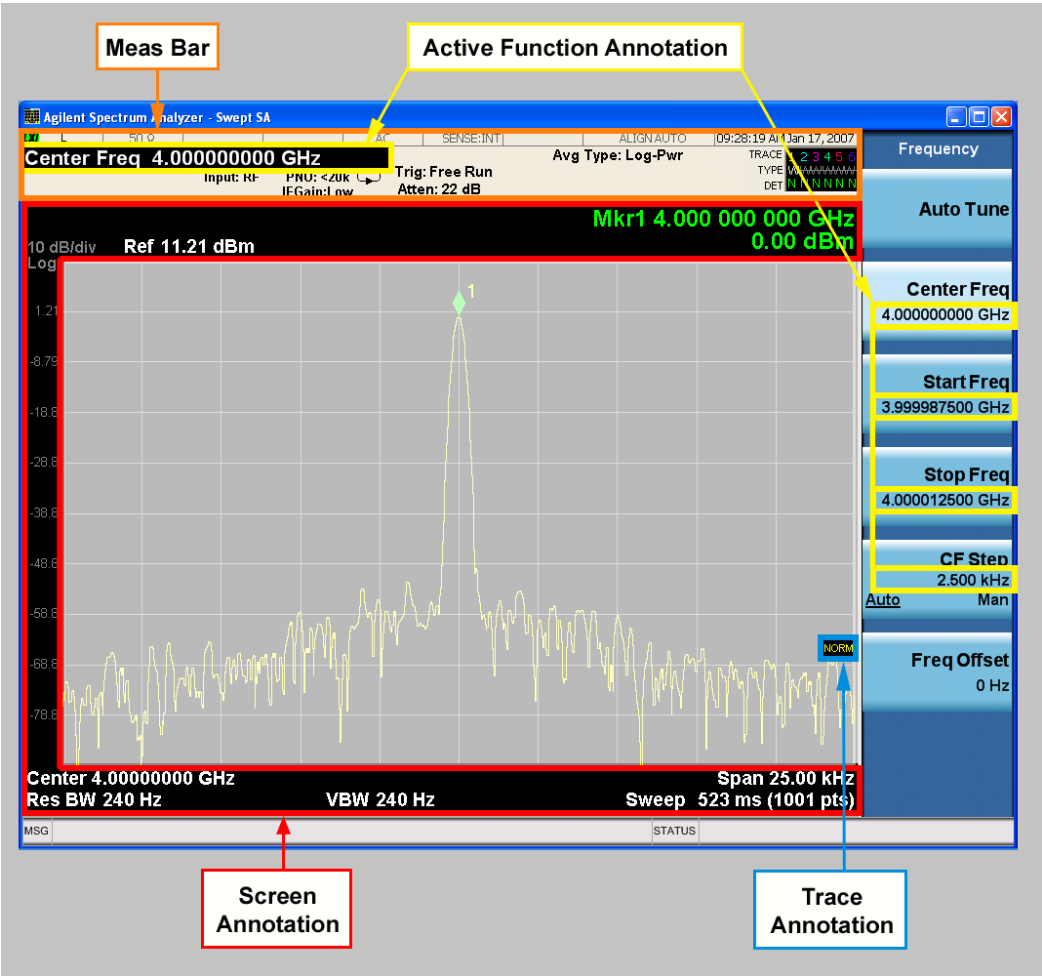
Key Path	Display
Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.



Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ANNOtation:MBAR[:STATe] OFF ON 0 1 :DISPlay:ANNOtation:MBAR[:STATe]?
Example	DISP:ANN:MBAR OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off.

State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Screen

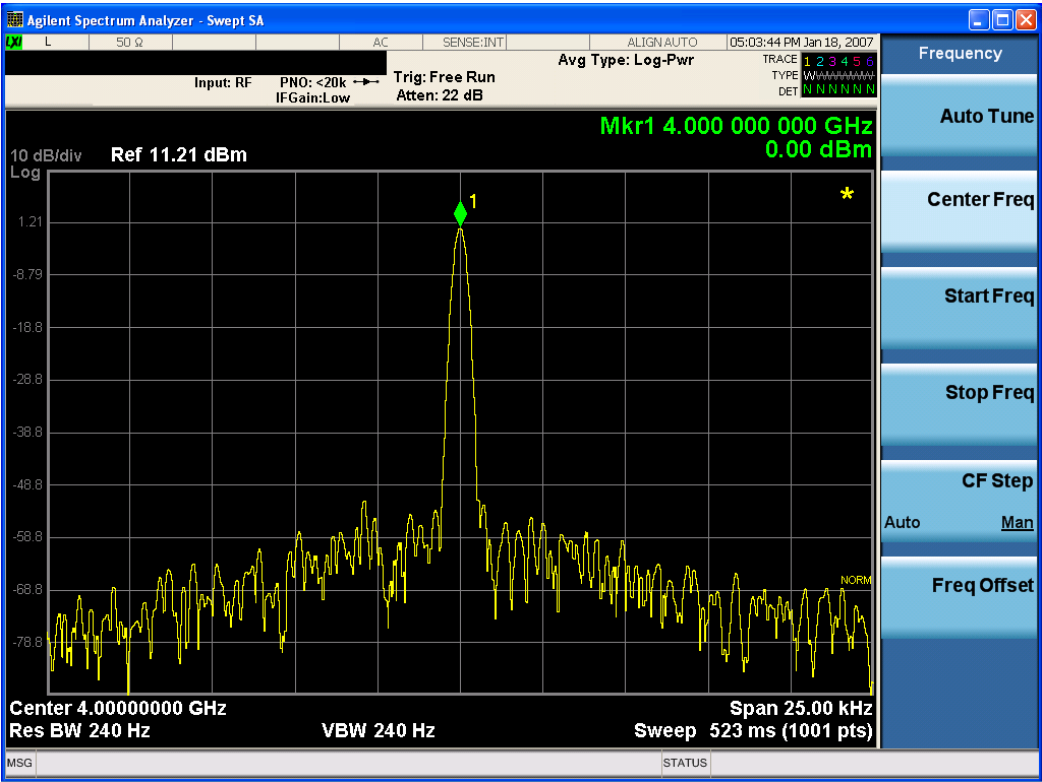
This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1 :DISPlay:ANNotation:SCReen[:STATe]?
Example	DISP:ANN:SCR OFF
Dependencies	Grayed-out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature..



Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ACTivefunc[:STATe] ON OFF 1 0 :DISPlay:ACTivefunc[:STATe] ?
Example	DISP:ACT OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Title

Displays menu keys that enable you to change or clear a title on your display.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press **Change Title** to enter a new title through the alpha editor. Press **Enter** or **Return** to complete the entry. Press **ESC** to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press **Change Title** again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing **Title**, **Clear Title**.

NOTE

Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

Key Path	View/Display, Display, Title
Mode	All
Remote Command	:DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA?
Example	DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title
Notes	Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters.
Preset	No title (measurement name instead)
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Clear Title

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

Key Path	View/Display, Display, Title
Example	The following commands clear the title and restore the measurement's original title: DISP:ANN:TITL:DATA "" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "" This example is for ACP; in measurements other than Swept SA the measurement name is required.
Notes	Uses the :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> command with an empty string (in the Swept SA, the <measurement> is omitted).

Preset	Performed on Preset.
Initial S/W Revision	Prior to A.02.00

Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

Key Path	View/Display, Display
Remote Command	:DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1 :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]?
Example	DISP:WIND:TRAC:GRAT:GRID OFF
Notes	The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis.
Preset	On
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by **Restore Misc Defaults** or **Restore System Defaults** under System.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is **All Off**, it forces **ScreenAnnotation, Meas Bar, Trace, and Active Function Values** settings to be **OFF** for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is **All Off**, the **Screen, Meas Bar, Trace, and Active Function Values** keys under the **Display, Annotation** menu are grayed out and forced to **Off**. When **Local Settings** is selected, you are able to set the local annotation settings on a measurement by measurement basis.

Key Path	View/Display, Display, System Display Settings
Remote Command	:DISPlay:WINDow[1]:ANNotation[:ALL] OFF ON 0 1 :DISPlay:WINDow[1]:ANNotation[:ALL]?
Example	:DISP:WIND:ANN OFF

Preset	On (Set by Restore Misc Defaults)
State Saved	Not saved in instrument state.
Backwards Compatibility Notes	The WINDow parameter and optional subopcode is included for backwards compatibility but ignored – all windows are equally affected.
Initial S/W Revision	Prior to A.02.00

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

Key Path	Save, Screen Image
Remote Command	:MMEMory:STORe:SCReen:THEMe TDCOLOR TDMonochrome FCOLOr FMONochrome :MMEMory:STORe:SCReen:THEMe?
Example	:MMEM:STOR:SCR:THEM TDM
Preset	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
Readback	3D Color 3D Mono Flat Color Flat Mono
Backwards Compatibility Notes	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
Initial S/W Revision	Prior to A.02.00

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDC
Readback	3D Color
Initial S/W Revision	Prior to A.02.00

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDM
Readback	3D Mono
Initial S/W Revision	Prior to A.02.00

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

I/Q Measured Polar Graph

For the Remote Commands, see [View Selection](#) and [View Selection by number \(Remote Command Only\)](#).

This topic includes the following sections, which provide details of this view's windows, as shown in the examples below:

["Graph window" on page 757](#)

["Metric window" on page 757](#)

Below: Example View with Vector and Constellation Traces

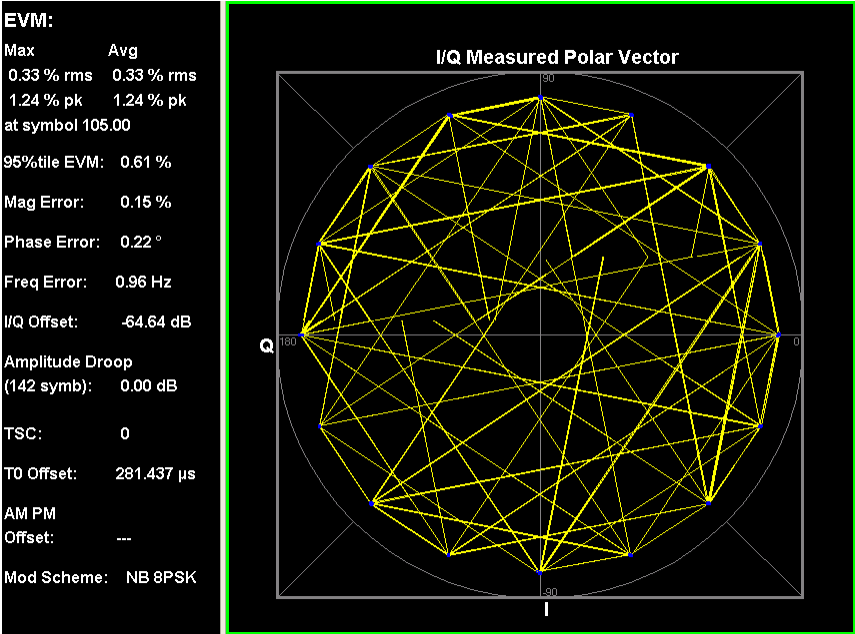


Figure 0-1 I/Q Measured Polar Graph view (Vector & Constellation) for EDGE EVM Measurement
Below: Example View with Vector Trace Only

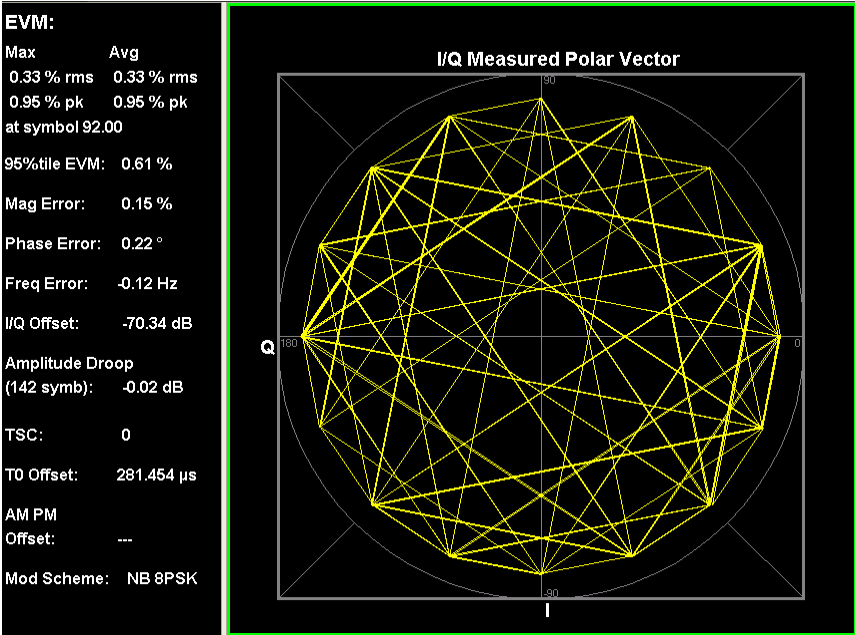


Figure 0-2 I/Q Measured Polar Graph view (Vector Only) for EDGE EVM Measurement
Below: Example View with Constellation Trace Only

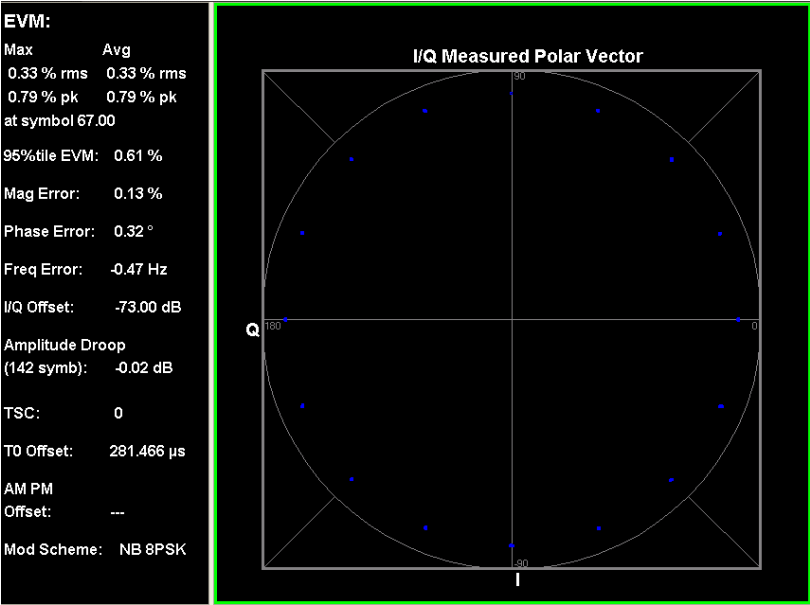


Figure 0-3 I/Q Measured Polar Graph view (Constellation Only) for EDGE EVM Measurement
Below: Example View with Vector and Constellation Traces (Symbol Derotated)

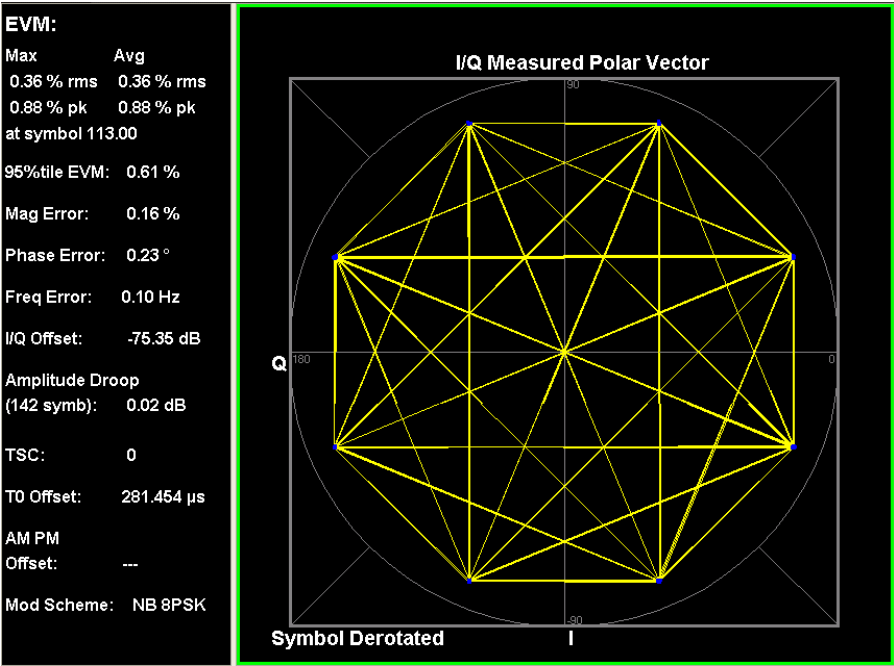


Figure 0-4 I/Q Measured Polar Graph view (Symbol Derotated) for EDGE EVM Measurement

Key Path	View/Display
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Graph window

Marker Operation	No
Corresponding Trace	Series of float point numbers that alternately represent I and Q pairs of the final corrected measured data for the last slot. (n=5)

Metric window

Name	Corresponding Results	Display Format
EVM rms (Max)	n=1 3rd Maximum RMS EVM	9.99 % rms
EVM rms (Avg)	n=1 2nd RMS EVM	9.99 % rms
EVM Pk (Max)	n=1 5th Maximum peak EVM	9.99 % pk
EVM Pk (Avg)	n=1 4th Peak EVM	9.99 % pk
Symbol position of the peak EVM	n=1 6th Symbol position of Peak EVM.	99
95%ile EVM	n=1 1st RMS 95th %ile EVM	9.99 %
Mag Error	n=1 7th Magnitude error	9.99 %
Phase Error	n=1 9th Phase error	9.99 °
Freq Error	n=1 11th Frequency error	-999.99 Hz
I/Q Offset	n=1 13th I/Q origin offset	-99.99 dB
Amplitude Droop	n=1 14th Amplitude droop error	-99.99 dB
T0 Offset	n=1 15th Trigger to T0	0.000 us 0.000 symbols
AMPM Offset	n=1 16th AMPM Offset	0.000 us 0.0000 symbols
Mod Scheme	n=8 18th Modulation Scheme	NB 8PSK

NOTE

The value of 'TO Offset' and 'AM PM Offset' is displayed by 'sec' and both 'Symbol' unit. (The figure above does not show this. See the Data Bits figure.)

I/Q Polar Vect/Constln

I/Q Polar Vector/Constellation provides options that allow you to change the format of the polar vector graph. The following display options are available:

- Vector and Constellation (SCPI: VC)
- Vector Only (SCPI: VECTor)
- Constellation Only (SCPI: CONSTln)

Key Path	View/Display, I/Q Measured Polar Graph
Mode	GSM
Remote Command	:DISPlay:EEVM:VIEW[1]:WINDow2:TRACe:POLar VC VECTor CONSTln :DISPlay:EEVM:VIEW[1]:WINDow2:TRACe:POLar?
Example	DISP:EEVM:VIEW:WIND2:TRAC:POL VC DISP:EEVM:VIEW:WIND2:TRAC:POL?
Notes	VC : Vect & Constln VECTor: Vector CONSTln : Constellation You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	DISP:EEVM:VIEW POL changes this parameter to POL. DISP:EEVM:VIEW CONS changes this parameter to CONS.
Preset	VC
State Saved	Saved in instrument state.
Range	Vect & Constln Vector Constellation
Initial S/W Revision	Prior to A.02.00

Time Offset Unit

Toggles the unit of Time Offset result between Symbol and Second.

Key Path	View/Display, Display
Mode	GSM
Remote Command	:DISPlay:EEVM:TEXT:TFUNit SECond SYMBol :DISPlay:EEVM:TEXT:TFUNit?
Example	DISP:EEVM:TEXT:TFUN SEC DISP:EEVM:TEXT:TFUN?
Notes	This command only affects the display result. Results returned by remote commands are always expressed in units of "SYMBol".

Preset	SEC
State Saved	Saved in instrument state.
Range	sec symbols
Initial S/W Revision	Prior to A.02.00

I/Q Symbol Derotation

Allows you to derotate I/Q symbols.

- On: Derotate I/Q Symbols.
- Off: No I/Q Symbol derotation.

Key Path	View/Display, I/Q Measured Polar Graph
Mode	GSM
Remote Command	:DISPlay:EEVM:SDERotation[:STATe] OFF ON 0 1 :DISPlay:EEVM:SDERotation[:STATe]?
Example	DISP:EEVM:SDER ON DISP:EEVM:SDER?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

I/Q Error

For the Remote Commands, see [View Selection](#) and [View Selection by number \(Remote Command Only\)](#).

This topic includes the following sections, which provide details of this view's windows, as shown in the examples below:

["Mag Error window" on page 760](#)

["Phase Error window" on page 760](#)

["EVM window" on page 760](#)

["Metric window" on page 761](#)

Below: Example I/Q Error View

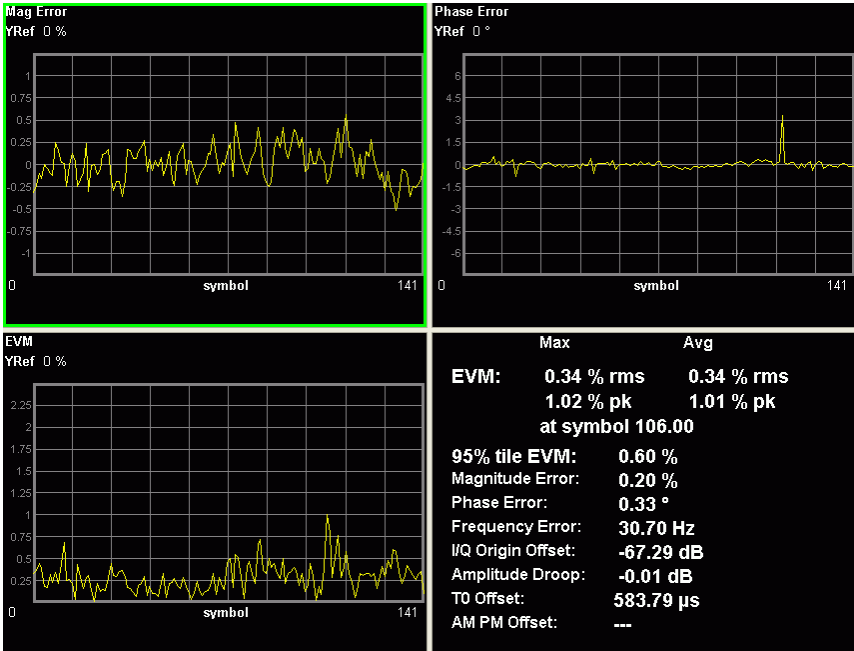


Figure 0-5 I/Q Error view for EDGE EVM Measurement

Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

Mag Error window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in percent) that represent each sample in the magnitude error vector trace for the last slot. (n=3)

Phase Error window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in degree) that represent each sample in the phase error vector trace for the last slot. (n=4)

EVM window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in percent) that represent each sample in the EVM vector trace for the last slot. (n=2)

Metric window

Name	Corresponding Results	Display Format
EVM [rms] (Max)	n=1 3rd Maximum RMS EVM	9.99 % rms
EVM [rms] (Avg)	n=1 2nd RMS EVM	9.99 % rms
EVM [pk] (Max)	n=1 5th Maximum peak EVM	9.99 % pk
EVM [pk] (Avg)	n=1 4th Peak EVM	9.99 % pk
Symbol position of the peak EVM	n=1 6th Symbol position of Peak EVM.	99
95%ile EVM	n=1 1st RMS 95th %ile EVM	9.99 %
Magnitude Error	n=1 7th Magnitude error	9.99 %
Phase Error	n=1 9th Phase error	9.99 °
Frequency Error	n=1 11th Frequency error	-999.99 Hz
I/Q Origin Offset	n=1 13th I/Q origin offset	-99.99 dB
Amplitude Droop	n=1 14th Amplitude droop error	-99.99 dB
T0 Offset	n=1 15th Trigger to T0	0.000 us 0.000 symbols
AMPM Offset	n=1 16th AMPM Offset	0.000 us 0.0000 symbols

NOTE

The value of 'T0 Offset' and 'AM PM Offset' is displayed by 'sec' and both 'Symbol' unit. (The figure above does not show this. See the Data Bits figure.)

Symbol Dots

Allows you to toggle the symbol dots between On and Off.

- On: turns on blue symbol dots on the trace in 'Mag Error', 'Phase Error' & 'EVM' window.
- Off: turns off blue symbol dots on the trace in 'Mag Error', 'Phase Error' & 'EVM' window.

Key Path	View/Display
Mode	GSM
Remote Command	:DISPlay:EEVM:SDOTs[:STATe] OFF ON 0 1 :DISPlay:EEVM:SDOTs[:STATe]?
Example	DISP:EEVM:SDOT ON DISP:EEVM:SDOT?
Notes	This parameter does not control the constellation view/hide state on I/Q Measured Polar Graph. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Backwards Compatibility SCPI	[[:SENSe]:EEVM:SDOTs[:STATe]
Initial S/W Revision	Prior to A.02.00

Time Offset Unit

Toggles the unit of Time Offset result between Symbol and Second.

Key Path	View/Display, Display
Mode	GSM
Remote Command	:DISPlay:EEVM:TEXT:TFUNit SECond SYMBol :DISPlay:EEVM:TEXT:TFUNit?
Example	DISP:EEVM:TEXT:TFUN SEC DISP:EEVM:TEXT:TFUN?
Notes	This command only affects the display result. Results returned by remote commands are always expressed in units of "SYMBol".
Preset	SEC
State Saved	Saved in instrument state.
Range	sec symbols
Initial S/W Revision	Prior to A.02.00

Data Bits

For the Remote Command, see [View Selection](#) and [View Selection by number \(Remote Command Only\)](#).

This view has only one window: the "[Metric window](#)" on page 766.

Below: Example Data Bits View for EDGE Normal 8PSK Burst

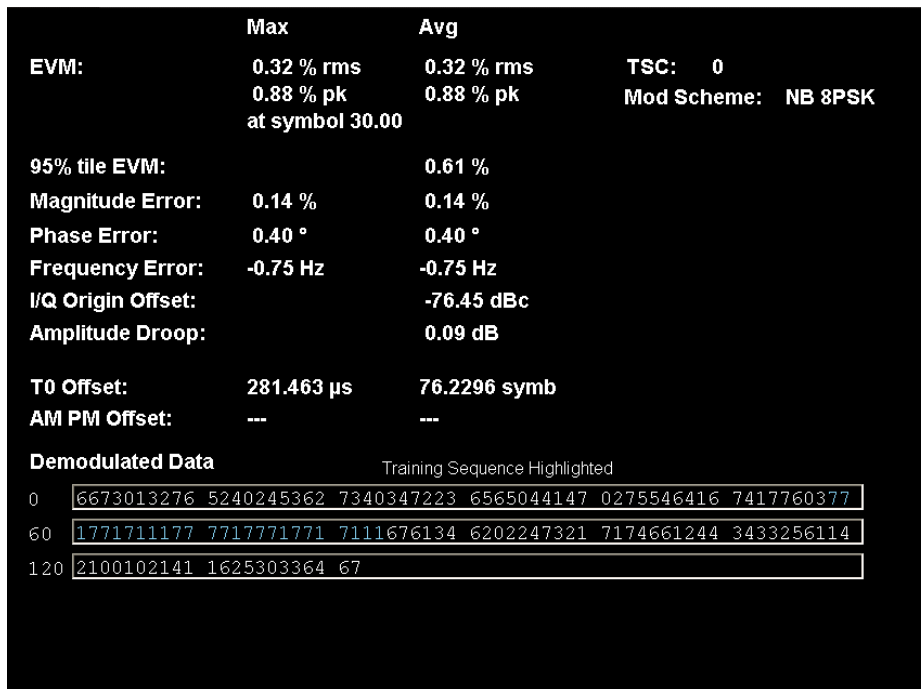


Figure 0-6 Data Bits view for EDGE Normal 8PSK Burst

Below: Example Data Bits View for EDGE Normal 16QAM Burst

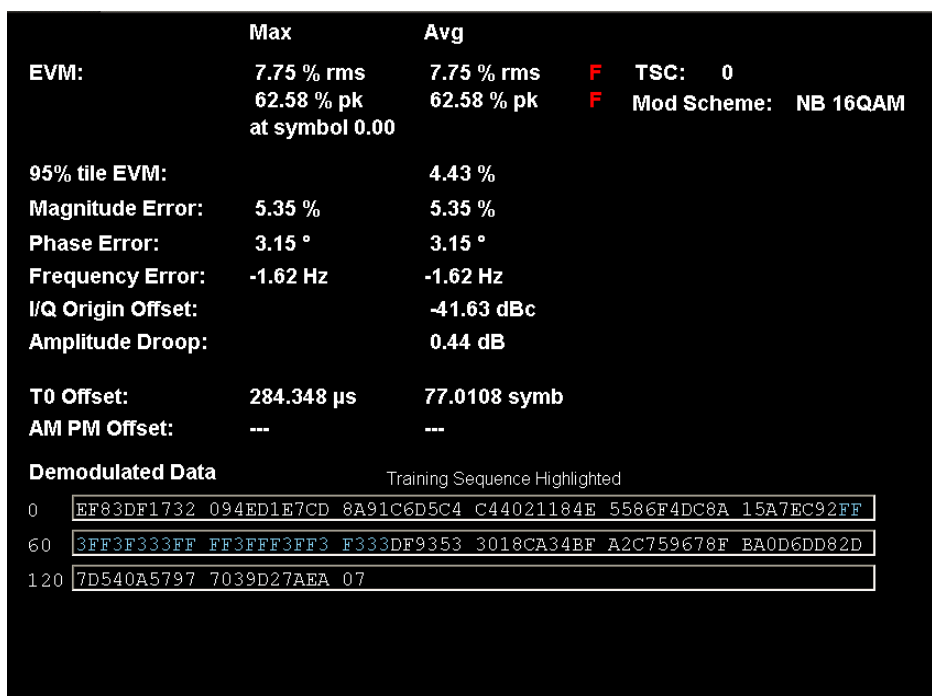


Figure 0-7Data Bits view for EDGE Normal 16QAM Burst

Below: Example Data Bits View for EDGE Normal 32QAM Burst

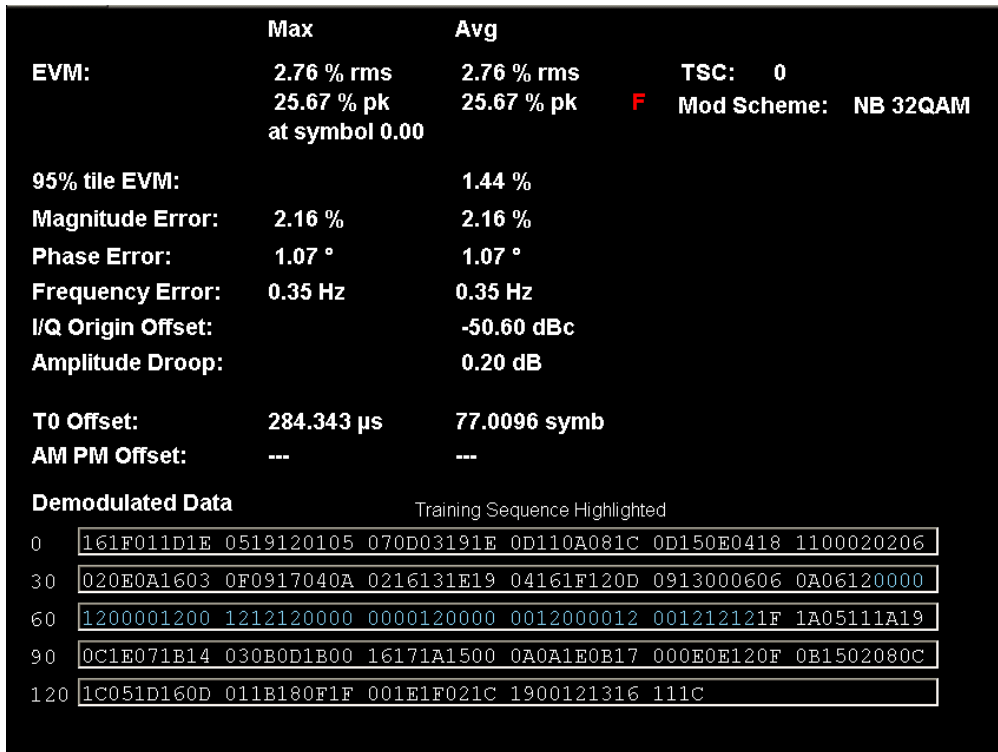


Figure 0-8Data Bits view for EDGE Normal 32QAM Burst

Below: Example Data Bits View for EDGE HSR QPSK Burst

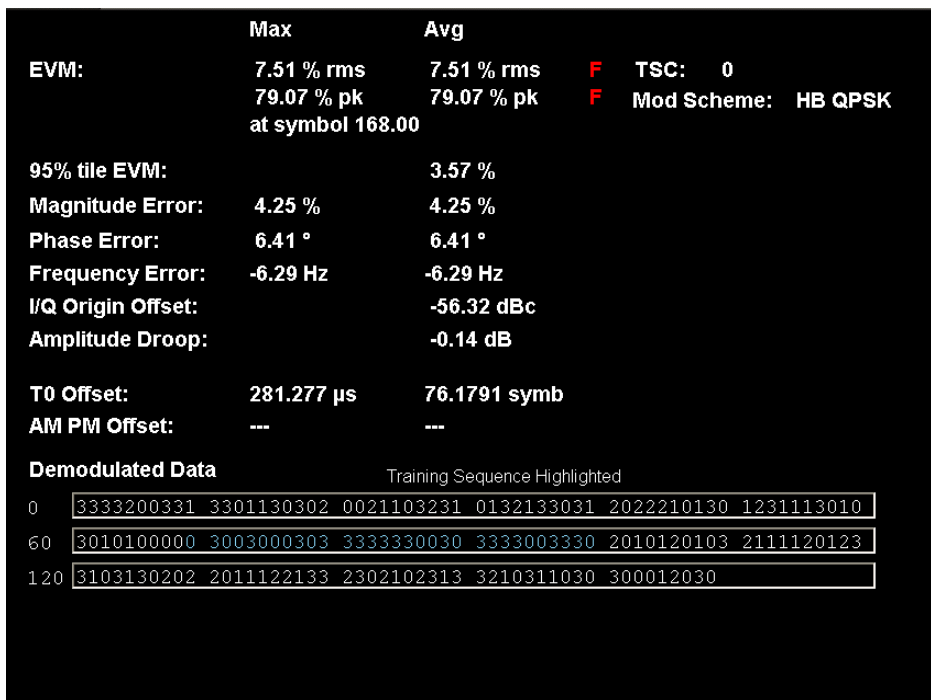


Figure 0-9Data Bits view for EDGE HSR QPSK Burst

Below: Example Data Bits View for EDGE HSR 16QAM Burst

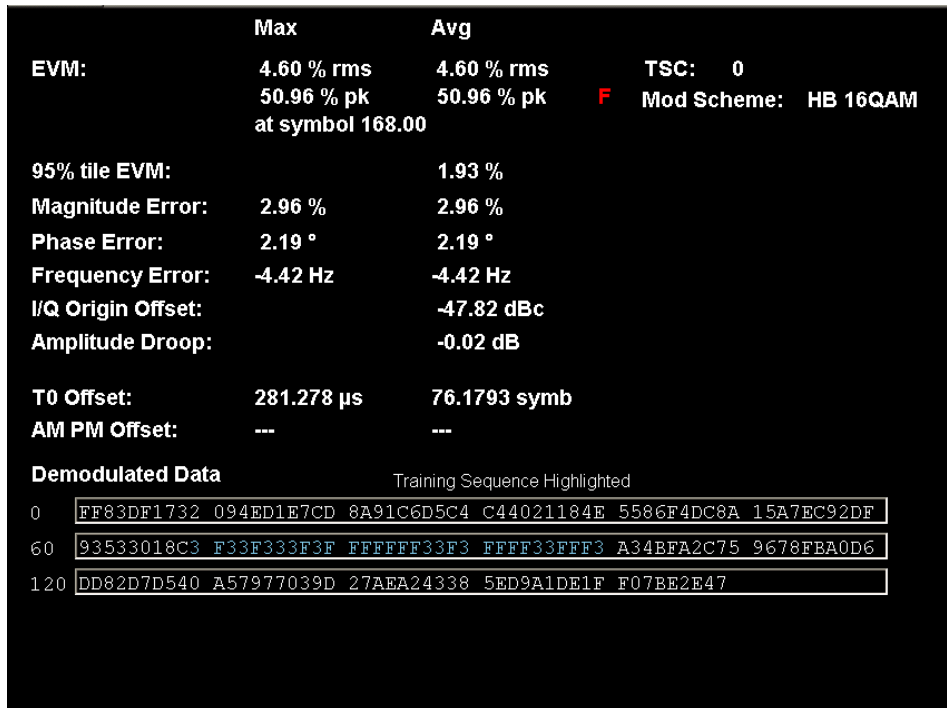


Figure 0-10 Data Bits view for EDGE HSR 16QAM Burst

Below: Example Data Bits View for EDGE HSR 32QAM Burst

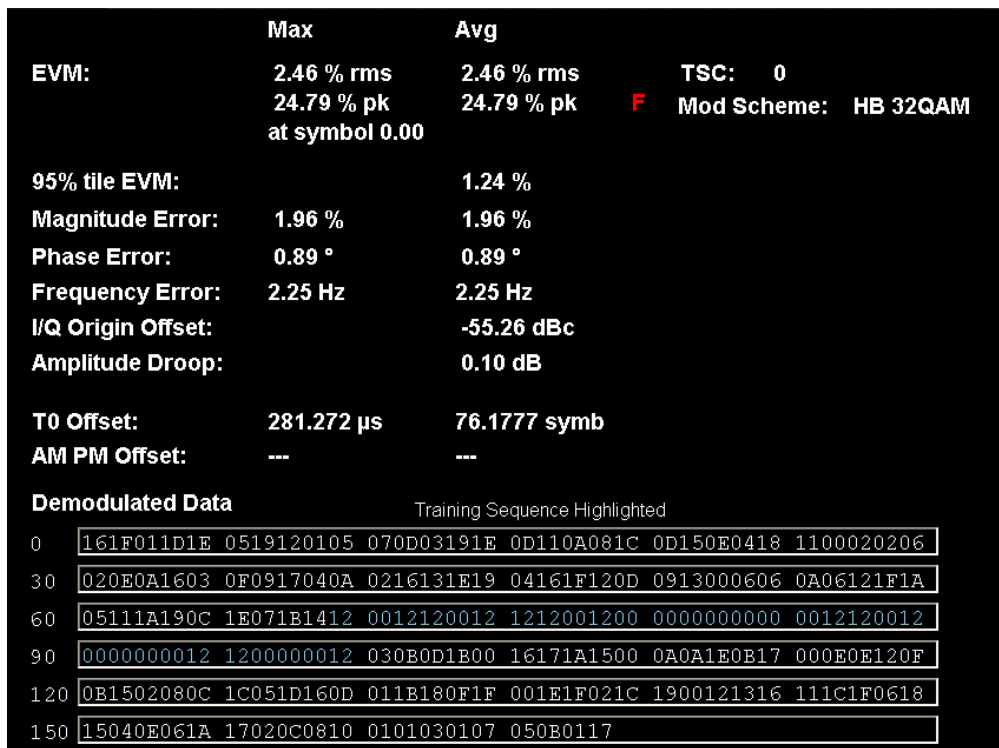


Figure 0-11 Data Bits view for EDGE HSR 32QAM Burst

Metric window

Name	Corresponding Results	Display Format
EVM rms (Max)	n=1 3rd Maximum RMS EVM	9.99 %rms
EVM rms (Avg)	n=1 2nd RMS EVM	9.99 %rms
EVM Pk (Max)	n=1 5th Maximum peak EVM	9.99 %pk
EVM Pk (Avg)	n=1 4th Peak EVM	9.99 %pk
Symbol position of the peak EVM	n=1 6th Symbol position of Peak EVM.	99
95%ile EVM	n=1 1st RMS 95th %ile EVM	9.99 %
Magnitude Error	n=1 7th Magnitude error	9.99 %
Phase Error	n=1 9th Phase error	9.99 °
Frequency Error	n=1 11th Frequency error	-999.99 Hz
I/Q Origin Offset	n=1 13th I/Q origin offset	-99.99 dB
Amplitude Droop	n=1 14th Amplitude droop error	-99.99 dB
T0 Offset	n=1 15th Trigger to T0	0.000 us 0.000 symbols
AMPM Offset	n=1 16th AMPM Offset	0.000 us 0.0000 symbols
Mod Scheme	n=8 18th Modulation Scheme	NB 8PSK

Key Path	View/Display
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

10 EDGE Output RF Spectrum Measurement

The Output RF Spectrum measurement is the GSM version of the adjacent channel power (ACP) measurement.

This topic contains the following sections:

["Measurement Commands for EDGE Output RF Spectrum" on page 768](#)

["Remote Command Results for EDGE Output RF Spectrum" on page 769](#)

Measurement Commands for EDGE Output RF Spectrum

The following commands and queries can be used to retrieve the measurement results:

`:CONFigure:EORFspectr`

`:CONFigure:EORFspectr:NDEFault`

`:INITiate:EORFspectr`

`:FETCh:EORFspectr[n]?`

`:READ:EORFspectr[n]?`

`:MEASure:EORFspectr[n]?`

For more measurement related commands, see the section ["Remote Measurement Functions" on page 1430](#).

Remote Command Results for EDGE Output RF Spectrum

For the queries listed above, the results returned depend on the value of n, as follows.

Measurement Method	n	Results Returned
	0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
Single offset	not specified or n = 1	Returns 4 comma-separated results for the specified offset: 1. Modulation spectrum power, dB 2. Modulation spectrum power, dBm 3. Switching transient power, dB 4. Switching transient power, dBm
Multi-Offset	not specified or n = 1	Returns a list of comma-separated values for the modulation spectrum at all the offsets (lower and upper). This is followed by the switching transient results at all the offsets (lower and upper). The carrier is considered offset zero (0) and is the first set of results sent. Four values are provided for each of the offsets (including the carrier), in this order: 1. Lower offset(a) - power relative to carrier (dB) 2. Lower offset(a) - absolute average power (dBm) 3. Upper offset(a) - power relative to carrier (dB) 4. Upper offset(a) - absolute average power (dBm) Values for all possible offsets are sent. Zeros are sent for offsets that have not been defined. The total number of values sent $(120) = (4 \text{ results/offset}) * (15 \text{ offsets}) * (2 \text{ measurement types - modulation \& switching})$ Carrier – modulation measurement values Offset 1 – modulation measurement values and so on ... Offset 14 – modulation measurement values Carrier – switching transients measurement values Offset 1 – switching transients measurement values ... Offset 14 – switching transients measurement values and so on This measurement defaults to modulation measurements and not switching measurements. If you want to return the switching measurement values, you must change that default condition and use FETCh or READ to return values, rather than MEASure.
Swept	not specified or n = 1	Returns 5 comma-separated results of the closest point to the limit line: 1. Frequency 2. Offset frequency from carrier frequency

Measurement Method	n	Results Returned
		3. Power in dBm 4. delta from limit (dB) 5. delta from reference (dB)
Single offset	2	Returns floating point numbers (in dBm) of the captured trace data. It contains N data points of the “spectrum due to modulation” signal, where N is the specified number of samples.
Multi-Offset or Swept	2	Nothing returns.
Single offset	3	Returns floating point numbers (in dBm) of the captured trace data. It contains N data points of the “spectrum due to switching transients” signal, where N is the specified number of samples.
Multi-Offset or Swept	3	Nothing returns.
Swept	4	Returns floating point numbers (in dBm) of the sweep spectrum trace.
Multi-Offset or Single Offset	4	Nothing returns.
Swept	5	Returns floating point numbers (in dBm) of the swept limit trace.
Multi-Offset or Single Offset	5	Nothing returns.
Multi-Offset	6	Relative level to the test limit, and test limit itself for both modulation and switching transient measurements. Returns a list of relative level to the test limit, the relative test limit and the absolute test limit for all the offset frequencies. The relative level to the test limit is returned for both lower and upper offsets. Four values are returned for each offset in the following order: 1. Relative level to the test limit (dB) at the lower offset frequency 2. Relative level to the test limit (dB) at the upper offset frequency 3. Relative test limit used (dB) 4. Absolute test limit used (dBm) For #3 and #4, the value of the upper offset frequencies are returned when carriers are set to more than 1. Values for all possible offsets are returned. The carrier frequency is considered offset zero (0.0 Hz) and is the first set of values returned. Zeros are returned for offsets that have not been defined. Zeros are returned for the measurement that was not performed. For example, if Meas Type is Modulation, all switching transient measurement results are 0.0. The total number of values returned is: $120 = (4 \text{ results / offset}) * (15 \text{ offset frequencies}) * (2 \text{ measurement types})$

Measurement Method	n	Results Returned
		Carrier (Offset A) – modulation measurement results Offset 1 (Offset B) - modulation measurement results ... Offset 14 (Offset O) - modulation measurement results Carrier (Offset A) – switching transients measurement results Offset 1 (Offset B) – switching transient measurement results ... Offset 14 (Offset O) – switching transients measurement results
Single Offset or Swept	6	Returns NULL
All	7	Returns floating point number (in dBm) of Measured Carrier Power Level that determines the PCL.
Multi-Offset	8	Returns a list of relative level to the test limit, test limit itself, and the test limit actually applied for the test (Abs, Rel, or both Abs and Rel) for both modulation and switching transient measurements. Eight values are returned for each offset in the following order. <1 ~4: Lower Offset Freq.> 1. Relative level to the test limit (dB) 2. Relative test limit (dB) 3. Absolute test limit (dBm) 4. Test limit actually applied (1 for Abs, 2 for Rel, 3 for Abs and Rel) <5 ~8: Upper Offset Freq.> 1. Relative level to the test limit (dB) 1. Relative test limit (dB) 2. Absolute test limit (dBm) 3. Test limit actually applied (1 for Abs, 2 for Rel, 3 for Abs and Rel) The total number of values returned: $240 = (8 \text{ values/offset}) * (15 \text{ offset frequencies}) * (2 \text{ Meas Type})$ Values for all possible offsets are returned. The carrier frequency is considered offset zero (0.0 Hz) and is the first set of values returned. Zeros are returned for offsets that have not been defined. Zeros are returned for the measurement that was not performed. For example, if Meas Type is Modulation, all switching transient measurement results are 0.0. When Meas Type is Modulation: Carrier (Offset A) - All values are 0. Offset 1 (Offset B) - limit measurement values ...

Measurement Method	n	Results Returned
		Offset 14 (Offset 0) - limit measurement values When Meas Type is Switching: Carrier (Offset A) - All values are 0. Offset 1 (Offset B) -limit measurement values ... Offset 14 (Offset 0) - limit measurement values
Single Offset or Swept	8	Returns NULL.
All	9	Note that this query is duplicated. Use the query (n=11) instead. Returns a list of comma-separated values for the Carrier Header Information and the Carrier Power Measurement Results for Modulation and Switching. 1. Carrier Header Information for Modulation Nine values are returned in the following order. (a) Number of Carriers (b) Reference Carrier (c) VBW/RBW Ratio (d) Modulation Carrier RBW 1 (e) Modulation Carrier RBW 2 (f) Modulation Carrier RBW 3 (g) Power Reference Type (Reference Carrier = 0, Max Power = 1) (h) Actual Reference Carrier (i) Modulation Type for Actual Reference Carrier (GMSK = 0, EDGE = 1) All of the modulation carrier RBW 1, 2, and 3 are valid only when the following conditions are met. + The number of carriers is more than 1. + The Meas Type is set to Modulation or Modulation&Switching. + The Carrier RBW is set to Auto. + The Ofst Freq List is set to Standard in the Multi Offset method or the Wideband Noise is set to ON in the Swept method. All are invalid unless the Meas Type is set to Modulation or Modulation&Switching. 2. Carrier Power Measurement Results for Modulation Six values are returned for each carrier in the following order. (a) Carrier Power (b) Reference Power Measured with Modulation Carrier RBW 1 (c) Reference Power Measured with Modulation Carrier RBW 2 (d) Reference Power Measured with Modulation Carrier RBW 3

Measurement Method	n	Results Returned
		(e) Carrier Center Frequency (f) Power Present (No = 0, Yes = 1) The maximum number of carriers is 8, and therefore a total of 48 values are returned. The Carrier Power and the Carrier Center Frequency are invalid when its corresponding Power Present is set to 0. The Reference Power is invalid when its corresponding Modulation Carrier RBW is invalid. All are invalid unless the Meas Type is set to Modulation or Modulation&Switching. 3. Carrier Header Information for Switching Seven values are returned in the following order. (a) Number of Carriers (b) Reference Carrier (c) VBW/RBW Ratio (d) Switching Carrier RBW (e) Power Reference Type (Reference Carrier = 0. Max Power = 1) (f) Actual Reference Carrier (g) Modulation Type for Actual Reference Carrier (GMSK = 0, EDGE = 1) All are invalid unless the Meas Type is set to Switching or Modulation&Switching. 4 Carrier Power Measurement Results for Switching Four values are returned for each carrier in the following order. (a) Carrier Power (b) Reference Power Measured with Switching Carrier RBW (c) Carrier Center Frequency (d) Power Present (No = 0, Yes = 1) The maximum number of carriers is 8, and therefore a total of 32 values are returned. The Carrier Power and the Carrier Center Frequency are invalid when its corresponding Power Present is set to 0. The Reference Power is invalid when the Switching Carrier RBW is invalid All are invalid unless the Meas Type is set to Switching or Modulation&Switching.
Multi-Offset	10	Returns a list of results for both modulation and switching transient measurements in the multi-offset method. Sixteen values are returned for each offset in the following order. 1. Offset frequency (Hz) 2. Offset RBW (Hz)

Measurement Method	n	Results Returned
		<3~9: Lower Offset Freq.> 3. Carrier RBW (Hz) 4. Power relative to carrier (dB) 5. Relative level to the test limit (dB) 6. Absolute average power (dBm) 7. Relative test limit (dB) 8. Absolute test limit (dBm) 9. Test limit actually applied (0 for not applied, 1 for Abs, 2 for Rel, 3 for Abs and Rel) <10~16: Upper Offset Freq.> 10. Carrier RBW (Hz) 11. Power relative to carrier (dB) 12. Relative level to the test limit (dB) 13. Absolute average power (dBm) 14. Relative test limit (dB) 15. Absolute test limit (dBm) 16. Test limit actually applied (0 for not applied, 1 for Abs, 2 for Rel, 3 for Abs and Rel) The total number of values returned: IF all the following conditions are met • The number of carriers is greater than one. • (CHAN:CARR:COUN n, where $n > 1$) • The state of the test limit exception is set to On. (EORF:MCAR:LEXC ON) • The type of the multicarrier limit exception rule is set to Custom. (EORF:MCAR:LEXC:RULE CUST) • The type of a frequency list for multi offset is set to Limited Custom. (EORF:LIST:SEL LCUS) THEN $1280 = (16 \text{ values/offset}) * (40 \text{ offset frequencies}) * (2 \text{ Meas Type})$ Values for all possible offsets are returned. Offset 1 – modulation measurement results ... Offset 40 – modulation measurement results Offset 1 – switching transient measurement results ... Offset 40 – switching transient measurement results ELSE $448 = (16 \text{ values/offset}) * (14 \text{ offset frequencies}) * (2 \text{ Meas Type})$ Values for all possible offsets are returned. Offset 1 – modulation measurement results ... Offset 14 – modulation measurement results

Measurement Method	n	Results Returned
		Offset 1 – switching transient measurement results ... Offset 14 – switching transient measurement results
All	11	Returns a list of comma-separated values for the Carrier Header Information and the Carrier Power Measurement Results for Modulation and Switching. 1. Carrier Header Information for Modulation Nine values are returned in the following order. (a) Number of Carriers (b) Reference Carrier (c) VBW/RBW Ratio (d) Modulation Carrier RBW 1 (e) Modulation Carrier RBW 2 (f) Modulation Carrier RBW 3 (g) Power Reference Type (Reference Carrier = 0, Max Power = 1) (h) Actual Reference Carrier (i) Modulation Type for Actual Reference Carrier (GMSK = 0, EDGE = 1) All of the modulation carrier RBW 1, 2, and 3 are valid only when the following conditions are met. + The number of carriers is more than 1. + The Meas Type is set to Modulation or Modulation&Switching. + The Carrier RBW is set to Auto. + The Ofst Freq List is set to Standard in the Multi Offset method or the Wideband Noise is set to ON in the Swept method. All are invalid unless the Meas Type is set to Modulation or Modulation&Switching. 2. Carrier Power Measurement Results for Modulation Six values are returned for each carrier in the following order. (a) Carrier Power (b) Reference Power Measured with Modulation Carrier RBW 1 (c) Reference Power Measured with Modulation Carrier RBW 2 (d) Reference Power Measured with Modulation Carrier RBW 3 (e) Carrier Center Frequency (f) Power Present (No = 0, Yes = 1) As a result, a total of 6 * N values are returned where N is the number of carriers. The Carrier Power and the Carrier Center Frequency are invalid when its corresponding Power Present is set to 0. The Reference Power is invalid when its corresponding Modulation

Measurement Method	n	Results Returned
		Carrier RBW is invalid. All are invalid unless the Meas Type is set to Modulation or Modulation&Switching. 3. Carrier Header Information for Switching Seven values are returned in the following order. (a) Number of Carriers (b) Reference Carrier (c) VBW/RBW Ratio (d) Switching Carrier RBW (e) Power Reference Type (Reference Carrier = 0. Max Power = 1) (f) Actual Reference Carrier (g) Modulation Type for Actual Reference Carrier (GMSK = 0, EDGE = 1) All are invalid unless the Meas Type is set to Switching or Modulation&Switching. 4. Carrier Power Measurement Results for Switching Four values are returned for each carrier in the following order. (a) Carrier Power (b) Reference Power Measured with Switching Carrier RBW (c) Carrier Center Frequency (d) Power Present (No = 0, Yes = 1) As a result, a total of $4 * N$ values are returned where N is the number of carriers. The Carrier Power and the Carrier Center Frequency are invalid when its corresponding Power Present is set to 0. The Reference Power is invalid when the Switching Carrier RBW is invalid All are invalid unless the Meas Type is set to Switching or Modulation&Switching.
Swept	12	Returns the number of failed frequency bands and a list of the following four pieces of information for each of the frequency bands. 1. The offset frequency of the band center frequency, Hz 17. The worst delta power in the band, dBm 18. The absolute frequency of the band center frequency, Hz 19. The absolute frequency with the worst delta power in the band, Hz As a result, a total of $(1 + 4 * N)$ values are returned where N is the number of failed frequency bands.
Key Path	Meas	

Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.07.00, A.13.00, A.14.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Range

The Range menu allows setting amplitude controls of the instrument.

Key Path	AMPTD Y Scale
Scope	Meas Global
Initial S/W Revision	A.12.50

Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

Key Path	Range
Mode	BASIC
Remote Command	[:SENSe] :POWer [:RF] :RANGe <real> [:SENSe] :POWer [:RF] :RANGe?
Example	:POW:RANG 10.0 :POW:RANG?
Notes	The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.)
Preset	0
State Saved	Saved in instrument state.
Min	-100
Max	100
Initial S/W Revision	A.12.50

Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

Key Path	AMPTD Y Scale, Attenuation
Remote Command	<code>[:SENSe]:POWer[:RF]:RANGe:OPTimize IMMEDIATE</code>
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

Key Path	AMPTD Y Scale, Attenuation
Remote Command	<code>[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation OFF ON ELEctrical COMBined</code> <code>[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation?</code>
Notes	This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELEctrical and COMBined still can be used. Then, upon receiving ELEctrical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned.
Preset	OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

Key Path	AMPTD Y Scale, Range
Remote Command	<code>[:SENSe]:POWer[:RF]:RANGe:PARatio <real></code> <code>[:SENSe]:POWer[:RF]:RANGe:PARatio?</code>
Example	POW:RANG:PAR 12 dB
Notes	In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out.

	Attempting to change the value via SCPI will be ignored and no error message will be generated.
Preset	10 dB
State Saved	Saved in instrument state
Min	0 dB
Max	20 dB
Initial S/W Revision	A.13.00

Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

Key Path	AMPTD Y Scale, Range
Remote Command	[:SENSe] :POWeR [:RF] :RANGe:MIXer:OFFSet <real> [:SENSe] :POWeR [:RF] :RANGe:MIXer:OFFSet?
Example	POW:RANG:MIX:OFFS -5 dB
Preset	0 dB
State Saved	Saved in instrument state
Min	-35 dB
Max	30 dB
Initial S/W Revision	A.13.00

Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple key actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See ["More Information" on page 781](#)

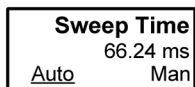
Key Path	Front-panel key
Remote Command	:COUPle ALL NONE
Example	:COUP ALL
Notes	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements.
Initial S/W Revision	Prior to A.02.00

More Information

There are two types of functions that have Auto/Manual modes.

Auto/Man Active Function keys

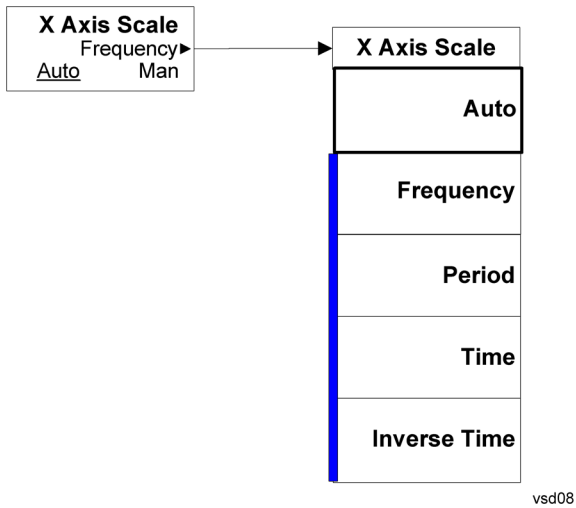
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between **Auto** (where the parameter is automatically coupled to the other parameters it is dependent upon) and **Man** (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either **Auto** or **Man** underlined as illustrated below.



vsd07

Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.



BW

There is no 'BW' functionality supported in EDGE Output RF Spectrum, so this Front-panel key displays a blank menu when pressed.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing **Cont** does a Resume.

Key Path	Front-panel key
Remote Command	:INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous?
Example	:INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation
Preset	ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF)
State Saved	Saved in instrument state
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold . The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON) switches to continuous measurement, but never restarts a measurement and never resets a sweep.
Initial S/W Revision	Prior to A.02.00

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of **Trace Average**, **Max Hold**, or **Min Hold**.

In Other Measurements/Modes:

With **Avg/Hold Num** (in the **Meas Setup** menu) set to **Off** or set to **On** with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with **Avg/Hold Num** set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the **Cont** key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until $k = N$, at which point the current sequence will stop and the instrument will go to the idle state.

File

See ["File" on page 156](#)

FREQ/Channel

Accesses a menu of keys that allows you to control the Frequency parameters of the instrument.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

ARFCN

Sets the analyzer to a frequency that corresponds to the ARFCN (Absolute RF Channel Number). Used to enter the channel to be measured for the selected band. If the Center Freq value entered does not exactly correlate with an ARFCN, the softkey label changes to display the closest ARFCN to the selected frequency, along with a > or < symbol indicating whether the frequency is above or below that ARFCN.

Key Path	FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:ARFCn RFChannel <integer> [:SENSe]:CHANnel:ARFCn RFChannel?
Example	CHAN:ARFC 3 CHAN:ARFC?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	Coupled with Center Frequency . Setting ARFCN sets Center Freq to the value corresponding to that ARFCN. BMT Freq choice changes this parameter.
Preset	1
State Saved	Saved in instrument state.
Range	Different for each BAND as follows: E-GSM: 0 to 124, and 975 to 1023 P-GSM: 1 to 124 R-GSM: 0 to 124(MS), and 955 to 1023(BTS) DCS1800: 512 to 885 PCS1900: 512 to 810 GSM450: 259 to 293 GSM480: 306 to 340 GSM700: 438 to 516 GSM850: 128 to 251 T-GSM 810: 350 to 425

Min	Different for each BAND as follows: E-GSM: 0(MS), and 975(BTS) P-GSM: 1 R-GSM: 0(MS), and 955(BTS) DCS1800: 512 PCS1900: 512 GSM450: 259 GSM480: 306 GSM700: 438 GSM850: 128 T-GSM 810: 350
Max	Different for each BAND as follows: E-GSM: 124(MS), and 1023(BTS) P-GSM: 124 R-GSM: 124(MS), and 1023(BTS) DCS1800: 885 PCS1900: 810 GSM450: 293 GSM480: 340 GSM700: 516 GSM850: 251 T-GSM 810: 425
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.07.00

Center Freq

Sets the center frequency to be measured for the selected band. It is coupled with ARFCN – setting Center Freq sets ARFCN to the channel corresponding to that frequency.

For more information, see the section ["Center Freq" on page 1399](#).

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

Time Slot

This functionality is the same as that of the corresponding key in the Demod menu. See ["Time Slot" on page 1418](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

Burst Type

This functionality is the same as that of the corresponding key in the Demod menu. See ["Burst Type" on page 1419](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

TSC (Std)

This functionality is the same as that of the corresponding key in the Demod menu. See ["TSC \(Std\)" on page 1420](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is **Center Freq**.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a **Global Settings** key in its **Mode Setup** menu.

The **Center Freq** function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 792](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 794](#)

See ["Center Frequency Presets" on page 791](#)

Key Path	FREQ Channel
Scope	Meas Global
Remote Command	[:SENSe] :FREQuency:CENTer <freq> [:SENSe] :FREQuency:CENTer?
Example	FREQ:CENT 50 MHz FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT?
Notes	This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated.
Dependencies	The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit.
Couplings	When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range
Preset	Depends on instrument maximum frequency, mode, measurement, and selected input. See "Center Frequency Presets" on page 791 and "RF Center Freq" on page 792 and Ext Mix Center Freq and "I/Q Center Freq" on page 794 .
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 791 and "RF Center Freq" on page 792 and "I/Q Center Freq" on page 794 .
Max	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 791 and "RF Center Freq" on page 792 and "I/Q Center Freq" on page 794 .
Default Unit	Hz
Status Bits/OPC Dependencies	Non-overlapped
Initial S/W Revision	Prior to A.02.00

Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

Freq Option	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
503 (all but N9000A)	1.805 GHz	3.6 GHz	3.7 GHz
503 (N9000A)	1.505 GHz	3.0 GHz	3.08 GHz
507 (all but N9000A)	3.505 GHz	7.0 GHz	7.1 GHz
507 (N9000A)	3.755 GHz	7.5 GHz	7.58 GHz
508 (all but N9038A)	1.805 GHz	3.6 GHz	8.5 GHz
508 (N9038A)	4.205 GHz	8.4 GHz	8.5 GHz
513	6.805 GHz	13.6 GHz	13.8 GHz
526 (all but N9000A and N9038A)	13.255 GHz	26.5 GHz	27.0 GHz
526 (N9000A)	13.255 GHz	26.5 GHz	26.55 GHz
526 (N9038A)	1.805 GHz	3.6 GHz	27.0 GHz
532	16.005 GHz	32.0 GHz	32.5 GHz
543	21.505 GHz	43.0 GHz	TBD
544	22.005 GHz	44.0 GHz	44.5 GHz
550	25.005 GHz	50.0 GHz	51 GHz

Input 2:

Model	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
N9000A opt C75	0.7505GHz	1.5 GHz	1.58 GHz
N9038A	505 MHz	1 GHz	1.000025 GHz

Tracking Generator Frequency Limits (N9000A only):

Tracking Generator Option	Min Freq (clips to this freq when turn TG on and can't tune below while TG on)	If above this Freq, Stop Freq clipped to this Freq when TG turned on	Max Freq (can't tune above) while TG on
T03	9 kHz	3.0 GHz	3.08 GHz
T06	9 kHz	6.0 GHz	6.05 GHz

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

Mode	CF Preset for RF
WCDMA	1 GHz
WIMAXOFDMA,	1 GHz
BASIC	1 GHz
ADEMOD	1 GHz
VSA	1 GHz
TDSCDMA	1 GHz
PNOISE	1 GHz
LTE	1 GHz
LTETDD	1 GHz
MSR	1 GHz
GSM	935.2 MHz
NFIGURE	1.505 GHz

RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	<code>[:SENSe] :FREQuency:RF:CENTer <freq></code> <code>[:SENSe] :FREQuency:RF:CENTer?</code>
Example	FREQ:RF:CENT 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Dependencies	If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop

	Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep.
Preset	See table above
State Saved	Saved in instrument state.
Min	-79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source
Max	See table above. Basically instrument maximum frequency - 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	<code>[:SENSe] :FREQuency:EMIXer:CENTer <freq></code> <code>[:SENSe] :FREQuency:EMIXer:CENTer?</code>
Example	<code>:FREQ:EMIX:CENT 60 GHz</code> <code>:FREQ:EMIX:CENT?</code>
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Couplings	When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup.
Preset	When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies.

	If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table (Span=Stop Freq – Start Freq), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table. When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is 33.25 GHz. Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz.
State Saved	Saved in instrument state.
Min	The minimum frequency in the currently selected mixer band + 5 Hz
Max	The maximum frequency in the currently selected mixer band – 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	A.08.01

I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	<pre>[:SENSe] :FREQuency:IQ:CENTer <freq></pre> <pre>[:SENSe] :FREQuency:IQ:CENTer?</pre>
Example	FREQ:IQ:CEN: 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Preset	0 Hz
State Saved	Saved in instrument state.
Min	–40.049995 MHz
Max	40.049995 MHz
Initial S/W Revision	Prior to A.02.00

BMT Freq

Enables quick selection from a subset of the available ARFCN numbers for the Top, Middle, or Bottom frequency in the selected band.

Key Path	FREQ Channel

Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	BMT choice changes ARFCN and Center Freq. Chosen ARFCN will be displayed on each menu key.
Range	Top Middle Bottom
Initial S/W Revision	Prior to A.02.00

BMT Freq Top

Sets the analyzer to the frequency of the highest ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :ARFCn RFCHannel :TOP
Example	CHAN:ARFC:TOP
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 124 P-GSM: 124 R-GSM: 124 DCS 1800: 885 PCS 1900: 810 GSM 450: 293 GSM 480: 340 GSM 700: 516 GSM 850: 251 T-GSM 810: 425 Change BMT ARFCN to BMT FreqTOP. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 959.800 MHz P-GSM: 959.800 MHz R-GSM: 959.800 MHz

	DCS 1800: 1879.80 MHz
	PCS 1900: 1989.80 MHz
	GSM 450: 467.400 MHz
	GSM 480: 495.800 MHz
	GSM 700: 792.800 MHz
	GSM 850: 893.800 MHz
	T-GSM810: 866.000 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

BMT Freq Middle

Sets the analyzer to the frequency of the middle ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :ARFCn RFCHannel :MIDDLE
Example	CHAN:ARFC:MIDD
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 38 P-GSM: 63 R-GSM: 28 DSC 1800: 699 PCS 1900: 661 GSM 450: 276 GSM 480: 323 GSM 700: 477 GSM 850: 190 T-GSM 810: 388 Change BMT ARFCN to BMT FreqMIDDLE. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 942.600 MHz P-GSM: 947.600 MHz R-GSM: 940.600 MHz

	DCS 1800: 1842.60 MHz
	PCS 1900: 1960.00 MHz
	GSM 450: 464.000 MHz
	GSM 480: 492.400 MHz
	GSM 700: 755.000 MHz
	GSM 850: 881.600 MHz
	T-GSM 810: 858.600 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

BMT Freq Bottom

Sets the analyzer to the frequency of the lowest ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel:ARFCn RFCHannel:BOTTom
Example	CHAN:ARFC:BOTT
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 975 P-GSM: 1 R-GSM: 955 DCS 1800: 512 PCS 1900: 512 GSM 450: 259 GSM 480: 306 GSM 700: 438 GSM 850: 128 T-GSM 810: 350 Change BMT ARFCN to BMT FreqBOTTOM. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 925.200 MHz P-GSM: 935.200 MHz R-GSM: 921.200 MHz

	DCS 1800: 1805.20 MHz PCS 1900: 1930.20 MHz GSM 450: 460.600 MHz GSM 480: 489.000 MHz GSM 700: 747.2 MHz GSM 850: 869.200 MHz T-GSM 810: 851.000 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

Carrier Setup

Allows you to set carrier parameters.

Key Path	FREQ Channel
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.14.00

BTS Class

Selects a BTS class.

BTS Class	Definition
MC	Multicarrier BTS is defined as a class of BTS, characterized by the ability to, in addition to single carrier operation, process two or more carriers in common active RF components simultaneously, either in multicarrier transmitter only or, in both multicarrier transmitter and multicarrier receiver.
SC	Single carrier BTS is defined as a class of BTS, characterized by the ability to process one carrier in single carrier BTSs, not belonging to a Multicarrier BTS class.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Remote Command	[:SENSe]:CHANnel:CARRier:BASE:CLASs:AUTO ON OFF 1 0 [:SENSe]:CHANnel:CARRier:BASE:CLASs:AUTO?
Example	CHAN:CARR:BASE:CLAS:AUTO 1 CHAN:CARR:BASE:CLAS:AUTO?
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is

	sent, an undefined header error or illegal parameter error is returned.
Couplings	ON automatically changes to OFF when Multicarrier Class (MC) or Single carrier Class (SC) is selected as BTS Class.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.14.00

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
Remote Command	<code>[:SENSe]:CHANnel:CARRier:BASE:CLASs SC MC</code> <code>[:SENSe]:CHANnel:CARRier:BASE:CLASs?</code>
Example	CHAN:CARR:BASE:CLAS MC CHAN:CARR:BASE:CLAS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Selection C1 and C2 are supported for backwards compatibility. When "C1" or "C2" is passed as SCPI command parameter, the BTS Class Auto is set to ON. As a result, it's converted to "SC" if the number of carriers is one, and otherwise "MC."
Dependencies	This parameter is available when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Preset	SC
State Saved	Saved in instrument state.
Range	Single Carrier Multi Carrier
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.10.01, A14.00

Carriers

Defines the number of carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
Remote Command	<code>[:SENSe]:CHANnel:CARRier:COUNt <integer></code> <code>[:SENSe]:CHANnel:CARRier:COUNt?</code>

Example	CHAN:CARR:COUN 3 CHAN:CARR:COUN?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	This can change when the SCPI command of the Carrier Power Present or the Carrier Interval is sent.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	16
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.13.00

Reference Carrier

Defines the reference active carrier. The Reference Carrier frequency point is always aligned with the Measurement Global Center Frequency. The minimum value 1 specifies the lowest frequency carrier among the active carriers. The maximum value specifies the highest frequency carrier among the active carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :CARRier :RCARrier <integer> [:SENSe] :CHANnel :CARRier :RCARrier?
Example	CHAN:CARR:RCAR 3 CHAN:CARR:RCAR?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. If you set it to more than the number of carriers, it's clipped to the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	When you decrease the number of carriers to a value which is less than this value, this is clipped to the value.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

Configure Carriers

Opens a menu of keys that allows you to configure carriers.

Key Path	FREQ Channel, Multi Carrier Setup
Dependencies	This key is grayed out when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00

Select Carrier

Selects a carrier to configure.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	No
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:CARRier:LIST:COUPle OFF ON 0 1, ... [:SENSe]:CHANnel:CARRier:LIST:COUPle?
Example	CHAN:CARR:LIST:COUP OFF CHAN:CARR:LIST:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	When Couple is selected, the carrier settings are coupled to carrier #1. Coupled parameters are

	Carrier Power Present, Carrier Interval. When a setting is changed, the couple is set to Man automatically. Carrier #1 is always set to couple and cannot be changed. Couple/Man selection on the Carrier key is not displayed when selected carrier number is #1.
Preset	ON
State Saved	No
Range	Couple Man
Initial S/W Revision	A.06.00

Carrier Power Present

Specifies whether each of carriers is active or not.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:CARRier:LIST:PPresent YES NO, ... [:SENSe]:CHANnel:CARRier:LIST:PPresent?
Example	CHAN:CARR:LIST:PPR YES CHAN:CARR:LIST:PPR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored.
Dependencies	This parameter is unavailable when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list.
Preset	YES
State Saved	Saved in instrument state.
Range	Yes No
Initial S/W Revision	A.06.00

Carrier Interval

Specifies the frequency interval between the Carrier #n and #n+1 center frequencies.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global

Remote Command	<code>[:SENSe]:CHANnel:CARRier:LIST:INTerval <freq>, ...</code> <code>[:SENSe]:CHANnel:CARRier:LIST:INTerval?</code>
Example	CHAN:CARR:LIST:INT 600k CHAN:CARR:LIST:INT?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. The softkey for the last carrier (say, #N) is grayed out.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list. Changing Carrier Interval might affect the Span.
Preset	600kHz
State Saved	Saved in instrument state.
Min	400 kHz
Max	100 MHz
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.07.00, A.08.00

Carrier Frequency Allocation

Specifies the carrier frequency allocation. There are two types of allocation, contiguous and non-contiguous. Non-Contiguous frequency allocation is defined as an allocation where two groups of frequencies are separated with at least [3.6] MHz carrier separation between the innermost carriers. In case of the non-contiguous frequency allocation, tests will be measured between the uppermost carrier A of the lower frequency group and the lowermost carrier B of the upper frequency group.

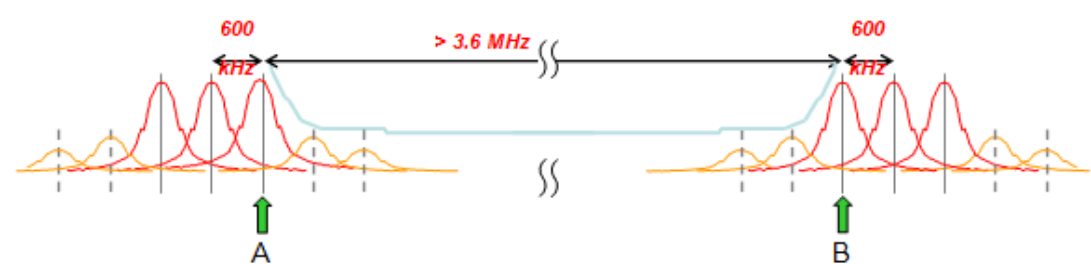
Error! Reference source not found.

See "An example of non-contiguous frequency allocation" on page 804

Key Path	FREQ Channel, Multi Carrier Setup
Mode	GSM
Scope	Meas Global
Remote Command	<code>[:SENSe]:CHANnel:CARRier:FALLocation</code> CONTiguous NCONTiguous <code>[:SENSe]:CHANnel:CARRier:FALLocation?</code>
Example	CHAN:CARR:FALL NCON CHAN:CARR:FALL?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This menu key is available only when the number of carriers is more than one.

	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	CONTiguous
State Saved	Saved in instrument state.
Range	Contiguous Non-Contiguous
Readback Text	CONTiguous NCONTiguous
Initial S/W Revision	A.07.00

An example of non-contiguous frequency allocation



Non-Contiguous

Opens a menu of keys that allows you to set non-contiguous frequency allocation parameters.

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Initial S/W Revision	A.07.00

Allocation Break Pt

Specifies an allocation break point that is a sequence (or index) number of the uppermost carrier in the lower frequency group.

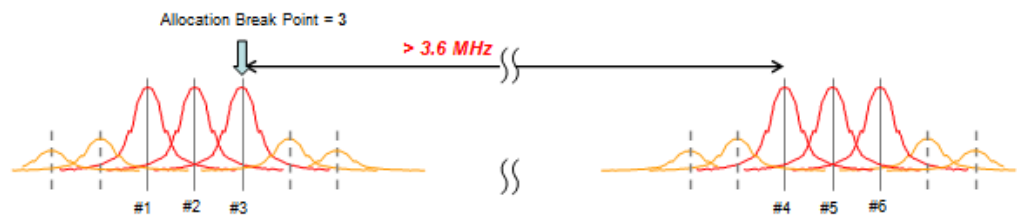
Error! Reference source not found.

See "An example of allocation break point" on page 806

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :CARRier :FALLocation :NCONtiguous :ABPoint <integer> [:SENSe] :CHANnel :CARRier :FALLocation :NCONtiguous :ABPoint?
Example	CHAN:CARR:FALL:NCON:ABP 3 CHAN:CARR:FALL:NCON:ABP?

Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers – 1
Initial S/W Revision	A.07.00
Modified at S/W Revision	A.13.00

An example of allocation break point



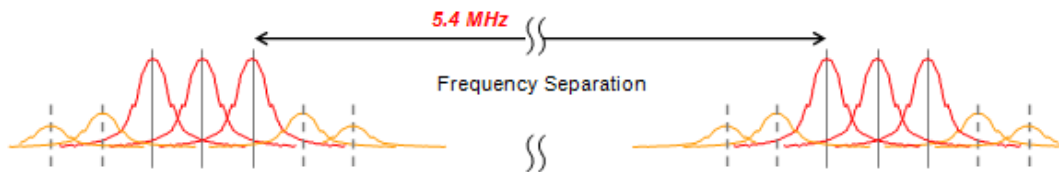
Freq Separation

Specifies frequency separation between the innermost of carriers.

See "An example of frequency separation" on page 807

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :CARRier :FALLocation :NCONtiguous :FSEParation <freq> [:SENSe] :CHANnel :CARRier :FALLocation :NCONtiguous :FSEParation?
Example	CHAN:CARR:FALL:NCON:FSEP 5.4M CHAN:CARR:FALL:NCON:FSEP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Changing Frequency Separation might affect the Span
Preset	5.4 MHz
State Saved	Saved in instrument state.
Min	3.6 MHz
Max	100 MHz
Initial S/W Revision	A.07.00

An example of frequency separation



Carrier BPF

Selects whether to use the carrier bandpass filter.

Key Path	FREQ Channel, Multi Carrier SetupMode Setup, Demod
Mode	GSM
Remote Command	<code>[:SENSe]:RADio:CARRier:NUMBer:AUTO ON OFF 1 0</code> <code>[:SENSe]:RADio:CARRier:NUMBer:AUTO?</code>
Example	<code>RAD:CARR:NUMB:AUTO 1</code> <code>RAD:CARR:NUMB:AUTO?</code>
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	ON automatically changes to OFF when Multiple or Single is selected as Carrier BPF Type.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.06.00

Carrier BPF Type

Opens a menu of keys that allows you to select the type of the bandpass filter. When carriers other than the signal of interest are present, especially if they are strong, they can interfere with the measurement, making it difficult to sync and producing artificially high EVM results. When this condition exists, toggle from Single to Multi. A band-limited filter will help reduce the measurement interference.

BPF Type	Description
MULTiple	Enable multi carrier tolerance filter.
SINGLE	Disable multi carrier tolerance filter

This parameter applies only to the following measurements:

- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement
- GMSK Power vs. Time

- EDGE Power vs. Time

Key Path	FREQ Channel, Multi Carrier Setup, Carrier BPFMode Setup, Demod, Carrier BPF
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:RADio:CARRier:NUMBer SINGLE MULTiple [:SENSe]:RADio:CARRier:NUMBer?
Example	RAD:CARR:NUMB SING RAD:CARR:NUMB?
Notes	The Carrier Bandpass Filter key is in the Mode Setup menu, but only EDGE EVM and GSM PFER measurements support this feature. In other measurements, this setting is not applicable. You must be in the GSM mode to use this command. Use INSTrument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	SINGLE
State Saved	Saved in instrument state.
Range	Single Multi
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

Time Slot

Selects On or Off for slot searching. Generally, this feature is only valid in external and periodic timer trigger source modes that triggers every frame since another trigger source does not have the information that identifies the head of the frame. When Timeslot is set to On, the demodulation measurement is made on the nth timeslot specified by the trigger point + n timeslots, where n is the selected timeslot value 0 to 7.

This functionality is the same as Time Slot under the Freq/Channel menu.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:SLOT <integer> [:SENSe]:CHANnel:SLOT? [:SENSe]:CHANnel:SLOT:AUTO OFF ON 0 1 [:SENSe]:CHANnel:SLOT:AUTO?
Example	CHAN:SLOT 0 CHAN:SLOT? CHAN:SLOT:AUTO OFF CHAN:SLOT:AUTO?
Notes	This functionality does not affect Combined GSM/EDGE measurement.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.	
Preset	0	OFF
State Saved	Saved in instrument state.	
Min	0	
Max	7	
Initial S/W Revision	Prior to A.02.00	

Burst Type

Sets the burst type that the analyzer will search for and to which it will synchronize.

This functionality is the same as Burst Type under the FREQ Channel menu.

Key	SCPI	Description
Sync (SCH)	SYNC	Burst length = 142 symbols Extended training sequences for CTS and COMPACT synchronization bursts are not supported.
Access (RACH)	ACCess	Burst length = 88 symbols Alternative training (synchronization) sequence "TS1" and "TS2" are supported only in GSMK Power vs. Time.
Normal - NB (TCH & CCH)	NORMal	Burst length = 142 symbols Softkey label will be changed to 'Normal - NB' form 'Normal'
Higher Symbol Rate - HB (TCH & CCH)	HSRate	Burst length = 169 symbols This selection key is only shown when theN9071A-3FP license is installed.
Mixed (NB/HB for TSC sync)	MIXed	Enables auto detection between Normal (NB) and HSR (HB) TCH & CCH EDGE Burst. This selection key is only shown when theN9071A-3FP license is installed.

Measurement synchronization capability (Burst Sync = Training Seq)

	GMSK		8PSK		
			16QAM		
			32QAM		
			AQPSK		
GMSK Phase & Freq Error measurement	Yes	Yes	Yes	No	N/A
GMSK Power vs. Time measurement	Yes	Yes	Yes	No	(measures as Normal GMSK when selected)

GMSK Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off)	No	No	Yes	No		
EDGE EVM measurement	No	No	No	Yes	Yes	Yes
EDGE Power vs. Time measurement	Yes	Yes	Yes	Yes	Yes	Yes
EDGE Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off.)	No	No	Yes	Yes	Yes	Yes

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :BURSt NORMal SYNC ACCess HSRate MIXed [:SENSe] :CHANnel :BURSt?
Example	CHAN:BURS NORM CHAN:BURS?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. Higher Symbol Rate and Mixed selections are only available when the N9071A-3FP license is installed. Otherwise these menu keys are blank. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Higher Symbol Rate and Mixed selection keys are not shown unless N9071A-3FP is installed. When unlicensed and SCPI is sent, an undefined header error is returned. When "Mixed" is selected, the Burst Sync menu key under the Meas Setup menu will be grayed out and Training Sequence (TSC) will be used for synchronization. The sync algorithm always runs in Training Sequence (TSC) synchronization because the Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync will become effective again when the Burst Type selection is changed from "Mixed" to another one.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Sync (SCH) Access (RACH) Normal - NB (TCH & CCH) Higher Symbol Rate - HB (TCH & CCH) Mixed (NB/HB for TSC sync)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

TSC (Std)

Allows you to select the Training Sequence Code that determines which burst is to be measured. Applicable only when Burst Sync is set to Training Sequence in the measurement. In the case of AQPSK, this parameter specifies TSC number of VAMOS sub-channel A. TSC of VAMOS sub-channel B is ignored.

This functionality is the same as TSC under the FREQ Channel menu.

This parameter applies only to the following measurements:

- GMSK/EDGE Power vs. Time measurement
- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement

Selection	SCPI	Description
AutoDet	ON 1	The measurement is made on the first burst found to have any one of the valid TSCs in the range of 0 to 7. The measurement may be made on various timeslots if more than one timeslot has one of the 8 valid TSCs.
Man	OFF 0	The measurement is made on the first burst found to have the selected TSC. TSC numbers in the range of 0 to 7 can be selected. The measurement may be made on various timeslots if more than one timeslot has this same TSC.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:TSCode <integer> [:SENSe]:CHANnel:TSCode? [:SENSe]:CHANnel:TSCode:AUTO OFF ON 0 1 [:SENSe]:CHANnel:TSCode:AUTO?
Example	CHAN:TSC 3 CHAN:TSC? CHAN:TSC:AUTO 1 CHAN:TSC:AUTO?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When Sync or Access is selected as Burst Type, this key is grayed out.
Preset	0 ON
State Saved	Saved in instrument state.
Min	0
Max	7
Initial S/W Revision	Prior to A.02.00

Input/Output

See ["Input/Output" on page 128](#)

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Marker Type

Sets the marker control mode to **Normal**, **Delta** or **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Key Path	Marker
Mode	GSM
Remote Command	:CALCulate:EORFspectr:MARKer[1] 2 ... 12:MODE POSition DELTa OFF :CALCulate:EORFspectr:MARKer[1] 2 ... 12:MODE?
Example	CALC:EORF:MARK:MODE OFF CALC:EORF:MARK:MODE?
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal Delta Off
Initial S/W Revision	Prior to A.02.00

Properties

Accesses a menu that allow you to set marker properties and to access the marker trace menu.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Relative To

Selects the marker that the selected marker is relative to (its reference marker).

Key Path	Marker, Properties
Mode	GSM
Remote Command	:CALCulate:EORFspectr:MARKer[1] 2 ... 12:REFerence <integer> :CALCulate:EORFspectr:MARKer[1] 2 ... 12:REFerence?
Example	CALC:EORF:MARK:REF 10 CALC:EORF:MARK:REF?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When queried a single value is returned (the specified marker numbers relative marker). A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself."
Dependencies	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself."
Preset	2 3 4 5 6 7 8 9 10 11 12 1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Key Path	Marker, Properties
Mode	GSM
Remote Command	:CALCulate:EORFspectr:MARKer[1] 2 ... 12:TRACe RFEMod RFESwitching SPEMod LIMMod :CALCulate:EORFspectr:MARKer[1] 2 ... 12:TRACe?
Example	CALC:EORF:MARK:TRACE RFES CALC:EORF:MARK:TRACE?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	RF Envelope Modulation and RF Envelop Switching are available only when Meas Method is Single. Swp Spectrum Modulation and Limit Modulation are available when the Meas Method is Swept. Otherwise they are unavailable.
Preset	RFEMod
State Saved	Saved in instrument state.
Range	RF Envelope Modulation RF Envelope Switching Swp Spectrum Modulation Limit Modulation
Initial S/W Revision	Prior to A.02.00

Couple Markers

When this function is true, moving any marker causes an equal X Axis movement of every other marker which is not **Off**. By “equal X Axis movement” we mean that we preserve the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units).

This may result in markers going off screen.

Key Path	Marker
Mode	GSM
Remote Command	:CALCulate:EORFspectr:MARKer:COUPle[:STATe] ON OFF 1 0 :CALCulate:EORFspectr:MARKer:COUPle[:STATe]?
Example	CALC:EORF:MARK:COUP ON CALC:EORF:MARK:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Key Path	Marker
Mode	GSM
Remote Command	:CALCulate:EORFspectr:MARKer:AOff
Example	CALC:EORFspectr:MARK:AOff
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value, using the current marker X Axis Scale unit. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering an X value if the control mode is **Normal**, **Delta** or **Fixed**.

Mode	GSM
Remote Command	:CALCulate:EORFspectr:MARKer[1] 2 ... 12:X <real> :CALCulate:EORFspectr:MARKer[1] 2 ... 12:X?
Example	CALC:EORF:MARK3:X 0 CALC:EORF:MARK3:X?
Notes	If no suffix is sent , uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error "Invalid suffix" is generated. The query returns the marker's absolute X Axis value if the control mode is Normal , or the offset from the marker's reference marker if the control mode is Delta . The query is returned in the fundamental units for the current marker X Axis scale: Hz for Frequency and Inverse Time , seconds for Period and Time . If the marker is Off the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Max/Min value is changed by Sweep Time or Frequency Span.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	-9.9E37.
Max	9.9E37
Initial S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** except in trace points rather than X

Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	GSM
Remote Command	:CALCulate:EORFspectr:MARKer[1] 2 ... 12:X:POSition <integer> :CALCulate:EORFspectr:MARKer[1] 2 ... 12:X:POSition?
Example	CALC:EORFspectr:MARK10:X:POS 0 CALC:EORFspectr:MARK10:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is Normal , or the offset from the marker's reference marker in trace points if the control mode is Delta . If the marker is Off the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Max/Min value is changed by Sweep Time or Frequency Span.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	-9.9E37
Max	9.9E37
Initial S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command Only)

Returns the marker Y Axis value in the current marker Y Axis unit.

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value, the remote programmer must also know what the analyzer's Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

- **Absolute** result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

- **Relative** result: if a marker's control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker.

Mode	GSM
Remote Command	:CALCulate:EORFspectr:MARKer[1] 2 ... 12:Y?
Example	CALC:EORFspectr:MARK11:Y?
Notes	The query returns the marker Y-axis result. If the marker is Off the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.

Preset	0
State Saved	No
Backwards Compatibility SCPI	:CALCulate:EORFspectr:MARKer[1] 2 ... 4:FUNction:RESult?
Initial S/W Revision	Prior to A.02.00

Marker State (Backwards Compatibility/Remote Command Only)

Sets or queries the state of a marker. Setting a marker which is OFF to state ON or 1 puts it in Normal mode and places it at the center of the screen.

Mode	EDGE GSM
Remote Command	:CALCulate:EORFspectr:MARKer[1] 2 ... 12:STATe OFF ON 0 1 :CALCulate:EORFspectr:MARKer[1] 2 ... 12:STATe?
Example	CALC:EORF:MARK3:STAT ON
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Marker Function

There is no functionality for this Front-panel key in this measurement. Pressing this key displays a blank menu.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Marker To

There is no functionality for this Front-panel key in this measurement. Pressing this key displays a blank menu.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

NOTE

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Remote Measurement Functions

This section contains the following topics:

"Measurement Group of Commands" on page 1431

"Current Measurement Query (Remote Command Only)" on page 1433

"Limit Test Current Results (Remote Command Only)" on page 1433

"Data Query (Remote Command Only)" on page 1433

"Calculate/Compress Trace Data Query (Remote Command Only)" on page 1434

"Calculate Peaks of Trace Data (Remote Command Only)" on page 1439

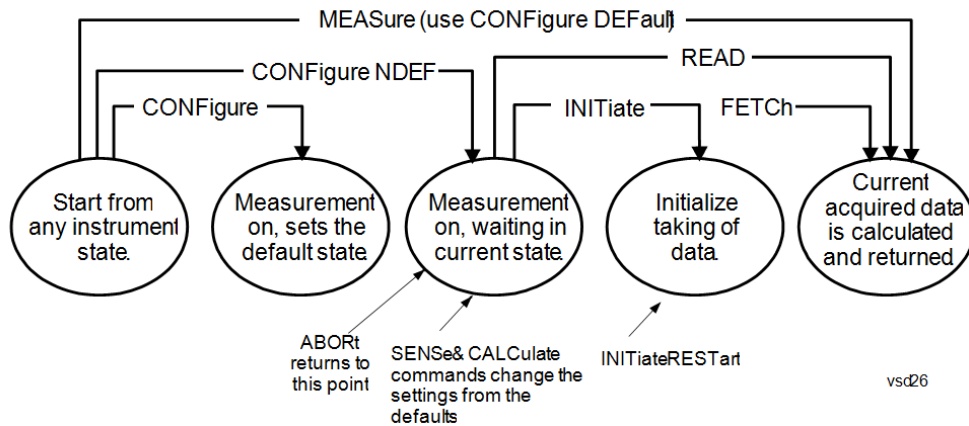
"Hardware-Accelerated Fast Power Measurement (Remote Command Only)" on page 1440

"Format Data: Numeric Data (Remote Command Only)" on page 1454

"Format Data: Byte Order (Remote Command Only)" on page 1455

Initial S/W Revision	Prior to A.02.00

Measurement Group of Commands



Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEfault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

Fetch Commands:

:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

INITiate Commands:

:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
 - Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
 - If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.
-

READ Commands:

:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
-

measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
 - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
 - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
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Initial S/W Revision	Prior to A.02.00

Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

Remote Command	:CONFigure?

Example	CONF?

Initial S/W Revision	Prior to A.02.00

Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

Remote Command	:CALCulate:CLIMits:FAIL?

Example	CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails.

Initial S/W Revision	Prior to A.02.00

Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

Remote Command	<code>:CALCulate:DATA[n]?</code>
Notes	The return trace depends on the measurement. In <code>CALCulate:<meas>:DATA[n]</code> , n is any valid subopcode for the current measurement. It returns the same data as the <code>FETCH:<measurement>?</code> query where <measurement> is the current measurement.
Initial S/W Revision	Prior to A.02.00

Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the `MEASure:<measurement>?` command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

Remote Command	<code>:CALCulate:DATA<n>:COMPRESS? BLOCK CFIT MAXimum MINimum MEAN DMEan RMS RMSCubed SAMPLE SDEVIation PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]]</code>
Example	To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, <code>CALC:DATA2:COMP? MEAN, 24e-6, 526e-6</code> (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.)
Notes	The command supports 5 parameters. Note that the last 4 (<soffset>, <length>, <roffset>, <rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters. This command uses the data in the format specified by <code>FORMat:DATA</code> , returning either binary or ASCII data.
Initial S/W Revision	Prior to A.02.00

- **BLOCK** or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

•

NOTE

If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region(s)}} X_i$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region(s)}} |X_i|$$

where $|X_i|$ is the magnitude of an I/Q pair, and n is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$\text{DME} = 10 \times \log_{10} \left(\frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

NOTE

For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPlE - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEViation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$SDEV = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where X_i is a data point value, $\bar{X}$ is the arithmetic mean of the data point values for the specified region (s), and n is the number of data points in the specified region(s).

$$SDEV = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where $|X_i|$ is the magnitude of an I/Q pair, $\bar{X}$ is the mean of the magnitudes for the specified region(s), and n is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector ($n=0$) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

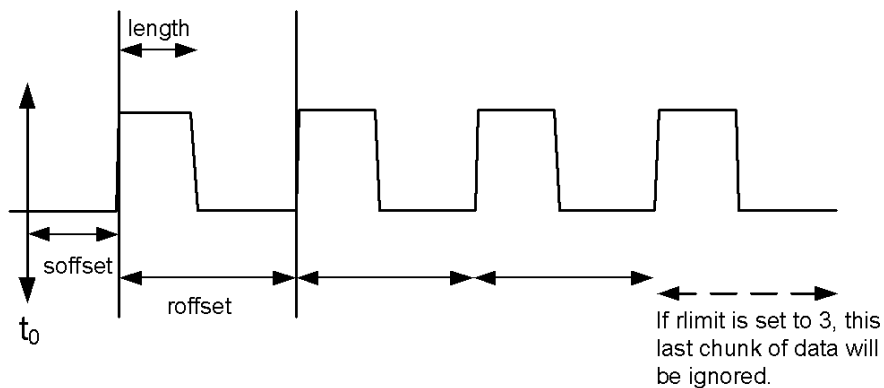
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where Y_i is the unwrapped phase of I/Q pair with applying frequency correction and n is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

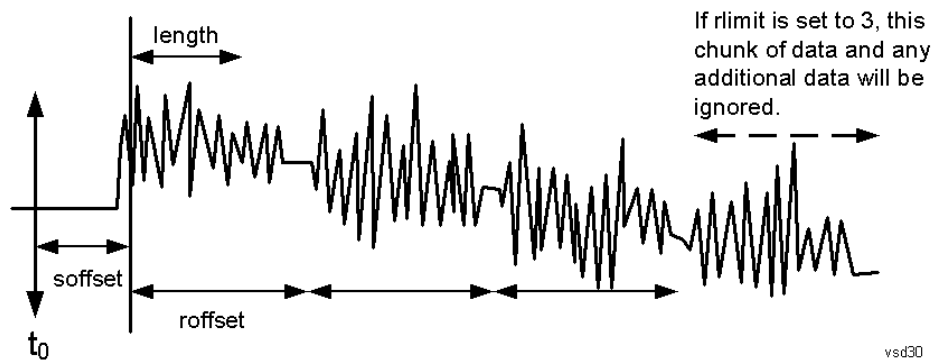
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

Remote Command	For Swept SA measurement: <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME[,ALL GTDLine LTDLine]]</pre> For most other measurements: <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME]</pre>
Example	Example for Swept SA measurement in Spectrum Analyzer Mode: CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned. Query Results 1: With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time). If no peaks are found the peak list will consist of only the number of peaks, (0).
Notes	<n> - is the trace that will be used <threshold> - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu. <excursion> - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the

excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported. Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQUENCY - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

Initial S/W Revision	Prior to A.02.00

Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

Mode	All
Remote Command	:CALCulate:FPOW:Power[1,2,...,999]:RESet
Example	:CALC:FPOW:POW1:RES

Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:DEFine "configuration string"
Example	:CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005"
Notes	See below for a list of measurement variables that can be defined in the configuration string.
Initial S/W Revision	A.14.00

Acquisition Time

Example	CALC:FPOW:POW1:DEF "AcquisitionTime=0.002"
Notes	The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability.
Preset	0.001 s
Range	0 s to 1 s
Default Unit	Time (s)
Initial S/W Revision	A.14.00

Center Frequency

Example	CALC:FPOW:POW1:DEF "CenterFrequency=2e9"
Notes	The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency.
Preset	1 GHz
Range	0 Hz to maximum instrument frequency
Default Unit	Frequency (Hz)
Initial S/W Revision	A.14.00

DC Coupled

Example	CALC:FPOW:POW1:DEF "DCCoupled=True"
Notes	The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz.
Preset	False
Range	True (DC Coupled) or False (AC Coupled)
Default Unit	Boolean
Initial S/W Revision	A.14.00

DetectorType

Example	CALC:FPOW:POW1:DEF "DetectorType=Peak"
Notes	Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement.
Preset	RmsAverage
Range	RmsAverage, Peak
Initial S/W Revision	A.14.00

Do Noise Correction

Example	CALC:FPOW:POW1:DEF "DoNoiseCorrection=True"
Notes	When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured.
Preset	False
Range	True (enable noise correction) or False (disable noise correction)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Do Spur Suppression

Example	CALC:FPOW:POW1:DEF "DoSpurSuppression=True"
Notes	When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals. When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method. Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.
Preset	False
Range	True (enable spur suppression) or False (disable spur suppression)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Electronic Attenuator Bypass

Example	CALC:FPOW:POW1:DEF "ElecAttBypass =False"
Notes	The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp.
Preset	True
Range	True (bypass electronic attenuator) or False (use electronic attenuator)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Electronic Attenuation

Example	CALC:FPOW:POW1:DEF "ElecAttenuation=10"
Notes	Option EA3 is required. The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps). Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.
Preset	0 dB
Range	0 – 24 dB (1 dB steps)

Default Unit	dB
Initial S/W Revision	A.14.00

IF Gain

Example	CALC:FPOW:POW1:DEF "IFGain=10"
Notes	The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB.
Preset	0 dB
Range	-6 - 16 dB (1 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

IF Type

Example	CALC:FPOW:POW1:DEF "IFType=B25M"
Notes	The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path.
Preset	B40M
Range	B10M, B25M, B40M
Initial S/W Revision	A.14.00

Include Power Spectrum

Example	CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True"
Notes	The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response.
Preset	False
Range	True (return both channel power and full power spectrum) or False (returns only channel power)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Mechanical Attenuation

Example	CALC:FPOW:POW1:DEF "MechAttenuation=10"
Notes	The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps).
Preset	0 dB
Range	0 – 70 dB (2 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

Preamp Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps.
Preset	Off
Range	Off, Low, Full
Initial S/W Revision	A.14.00

Resolution Bandwidth Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value.
Preset	BestSpeed
Range	BestSpeed, Narrowest, Explicit
Initial S/W Revision	A.14.00

Resolution Bandwidth

Example	CALC:FPOW:POW1:DEF "ResolutionBW=25e3"
Notes	The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW.

Preset	0 Hz
Default Unit	Hz
Initial S/W Revision	A.14.00

Trigger Delay

Example	CALC:FPOW:POW1:DEF "TriggerDelay=0.025"
Notes	The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed.
Preset	0 s
Range	0 – 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

Trigger Level

Example	CALC:FPOW:POW1:DEF "TriggerLevel=2"
Notes	The trigger level parameter sets the voltage value at which an external trigger is detected.
Preset	1.2 V
Range	–5 to 5 V
Default Unit	Volts
Initial S/W Revision	A.14.00

Trigger Slope

Example	CALC:FPOW:POW1:DEF "TriggerSlope=Negative"
Notes	The trigger slope parameter indicates the direction of the edge trigger voltage for detection.
Preset	Positive
Range	Positive, Negative
Initial S/W Revision	A.14.00

Trigger Source

Example	CALC:FPOW:POW1:DEF "TriggerSource=Ext1"
Notes	The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively.
Preset	Free
Range	Free, Ext1, Ext2
Initial S/W Revision	A.14.00

Trigger Timeout

Example	CALC:FPOW:POW1:DEF "TriggerTimeout=0.1"
Notes	The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement.
Preset	1 s
Range	0 – 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

Signal Input

Example	CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW"
Notes	The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz.
Preset	FpMainRf
Range	FpMainRf, Fp50MHzCW
Initial S/W Revision	A.14.00

Use Preselector

Example	CALC:FPOW:POW1:DEF "UsePreSelector=True"
Notes	The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases.
Preset	False
Range	True (use preselector above 3.6 GHz), or False (preselector bypassed)

Default Unit	Boolean
Initial S/W Revision	A.14.00

Channel Bandwidth Array

Example	CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]"
Notes	The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[1 e6]
Range	0 to 40 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

Channel Filter Type Array

Example	CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]"
Notes	The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.
Preset	[IBW]
Range	IBW, RRC
Initial S/W Revision	A.14.00

Channel Filter Alpha Array

Example	CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]"
Notes	The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[0.22]
Range	0.0 – 1.0

Initial S/W Revision	A.14.00

Channel Measurement Function Array

Example	CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]"
Notes	This parameter array defines what measurement is being made for each individually-specified channel: BandPower: Total power within the specified bandwidth of the channel (dBm) BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz) PeakPower: The peak power value within the specified bandwidth of the channel (dBm) PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz) XdbBbandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdbBbandwidth parameter OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.
Preset	[BandPower]
Range	BandPower, BandDensity, PeakPower, PeakFrequency, XdbBbandwidth, OccupiedBandwidth
Initial S/W Revision	A.14.00

Channel Offset Frequency Array

Example	CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]"
Notes	The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel. All array parameters should have the same number of elements.
Preset	[0]
Range	0 to 20 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

Channel Occupied Bandwidth Percent Array

Example	CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]"
Notes	This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied

	bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power.
Preset	[0.99]
Range	0 – 1.0
Initial S/W Revision	A.14.00

Channel x-dB Bandwidth Array

Example	CALC:FPOW:POW1:DEF "XdBBandwidth=[-6.02, -3.01, -1.0]"
Notes	This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number.
Preset	[-3.01]
Range	-200 to 0 dB
Default Unit	dB
Initial S/W Revision	A.14.00

Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

M	All
o	
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e	
R	:CALCulate:FPOWER:POWer[1,2,...,999]:DEFine?
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d	
E	:CALC:FPOW:POW1:DEF?

x a m p l e	
N o t e s	This command query is used to retrieve a list of all defined parameters in an ASCII format. The following is an example of the returned results: "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=10000000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1000000000,ResolutionBW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1000000],OffsetFrequency=[0],Function=[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False,TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"
I n i t i a l	A.14.00
S / W	
R e v i s i o n	

Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:CONFigure
Example	:CALC:FPOW:POW1:CONF
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:INITiate
Example	:CALC:FPOW:POW1:INIT
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:FETCh?
Example	:CALC:FPOW:POW1:FETC?
Notes	Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel.
Initial S/W Revision	A.14.00

Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]?
Example	:CALC:FPOW:POW1?

Notes	Option FP2 is required. See notes for Fast Power Fetch for return format.
Initial S/W Revision	A.14.00

Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

Mode	All
Remote Command	:CALCulate:FPOWER:POWer[1,2,...,999]:READ? :CALCulate:FPOWER:POWer[1,2,...,999]:READ1?
Example	:CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1?
Notes	Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined.
Initial S/W Revision	A.14.00

Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

Mode	All
Remote Command	:CALCulate:FPOWER:POWer[1,2,...,999]:READ2?
Example	:CALC:FPOW:POW1:READ2?
Notes	Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float]

	3. Declared function result for the 2nd specified channel [4 byte float]
	...
	(m + 1). Declared function result for the last (mth) specified channel [4 byte float]
	ADC Over Range
	1. ADC over-range occurred (1: true, 0: false) [2 byte short]
	Spectrum Data
	1. Number of points in the spectrum data, k [4 byte int]
	2. Start frequency of spectrum data (Hz) [8 byte double]
	3. Step frequency of spectrum data (Hz) [8 byte double]
	4. FFT bin at 1st point (dBm) [4 byte float]
	5. FFT bin at 2nd point (dBm) [4 byte float]
	...
	(k + 3). FFT bin at last (kth) point (dBm) [4 byte float]
Initial S/W Revision	A.14.00

Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

Remote Command	:FORMat[:TRACe][:DATA] ASCii INTEger,32 REAL,32 REAL,64 :FORMat[:TRACe][:DATA]?
Notes	The query response is: ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTEger,32: INT,32 When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTEger, data is output in units of m dBm (.001 dBm). The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block.
Dependencies	Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTEger, 32 for REAL). Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number".
Preset	ASCii
Backwards Compatibility	Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves

Notes	backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32.
Initial S/W Revision	Prior to A.02.00

The specs for each output type follow:

ASCIi - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMal order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

Remote Command	:FORMat:BORDer NORMal SWAPped :FORMat:BORDer?
Preset	NORMal
Initial S/W Revision	Prior to A.02.00

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Avg/Hold Num

Specifies the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

- On – Sets measurement averaging on.
- Off – Sets measurement averaging off.

Key Path	Meas Setup
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:AVERage:COUNT <integer> [:SENSe]:EORFspectr:AVERage:COUNT? [:SENSe]:EORFspectr:AVERage[:STATe] OFF ON 0 1 [:SENSe]:EORFspectr:AVERage[:STATe]?
Example	EORF:AVER:COUN 3 EORF:AVER:COUN? EORF:AVER ON EORF:AVER?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	20 ON
State Saved	Saved in instrument state.
Range	1 to 10000
Min	1
Max	10000
Initial S/W Revision	Prior to A.02.00

Meas Type

Selects the measurement type.

Key	SCPI	Type
Mod & Switch	MSWitching	Performs both Modulation and Switching measurements.
Modulation	MODulation	Measures the spectrum due to the 3/8pi shift 8PSK modulation and noise.
Switching	SWITching	Measures the spectrum due to switching transients (burst ramping).
Full Frame Modulation (FAST)	FFModulation	Improves measurement speed by acquiring a full frame of data prior to performing the FFT calculation. This feature can only be used when all slots in the transmitted frame are active.

Key Path	Meas Setup
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:TYPE MODulation MSWitching SWITching FFModulation [:SENSe]:EORFspectr:TYPE?
Example	EORF:TYPE MOD EORF:TYPE?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. If a grayed out selection is chosen via SCPI command, it is ignored (no error)
Dependencies	When "Meas Method" on page 853 is set to SWEPT, the Mod & Switch and Full Frame Mod(FAST) selection keys are grayed out. When "Meas Method" on page 853 is set to Single Offset, the Full Frame Mod selection key is grayed out.
Preset	MODulation
State Saved	Saved in instrument state.
Range	Mod & Switch Modulation Switching Full Frame Mod (FAST)
Initial S/W Revision	Prior to A.02.00

Modulation

Opens a menu of keys that allows you to specify parameters for Modulation.

Key Path	Meas Setup, Meas Type
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

Fast Avg

Allows you to change the On/Off state of fast averaging.

Fast average method shortens the measurement speed of spectrum due to modulation when averaging is On. This method halves the actual number of average and measures 10 ~ 90 % of the useful part of the time slot excluding midamble. When this state is set to Off, 50 ~ 90 % of the useful part of the time slot excluding midamble will be measured and actual average number will be the same as the Avg/Hold Num.

Key Path	Meas Setup, Meas Type, Modulation
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:AVERage:FAST[:STATe] OFF ON 0 1 [:SENSe]:EORFspectr:AVERage:FAST[:STATe]?
Example	EORF:AVER:FAST ON EORF:AVER:FAST?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This parameter is available when: • Avg/Hold Num is set to more than 2 and the state is On • Meas Type is set to Modulation • Meas Method is set to Multi Offset or Single Offset.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00, A.06.00

Switching

Opens a menu of keys that allows you to specify parameters for Switching.

Key Path	Meas Setup, Meas Type
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

Fast Peak Det

Allows you to change the On/Off state of fast peak detection.

Fast peak detection method shortens the measurement speed of spectrum due to switching when averaging is On. This method reduces the actual number of average and measures more than 2 slots at one measurement cycle.

Key Path	Meas Setup, Meas Type, Switching
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:DETEctor:SWITching:FAST[:STATe] ON OFF 1 0

	[:SENSe]:EORFspectr:DETEctor:SWITching:FAST[:STATe]?
Example	EORF:DET:SWIT:FAST ON EORF:DET:SWIT:FAST?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This parameter is available when - Avg/Hold Num is set to more than 2 and the state is On. - Meas Type is set to Switching. - Meas Method is set to Multi Offset or Single Offset.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00, A.06.00

Mod Average

Allows you to select the type of averaging method when measuring the spectrum due to modulation.

Pwr Avg (RMS) - True power averaging that is equivalent to taking the RMS value

Log-Pwr Avg (Video) - Simulates the traditional spectrum analyzer type of averaging by averaging the log of the power. (This is known as video averaging.)

This parameter determines how to average the results of spectrum due to modulation (Avg/Hold Num).

Key	SCPI	Operation
Log-Pwr Avg (Video)	LOG	The log of the power is averaged. (This is also known as video averaging.)
Pwr Avg (RMS)	RMS	The power is averaged, providing the rms of the voltage.

Key Path	Meas Setup
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:AVERage:MODulation:TYPE LOG RMS [:SENSe]:EORFspectr:AVERage:MODulation:TYPE?
Example	EORF:AVER:MOD:TYPE LOG EORF:AVER:MOD:TYPE?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This parameter is valid when the Meas Type is set to Modulation or Mod/Switch. Otherwise grayed out.
Preset	LOG
State Saved	Saved in instrument state.

Range	Pwr Avg (RMS) Log-Pwr Avg (Video)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00, A.06.00

Power Ref Carrier

Opens a menu of keys that allows you to specify parameters for power reference carrier.

Key Path	Meas Setup
Initial S/W Revision	A.06.00

Power Ref Carrier Type

Allows you to select which carrier power should be used as reference when the Mod Ref Pwr Auto or the Switch Ref Pwr Auto is set to true.

Key	SCPI	Type
Ref Carrier	REF	Ref Carrier – Uses the power of the carrier indicated by Ref Carrier as reference.
Max Power Carrier	MAX	Max Power Carrier – Uses the power of the carrier with the highest power as reference.

Key Path	Meas Setup, Power Ref Carrier
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:CARRier:PREFerence:TYPE REF MAX [:SENSe]:EORFspectr:CARRier:PREFerence:TYPE?
Example	EORF:CARR:PREF:TYPE REF EORF:CARR:PREF:TYPE?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	MAX
State Saved	Saved in instrument state.
Range	Ref Carrier Max Power Carrier
Initial S/W Revision	A.06.00

Mod Ref Power

Allows you to manually set the modulation reference power for each Meas Method

Key Path	Meas Setup, Power Ref Carrier
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:MODulation:RPOWer <ampl> [:SENSe]:EORFspectr:MODulation:RPOWer? [:SENSe]:EORFspectr:MODulation:RPOWer:AUTO[:STATe] OFF ON 0 1 [:SENSe]:EORFspectr:MODulation:RPOWer:AUTO[:STATe]?
Example	EORF:MOD:RPOW -20 EORF:MOD:RPOW? EORF:MOD:RPOW:AUTO 0 EORF:MOD:RPOW:AUTO?
Preset	-250 ON
State Saved	Saved in instrument state.
Min	-250
Max	250
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.06.00

Switching Ref Power

Allows you to manually set the switching reference power for each Meas Method.

Key Path	Meas Setup, Power Ref Carrier
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:SWITching:RPOWer <ampl> [:SENSe]:EORFspectr:SWITching:RPOWer [:SENSe]:EORFspectr:SWITching:RPOWer:AUTO[:STATe] OFF ON 0 1 [:SENSe]:EORFspectr:SWITching:RPOWer:AUTO[:STATe]?
Example	EORF:SWIT:RPOW -20 EORF:SWIT:RPOW? EORF:SWIT:RPOW:AUTO 0 EORF:SWIT:RPOW:AUTO?
Preset	-250 ON
State Saved	Saved in instrument state.
Min	-250
Max	250
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.06.00

Meas Method

Selects the measurement method.

Key	SCPI	Method
Multi-Offset	MULTiple	The measurement is done at all offsets in the offset frequency list.
Single Offset (Examine)	SINGLE	The measurement is done at only one offset as determined by the offset frequency setting. This allows detailed examination of the time-domain waveform at the specified offset frequency.
Swept	SWEPT	The measurement is done in the frequency domain. For output RF spectrum due to modulation it is done using time-gated spectrum analysis to sweep the analyzer with the gate turned on for the desired portion of the burst only.

Key Path	Meas Setup
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:MEASure MULTiple SINGLE SWEPT [:SENSe]:EORFspectr:MEASure?
Example	EORF:MEAS SING EORF:MEAS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. If a grayed out selection is chosen via SCPI command, it is ignored (no error). When “Select Modulation Method” is set to DIScrete, this parameter is forced to MULTiple. When “Select Modulation Method” is set to SWEPT and Meas Type is set to Modulation or Switching, this parameter is forced to SWEPT
Preset	MULTiple
State Saved	Saved in instrument state.
Range	Multi Offset Single Offset (Examine) Swept
Readback Text	Multi Offset: [xxxxx] where xxxxx is the type of Multi-Offset Freq List: Standard Short Custom Single Offset: (Examine) [xxxxx] where xxxxx is the value of the Single Offset Freq Swept: [WB Noise: xxxxx] where xxxxx is the state ON/OFF of Wideband Noise
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

Offset Frequency List

Frequency list items for Single Carrier

Allows you to select the type of a frequency list used for Multi Offset for Single Carrier. You can select a Standard, Short, or Custom frequency list as shown in the table below.

List	Modulation Offsets (kHz)	Switching Transients Offsets (kHz)
Standard	100, 200, 250, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 3000, 6000	400, 600, 1200, 1800
Short	200, 250, 400, 600, 1200, 1800	400, 600, 1200, 1800
Custom	User-defined list that specifies: Offset Freq, RES BW, Limit Offsets, Meas Type, Initialized to be the same as the standard list Mod RBW, SW Trans RBW	400, 600, 1200, 1800

Select the list of settings that are used to make the EORFspectr measurement. This specifies standard or customized lists and short lists. The lists contain the offset frequencies (and bandwidths) that are used for the modulation spectrum and transient spectrum parts of the EORFspectr measurement.

- CUSTom – uses the four user-defined lists that specify:
 - Offset frequencies for modulation spectrum measurement
 - Corresponding resolution bandwidths for each of the modulation offset frequencies
 - Offset frequencies for switching transient spectrum measurement
 - Corresponding resolution bandwidths for each of the switching transient offset frequencies
- SHORt – a shortened list of the offset frequencies specified in the GSM Standards. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the SENSE:EORFspectr subsystem.
- STANdard – the complete list of the offset frequencies specified in the GSM Standards, except for those offsets greater than 6 MHz. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the SENSE:EORFspectr subsystem.

Frequency list items for Multi Carrier

Allows you to select the type of a frequency list used for Multi Offset for Multi Carrier. You can select a Standard, Short, Custom, or Limited Custom frequency list as shown in the table below.

List	Modulation Offsets (kHz)	Switching Transients Offsets (kHz)
Standard (Non	400, 600, 1200, 1800, 2000, 2200, 2400, 2600, and offsets that meet	400, 600, 1200,

Contiguous and Inner)	the following conditions. (1) The frequency point is between 2600 kHz (exclusive) above the uppermost carrier in lower group and 2600 kHz (exclusive) below the lowermost carrier in upper group. (2) The frequency point corresponds to the center frequency of one of IM products. (3) The number of offsets is less than 15.	1800
Standard (Except for the above)	400, 600, 1200, 1800, and offsets that meet the following conditions. (1) The frequency point is between 10 MHz below/above the lower/upper edge of operating band and 1.8 MHz (exclusive) below/above the lowermost/uppermost carrier (2) The frequency point corresponds to the center frequency of one of IM products. (3) The number of offsets is less than 15.	400, 600, 1200, 1800
Short	400, 600, 1200, 1800	400, 600, 1200, 1800
Custom	User-defined list that specifies: Offset Freq, RES BW, Limit Offsets, Meas Type, Initialized to be the same as the standard list Mod RBW, SW Trans RBW	400, 600, 1200, 1800
Limited Custom	User-defined list that specifies: Only Offset Freq The following SCPI command is used to specify a list of User-defined offset frequencies. “[:SENSe]:EORFspectr:MCARrier:LCUStom:LIST:COFRrequency”	400, 600, 1200, 1800

Select the list of settings that are used to make the EORFspectr measurement. This specifies standard or customized lists and short lists. The lists contain the offset frequencies (and bandwidths) that are used for the modulation spectrum and transient spectrum parts of the EORFspectr measurement.

- CUSTom – uses the four user-defined lists that specify:
 - Offset frequencies for modulation spectrum measurement
 - Corresponding resolution bandwidths for each of the modulation offset frequencies
 - Offset frequencies for switching transient spectrum measurement
 - Corresponding resolution bandwidths for each of the switching transient offset frequencies
- SHORt – a shortened list of the offset frequencies specified in the GSM Standards. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the SENSE:EORFspectr subsystem.
- STANdard – a list of the offset frequencies specified in the GSM Standard and the offset frequencies that correspond to IM products. It uses two internal offset frequency lists, one for modulation spectrum and

the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the SENSE:EORFspectr subsystem.

- LCUSom – a list of user specified offset frequencies. The difference between CUSTom and LCUSom is the user can specify only the offset frequencies in LCUSom. In other words, the user cannot specify resolution bandwidth or limit level for each of the offset frequencies in LCUSom.

Key Path	Meas Setup, Meas Method, Multi Offset
Mode	GSM
Remote Command	[:SENSe] :EORFspectr :LIST :SElect CUSTom SHORt STANdard LCUSTom [:SENSe] :EORFspectr :LIST :SElect ?
Example	EORF:LIST:SEL CUST EORF:LIST:SEL?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	SHORt
State Saved	Saved in instrument state.
Range	Standard Freq List Short Freq List Custom Freq List Limited Custom Freq List
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.14.00

Min Freq Using Direct Time

Allows you to select the transition frequency (the first offset frequency) where the Direct Time Domain method is used instead of the FFT method. The Direct Time Domain offers a high dynamic range and the measurement speed is faster at a few offset frequencies. The FFT method has a moderate dynamic range (generally sufficient when the RBW = 30 kHz) and the measurement speed is much faster at many offset frequencies. The FFT method uses 5-pole sync-tuned filters, as required by the standards, while the Direct Time method does not. The use of 5-pole sync-tuned filters is critical at close-in offsets, such as 250 kHz and lower, because the measurement standards as written usually test the analyzer filter shape instead of the device under test. At 600 kHz offsets and above, the shape of the filters is unimportant, only their noise bandwidth and impulse bandwidth matter. At 400 kHz offset, the shape matters somewhat; therefore, the best agreement between different pieces of measurement equipment requires that the 400 kHz offset be measured with the FFT method.

Key Path	Meas Setup, Meas Method, Multi Offset
Mode	GSM
Remote Command	[:SENSe] :EORFspectr :BFRequency <freq> [:SENSe] :EORFspectr :BFRequency ?
Example	EORF:BFR 600e3 EORF:BFR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Grayed out unless "Meas Method" on page 853 is set to MULTiple and "Meas Type" on page 847 is

	set to MSWitching or MODulation.
Preset	600 kHz
State Saved	Saved in instrument state.
Min	0 kHz
Max	6.2MHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00, A.14.00

Single Offset

Opens a menu of keys that allows you to specify parameters for Multi Offset measurement method.

Key Path	Meas Setup, Meas Method
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

Single Offset Freq

Allows you to specify a frequency offset from the carrier at which a single offset Output RF Spectrum measurement is performed.

Key Path	Meas Setup, Meas Method, Single Offset
Mode	GSM
Remote Command	[:SENSe] :EORFspectr:OFrequency <freq> [:SENSe] :EORFspectr:OFrequency?
Example	EORF:OFR 250kHz EORF:OFR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	250 kHz
State Saved	Saved in instrument state.
Min	-12.0 MHz
Max	+12.0 MHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

Ref Pwr Avg

Allows you to specify how many averages you want to execute when measuring the reference power. This parameter is valid when the Meas Method is set to Single. Set to ON to use the same number of averages

as specified in the number of bursts averaged command. Set to OFF to use the number specified in the reference power averages command.

Key Path	Meas Setup, Meas Method, Single Offset
Mode	GSM
Remote Command	[:SENSE]:EORFspectr:REfERENCE:AVERage:COUNt <integer> [:SENSE]:EORFspectr:REfERENCE:AVERage:COUNt? [:SENSE]:EORFspectr:REfERENCE:AVERage[:AUTO] ON OFF 1 0 [:SENSE]:EORFspectr:REfERENCE:AVERage[:AUTO]?
Example	EORF:REF:AVER:COUN 10 EORF:REF:AVER:COUN? EORF:REF:AVER OFF EORF:REF:AVER?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This parameter is valid when the Meas Method is set to Single. Otherwise grayed out.
Preset	10 ON
State Saved	Saved in instrument state.
Min	1
Max	1000
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00, A.06.00

Swept

Opens a menu of keys that allows you to specify parameters for Swept measurement method.

Key Path	Meas Setup, Meas Method
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

Wideband Noise

Allows you to select whether to use the wideband noise function:

- OFF - the analyzer is tuned to the carrier and the sweep is performed as follows.
 - Single Carrier: -1800 kHz to +1800 kHz on either side of the center frequency is swept with the bandwidth of 30 kHz.
 - Multi Carrier:

- Non-Contiguous Inner Mode: –400 kHz to +400 kHz from the center frequency of the lowermost and the uppermost carrier is swept with the bandwidth of 30 kHz.
- Other: –1800 kHz to +1800 kHz from the center frequency of the lowermost and the uppermost carrier is swept with the resolution bandwidth of 30 kHz.
- ON – the span is extended until 2 MHz (10 MHz for Multi Carrier) outside the edge of the relevant Tx band. For single carrier, the power is measured with the resolution bandwidth of 100 kHz for frequency offsets 1800 kHz up to 2 MHz outside either side of the Tx band. The limit mask is changed accordingly to exclude between –1800 kHz (exclusive) to +1800 kHz (exclusive) on either side of the center frequency. For multi carrier, the power is measured as follows.

For frequency offsets from the center frequency of the uppermost and lowermost active carrier of more than 6 MHz,

- Within a 600 kHz band centered at the center frequencies of the intermodulation components, the power is measured with a measurement bandwidth of 300 kHz.
- For offsets outside the 600 kHz bands around the center frequencies of the intermodulation components, the power is measured with a measurement bandwidth of 100 kHz.

For frequency offsets from the center frequency of the uppermost and lowermost active carrier of 1.8 MHz up to and including 6 MHz, the power is measured with a measurement bandwidth of 100 kHz.

See ["Limit Test Region for the Swept Method" on page 861](#) for more details.

Key Path	Meas Setup, Meas Method
Mode	GSM
Remote Command	<code>[:SENSe]:EORFspectr:WBNoise ON OFF 1 0</code> <code>[:SENSe]:EORFspectr:WBNoise?</code>
Example	EORF:WBN ON EORF:WBN?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This function is effective only when "Meas Method" on page 853 is Swept and "Meas Type" on page 847 is Modulation. When Wideband Noise is ON, the sweep start/stop frequency is determined by the Radio Band parameter.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00, A.08.00

Custom Offset Frequency List for Limited Custom

Allows you to specify a list of custom offset frequencies for the limited custom list.

Key Path	SCPI only

Mode	GSM
Remote Command	[:SENSe]:EORFspectr:MCARrier:LCUS:tom:LIST:COFRrequency <freq>, ... [:SENSe]:EORFspectr:MCARrier:LCUS:tom:LIST:COFRrequency?
Example	EORF:MCAR:LCUS:LIST:COFR 600e3, 1200e3, 2400e3, 4800e3 EORF:MCAR:LCUS:LIST:COFR?
Notes	You can specify a maximum of 40 offset frequencies in the modulation measurement. This command is available when all the following conditions are met. • The number of carriers is greater than one. • (CHAN:CARR:COUN n, where n > 1) • The state of the test limit exception is set to On. (EORF:MCAR:LEXC ON). • The type of the multicarrier limit exception rule is set to Custom. (EORF:MCAR:LEXC:RULE CUST) • The type of a frequency list for multi offset is set to Limited Custom. (EORF:LIST:SEL LCUS)
Preset	400 kHz, 600 kHz, 1200 kHz, 1800 kHz
State Saved	Saved in instrument state.
Initial S/W Revision	A.14.00

Non-Contiguous Meas Region

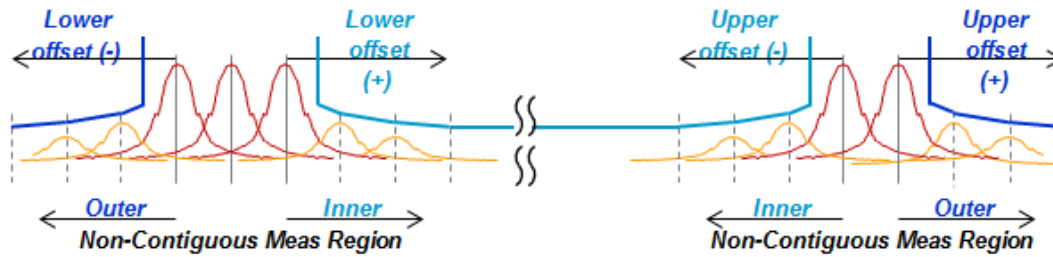
Selects the region to measure for the non-contiguous frequency allocation from either inner or outer.

Key Path	Meas Setup
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:NCONtiguous:REGion INNER OUTer [:SENSe]:EORFspectr:NCONtiguous:REGion?
Example	EORF:NCON:REG INN EORF:NCON:REG?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This function is effective only when the number of active carriers is more than one.
Preset	INNER
State Saved	Saved in instrument state.
Range	Inner Outer
Initial S/W Revision	A.07.00

Offset Frequency

The definition of offset frequency differs depending on the setting of the Non-Contiguous Meas Region. When it is set to Inner, the Lower/Upper offset frequency is defined as frequency offset from the uppermost/lowermost carrier of the lower/upper group, whose value is positive/negative. When it is set to Outer, meanwhile, the Lower/Upper offset frequency is defined as frequency offset from the lowermost/uppermost carrier, whose value is negative/positive.

The figure below shows Lower/Upper Offset Frequency Definition for Non-Contiguous Frequency Allocation.

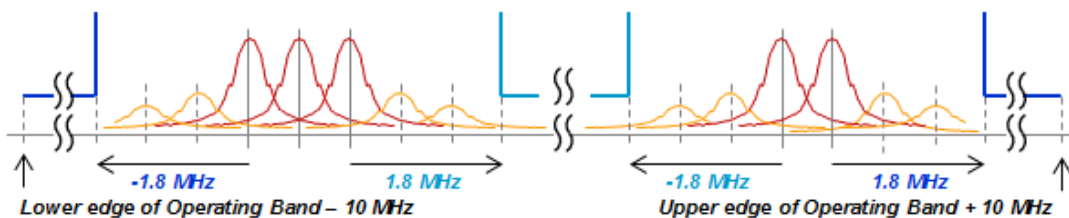


Limit Test Region for the Swept Method

The limit test region for the Swept method differs depending on the settings of both the Non-Contiguous Meas Region and the Wideband Noise.

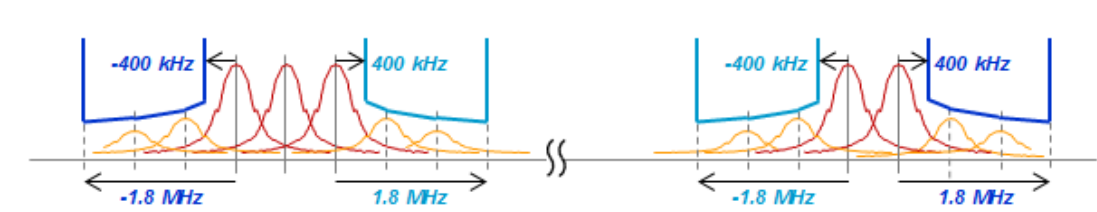
Wideband Noise	Non-Contiguous Meas Region	Limit Test to be Performed
ON (See "The Limit Test Region for the Wideband Noise ON" on page 861)	Inner	Frequency offsets between 1.8 MHz (inclusive) above the uppermost carrier in lower group and 1.8 MHz (inclusive) below the lowermost carrier in upper group.
	Outer	Frequency offsets between lower/upper edge of operating band ± 10 MHz and 1.8 MHz (inclusive) below/above the lowermost/uppermost carrier.
OFF (See "The Limit Test Region for the Wideband Noise OFF" on page 862)	Inner	Frequency offsets between 400 kHz and 1.8 MHz (exclusive) above/below the uppermost/lowermost carrier in lower/upper group.
	Outer	Frequency offsets between 400 kHz and 1.8 MHz (exclusive) below/above the lowermost/uppermost carrier.

The figure below shows the Limit Region for the Wideband Noise ON.



The Limit Test Region for the Wideband Noise ON

The figure below shows the Limit Region for the Wideband Noise OFF.



The Limit Test Region for the Wideband Noise OFF

Advanced

Opens a menu of keys that allows you to specify parameters for advanced features that are recommended for use only by advanced users.

Key Path	Meas Setup
Initial S/W Revision	Prior to A.02.00

Modulation Meas BWs

Opens a menu of keys that allows you to specify parameters for bandwidth for the modulation measurement. There are four sections as listed below.

- Carrier RBW (For Modulation Meas BWs)
- <= 1800 kHz Offset RBW (for Modulation Meas BWs)
- >1800 kHz Offset RBW (for Modulation Meas BWs)
- >6000 kHz Offset RBW (for Modulation Meas BWs)

This menu key is grayed out when:

- "Meas Type" on page 847 is Switching, or
- Multi-Offset Freq List is Custom, or
- "Meas Method" on page 853 is Swept.

When Carrier is set to 1, the bottom key (i.e. >6000 kHz Offset RBW) is grayed out.

Key Path	Meas Setup, Advanced
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

Carrier RBW (for Modulation Meas BWs)

Allows you to manually set the bandwidth for measuring the carrier when measuring spectrum due to modulation and wideband noise. When you select Auto, the following bandwidth is used.

Frequency Offset	Frequency Point	Bandwidth
<1.8 MHz	-	30 kHz
1.8 MHz ~ 6 MHz	Within 600 kHz band centered at the center frequency of the intermodulation components	100 kHz
	Outside 600 kHz bands around the center frequency of the intermodulation components	30 kHz
> 6 MHz	Within 600 kHz band centered at the center frequency of the intermodulation components	300 kHz
	Outside 600 kHz bands around the center frequency of the intermodulation components	30 kHz

Key Path	Meas Setup, Advanced, Modulation Meas BWs
Mode	GSM
Remote Command	<pre>[:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:CARRier <freq> [:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:CARRier? [:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:CARRier:AUTO OFF ON 0 1 [:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:CARRier:AUTO?</pre>
Example	<pre>EORF:BAND:MOD:CARR 30e3 EORF:BAND:MOD:CARR? EORF:BAND:MOD:CARR:AUTO 0 EORF:BAND:MOD:CARR:AUTO?</pre>
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This parameter is only used with the "Offset Frequency List" on page 854 Standard or Short, and not with Custom.
Preset	30 kHz ON
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Backwards Compatibility SCPI	[:SENSe]:EORFspectr:BWIDth[:RESolution]:MODulation:CARRier
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

< 1800 kHz Offset RBW (for Modulation Meas BWs)

Sets the resolution bandwidth used for the spectrum due to modulation part of the ORFS measurement for offset frequencies less than 1800 kHz.

Key Path	Meas Setup, Advanced, Modulation Meas BWs
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:CLOSe <freq> [:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:CLOSe?
Example	EORF:BAND:MOD:OFFS:CLOS 30 kHz EORF:BAND:MOD:OFFS:CLOS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This parameter is only used with the "Offset Frequency List" on page 854 Standard or Short, and not with Custom.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Backwards Compatibility SCPI	[:SENSe]:EORFspectr:BWIDth[:RESolution]:MODulation:OFFSet:CLOSe
Initial S/W Revision	Prior to A.02.00

>= 1800 kHz Offset RBW (for Modulation Meas BWs)

Sets the resolution bandwidth used for the spectrum due to modulation part of the ORFS measurement for offset frequencies greater than or equal to 1800 kHz.

Key Path	Meas Setup, Advanced, Modulation Meas BWs
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:FAR[1] <freq> [:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:FAR[1]?
Example	EORF:BAND:RES:MOD:OFFS:FAR 30 kHz EORF:BAND:RES:MOD:OFFS:FAR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This parameter is only used with the "Offset Frequency List" on page 854 Standard or Short, and not with Custom.
Preset	100 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Backwards Compatibility SCPI	[:SENSe]:EORFspectr:BWIDth[:RESolution]:MODulation:OFFSet:FAR
Initial S/W Revision	Prior to A.02.00

> 6000 kHz IM Offset RBW (for Modulation Meas BWs)

Allows you to specify the resolution bandwidth used for the spectrum due to modulation part of the ORFS measurement for offset frequencies greater than 6 MHz.

Key Path	Meas Setup, Advanced, Modulation Meas BWs
Mode	GSM
Remote Command	<code>[[:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:IM:FAR2<freq></code> <code>[[:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:IM:FAR2?</code>
Example	EORF:BAND:RES:MOD:OFFS:IM:FAR2 300 kHz EORF:BAND:RES:MOD:OFFS:IM:FAR2?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This parameter is only used with the "Offset Frequency List" on page 854 Standard or Short, and not with Custom. If there is only one carrier, this key will be grayed out.
Preset	300 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Initial S/W Revision	A.06.00

Switching Meas BWs

Accesses a menu with the following sections:

- Carrier RBW (For Modulation Meas BWs)
- < 1800 kHz Offset RBW (for Modulation Meas BWs)
- >=1800 kHz Offset RBW (for Modulation Meas BWs)
- VBW:3dB RBW (for Switching Meas BWs) – information only. Bandwidth ratio is fixed at 3.

This menu key is grayed out when "Meas Type" on page 847 is Modulation or Full Frame Mod, or when "Offset Frequency List" on page 854 is Custom.

Key Path	Meas Setup, Advanced
Initial S/W Revision	Prior to A.02.00

Carrier RBW (for Switching Meas BWs)

Sets the resolution bandwidth for the carrier when measuring spectrum due to switching transients.

Key Path	Meas Setup, Advanced, Switching Meas BWs
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:CARRier <freq> [:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:CARRier?
Example	EORF:BAND:SWIT:CARR 30e3 EORF:BAND:SWIT:CARR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This parameter is only used with the "Offset Frequency List" on page 854 Standard or Short, and not with Custom.
Preset	300 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Backwards Compatibility SCPI	[:SENSe]:EORFspectr:BWIDth[:RESolution]:SWITching:CARRier
Initial S/W Revision	Prior to A.02.00

< 1800 kHz Offset RBW (for Switching Meas BWs)

Sets the resolution bandwidth used for the spectrum due to switching transients part of the EORFspectr measurement for offset frequencies less than 1800 kHz.

Key Path	Meas Setup, Advanced, Switching Meas BWs
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:CLOSe <freq> [:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:CLOSe?
Example	EORF:BAND:RES:SWIT:OFFS:CLOS 30 kHz EORF:BAND:RES:SWIT:OFFS:CLOS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This parameter is only used with the "Offset Frequency List" on page 854 Standard or Short, and not with Custom.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Backwards Compatibility SCPI	[:SENSe]:EORFspectr:BWIDth[:RESolution]:SWITching:OFFSet:CLOSe
Initial S/W Revision	Prior to A.02.00

>= 1800 kHz Offset RBW (for Switching Meas BWs)

Sets the resolution bandwidth used for the spectrum due to switching transients part of the EORFspectr measurement for offset frequencies greater than or equal to 1800 kHz.

Key Path	Meas Setup, Advanced, Switching Meas BWs
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:FAR <freq> [:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:FAR?
Example	EORF:BAND:RES:SWIT:OFFS:FAR 30e3 EORF:BAND:RES:SWIT:OFFS:FAR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This parameter is only used with the "Offset Frequency List" on page 854 Standard or Short, and not with Custom.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Backwards Compatibility SCPI	[:SENSe]:EORFspectr:BWIDth[:RESolution]:SWITching:OFFSet:FAR
Initial S/W Revision	Prior to A.02.00

Modulation Custom Offs & Lim

This menu key is available only when the parameters listed below are set to the specified values at the same time. Otherwise it is grayed out.

- Meas Type: Mod & Switch|Modulation|Full Frame Mod
- Meas Method: Multi Offset
- Multi-Offset Freq List: Custom

Key Path	Meas Setup, Advanced
Initial S/W Revision	Prior to A.02.00

Offset

Selects the offset pairs (upper and lower) that affect the menu keys and displays the memory selection menu from A to O. The memory selection menu allows you to store up to 5 sets of parameter values for the offset pairs, such as Offset Freq, Res BW, Rel Limit Level Offset, Abs Limit Level Offset and Apply Level Offset. Press Offset until the letter selection at a time is shown on this menu key label.

Key Path	Meas Setup, Advanced
Mode	GSM
Initial S/W Revision	Prior to A.02.00

Offset Freq

This parameter defines a custom set of states that defines whether or not the measurement is made on each defined offset frequency. Note that offset frequencies need to be arranged in ascending order from left to right. Otherwise, the analyzer cannot perform measurements properly.

Key	SCPI	Operation
On	ON 1	The measurement is made on the corresponding frequency in Custom Modulation Offset Freq list.
Off	OFF 0	The measurement is skipped for the corresponding frequency in Custom Modulation Offset Freq list.

Key Path	Meas Setup, Advanced, Modulation Custom Offset & Limits
Mode	GSM
Remote Command	<pre>[[:SENSe]:EORFspectr:LIST:MODulation[:FREQuency] <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq> [:SENSe]:EORFspectr:LIST:MODulation[:FREQuency]? [:SENSe]:EORFspectr:LIST:MODulation:STATe OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1 [:SENSe]:EORFspectr:LIST:MODulation:STATe?</pre>
Example	<pre>EORF:LIST:MOD:FREQ 0.0, 1.0e5, 2.0e5 EORF:LIST:MOD:FREQ? EORF:LIST:MOD:STAT ON, ON, ON EORF:LIST:MOD:STAT?</pre>
Notes	Offset frequencies need to be arranged in ascending order from left to right. Otherwise, the analyzer cannot perform measurements properly. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	<pre>0.0, 1.0e5, 2.0e5, 2.5e5, 4.0e5, 6.0e5, 8.0e5, 1.0e6, 1.2e6, 1.4e6, 1.6e6, 1.8e6, 3.0e6, 6.0e6, 0.0 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1</pre>
State Saved	Saved in instrument state.

Min	0.0 Hz
Max	12.0 MHz
Initial S/W Revision	Prior to A.02.00

Res BW

Defines the custom set of resolution bandwidths for the modulation spectrum part of the EORFspectr measurement. The first bandwidth specified is for the carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each list must be the same.

Key Path	Meas Setup, Advanced, Modulation Custom Offset & Limits
Remote Command	<code>[:SENSe]:EORFspectr:LIST:MODulation:BANDwidth <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq></code> <code>[:SENSe]:EORFspectr:LIST:MODulation:BANDwidth?</code>
Example	EORF:LIST:MOD:BAND 10e3, 20e3, 10e3 EORF:LIST:MOD:BAND?
Notes	You must be in the GSM, EDGE mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This command is only valid when SENS:EORFspectr:MEAS is set to multiple and the custom list type is selected with SENS:EORFspectr:LISE:SEL CUST.
Preset	3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 1.000000000E+05, 1.000000000E+05, 1.000000000E+05
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Backwards Compatibility SCPI	<code>[:SENSe]:EORFspectr:LIST:MODulation:BWIDth</code>
Initial S/W Revision	Prior to A.02.00

Rel Limit Level Offset

Defines the custom set of level offsets for the modulation spectrum part of the EORF measurement. This allows you to modify the standard limits by adding a delta amplitude value to them. The first level offset specified must be 0 dB for the carrier. Each level offset in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists must be the same.

Key Path	Meas Setup, Advanced, Modulation Custom Offset & Limits

Mode	GSM
Remote Command	[:SENSe]:EORFspectr:LIST:MODulation:LOFFset[:RCARrier] <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl> [:SENSe]:EORFspectr:LIST:MODulation:LOFFset[:RCARrier]?
Example	EORF:LIST:MOD:LOFF:RCAR 0.0, -2.0, -5.0 EORF:LIST:MOD:LOFF:RCAR?
Notes	The first element of the parameters must be zero. Otherwise, the Custom freq list is not used, but Standard freq list is used instead. This command is only valid if SENS:EORF:MEAS is set to multiple, and the custom list type is selected with SENS:EORF:LIST:SEL CUST. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	-200.0
Max	200.0
Initial S/W Revision	Prior to A.02.00

Abs Limit Level Offset

This parameter defines a custom set of absolute limit level offsets for the modulation spectrum part of the EORFspectr measurement. It allows you to modify the standard-defined test limits by adding/subtracting a delta amplitude value to/from them. The single set of the offsets applies to all the cases in terms of all the DUT types and power level classes. It takes an array of float64 numbers. Each element represents absolute level offsets at corresponding Custom Modulation Offset Freq.

Key Path	Meas Setup, Advanced, Modulation Custom Offset & Limits
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:LIST:MODulation:LOFFset:ABSolute <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl> [:SENSe]:EORFspectr:LIST:MODulation:LOFFset:ABSolute?
Example	EORF:LIST:MOD:LOFF:ABS 0.0, -2.0, -5.0 EORF:LIST:MOD:LOFF:ABS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	-200.0
Max	200.0
Initial S/W Revision	Prior to A.02.00

Apply Level Offset

Key	SCPI	Operation
Rel	RELative	Only Custom Modulation Relative Limit Level Offsets are applied to standard-defined modulation relative test limit. Standard-defined modulation relative test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.
Both	BOTH	Custom Modulation Relative Limit Level Offsets are applied to standard-defined modulation relative test limit. And, Custom Modulation Absolute Limit Level Offsets are applied to standard-defined modulation absolute test limit. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.
Abs	ABSolute	Only Custom Modulation Absolute Limit Level Offsets are applied to standard-defined modulation absolute test limit. Standard-defined modulation absolute test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.

Key Path	Meas Setup, Advanced, Modulation Custom Offset & Limits
Mode	GSM
Remote Command	<pre>[:SENSe]:EORFspectr:LIST:MODulation:APPLy RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute</pre> <pre>[:SENSe]:EORFspectr:LIST:MODulation:APPLy?</pre>
Example	<pre>EORF:LIST:MOD:APPL REL, REL, REL EORF:LIST:MOD:APPL?</pre>
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH
State Saved	Saved in instrument state.
Range	Rel Both Abs
Initial S/W Revision	Prior to A.02.00

Switching Custom Offs & Lim

This menu key is available only when parameters below are set to the following values at the same time. Otherwise it is grayed out.

- Meas Type: Mod & Switch | Switching
- Meas Method: Multi Offset
- Multi-Offset Freq List: Custom

Key Path	Meas Setup, Advanced
Initial S/W Revision	Prior to A.02.00

Offset

Selects the offset pairs (upper and lower) that affect the menu keys and displays the memory selection menu from A to O. The memory selection menu allows you to store up to 5 sets of parameter values for the offset pairs, such as Offset Freq, Res BW, Rel Limit Level Offset, Abs Limit Level Offset and Apply Level Offset. Press Offset until the letter selection at a time is shown on this menu key label.

Key Path	Meas Setup, Advanced
Mode	GSM
Initial S/W Revision	Prior to A.02.00

Offset Freq

Defines the custom set of offset frequencies at which the switching transient spectrum part of the EORFspectr measurement is made.

The first offset specified must be 0 Hz, for the carrier. For each offset frequency specified, the power is measured at both the lower and upper offsets. Up to 14 offset frequencies, plus the 0 Hz carrier frequency, may be defined.

For the BAF SCPI command:

Key	SCPI	Operation
On	ON 1	The measurement is made on the corresponding frequency in Custom Switching Offset Freq list.
Off	OFF 0	The measurement is skipped for the corresponding frequency in Custom Switching Offset Freq list.

Key Path	Meas Setup, Advanced, Switching Custom Offsets & Limits
Mode	GSM
Remote Command	<code>[[:SENSe]:EORFspectr:LIST:SWITChing[:FREQuency] <freq>, <freq>, <freq>,</code>

	<pre> <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq> [:SENSe]:EORFspectr:LIST:SWITching[:FREQuency]? [:SENSe]:EORFspectr:LIST:SWITching:STATe OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1, OFF ON 0 1 [:SENSe]:EORFspectr:LIST:SWITching:STATe? </pre>
Example	<pre> EORF:LIST:SWIT:FREQ 0.0, 1.0e5, 2.0e5 EORF:LIST:SWIT:FREQ? EORF:LIST:SWIT:STAT ON, ON, ON EORF:LIST:SWIT:STAT? </pre>
Notes	This command is only valid if SENS:EORF:MEAS is set to multiple, and the custom list type is selected with SENS:EORF:LIST:SEL CUST. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	<pre> 0.0, 4.0e5, 6.0e5, 1.2e6, 1.8e6, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1 </pre>
State Saved	Saved in instrument state.
Min	0.0 Hz
Max	12.0 MHz
Initial S/W Revision	Prior to A.02.00

Res BW

Defines the custom set of resolution bandwidths for the switching transient spectrum part of the EORFspectr measurement. The first bandwidth specified is for the carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the switching offset frequency list. The number of items in each list must be the same.

Key Path	Meas Setup, Advanced, Switching Custom Offsets & Limits
Remote Command	<pre> [:SENSe]:EORFspectr:LIST:SWITching:BANDwidth <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq> [:SENSe]:EORFspectr:LIST:SWITching:BANDwidth? </pre>
Example	<pre> EORF:LIST:SWIT:BAND 1e3, 1e3,1e3 EORF:LIST:SWIT:BAND? </pre>
Notes	This command is only valid if SENS:EORFspectr:MEAS is set to multiple and the custom list type is selected with SENS:EORFspectr:LISE:SEL CUST. You must be in the GSM, EDGE mode to use this command. Use INSTRument:SElect to set the mode.

Preset	3.000000000E+05, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Backwards Compatibility SCPI	<code>[:SENSe] :EORFspectr:LIST:SWITching:BWIDth</code>
Initial S/W Revision	Prior to A.02.00

Rel Limit Level Offset

Defines the custom set of level offsets for the switching transient spectrum part of the EORF measurement. This allows you to modify the standard limits by adding a delta amplitude value to them. The first level offset specified must be 0 dB for the carrier. Each level offset in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists must be the same.

Key Path	Meas Setup, Advanced, Switching Custom Offsets & Limits
Mode	GSM
Remote Command	<code>[:SENSe] :EORFspectr:LIST:SWITching:LOFFset[:RCARrier] <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl></code> <code>[:SENSe] :EORFspectr:LIST:SWITching:LOFFset[:RCARrier] ?</code>
Example	EORF:LIST:SWIT:LOFF:RCAR 0.0, -2.0, -5.0 EORF:LIST:SWIT:LOFF:RCAR?
Notes	The first element of the parameters must be zero. Otherwise, the Custom freq list is not used, but Standard freq list is used instead. This command is only valid if SENS:EORF:MEAS is set to multiple, and the custom list type is selected with SENS:EORF:LIST:SEL CUST. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	-200.0
Max	200.0
Initial S/W Revision	Prior to A.02.00

Abs Limit Level Offset

This parameter defines a custom set of absolute limit level offsets for the Switching spectrum part of the EORFspectr measurement. It allows you to modify the standard-defined test limits by adding/subtracting a

delta amplitude value to/from them. The single set of the offsets applies all the cases in terms of all the DUT types and power level classes. It takes an array of float64 numbers. Each element represents absolute level offsets at corresponding Custom Switching Offset Freq.

Key Path	Meas Setup, Advanced, Switching Custom Offsets & Limits
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:LIST:SWITching:LOFFset:ABSolute <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl> [:SENSe]:EORFspectr:LIST:SWITching:LOFFset:ABSolute?
Example	EORF:LIST:SWIT:LOFF:ABS 0.0, -2.0, -5.0 EORF:LIST:SWIT:LOFF:ABS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	-200.0
Max	200.0
Initial S/W Revision	Prior to A.02.00

Apply Level Offset

Key	SCPI	Operation
Rel	RElative	Only Custom Switching Relative Limit Level Offsets are applied to standard-defined switching relative test limit. Standard-defined switching relative test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.
Both	BOTH	Custom Switching Relative Limit Level Offsets are applied to standard-defined switching relative test limit. And, Custom Switching Absolute Limit Level Offsets are applied to standard-defined switching absolute test limit. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.
Abs	ABSolute	Only Custom Switching Absolute Limit Level Offsets are applied to standard-defined switching absolute test limit. Standard-defined switching absolute test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.

Key Path	Meas Setup, Advanced, Switching Custom Offsets & Limits

Mode	GSM
Remote Command	[[:SENSE]:EORFspectr:LIST:SWITching:APPLy RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute, RELative BOTH ABSolute [[:SENSe]:EORFspectr:LIST:SWITching:APPLy?
Example	EORF:LIST:SWIT:APPL REL, REL, REL EORF:LIST:SWIT:APPL?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SELect to set the mode.
Preset	BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH
State Saved	Saved in instrument state.
Range	Rel Both Abs
Initial S/W Revision	Prior to A.02.00

Offset

Selects the offset pairs (upper and lower) that affect the menu keys and displays the memory selection menu from A to O. The memory selection menu allows you to store up to 5 sets of parameter values for the offset pairs, such as Offset Freq, Res BW, Rel Limit Level Offset, Abs Limit Level Offset and Apply Level Offset. Press Offset until the letter selection at a time is shown on this menu key label.

Key Path	Meas Setup, Advanced
Initial S/W Revision	Prior to A.02.00

IM Product Order

Sets the highest order of the intermodulation products to be considered in the measurement. It must be an integer between 3 and 5.

Key Path	Meas Setup, Advanced
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:IMPorder <integer> [:SENSe]:EORFspectr:IMPorder?
Example	EORF:IMP 5 EORF:IMP?
Notes	When an even value (i.e. 4) is entered, it's replaced with the maximum odd value that doesn't exceed the even value. If you recall 7, the previously saved value, it will be clipped to 5.

Preset	5
State Saved	Saved in instrument state.
Min	3
Max	5
Initial S/W Revision	A.07.00
Modified at S/W Revision	A.13.00

Multi Carrier Limit Exception

Accesses the menu to set Limit Exception parameters.

Key Path	Meas Setup
Readback	[On, Currently selected Exception Rule] [Off, ---]
Initial S/W Revision	A.14.00

Multi Carrier Limit Exception State

Selects whether to apply the Multicarrier Limit Exception.

Key Path	Meas Setup, Advanced, Limit Exception
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:MCARrier:LEXCeption[:STATe] OFF ON 0 1 [:SENSe]:EORFspectr:MCARrier:LEXCeption[:STATe]?
Example	EORF:MCAR:LEXC ON EORF:MCAR:LEXC?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. If set to ON, the exception is applied.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	A.10.00
Modified at S/W Revision	A.14.00

Multi Carrier Limit Exception Rule

Selects the Multicarrier Limit Exception Rule. The Rules are listed below.

FIXed: The exception bands (200 kHz block) are automatically allocated.

CUSTom: Allows you to allocate the exception bands (200 kHz block) manually.

Key Path	Meas Setup, Advanced, Limit Exception
Mode	GSM
Remote Command	<code>[:SENSe]:EORFspectr:MCARrier:LEXception:RULE FIXed CUSTom</code> <code>[:SENSe]:EORFspectr:MCARrier:LEXception:RULE?</code>
Example	EORF:MCAR:LEXC:RULE CUST EORF:MCAR:LEXC:RULE?
Preset	FIXed
State Saved	Saved in instrument state.
Range	Fixed Custom
Initial S/W Revision	A.14.00

Multi Carrier Limit Exception Frequency Band List

Specifies a list of center frequencies for the Multicarrier Limit Exception bands.

Key Path	SCPI only
Mode	GSM
Remote Command	<code>[:SENSe]:EORFspectr:MCARrier:LEXception:LIST:FREQuency <freq>, ...</code> <code>[:SENSe]:EORFspectr:MCARrier:LEXception:LIST:FREQuency?</code>
Example	EORF:MCAR:LEXC:LIST:FREQ -600e3, 600e3 EORF:MCAR:LEXC:LIST:FREQ?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Each given frequency is determined as the center frequency of 200 kHz block of an exception band when EORF:MCAR:LEXC is set to "ON" and "EORF:MCAR:LEXC:RULE" is set to "CUSTom". In the following 3 cases, the warning message "Setting conflict" is issued in the error queue. •Case 1: where the number of the given list items exceeds the specified value (i.e. $18+3*(N-1)$ or up to 40), whichever the lowest, where N is the number of active multi carriers. •Case 2: where the given frequency coincides with the center frequency of 3rd order IM products of any combination of two or three active carriers and corresponding adjacent channels (+/-200 kHz). •Case 3: where the given frequency is beyond either edge of the specified operating band +/-10 MHz margin.
Preset	0
State Saved	Saved in instrument state.
Initial S/W Revision	A.14.00

Band Extension for Multicarrier

Sets the band extension for multicarrier. The band extension is symmetrically applied on both sides of the relevant transmit band.

Key Path	Meas Setup, Advanced
Mode	GSM
Remote Command	<code>[:SENSe]:EORFspectr:MCARrier:BEXTension <freq></code> <code>[:SENSe]:EORFspectr:MCARrier:BEXTension?</code>
Example	EORF:MCAR:BEXT 12e6 EORF:MCAR:BEXT?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	10 MHz
State Saved	Saved in instrument state.
Min	100 kHz
Max	50 MHz
Initial S/W Revision	A.10.00

Switching Ref Power Type

Selects the type of Switching Reference Power from either Average or Max Hold.

Key Path	Meas Setup, Advanced
Mode	GSM
Remote Command	<code>[:SENSe]:EORFspectr:SWITching:RPOWer:TYPE AVERage MAXHold</code> <code>[:SENSe]:EORFspectr:SWITching:RPOWer:TYPE?</code>
Example	EORF:SWIT:RPOW:TYPE AVER EORF:SWIT:RPOW:TYPE?
Preset	AVERage
State Saved	Saved in instrument state.
Range	Average Max Hold
Initial S/W Revision	A.11.00

Meas Preset

Restores all the measurement parameters to their default values.

Key Path	Meas Setup
Mode	GSM
Remote Command	<code>:CONFigure:EORFspectr</code>
Example	CONF:EORF
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

Mod Average Scheme for BTS

Allows you to select the type of power averaging scheme when measuring the spectrum due to modulation.

When calculating the spectrum due to modulation power, this parameter determines a combination of the detector setting, averaging method when calculating slot power from the acquired time domain trace, and measurement cycle averaging.

The following two combinations are available.

Key	SCPI	Operation
Standards	STANdard	3GPP TS51.021 Average requirement is applied. Detector: RMS Slot Power Avg: RMS Avg/Hold: Mod Average state (default = LOG)
Legacy	LEGacy	The slot power average method, "LOG" or "RMS," is aligned with the Mod Average state. This is for measurement result backward compatibility with the PSA. Detector: RMS Slot Power Avg: Mod Average state (default = LOG) Avg/Hold: Mod Average state (default = LOG)

Key Path	No softkey – SCPI only
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:AVERage:MODulation:TYPE:LOG[:BTS] STANdard LEGacy [:SENSe]:EORFspectr:AVERage:MODulation:TYPE:LOG[:BTS]?
Example	EORF:AVER:MOD:TYPE:LOG LEG EORF:AVER:MOD:TYPE:LOG?
Notes	You must be in the GSM mode to use this command. Use INSTrument:SElect to set the mode. This parameter is applicable for BTS spectrum due to modulation power measurement.
Preset	STAN
State Saved	Saved in instrument state.
Range	STANdard LEGacy
Initial S/W Revision	A.10.00

Mod Average Scheme for MS

Allows you to select the type of power averaging scheme when measuring the spectrum due to modulation.

When calculating the spectrum due to modulation power, this parameter determines a combination of the detector setting, averaging method when calculating slot power from the acquired time domain trace, and measurement cycle averaging.

The following two combinations are available.

Key	SCPI	Operation
Standards	STANDARD	3GPP TS51.021 Average requirement is applied. Detector: Mod Average state (default = LOG) Slot Power Avg: RMS Avg/Hold: Mod Average state (default = LOG)
Legacy	LEGACY	The slot power average method, "LOG" or "RMS," is aligned with the Mod Average state. This is for measurement result backward compatibility with the PSA. Detector: Mod Average state (default = LOG) Slot Power Avg: Mod Average state (default = LOG) Avg/Hold: Mod Average state (default = LOG)

Key Path	No softkey – SCPI only
Mode	GSM
Remote Command	[:SENSe] :EORFspectr:AVERage:MODulation:TYPE:LOG:MS STANDARD LEGACY [:SENSe] :EORFspectr:AVERage:MODulation:TYPE:LOG:MS?
Example	EORF:AVER:MOD:TYPE:LOG:MS LEG EORF:AVER:MOD:TYPE:LOG:MS?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode. This parameter is applicable for MS spectrum due to modulation power measurement.
Preset	LEG
State Saved	Saved in instrument state.
Range	STANDARD LEGACY
Initial S/W Revision	A.10.00

Select Modulation Method (Backwards Compatibility/Remote Command Only)

Mode	GSM
Remote Command	[:SENSe] :EORFspectr:TYPE:MODulation[:METHod] DIScrete SWEep [:SENSe] :EORFspectr:TYPE:MODulation[:METHod] ?
Example	EORF:TYPE:MOD SWE EORF:TYPE:MOD?
Notes	The legacy parameter [:SENSe] :EORFspectr:TYPE:MODulation[:METHod] DIScrete SWEep is aliased to the new command [:SENSe] :EORFspectr:MEASure MULTiple SWEpt.

	When Meas Method is set to MULTiple, this parameter is forced to DISCcrete. When Meas Method is set to SWEPT, this parameter is forced to SWEep. When this parameter is set to DISCcrete, Meas Method is forced to MULTiple. When this parameter is set to SWEep and "Meas Type" on page 847 is set to MODulation or SWITching., Meas Method is forced to SWEPT.
Dependencies	This parameter is available only when "Meas Type" on page 847 is set to MODulation or SWITching.
Couplings	Coupled with "Meas Type" on page 847 and Meas Method. See Notes.
Preset	DISC
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Mode

See "Mode" on page 136

Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See ["How-To Preset" on page 885](#) for more information.

Key Path	Front-panel key
Remote Command	:SYSTem:PRESet
Example	:SYST:PRES
Notes	*RST is preferred over :SYST : PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0.
Couplings	A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set.
Backwards Compatibility Notes	In the X-Series, the legacy “Factory Preset” has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no “Preset Type” as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using

	User Preset.
Initial S/W Revision	Prior to A.02.00

How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

Type Of Preset	SCPI Command	Front Panel Access
Auto Couple	:COUPLe ALL	Auto Couple front-panel key
Meas Preset	:CONFigure:<Measurement>	Meas Setup Menu
Mode Preset	:SYSTem:PRESet	Mode Preset (green key)
Restore Mode Defaults	:INSTrument:DEFault	Mode Setup Menu
Restore All Mode Defaults	:SYSTem:DEFault MODEs	System Menu; Restore System Default Menu
*RST	*RST	not possible (Mode Preset with Single)
Restore Input/Output Defaults	:SYSTem:DEFault INPut	System Menu; Restore System Default Menu
Restore Power On Defaults	:SYSTem:DEFault PON	System Menu; Restore System Default Menu
Restore Alignment Defaults	:SYSTem:DEFault ALIGn	System Menu; Restore System Default Menu
Restore Miscellaneous Defaults	:SYSTem:DEFault MISC	System Menu; Restore System Default Menu
Restore All System Defaults	:SYSTem:DEFault [ALL] :SYSTem:PRESet:PERSistent	System Menu; Restore System Default Menu
User Preset	:SYSTem:PRESet:USER	User Preset Menu
User Preset All Modes	:SYSTem:PRESet:USER:ALL	User Preset Menu

10 EDGE Output RF Spectrum Measurement
Mode Preset

Power On Mode Preset	:SYSTem:PON:TYPE MODE	System Menu
Power On User Preset	:SYSTem:PON:TYPE USER	System Menu
Power On Last State	:SYSTem:PON:TYPE LAST	System Menu

Mode Setup

See "Mode Setup" on page 151

Peak Search

Pressing Peak Search front-panel key performs a peak search and opens this Peak Search menu. Peak Search places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

Key Path	Front-panel key
Mode	GSM
Remote Command	:CALCulate:EORFspectr:MARKer[1] 2 ... 12:MAXimum
Example	CALC:EORF:MARK2:MAX
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

Min Peak Search (Backwards Compatibility/Remote Command Only)

Mode	GSM
Remote Command	:CALCulate:EORFspectr:MARKer[1] 2 ... 12:MINimum
Example	CALC:EORF:MARK:MIN
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

Print

See "Print " on page 161

Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

Type	Default Prefix	Menu
State	State_	(Save/Recall)
Trace + State	State_	(Save/Recall)
Screen	Screen_	(Save/Recall)
Amplitude Corrections	Ampcor_	(Import/Export)
Traces	Trace_	(Import/Export)
Limit Lines	LLine_	(Import/Export)
Measurement Result	MeasR_	(Import/Export)
Capture Buffer	CapBuf_	(Import/Export)

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State_0000.state. The next is State_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State_0010.state there is already a State_0010.state file in the current directory, it advances the counter to State_0011.state to ensure that no conflict will exist (and then it verifies that State_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred_0000.csv.

NOTE

Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

NOTE

If the filename you entered ends with _dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

Key Path	Front-panel key
Notes	No remote command for this key specifically.
Initial S/W Revision	Prior to A.02.00

Recall

The **Recall** menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an **Import (Data)** option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	Front-panel key
Notes	No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATe <filename>. If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.
Backwards Compatibility Notes	In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data. In the X-Series, "state" always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.
Backwards Compatibility Notes	Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows. Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible. It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user. Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.
Initial S/W Revision	Prior to A.02.00

State

The **Recall State** menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the

additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. **Recall State** will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or "Recalled State Register <register number>" is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See ["More Information" on page 894](#).

Key Path	Recall
Mode	All
Remote Command	:MMEMory:LOAD:STATe <filename>
Example	:MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path
Example	MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state.
Notes	When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled. • If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number. After recalling the state, the Recall State function does the following: • Makes the saved measurement for the mode the active measurement. • Clears the input and output buffers. • Status Byte is set to 0. • Executes a *CLS If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If

	there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away. After the Recall, the analyzer exits the Recall menu and returns to the previous menu.
Backwards Compatibility SCPI	:MMEMory:LOAD:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored.
Initial S/W Revision	Prior to A.02.00

More Information

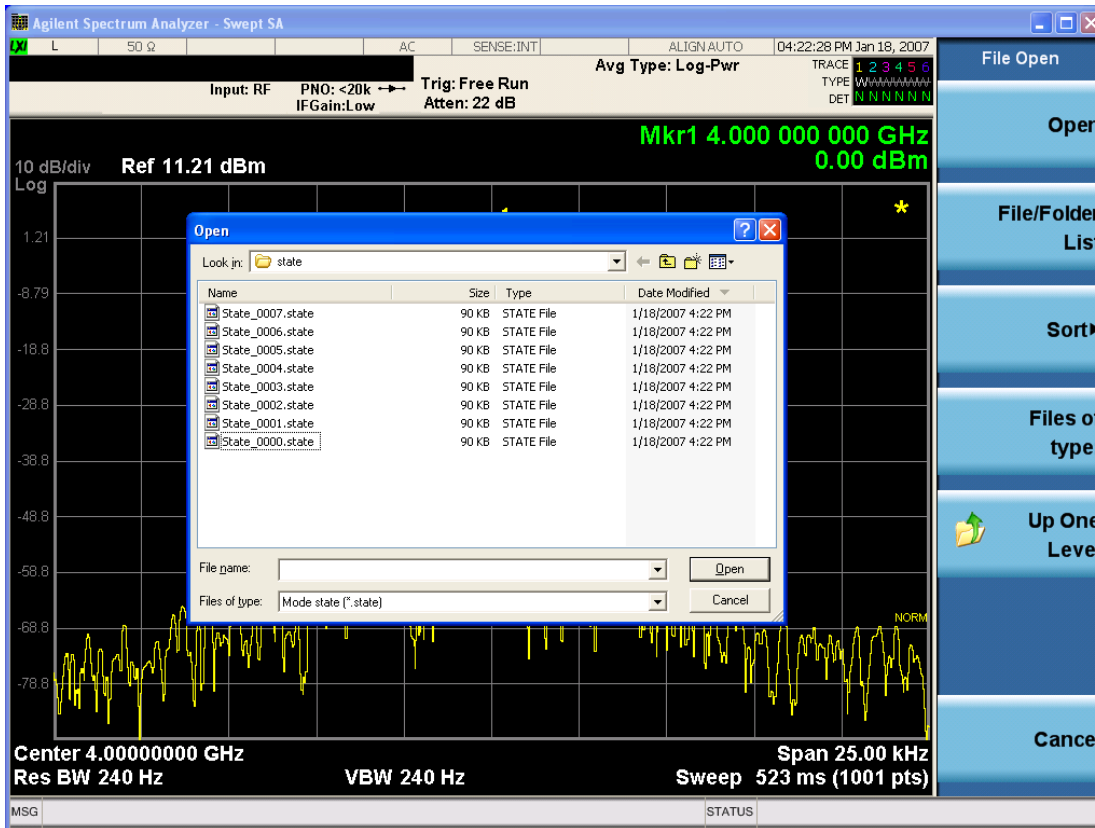
In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

The following table describes the Trace Save and Recall possibilities:

You want to recall state and one trace's data, leaving other traces unaffected.	Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed.	On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed.
You want to recall all traces	Save Trace+State from ALL traces.	On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved)
You want all traces to load exactly as they were when saved.	Save State	On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten.

From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

Look In

The **Look In** field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are **By Date**, **By Name**, **By extension**, and **By Size**.

Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

Key Path	Recall, State
Notes	Brings up the Open dialog for recalling a State Save Type
Initial S/W Revision	Prior to A.02.00

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the **Save, State** function.

Key Path	Recall, State
Mode	All
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available"
Initial S/W Revision	A.11.00

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
Example	*RCL 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State, Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
Example	*RCL 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

Key Path	Recall, Sequences
Mode	All
Remote Command	:MMEMory:LOAD:SEquences: SLIS ALIS SAALIS "MySequence.txt"
Example	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Notes	Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt)
Initial S/W Revision	A.05.00

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Recall, Sequences
Example	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Dependencies	Only available in XOBT
Initial S/W Revision	A.05.00

Open...

When you press “Open”, the analyzer brings up a Windows dialog and a menu entitled “**File Open.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 1473 in **Recall, State**, for a full description of this dialog and menu.

Key Path	Recall, Data
Notes	The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type
Initial S/W Revision	Prior to A.02.00

Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMediate
- Sending the remote command INIT:REStart

See ["More Information" on page 900](#)

Key Path	Front-panel key
Remote Command	:INITiate[:IMMediate] :INITiate:REStart
Example	:INIT:IMM :INIT:REST
Notes	:INITiate:REStart and :INITiate:IMMediate perform exactly the same function.
Couplings	Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement.
Status Bits/OPC dependencies	This is an Overlapped command. The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUESTionable register bit 9 (INTEgrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set.
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:REStart command restart trace averages (displayed average count reset to 1) for a trace in Clear Write , but did not restart Max Hold and Min Hold . In the X-Series, the Restart hardkey and the INITiate:REStart command restart not only Trace Average , but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:REStart command restart every measurement, which includes all traces and numeric results. There is no change to this operation.
Initial S/W Revision	Prior to A.02.00

More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average**, **Max Hold**, or **Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count k equals the number N set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC: AVER: TCON UP.

Save

The **Save** menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an **Export (Data)** option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

Key Path	Front-panel key
Mode	All
Notes	No remote command for this key specifically, but the :MMEM:STORe command is available for specific file types. An example is :MMEM:STOR:STATe <filename>.
Initial S/W Revision	Prior to A.02.00

State

The Save State menu lets you choose a register or file for saving the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent **System** settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<mode name>\state

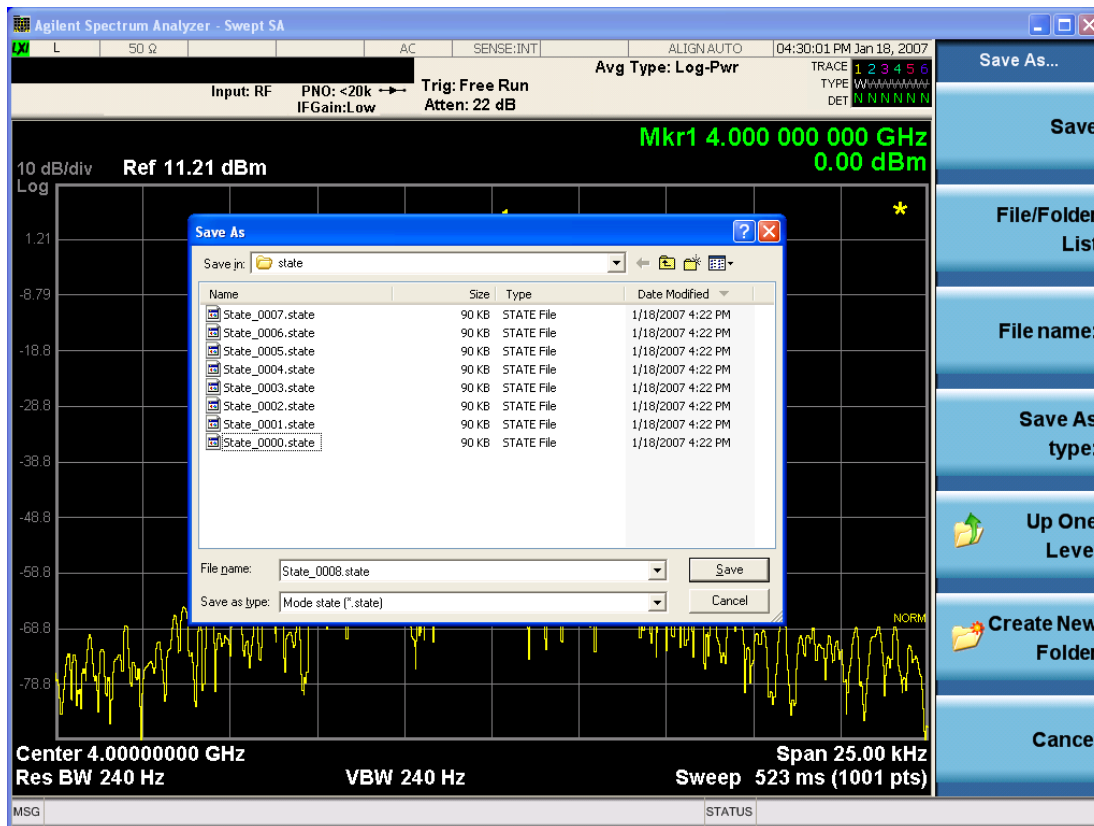
where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save
Mode	All
Remote Command	:MMEMory:STORe:STATe <filename>
Example	MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory.
Notes	Both single and double quotes are supported for any filename parameter over remote. After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key. After saving to a register, you remain in the Save State menu, so that you can see the Register key

	update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.
Backwards Compatibility SCPI	:MMEMory:STORe:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.
Initial S/W Revision	Prior to A.02.00

To File . . .

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



The Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting **OK**, or you can Cancel the request. If you select **OK**, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

File Name

The **File Name** field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 1469](#) documentation for more on the automatic file naming algorithm.

When you press the **File Name** key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the **Done** softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Create New Folder

This key corresponds to the icon of a folder with the "*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

Key Path	Save, State
Mode	All
Notes	Brings up Save As dialog for saving a State Save Type
Initial S/W Revision	Prior to A.02.00

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See ["More Information" on page 905](#)

Key Path	Save, State
Mode	All
Remote Command	:MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number>
Example	:MMEM:REG:STAT:LAB 1,"my label"
Notes	<reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,""
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available"
Preset	The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc"
Initial S/W Revision	A.11.00

More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The *SAV and *RCL commands will not be affected by the custom register names, nor will the MMEM commands.

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
Example	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
Example	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

Mass Storage Catalog (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:CATalog? [<directory_name>]
Notes	The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty
Initial S/W Revision	Prior to A.02.00

Mass Storage Change Directory (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory?

Notes	The string must be a valid logical path. Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value. At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal. Query returns full path of the default directory.
Initial S/W Revision	Prior to A.02.00

Mass Storage Copy (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:COpy <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Copies an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists. This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

Key path	SCPI Only
Remote Command	:MMEMory:COpy:DEvice <source_string>,<dest_string>
Notes	The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device. Valid device keywords are: SNS (smart noise source) An error is generated if the file or device is not found.

Mass Storage Delete (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:DELeTe <file_name>[,<directory_name>]

Notes	The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an “access denied” error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

Key path	SCPI Only
Remote Command	:MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name>
Notes	The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format.
Initial S/W Revision	Prior to A.02.00

Mass Storage Make Directory (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:MDIRectory <directory_name>
Notes	The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an “access denied” error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Mass Storage Move (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:MOVE <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source.

	The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists. This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Mass Storage Remove Directory (Remote Command Only)

Key path	SCPI Only
Remote Command	<code>:MMEMory:RDIRectory <directory_name></code>
Notes	The string must be a valid logical path. Removes a directory. The <directory_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed. This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

Key Path	Save, Sequences
Mode	All
Remote Command	<code>:MMEM:STOR:SEquences: SLISt ALISt SAALISt SSTep "MySequence.txt"</code>
Example	<code>:MMEM:STOR:SEQ:SLISt "MySequence.txt"</code>
Notes	Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt)
Initial S/W Revision	A.05.00

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Save, Sequences
Example	:MMEM:STOR:SEQ:SLIS "MySequence.txt"
Dependencies	Only available in XOBT
Initial S/W Revision	A.05.00

Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

Key Path	Save, Sequences
Mode	All
Notes	Brings up Save As dialog for saving a Sequence Save Type
Initial S/W Revision	A.05.00

Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

Key Path	Save
Mode	All
Notes	The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in

	the MMEM:STOR commands.
Dependencies	If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it.
Preset	Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults
Readback	The data type that is currently selected
Initial S/W Revision	Prior to A.02.00

Measurement Results

Pressing this key selects Meas Results as the data type to be exported. Pressing the key a second time brings up the Meas Results menu, which allows you to select which **Meas Result** to save. In the Swept SA measurement, there are three types of Measurement Results files: Peak Table, Marker Table and Spectrogram.

See ["Meas Results File Contents" on page 913](#).

See ["Marker Table" on page 913](#).

See ["Peak Table" on page 915](#).

See ["Spectrogram" on page 918](#)

Remote Command	:MMEMory:STORe:RESults:MTABle PTABle SPECTrogram <filename>
Example	:MMEM:STOR:RES:MTAB "myResults.csv" Saves the results from the current marker table to the file myResults.csv in the current path. :MMEM:STOR:RES:PTAB "myResults.csv" Saves the results from the current peak table to the file myResults.csv in the current path. :MMEM:STOR:RES:SPEC "myResults.csv" Saves the results from the current Spectrogram display to the file myResults.csv in the current path. The default path is My Documents\SA\data\SAN\results
Notes	If the save is initiated via SCPI, and the file already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	If a save of Marker Table results is requested and the Marker Table is not on, no file is saved and a message is generated If a save of Peak Table results is requested and the Peak Table is not on, no file is saved and a message is generated If a save of Spectrogram results is requested and the Spectrogram is not on, no file is saved and a message is generated. The Spectrogram choice only appears if option EDP is licensed.
Preset	Not part of Preset, but is reset to Peak Table by Restore Mode Defaults. Survives a shutdown.
Initial S/W Revision	Prior to A.02.00

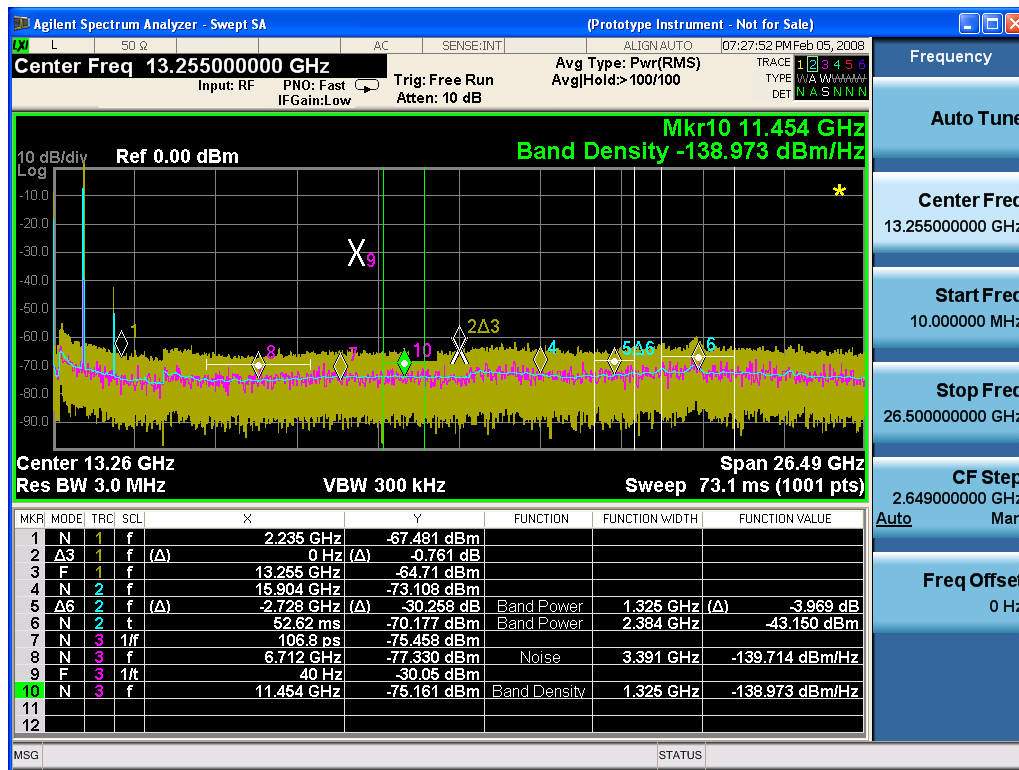
Meas Results File Contents

All files are .csv files. The following section details the data in each file type.

Marker Table

This section discusses the Marker Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:



Then the Meas Results file, when opened, would show the following data:

MeasurementR	
result	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR	1
P26 EA3	
Result Type	Marker Table
Ref Level	0
Number of Points	1001
Sweep Time	0.0662666 67

Start Frequency	10000000								
Stop Frequency	26500000000								
Average Count	0								
Average Type	LogPower (Video)								
RBW	3000000								
RBW Filter	Gaussian								
RBW Filter BW	3dB								
VBW	3000000								
Sweep Type	Swept								
X Axis Scale	Lin								
PreAmp State	Off								
PreAmp Band	Low								
Trigger Source	Free								
Trigger Level	1.2								
Trigger Slope	Positive								
Trigger Delay	1.00E-06								
Phase Noise Optimization	Fast								
Swept If Gain	Low								
FFT If Gain	Autorange								
RF Coupling	AC								
FFT Width	411900								
Ext Ref	10000000								
Input	RF								
RF Calibrator	Off								
Attenuation	10								
Ref Level Offset	0								
External Gain	0								
X Axis Units	Hz								
Y Axis Units	dBm								
DATA									
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	FUNCTION UNIT
1	Normal	1	Frequency	2.2350E+09	-67.481	Off	0.0000E+00	0	None

2	Delta3	1	Frequency	0.0000E+00	-0.761	Off	0.0000E+00	0	None
3	Fixed	1	Frequency	1.3255E+10	-64.71	Off	0.0000E+00	0	None
4	Normal	2	Frequency	1.5904E+10	-73.108	Off	0.0000E+00	0	None
5	Delta7	2	Frequency	-2.7280E+09	-30.258	Band Power	1.3250E+06	-3.969	dB
6	Normal	2	Time	5.2620E-02	-70.177	Band Power	2.3840E+06	-43.15	dBm
7	Normal	3	Period	1.0680E-10	-75.458	Off	0.0000E+00	0	None
8	Normal	3	Frequency	6.7120E+09	-77.33	Noise	3.3910E+06	-139.714	dBm/Hz
9	Fixed	3	Inverse Time	4.0000E+01	-30.05	Off	0.0000E+00	0	None
10	Normal	3	Frequency	1.1454E+10	-75.161	Band Density	1.3250E+06	-138.973	dBm/Hz
11	Off	1	Frequency	0.0000E+00	0	Off	0.0000E+00	0	None
12	Off	1	Frequency	0.0000E+00	0	Off	0.0000E+00	0	None

The numbers appear in the file exactly as they appear onscreen. If it says 11.454 GHz onscreen, then in the file it is 11.454E+09.

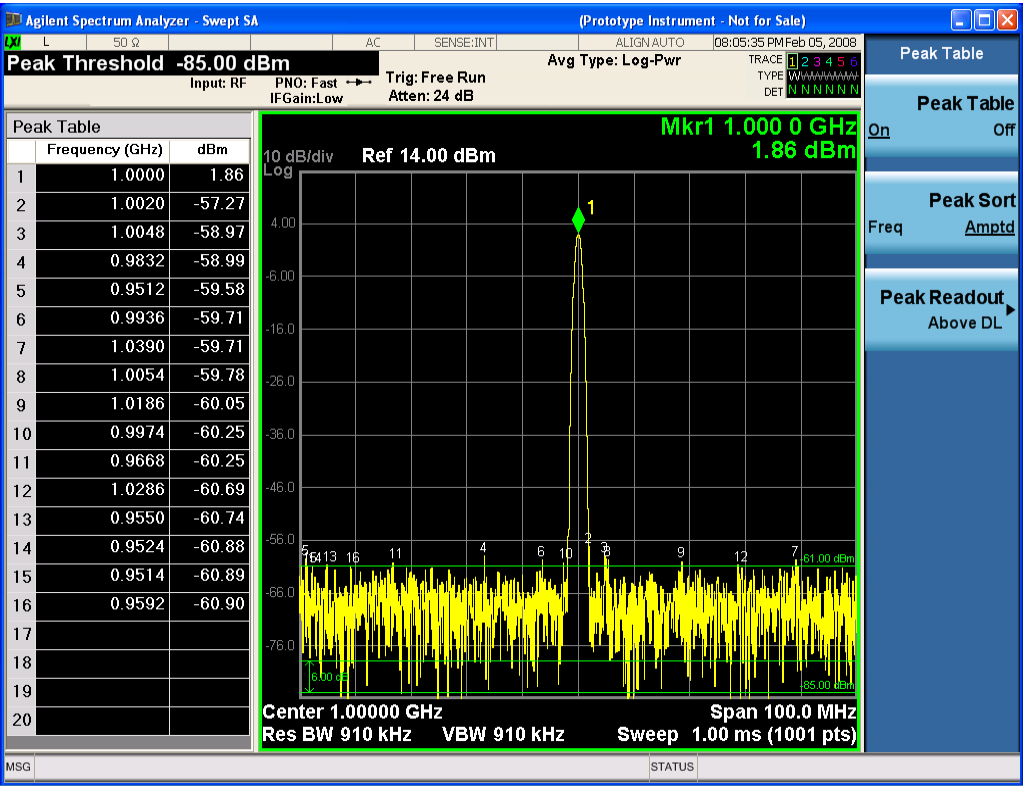
The metadata header is very similar to the metadata used in the trace data .csv files. See Trace File Contents. The only new information concerns the 1-of-N fields in the marker table itself.

Peak Table

This section discusses the Peak Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:

10 EDGE Output RF Spectrum Measurement
Save



Then the Meas Results file, when opened, would show the header data (the same as for the Marker Table except that the Result Type is Peak Table) ending with a few fields of specific interest to Peak Table users:

- Peak Threshold
- Peak Threshold State (On|Off)
- Peak Excursion
- Peak Excursion State (On|Off)
- Display Line
- Peak Readout (All|AboveDL|BelowDL)
- Peak Sort (Freq|Amptd)

These fields are then followed by the data for the Peak Table itself.
Note that the label for the Frequency column changes to Time in 0 span.
Here is what the table for the above display looks like:

MeasurementResult	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR P26 EA3	1

Result Type	Peak Table
Ref Level	0
Number of Points	1001
Sweep Time	0.066266667
Start Frequency	10000000
Stop Frequency	26500000000
Average Count	0
Average Type	LogPower(Video)
RBW	3000000
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	3000000
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	1.00E-06
Phase Noise Optimization	Fast
Swept If Gain	Low
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	10
Ref Level Offset	0
External Gain	0
X Axis Units	Hz
Y Axis Units	dBm
Peak Threshold	-85
Peak Threshold State	On
Peak Excursion	6
Peak Excursion State	On

Display Line	-61	
Peak Readout	AboveDL	
Peak Sort	Amptd	
DATA		
Peak	Frequency	Amplitude
1	1.0000E+06	1.86
2	1.0020E+06	-57.27
3	1.0048E+06	-58.97
4	9.8320E+05	-58.99
5	9.5120E+05	-59.58
6	9.9360E+05	-59.71
7	1.0390E+06	-59.71
8	1.0054E+06	-59.78
9	1.1086E+06	-60.05
10	9.9740E+05	-60.25
11	9.6680E+05	-60.25
12	1.0286E+06	-60.69
13	9.5500E+05	-60.74
14	9.5240E+05	-60.88
15	9.5140E+05	-60.89
16	9.5920E+05	-60.90
17		
18		
19		
20		

Spectrogram

This section discusses the Spectrogram Results file format. The Spectrogram choice only appears if option EDP is licensed.

The Spectrogram results are the same as a Trace data export, except that instead of having just one trace's data, all 300 traces appear one after the other.

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Each trace has its own data mark; the data for Spectrogram Trace 0 follows the row marked DATA, the data for Spectrogram Trace 1 follows the row marked DATA1, for Spectrogram Trace 2 follows the row marked DATA2, and so on.

Each DATA row has a timestamp in the second column (as of firmware revision A.11.01). So, for example, if Trace 0 had a relative start time of 1729.523 sec, then the first DATA row would look like this:

DATA,1729.523

And if Trace 13 had a relative start time of 100.45 sec, then the fourteenth data row would look like:

DATA13,100.453

To find the absolute time for the relative timestamps of each trace, the last row before the first DATA row gives the absolute start time of the Spectrogram, in the form YYYYMMDDHHMMSS

So, for example, if the absolute start time is 13:23:45:678 on January 30, 2012, this row would look like:

Start Time,20120130132345678

NOTE:

NOTE

The resolution of the absolute time stored is 1 ms, which matches up with the fact that the fastest sweep time is also 1 ms. However, there is no specification for the absolute accuracy of the clock in the analyzer, nor is there any facility provided to allow the user to set this time to any particular degree of accuracy.

Traces that have not yet been filled in the Spectrogram display are empty; there is no DATA header for them. The file ends after the last non-empty trace.

Imagine that, at the point where a Spectrogram Meas Result is requested, the following screen is showing:



For the purpose of this example, we have set the Average/Hold Number to 10, thus we have only traces 0 thru 10. The Spectrogram was started at 02:28:08:700 pm on April 25, 2012 (that is, 700 ms after 2:28:08 pm), although the screen dump itself shows a different time, as it was taken ten minutes after the Spectrogram data. Trace 0 is showing a start time of 5.30 seconds, meaning 5.3 seconds after the Spectrogram started (trace 10 has a start time of 0, as it was the first trace taken but has now rolled up into the tenth trace slot).

The Meas Results file, when opened, shows the header data and ten traces of trace data. Below is an extract from the result file for the above display. Note the start time of 20120425142808700 showing in the last row before the first DATA row, and the relative time of 5.299231048 showing in the first DATA row:

Result Type	Spectrogram
MeasResult	
Swept SA	
A.11.00.01	N9020A
503 508 513 526 ALL ALV B1C B1X B25 B2X B40 BAB BBA CR3 CRP DP2 DRD EA3 EDP EMC EP1 ERC ESC ESP EXM FSA HBA K03 LFE MPB P03 P08 P13 P26 PFR RTL RTS S40 SB1 SEC SM1 UK6 YAS YAV	1
Segment	0
Number of Points	1001
Sweep Time	0.523333333
Start Frequency	5999984415
Stop Frequency	6000009415
Average Count	0
Average Type	LogPower(Video)
RBW	240
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	240
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	0
Phase Noise Optimization	Wide
Swept If Gain	Low

Result Type	Spectrogram
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	14
Ref Level Offset	0
External Gain	0
Trace Type	Clearwrite
Detector	Normal
Trace Math	Off
Trace Math Oper1	Trace5
Trace Math Oper2	Trace6
Trace Math Offset	0
Trace Name	Trace1
X Axis Units	Hz
Y Axis Units	dBm
Start Time	20120425142808700
DATA	5.299231048
5999984415	-76.34749519
5999984440	-77.28097006
5999984465	-75.32317869
5999984490	-73.64417681
5999984515	-72.67154604

O
O
O

6000009315	-77.94423277
6000009340	-79.51829697
6000009365	-78.46108961
6000009390	-78.46108957
6000009415	-76.59570596
DATA2	4.708697055

5999984415	-80.98197882
5999984440	-80.98197879
5999984465	-75.83142132
5999984490	-74.02712079
5999984515	-73.57213005

O
O
O

6000009315	-75.9183103
6000009340	-79.53787488
6000009365	-78.82602191
6000009390	-78.82602188
6000009415	-76.37486709
DATA10	0
5999984415	-75.56751112
5999984440	-75.76485645
5999984465	-76.67718717
5999984490	-78.79238489
5999984515	-83.72680212

O
O
O

6000009315	-71.3942461
6000009340	-72.28308332
6000009365	-73.92684489
6000009390	-75.45548832
6000009415	-75.17904815

Save As . . .

When you press “Save As”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See ["To File . . ." on page 1482](#) in **Save, State** for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<mode name>\data\limits

For all of the Measurement Results Data Files:

My Documents\<mode name>\data\<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<mode name>\data\captureBuffer

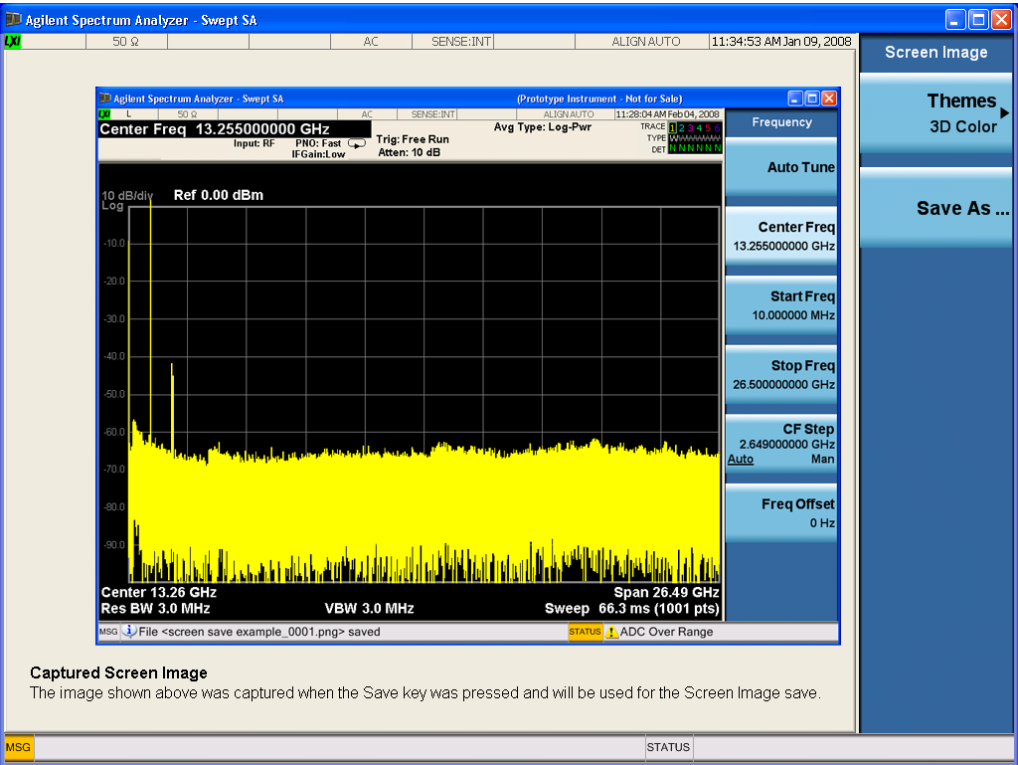
Key Path	Save, Data
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision	Prior to A.02.00

Screen Image

Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the **Save** front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the **Save As** menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the **Save** menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the **Quick Save** front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

NOTE For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

Key Path	Save
Mode	All
Remote Command	:MMEMory:STORe:SCReen <filename>
Example	:MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory.
Initial S/W Revision	Prior to A.02.00

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

Key Path	Save, Screen Image
Remote Command	:MMEMory:STORe:SCReen:THEMe TDColor TDMonochrome FCOLOR FMONochrome :MMEMory:STORe:SCReen:THEMe?
Example	:MMEM:STOR:SCR:THEM TDM
Preset	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
Readback	3D Color 3D Mono Flat Color Flat Mono
Backwards Compatibility Notes	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
Initial S/W Revision	Prior to A.02.00

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDC
Readback	3D Color
Initial S/W Revision	Prior to A.02.00

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDM
Readback	3D Mono
Initial S/W Revision	Prior to A.02.00

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	Save, Screen Image, Themes

Example	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 1482 in **Save, State** for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\<mode name>\screen.

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save, Screen Image
Notes	Brings up Save As dialog for saving a Screen Image Save Type
Initial S/W Revision	Prior to A.02.00

Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing **Single** does a Resume.

See ["More Information" on page 927](#)

Key Path	Front-panel key
Example	:INIT:CONT OFF
Notes	See Cont key description.
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold. For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state. INIT[:IMM] in ESA & PSA Spectrum Analysis Mode does an implied ABORT. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.
Initial S/W Revision	Prior to A.02.00

More Information

See ["Restart" on page 1479](#) for details on the INIT:IMMediate (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the **Single** key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the **Single** key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the **Single** key in the middle of a sweep does not restart the sweep, sending INIT:IMMediate does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

Key Path	Front-panel key

RF Output

This parameter sets the source RF power output state.

Key Path	Source
Remote Command	:OUTPut[:EXTeRnal][:STATe] ON OFF 1 0 :OUTPut[:EXTeRnal][:STATe]?
Example	OUTP OFF OUTP?
Notes	The EXTeRnal node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source. This setting is for the independent mode and has no effect on the "List Sequencer" on page 1584. If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately. When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the "Sequencer" on page 1585 is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

Amplitude

Allows you to access the Amplitude sub-menu.

Key Path	Source
Notes	The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 1584. If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set "Sequencer" on page 1585 to Off will make source leave list sequencer and this button will be black out.
Initial S/W Revision	A.05.00

RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the ["RF Power Range " on page 930](#) table below for the valid ranges.

Key Path	Source, Amplitude
Remote Command	:SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]?
Example	:SOUR:POW -100 dBm
Notes	Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel. Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Couplings	If "Real-Time AWGN" on page 1545 AWGN State is On and "ARB" on page 1534 ARB State is On, this setting will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 1546 Power Control Mode and other noise settings
Preset	-100 dBm
Min	The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 930 table below for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 930 table below for the valid ranges.

Initial S/W Revision	A.05.00
Modified at S/W Revision	A.16.00 (Add couplings with AWGN state)

RF Power Range

RF Output Port	Frequency Range	Min Output Power	Max Output Power
High Power RF Out	10 MHz $\leq$ f $\leq$ 6 GHz	-150 dBm	20 dBm
RFIO 1 & RFIO 2	10 MHz $\leq$ f $\leq$ 6 GHz	-150 dBm	0 dBm
GPS (Note2)	10 MHz $\leq$ f $\leq$ 6 GHz	-150 dBm	0 dBm

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power – entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

Key Path	Source, Amplitude
Dependencies	This key is unavailable, and is grayed out when the "List Sequencer" on page 1584 is turned ON.
Initial S/W Revision	A.05.00

Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 1500](#)

Key Path	Source, Amplitude
Remote Command	:SOURCE:POWER:REFERENCE <ampl> :SOURCE:POWER:REFERENCE? :SOURCE:POWER:REFERENCE:STATE OFF ON 0 1 :SOURCE:POWER:REFERENCE:STATE?
Example	:SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATE ON
Dependencies	This setting is unavailable and is grayed out when the "List Sequencer" on page 1584 is turned ON.
Couplings	This value is coupled to the "Set Reference Power " on page 1500 key such that pressing the Set Reference Power key updates the reference power with the current output power.
Preset	0.00 dBm OFF
Min	-125.00 dBm
Max	10.00 dBm
Initial S/W Revision	A.05.00

Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

Key Path	Source, Amplitude
Remote Command	:SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_ampl> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet?
Example	:SOUR:POW:OFFS 0.00 dB
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0.00 dB
Min	-200.00 dB
Max	200.00 dB
Initial S/W Revision	A.05.00

Modulation

Allows you to toggle the state of the modulation.

Key Path	Source
Remote Command	:OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]?
Example	:OUTP:MOD OFF
Notes	This setting is for independent mode and has no effect on "List Sequencer" on page 1584. If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately. When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the "Sequencer" on page 1585 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer.
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

Frequency

Allows you to access the Frequency sub-menu.

Key Path	Source
Notes	The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 1584. If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out.
Initial S/W Revision	A.05.00

Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW]?
Example	:SOUR:FREQ 1.00 GHz
Notes	Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency.
Couplings	The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency.
Preset	1.00 GHz
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: **"GSM/EDGE Channel Number Ranges"** on page 934,

"W-CDMA Channel Number Ranges" on page 935, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 936, and "LTE FDD Channel Number Ranges" on page 938.

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:CHANnels:NUMBer <int> :SOURce:FREQuency:CHANnels:NUMBer?
Example	:SOUR:FREQ:CHAN:NUMB 1
Notes	This key is grayed out when the "Radio Standard" on page 1512 is set to NONE. This key is grayed out on E6630A.
Dependencies	This key is grayed out when the "Radio Standard" on page 1512 is set to NONE. This key is grayed out on E6630A.
Couplings	The channel number is coupled to the frequency value when the "Radio Standard" on page 1512 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	Please refer to the tables below for the valid ranges.
Max	Please refer to the tables below for the valid ranges.
Initial S/W Revision	A.05.00

GSM/EDGE Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
P-GSM	Uplink (MS)	$1 \leq n \leq 124$	$890.0 + 0.2*n$
	Downlink (BS)	$1 \leq n \leq 124$	$935.0 + 0.2*n$
E-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$975 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$975 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
DCS 1800	Uplink (MS)	$512 \leq n \leq 885$	$1710.200 + 0.20*(n-512)$
	Downlink (BS)	$512 \leq n \leq 885$	$1805.200 + 0.20*(n-512)$
PCS 1900	Uplink (MS)	$512 \leq n \leq 810$	$1850.200 + 0.2*(n-512)$
	Downlink (BS)	$512 \leq n \leq 810$	$1930.200 + 0.2*(n-512)$
R-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$955 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$955 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
GSM 450	Uplink (MS)	$256 \leq n \leq 293$	$450.6 + 0.2*(n-259)$
	Downlink (BS)	$256 \leq n \leq 293$	$460.6 + 0.2*(n-259)$

Band	Link (Device)	Range	Frequency (MHz)
GSM 480	Uplink (MS)	$306 \leq n \leq 340$	$479.000 + 0.20*(n-306)$
	Downlink (BS)	$306 \leq n \leq 340$	$489.000 + 0.20*(n-306)$
GSM 850	Uplink (MS)	$128 \leq n \leq 251$	$824.200 + 0.20*(n-128)$
	Downlink (BS)	$128 \leq n \leq 251$	$869.200 + 0.20*(n-128)$
GSM 700	Uplink (MS)	$438 \leq n \leq 516$	$777.200 + 0.20*(n-438)$
	Downlink (BS)	$438 \leq n \leq 516$	$747.200 + 0.20*(n-438)$
T-GSM810	Uplink (MS)	$350 \leq n \leq 425$	$806.0 + 0.20*(n-350)$
	Downlink (BS)	$350 \leq n \leq 425$	$851.0 + 0.20*(n-350)$

W-CDMA Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
Band I	Downlink	$10562 \leq n \leq 10838$	$n \div 5$
	Uplink	$9612 \leq n \leq 9888$	$n \div 5$
Band II	Downlink	$412 \leq n \leq 687$	$n \div 5 + 1850.1$
		$9662 \leq n \leq 9938$	$n \div 5$
	Uplink	$12 \leq n \leq 287$	$n \div 5 + 1850.1$
		$350 \leq n \leq 425$	$n \div 5$
Band III	Downlink	$1162 \leq n \leq 1513$	$n \div 5 + 1575$
	Uplink	$937 \leq n \leq 1288$	$n \div 5 + 1525$
Band IV	Downlink	$537 \leq n \leq 1738$	$n \div 5 + 1805$
		$1887 \leq n \leq 2087$	$n \div 5 + 1735.1$
	Uplink	$1312 \leq n \leq 1513$	$n \div 5 + 1450$
		$1662 \leq n \leq 1862$	$n \div 5 + 1380.1$
Band V	Downlink	$1007 \leq n \leq 1087$	$n \div 5 + 670.1$
		$4357 \leq n \leq 4458$	$n \div 5$
	Uplink	$782 \leq n \leq 862$	$n \div 5 + 670.1$
		$4132 \leq n \leq 4233$	$n \div 5$
Band VI	Downlink	$1037 \leq n \leq 1062$	$n \div 5 + 670.1$
		$4387 \leq n \leq 4413$	$n \div 5$
	Uplink	$812 \leq n \leq 837$	$n \div 5 + 670.1$
		$4162 \leq n \leq 4188$	$n \div 5$
Band VII	Downlink	$2237 \leq n \leq 2563$	$n \div 5 + 2175$
		$2587 \leq n \leq 2912$	$n \div 5 + 2105.1$
	Uplink	$2012 \leq n \leq 2338$	$n \div 5 + 2100$
		$2362 \leq n \leq 2687$	$n \div 5 + 2030.1$
Band VIII	Downlink	$2937 \leq n \leq 3088$	$n \div 5 + 340$

Band	Link (Device)	Range	Frequency (MHz)
Band IX	Uplink	$2712 \leq n \leq 2863$	$n \div 5 + 340$
	Downlink	$9237 \leq n \leq 9387$	$n \div 5$
	Uplink	$8762 \leq n \leq 8912$	$n \div 5$
Band X	Downlink	$3112 \leq n \leq 3388$	$n \div 5 + 1490$
		$3412 \leq n \leq 3687$	$n \div 5 + 1430.1$
	Uplink	$2887 \leq n \leq 3163$	$n \div 5 + 1135$
		$3187 \leq n \leq 3462$	$n \div 5 + 1075.1$
Band XI	Downlink	$3712 \leq n \leq 3812$	$n \div 5 + 736$
	Uplink	$3487 \leq n \leq 3587$	$n \div 5 + 733$
Band XII	Downlink	$3837 \leq n \leq 3903$	$n \div 5 - 37$
		$3927 \leq n \leq 3992$	$n \div 5 - 54.9$
	Uplink	$3612 \leq n \leq 3678$	$n \div 5 - 22$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIII	Downlink	$4017 \leq n \leq 4043$	$n \div 5 - 55$
		$4067 \leq n \leq 4092$	$n \div 5 - 64.9$
	Uplink	$3792 \leq n \leq 3818$	$n \div 5 + 21$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIV	Downlink	$4117 \leq n \leq 4143$	$n \div 5 - 63$
		$4167 \leq n \leq 4192$	$n \div 5 - 72.9$
	Uplink	$3892 \leq n \leq 3918$	$n \div 5 + 12$
		$3942 \leq n \leq 3967$	$n \div 5 + 2.1$
Band XIX	Downlink	$712 \leq n \leq 763$	$n \div 5 + 735$
		$787 \leq n \leq 837$	$n \div 5 + 720.1$
	Uplink	$312 \leq n \leq 363$	$n \div 5 + 770$
		$387 \leq n \leq 437$	$n \div 5 + 755.1$

CDMA 2000 / 1xEVDO Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
US Cellular	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.030 \times N + 825.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 825.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 815.040$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.030 \times N + 870.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 870.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 860.040$
US PCS	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1850.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
Japan Cellular Band	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$1930.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.0125 \times (N + 915.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 898.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 887.000$
		$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 893.000$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.0125 \times (N + 860.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 843.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 832.000$
		$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 838.000$
Korean PCS Band	Uplink (MS, reverse link)	$0 \leq N \leq 599$	$0.050 \times N + 1750.000$
	Downlink (BS, forward link)	$0 \leq N \leq 599$	$0.050 \times N + 1840.000$
NMT-450 Band	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 450.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 410.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 451.010$
		$1536 \leq N \leq 1715$	$0.025 \times (N - 1536) + 479.000$
		$1792 \leq N \leq 2016$	$0.020 \times (N - 1792) + 479.000$
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 460.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 420.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 461.010$
		$1536 \leq N \leq 1715$	$0.025 \times (N - 1536) + 489.000$
		$1792 \leq N \leq 2016$	$0.020 \times (N - 1792) + 489.000$
IMT-2000 Band	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1920.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$2100.000 + 0.050 \times N$
Upper 700 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$776.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 240$	$746.000 + 0.050 \times N$
Secondary 800 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 719$	$0.025 \times N + 806.000$
		$720 \leq N \leq 919$	$0.025 \times (N - 720) + 896.000$
	Downlink (BS, forward link)	$0 \leq N \leq 719$	$0.025 \times N + 851.000$
		$720 \leq N \leq 919$	$0.025 \times (N - 720) + 935.000$
2.5 GHz IMT Extension	Uplink (MS, reverse link)	$0 \leq N \leq 1399$	$2500.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1399$	$2620.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
US PCS 1.9 GHz	Uplink (MS, reverse link)	$0 \leq N \leq 1299$	$1850.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1299$	$1930.000 + 0.050 \times N$
AWS	Uplink (MS, reverse link)	$0 \leq N \leq 899$	$1710.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 899$	$2100.000 + 0.050 \times N$
US 2.5 GHz	Uplink (MS, reverse link)	$140 \leq N \leq 1459$	$2495.000 + 0.050 \times N$
	Downlink (BS, forward link)	$140 \leq N \leq 1459$	$2617.000 + 0.050 \times N$
700 Public Safety	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$787.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 240$	$757.000 + 0.050 \times N$
C2K Lower 700	Uplink (MS, reverse link)	$0 \leq N \leq 360$	$698.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 360$	$728.000 + 0.050 \times N$
400 Euro PAMR	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 450.000$
		$472 \leq N \leq 871$	$0.025 \times (N-472) + 410.000$
	Uplink (MS, reverse link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 479.000$
	Uplink (MS, reverse link)		
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 460.000$
		$472 \leq N \leq 871$	$0.025 \times (N-472) + 420.000$
	Downlink (BS, forward link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 489.000$
	Downlink (BS, forward link)		
800 PAMR	Uplink (MS, reverse link)	$0 \leq N \leq 239$	$870.0125 + 0.025 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 239$	$915.0125 + 0.025 \times N$

LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier

frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$\text{FDL} = \text{FDL\_low} + 0.1(\text{NDL} - \text{NOffs-DL})$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$\text{FUL} = \text{FUL\_low} + 0.1(\text{NUL} - \text{NOffs-UL})$$

Band	Downlink		Uplink			
FDL_low (MHz)	NOffs-DL	Range of NDL	FUL_low (MHz)	NOffs-UL	Range of NUL	
1	2110	0	0 – 599	1920	18000	18000 – 18599
2	1930	600	600 – 1199	1850	18600	18600 – 19199
3	1805	1200	1200 – 1949	1710	19200	19200 – 19949
4	2110	1950	1950 – 2399	1710	19950	19950 – 20399
5	869	2400	2400 – 2649	824	20400	20400 – 20649
6	875	2650	2650 – 2749	830	20650	20650 – 20749
7	2620	2750	2750 – 3449	2500	20750	20750 – 20449
8	925	3450	3450 – 3799	880	21450	21450 – 21799
9	1844.9	3800	3800 – 4149	1749.9	21800	21800 – 22149
10	2110	4150	4150 – 4749	1710	22150	22150 – 22749
11	1475.9	4750	4750 – 4949	1427.9	22750	22750 – 22949
12	729	5010	5010 – 5179	699	23010	23010 – 23179
13	746	5180	5180 – 5279	777	23180	23180 – 23279
14	758	5280	5280 – 5379	788	23280	23280 – 23379
...						
17	734	5730	5730 – 5849	704	23730	23730 – 23849
18	860	5850	5850 – 5999	815	23850	23850 – 23999

Band	Downlink	Uplink				
19	875	6000	6000 – 6149	830	24000	24000 – 24149
20	791	6150	6150 – 6449	832	24150	24150 – 24449
21	1495.9	6450	6450 – 6599	1447.9	24450	24450 – 24599
...						
24	1525	7700	7700 – 8039	1626.5	25700	25700 – 26039
25	1930	8040	8040 – 8689	1850	26040	26040 – 26689
26	859	8690	8690 – 9039	814	26690	26690 – 27039
...						

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4–1 and NDL is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4–1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOffs-UL)$$

Band	Downlink	Uplink				
FDL_low (MHz)	NOffs-DL	Range of NDL	FUL_low (MHz)	NOffs-UL	Range of NUL	
33	1900	36000	36000 – 36199	1900	36000	36000 – 36199
34	2010	36200	36200 – 36349	2010	36200	36200 – 36349
35	1850	36350	36350 – 36949	1850	36350	36350 – 36949
36	1930	36950	36950 – 37549	1930	36950	36950 – 37549

Band	Downlink	Uplink				
37	1910	37550	37550 – 37749	1910	37550	37550 – 37749
38	2570	37750	37750 – 38249	2570	37750	37750 – 38249
39	1880	38250	38250 – 38649	1880	38250	38250 – 38649
40	2300	38650	38650 – 39649	2300	38650	38650 – 39649
41	2496	39650	39650 – 41589	2496	39650	39650 – 41589
42	3400	41590	41590 – 43589	3400	41590	41590 – 43589
43	3600	43590	43590 – 45589	3600	43590	43590 – 45589

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

TDSCDMA Channel Number Ranges

1.28 Mcps TDD Option

No TX–RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 \cdot F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 \cdot (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

**Table: UTRA Absolute Radio
Frequency Channel Number 1.28
Mcps TDD Option**

Frequency Band	Frequency Range	UARFCN Uplink and Downlink transmission
For operation in frequency band as defined in subclause 5.2 (a)	1900–1920 MHz	9504 to 9596
	2010–2025 MHz	10054 to 10121
For operation in frequency band as defined in subclause 5.2 (b)	1850–1910 MHz	9254 to 9546
	1930–1990 MHz	9654 to 9946
For operation in frequency band as defined in subclause 5.2 (c)	1910–1930 MHz	9554 to 9646
For operation in frequency band as defined in subclause 5.2 (d)	2570–2620 MHz	12854 to 13096
For operation in frequency band as defined in subclause 5.2 (e)	2300–2400 MHz	11504 to 11996
For operation in frequency band as defined in subclause 5.2 (f)	1880–1920 MHz	9404 to 9596

Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

Key Path	Source, Frequency
Initial S/W Revision	A.05.00

Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

Key Path	Source, Frequency, Radio Setup
Remote Command	:SOURce:FREquency:CHANnels:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10

BAND11 | BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 |
BAND21 | BAND24 | BAND25 | BAND26 | BAND27 | BAND28 | BAND29 | BAND30 |
BAND31 | BAND33 | BAND34 | BAND35 | BAND36 | BAND37 | BAND38 | BAND39 |
BAND40 | BAND41 | BAND42 | BAND43 | BAND44 | BANDA | BANDB | BANDC |
BANDD | BANDE | BANDF

:SOURce:FREQuency:CHANnels:BAND?

Example	:SOUR:FREQ:CHAN:BAND PGSM
Notes	Set this setting to "NONE" will grey out "Channel" on page 1503 Channel
Initial S/W Revision	A.05.00

None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

P-GSM

Selects P-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND PGSM
Initial S/W Revision	A.05.00

E-GSM

Selects E-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND EGSM
Initial S/W Revision	A.05.00

R-GSM

Selects R-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND RGSM
Initial S/W Revision	A.05.00

DCS 1800

Selects DCS 1800 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND DCS1800
Initial S/W Revision	A.05.00

PCS 1900

Selects PCS 1900 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND PCS1900
Initial S/W Revision	A.05.00

GSM 450

Selects GSM 450 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND GSM450
Initial S/W Revision	A.05.00

GSM 480

Selects GSM 480 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND GSM480
Initial S/W Revision	A.05.00

GSM 850

Selects GSM 850 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND GSM850
Initial S/W Revision	A.05.00

GSM 700

Selects GSM 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND GSM700
Initial S/W Revision	A.05.00

T-GSM 810

Selects T-GSM 810 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND T-GSM810
Initial S/W Revision	A.05.00

WCDMA

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

Band I

Selects Band I as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDI
Initial S/W Revision	A.05.00

Band II

Selects Band II as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDII
Initial S/W Revision	A.05.00

Band III

Selects Band III as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDIII
Initial S/W Revision	A.05.00

Band IV

Selects Band IV as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDIV
Initial S/W Revision	A.05.00

Band V

Selects Band V as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDV
Initial S/W Revision	A.05.00

Band VI

Selects Band VI as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDVI
Initial S/W Revision	A.05.00

Band VII

Selects Band VII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDVII
Initial S/W Revision	A.05.00

Band VIII

Selects Band VIII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDVIII
Initial S/W Revision	A.05.00

Band IX

Selects Band IX as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDIX
Initial S/W Revision	A.05.00

Band X

Selects Band X as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDX
Initial S/W Revision	A.05.00

Band XI

Selects Band XI as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDXI
Initial S/W Revision	A.05.00

Band XII

Selects Band XII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDXII
Initial S/W Revision	A.05.00

Band XIII

Selects band XIII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDXIII
Initial S/W Revision	A.05.00

Band XIV

Selects Band XIV as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDXIV
Initial S/W Revision	A.05.00

CDMA 2000 / 1xEVDO

Sets CDMA 2000 / 1XEVD0 as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

US CELL

Selects US Cell as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND USCELL
Initial S/W Revision	A.05.00

US PCS

Selects US PCS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PCS
Initial S/W Revision	A.05.00

Japan Cell

Selects Japan Cell as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND JAPAN
Initial S/W Revision	A.05.00

Korean PCS

Selects Korean PCS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND KOREAN
Initial S/W Revision	A.05.00

NMT 450

Selects NMT 450 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND NMT
Initial S/W Revision	A.05.00

IMT 2000

Selects IMT 2000 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND IMT2K
Initial S/W Revision	A.05.00

Upper 700

Selects Upper 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND UPPER
Initial S/W Revision	A.05.00

Secondary 800

Selects Secondary 800 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND SECOND
Initial S/W Revision	A.05.00

400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PAMR400
Initial S/W Revision	A.05.00

800 PAMR

Selects 800 PAMR as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PAMR800
Initial S/W Revision	A.05.00

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND IMTEXT
Initial S/W Revision	A.05.00

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PCS1DOT9G
Initial S/W Revision	A.05.00

AWS

Selects AWS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND AWS
Initial S/W Revision	A.05.00

US 2.5GHz

Selects US 2.5 GHz as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND US2DOT5G
Initial S/W Revision	A.05.00

700 Public Safety

Selects 700 Public Safety as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PUBLIC
Initial S/W Revision	A.05.00

C2K Lower 700

Selects C2K Lower 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND LOWER
Initial S/W Revision	A.05.00

LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

BAND 1

Selects BAND 1 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND1
Initial S/W Revision	A.09.50

BAND 2

Selects BAND 2 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND2
Initial S/W Revision	A.09.50

BAND 3

Selects BAND 3 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND3
Initial S/W Revision	A.09.50

BAND 4

Selects BAND 4 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND4
Initial S/W Revision	A.09.50

BAND 5

Selects BAND 5 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND5
Initial S/W Revision	A.09.50

BAND 6

Selects BAND 6 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND6
Initial S/W Revision	A.09.50

BAND 7

Selects BAND 7 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND7
Initial S/W Revision	A.09.50

BAND 8

Selects BAND 8 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND8
Initial S/W Revision	A.09.50

BAND 9

Selects BAND 9 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND9
Initial S/W Revision	A.09.50

BAND 10

Selects BAND 10 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND10
Initial S/W Revision	A.09.50

BAND 11

Selects BAND 11 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND11
Initial S/W Revision	A.09.50

BAND 12

Selects BAND 12 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND12
Initial S/W Revision	A.09.50

BAND 13

Selects BAND 13 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND13
Initial S/W Revision	A.09.50

BAND 14

Selects BAND 14 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND14
Initial S/W Revision	A.09.50

BAND 17

Selects BAND 17 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND17
Initial S/W Revision	A.09.50

BAND 18

Selects BAND 18 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND18
Initial S/W Revision	A.09.50

BAND 19

Selects BAND 19 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND19
Initial S/W Revision	A.09.50

BAND 20

Selects BAND 20 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND20
Initial S/W Revision	A.09.50

BAND 21

Selects BAND 21 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND21
Initial S/W Revision	A.09.50

BAND 24

Selects BAND 24 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND24
Initial S/W Revision	A.09.50

BAND 25

Selects BAND 25 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND25
Initial S/W Revision	A.09.50

BAND 26

Selects BAND 26 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND26
Initial S/W Revision	A.12.53

BAND 27

Selects BAND 27 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND27
Initial S/W Revision	A.14.00

BAND 28

Selects BAND 28 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND28
Initial S/W Revision	A.14.00

BAND 31

Selects BAND 31 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND31
Initial S/W Revision	A.14.00

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND 33

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

BAND 34

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

BAND 35

Selects BAND 35 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

BAND 36

Selects BAND 36 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

BAND 37

Selects BAND 37 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

BAND 38

Selects BAND 38 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

BAND 39

Selects BAND 39 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

BAND 40

Selects BAND 40 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

BAND 41

Selects BAND 41 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

BAND 42

Selects BAND 42 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

BAND 43

Selects BAND 43 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

BAND 44

Selects BAND 44 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND44
Initial S/W Revision	A.14.00

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND A

Selects BAND A as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

BAND B

Selects BAND B as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

BAND C

Selects BAND C as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

BAND D

Selects BAND D as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

BAND E

Selects BAND E as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

BAND F

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

Radio Band Link

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the

source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

Key Path	Source, Frequency, Radio Setup
Remote Command	:SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK?
Example	:SOUR:RAD:BAND:LINK UP
Preset	DOWN
Range	DOWN UP
Backwards Compatibility SCPI	:SOURce:RADio:DEvice BTS MS :SOURce:RADio:DEvice?
Backwards Compatibility Notes	BTS maps to the Downlink frequency MS maps to the Uplink frequency
Initial S/W Revision	A.05.00

Set Reference Frequency

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency – entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

NOTE

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

Key Path	Source, Frequency

Remote Command	:SOURce:FREQuency:REFErence:SET
Example	:SOUR:FREQ:REF:SET
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Initial S/W Revision	A.05.00

Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency + entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 1531](#)

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:REFErence <freq> :SOURce:FREQuency:REFErence? :SOURce:FREQuency:REFErence:STATe OFF ON 0 1 :SOURce:FREQuency:REFErence:STATe?
Example	:SOUR:FREQ:REF 0.00 Hz :SOUR:FREQ:REF:STATe ON
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Couplings	The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON.
Preset	0.00 Hz OFF
Min	0.00 Hz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source>Frequency>Frequency

offset value equals the value entered under Source>Frequency>Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source>Frequency>Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source>Frequency>Frequency

offset frequency equals the value previously entered and set under Source>Frequency>Freq Offset

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:OFFSet <freq> :SOURce:FREQuency:OFFSet?
Example	:SOUR:FREQ:OFFS 0 Hz
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0 Hz
Min	-100.00 GHz
Max	100.00 GHz
Initial S/W Revision	A.05.00

Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 1534, "AM" on page 1580, "FM" on page 1582, and "PM" on page 1583.

Key Path	Source
Initial S/W Revision	A.05.00

ARB

Allows you access to the ARB sub-menus.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a “MOD” annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe]?
Example	:SOUR:RAD:ARB OFF :SOUR:RAD:ARB?
Notes	If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Dependencies	This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 1585 Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 1585 Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately. The ARB can only be turned on when there is a waveform file selected for playback. On the GUI If no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. "- When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported
Couplings	If "Real-Time AWGN" on page 1545 AWGN State is On and this setting is On, "RF Power" on page 1499 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 1546 Power Control Mode and other noise settings
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00
Modified at S/W Revision	A.16.00 (Add couplings with AWGN state)

Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Remote Command	:SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform?
Example	:SOUR:RAD:ARB:WAV "test_waveform.bin"
Notes	If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB. When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated . When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and none of the waveform segments is loaded. If the ARB is ON, and you attempt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On. If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generated and the file selection remains unchanged. If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated. error is generated. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this

	case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMORY:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
Notes	<string> - specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error. When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated. If you specify a directory over SCPI, but the directory does not exist, an error is generated. If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for

selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated. It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated. When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 1584 and "Sequencer" on page 1585 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

NOTE

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use "Query ARB Memory Full File List (Remote Command Only)" on page 1539.

Remote Command	:SOURce:RADio:ARB:CATalog?
Example	:SOUR:RAD:ARB:CATalog?
Notes	The return data is in the following format: <integer> - memory used <integer> - memory free <string> ... - comma separated list of waveform segments within ARB memory
Initial S/W Revision	A.05.00

Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

Remote Command	:SOURce:RADio:ARB:FCATalog?
Example	:SOUR:RAD:ARB:FCATalog?
Notes	The return data is in the following format: <integer> - memory used

	<integer> - memory free <integer> - file count in ARB memory <string>,<string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm"
Initial S/W Revision	A.09.00

ARB Setup

Allows access to the ARB setup sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Sample Rate

Allows you to set the ARB waveform playback sample rate.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE?
Example	:SOUR:RAD:ARB:SCL:RATE 48.00 MHz
Notes	If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing.
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	125.00 MHz
Min	1.00 kHz
Max	125.00 MHz
Initial S/W Revision	A.05.00

Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

Key Path	Source, Modulation Setup, ARB, ARB Setup

Remote Command	:SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling?
Example	:SOUR:RAD:ARB:RSC 100.00
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	70.00 %
Min	1.00 %
Max	100.00 %
Initial S/W Revision	A.05.00

Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet?
Example	:SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	0.00 Hz
Min	-50.00 MHz
Max	50.00 MHz
Initial S/W Revision	A.05.00

Edit RMS

Allows you to edit or calculate current RMS of selected waveform.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Initial S/W Revision	A.14.50

Current RMS

Allows you to directly specify current RMS value used to playback currently selected waveform. Please note incorrect RMS value may cause inaccurate power output in E6640A that is sensitive to RMS value.

This setting is also updated by RMS in waveform header or updated when invoking RMS calculation operation.

This setting can be saved to the header of currently selected waveform by invoking ["Save Setup To Header" on page 1579](#) "Save Setup To Header".

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS
Remote Command	:SOURce:RADio:ARB:RMS <float> :SOURce:RADio:ARB:RMS?
Example	:SOUR:RAD:ARB:HEAD:RMS 0.7 :SOUR:RAD:ARB:HEAD:RMS?
Notes	Valid range is 0 to 1.414, values outside the range will be clipped to the closest boundary. Note this value does not affect "List Sequencer" on page 1584 Source List Sequencer that always uses RMS value resides in each ARB header. If want this value to take effect in list sequencer, use "Save Setup To Header" on page 1579 "Save Setup to Header" to save current RMS value to header first, then play the ARB in source list sequencer.
Dependencies	When a new waveform is selected for playback, this setting is updated by the RMS value defined in associated waveform header file. If selected waveform has no associated header file or header file does not specify RMS value, then instrument will try to calculate out one automatically. Calculating RMS can also update this setting.
Preset	0
Range	0 ~ 1.414
Initial S/W Revision	A.14.50

RMS Calculation Mode

Allows you to specify the mode to calculate the current RMS.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS
Remote Command	:SOURce:RADio:ARB:RMS:CALCulation:MODE AUTO M1 M2 M3 M4 :SOURce:RADio:ARB:RMS:CALCulation:MODE?
Example	:SOUR:RAD:ARB:RMS:CALC:MODE AUTO
Notes	If no waveform is selected, or selected waveform is waveform sequence, the key will grey out.
Preset	AUTO
Range	AUTO M1 M2 M3 M4
Initial S/W Revision	A.14.50

Auto

RMS will be calculated based on the whole sample range of current selected waveform.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode
Example	:SOUR:RAD:ARB:RMS:CALC:MODE AUTO
Initial S/W Revision	A.14.50

Marker 1

Selects marker 1 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker
Example	:SOUR:RAD:ARB:RMS:CALC:MODE M1
Initial S/W Revision	A.14.50

Marker 2

Selects marker 2 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker
Example	:SOUR:RAD:ARB:RMS:CALC:MODE M2
Initial S/W Revision	A.14.50

Marker 3

Selects marker 3 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker
Example	:SOUR:RAD:ARB:RMS:CALC:MODE M3
Initial S/W Revision	A.14.50

Marker 4

Selects marker 4 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker
Example	:SOUR:RAD:ARB:RMS:CALC:MODE M4
Initial S/W Revision	A.14.50

Calculate RMS

Allows you to calculate current RMS based on mode selected. This will update ["Current RMS" on page 1542](#) Current RMS setting.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS
Remote Command	:SOURce:RADio:ARB:RMS:CALCulate
Example	:SOUR:RAD:ARB:RMS:CALC
Notes	If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”. If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 1542 “RMS Calculation Mode” is set to marker, under this circumstance, invoking calculation operation will get error “-221 Setting conflict; There is no marker for currently selected waveform, auto RMS calculation mode is used instead”, and "RMS Calculation Mode" on page 1542 “RMS Calculation Mode” will be coupled to “Auto” mode automatically. RMS calculation does not suit for waveform sequence. If selected waveform is waveform sequence file, invoking this operation will get error “-221 Setting conflict; RMS calculation does not apply to waveform sequence”. But users can still edit current RMS as play parameter, and can save current RMS to waveform sequence header for later use.
Initial S/W Revision	A.14.50

Use Header RMS

Allows you to quickly set RMS in ARB header to ["Current RMS" on page 1542](#) Current RMS setting.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS,
Notes	No remote command, front panel only. If no waveform is selected, the key will grey out. If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.
Initial S/W Revision	A.14.50

Real-Time AWGN Setup

The source allows you to apply additive white Gaussian noise (AWGN) to a carrier in real time while the modulating waveform plays in the dual ARB player. Pressing this key allows access to the real time AWGN sub-menus and changes the central display area to show the AWGN Setup view.

This feature is controlled by E6650A-AW1 option

Key Path	Source, Modulation Setup, ARB, ARB Setup
Notes	This menu only appears and related SCPIs are only available when E6650A-AW1 option presents.
Initial S/W Revision	A.16.00

Real-Time AWGN

Allows you to enable or disable adding real-time AWGN to the carrier modulated by the waveform currently being played by the dual ARB.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe[:STATe] ON OFF 1 0 :SOURce:RADio:ARB:NOISe[:STATe]?
Example	:SOUR:RAD:ARB:NOIS OFF
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN state is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN state is updated with the value from the header file. The AWGN state will remain unchanged if the newly selected waveform does not have an associated header file.
Couplings	If this setting is On and "ARB" on page 1534 ARB State is On, "RF Power" on page 1499 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 1546 Power Control Mode and other noise settings
Preset	Off
Range	On Off
Initial S/W Revision	A.16.00

Carrier To Noise Ratio

Allows you to specify the carrier to noise ratio (C/N) in dB. The carrier power is defined as the total modulated signal power without noise power added. The noise power is applied over the specified bandwidth of the carrier signal.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:CN <ampl> :SOURce:RADio:ARB:NOISe:CN?
Example	:SOUR:RAD:ARB:NOIS:CN 0.00 dB
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN C/N ratio is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN C/N ratio is updated with the value from the header file. The AWGN C/N ratio will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	0.00 dB
Min	-100.00 dB
Max	100.00 dB
Initial S/W Revision	A.16.00

Carrier Bandwidth

Allows you to specify the bandwidth over which the AWGN is applied. The carrier RMS power and the noise power are integrated over the selected carrier bandwidth for the purpose of calculating carrier to noise ratio (C/N).

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:CBWidth <freq> :SOURce:RADio:ARB:NOISe:CBWidth?
Example	:SOUR:RAD:ARB:NOIS:CBW 1.00 Hz
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file.
Min	1.00 Hz
Max	200.00 MHz
Initial S/W Revision	A.16.00

Noise Bandwidth

Allows you to specify the flat noise bandwidth of the real-time noise for an ARB waveform.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:BANDwidth <freq> :SOURce:RADio:ARB:NOISe:BANDwidth?
Example	:SOUR:RAD:ARB:NOIS:BAND 1.00 Hz
Notes	Generally, flat noise bandwidth should be set slightly wider than the carrier bandwidth (typically 1.6 times wider)
Notes	Max Noise Bandwidth equals $0.8 * \text{Maximum ARB Sample Rate}$ reported in HW capability
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	1.00 Hz
Min	1.00 Hz
Max	160.00 MHz
Initial S/W Revision	A.16.00

Power Control Mode

This setting offers four ways to control the RF output power when adding AWGN to a signal.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:POWer:CONTRol[:MODE] TOTal CARRier NOISe NCHannel :SOURce:RADio:ARB:NOISe: POWer:CONTRol[:MODE]?
Example	:SOUR:RAD:ARB:NOIS:POW:CONT NCHannel :SOUR:RAD:ARB:NOIS:POW:CONT?
Preset	TOTal
Range	Total Power Carrier Power Total Noise Power Noise Power in Channel
Initial S/W Revision	A.16.00

Total

Set the power control mode as total power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT TOTAl
Couplings	Set to this value will make Carrier Power Carrier Power, Total Noise Power Total Noise Power, and Channel Noise Power Channel Noise Power buttons invisible on menu. Selecting Total as the power control mode makes the total power and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the total power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the total power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Carrier

Set the power control mode as carrier power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT CARRier
Couplings	Set to this value will make Carrier Power Carrier Power button visible, while Total Noise Power Total Noise Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Carrier as the power control mode makes the carrier power and C/N independent variables while making the total power and total noise power dependent variables. The dependent variables total power and total noise power are set by the carrier power, C/N, and the rest of the Noise settings. The total power and total noise power change as any noise parameter is adjusted to keep the carrier power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Total Noise

Set the power control mode as total noise power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT NOISe
Couplings	Set to this value will make Total Noise Power Total Noise Power button visible, while Carrier Power Carrier Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Total Noise as the power control mode makes the total noise power and C/N independent variables while making the total power and carrier power dependent variables. The dependent variables total power and carrier power are set by the total noise power, C/N, and the rest of the Noise settings. The total power and carrier power change as any noise parameter is adjusted to keep the total noise power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Channel Noise

Set the power control mode as channel noise power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT NCHannel
Couplings	Set to this value will make Channel Noise Power Channel Noise Power button visible, while Total Noise Power Total Noise Power and Carrier Power Carrier Power buttons invisible from menu. Selecting Channel Noise as the power control mode makes the noise power in channel and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the channel noise power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the channel noise power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE CONTInuous SINGLE SADVance :SOURce:RADio:ARB:TRIGger:TYPE?
Example	:SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE?
Notes	Gated trigger type will be implemented at a later release
Preset	CONTInuous
Range	Continuous Single Seg Adv
Initial S/W Revision	A.05.00

Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE] FREE TRIGger RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE]?
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Preset	FREE
Range	Free Run Trigger + Run Reset + Run
Initial S/W Revision	A.05.00

Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Initial S/W Revision	A.05.00

Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG
Initial S/W Revision	A.05.00

Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT RES
Initial S/W Revision	A.05.00

Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:RETRigger ON OFF IMMediate :SOURce:RADio:ARB:RETRigger?
Example	:SOUR:RAD:ARB:RETR OFF
Notes	ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1.
Preset	ON
Range	No Retrigger Buffered Trigger Restart on Trigger
Initial S/W Revision	A.05.00

No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
Example	:SOUR:RAD:ARB:RETR OFF
Initial S/W Revision	A.05.00

Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
Example	:SOUR:RAD:ARB:RETR ON
Initial S/W Revision	A.05.00

Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
Example	:SOUR:RAD:ARB:RETR IMM
Initial S/W Revision	A.05.00

Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE CONTInuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] ?
Example	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
Preset	CONTInuous
Range	Single Continuous
Initial S/W Revision	A.05.00

Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
Example	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
Initial S/W Revision	A.05.00

Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
Example	:SOUR:RAD:ARB:TRIG:TYPE:SADV CONT
Initial S/W Revision	A.05.00

Trigger Source

The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXternal2 :SOURce:RADio:ARB:TRIGger[:SOURce] ?
Example	:SOUR:RAD:ARB:TRIGger KEY
Dependencies	This key is grayed out if the current trigger type is Continuous, Free Run.
Preset	EXternal2
Range	Trigger Key Bus External 2
Initial S/W Revision	A.05.00

Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger KEY
Initial S/W Revision	A.05.00

Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger BUS
Initial S/W Revision	A.05.00

External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger EXT2
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

Key Path	Source, Modulation Setup , ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty.
Initial S/W Revision	A.05.00

Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the

same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
Notes	<string> - specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error. When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated. If you specify a directory over SCPI, but the directory does not exist, an error is generated. If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated. It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated. When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated. If you attempt to delete all files from ARB memory when there are waveform files used in "List

Sequencer" on page 1584 and **"Sequencer" on page 1585** state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as **"Segments on Hard Disk" on page 1610**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform

Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as **"Load Segment To ARB Memory" on page 1610**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as **"Load All To ARB Memory" on page 1611**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as **"Change Directory..." on page 1612**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as **"Default Directory..." on page 1612**

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 1612.](#)

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Initial S/W Revision	Prior to A.09.00

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 1613.](#)

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 1613.](#)

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 1539.](#)

Initial S/W Revision	Prior to A.09.00

Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, SCPI front panel only.
Preset	1
Min	1
Max	65535
Initial S/W Revision	A.05.00

Marker 1

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Delete Segment

Allows you to delete the selected segment from the waveform sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Save Sequence...

Pressing this key displays the “Save As” dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Initial S/W Revision	A.05.00

Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in ["Build New Sequence" on page 1553](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) "NVWFM" or use a real full path representation. See the example below. MSUS "NVWFM" is mapped to D: VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

Remote Command	<pre>:SOURce:RADio:ARB:SEquence[:MWAVeform] <filename>, <waveform1>, <reps>, NONE M1 M2 M3 M4 M1M2 M1M3 M1M4 M2M3 M2M4 M3M4 M1M2M3 M1M2M4 M1M3M4 M2M3M4 M1M2M3M4 ALL, {<waveform2>, <reps>, NONE M1 M2 M3 M4 M1M2 M1M3 M1M4 M2M3 M2M4 M3M4 M1M2M3 M1M2M4 M1M3M4 M2M3M4 M1M2M3M4 ALL, } ...</pre> (For additional description of each item, see Notes below "For Setup SCPI" on page 992 "For Setup SCPI".) <pre>:SOURce:RADio:ARB:SEquence[:MWAVeform]? <filename></pre> (For additional description of each item, see Notes "For Query SCPI" on page 993 below.)
Example	For setup: <pre>>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1M3</pre> Or <pre>>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", "D: VARB\wfmSegment1.wfm", 10, M2M3M4, "D: VARB\wfmSegment2.wfm", 20, M1M3</pre> For query, must specify which waveform sequence file to query. <pre>>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"</pre> Or <pre>>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",</pre>

Notes	For Setup SCPI For the Setup SCPI command, the parameters are: <filename> - String Type This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example. <waveform1> - String Type This variable specifies the path and name of the first existing waveform segment. The path supports

MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE – This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 – these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL – This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not “.seq”, error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

>:SOUR:RAD:ARB:SEQ? “NVWFM:testSeq1.seq”,

<“wfmSegment1.wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3”,

Error Checks for Query SCPI command:

	If you do not specify a filename, an error is generated. If the waveform sequence file name is empty, an error is generated. If the specified waveform sequence file cannot be found, an error is generated.
Initial S/W Revision	A.05.00

Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Waveform Utilities

Allows you access to the waveform utilities sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. "Left" module for E6630A or "TRX1" module for E6640A.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities
Dependencies	This key is only available if there is at least one Multi-pack license installed on the instrument.
Initial S/W Revision	A.05.00

Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if there is at least one slot available within at least one multi-pack license.
Initial S/W Revision	A.05.00

Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
Remote Command	:SYSTem:LKEY:WAVEform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVEform:ADD <string>
Example	SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm"
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVEform:ADD is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. .
Dependencies	This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable.
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
Notes	<string> - specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error. When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated. If you specify a directory over SCPI, but the directory does not exist, an error is generated. If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles"

	:SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1611](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as ["Change Directory..." on page 1612](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as ["Default Directory..." on page 1612](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision	A.05.00

Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Remote Command	:SYSTem:LKEY:WAVeform:REPLace <int>, <string> or :SYSTem:LIcense[:FPACK]:WAVeform:REPLace <int>, <string>
Example	SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" or :SYST:LIC:WAV:REPL 1, "myotherwaveform.wfm"
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Keysight signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.
Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1611](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as ["Change Directory..." on page 1612](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as ["Default Directory..." on page 1612](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Remote Command	<code>:SYSTem:LKEY:WAVeform:CLEar <int></code> or <code>:SYSTem:LICense[:FPack]:WAVeform:CLEar <int></code>
Example	<code>SYST:LKEY:WAV:CLE 1</code> or <code>:SYST:LIC:WAV:CLE 1</code>
Notes	The second SCPI <code>:SYSTem:LICense[:FPack]:WAVeform:CLEar</code> is provided to be consistent with the style of Keysight signal sources. You can use either one of them.

Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

Dependencies	This key is only available if the currently selected slot is in the trial state.

Initial S/W Revision	A.05.00

Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Remote Command	:SYSTem:LKEY:WAVEform:LOCK <int> or :SYSTem:LICense[:FPACK]:WAVEform:LOCK <int>
Example	SYST:LKEY:WAV:LOCK 1 or SYST:LIC:WAV:LOCK 1
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVEform:LOCK is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.
Dependencies	This key is only available if the currently selected slot is in the trial state or the lock required state.
Initial S/W Revision	A.05.00

Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

Remote Command	:SYSTem:LKEY:WAVEform:STATus? <int> or :SYSTem:LICense[:FPACK]:WAVEform:STATus? <int>
Example	:SYST:LKEY:WAV:STAT? 1 <"Locked" or :SYST:LIC:WAV:STAT? 1 <"Locked"
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVEform:STATus is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

	error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.
Range	"Locked" "Available" "Trail" "LockRequired" "Nonexistent"
Initial S/W Revision	A.05.00

Slots Free Query (Remote Command Only)

Returns the number of license slots free.

Remote Command	:SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LIcense[:FPACK]:WAVeform:FREE?
Example	:SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE?
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Initial S/W Revision	A.05.00

Slot Used Query (Remote Command Only)

Returns the number of license slots used.

Remote Command	:SYSTem:LKEY:WAVeform:USED? or :SYSTem:LIcense[:FPACK]:WAVeform:USED?
Example	:SYST:LKEY:WAV:USED? or :SYST:LIC:WAV:USED?
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Initial S/W Revision	A.05.00

Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

Remote Command	:SYSTem:LKEY:WAVeform:NAME? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int>

Example	:SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm" or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then empty string is returned.
Initial S/W Revision	A.12.00

Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

Remote Command	:SYSTem:LKEY:WAVeform:UID? <int> or :SYSTem:LICense[:FPACK]:WAVeform:UID? <int>
Example	:SYST:LKEY:WAV:UID? 2 <"1346752140" or :SYST:LIC:WAV:UID? 2 <"1346752140"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then "0" is returned
Initial S/W Revision	A.12.00

Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

Remote Command	:SOURce:RADio:ARB:MPLicensed:NAME:LOCKed?
Example	SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm"
Initial S/W Revision	A.11.00

Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

Remote Command	:SOURce:RADio:ARB:MPLicensed:UID:LOCKed?
Example	SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136","3812603511","3710986266"
Notes	Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list
Initial S/W Revision	A.11.00

Marker Utilities

Allows access to the marker utilities sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

Key Path	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

Mkr 1 Polarity

Allows you to set the polarity of marker 1.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1?
Example	:SOUR:RAD:ARB:MPOL:MARK1 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Mkr 2 Polarity

Allows you to set the polarity of marker 2.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2?
Example	:SOUR:RAD:ARB:MPOL:MARK2 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Mkr 3 Polarity

Allows you to set the polarity of marker 3.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3?
Example	:SOUR:RAD:ARB:MPOL:MARK3 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Mkr 4 Polarity

Allows you to set the polarity of marker 4.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4?

Example	:SOUR:RAD:ARB:MPOL:MARK4 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

Key Path	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting maker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
Remote Command	:SOURce:RADio:ARB:MDEStination:PULSe NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:PULSe?
Example	:SOUR:RAD:ARB:MDES:PULS NONE
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range	None M1 M2 M3 M4
Initial S/W Revision	A.05.00

None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision	A.05.00

Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision	A.05.00

Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision	A.05.00

Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
Remote Command	:SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold?
Example	:SOUR:RAD:ARB:MDES:ALCH NONE
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range	None M1 M2 M3 M4
Initial S/W Revision	A.05.00

None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision	A.05.00

Marker 1

Sets marker 1 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision	A.05.00

Marker 2

Sets marker 2 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision	A.05.00

Marker 3

Sets marker 3 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

Marker 4

Sets marker 4 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

Key Path	Source, Modulation Setup, ARB, Header Utilities
Remote Command	:SOURce:RADio:ARB:HEADer:CLEar
Example	:SOUR:RAD:ARB:HEAD:CLE
Notes	Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error.
Initial S/W Revision	A.05.00

Save Setup To Header

Allows you to save new file header information details to the file.

Key Path	Source, Modulation Setup, ARB, Header Utilities
Remote Command	:SOURce:RADio:ARB:HEADer:SAVE
Example	:SOUR:RAD:ARB:HEAD:SAVE
Notes	Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error.
Initial S/W Revision	A.05.00
Modified at S/W Revision	A.16.00 (AWGN settings will be saved to header as well)

Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

Remote Command	:MMEMory:HEADer:ID? "<file name>"
Example	:MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS)
Notes	SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk. If the file cannot be found in ARB memory or on hard disk, an error is generated and value -1 is returned
Initial S/W Revision	A.09.00

Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

Remote Command	:SOURce:RADio:ARB:TRIGger:INITiate
Example	:SOUR:RAD:ARB:TRIG:INIT
Initial S/W Revision	A.05.00

AM

Allows access to the menu for configuring the Amplitude Modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, AM
Remote Command	:SOURce:AM:STATe :SOURce:AM:STATe?
Example	:SOUR:AM:STAT OFF
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

AM Depth

Allows you to set the amplitude modulation depth in percent.

Key Path	Source, Modulation Setup, AM
Remote Command	:SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear]?
Example	:SOUR:AM 0.1
Preset	0.1 %
Min	0.1 %
Max	95.0 %
Initial S/W Revision	A.05.00

AM Rate

Allows you to set the internal amplitude modulation rate.

Key Path	Source, Modulation Setup, AM
Remote Command	:SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency?
Example	:SOUR:AM:INT:FREQ 40.0 Hz

Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

FM

Allows access to the menu for configuring the frequency modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, FM
Remote Command	:SOURce:FM:STATe :SOURce:FM:STATe?
Example	:SOUR:FM:STAT OFF
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

FM Deviation

Allows you to set the frequency modulation deviation.

Key Path	Source, Modulation Setup, FM
Remote Command	:SOURce:FM[:DEViation] :SOURce:FM[:DEViation]?
Example	:SOUR:FM 1.00 kHz
Preset	1.00 Hz
Min	1.00 Hz
Max	100.00 kHz
Initial S/W Revision	A.05.00

FM Rate

Allows you to set the internal frequency modulation rate.

Key Path	Source, Modulation Setup, FM
Remote Command	:SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency?
Example	:SOUR:FM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

PM

Allows access to the menu for configuring the phase modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM:STATe :SOURce:PM:STATe?
Example	:SOUR:PM:STAT OFF
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

PM Deviation

Allows you to set the phase modulation deviation.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM[:DEViation] :SOURce:PM[:DEViation]?

Example	:SOUR:PM 1.00 rad
Preset	0.1 rad
Min	0.1 rad
Max	20.0 rad
Initial S/W Revision	A.05.00

PM Rate

Allows you to set the internal phase modulation rate.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency?
Example	:SOUR:PM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a tabular form. The details of the SCPI for configuring the list sequencer can be found in "[Step Configuration \(Remote Command Only\)](#)" on page 1618.

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

Key Path	Source
Initial S/W Revision	A.05.00

Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe] ?
Example	:SOUR:LIST OFF
Notes	When the sequencer is set to ON, the list sequencer controls the output of the source.
Couplings	When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected.
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST:TRIGger[:IMMediate]
Example	:SOUR:LIST:TRIG
Notes	When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " Query List Sequence Initiation Armed Status (Remote Command Only) " on page 1629 Query Source List Sequence Armed Status)
Dependencies	Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled.
Initial S/W Revision	A.05.00

List Sequencer Setup

Allows you access to the list sequencer setup menus.

Key Path	Source, List Sequencer

Number of Steps

Allows you to specify the number of steps within the list sequence.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:NUMBer:STEPs <integer> :SOURce:LIST:NUMBer:STEPs?
Example	:SOUR:LIST:NUMB:STEP 1
Notes	Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps.
Dependencies	The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer.
Preset	1
Min	1
Max	1000
Initial S/W Revision	A.05.00

Current Step

Allows you to select the step number you wish to view or edit.

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only.
Preset	1
Min	1
Max	Step Count
Initial S/W Revision	A.05.00

Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of

1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key.
Initial S/W Revision	A.05.00

Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key
Initial S/W Revision	A.05.00

Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

Key Path	Source, List Sequencer, List Sequencer Setup
Initial S/W Revision	A.05.00

Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE INTERNAL EXTERNAL2 KEY BUS EXTERNAL4 :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger?
Example	:SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Free Run
Range	Free Run Internal Manual (Trigger Key) Bus External 2 EXTERNAL4
Initial S/W Revision	A.05.00

Free Run

Sets the trigger input for the current step to Free Run.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG IMM
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Internal

Sets the trigger input for the current step to Internal.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG INT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG KEY
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG BUS
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

External 2

Sets the trigger input for the current step to External 2.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG EXT2
Notes	SCPI is supported after A.09.40
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

Value Changed	Recommended Transition Time
Frequency	500 μ s
Amplitude	100 μ s to within 0.1 dB 20 μ s to within 1.0 dB

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME?
Example	:SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME?

Notes	SCPI is supported after A.09.40
Preset	1.0 ms
Min	0.0 ms
Max	4.0 ks
Initial S/W Revision	A.05.00

Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
Remote Command	:SOURCE:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND27 BAND28 BAND29 BAND30 BAND31 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BAND44 BANDA BANDB BANDC BANDD BANDE BANDF :SOURCE:LIST:STEP[1] 2 3...1000:SETup: RADio:BAND?
Example	:SOUR:LIST:STEP2:SET:RAD:BAND PGSM :SOUR:LIST:STEP2:SET:RAD:BAND?
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

None

Selects no radio standard for use on the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Example	:SOUR:LIST:STEP2:SET:RAD:BAND NONE
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

P-GSM

Selects P-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

E-GSM

Selects E-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

R-GSM

Selects R-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

DCS 1800

Selects DCS 1800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

PCS 1900

Selects PCS 1900 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 450

Selects GSM 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 480

Selects GSM 480 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 850

Selects GSM 850 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 700

Selects GSM 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

T-GSM 810

Selects T-GSM 810 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

Band I

Selects Band I as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band II

Selects Band II as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band III

Selects Band III as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band IV

Selects Band IV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band V

Selects Band V as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band VI

Selects Band VI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band VII

Selects Band VII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band VIII

Selects Band VIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band IX

Selects Band IX as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band X

Selects Band X as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XI

Selects Band XI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XII

Selects Band XII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XIII

Selects Band XIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XIV

Selects Band XIV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

US CELL

Selects US Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

US PCS

Selects US PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Japan Cell

Selects Japan Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Korean PCS

Selects Korean PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

NMT 450

Selects NMT 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

IMT 2000

Selects IMT 2000 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Upper 700

Selects Upper 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Secondary 800

Selects Secondary 800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

400 Euro PAMR

Selects 400 Euro PAMR as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

800 PAMR

Selects 800 PAMR as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

AWS

Selects AWS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

700 Public Safety

Selects 700 Public Safety as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

LTE

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

BAND 1

Selects BAND 1 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 2

Selects BAND 2 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 3

Selects BAND 3 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 4

Selects BAND 4 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 5

Selects BAND 5 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 6

Selects BAND 6 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 7

Selects BAND 7 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 8

Selects BAND 8 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 9

Selects BAND 9 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 10

Selects BAND 10 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 11

Selects BAND 11 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 12

Selects BAND 12 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 13

Selects BAND 13 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 14

Selects BAND 14 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 17

Selects BAND 17 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 18

Selects BAND 18 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 19

Selects BAND 19 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 20

Selects BAND 20 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 21

Selects BAND 21 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 24

Selects BAND 24 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 25

Selects BAND 25 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 26

Selects BAND 26 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.12.53

BAND 27

Selects BAND 27 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

BAND 28

Selects BAND 28 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

BAND 31

Selects BAND 31 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND 33

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

BAND 34

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

BAND 35

Selects BAND 35 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

BAND 36

Selects BAND 36 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

BAND 37

Selects BAND 37 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

BAND 38

Selects BAND 38 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

BAND 39

Selects BAND 39 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

BAND 40

Selects BAND 40 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

BAND 41

Selects BAND 41 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

BAND 42

Selects BAND 42 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

BAND 43

Selects BAND 43 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

BAND 44

Selects BAND 44 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD
Initial S/W Revision	A.14.00

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND A

Selects BAND A as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

BAND B

Selects BAND B as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

BAND C

Selects BAND C as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

BAND D

Selects BAND D as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

BAND E

Selects BAND E as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

BAND F

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK?

Example	:SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK?
Notes	SCPI is supported after A.09.40
Preset	DOWN
Range	DOWN UP
Initial S/W Revision	A.05.00

Channel

Allows you to specify the frequency of the current step via a channel number.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency?
Example	:SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	0 (Please refer to for valid ranges.)
Max	10838 (Please refer to for valid ranges.)
Initial S/W Revision	A.05.00

Frequency

Allows you to specify a frequency value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency?
Example	:SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40.

	This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated.
Preset	1.00 GHz
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

Power

Allows you to specify a power value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude?
Example	:SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL?
Notes	SCPI is supported after A.09.40
Notes	Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON.
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Preset	-100 dBm

Min	The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 1499 and the table RF Power Range for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 1499 and the table RF Power Range for the valid ranges.
Initial S/W Revision	A.05.00

Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform <string> :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform?
Example	:SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV?
Notes	SCPI is supported after A.09.40
Remote Command Notes	String type, takes "Off" "CW" "Cont" "waveform name"
Preset	CW
Range	Waveform Continue Previous CW Off
Initial S/W Revision	A.05.00

CW

Sets the current step to output a CW tone.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "CW"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "waveform name"
Notes	SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list

sequence will automatically apply header settings of the selected waveform in that step.

Initial S/W Revision	A.05.00

Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "Cont"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Off

Disable RF output of the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "Off"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

"NVWFM" (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. "NVWFM" MSUS will be mapped to the

default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD “D: VARB\testwaveform.bin” or :SOUR:RAD:ARB:LOAD “NVWFM:testwaveform.bin”
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operation is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL “D: varb”
Notes	<string> – specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a

directory to ARB memory is rejected with an error.

When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.

If you specify a directory over SCPI, but the directory does not exist, an error is generated.

If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated. It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated. When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 1584 and "Sequencer" on page 1585 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1610](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1610](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1611](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as ["Change Directory..." on page 1612](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as ["Default Directory..." on page 1612](#)

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 1612](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory
Initial S/W Revision	Prior to A.09.00

Delete Segment From ARB Memory

This key functions the same as "Delete Segment From ARB Mem" on page 1613.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Delete All From ARB Memory

This key functions the same as "Delete All From ARB Memory" on page 1613.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME COUNT CONTInuous CABort :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE?
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE?
Notes	SCPI is supported after A.09.40
Notes	If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query Error! Reference source not found. Source Sweeping Condition Message to find out if the current list sequence is complete or not.
Range	Time Play Count Continuous Continuous Abort
Initial S/W Revision	A.05.00

Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found.** List Sequence Step Validation.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration, Time
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOunt <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOunt?
Example	:SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO?
Notes	SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #"
Notes	If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not.
Preset	1.00 ms
Min	100 μ s
Max	1800 s
Initial S/W Revision	A.05.00

Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE COUN
Notes	SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform.
Initial S/W Revision	A.05.00

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE CONT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select “On”, trigger event will occur on both Internal and External2 paths. Select “Off” will turn off trigger output.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON OFF 1 0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger
Example	:SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Off

Range	On Off
Initial S/W Revision	A.05.00

Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMEDIATE INTERNAL KEY BUS EXTERNAL2, <time>, NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF, DOWN UP, <freq>, <ampl>, <string>, TIME COUNT CONTinuous, <time>, ON OFF 1 0, [<int>], :SOURce:LIST:STEP[1] 2 ... 4..1000:SETup?</pre>
Example	:SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM_Test1.bin", TIME, 10ms, OFF, 255
Notes	The parameters are: (There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.) 1. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 1587. 2. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 1589. 3. Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 1590. 4. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 1606. 5. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 1607 and "Frequency" on page 1607. 6. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 1608. 7. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The

options for specifying these are:

<filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.

CONT - continues playback of the ARB file from the previous step

CW - outputs a CW tone

OFF - disable RF output

8. Step Duration <enum> - specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see ["Step Duration" on page 1615](#).

9. Time or Count <time/int> - specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, ["Time" on page 1615](#) and ["Play Count" on page 1616](#).

10. Output Trigger <Boolean> - specifies the output trigger for the step. For details of the ranges for this setting see ["Output Trigger" on page 1617](#).

Dependencies	The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 . If you attempt to remotely set or query a subopcode that is out of range, an error is generated.
Initial S/W Revision	A.05.00

Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Step Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:INPut:TRIGger?
Example	:SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG?
Notes	The command is to setup below parameter array of whole list sequence. Step Trigger <enum> - specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 1587 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes	IMMediate INTernal KEY BUS EXTernal2
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 1586 Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:TRANSition:TIME <time>, <time>, <time>, ... :SOURce:LIST:SETup:TRANSition:TIME?
Example	:SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms :SOUR:LIST:SET:TRAN:TIME?
Notes	The command is to setup below parameter array of whole list sequence. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 1589 If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586.
Initial S/W Revision	A.09.40

Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 1586 Number of Steps. As a step is setup, the value entered run through several levels of validation.

R e m o t e C o m m a n d	:SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND?
E x a m p l	:SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM :SOUR:LIST:SET:RAD:BAND?

e

N The command is to setup below parameter array of whole list sequence.

0 Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 1590.

t If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then
e generate error ", and only those parametes whose index number falls in number of steps will be updated.
s

R NONE|PGSM|EGSM|RGSM|DCS1800|PCS1900|TGSM810|GSM450|GSM480|GSM700|GSM850|BANDI|BANDII|BANDIII|BANDI
e V|BANDV|BANDVI|BANDVII|BANDVIII|BANDIX|BANDX|BANDXI|BANDXII|BANDXIII|BANDXIV|BANDXIX|USCELL|USPCS|JAPAN|KO
m REAN|NMT|IMT2K|UPPER|SECOND|PAMR400|PAMR800|IMTEXT|PCS1DOT9G|AWS|US2DOT5G|PUBLIC|LOWER|NONE|BAND1|
o BAND2|BAND3|BAND4|BAND5|BAND6|BAND7|BAND8|BAND10|BAND11|BAND12|BAND13|BAND14|BAND17|BAND18|BAND1
t 9|BAND20|BAND21|BAND24|BAND25|BAND26|BAND33|BAND34|BAND35|BAND36|BAND37|BAND38|BAND39|BAND40|BAN
e D41|BAND42|BAND43|BANDA|BANDB|BANDC|BANDD|BANDE|BANDF

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D The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on
e page 1586.

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Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK?
Example	:SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK?
Notes	The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 1606 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes	DOWN UP
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:CNFRequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFRequency?
Example	:SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR?

Notes	The command is to setup below parameter array of whole list sequence. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 1607 and "Frequency" on page 1607 This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?</pre>
Example	<pre>:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?</pre>
Notes	The command is to setup below parameter array of whole list sequence. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 1608. If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:SETup:WAVEform <string>, <string>, <string>, ...</pre>

	:SOURce:LIST:SETup:WAVeform?
Example	:SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV?
Notes	The command is to setup below parameter array of whole list sequence. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are: <filename> – plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it is does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated. CONT – continues playback of the ARB file from the previous step CW – outputs a CW tone OFF – disable RF output If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586.
Range	"filename" "CW" "Off" "CONT"
Initial S/W Revision	A.09.40

Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 1586 Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:DURation:TYPE <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:DURation:TYPE?
Example	:SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE?
Notes	The command is to setup below parameter array of whole list sequence. Step Duration <enum> – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 1615. If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes	TIME COUNT CONTinuous
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details

	see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure “Duration Time” or “Play Count” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:TOCount <time/int>, <time/int>, <time/int>, ... :SOURce:LIST:SETup:TOCount?
Example	:SOUR:LIST:SET:TOC 1s,2s,3s :SOUR:LIST:SET:TOC? :SOUR:LIST:SET:TOC 5,6,7 :SOUR:LIST:SET:TOC?
Notes	The command is to setup below parameter array of whole list sequence. Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "Time" on page 1615 and "Play Count" on page 1616 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. If current "Step Duration" on page 1615 is “Continuous”, then generate error -221,"Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Output Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ... :SOURce:LIST:SETup:OUTPut:TRIGger ?
Example	:SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON :SOUR:LIST:SET:OUTP:TRIG?
Notes	The command is to setup below parameter array of whole list sequence. Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see "Output Trigger" on page 1617 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in

	legal step number will be updated.
Remote Command Notes	ON OFF 1 0
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI feature described in.

Remote Command	:SOURce:LIST:SETup:CLEar
Example	:SOUR:LIST:SETup:CLE
Initial S/W Revision	A.05.00

Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST:TRIGgerout:TYPE BEGinningofstep DATamarker
Example	:SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP?
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer
Preset	BEGinningofstep
Range	BEGinningofstep DATamarker
Initial S/W Revision	A.14.00

BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type
Example	:SOUR:LIST:TRIG:TYP BEG
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP

Initial S/W Revision	A.14.00

DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

Key Path	Source, List Sequencer, Trigger Type
Example	:SOUR:LIST:TRIG:TYP DAT
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE MARKer
Initial S/W Revision	A.14.00

Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M1
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1
Initial S/W Revision	A.14.00

Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M2
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2
Initial S/W Revision	A.14.00

Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M3
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3
Initial S/W Revision	A.14.00

Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M4
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4
Initial S/W Revision	A.14.00

Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

Key Path	Source, List Sequencer
Remote Command	No remote command, front panel only.
Initial S/W Revision	A.05.00

Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to “Bus”. Sending this command will trigger the step and continue the sequence.

Remote Command	:SOURce:LIST:TRIGger:INITiate[:IMMediate]
Example	:SOUR:LIST:TRIG:INIT
Initial S/W Revision	A.05.00

Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

Remote Command	:SOURce:LIST:INITiation:ARMed?
Example	:SOUR:LIST:INIT:ARMed?
Notes	The return data is in the following format: Integer
Notes	Query only SCPI. Returning “1” if list sequence has been initiated successfully, returning “0” if not. Once get “0”, you can use :SYST:ERR? to query what error happened. Just like “*OPC?”, this command can be blocked until event/status “IsSourceSweeping” happens, and then returns. Doing so can help user’s script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI “:SOUR:LIST:TRIGger[:IMMediate]” (see "Initiate Sequence" on page 1585 Initiate Sequence), the right usage of this command is to use it after “:SOUR:LIST:TRIG”. If not, this command will return “1” immediately.
Notes	There is an alias SCPI “:SOURce:LIST:TRIGger:INITiation:ARMed?”.
Initial S/W Revision	A.09.40

Source Preset

Allows you to preset the source settings to their default values.

Key Path	Source
Remote Command	:SOURce:PRESet
Example	:SOUR:PRES

SPAN X Scale

Accesses a menu of functions that enable you to set the horizontal scale parameters

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Sweep/Control

Accesses a menu that enables you to configure the Sweep and Control functions of the analyzer, such as Acquisition Time and Gating.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing **Restart**, **Single** or **Cont** does a Resume.

Key Path	Sweep/Control
Remote Command	:INITiate:PAUSE
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

Key Path	Sweep/Control
Remote Command	:INITiate:RESume
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

Abort (Remote Command Only)

This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state. If the analyzer is in the process of aligning when ABORT is sent, the alignment finishes before the abort function is performed. So ABORT does not abort an alignment.

If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is set for Single measurement, it remains in the "idle" state until an :INIT:IMM command is received.

Remote Command	:ABORt
Example	:ABOR

Notes	If :INITiate:CONTInuous is ON, then a new continuous measurement will start immediately; with sweep (data acquisition) occurring once the trigger condition has been met. If :INITiate:CONTInuous is OFF, then :INITiate:IMMediate is used to start a single measurement; with sweep (data acquisition) occurring once the trigger condition has been met.
Dependencies	For continuous measurement, ABORt is equivalent to the Restart key. Not all measurements support the abort command.
Status Bits/OPC dependencies	The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUEStionable register bit 9 (INTEgrity sum) is cleared. Since all the bits that feed into OPC are cleared by the ABORt, the ABORt will cause the *OPC query to return true.
Initial S/W Revision	Prior to A.02.00

System

See "System" on page 162

Trigger

See ["Trigger" on page 218](#)

Free Run

See ["Free Run " on page 225](#)

Video

See ["Video \(IF Envelope\) " on page 226](#)

Trigger Level

See [___ on page X](#)

Trig Slope

See [___ on page X](#)

Trig Delay

See [___ on page X](#)

External 1

See ["External 1 " on page 226](#)

Trigger Level

See ["Trigger Level " on page 227](#)

Trig Slope

See ["Trig Slope " on page 227](#)

Trig Delay

See ["Trig Delay " on page 228](#)

Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off" on page 229](#)

External 2

See ["External 2 " on page 229](#)

Trigger Level

See [___ on page X](#)

Trig Slope

See [___ on page X](#)

Trig Delay

See [___ on page X](#)

Zero Span Delay Comp

See [___ on page X](#)

RF Burst

See "RF Burst " on page 230

Absolute Trigger

See [___ on page X](#)

Relative Trigger

See [___ on page X](#)

Trig Slope

See [___ on page X](#)

Trig Delay

See [___ on page X](#)

Periodic Timer

See [___ on page X](#)

Period

See [___ on page X](#)

Offset

See [___ on page X](#)

Offset Adjust (Remote Command Only)

See [___ on page X](#)

Reset Offset Display

See [___ on page X](#)

Sync Source

See [___ on page X](#)

Off

See [___ on page X](#)

External 1

See ["External 1 " on page 226](#)

Trigger Level

See ["Trigger Level " on page 227](#)

Trig Slope

See ["Trig Slope " on page 227](#)

External 2

See ["External 2 " on page 229](#)

Trigger Level

See [___ on page X](#)

Trig Slope

See [___ on page X](#)

RF Burst

See ["RF Burst " on page 230](#)

Absolute Trigger

See [___ on page X](#)

Trig Slope

See [___ on page X](#)

Trig Delay

See [___ on page X](#)

Auto/Holdoff

See [___ on page X](#)

Auto Trig

See [___ on page X](#)

Trig Holdoff

See [___ on page X](#)

Holdoff Type

See [___ on page X](#)

User Preset

Accesses a menu that gives you the following three choices:

- **User Preset** – recalls a state previously saved using the Save User Preset function.
- **User Preset All Modes** – presets all of the modes in the analyzer
- **Save User Preset**– saves the current state for the current mode

Key Path	Front-panel key
Backwards Compatibility Notes	User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data. In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users. On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode. User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.
Initial S/W Revision	Prior to A.02.00

User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, `SYST:PRESET:USER:SAV`. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER
Example	:SYST:PRES:USER:SAVE:SYST:PRES:USER
Notes	:SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed
Couplings	A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.
Initial S/W Revision	Prior to A.02.00

User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

NOTE

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER:ALL
Example	:SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL
Notes	Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state.
Couplings	A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.

Initial S/W Revision	Prior to A.02.00

Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER:SAVE
Example	:SYST:PRES:USER:SAVE
Notes	:SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM:STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file.
Initial S/W Revision	Prior to A.02.00

View Selection

The View/Display key accesses a menu that allows you to select the desired view of the measurement from the following selections.

- ORFS Result Summary (SCPI: RSUMmary) – views the result summary.
- Carrier Info (SCPI: CINfo) – views the carrier information.

The measurement has several available view types. The displayed view depends on the settings of **Meas Type** (see "[Meas Type](#)" on page 847) and **Meas Method** (see "[Meas Method](#)" on page 853), in the **Meas Setup** menu.

For details of each view, click the link in the View column of the table below. For remote commands, see "[View Selection by Name](#)" on page 1070 and "[View Selection by Number \(Remote Command Only\)](#)" on page 1071.

Meas Type Setting	Meas Method Setting	View
Modulation or Full Frame Mod (FAST)	Multi Offset	Modulation Power, Multi Offset (See Modulation Power)
Switching	Multi Offset	Switching Power, Multi Offset (See Switching Power)
Mod & Switch	Multi Offset	Modulation and Switching, Multi Offset (See Modulation & Switching)
Mod & Switch	Single Offset	Modulation and Switching, Single Offset (See Modulation & Switching)
Modulation	Single Offset	Modulation, Single Offset (See Modulation Power)
Switching	Single Offset	Switching, Single Offset (See Switching Power)
Modulation or Switching	Swept	Swept Spectrum (See Swept Spectrum Views)

For any view, if a result fails, a red 'F' is displayed beside the result.

View Selection by Name

See also "[View Selection by Number \(Remote Command Only\)](#)" on page 1071.

Key Path	View/Display
Mode	GSM
Remote Command	:DISPlay:EORFspectr:VIEW[:SElect] RSUMmary CINFormation :DISPlay:EORFspectr:VIEW[:SElect]?
Example	DISP:EORF:VIEW RSUM

	DISP:EORF:VIEW?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	RSUMmary
State Saved	Saved in instrument state.
Range	ORFS Result Summary Carrier Info
Initial S/W Revision	A.06.00

View Selection by Number (Remote Command Only)

Mode	GSM
Remote Command	:DISPlay:EORFSpectr:VIEW:NSElect <integer> :DISPlay:EORFSpectr:VIEW:NSElect?
Example	DISP:EORF:VIEW:NSEL 5 DISP:EORF:VIEW:NSEL?
Notes	5: ORFS Result Summary 6: Carrier Info You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	5
State Saved	Saved in instrument state.
Min	5
Max	6
Initial S/W Revision	A.06.00

Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the **System Display Settings** key apply to all measurements in all modes.

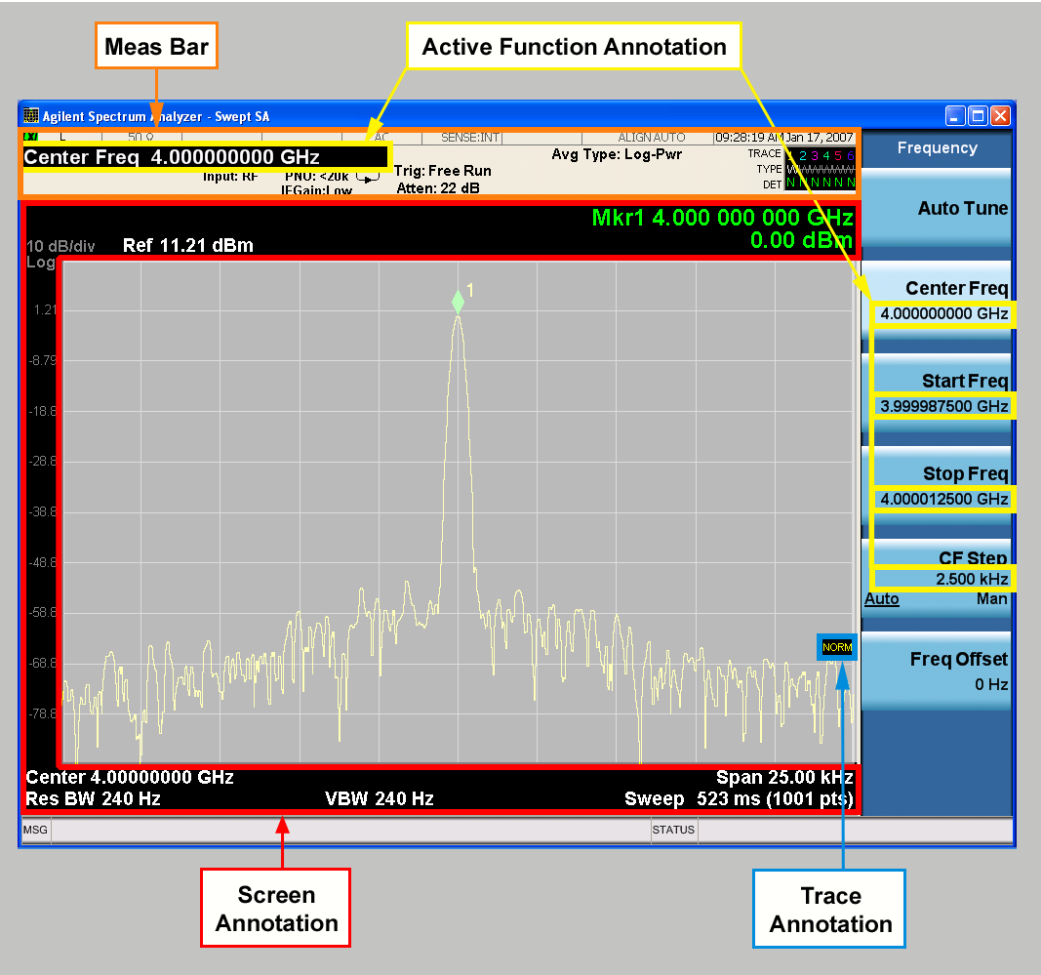
Key Path	Display
Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

- 1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
- 2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
- 3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
- 4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.



Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ANNotation:MBAR[:STATe] OFF ON 0 1 :DISPlay:ANNotation:MBAR[:STATe]?
Example	DISP:ANN:MBAR OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off.
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Screen

This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

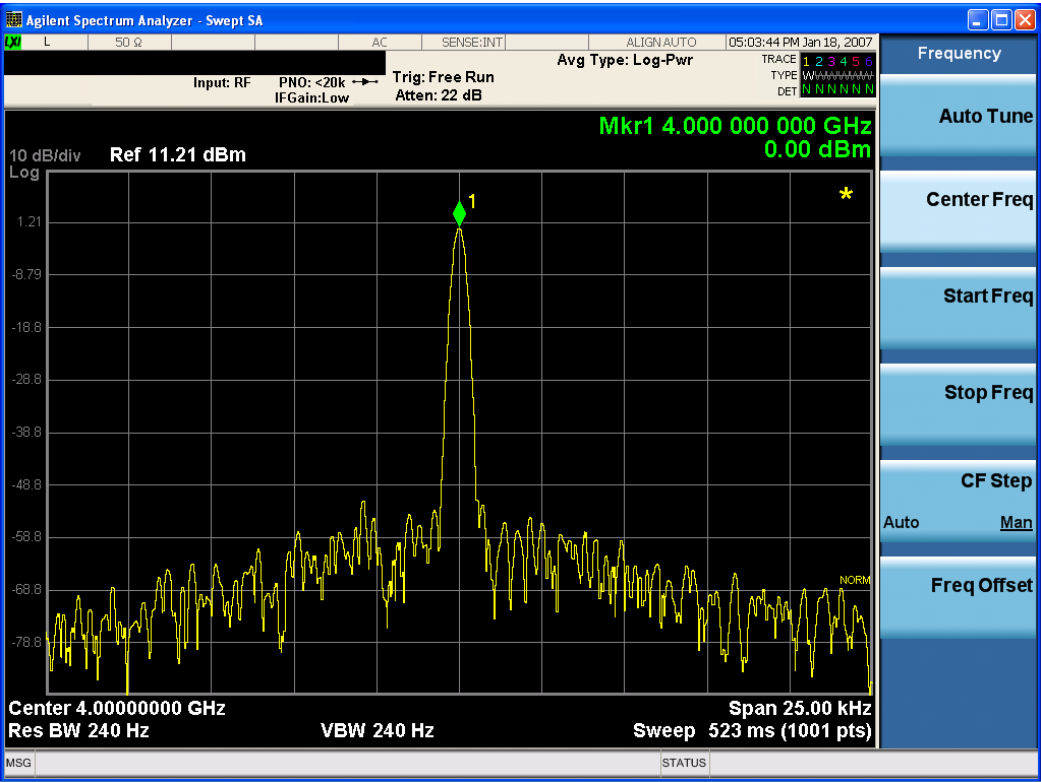
Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1 :DISPlay:ANNotation:SCReen[:STATe]?
Example	DISP:ANN:SCR OFF
Dependencies	Grayed-out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature..

10 EDGE Output RF Spectrum Measurement
View Selection



Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ACTivefunc[:STATe] ON OFF 1 0 :DISPlay:ACTivefunc[:STATe] ?
Example	DISP:ACT OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Title

Displays menu keys that enable you to change or clear a title on your display.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press **Change Title** to enter a new title through the alpha editor. Press **Enter** or **Return** to complete the entry. Press **ESC** to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press **Change Title** again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing **Title**, **Clear Title**.

NOTE

Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

Key Path	View/Display, Display, Title
Mode	All
Remote Command	:DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA?
Example	DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title
Notes	Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters.
Preset	No title (measurement name instead)
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Clear Title

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

Key Path	View/Display, Display, Title
Example	The following commands clear the title and restore the measurement's original title: DISP:ANN:TITL:DATA "" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "" This example is for ACP; in measurements other than Swept SA the measurement name is required.
Notes	Uses the :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> command with an empty string (in the Swept SA, the <measurement> is omitted).

Preset	Performed on Preset.
Initial S/W Revision	Prior to A.02.00

Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

Key Path	View/Display, Display
Remote Command	:DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1 :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]?
Example	DISP:WIND:TRAC:GRAT:GRID OFF
Notes	The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis.
Preset	On
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by **Restore Misc Defaults** or **Restore System Defaults** under System.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is **All Off**, it forces **ScreenAnnotation, Meas Bar, Trace, and Active Function Values** settings to be **OFF** for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is **All Off**, the **Screen, Meas Bar, Trace, and Active Function Values** keys under the **Display, Annotation** menu are grayed out and forced to **Off**. When **Local Settings** is selected, you are able to set the local annotation settings on a measurement by measurement basis.

Key Path	View/Display, Display, System Display Settings
Remote Command	:DISPlay:WINDow[1]:ANNotation[:ALL] OFF ON 0 1 :DISPlay:WINDow[1]:ANNotation[:ALL]?
Example	:DISP:WIND:ANN OFF

Preset	On (Set by Restore Misc Defaults)
State Saved	Not saved in instrument state.
Backwards Compatibility Notes	The WINDow parameter and optional subopcode is included for backwards compatibility but ignored – all windows are equally affected.
Initial S/W Revision	Prior to A.02.00

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

Key Path	Save, Screen Image
Remote Command	:MMEMory:STORe:SCReen:THEMe TDCOLOR TDMonochrome FCOLOR FMONochrome :MMEMory:STORe:SCReen:THEMe?
Example	:MMEM:STOR:SCR:THEM TDM
Preset	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
Readback	3D Color 3D Mono Flat Color Flat Mono
Backwards Compatibility Notes	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
Initial S/W Revision	Prior to A.02.00

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDC
Readback	3D Color
Initial S/W Revision	Prior to A.02.00

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDM
Readback	3D Mono
Initial S/W Revision	Prior to A.02.00

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

11 GSMK Phase and Frequency Measurement

Phase and frequency error are the measures of modulation quality for GSM systems. Since GSM systems use relative phase to transmit information, the phase and frequency accuracy of the transmitter are critical to the systems' performance and ultimately affect range.

This topic contains the following sections:

"Measurement Commands for GSMK Phase & Frequency" on page 1080

"Remote Command Results for GSMK Phase & Frequency" on page 1081

Measurement Commands for GMSK Phase & Frequency

The following commands and queries are used to retrieve the measurement results:

:CONFigure:PFERror

:CONFigure:PFERror:NDEFault

:INITiate:PFERror

:FETCh:PFERror[n]?

:READ:PFERror[n]?

:MEASure:PFERror[n]?

For more measurement related commands, see the section ["Remote Measurement Functions" on page 1430](#).

Remote Command Results for GMSK Phase & Frequency

For the queries listed above, the results returned depend on the value of n, as follows.

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
not specified or n = 1	Returns the 10 following scalar results: The result depends on the Average Type setting (Maximum or Mean) if the average state is ON. The average type is a remote command only parameter. Average type is: • Maximum (default setting) : Detected Maximum value in average cycle • Mean : Averaged value in average cycle 1. RMS Phase Error is a floating point number (in degrees) of the rms phase error between the measured phase and the ideal phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). 2. Peak Phase Error is a floating point number (in degrees) of the peak phase error of all the individual symbol decision points (prior to the rms averaging process). 3. Peak Phase Error Symbol Position is a floating point number (in symbols) representing the symbol number at which the peak phase error occurred. 4. Frequency Error is a floating point number (in Hz) of the frequency error in the measured signal. This is the difference between the measured phase trajectory and the reference phase trajectory. 5. I/Q Origin Offset is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. 6. Trace Phase Sample is a floating point number (in units of bits) representing the time between samples. It is used in querying phase error vector traces. 7. Trace bit 0 Decision Offset is an integer number in units of sample pairs for the sample points in an I/Q vector trace that represents the bit 0 (zero) decision point. The sample pairs in the trace are numbered 0 to N. 8. Trace Sync Start is an integer number in units of bits for the bit number, within the data bits trace, that represents the start of the sync word. 9. Trace Time Sample is a floating point number (in second) of the time between samples. It is used in querying time domain traces. For the n=0 trace, of acquired I/Q pairs, this is the time between pairs. 10. T0 Offset is a floating-point number of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot. Unit is sec.
2	Returns a series of floating point numbers (in degrees) that represent each sample in the phase error trace. The first number is the symbol 0 decision point and there are 10 points per symbol. Therefore, decision points are at 0, 10, 20, etc.
3	Returns a series of floating point numbers (in degrees) that represent each sample in the phase error with frequency trace. Phase error with frequency is the error vector between the measured phase (that has not had frequency compensation) and the ideal

n	Results Returned
	reference phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). The first number is the symbol 0 decision point and there are 10 points per symbol. Therefore, decision points are at 0, 10, 20, etc.
4	Returns a series of floating point numbers that represent each sample in the log magnitude trace of the original time record. Each number represents a value (in dBm) of the time record.
5	Returns a series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. As in the rms phase error, there are ten points per symbol, so that: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point ... 10th number = Q of the symbol 0 decision point 11th number = I of the symbol 1 decision point 12th number = Q of the symbol 1 decision point ... Nth number = Q of the symbol N decision point
6	Returns a series of logical values (0 or 1) that represent the demodulated bit value of the measured waveform. The first number is the symbol 0 decision point and there are 1 point per symbol. Therefore, decision points are at 0, 1, 2, etc.
7	Returns comma-separated scalar values of pass/fail (0.0 = passed, 1.0 = failed) results determined by testing Phase and Frequency Error. The tested results are changed between Maximum and Average. It depends on the Average Type (:PFER:AVER:TYPE) setting. 1. Test results of RMS Phase Error 2. Test results of Peak Phase Error 3. Test results of Frequency Error
8	Returns the following 22 scalar results: 1. Average RMS Phase Error is a floating point number (in degrees) of the rms phase error between the measured phase and the ideal phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). If averaging is ON, this is the average of the individual rms phase error. 2. Maximum RMS Phase Error is a floating point number (in degrees) of the rms phase error between the measured phase and the ideal phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). If averaging is ON, this is the max hold number of the individual rms phase error. 3. Average Peak Phase Error is a floating point number (in degrees) of the peak phase error of all the individual symbol decision points (prior to the rms averaging process). If averaging is ON, this is the average of the individual peak phase error.

n	Results Returned
	4. Maximum Peak Phase Error is a floating point number (in degrees) of the peak phase error of all the individual symbol decision points (prior to the rms averaging process). If averaging is ON, this is the max hold number of the individual peak phase error. 5. Average Peak Phase Error Symbol Position is a floating point number (in symbols) representing the symbol number at which the peak phase error occurred. If averaging is ON, keeps the position that has the worst phase error. 6. Maximum Peak Phase Error Symbol Position is a floating point number (in symbols) representing the symbol number at which the peak phase error occurred. If averaging is ON, keeps the position that has the worst maximum peak phase error. 7. Average Frequency Error is a floating point number (in Hz) of the frequency error in the measured signal. This is the difference between the measured phase trajectory and the reference phase trajectory. If averaging is ON, this is the average of the individual frequency error. 8. Maximum Frequency Error is a floating point number (in Hz) of the frequency error in the measured signal. This is the difference between the measured phase trajectory and the reference phase trajectory. If averaging is ON, this is the max hold number of the individual frequency error. 9. Average I/Q Origin Offset is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. If averaging is ON, this is the average of the individual IQ Offset. 10. Maximum I/Q Origin Offset is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. If averaging is ON, this is the max hold number of the individual IQ Offset 11. Average T0 Offset is a floating-point number of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot. Unit is sec. If averaging is ON, this is the average of the T0 offset. 12. Maximum T0 Offset is a floating-point number of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot. Unit is sec. If averaging is ON, this is the max hold number of the T0 offset. 13. Trace Phase Sample is a floating point number (in units of bits) representing the time between samples. It is used in querying phase error vector traces. 14. Trace bit 0 Decision Offset is an integer number in units of sample pairs for the sample points in an I/Q vector trace that represents the bit 0 (zero) decision point. The sample pairs in the trace are numbered 0 to N. 15. Trace Sync Start is an integer number in units of bits for the bit number, within the data bits trace, that represents the start of the sync word. 16. Trace Time Sample is a floating point number (in second) of the time between samples. It is used in querying time domain traces. For the n=0 trace, of acquired I/Q pairs, this is the time between pairs. 17. Detected TSC is the most recently detected TSC. The returned value is 0~7 (Burst Type : Normal), 10 (Burst Type : Sync), 20 (Burst Type : Access) if TSC detected. If TSC(Normal), Extended Training Sequence Bits(Sync) or Synch. Sequence Bits (Access) not detected, the returned value is -999.0. If Amptd or NONE(Power vs Time only) specified in Sync Type, the returned value is -999.0. In multi slot

n	Results Returned
	condition, the returned value is the detected TSC of the specified slot(Time Slot ON) or the first evaluated slot(Time Slot OFF).
	18. Reserved for future use – the value returned is –999.0 (floating point).
	19. Reserved for future use – the value returned is –999.0 (floating point).
	20. Reserved for future use – the value returned is –999.0 (floating point).
	21. Reserved for future use – the value returned is –999.0 (floating point).
	22. Reserved for future use – the value returned is –999.0 (floating point).

Key Path	Meas
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

AMPTD Y Scale

The Amplitude front-panel key activates the Amplitude menu and selects Reference Level or Reference Value (depending on the measurement) as the active function.

Some features in the Amplitude menu apply to multiple measurements; others apply only to specific measurements. Keys that only apply to some measurements are blanked or grayed out in measurements that are not supported.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Ref Value

Allows you to set the reference value, using absolute degree (Phase Error and Phase Error w/Freq) or absolute power (RF Envelope).

See also:

- ["Ref Value \(Phase Error and Phase Error w/Freq window\)" on page 1085](#)
- ["Ref Value \(RF Envelope window\)" on page 1086](#)

Key Path	AMPTD Y Scale
Mode	GSM
Initial S/W Revision	Prior to A.02.00

Ref Value (Phase Error and Phase Error w/Freq window)

Allows you to set the absolute degree reference.

Key Path	AMPTD Y Scale
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:Y[:SCALe]:RLEVel <real> :DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:Y[:SCALe]:RLEVel?
Example	DISP:PFER:VIEW:WIND:TRAC:Y:RLEV 5 DISP:PFER:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When "Auto Scaling" on page 1090 is On, this value is automatically determined by the measurement result. When the user sets this value manually, "Auto Scaling" on page 1090 automatically changes to Off.
Preset	0.00
State Saved	Saved in instrument state.

Min	-36000.0
Max	36000.0
Initial S/W Revision	Prior to A.02.00

Ref Value (RF Envelope window)

Allows you to set the absolute power reference.

Key Path	AMPTD Y Scale
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALE]:RLEVel <real> :DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALE]:RLEVel?
Example	DISP:PFER:VIEW:WIND3:TRAC:Y:RLEV 4 DISP:PFER:VIEW:WIND3:TRAC:Y:RLEV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When "Auto Scaling" on page 1090 is On, this value is automatically determined by the measurement result. When the user sets this value manually, "Auto Scaling" on page 1090 automatically changes to Off.
Preset	0.00
State Saved	Saved in instrument state.
Min	-250.0
Max	250.0
Initial S/W Revision	Prior to A.02.00

Range

The Range menu allows setting amplitude controls of the instrument.

Key Path	AMPTD Y Scale
Scope	Meas Global
Initial S/W Revision	A.12.50

Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

Key Path	Range

Mode	BASIC
Remote Command	[:SENSe]:POWer[:RF]:RANGe <real> [:SENSe]:POWer[:RF]:RANGe?
Example	:POW:RANG 10.0 :POW:RANG?
Notes	The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.)
Preset	0
State Saved	Saved in instrument state.
Min	-100
Max	100
Initial S/W Revision	A.12.50

Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

Key Path	AMPTD Y Scale, Attenuation
Remote Command	[:SENSe]:POWer[:RF]:RANGe:OPTimize IMMEDIATE
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

Key Path	AMPTD Y Scale, Attenuation
Remote Command	[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation OFF ON ELEctrical COMBined [:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation?
Notes	This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELEctrical and COMBined still can be used. Then, upon receiving ELEctrical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned.

Preset	OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

Key Path	AMPTD Y Scale, Range
Remote Command	[:SENSe] :POWeR[:RF] :RANGe:PARatio <real> [:SENSe] :POWeR[:RF] :RANGe:PARatio?
Example	POW:RANG:PAR 12 dB
Notes	In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out. Attempting to change the value via SCPI will be ignored and no error message will be generated.
Preset	10 dB
State Saved	Saved in instrument state
Min	0 dB
Max	20 dB
Initial S/W Revision	A.13.00

Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

Key Path	AMPTD Y Scale, Range
Remote Command	[:SENSe] :POWeR[:RF] :RANGe:MIXer:OFFSet <real> [:SENSe] :POWeR[:RF] :RANGe:MIXer:OFFSet?
Example	POW:RANG:MIX:OFFS -5 dB
Preset	0 dB
State Saved	Saved in instrument state

Min	-35 dB
Max	30 dB
Initial S/W Revision	A.13.00

Scale/Div

Sets the Y scale per division on the display, using absolute degree (Phase Error and Phase Error w/Freq) or absolute power (RF Envelope).

See also:

- ["Ref Value \(Phase Error and Phase Error w/Freq window\)" on page 1085](#)
- ["Scale/Division \(RF Envelope window\)" on page 1089](#)

Key Path	AMPTD Y Scale
Mode	GSM
Initial S/W Revision	Prior to A.02.00

Scale/Div (Phase Error and Phase Error w/Freq window)

Allows you to enter a numeric value to change the vertical display sensitivity.

Key Path	AMPTD Y Scale
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:Y[:SCALe]:PDIVision <real> :DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:Y[:SCALe]:PDIVision?
Example	DISP:PFER:VIEW:WIND:TRAC:Y:PDIV 10 DISP:PFER:VIEW:WIND:TRAC:Y:PDIV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Preset	5.00
State Saved	Saved in instrument state.
Min	0.01
Max	360
Initial S/W Revision	Prior to A.02.00

Scale/Division (RF Envelope window)

Allows you to enter a numeric value to change the vertical display sensitivity.

Key Path	AMPTD Y Scale
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:PDIVision <rel_ampl> :DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:PDIVision?
Example	DISP:PFER:VIEW:WIND3:TRAC:Y:SCAL:PDIV 10 DISP:PFER:VIEW:WIND3:TRAC:Y:SCAL:PDIV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Initial S/W Revision	Prior to A.02.00

Ref Position

Allows you to set the reference position.

Key Path	AMPTD Y Scale
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow[1] 2 3:TRACe:Y[:SCALe]:RPOSition TOP CENTer BOTTom :DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:Y[:SCALe]:RPOSition?
Example	DISP:PFER:VIEW:WIND:TRAC:Y:RPOS TOP DISP:PFER:VIEW:WIND:TRAC:Y:RPOS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	CENT CENT TOP
State Saved	Saved in instrument state.
Range	Top Ctr Bot
Initial S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the auto scaling function between On and Off.

Key Path	AMPTD Y Scale
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow[1]2 3:TRACe:Y[:SCALe]:COUPle ON OFF

	1 0 :DISPlay:PFERror:VIEW[1]:WINDow[1]2 3:TRACe:Y[:SCALe]:COUPle?
Example	DISP:PFER:VIEW:WIND:TRAC:Y:COUP ON DISP:PFER:VIEW:WIND:TRAC:Y:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When you set either "Ref Value" on page 1085 or Presel Center@3017 manually, this parameter is set to 'Off' automatically.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple keyactions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See ["More Information" on page 1092](#)

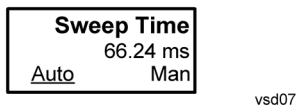
Key Path	Front-panel key
Remote Command	:COUPle ALL NONE
Example	:COUP ALL
Notes	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements.
Initial S/W Revision	Prior to A.02.00

More Information

There are two types of functions that have Auto/Manual modes.

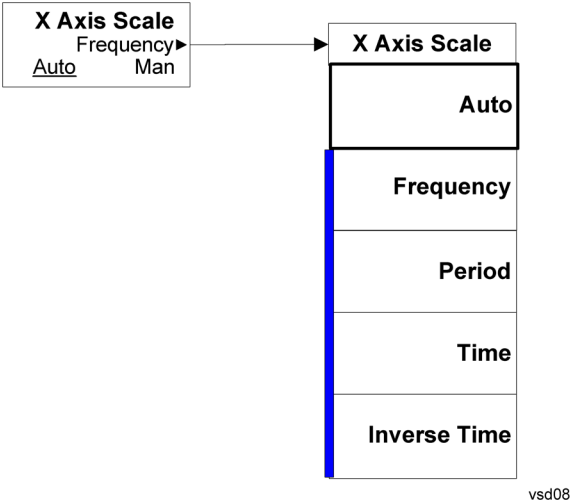
Auto/Man Active Function keys

An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between **Auto** (where the parameter is automatically coupled to the other parameters it is dependent upon) and **Man** (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either **Auto** or **Man** underlined as illustrated below.



Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.



BW

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	Front-panel key
Mode	EDGE GSM

Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing **Cont** does a Resume.

Key Path	Front-panel key
Remote Command	:INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous?
Example	:INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation
Preset	ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF)
State Saved	Saved in instrument state
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold . The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON) switches to continuous measurement, but never restarts a measurement and never resets a sweep.
Initial S/W Revision	Prior to A.02.00

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of **Trace Average**, **Max Hold**, or **Min Hold**.

In Other Measurements/Modes:

With **Avg/Hold Num** (in the **Meas Setup** menu) set to **Off** or set to **On** with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with **Avg/Hold Num** set to **On** with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the **Cont** key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until $k = N$, at which point the current sequence will stop and the instrument will go to the idle state.

File

See "File" on page 156

FREQ/Channel

Accesses a menu of keys that allows you to control the Frequency parameters of the instrument.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

ARFCN

Sets the analyzer to a frequency that corresponds to the ARFCN (Absolute RF Channel Number). Used to enter the channel to be measured for the selected band. If the Center Freq value entered does not exactly correlate with an ARFCN, the softkey label changes to display the closest ARFCN to the selected frequency, along with a > or < symbol indicating whether the frequency is above or below that ARFCN.

Key Path	FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel:ARFCn RFCHannel <integer> [:SENSe] :CHANnel:ARFCn RFCHannel?
Example	CHAN:ARFC 3 CHAN:ARFC?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	Coupled with Center Frequency . Setting ARFCN sets Center Freq to the value corresponding to that ARFCN. BMT Freq choice changes this parameter.
Preset	1
State Saved	Saved in instrument state.
Range	Different for each BAND as follows: E-GSM: 0 to 124, and 975 to 1023 P-GSM: 1 to 124 R-GSM: 0 to 124(MS), and 955 to 1023(BTS) DCS1800: 512 to 885 PCS1900: 512 to 810 GSM450: 259 to 293 GSM480: 306 to 340 GSM700: 438 to 516 GSM850: 128 to 251 T-GSM 810: 350 to 425

Min	Different for each BAND as follows: E-GSM: 0(MS), and 975(BTS) P-GSM: 1 R-GSM: 0(MS), and 955(BTS) DCS1800: 512 PCS1900: 512 GSM450: 259 GSM480: 306 GSM700: 438 GSM850: 128 T-GSM 810: 350
Max	Different for each BAND as follows: E-GSM: 124(MS), and 1023(BTS) P-GSM: 124 R-GSM: 124(MS), and 1023(BTS) DCS1800: 885 PCS1900: 810 GSM450: 293 GSM480: 340 GSM700: 516 GSM850: 251 T-GSM 810: 425
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.07.00

Center Freq

Sets the center frequency to be measured for the selected band. It is coupled with ARFCN – setting Center Freq sets ARFCN to the channel corresponding to that frequency.

For more information, see the section ["Center Freq" on page 1399](#).

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

Time Slot

This functionality is the same as that of the corresponding key in the Demod menu. See ["Time Slot" on page 1418](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

Burst Type

This functionality is the same as that of the corresponding key in the Demod menu. See ["Burst Type" on page 1419](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

TSC (Std)

This functionality is the same as that of the corresponding key in the Demod menu. See ["TSC \(Std\)" on page 1420](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is **Center Freq**.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a **Global Settings** key in its **Mode Setup** menu.

The **Center Freq** function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 1103](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 1105](#)

See ["Center Frequency Presets" on page 1102](#)

Key Path	FREQ Channel
Scope	Meas Global
Remote Command	<code>[:SENSe]:FREQuency:CENTer <freq></code> <code>[:SENSe]:FREQuency:CENTer?</code>
Example	FREQ:CENT 50 MHz FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT?
Notes	This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated.
Dependencies	The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit.
Couplings	When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range
Preset	Depends on instrument maximum frequency, mode, measurement, and selected input. See "Center Frequency Presets" on page 1102 and "RF Center Freq" on page 1103 and Ext Mix Center Freq and "I/Q Center Freq" on page 1105 .
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 1102 and "RF Center Freq" on page 1103 and "I/Q Center Freq" on page 1105 .
Max	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 1102 and "RF Center Freq" on page 1103 and "I/Q Center Freq" on page 1105 .
Default Unit	Hz
Status Bits/OPC Dependencies	Non-overlapped
Initial S/W Revision	Prior to A.02.00

Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

Freq Option	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
503 (all but N9000A)	1.805 GHz	3.6 GHz	3.7 GHz
503 (N9000A)	1.505 GHz	3.0 GHz	3.08 GHz
507 (all but N9000A)	3.505 GHz	7.0 GHz	7.1 GHz
507 (N9000A)	3.755 GHz	7.5 GHz	7.58 GHz
508 (all but N9038A)	1.805 GHz	3.6 GHz	8.5 GHz
508 (N9038A)	4.205 GHz	8.4 GHz	8.5 GHz
513	6.805 GHz	13.6 GHz	13.8 GHz
526 (all but N9000A and N9038A)	13.255 GHz	26.5 GHz	27.0 GHz
526 (N9000A)	13.255 GHz	26.5 GHz	26.55 GHz
526 (N9038A)	1.805 GHz	3.6 GHz	27.0 GHz
532	16.005 GHz	32.0 GHz	32.5 GHz
543	21.505 GHz	43.0 GHz	TBD
544	22.005 GHz	44.0 GHz	44.5 GHz
550	25.005 GHz	50.0 GHz	51 GHz

Input 2:

Model	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
N9000A opt C75	0.7505GHz	1.5 GHz	1.58 GHz
N9038A	505 MHz	1 GHz	1.000025 GHz

Tracking Generator Frequency Limits (N9000A only):

Tracking Generator Option	Min Freq (clips to this freq when turn TG on and can't tune below while TG on)	If above this Freq, Stop Freq clipped to this Freq when TG turned on	Max Freq (can't tune above) while TG on
T03	9 kHz	3.0 GHz	3.08 GHz
T06	9 kHz	6.0 GHz	6.05 GHz

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

Mode	CF Preset for RF
WCDMA	1 GHz
WIMAXOFDMA,	1 GHz
BASIC	1 GHz
ADEMOD	1 GHz
VSA	1 GHz
TDSCDMA	1 GHz
PNOISE	1 GHz
LTE	1 GHz
LTETDD	1 GHz
MSR	1 GHz
GSM	935.2 MHz
NFIGURE	1.505 GHz

RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	<code>[:SENSe] :FREQuency:RF:CENTer <freq></code> <code>[:SENSe] :FREQuency:RF:CENTer?</code>
Example	FREQ:RF:CENT 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Dependencies	If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop

	Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep.
Preset	See table above
State Saved	Saved in instrument state.
Min	-79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source
Max	See table above. Basically instrument maximum frequency – 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	[:SENSe] :FREQuency:EMIXer:CENTer <freq> [:SENSe] :FREQuency:EMIXer:CENTer?
Example	:FREQ:EMIX:CEN 60 GHz :FREQ:EMIX:CEN?
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Couplings	When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup.
Preset	When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies.

	If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table (Span=Stop Freq – Start Freq), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table. When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is 33.25 GHz. Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz.
State Saved	Saved in instrument state.
Min	The minimum frequency in the currently selected mixer band + 5 Hz
Max	The maximum frequency in the currently selected mixer band – 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	A.08.01

I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	<pre>[:SENSe]:FREQuency:IQ:CENTer <freq></pre> <pre>[:SENSe]:FREQuency:IQ:CENTer?</pre>
Example	FREQ:IQ:CEN: 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Preset	0 Hz
State Saved	Saved in instrument state.
Min	–40.049995 MHz
Max	40.049995 MHz
Initial S/W Revision	Prior to A.02.00

BMT Freq

Enables quick selection from a subset of the available ARFCN numbers for the Top, Middle, or Bottom frequency in the selected band.

Key Path	FREQ Channel

Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	BMT choice changes ARFCN and Center Freq. Chosen ARFCN will be displayed on each menu key.
Range	Top Middle Bottom
Initial S/W Revision	Prior to A.02.00

BMT Freq Top

Sets the analyzer to the frequency of the highest ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel:ARFCn RFCHannel:TOP
Example	CHAN:ARFC:TOP
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 124 P-GSM: 124 R-GSM: 124 DCS 1800: 885 PCS 1900: 810 GSM 450: 293 GSM 480: 340 GSM 700: 516 GSM 850: 251 T-GSM 810: 425 Change BMT ARFCN to BMT FreqTOP. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 959.800 MHz P-GSM: 959.800 MHz R-GSM: 959.800 MHz

	DCS 1800: 1879.80 MHz
	PCS 1900: 1989.80 MHz
	GSM 450: 467.400 MHz
	GSM 480: 495.800 MHz
	GSM 700: 792.800 MHz
	GSM 850: 893.800 MHz
	T-GSM810: 866.000 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

BMT Freq Middle

Sets the analyzer to the frequency of the middle ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel:ARFCn RFCHannel:MIDDLE
Example	CHAN:ARFC:MIDD
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 38 P-GSM: 63 R-GSM: 28 DSC 1800: 699 PCS 1900: 661 GSM 450: 276 GSM 480: 323 GSM 700: 477 GSM 850: 190 T-GSM 810: 388 Change BMT ARFCN to BMT FreqMIDDLE. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 942.600 MHz P-GSM: 947.600 MHz R-GSM: 940.600 MHz

	DCS 1800: 1842.60 MHz
	PCS 1900: 1960.00 MHz
	GSM 450: 464.000 MHz
	GSM 480: 492.400 MHz
	GSM 700: 755.000 MHz
	GSM 850: 881.600 MHz
	T-GSM 810: 858.600 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

BMT Freq Bottom

Sets the analyzer to the frequency of the lowest ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :ARFCn RFCHannel :BOTTom
Example	CHAN:ARFC:BOTT
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 975 P-GSM: 1 R-GSM: 955 DCS 1800: 512 PCS 1900: 512 GSM 450: 259 GSM 480: 306 GSM 700: 438 GSM 850: 128 T-GSM 810: 350 Change BMT ARFCN to BMT FreqBOTTOM. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 925.200 MHz P-GSM: 935.200 MHz R-GSM: 921.200 MHz

	DCS 1800: 1805.20 MHz PCS 1900: 1930.20 MHz GSM 450: 460.600 MHz GSM 480: 489.000 MHz GSM 700: 747.2 MHz GSM 850: 869.200 MHz T-GSM 810: 851.000 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

Carrier Setup

Allows you to set carrier parameters.

Key Path	FREQ Channel
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.14.00

BTS Class

Selects a BTS class.

BTS Class	Definition
MC	Multicarrier BTS is defined as a class of BTS, characterized by the ability to, in addition to single carrier operation, process two or more carriers in common active RF components simultaneously, either in multicarrier transmitter only or, in both multicarrier transmitter and multicarrier receiver.
SC	Single carrier BTS is defined as a class of BTS, characterized by the ability to process one carrier in single carrier BTSs, not belonging to a Multicarrier BTS class.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Remote Command	[:SENSe]:CHANnel:CARRier:BASE:CLASs:AUTO ON OFF 1 0 [:SENSe]:CHANnel:CARRier:BASE:CLASs:AUTO?
Example	CHAN:CARR:BASE:CLAS:AUTO 1 CHAN:CARR:BASE:CLAS:AUTO?
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is

	sent, an undefined header error or illegal parameter error is returned.
Couplings	ON automatically changes to OFF when Multicarrier Class (MC) or Single carrier Class (SC) is selected as BTS Class.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.14.00

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:CARRier:BASE:CLASs SC MC [:SENSe]:CHANnel:CARRier:BASE:CLASs?
Example	CHAN:CARR:BASE:CLAS MC CHAN:CARR:BASE:CLAS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Selection C1 and C2 are supported for backwards compatibility. When "C1" or "C2" is passed as SCPI command parameter, the BTS Class Auto is set to ON. As a result, it's converted to "SC" if the number of carriers is one, and otherwise "MC."
Dependencies	This parameter is available when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Preset	SC
State Saved	Saved in instrument state.
Range	Single Carrier Multi Carrier
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.10.01, A14.00

Carriers

Defines the number of carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:CARRier:COUNT <integer> [:SENSe]:CHANnel:CARRier:COUNT?

Example	CHAN:CARR:COUN 3 CHAN:CARR:COUN?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	This can change when the SCPI command of the Carrier Power Present or the Carrier Interval is sent.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	16
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.13.00

Reference Carrier

Defines the reference active carrier. The Reference Carrier frequency point is always aligned with the Measurement Global Center Frequency. The minimum value 1 specifies the lowest frequency carrier among the active carriers. The maximum value specifies the highest frequency carrier among the active carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :CARRier :RCARrier <integer> [:SENSe] :CHANnel :CARRier :RCARrier?
Example	CHAN:CARR:RCAR 3 CHAN:CARR:RCAR?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. If you set it to more than the number of carriers, it's clipped to the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	When you decrease the number of carriers to a value which is less than this value, this is clipped to the value.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

Configure Carriers

Opens a menu of keys that allows you to configure carriers.

Key Path	FREQ Channel, Multi Carrier Setup
Dependencies	This key is grayed out when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00

Select Carrier

Selects a carrier to configure.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	No
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:CARRier:LIST:COUPle OFF ON 0 1, ... [:SENSe]:CHANnel:CARRier:LIST:COUPle?
Example	CHAN:CARR:LIST:COUP OFF CHAN:CARR:LIST:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	When Couple is selected, the carrier settings are coupled to carrier #1. Coupled parameters are

	Carrier Power Present, Carrier Interval. When a setting is changed, the couple is set to Man automatically. Carrier #1 is always set to couple and cannot be changed. Couple/Man selection on the Carrier key is not displayed when selected carrier number is #1.
Preset	ON
State Saved	No
Range	Couple Man
Initial S/W Revision	A.06.00

Carrier Power Present

Specifies whether each of carriers is active or not.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:CARRier:LIST:PPresent YES NO, ... [:SENSe]:CHANnel:CARRier:LIST:PPresent?
Example	CHAN:CARR:LIST:PPR YES CHAN:CARR:LIST:PPR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored.
Dependencies	This parameter is unavailable when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list.
Preset	YES
State Saved	Saved in instrument state.
Range	Yes No
Initial S/W Revision	A.06.00

Carrier Interval

Specifies the frequency interval between the Carrier #n and #n+1 center frequencies.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global

Remote Command	<code>[:SENSe]:CHANnel:CARRier:LIST:INTerval <freq>, ...</code> <code>[:SENSe]:CHANnel:CARRier:LIST:INTerval?</code>
Example	CHAN:CARR:LIST:INT 600k CHAN:CARR:LIST:INT?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. The softkey for the last carrier (say, #N) is grayed out.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list. Changing Carrier Interval might affect the Span.
Preset	600kHz
State Saved	Saved in instrument state.
Min	400 kHz
Max	100 MHz
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.07.00, A.08.00

Carrier Frequency Allocation

Specifies the carrier frequency allocation. There are two types of allocation, contiguous and non-contiguous. Non-Contiguous frequency allocation is defined as an allocation where two groups of frequencies are separated with at least [3.6] MHz carrier separation between the innermost carriers. In case of the non-contiguous frequency allocation, tests will be measured between the uppermost carrier A of the lower frequency group and the lowermost carrier B of the upper frequency group.

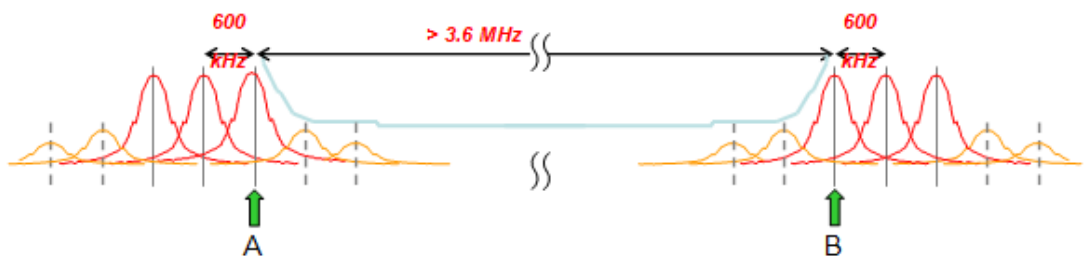
Error! Reference source not found.

See "An example of non-contiguous frequency allocation" on page 1115

Key Path	FREQ Channel, Multi Carrier Setup
Mode	GSM
Scope	Meas Global
Remote Command	<code>[:SENSe]:CHANnel:CARRier:FALLocation</code> CONTiguous NCONTiguous <code>[:SENSe]:CHANnel:CARRier:FALLocation?</code>
Example	CHAN:CARR:FALL NCON CHAN:CARR:FALL?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This menu key is available only when the number of carriers is more than one.

	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	CONTiguous
State Saved	Saved in instrument state.
Range	Contiguous Non-Contiguous
Readback Text	CONTiguous NCONTiguous
Initial S/W Revision	A.07.00

An example of non-contiguous frequency allocation



Non-Contiguous

Opens a menu of keys that allows you to set non-contiguous frequency allocation parameters.

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Initial S/W Revision	A.07.00

Allocation Break Pt

Specifies an allocation break point that is a sequence (or index) number of the uppermost carrier in the lower frequency group.

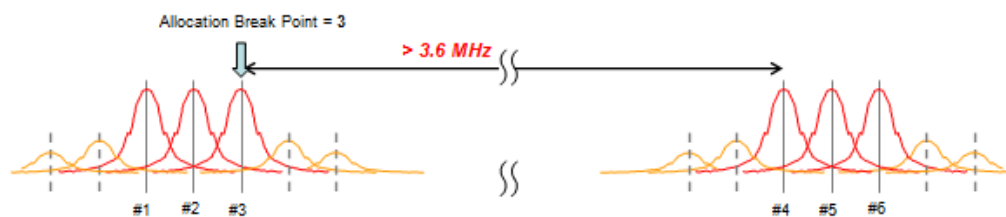
Error! Reference source not found.

See "An example of allocation break point" on page 1117

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	<code>[:SENSe]:CHANnel:CARRier:FALLocation:NCONTiguous:ABPoint <integer></code> <code>[:SENSe]:CHANnel:CARRier:FALLocation:NCONTiguous:ABPoint?</code>
Example	<code>CHAN:CARR:FALL:NCON:ABP 3</code> <code>CHAN:CARR:FALL:NCON:ABP?</code>

Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers – 1
Initial S/W Revision	A.07.00
Modified at S/W Revision	A.13.00

An example of allocation break point



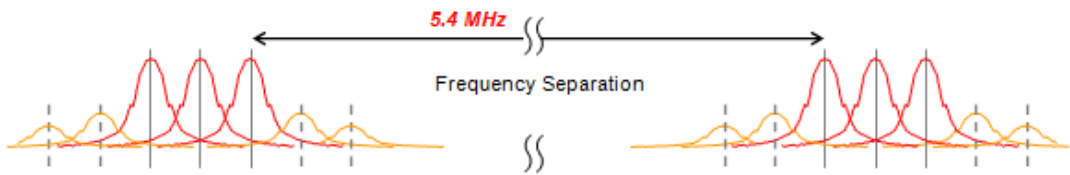
Freq Separation

Specifies frequency separation between the innermost of carriers.

See ["An example of frequency separation" on page 1118](#)

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	<code>[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:FSEParation <freq></code> <code>[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:FSEParation?</code>
Example	<code>CHAN:CARR:FALL:NCON:FSEP 5.4M</code> <code>CHAN:CARR:FALL:NCON:FSEP?</code>
Notes	You must be in the GSM mode to use this command. Use <code>INSTrument:SElect</code> to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Changing Frequency Separation might affect the Span
Preset	5.4 MHz
State Saved	Saved in instrument state.
Min	3.6 MHz
Max	100 MHz
Initial S/W Revision	A.07.00

An example of frequency separation



Carrier BPF

Selects whether to use the carrier bandpass filter.

Key Path	FREQ Channel, Multi Carrier SetupMode Setup, Demod
Mode	GSM
Remote Command	[:SENSe]:RADio:CARRier:NUMBer:AUTO ON OFF 1 0 [:SENSe]:RADio:CARRier:NUMBer:AUTO?
Example	RAD:CARR:NUMB:AUTO 1 RAD:CARR:NUMB:AUTO?
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	ON automatically changes to OFF when Multiple or Single is selected as Carrier BPF Type.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.06.00

Carrier BPF Type

Opens a menu of keys that allows you to select the type of the bandpass filter. When carriers other than the signal of interest are present, especially if they are strong, they can interfere with the measurement, making it difficult to sync and producing artificially high EVM results. When this condition exists, toggle from Single to Multi. A band-limited filter will help reduce the measurement interference.

BPF Type	Description
MULTiple	Enable multi carrier tolerance filter.
SINGle	Disable multi carrier tolerance filter

This parameter applies only to the following measurements:

- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement
- GMSK Power vs. Time

- EDGE Power vs. Time

Key Path	FREQ Channel, Multi Carrier Setup, Carrier BPFMode Setup, Demod, Carrier BPF
Mode	GSM
Scope	Meas Global
Remote Command	<code>[:SENSe]:RADio:CARRier:NUMBer SINGLE MULTiple</code> <code>[:SENSe]:RADio:CARRier:NUMBer?</code>
Example	<code>RAD:CARR:NUMB SING</code> <code>RAD:CARR:NUMB?</code>
Notes	The Carrier Bandpass Filter key is in the Mode Setup menu, but only EDGE EVM and GSM PFER measurements support this feature. In other measurements, this setting is not applicable. You must be in the GSM mode to use this command. Use <code>INSTrument:SElect</code> to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	SINGLE
State Saved	Saved in instrument state.
Range	Single Multi
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

Time Slot

Selects On or Off for slot searching. Generally, this feature is only valid in external and periodic timer trigger source modes that triggers every frame since another trigger source does not have the information that identifies the head of the frame. When Timeslot is set to On, the demodulation measurement is made on the nth timeslot specified by the trigger point + n timeslots, where n is the selected timeslot value 0 to 7.

This functionality is the same as Time Slot under the Freq/Channel menu.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	<code>[:SENSe]:CHANnel:SLOT <integer></code> <code>[:SENSe]:CHANnel:SLOT?</code> <code>[:SENSe]:CHANnel:SLOT:AUTO OFF ON 0 1</code> <code>[:SENSe]:CHANnel:SLOT:AUTO?</code>
Example	<code>CHAN:SLOT 0</code> <code>CHAN:SLOT?</code> <code>CHAN:SLOT:AUTO OFF</code> <code>CHAN:SLOT:AUTO?</code>
Notes	This functionality does not affect Combined GSM/EDGE measurement.

You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.	
Preset	0 OFF
State Saved	Saved in instrument state.
Min	0
Max	7
Initial S/W Revision	Prior to A.02.00

Burst Type

Sets the burst type that the analyzer will search for and to which it will synchronize.

This functionality is the same as Burst Type under the FREQ Channel menu.

Key	SCPI	Description
Sync (SCH)	SYNC	Burst length = 142 symbols Extended training sequences for CTS and COMPACT synchronization bursts are not supported.
Access (RACH)	ACCEss	Burst length = 88 symbols Alternative training (synchronization) sequence "TS1" and "TS2" are supported only in GSMK Power vs. Time.
Normal - NB (TCH & CCH)	NORMal	Burst length = 142 symbols Softkey label will be changed to 'Normal - NB' form 'Normal'
Higher Symbol Rate - HB (TCH & CCH)	HSRate	Burst length = 169 symbols This selection key is only shown when theN9071A-3FP license is installed.
Mixed (NB/HB for TSC sync)	MIXed	Enables auto detection between Normal (NB) and HSR (HB) TCH & CCH EDGE Burst. This selection key is only shown when theN9071A-3FP license is installed.

Measurement synchronization capability (Burst Sync = Training Seq)

	GMSK		8PSK		
			16QAM		
			32QAM		
			AQPSK		
GMSK Phase & Freq Error measurement	Yes	Yes	Yes	No	N/A
GMSK Power vs. Time measurement	Yes	Yes	Yes	No	(measures as Normal GMSK when selected)

GMSK Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off)	No	No	Yes	No		
EDGE EVM measurement	No	No	No	Yes	Yes	Yes
EDGE Power vs. Time measurement	Yes	Yes	Yes	Yes	Yes	Yes
EDGE Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off.)	No	No	Yes	Yes	Yes	Yes

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:BURSt NORMal SYNC ACcEss HSRate MIXed [:SENSe]:CHANnel:BURSt?
Example	CHAN:BURS NORM CHAN:BURS?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. Higher Symbol Rate and Mixed selections are only available when the N9071A-3FP license is installed. Otherwise these menu keys are blank. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Higher Symbol Rate and Mixed selection keys are not shown unless N9071A-3FP is installed. When unlicensed and SCPI is sent, an undefined header error is returned. When "Mixed" is selected, the Burst Sync menu key under the Meas Setup menu will be grayed out and Training Sequence (TSC) will be used for synchronization. The sync algorithm always runs in Training Sequence (TSC) synchronization because the Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync will become effective again when the Burst Type selection is changed from "Mixed" to another one.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Sync (SCH) Access (RACH) Normal - NB (TCH & CCH) Higher Symbol Rate - HB (TCH & CCH) Mixed (NB/HB for TSC sync)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

TSC (Std)

Allows you to select the Training Sequence Code that determines which burst is to be measured. Applicable only when Burst Sync is set to Training Sequence in the measurement. In the case of AQPSK, this parameter specifies TSC number of VAMOS sub-channel A. TSC of VAMOS sub-channel B is ignored.

This functionality is the same as TSC under the FREQ Channel menu.

This parameter applies only to the following measurements:

- GMSK/EDGE Power vs. Time measurement
- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement

Selection	SCPI	Description
AutoDet	ON 1	The measurement is made on the first burst found to have any one of the valid TSCs in the range of 0 to 7. The measurement may be made on various timeslots if more than one timeslot has one of the 8 valid TSCs.
Man	OFF 0	The measurement is made on the first burst found to have the selected TSC. TSC numbers in the range of 0 to 7 can be selected. The measurement may be made on various timeslots if more than one timeslot has this same TSC.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:TSCode <integer> [:SENSe]:CHANnel:TSCode? [:SENSe]:CHANnel:TSCode:AUTO OFF ON 0 1 [:SENSe]:CHANnel:TSCode:AUTO?
Example	CHAN:TSC 3 CHAN:TSC? CHAN:TSC:AUTO 1 CHAN:TSC:AUTO?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When Sync or Access is selected as Burst Type, this key is grayed out.
Preset	0 ON
State Saved	Saved in instrument state.
Min	0
Max	7
Initial S/W Revision	Prior to A.02.00

Input/Output

See "Input/Output" on page 128

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	Front-panel key
Mode	EDGE/GSM
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Marker Type

Sets the marker control mode **Normal**, **Delta** and **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

See also:

- ["Marker X Axis Value \(Remote Command Only\)" on page 1127](#)
- ["Marker X Axis Position \(Remote Command Only\)" on page 1127](#)
- ["Marker Y Axis Value \(Remote Command Only\)" on page 1128](#)

Key Path	Marker
Mode	GSM
Remote Command	:CALCulate:PFERror:MARKer[1] 2 ... 12:MODE POSition DELTa OFF :CALCulate:PFERror:MARKer[1] 2 ... 12:MODE?
Example	CALC:PFER:MARK:MODE OFF CALC:PFER:MARK:MODE?
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X-axis value entered in the active function area displays the marker value to its full entered precision. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF

State Saved	Saved in instrument state.
Range	Normal Delta Off
Initial S/W Revision	Prior to A.02.00

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Relative To

Selects the marker that the selected marker is relative to (its reference marker).

Key Path	Marker, Properties
Mode	GSM
Remote Command	:CALCulate:PFERror:MARKer[1] 2 ... 12:REference <integer> :CALCulate:PFERror:MARKer[1] 2 ... 12:REference?
Example	CALC:PFER:MARK:REF 10 CALC:PFER:MARK:REF?
Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself." You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When queried, a single value is returned (the specified marker number's relative marker).
Preset	2 3 4 5 6 7 8 9 10 11 12 1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Key Path	Marker, Properties
Mode	GSM
Remote Command	:CALCulate:PFERror:MARKer[1] 2 ... 12:TRACe PERRor PFERror RFENvelope POLar :CALCulate:PFERror:MARKer[1] 2 ... 12:TRACe?
Example	CALC:PFER:MARK:TRAC POL CALC:PFER:MARK:TRAC?
Couplings	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	PERRor
State Saved	Saved in instrument state.
Range	IQ Polar Phase Error Phase Error w/Freq RF Envelope
Initial S/W Revision	Prior to A.02.00

Couple Markers

When this function is true, moving any marker causes an equal X Axis movement of every other marker which is not **Off**. By “equal X Axis movement” we mean that we preserve the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units).

This may result in markers going off screen.

Key Path	Marker
Mode	GSM
Remote Command	:CALCulate:PFERror:MARKer:COUPle[:STATe] ON OFF 1 0 :CALCulate:PFERror:MARKer:COUPle[:STATe]?
Example	CALC:PFER:MARK:COUP ON CALC:PFER:MARK:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Key Path	Marker
Mode	GSM
Remote Command	:CALCulate:PFERror:MARKer:AOff
Example	CALC:PFER:MARK:AOff
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering an X-value if the control mode is **Normal** or **Delta**.

Mode	EDGEgsm
Remote Command	:CALCulate:PFERror:MARKer[1] 2 ... 12:X <real> :CALCulate:PFERror:MARKer[1] 2 ... 12:X?
Example	CALC:PFER:MARK3:X 0 CALC:PFER:MARK3:X?
Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error "Invalid suffix" is generated. The query returns the marker's absolute X Axis value if the control mode is Normal , or the offset from the marker's reference marker if the control mode is Delta . The query is returned in the fundamental units for the current marker X Axis scale: Hz for Frequency and Inverse Time , seconds for Period and Time . If the marker is Off , the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Max value would be changed.
Preset	After a preset, all markers are turned OFF, so the Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	-9.9E37
Max	9.9E37
Initial S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** or **Fixed** - except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	EDGEgsm
Remote Command	:CALCulate:PFERror:MARKer[1] 2 ... 12:X:POSition <integer>

	:CALCulate:PFERror:MARKer[1] 2 ... 12:X:POSition?
Example	CALC:PFER:MARK10:X:POS 0 CALC:PFER:MARK10:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is Normal , or the offset from the marker's reference marker in trace points if the control mode is Delta . If the marker is Off the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	After a preset, all markers are turned OFF, so the Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	-9.9E37
Max	9.9E37
Initial S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command Only)

Returns the marker Y Axis value in the current marker Y Axis unit.

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value, the remote programmer must also know what the analyzer's Y Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

- Absolute result: every marker has an absolute result:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

- Relative result: if a marker's control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

Mode	EDGE GSM
Remote Command	:CALCulate:PFERror:MARKer[1] 2 ... 12:Y?
Example	CALC:PFERror:MARK11:Y?
Notes	The query returns the marker Y-axis result. If the marker is Off the response is not a number. If 'Polar' is selected for the Marker Trace, it returns the values of 'I' and 'Q' at the same time. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0
State Saved	No
Backwards Compatibility SCPI	:CALCulate:PFERror:MARKer[1] 2 ... 4:FUNction:RESult?

Initial S/W Revision	Prior to A.02.00

Marker Function

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	Front-panel key
Mode	EDGE GSM

Marker To

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	Front-panel key
Mode	EDGE GSM

Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

NOTE

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

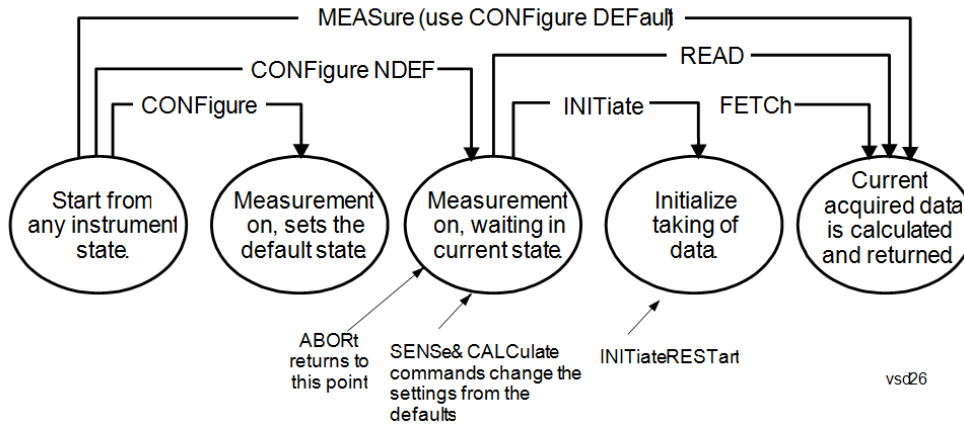
Remote Measurement Functions

This section contains the following topics:

- "Measurement Group of Commands" on page 1431
- "Current Measurement Query (Remote Command Only) " on page 1433
- "Limit Test Current Results (Remote Command Only)" on page 1433
- "Data Query (Remote Command Only)" on page 1433
- "Calculate/Compress Trace Data Query (Remote Command Only)" on page 1434
- "Calculate Peaks of Trace Data (Remote Command Only)" on page 1439
- "Hardware-Accelerated Fast Power Measurement (Remote Command Only) " on page 1440
- "Format Data: Numeric Data (Remote Command Only)" on page 1454
- "Format Data: Byte Order (Remote Command Only)" on page 1455

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Measurement Group of Commands



Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSE:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSE:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEFault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

Fetch Commands:

:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

INITiate Commands:

:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
 - Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
 - If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.
-

READ Commands:

:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
-

measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
 - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
 - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
-

Initial S/W Revision	Prior to A.02.00

Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

Remote Command	:CONFigure?

Example	CONF?

Initial S/W Revision	Prior to A.02.00

Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

Remote Command	:CALCulate:CLIMits:FAIL?

Example	CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails.

Initial S/W Revision	Prior to A.02.00

Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

Remote Command	:CALCulate:DATA[n]?
Notes	The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCH:<measurement>? query where <measurement> is the current measurement.
Initial S/W Revision	Prior to A.02.00

Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

Remote Command	:CALCulate:DATA<n>:COMPRESS? BLOCK CFIT MAXimum MINimum MEAN DMEan RMS RMSCubed SAMPLE SDEVIation PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]]
Example	To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN, 24e-6, 526e-6 (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.)
Notes	The command supports 5 parameters. Note that the last 4 (<soffset>, <length>, <roffset>, <rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters. This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data.
Initial S/W Revision	Prior to A.02.00

- BLOCK or block data – returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

•

NOTE

If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where $|X_i|$ is the magnitude of an I/Q pair, and n is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$\text{DME} = 10 \times \log_{10} \left(\frac{1}{n} \sum_{X_i \in \text{region(s)}} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

NOTE

For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region(s)}} X_i^2}$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region(s)}} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPlE - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEViation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$SDEV = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where X_i is a data point value, $\bar{X}$ is the arithmetic mean of the data point values for the specified region (s), and n is the number of data points in the specified region(s).

$$SDEV = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where $|X_i|$ is the magnitude of an I/Q pair, $\bar{X}$ is the mean of the magnitudes for the specified region(s), and n is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector ($n=0$) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

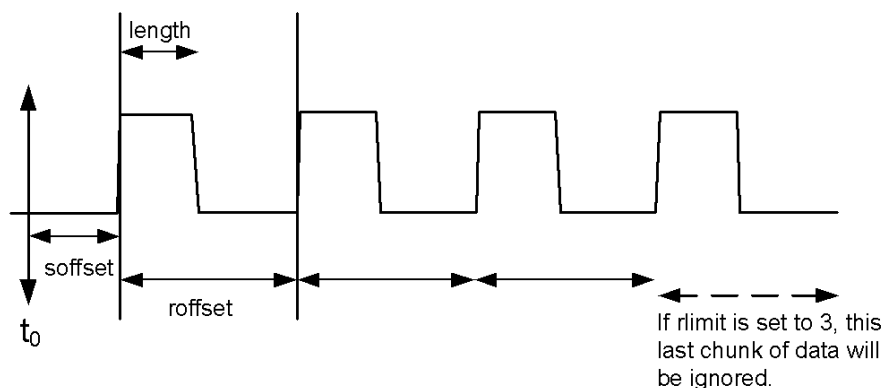
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where Y_i is the unwrapped phase of I/Q pair with applying frequency correction and n is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

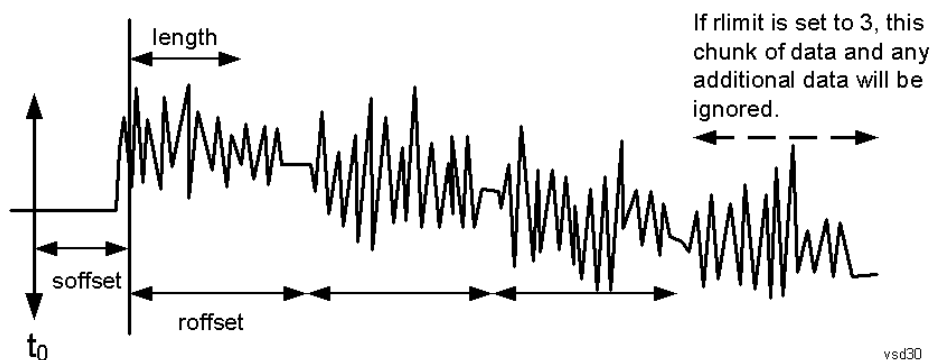
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

Remote Command	For Swept SA measurement: <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME[,ALL GTDLLine LTDLine]]</pre> For most other measurements: <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME]</pre>
Example	Example for Swept SA measurement in Spectrum Analyzer Mode: CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned. Query Results 1: With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time). If no peaks are found the peak list will consist of only the number of peaks, (0).
Notes	<n> - is the trace that will be used <threshold> - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu. <excursion> - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the

excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported. Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQUENCY - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

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Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to "list mode" on other measurements.

In addition to basic channel power measurements, there are a number of other measurement "functions" for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:RESet
Example	:CALC:FPOW:POW1:RES

Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:DEFine "configuration string"
Example	:CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005"
Notes	See below for a list of measurement variables that can be defined in the configuration string.
Initial S/W Revision	A.14.00

Acquisition Time

Example	CALC:FPOW:POW1:DEF "AcquisitionTime=0.002"
Notes	The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability.
Preset	0.001 s
Range	0 s to 1 s
Default Unit	Time (s)
Initial S/W Revision	A.14.00

Center Frequency

Example	CALC:FPOW:POW1:DEF "CenterFrequency=2e9"
Notes	The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency.
Preset	1 GHz
Range	0 Hz to maximum instrument frequency
Default Unit	Frequency (Hz)
Initial S/W Revision	A.14.00

DC Coupled

Example	CALC:FPOW:POW1:DEF "DCCoupled=True"
Notes	The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz.
Preset	False
Range	True (DC Coupled) or False (AC Coupled)
Default Unit	Boolean
Initial S/W Revision	A.14.00

DetectorType

Example	CALC:FPOW:POW1:DEF "DetectorType=Peak"
Notes	Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement.
Preset	RmsAverage
Range	RmsAverage, Peak
Initial S/W Revision	A.14.00

Do Noise Correction

Example	CALC:FPOW:POW1:DEF "DoNoiseCorrection=True"
Notes	When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured.
Preset	False
Range	True (enable noise correction) or False (disable noise correction)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Do Spur Suppression

Example	CALC:FPOW:POW1:DEF "DoSpurSuppression=True"
Notes	When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals. When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method. Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.
Preset	False
Range	True (enable spur suppression) or False (disable spur suppression)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Electronic Attenuator Bypass

Example	CALC:FPOW:POW1:DEF "ElecAttBypass =False"
Notes	The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp.
Preset	True
Range	True (bypass electronic attenuator) or False (use electronic attenuator)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Electronic Attenuation

Example	CALC:FPOW:POW1:DEF "ElecAttenuation=10"
Notes	Option EA3 is required. The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps). Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.
Preset	0 dB
Range	0 – 24 dB (1 dB steps)

Default Unit	dB
Initial S/W Revision	A.14.00

IF Gain

Example	CALC:FPOW:POW1:DEF "IFGain=10"
Notes	The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB.
Preset	0 dB
Range	-6 - 16 dB (1 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

IF Type

Example	CALC:FPOW:POW1:DEF "IFType=B25M"
Notes	The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path.
Preset	B40M
Range	B10M, B25M, B40M
Initial S/W Revision	A.14.00

Include Power Spectrum

Example	CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True"
Notes	The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response.
Preset	False
Range	True (return both channel power and full power spectrum) or False (returns only channel power)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Mechanical Attenuation

Example	CALC:FPOW:POW1:DEF "MechAttenuation=10"
Notes	The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps).
Preset	0 dB
Range	0 – 70 dB (2 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

Preamp Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps.
Preset	Off
Range	Off, Low, Full
Initial S/W Revision	A.14.00

Resolution Bandwidth Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value.
Preset	BestSpeed
Range	BestSpeed, Narrowest, Explicit
Initial S/W Revision	A.14.00

Resolution Bandwidth

Example	CALC:FPOW:POW1:DEF "ResolutionBW=25e3"
Notes	The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW.

Preset	0 Hz
Default Unit	Hz
Initial S/W Revision	A.14.00

Trigger Delay

Example	CALC:FPOW:POW1:DEF "TriggerDelay=0.025"
Notes	The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed.
Preset	0 s
Range	0 – 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

Trigger Level

Example	CALC:FPOW:POW1:DEF "TriggerLevel=2"
Notes	The trigger level parameter sets the voltage value at which an external trigger is detected.
Preset	1.2 V
Range	–5 to 5 V
Default Unit	Volts
Initial S/W Revision	A.14.00

Trigger Slope

Example	CALC:FPOW:POW1:DEF "TriggerSlope=Negative"
Notes	The trigger slope parameter indicates the direction of the edge trigger voltage for detection.
Preset	Positive
Range	Positive, Negative
Initial S/W Revision	A.14.00

Trigger Source

Example	CALC:FPOW:POW1:DEF "TriggerSource=Ext1"
Notes	The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively.
Preset	Free
Range	Free, Ext1, Ext2
Initial S/W Revision	A.14.00

Trigger Timeout

Example	CALC:FPOW:POW1:DEF "TriggerTimeout=0.1"
Notes	The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement.
Preset	1 s
Range	0 – 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

Signal Input

Example	CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW"
Notes	The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz.
Preset	FpMainRf
Range	FpMainRf, Fp50MHzCW
Initial S/W Revision	A.14.00

Use Preselector

Example	CALC:FPOW:POW1:DEF "UsePreSelector=True"
Notes	The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases.
Preset	False
Range	True (use preselector above 3.6 GHz), or False (preselector bypassed)

Default Unit	Boolean
Initial S/W Revision	A.14.00

Channel Bandwidth Array

Example	CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]"
Notes	The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[1e6]
Range	0 to 40 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

Channel Filter Type Array

Example	CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]"
Notes	The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.
Preset	[IBW]
Range	IBW, RRC
Initial S/W Revision	A.14.00

Channel Filter Alpha Array

Example	CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]"
Notes	The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[0.22]
Range	0.0 – 1.0

Initial S/W Revision	A.14.00

Channel Measurement Function Array

Example	CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]"
Notes	This parameter array defines what measurement is being made for each individually-specified channel: BandPower: Total power within the specified bandwidth of the channel (dBm) BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz) PeakPower: The peak power value within the specified bandwidth of the channel (dBm) PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz) XdbBandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdbBandwidth parameter OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.
Preset	[BandPower]
Range	BandPower, BandDensity, PeakPower, PeakFrequency, XdbBandwidth, OccupiedBandwidth
Initial S/W Revision	A.14.00

Channel Offset Frequency Array

Example	CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]"
Notes	The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel. All array parameters should have the same number of elements.
Preset	[0]
Range	0 to 20 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

Channel Occupied Bandwidth Percent Array

Example	CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]"
Notes	This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied

	bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power.
Preset	[0.99]
Range	0 – 1.0
Initial S/W Revision	A.14.00

Channel x-dB Bandwidth Array

Example	CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]"
Notes	This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number.
Preset	[-3.01]
Range	-200 to 0 dB
Default Unit	dB
Initial S/W Revision	A.14.00

Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

M o d e	All
R e m o t e	:CALCulate:FPOWer:POWer[1,2,...,999]:DEFine?
C o m m a n d	
E	:CALC:FPOW:POW1:DEF?

x a m p l e	
N o t e s	This command query is used to retrieve a list of all defined parameters in an ASCII format. The following is an example of the returned results: "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=1 000 0000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1 000 000 000,ResolutionBW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1 000 000],OffsetFrequency=[0],Function=[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False,TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"
I n i t i a l	A.14.00
S / W	
R e v i s i o n	

Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

Mode	All
Remote Command	:CALCulate:FPOWER:POWer[1,2,...,999]:CONFigure
Example	:CALC:FPOW:POW1:CONF
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:INITiate
Example	:CALC:FPOW:POW1:INIT
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:FETCh?
Example	:CALC:FPOW:POW1:FETC?
Notes	Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel.
Initial S/W Revision	A.14.00

Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]?
Example	:CALC:FPOW:POW1?

Notes	Option FP2 is required. See notes for Fast Power Fetch for return format.
Initial S/W Revision	A.14.00

Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

Mode	All
Remote Command	:CALCulate:FPOWER:POWer[1,2,...,999]:READ? :CALCulate:FPOWER:POWer[1,2,...,999]:READ1?
Example	:CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1?
Notes	Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined.
Initial S/W Revision	A.14.00

Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

Mode	All
Remote Command	:CALCulate:FPOWER:POWer[1,2,...,999]:READ2?
Example	:CALC:FPOW:POW1:READ2?
Notes	Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float]

	3. Declared function result for the 2nd specified channel [4 byte float]
	...
	(m + 1). Declared function result for the last (mth) specified channel [4 byte float]
	ADC Over Range
	1. ADC over-range occurred (1: true, 0: false) [2 byte short]
	Spectrum Data
	1. Number of points in the spectrum data, k [4 byte int]
	2. Start frequency of spectrum data (Hz) [8 byte double]
	3. Step frequency of spectrum data (Hz) [8 byte double]
	4. FFT bin at 1st point (dBm) [4 byte float]
	5. FFT bin at 2nd point (dBm) [4 byte float]
	...
	(k + 3). FFT bin at last (kth) point (dBm) [4 byte float]
Initial S/W Revision	A.14.00

Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

Remote Command	:FORMat[:TRACe][:DATA] ASCii INTEger,32 REAL,32 REAL,64 :FORMat[:TRACe][:DATA]?
Notes	The query response is: ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTEger,32: INT,32 When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTEger, data is output in units of m dBm (.001 dBm). The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block.
Dependencies	Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTEger, 32 for REAL). Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number".
Preset	ASCii
Backwards Compatibility	Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves

Notes	backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32.
Initial S/W Revision	Prior to A.02.00

The specs for each output type follow:

ASCIi - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMAl order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

Remote Command	:FORMat:BORDER NORMAl SWAPped :FORMat:BORDER?
Preset	NORMAl
Initial S/W Revision	Prior to A.02.00

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	Front-panel key
Mode	EDGE/GSM
Initial S/W Revision	Prior to A.02.00

Avg/Hold Num

Used to specify the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

- On – Sets measurement averaging on.
- Off – Sets measurement averaging off.

Key Path	Meas Setup
Mode	GSM
Remote Command	[:SENSe]:PFERror:AVERage:COUNt <integer> [:SENSe]:PFERror:AVERage:COUNt? [:SENSe]:PFERror:AVERage[:STATe] OFF ON 0 1 [:SENSe]:PFERror:AVERage[:STATe]?
Example	PFER:AVER:COUN 4 PFER:AVER:COUN? PFER:AVER OFF PFER:AVER?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When this value is changed, Avg State is set to On.
Preset	10 OFF
State Saved	Saved in instrument state.
Min	1
Max	10000
Initial S/W Revision	Prior to A.02.00

Avg Mode

Allows you to choose either exponential or repeat averaging. This selection only effects the averaging after the number of N averages is reached (set using the Averages, Avg Bursts, or Avg Number key).

- Exponential averaging – When Measure is set at Cont, data acquisitions continue indefinitely. After N averages, exponential averaging is used with a weighting factor of N (the displayed average count stops at N). Exponential averaging weights new data more than old data, which allows tracking of slow-changing signals. The weighting factor N is set using the Averages, Avg Bursts key.
- Repeat averaging – When Measure is set at Cont, data acquisitions continue indefinitely. After N averages is reached, all previous result data is cleared and the average count is set back to 1. This is equivalent to being in Measure Single and pressing the Restart key when the Single measurement finishes.

Key Path	Meas Setup
Mode	GSM
Remote Command	[:SENSe]:PFERror:AVERage:TCONtrol EXPonential REPeat [:SENSe]:PFERror:AVERage:TCONtrol?
Example	PFER:AVER:TCON REP PFER:AVER:TCON?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	REPeat
State Saved	Saved in instrument state.
Range	Exp Repeat
Initial S/W Revision	Prior to A.02.00

Burst Sync

Allows you to select the method of synchronizing the measurement to the bursts.

- RFBurst – The burst synchronization approximates the start and stop of the useful part of the burst without demodulation of the burst.
- Training Sequence (TSEquence) – The burst synchronization performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sync sequence.

Key Path	Meas Setup
Mode	GSM
Remote Command	[:SENSe]:PFERror:BSYNc:SOURce RFBurst TSEquence [:SENSe]:PFERror:BSYNc:SOURce?
Example	PFER:BSYN:SOUR RFB PFER:BSYN:SOUR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	TSEquence
State Saved	Saved in instrument state.
Range	Training Seq RF Amptd
Initial S/W Revision	Prior to A.02.00

Limits

Accesses a menu that enables you to set the Limit Test.

Key Path	Meas Setup, Mode, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00

Limit Test

Turns on or off limit pass/fail testing.

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:PFERror:LIMit:TEST[:STATe] OFF ON 0 1 :CALCulate:PFERror:LIMit:TEST[:STATe]?
Example	CALC:PFER:LIM:TEST ON CALC:PFER:LIM:TEST?
Notes	If set to Off, PASS/FAIL indicator on the Meas Bar goes blank. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

RMS Phase Error

Sets the limit value for RMS Phase limit in degree for MS and BTS.

See also:

- ["RMS Phase Error Limit for BTS" on page 1161](#)
- ["RMS Phase Error Limit for MS" on page 1161](#)

Key Path	Meas Setup, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00

RMS Phase Error Limit for BTS

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:PFERror:LIMit:BTS:RPHase <real> :CALCulate:PFERror:LIMit:BTS:RPHase?
Example	CALC:PFER:LIM:BTS:RPH 10 CALC:PFER:LIM:BTS:RPH?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	5
State Saved	Saved in instrument state.
Min	0.0
Max	180.0
Initial S/W Revision	Prior to A.02.00

RMS Phase Error Limit for MS

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:PFERror:LIMit:MS:RPHase <real> :CALCulate:PFERror:LIMit:MS:RPHase?
Example	CALC:PFER:LIM:MS:RPH 10 CALC:PFER:LIM:MS:RPH?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	5
State Saved	Saved in instrument state.
Min	0.0
Max	180.0
Initial S/W Revision	Prior to A.02.00

Peak Phase Error

Sets the limit value for Peak Phase limit in degree for MS and BTS.

See also:

- ["Peak Phase Error Limit for BTS" on page 1162](#)
- ["Peak Phase Error Limit for MS" on page 1162](#)

Key Path	Meas Setup, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00

Peak Phase Error Limit for BTS

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:PFERror:LIMit:BTS:PPHase <real> :CALCulate:PFERror:LIMit:BTS:PPHase?
Example	CALC:PFER:LIM:BTS:PPH 10 CALC:PFER:LIM:BTS:PPH?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Unit is Degree(s).
Preset	20
State Saved	Saved in instrument state.
Min	0.0
Max	180.0
Initial S/W Revision	Prior to A.02.00

Peak Phase Error Limit for MS

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:PFERror:LIMit:MS:PPHase <real> :CALCulate:PFERror:LIMit:MS:PPHase?
Example	CALC:PFER:LIM:MS:PPH 10 CALC:PFER:LIM:MS:PPH?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	20
State Saved	Saved in instrument state.
Min	0.0
Max	180.0
Initial S/W Revision	Prior to A.02.00

Frequency Error

Sets the limit value for frequency limit in ppm for MS and BTS.

See also:

- "Freq Error Limit for BTS (BTS Type is Normal)" on page 1163
- "Freq Error Limit for mBTS (BTS Type is one of Micro BTS types)" on page 1163
- "Freq Error Limit for pBTS (BTS Type is Pico1)" on page 1164
- "Freq Error Limit for MS" on page 1164

Key Path	Meas Setup, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00

Freq Error Limit for BTS (BTS Type is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:PFERror:LIMit:BTS:FERRor <real> :CALCulate:PFERror:LIMit:BTS:FERRor?
Example	CALC:PFER:LIM:BTS:FERR 10 CALC:PFER:LIM:BTS:FERR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Min	0
Max	100
Initial S/W Revision	Prior to A.02.00

Freq Error Limit for mBTS (BTS Type is one of Micro BTS types)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:PFERror:LIMit:MBTS:FERRor <real> :CALCulate:PFERror:LIMit:MBTS:FERRor?
Example	CALC:PFER:LIM:MBTS:FERR 10 CALC:PFER:LIM:MBTS:FERR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.

Preset	0.05
State Saved	Saved in instrument state.
Min	0
Max	100
Initial S/W Revision	Prior to A.02.00

Freq Error Limit for pBTS (BTS Type is Pico1)

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:PFError:LIMit:PBTS:FERRor <real> :CALCulate:PFError:LIMit:PBTS:FERRor?
Example	CALC:PFER:LIM:PBTS:FERR 10 CALC:PFER:LIM:PBTS:FERR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Unit is ppm.
Preset	0.1
State Saved	Saved in instrument state.
Min	0
Max	100
Initial S/W Revision	Prior to A.02.00

Freq Error Limit for MS

Key Path	Meas Setup, Limits
Mode	GSM
Remote Command	:CALCulate:PFError:LIMit:MS:FERRor <real> :CALCulate:PFError:LIMit:MS:FERRor?
Example	CALC:PFER:LIM:MS:FERR 10 CALC:PFER:LIM:MS:FERR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.
Min	0
Max	100
Initial S/W Revision	Prior to A.02.00

Meas Preset

Restores all the measurement parameters to their default values.

Key Path	Meas Setup
Mode	GSM
Remote Command	:CONFigure:PFERror
Example	CONF:PFER
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

Average Type (Backward Compatibility/Remote Command Only)

Allows you to select the averaging type from the following selections:

- Maximum – The maximum values are restored (the maximum of all values is retained).
- Mean – The mean values are restored (the average of all values is retained).

Mode	EDGE GSM
Remote Command	[:SENSe] :PFERror:AVERage:TYPE MEAN MAXimum [:SENSe] :PFERror:AVERage:TYPE?
Example	PFER:AVER:TYPE MEAN PFER:AVER:TYPE?
Notes	SCPI only. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	MAXimum
State Saved	Saved in instrument state.
Range	Mean Maximum
Initial S/W Revision	Prior to A.02.00

Mode

See ["Mode" on page 136](#)

Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See ["How-To Preset" on page 1168](#) for more information.

Key Path	Front-panel key
Remote Command	:SYSTem:PRESet
Example	:SYST:PRES
Notes	*RST is preferred over :SYST: PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0.
Couplings	A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set.
Backwards Compatibility Notes	In the X-Series, the legacy “Factory Preset” has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no “Preset Type” as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using

	User Preset.
Initial S/W Revision	Prior to A.02.00

How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple – is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset – is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset – resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults – resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

Type Of Preset	SCPI Command	Front Panel Access
Auto Couple	:COUPle ALL	Auto Couple front-panel key
Meas Preset	:CONFigure:<Measurement>	Meas Setup Menu
Mode Preset	:SYSTem:PRESet	Mode Preset (green key)
Restore Mode Defaults	:INSTrument:DEFault	Mode Setup Menu
Restore All Mode Defaults	:SYSTem:DEFault MODEs	System Menu; Restore System Default Menu
*RST	*RST	not possible (Mode Preset with Single)
Restore Input/Output Defaults	:SYSTem:DEFault INPut	System Menu; Restore System Default Menu
Restore Power On Defaults	:SYSTem:DEFault PON	System Menu; Restore System Default Menu
Restore Alignment Defaults	:SYSTem:DEFault ALIGn	System Menu; Restore System Default Menu
Restore Miscellaneous Defaults	:SYSTem:DEFault MISC	System Menu; Restore System Default Menu
Restore All System Defaults	:SYSTem:DEFault [ALL] :SYSTem:PRESet:PERSistent	System Menu; Restore System Default Menu
User Preset	:SYSTem:PRESet:USER	User Preset Menu
User Preset All Modes	:SYSTem:PRESet:USER:ALL	User Preset Menu

Power On Mode Preset	:SYSTem:PON:TYPE MODE	System Menu
Power On User Preset	:SYSTem:PON:TYPE USER	System Menu
Power On Last State	:SYSTem:PON:TYPE LAST	System Menu

Mode Setup

See "[Mode Setup](#)" on page 151

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace. Pressing Peak Search with the selected marker off causes the selected marker to be set to Normal, then a peak search is immediately performed.

When Marker Trace of the selected marker is POL, peak search will not be performed.

Key Path	Peak Search
Mode	GSM
Remote Command	:CALCulate:PFERror:MARKer[1] 2 ... 12:MAXimum
Example	CALC:PFER:MARK2:MAX
Initial S/W Revision	Prior to A.02.00

Print

See "Print " on page 161

Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

Type	Default Prefix	Menu
State	State_	(Save/Recall)
Trace + State	State_	(Save/Recall)
Screen	Screen_	(Save/Recall)
Amplitude Corrections	Ampcor_	(Import/Export)
Traces	Trace_	(Import/Export)
Limit Lines	LLine_	(Import/Export)
Measurement Result	MeasR_	(Import/Export)
Capture Buffer	CapBuf_	(Import/Export)

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State_0000.state. The next is State_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State_0010.state there is already a State_0010.state file in the current directory, it advances the counter to State_0011.state to ensure that no conflict will exist (and then it verifies that State_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred_0000.csv.

NOTE Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

NOTE If the filename you entered ends with _dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

Key Path	Front-panel key
Notes	No remote command for this key specifically.
Initial S/W Revision	Prior to A.02.00

Recall

The **Recall** menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an **Import (Data)** option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	Front-panel key
Notes	No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATe <filename>. If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.
Backwards Compatibility Notes	In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data. In the X-Series, “state” always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.
Backwards Compatibility Notes	Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows. Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible. It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user. Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.
Initial S/W Revision	Prior to A.02.00

State

The **Recall State** menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the

additional settings affected by Restore Mode Defaults; all of the Mode’s settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode’s state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. **Recall State** will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or “Recalled State Register <register number>” is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See ["More Information" on page 1177](#).

Key Path	Recall
Mode	All
Remote Command	:MMEMory:LOAD:STATe <filename>
Example	:MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path
Example	MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state.
Notes	When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled. • If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number. After recalling the state, the Recall State function does the following: • Makes the saved measurement for the mode the active measurement. • Clears the input and output buffers. • Status Byte is set to 0. • Executes a *CLS If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If

	there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away. After the Recall, the analyzer exits the Recall menu and returns to the previous menu.
Backwards Compatibility SCPI	:MMEMory:LOAD:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored.
Initial S/W Revision	Prior to A.02.00

More Information

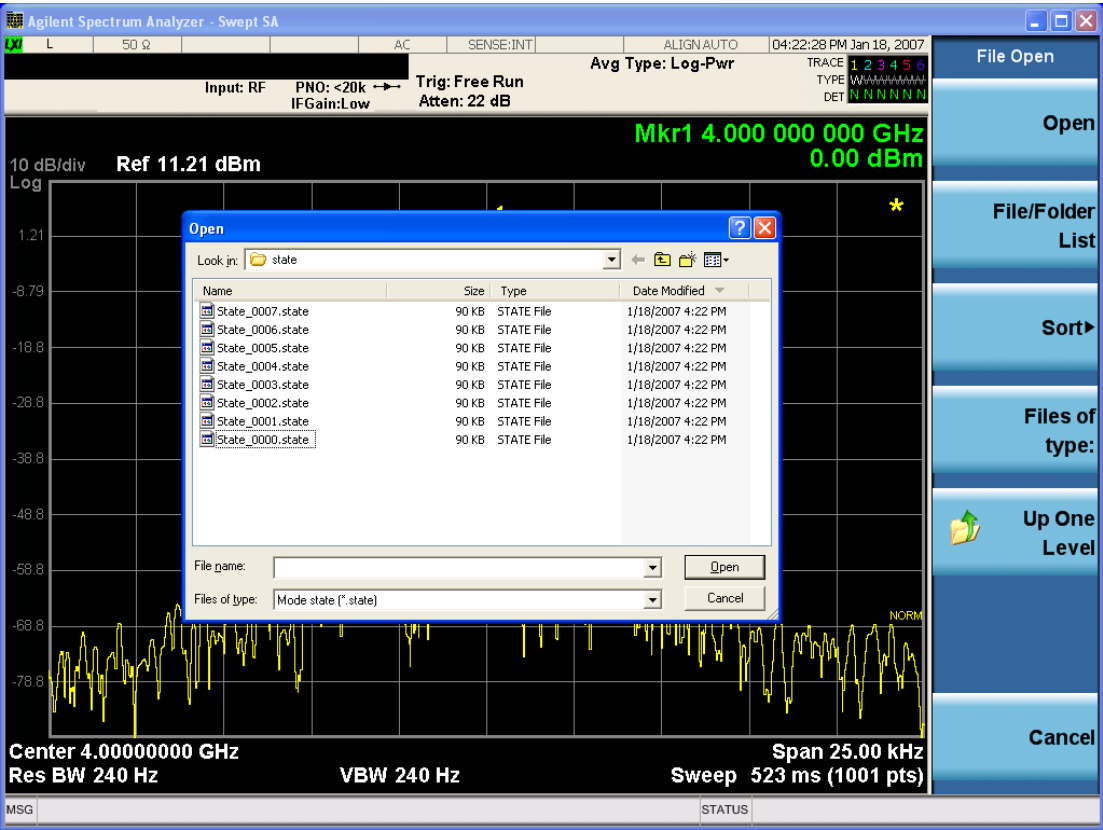
In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

The following table describes the Trace Save and Recall possibilities:

You want to recall state and one trace's data, leaving other traces unaffected.	Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed.	On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed.
You want to recall all traces	Save Trace+State from ALL traces.	On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved)
You want all traces to load exactly as they were when saved.	Save State	On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten.

From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

Look In

The **Look In** field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are **By Date**, **By Name**, **By extension**, and **By Size**.

Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

Key Path	Recall, State
Notes	Brings up the Open dialog for recalling a State Save Type
Initial S/W Revision	Prior to A.02.00

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the **Save, State** function.

Key Path	Recall, State
Mode	All
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available"
Initial S/W Revision	A.11.00

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
Example	*RCL 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
Example	*RCL 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State, Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

Key Path	Recall, Sequences
Mode	All
Remote Command	:MMEMory:LOAD:SEquences: SLIS ALIS SAALIS "MySequence.txt"
Example	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Notes	Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt)
Initial S/W Revision	A.05.00

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Recall, Sequences
Example	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Dependencies	Only available in XOBT
Initial S/W Revision	A.05.00

Open...

When you press “Open”, the analyzer brings up a Windows dialog and a menu entitled “**File Open.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "**From File...**" on page 1473 in **Recall, State**, for a full description of this dialog and menu.

Key Path	Recall, Data
Notes	The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type
Initial S/W Revision	Prior to A.02.00

Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMediate
- Sending the remote command INIT:REStart

See ["More Information" on page 1183](#)

Key Path	Front-panel key
Remote Command	:INITiate[:IMMediate] :INITiate:REStart
Example	:INIT:IMM :INIT:REST
Notes	:INITiate:REStart and :INITiate:IMMediate perform exactly the same function.
Couplings	Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement.
Status Bits/OPC dependencies	This is an Overlapped command. The STATUS:OPERation register bits 0 through 8 are cleared. The STATUS:QUESTionable register bit 9 (INTEgrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set.
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:REStart command restart trace averages (displayed average count reset to 1) for a trace in Clear Write , but did not restart Max Hold and Min Hold . In the X-Series, the Restart hardkey and the INITiate:REStart command restart not only Trace Average , but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:REStart command restart every measurement, which includes all traces and numeric results. There is no change to this operation.
Initial S/W Revision	Prior to A.02.00

More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average**, **Max Hold**, or **Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count k equals the number N set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC: AVER: TCON UP.

Save

The **Save** menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an **Export (Data)** option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

Key Path	Front-panel key
Mode	All
Notes	No remote command for this key specifically, but the :MMEM:STOR:STATE command is available for specific file types. An example is :MMEM:STOR:STATE <filename>.
Initial S/W Revision	Prior to A.02.00

State

The Save State menu lets you choose a register or file for saving the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent **System** settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<mode name>\state

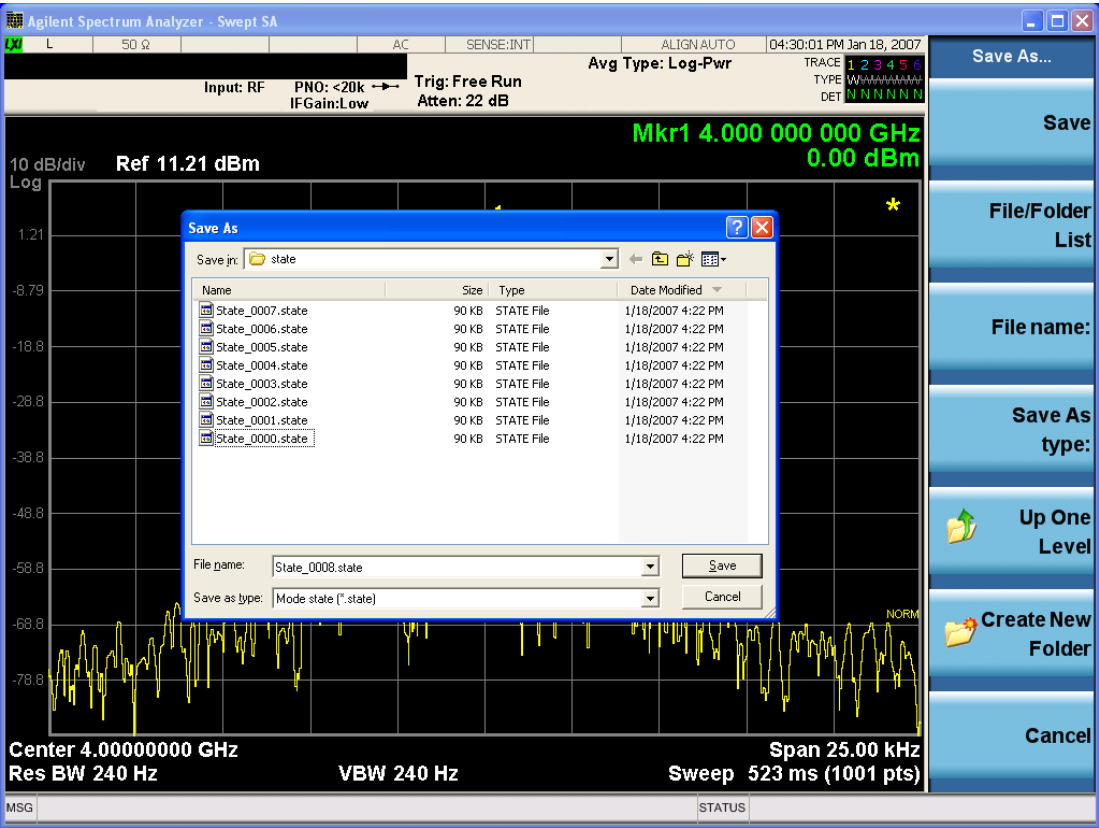
where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save
Mode	All
Remote Command	:MMEMory:STOR:STATE <filename>
Example	MMEM:STOR:STATE "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory.
Notes	Both single and double quotes are supported for any filename parameter over remote. After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key. After saving to a register, you remain in the Save State menu, so that you can see the Register key

	update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.
Backwards Compatibility SCPI	:MMEMory:STORe:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.
Initial S/W Revision	Prior to A.02.00

To File . . .

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “Save As.” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



The Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting **OK**, or you can Cancel the request. If you select OK, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

File Name

The **File Name** field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 1469](#) documentation for more on the automatic file naming algorithm.

When you press the **File Name** key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the **Done** softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Create New Folder

This key corresponds to the icon of a folder with the "*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

Key Path	Save, State
Mode	All
Notes	Brings up Save As dialog for saving a State Save Type
Initial S/W Revision	Prior to A.02.00

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See ["More Information" on page 1188](#)

Key Path	Save, State
Mode	All
Remote Command	:MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number>
Example	:MMEM:REG:STAT:LAB 1,"my label"
Notes	<reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,""
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available"
Preset	The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc"
Initial S/W Revision	A.11.00

More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The *SAV and *RCL commands will not be affected by the custom register names, nor will the MMEM commands.

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
Example	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
Example	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

Mass Storage Catalog (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:CATalog? [<directory_name>]
Notes	The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty
Initial S/W Revision	Prior to A.02.00

Mass Storage Change Directory (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory?

Notes	The string must be a valid logical path. Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value. At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal. Query returns full path of the default directory.
Initial S/W Revision	Prior to A.02.00

Mass Storage Copy (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:COpy <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Copies an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists. This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

Key path	SCPI Only
Remote Command	:MMEMory:COpy:DEvice <source_string>,<dest_string>
Notes	The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device. Valid device keywords are: SNS (smart noise source) An error is generated if the file or device is not found.

Mass Storage Delete (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:DElete <file_name>[,<directory_name>]

Notes	The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an “access denied” error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

Key path	SCPI Only
Remote Command	:MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name>
Notes	The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format.
Initial S/W Revision	Prior to A.02.00

Mass Storage Make Directory (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:MDIRectory <directory_name>
Notes	The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an “access denied” error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Mass Storage Move (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:MOVE <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source.

	The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists. This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Mass Storage Remove Directory (Remote Command Only)

Key path	SCPI Only
Remote Command	<code>:MMEMory:RDIRectory <directory_name></code>
Notes	The string must be a valid logical path. Removes a directory. The <directory_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed. This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

Key Path	Save, Sequences
Mode	All
Remote Command	<code>:MMEM:STOR:SEquences: SLISt ALISt SAALISt SSTep "MySequence.txt"</code>
Example	<code>:MMEM:STOR:SEQ:SLISt "MySequence.txt"</code>
Notes	Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt)
Initial S/W Revision	A.05.00

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Save, Sequences
Example	:MMEM:STOR:SEQ:SLIS "MySequence.txt"
Dependencies	Only available in XOBT
Initial S/W Revision	A.05.00

Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

Key Path	Save, Sequences
Mode	All
Notes	Brings up Save As dialog for saving a Sequence Save Type
Initial S/W Revision	A.05.00

Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

Key Path	Save
Mode	All
Notes	The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in

	the MMEM:STOR commands.
Dependencies	If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it.
Preset	Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults
Readback	The data type that is currently selected
Initial S/W Revision	Prior to A.02.00

Measurement Results

Pressing this key selects Meas Results as the data type to be exported. Pressing the key a second time brings up the Meas Results menu, which allows you to select which **Meas Result** to save. In the Swept SA measurement, there are three types of Measurement Results files: Peak Table, Marker Table and Spectrogram.

See ["Meas Results File Contents" on page 1196](#).

See ["Marker Table" on page 1196](#).

See ["Peak Table" on page 1198](#).

See ["Spectrogram" on page 1201](#)

Remote Command	:MMEMory:STORe:RESults:MTABle PTABle SPECtrogram <filename>
Example	:MMEM:STOR:RES:MTAB "myResults.csv" Saves the results from the current marker table to the file myResults.csv in the current path. :MMEM:STOR:RES:PTAB "myResults.csv" Saves the results from the current peak table to the file myResults.csv in the current path. :MMEM:STOR:RES:SPEC "myResults.csv" Saves the results from the current Spectrogram display to the file myResults.csv in the current path. The default path is My Documents\SA\data\SAN\results
Notes	If the save is initiated via SCPI, and the file already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	If a save of Marker Table results is requested and the Marker Table is not on, no file is saved and a message is generated If a save of Peak Table results is requested and the Peak Table is not on, no file is saved and a message is generated If a save of Spectrogram results is requested and the Spectrogram is not on, no file is saved and a message is generated. The Spectrogram choice only appears if option EDP is licensed.
Preset	Not part of Preset, but is reset to Peak Table by Restore Mode Defaults. Survives a shutdown.
Initial S/W Revision	Prior to A.02.00

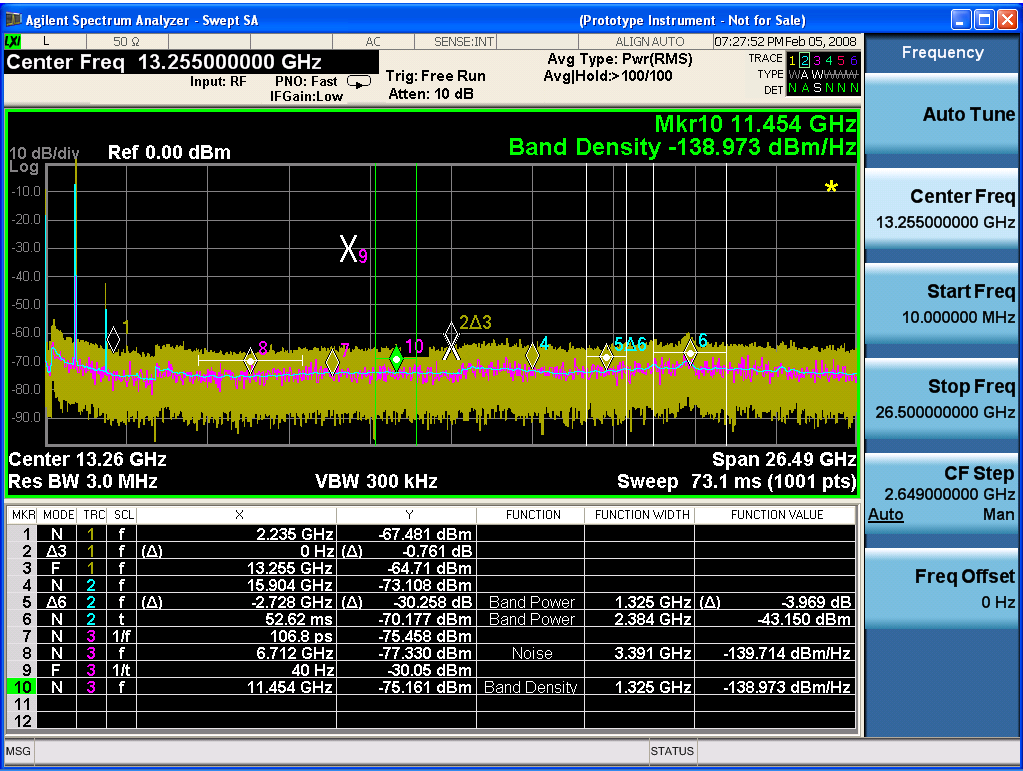
Meas Results File Contents

All files are .csv files. The following section details the data in each file type.

Marker Table

This section discusses the Marker Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:



Then the Meas Results file, when opened, would show the following data:

MeasurementR	
result	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR	1
P26 EA3	
Result Type	Marker Table
Ref Level	0
Number of Points	1001
Sweep Time	0.0662666
	67

Start Frequency	10000000								
Stop Frequency	26500000000								
Average Count	0								
Average Type	LogPower (Video)								
RBW	3000000								
RBW Filter	Gaussian								
RBW Filter BW	3dB								
VBW	3000000								
Sweep Type	Swept								
X Axis Scale	Lin								
PreAmp State	Off								
PreAmp Band	Low								
Trigger Source	Free								
Trigger Level	1.2								
Trigger Slope	Positive								
Trigger Delay	1.00E-06								
Phase Noise Optimization	Fast								
Swept If Gain	Low								
FFT If Gain	Autorange								
RF Coupling	AC								
FFT Width	411900								
Ext Ref	10000000								
Input	RF								
RF Calibrator	Off								
Attenuation	10								
Ref Level Offset	0								
External Gain	0								
X Axis Units	Hz								
Y Axis Units	dBm								
DATA									
MKR	MODE	TR C	SCL	X	Y	FUNCTI ON	FUNCTIO N WIDTH	FUNCTI ON VALUE	FUNCTI ON UNIT
1	Normal	1	Freque ncy	2.2350E+09	- 67.481	Off	0.0000E+00	0	None

2	Delta3	1	Frequ ncy	0.0000E+ 00	– 0.76 1	Off	0.0000E+ 00	0	None
3	Fixed	1	Frequ ncy	1.3255E+ 10	– 64.7 1	Off	0.0000E+ 00	0	None
4	Normal	2	Frequ ncy	1.5904E+ 10	– 73.1 08	Off	0.0000E+ 00	0	None
5	Delta7	2	Frequ ncy	– 2.7280E+ 09	– 30.2 58	Band Power	1.3250E+ 06	–3.969	dB
6	Normal	2	Time	5.2620E– 02	– 70.1 77	Band Power	2.3840E+ 06	–43.15	dBm
7	Normal	3	Period	1.0680E– 10	– 75.4 58	Off	0.0000E+ 00	0	None
8	Normal	3	Frequ ncy	6.7120E+ 09	– 77.3 3	Noise	3.3910E+ 06	– 139.71 4	dBm/Hz
9	Fixed	3	Inverse Time	4.0000E+ 01	– 30.0 5	Off	0.0000E+ 00	0	None
10	Normal	3	Frequ ncy	1.1454E+ 10	– 75.1 61	Band Density	1.3250E+ 06	– 138.97 3	dBm/Hz
11	Off	1	Frequ ncy	0.0000E+ 00	0	Off	0.0000E+ 00	0	None
12	Off	1	Frequ ncy	0.0000E+ 00	0	Off	0.0000E+ 00	0	None

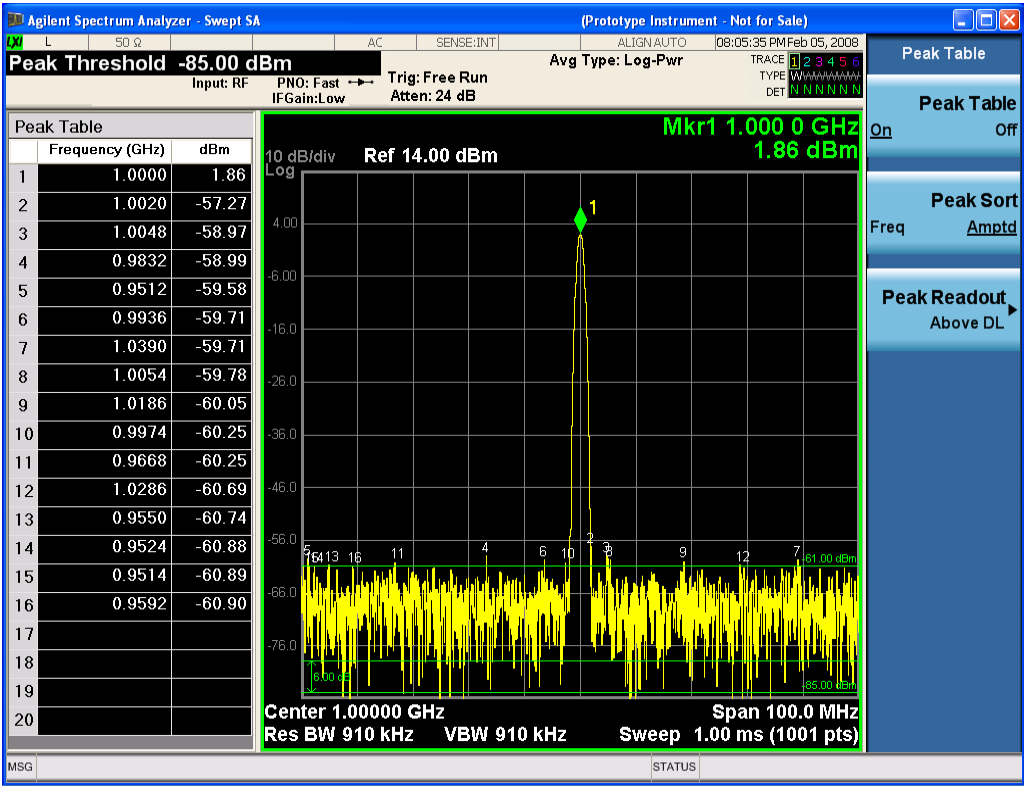
The numbers appear in the file exactly as they appear onscreen. If it says 11.454 GHz onscreen, then in the file it is 11.454E+09.

The metadata header is very similar to the metadata used in the trace data .csv files. See Trace File Contents. The only new information concerns the 1-of-N fields in the marker table itself.

Peak Table

This section discusses the Peak Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:



Then the Meas Results file, when opened, would show the header data (the same as for the Marker Table except that the Result Type is Peak Table) ending with a few fields of specific interest to Peak Table users:

- Peak Threshold
- Peak Threshold State (On|Off)
- Peak Excursion
- Peak Excursion State (On|Off)
- Display Line
- Peak Readout (All|AboveDL|BelowDL)
- Peak Sort (Freq|Amptd)

These fields are then followed by the data for the Peak Table itself.

Note that the label for the Frequency column changes to Time in 0 span.

Here is what the table for the above display looks like:

MeasurementResult	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR P26 EA3	1

Result Type	Peak Table
Ref Level	0
Number of Points	1001
Sweep Time	0.066266667
Start Frequency	10000000
Stop Frequency	26500000000
Average Count	0
Average Type	LogPower(Video)
RBW	3000000
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	3000000
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	1.00E-06
Phase Noise Optimization	Fast
Swept If Gain	Low
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	10
Ref Level Offset	0
External Gain	0
X Axis Units	Hz
Y Axis Units	dBm
Peak Threshold	-85
Peak Threshold State	On
Peak Excursion	6
Peak Excursion State	On

Display Line	-61	
Peak Readout	AboveDL	
Peak Sort	Amptd	
DATA		
Peak	Frequency	Amplitude
1	1.0000E+06	1.86
2	1.0020E+06	-57.27
3	1.0048E+06	-58.97
4	9.8320E+05	-58.99
5	9.5120E+05	-59.58
6	9.9360E+05	-59.71
7	1.0390E+06	-59.71
8	1.0054E+06	-59.78
9	1.1086E+06	-60.05
10	9.9740E+05	-60.25
11	9.6680E+05	-60.25
12	1.0286E+06	-60.69
13	9.5500E+05	-60.74
14	9.5240E+05	-60.88
15	9.5140E+05	-60.89
16	9.5920E+05	-60.90
17		
18		
19		
20		

Spectrogram

This section discusses the Spectrogram Results file format. The Spectrogram choice only appears if option EDP is licensed.

The Spectrogram results are the same as a Trace data export, except that instead of having just one trace's data, all 300 traces appear one after the other.

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Each trace has its own data mark; the data for Spectrogram Trace 0 follows the row marked DATA, the data for Spectrogram Trace 1 follows the row marked DATA1, for Spectrogram Trace 2 follows the row marked DATA2, and so on.

Each DATA row has a timestamp in the second column (as of firmware revision A.11.01). So, for example, if Trace 0 had a relative start time of 1729.523 sec, then the first DATA row would look like this:

DATA,1729.523

And if Trace 13 had a relative start time of 100.45 sec, then the fourteenth data row would look like:

DATA13,100.453

To find the absolute time for the relative timestamps of each trace, the last row before the first DATA row gives the absolute start time of the Spectrogram, in the form YYYYMMDDHHMMSS

So, for example, if the absolute start time is 13:23:45:678 on January 30, 2012, this row would look like:

Start Time,20120130132345678

NOTE:

NOTE

The resolution of the absolute time stored is 1 ms, which matches up with the fact that the fastest sweep time is also 1 ms. However, there is no specification for the absolute accuracy of the clock in the analyzer, nor is there any facility provided to allow the user to set this time to any particular degree of accuracy.

Traces that have not yet been filled in the Spectrogram display are empty; there is no DATA header for them. The file ends after the last non-empty trace.

Imagine that, at the point where a Spectrogram Meas Result is requested, the following screen is showing:



For the purpose of this example, we have set the Average/Hold Number to 10, thus we have only traces 0 thru 10. The Spectrogram was started at 02:28:08:700 pm on April 25, 2012 (that is, 700 ms after 2:28:08 pm), although the screen dump itself shows a different time, as it was taken ten minutes after the Spectrogram data. Trace 0 is showing a start time of 5.30 seconds, meaning 5.3 seconds after the Spectrogram started (trace 10 has a start time of 0, as it was the first trace taken but has now rolled up into the tenth trace slot).

The Meas Results file, when opened, shows the header data and ten traces of trace data. Below is an extract from the result file for the above display. Note the start time of 20120425142808700 showing in the last row before the first DATA row, and the relative time of 5.299231048 showing in the first DATA row:

Result Type	Spectrogram
MeasResult	
Swept SA	
A.11.00.01	N9020A
503 508 513 526 ALL ALV B1C B1X B25 B2X B40 BAB BBA CR3 CRP DP2 DRD EA3 EDP EMC EP1 ERC ESC ESP EXM FSA HBA K03 LFE MPB P03 P08 P13 P26 PFR RTL RTS S40 SB1 SEC SM1 UK6 YAS YAV	1
Segment	0
Number of Points	1001
Sweep Time	0.523333333
Start Frequency	5999984415
Stop Frequency	6000009415
Average Count	0
Average Type	LogPower(Video)
RBW	240
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	240
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	0
Phase Noise Optimization	Wide
Swept If Gain	Low

Result Type	Spectrogram
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	14
Ref Level Offset	0
External Gain	0
Trace Type	Clearwrite
Detector	Normal
Trace Math	Off
Trace Math Oper1	Trace5
Trace Math Oper2	Trace6
Trace Math Offset	0
Trace Name	Trace1
X Axis Units	Hz
Y Axis Units	dBm
Start Time	20120425142808700
DATA	5.299231048
5999984415	-76.34749519
5999984440	-77.28097006
5999984465	-75.32317869
5999984490	-73.64417681
5999984515	-72.67154604

O

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O

6000009315	-77.94423277
6000009340	-79.51829697
6000009365	-78.46108961
6000009390	-78.46108957
6000009415	-76.59570596
DATA2	4.708697055

5999984415	-80.98197882
5999984440	-80.98197879
5999984465	-75.83142132
5999984490	-74.02712079
5999984515	-73.57213005

0
0
0

6000009315	-75.9183103
6000009340	-79.53787488
6000009365	-78.82602191
6000009390	-78.82602188
6000009415	-76.37486709
DATA10	0
5999984415	-75.56751112
5999984440	-75.76485645
5999984465	-76.67718717
5999984490	-78.79238489
5999984515	-83.72680212

0
0
0

6000009315	-71.3942461
6000009340	-72.28308332
6000009365	-73.92684489
6000009390	-75.45548832
6000009415	-75.17904815

Save As . . .

When you press “Save As”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See ["To File . . ." on page 1482](#) in **Save, State** for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<mode name>\data\limits

For all of the Measurement Results Data Files:

My Documents\<mode name>\data\<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<mode name>\data\captureBuffer

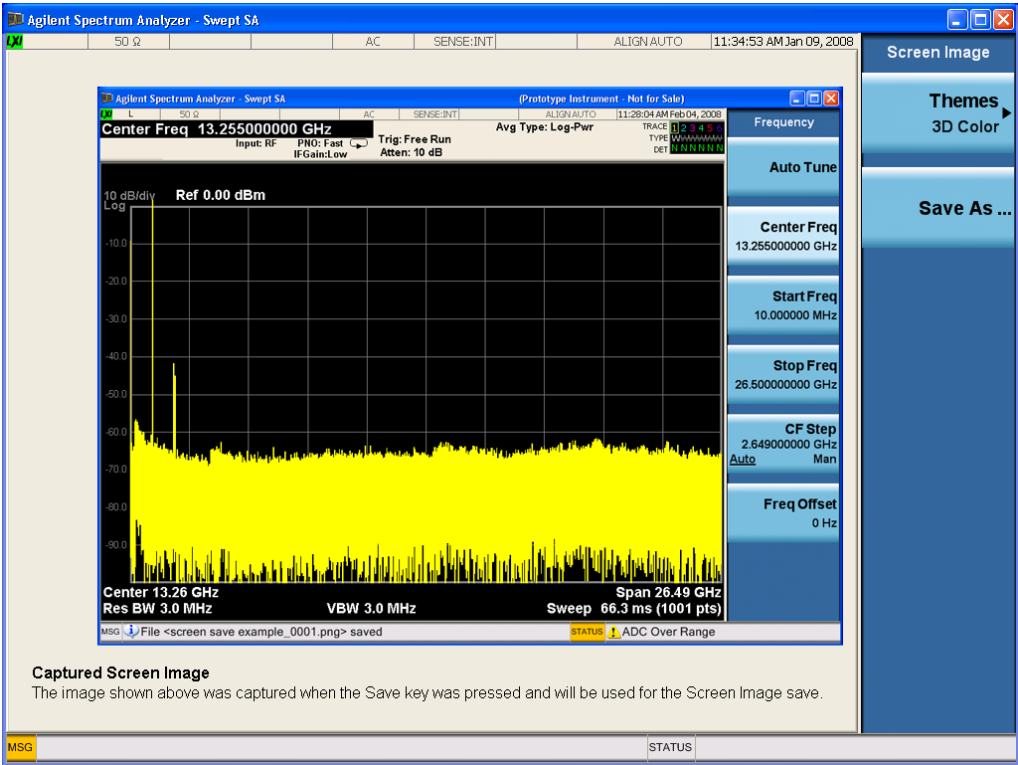
Key Path	Save, Data
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision	Prior to A.02.00

Screen Image

Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the **Save** front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the **Save As** menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the **Save** menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the **Quick Save** front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

NOTE

For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

Key Path	Save
Mode	All
Remote Command	:MMEMory:STORe:SCReen <filename>
Example	:MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory.
Initial S/W Revision	Prior to A.02.00

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

Key Path	Save, Screen Image
Remote Command	:MMEMory:STORe:SCReen:THEMe TDCOLOR TDMonochrome FCOLOR FMONochrome :MMEMory:STORe:SCReen:THEMe?
Example	:MMEM:STOR:SCR:THEM TDM
Preset	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
Readback	3D Color 3D Mono Flat Color Flat Mono
Backwards Compatibility Notes	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
Initial S/W Revision	Prior to A.02.00

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDC
Readback	3D Color
Initial S/W Revision	Prior to A.02.00

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDM
Readback	3D Mono
Initial S/W Revision	Prior to A.02.00

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	Save, Screen Image, Themes

Example	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 1482 in **Save, State** for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\<mode name>\screen.

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save, Screen Image
Notes	Brings up Save As dialog for saving a Screen Image Save Type
Initial S/W Revision	Prior to A.02.00

Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing **Single** does a Resume.

See ["More Information" on page 1210](#)

Key Path	Front-panel key
Example	:INIT:CONT OFF
Notes	See Cont key description.
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold. For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state. INIT[:IMM] in ESA & PSA Spectrum Analysis Mode does an implied ABORT. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.
Initial S/W Revision	Prior to A.02.00

More Information

See ["Restart" on page 1479](#) for details on the INIT:IMMediate (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the **Single** key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the **Single** key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the **Single** key in the middle of a sweep does not restart the sweep, sending INIT:IMMediate does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

Key Path	Front-panel key

RF Output

This parameter sets the source RF power output state.

Key Path	Source
Remote Command	:OUTPut[:EXTernal][:STATe] ON OFF 1 0 :OUTPut[:EXTernal][:STATe]?
Example	OUTP OFF OUTP?
Notes	The EXTERNAL node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source. This setting is for the independent mode and has no effect on the "List Sequencer" on page 1584. If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately. When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the "Sequencer" on page 1585 is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

Amplitude

Allows you to access the Amplitude sub-menu.

Key Path	Source
Notes	The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 1584. If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set "Sequencer" on page 1585 to Off will make source leave list sequencer and this button will be black out.
Initial S/W Revision	A.05.00

RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the ["RF Power Range " on page 1213](#) table below for the valid ranges.

Key Path	Source, Amplitude
Remote Command	:SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]?
Example	:SOUR:POW -100 dBm
Notes	Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel. Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Couplings	If "Real-Time AWGN" on page 1545 AWGN State is On and "ARB" on page 1534 ARB State is On, this setting will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 1546 Power Control Mode and other noise settings
Preset	-100 dBm
Min	The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 1213 table below for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 1213 table below for the valid ranges.

Initial S/W Revision	A.05.00
Modified at S/W Revision	A.16.00 (Add couplings with AWGN state)

RF Power Range

RF Output Port	Frequency Range	Min Output Power	Max Output Power
High Power RF Out	10 MHz $\leq$ f $\leq$ 6 GHz	-150 dBm	20 dBm
RFIO 1 & RFIO 2	10 MHz $\leq$ f $\leq$ 6 GHz	-150 dBm	0 dBm
GPS (Note2)	10 MHz $\leq$ f $\leq$ 6 GHz	-150 dBm	0 dBm

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power – entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

Key Path	Source, Amplitude
Dependencies	This key is unavailable, and is grayed out when the "List Sequencer" on page 1584 is turned ON.
Initial S/W Revision	A.05.00

Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 1500](#)

Key Path	Source, Amplitude
Remote Command	:SOURce:POWer:REfERENCE <ampl> :SOURce:POWer:REfERENCE? :SOURce:POWer:REfERENCE:STATe OFF ON 0 1 :SOURce:POWer:REfERENCE:STATe?
Example	:SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATe ON
Dependencies	This setting is unavailable and is grayed out when the "List Sequencer" on page 1584 is turned ON.
Couplings	This value is coupled to the "Set Reference Power " on page 1500 key such that pressing the Set Reference Power key updates the reference power with the current output power.
Preset	0.00 dBm OFF
Min	-125.00 dBm
Max	10.00 dBm
Initial S/W Revision	A.05.00

Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

Key Path	Source, Amplitude
Remote Command	:SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_ampl> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet?
Example	:SOUR:POW:OFFS 0.00 dB
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0.00 dB
Min	-200.00 dB
Max	200.00 dB
Initial S/W Revision	A.05.00

Modulation

Allows you to toggle the state of the modulation.

Key Path	Source
Remote Command	:OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]?
Example	:OUTP:MOD OFF
Notes	This setting is for independent mode and has no effect on "List Sequencer" on page 1584 . If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately. When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the "Sequencer" on page 1585 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer.
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

Frequency

Allows you to access the Frequency sub-menu.

Key Path	Source
Notes	The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 1584 . If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out.
Initial S/W Revision	A.05.00

Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW]?
Example	:SOUR:FREQ 1.00 GHz
Notes	Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency.
Couplings	The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency.
Preset	1.00 GHz
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: **"GSM/EDGE Channel Number Ranges" on page 1217**,

"W-CDMA Channel Number Ranges" on page 1218, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 1219, and "LTE FDD Channel Number Ranges" on page 1221.

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:CHANnels:NUMBer <int> :SOURce:FREQuency:CHANnels:NUMBer?
Example	:SOUR:FREQ:CHAN:NUMB 1
Notes	This key is grayed out when the "Radio Standard" on page 1512 is set to NONE. This key is grayed out on E6630A.
Dependencies	This key is grayed out when the "Radio Standard" on page 1512 is set to NONE. This key is grayed out on E6630A.
Couplings	The channel number is coupled to the frequency value when the "Radio Standard" on page 1512 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	Please refer to the tables below for the valid ranges.
Max	Please refer to the tables below for the valid ranges.
Initial S/W Revision	A.05.00

GSM/EDGE Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
P-GSM	Uplink (MS)	$1 \leq n \leq 124$	$890.0 + 0.2*n$
	Downlink (BS)	$1 \leq n \leq 124$	$935.0 + 0.2*n$
E-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$975 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$975 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
DCS 1800	Uplink (MS)	$512 \leq n \leq 885$	$1710.200 + 0.20*(n-512)$
	Downlink (BS)	$512 \leq n \leq 885$	$1805.200 + 0.20*(n-512)$
PCS 1900	Uplink (MS)	$512 \leq n \leq 810$	$1850.200 + 0.2*(n-512)$
	Downlink (BS)	$512 \leq n \leq 810$	$1930.200 + 0.2*(n-512)$
R-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$955 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$955 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
GSM 450	Uplink (MS)	$256 \leq n \leq 293$	$450.6 + 0.2*(n-259)$
	Downlink (BS)	$256 \leq n \leq 293$	$460.6 + 0.2*(n-259)$

Band	Link (Device)	Range	Frequency (MHz)
GSM 480	Uplink (MS)	$306 \leq n \leq 340$	$479.000 + 0.20*(n-306)$
	Downlink (BS)	$306 \leq n \leq 340$	$489.000 + 0.20*(n-306)$
GSM 850	Uplink (MS)	$128 \leq n \leq 251$	$824.200 + 0.20*(n-128)$
	Downlink (BS)	$128 \leq n \leq 251$	$869.200 + 0.20*(n-128)$
GSM 700	Uplink (MS)	$438 \leq n \leq 516$	$777.200 + 0.20*(n-438)$
	Downlink (BS)	$438 \leq n \leq 516$	$747.200 + 0.20*(n-438)$
T-GSM810	Uplink (MS)	$350 \leq n \leq 425$	$806.0 + 0.20*(n-350)$
	Downlink (BS)	$350 \leq n \leq 425$	$851.0 + 0.20*(n-350)$

W-CDMA Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
Band I	Downlink	$10562 \leq n \leq 10838$	$n \div 5$
	Uplink	$9612 \leq n \leq 9888$	$n \div 5$
Band II	Downlink	$412 \leq n \leq 687$	$n \div 5 + 1850.1$
		$9662 \leq n \leq 9938$	$n \div 5$
	Uplink	$12 \leq n \leq 287$	$n \div 5 + 1850.1$
		$350 \leq n \leq 425$	$n \div 5$
Band III	Downlink	$1162 \leq n \leq 1513$	$n \div 5 + 1575$
	Uplink	$937 \leq n \leq 1288$	$n \div 5 + 1525$
Band IV	Downlink	$537 \leq n \leq 1738$	$n \div 5 + 1805$
		$1887 \leq n \leq 2087$	$n \div 5 + 1735.1$
	Uplink	$1312 \leq n \leq 1513$	$n \div 5 + 1450$
		$1662 \leq n \leq 1862$	$n \div 5 + 1380.1$
Band V	Downlink	$1007 \leq n \leq 1087$	$n \div 5 + 670.1$
		$4357 \leq n \leq 4458$	$n \div 5$
	Uplink	$782 \leq n \leq 862$	$n \div 5 + 670.1$
		$4132 \leq n \leq 4233$	$n \div 5$
Band VI	Downlink	$1037 \leq n \leq 1062$	$n \div 5 + 670.1$
		$4387 \leq n \leq 4413$	$n \div 5$
	Uplink	$812 \leq n \leq 837$	$n \div 5 + 670.1$
		$4162 \leq n \leq 4188$	$n \div 5$
Band VII	Downlink	$2237 \leq n \leq 2563$	$n \div 5 + 2175$
		$2587 \leq n \leq 2912$	$n \div 5 + 2105.1$
	Uplink	$2012 \leq n \leq 2338$	$n \div 5 + 2100$
		$2362 \leq n \leq 2687$	$n \div 5 + 2030.1$
Band VIII	Downlink	$2937 \leq n \leq 3088$	$n \div 5 + 340$

Band	Link (Device)	Range	Frequency (MHz)
Band IX	Uplink	$2712 \leq n \leq 2863$	$n \div 5 + 340$
	Downlink	$9237 \leq n \leq 9387$	$n \div 5$
	Uplink	$8762 \leq n \leq 8912$	$n \div 5$
Band X	Downlink	$3112 \leq n \leq 3388$	$n \div 5 + 1490$
		$3412 \leq n \leq 3687$	$n \div 5 + 1430.1$
	Uplink	$2887 \leq n \leq 3163$	$n \div 5 + 1135$
		$3187 \leq n \leq 3462$	$n \div 5 + 1075.1$
Band XI	Downlink	$3712 \leq n \leq 3812$	$n \div 5 + 736$
	Uplink	$3487 \leq n \leq 3587$	$n \div 5 + 733$
Band XII	Downlink	$3837 \leq n \leq 3903$	$n \div 5 - 37$
		$3927 \leq n \leq 3992$	$n \div 5 - 54.9$
	Uplink	$3612 \leq n \leq 3678$	$n \div 5 - 22$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIII	Downlink	$4017 \leq n \leq 4043$	$n \div 5 - 55$
		$4067 \leq n \leq 4092$	$n \div 5 - 64.9$
	Uplink	$3792 \leq n \leq 3818$	$n \div 5 + 21$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIV	Downlink	$4117 \leq n \leq 4143$	$n \div 5 - 63$
		$4167 \leq n \leq 4192$	$n \div 5 - 72.9$
	Uplink	$3892 \leq n \leq 3918$	$n \div 5 + 12$
		$3942 \leq n \leq 3967$	$n \div 5 + 2.1$
Band XIX	Downlink	$712 \leq n \leq 763$	$n \div 5 + 735$
		$787 \leq n \leq 837$	$n \div 5 + 720.1$
	Uplink	$312 \leq n \leq 363$	$n \div 5 + 770$
		$387 \leq n \leq 437$	$n \div 5 + 755.1$

CDMA 2000 / 1xEVDO Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
US Cellular	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.030 \times N + 825.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 825.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 815.040$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.030 \times N + 870.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 870.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 860.040$
US PCS	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1850.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
Japan Cellular Band	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$1930.000 + 0.050 \times N$
		$1 \leq N \leq 799$	$0.0125 \times (N + 915.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 898.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 887.000$
	Downlink (BS, forward link)	$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 893.000$
		$1 \leq N \leq 799$	$0.0125 \times (N + 860.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 843.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 832.000$
Korean PCS Band	Uplink (MS, reverse link)	$0 \leq N \leq 599$	$0.050 \times N + 1750.000$
	Downlink (BS, forward link)	$0 \leq N \leq 599$	$0.050 \times N + 1840.000$
NMT-450 Band	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 450.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 410.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 451.010$
		$1536 \leq N \leq 1715$	$0.025 \times (N - 1536) + 479.000$
		$1792 \leq N \leq 2016$	$0.020 \times (N - 1792) + 479.000$
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 460.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 420.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 461.010$
		$1536 \leq N \leq 1715$	$0.025 \times (N - 1536) + 489.000$
		$1792 \leq N \leq 2016$	$0.020 \times (N - 1792) + 489.000$
IMT-2000 Band	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1920.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$2100.000 + 0.050 \times N$
Upper 700 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$776.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 240$	$746.000 + 0.050 \times N$
Secondary 800 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 719$	$0.025 \times N + 806.000$
		$720 \leq N \leq 919$	$0.025 \times (N - 720) + 896.000$
	Downlink (BS, forward link)	$0 \leq N \leq 719$	$0.025 \times N + 851.000$
		$720 \leq N \leq 919$	$0.025 \times (N - 720) + 935.000$
2.5 GHz IMT Extension	Uplink (MS, reverse link)	$0 \leq N \leq 1399$	$2500.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1399$	$2620.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
US PCS 1.9 GHz	Uplink (MS, reverse link)	$0 \leq N \leq 1299$	$1850.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1299$	$1930.000 + 0.050 \times N$
AWS	Uplink (MS, reverse link)	$0 \leq N \leq 899$	$1710.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 899$	$2100.000 + 0.050 \times N$
US 2.5 GHz	Uplink (MS, reverse link)	$140 \leq N \leq 1459$	$2495.000 + 0.050 \times N$
	Downlink (BS, forward link)	$140 \leq N \leq 1459$	$2617.000 + 0.050 \times N$
700 Public Safety	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$787.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 240$	$757.000 + 0.050 \times N$
C2K Lower 700	Uplink (MS, reverse link)	$0 \leq N \leq 360$	$698.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 360$	$728.000 + 0.050 \times N$
400 Euro PAMR	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 450.000$
		$472 \leq N \leq 871$	$0.025 \times (N-472) + 410.000$
	Uplink (MS, reverse link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 479.000$
	Uplink (MS, reverse link)		
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 460.000$
		$472 \leq N \leq 871$	$0.025 \times (N-472) + 420.000$
	Downlink (BS, forward link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 489.000$
	Downlink (BS, forward link)		
800 PAMR	Uplink (MS, reverse link)	$0 \leq N \leq 239$	$870.0125 + 0.025 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 239$	$915.0125 + 0.025 \times N$

LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier

frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOffs-UL)$$

Band	Downlink		Uplink			
FDL_low (MHz)	NOffs-DL	Range of NDL	FUL_low (MHz)	NOffs-UL	Range of NUL	
1	2110	0	0 - 599	1920	18000	18000 - 18599
2	1930	600	600 - 1199	1850	18600	18600 - 19199
3	1805	1200	1200 - 1949	1710	19200	19200 - 19949
4	2110	1950	1950 - 2399	1710	19950	19950 - 20399
5	869	2400	2400 - 2649	824	20400	20400 - 20649
6	875	2650	2650 - 2749	830	20650	20650 - 20749
7	2620	2750	2750 - 3449	2500	20750	20750 - 20449
8	925	3450	3450 - 3799	880	21450	21450 - 21799
9	1844.9	3800	3800 - 4149	1749.9	21800	21800 - 22149
10	2110	4150	4150 - 4749	1710	22150	22150 - 22749
11	1475.9	4750	4750 - 4949	1427.9	22750	22750 - 22949
12	729	5010	5010 - 5179	699	23010	23010 - 23179
13	746	5180	5180 - 5279	777	23180	23180 - 23279
14	758	5280	5280 - 5379	788	23280	23280 - 23379
...						
17	734	5730	5730 - 5849	704	23730	23730 - 23849
18	860	5850	5850 - 5999	815	23850	23850 - 23999

Band	Downlink	Uplink				
19	875	6000	6000 – 6149	830	24000	24000 – 24149
20	791	6150	6150 – 6449	832	24150	24150 – 24449
21	1495.9	6450	6450 – 6599	1447.9	24450	24450 – 24599
...						
24	1525	7700	7700 – 8039	1626.5	25700	25700 – 26039
25	1930	8040	8040 – 8689	1850	26040	26040 – 26689
26	859	8690	8690 – 9039	814	26690	26690 – 27039
...						

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4–1 and NDL is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4–1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOffs-UL)$$

Band	Downlink	Uplink				
FDL_low (MHz)	NOffs-DL	Range of NDL	FUL_low (MHz)	NOffs-UL	Range of NUL	
33	1900	36000	36000 – 36199	1900	36000	36000 – 36199
34	2010	36200	36200 – 36349	2010	36200	36200 – 36349
35	1850	36350	36350 – 36949	1850	36350	36350 – 36949
36	1930	36950	36950 – 37549	1930	36950	36950 – 37549

Band	Downlink	Uplink				
37	1910	37550	37550 – 37749	1910	37550	37550 – 37749
38	2570	37750	37750 – 38249	2570	37750	37750 – 38249
39	1880	38250	38250 – 38649	1880	38250	38250 – 38649
40	2300	38650	38650 – 39649	2300	38650	38650 – 39649
41	2496	39650	39650 – 41589	2496	39650	39650 – 41589
42	3400	41590	41590 – 43589	3400	41590	41590 – 43589
43	3600	43590	43590 – 45589	3600	43590	43590 – 45589

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

TDSCDMA Channel Number Ranges

1.28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 \cdot F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 \cdot (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

**Table: UTRA Absolute Radio
Frequency Channel Number 1.28
Mcps TDD Option**

Frequency Band	Frequency Range	UARFCN Uplink and Downlink transmission
For operation in frequency band as defined in subclause 5.2 (a)	1900–1920 MHz	9504 to 9596
	2010–2025 MHz	10054 to 10121
For operation in frequency band as defined in subclause 5.2 (b)	1850–1910 MHz	9254 to 9546
	1930–1990 MHz	9654 to 9946
For operation in frequency band as defined in subclause 5.2 (c)	1910–1930 MHz	9554 to 9646
For operation in frequency band as defined in subclause 5.2 (d)	2570–2620 MHz	12854 to 13096
For operation in frequency band as defined in subclause 5.2 (e)	2300–2400 MHz	11504 to 11996
For operation in frequency band as defined in subclause 5.2 (f)	1880–1920 MHz	9404 to 9596

Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

Key Path	Source, Frequency
Initial S/W Revision	A.05.00

Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

Key Path	Source, Frequency, Radio Setup
Remote Command	:SOURce:FREQuency:CHANnels:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10

	BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND27 BAND28 BAND29 BAND30 BAND31 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BAND44 BANDA BANDB BANDC BANDD BANDE BANDF :SOURce:FREQuency:CHANnels:BAND?
Example	:SOUR:FREQ:CHAN:BAND PGSM
Notes	Set this setting to "NONE" will grey out "Channel" on page 1503 Channel
Initial S/W Revision	A.05.00

None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

P-GSM

Selects P-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND PGSM
Initial S/W Revision	A.05.00

E-GSM

Selects E-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND EGSM
Initial S/W Revision	A.05.00

R-GSM

Selects R-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND RGSM
Initial S/W Revision	A.05.00

DCS 1800

Selects DCS 1800 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND DCS1800
Initial S/W Revision	A.05.00

PCS 1900

Selects PCS 1900 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND PCS1900
Initial S/W Revision	A.05.00

GSM 450

Selects GSM 450 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND GSM450
Initial S/W Revision	A.05.00

GSM 480

Selects GSM 480 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND GSM480
Initial S/W Revision	A.05.00

GSM 850

Selects GSM 850 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND GSM850
Initial S/W Revision	A.05.00

GSM 700

Selects GSM 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND GSM700
Initial S/W Revision	A.05.00

T-GSM 810

Selects T-GSM 810 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND T-GSM810
Initial S/W Revision	A.05.00

WCDMA

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

Band I

Selects Band I as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDI
Initial S/W Revision	A.05.00

Band II

Selects Band II as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDII
Initial S/W Revision	A.05.00

Band III

Selects Band III as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDIII
Initial S/W Revision	A.05.00

Band IV

Selects Band IV as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDIV
Initial S/W Revision	A.05.00

Band V

Selects Band V as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDV
Initial S/W Revision	A.05.00

Band VI

Selects Band VI as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDVI
Initial S/W Revision	A.05.00

Band VII

Selects Band VII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDVII
Initial S/W Revision	A.05.00

Band VIII

Selects Band VIII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDVIII
Initial S/W Revision	A.05.00

Band IX

Selects Band IX as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDIX
Initial S/W Revision	A.05.00

Band X

Selects Band X as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDX
Initial S/W Revision	A.05.00

Band XI

Selects Band XI as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDXI
Initial S/W Revision	A.05.00

Band XII

Selects Band XII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDXII
Initial S/W Revision	A.05.00

Band XIII

Selects band XIII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDXIII
Initial S/W Revision	A.05.00

Band XIV

Selects Band XIV as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDXIV
Initial S/W Revision	A.05.00

CDMA 2000 / 1xEVDO

Sets CDMA 2000 / 1xEVDO as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

US CELL

Selects US Cell as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND USCELL
Initial S/W Revision	A.05.00

US PCS

Selects US PCS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PCS
Initial S/W Revision	A.05.00

Japan Cell

Selects Japan Cell as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND JAPAN
Initial S/W Revision	A.05.00

Korean PCS

Selects Korean PCS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND KOREAN
Initial S/W Revision	A.05.00

NMT 450

Selects NMT 450 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND NMT
Initial S/W Revision	A.05.00

IMT 2000

Selects IMT 2000 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND IMT2K
Initial S/W Revision	A.05.00

Upper 700

Selects Upper 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND UPPER
Initial S/W Revision	A.05.00

Secondary 800

Selects Secondary 800 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND SECOND
Initial S/W Revision	A.05.00

400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PAMR400
Initial S/W Revision	A.05.00

800 PAMR

Selects 800 PAMR as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PAMR800
Initial S/W Revision	A.05.00

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND IMTEXT
Initial S/W Revision	A.05.00

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PCS1DOT9G
Initial S/W Revision	A.05.00

AWS

Selects AWS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND AWS
Initial S/W Revision	A.05.00

US 2.5GHz

Selects US 2.5 GHz as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND US2DOT5G
Initial S/W Revision	A.05.00

700 Public Safety

Selects 700 Public Safety as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PUBLIC
Initial S/W Revision	A.05.00

C2K Lower 700

Selects C2K Lower 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND LOWER
Initial S/W Revision	A.05.00

LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

BAND 1

Selects BAND 1 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND1
Initial S/W Revision	A.09.50

BAND 2

Selects BAND 2 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND2
Initial S/W Revision	A.09.50

BAND 3

Selects BAND 3 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND3
Initial S/W Revision	A.09.50

BAND 4

Selects BAND 4 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND4
Initial S/W Revision	A.09.50

BAND 5

Selects BAND 5 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND5
Initial S/W Revision	A.09.50

BAND 6

Selects BAND 6 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND6
Initial S/W Revision	A.09.50

BAND 7

Selects BAND 7 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND7
Initial S/W Revision	A.09.50

BAND 8

Selects BAND 8 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND8
Initial S/W Revision	A.09.50

BAND 9

Selects BAND 9 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND9
Initial S/W Revision	A.09.50

BAND 10

Selects BAND 10 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND10
Initial S/W Revision	A.09.50

BAND 11

Selects BAND 11 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND11
Initial S/W Revision	A.09.50

BAND 12

Selects BAND 12 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND12
Initial S/W Revision	A.09.50

BAND 13

Selects BAND 13 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND13
Initial S/W Revision	A.09.50

BAND 14

Selects BAND 14 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND14
Initial S/W Revision	A.09.50

BAND 17

Selects BAND 17 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND17
Initial S/W Revision	A.09.50

BAND 18

Selects BAND 18 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND18
Initial S/W Revision	A.09.50

BAND 19

Selects BAND 19 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND19
Initial S/W Revision	A.09.50

BAND 20

Selects BAND 20 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND20
Initial S/W Revision	A.09.50

BAND 21

Selects BAND 21 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND21
Initial S/W Revision	A.09.50

BAND 24

Selects BAND 24 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND24
Initial S/W Revision	A.09.50

BAND 25

Selects BAND 25 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND25
Initial S/W Revision	A.09.50

BAND 26

Selects BAND 26 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND26
Initial S/W Revision	A.12.53

BAND 27

Selects BAND 27 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND27
Initial S/W Revision	A.14.00

BAND 28

Selects BAND 28 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND28
Initial S/W Revision	A.14.00

BAND 31

Selects BAND 31 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND31
Initial S/W Revision	A.14.00

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND 33

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

BAND 34

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

BAND 35

Selects BAND 35 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

BAND 36

Selects BAND 36 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

BAND 37

Selects BAND 37 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

BAND 38

Selects BAND 38 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

BAND 39

Selects BAND 39 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

BAND 40

Selects BAND 40 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

BAND 41

Selects BAND 41 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

BAND 42

Selects BAND 42 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

BAND 43

Selects BAND 43 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

BAND 44

Selects BAND 44 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND44
Initial S/W Revision	A.14.00

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND A

Selects BAND A as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

BAND B

Selects BAND B as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

BAND C

Selects BAND C as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

BAND D

Selects BAND D as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

BAND E

Selects BAND E as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

BAND F

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

Radio Band Link

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the

source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number . When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

Key Path	Source, Frequency, Radio Setup
Remote Command	:SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK?
Example	:SOUR:RAD:BAND:LINK UP
Preset	DOWN
Range	DOWN UP
Backwards Compatibility SCPI	:SOURce:RADio:DEVIce BTS MS :SOURce:RADio:DEVIce?
Backwards Compatibility Notes	BTS maps to the Downlink frequency MS maps to the Uplink frequency
Initial S/W Revision	A.05.00

Set Reference Frequency

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency - entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

NOTE

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

Key Path	Source, Frequency

Remote Command	:SOURce:FREQuency:REFeRence:SET
Example	:SOUR:FREQ:REF:SET
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Initial S/W Revision	A.05.00

Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency + entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 1531](#)

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:REFeRence <freq> :SOURce:FREQuency:REFeRence? :SOURce:FREQuency:REFeRence:STAtE OFF ON 0 1 :SOURce:FREQuency:REFeRence:STAtE?
Example	:SOUR:FREQ:REF 0.00 Hz :SOUR:FREQ:REF:STAtE ON
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Couplings	The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON.
Preset	0.00 Hz OFF
Min	0.00 Hz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source>Frequency>Frequency

offset value equals the value entered under Source>Frequency>Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source>Frequency>Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source>Frequency>Frequency

offset frequency equals the value previously entered and set under Source>Frequency>Freq Offset

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:OFFSet <freq> :SOURce:FREQuency:OFFSet?
Example	:SOUR:FREQ:OFFS 0 Hz
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0 Hz
Min	-100.00 GHz
Max	100.00 GHz
Initial S/W Revision	A.05.00

Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 1534, "AM" on page 1580, "FM" on page 1582, and "PM" on page 1583.

Key Path	Source
Initial S/W Revision	A.05.00

ARB

Allows you access to the ARB sub-menus.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a “MOD” annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe] ?
Example	:SOUR:RAD:ARB OFF :SOUR:RAD:ARB?
Notes	If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Dependencies	This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 1585 Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 1585 Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately. The ARB can only be turned on when there is a waveform file selected for playback. On the GUI If no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. "- When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported
Couplings	If "Real-Time AWGN" on page 1545 AWGN State is On and this setting is On, "RF Power" on page 1499 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 1546 Power Control Mode and other noise settings
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00
Modified at S/W Revision	A.16.00 (Add couplings with AWGN state)

Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Remote Command	:SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform?
Example	:SOUR:RAD:ARB:WAV "test_waveform.bin"
Notes	If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB. When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated . When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and none of the waveform segments is loaded. If the ARB is ON, and you attampt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On. If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generatedand the file selection remains unchanged. If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.error is generated. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this

	case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
Notes	<string> - specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error. When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated. If you specify a directory over SCPI, but the directory does not exist, an error is generated. If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for

selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated. It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated. When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 1584 and "Sequencer" on page 1585 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

NOTE

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use **"Query ARB Memory Full File List (Remote Command Only)" on page 1539**.

Remote Command	:SOURce:RADio:ARB:CATalog?
Example	:SOUR:RAD:ARB:CATalog?
Notes	The return data is in the following format: <integer> - memory used <integer> - memory free <string> ... - comma separated list of waveform segments within ARB memory
Initial S/W Revision	A.05.00

Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

Remote Command	:SOURce:RADio:ARB:FCATalog?
Example	:SOUR:RAD:ARB:FCATalog?
Notes	The return data is in the following format: <integer> - memory used

	<integer> - memory free <integer> - file count in ARB memory <string>,<string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm"
Initial S/W Revision	A.09.00

ARB Setup

Allows access to the ARB setup sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Sample Rate

Allows you to set the ARB waveform playback sample rate.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE?
Example	:SOUR:RAD:ARB:SCL:RATE 48.00 MHz
Notes	If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing.
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	125.00 MHz
Min	1.00 kHz
Max	125.00 MHz
Initial S/W Revision	A.05.00

Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

Key Path	Source, Modulation Setup, ARB, ARB Setup

Remote Command	:SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling?
Example	:SOUR:RAD:ARB:RSC 100.00
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	70.00 %
Min	1.00 %
Max	100.00 %
Initial S/W Revision	A.05.00

Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet?
Example	:SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	0.00 Hz
Min	-50.00 MHz
Max	50.00 MHz
Initial S/W Revision	A.05.00

Edit RMS

Allows you to edit or calculate current RMS of selected waveform.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Initial S/W Revision	A.14.50

Current RMS

Allows you to directly specify current RMS value used to playback currently selected waveform. Please note incorrect RMS value may cause inaccurate power output in E6640A that is sensitive to RMS value.

This setting is also updated by RMS in waveform header or updated when invoking RMS calculation operation.

This setting can be saved to the header of currently selected waveform by invoking ["Save Setup To Header" on page 1579](#) "Save Setup To Header".

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS
Remote Command	:SOURce:RADio:ARB:RMS <float> :SOURce:RADio:ARB:RMS?
Example	:SOUR:RAD:ARB:HEAD:RMS 0.7 :SOUR:RAD:ARB:HEAD:RMS?
Notes	Valid range is 0 to 1.414, values outside the range will be clipped to the closest boundary. Note this value does not affect "List Sequencer" on page 1584 Source List Sequencer that always uses RMS value resides in each ARB header. If want this value to take effect in list sequencer, use "Save Setup To Header" on page 1579 "Save Setup to Header" to save current RMS value to header first, then play the ARB in source list sequencer.
Dependencies	When a new waveform is selected for playback, this setting is updated by the RMS value defined in associated waveform header file. If selected waveform has no associated header file or header file does not specify RMS value, then instrument will try to calculate out one automatically. Calculating RMS can also update this setting.
Preset	0
Range	0 ~ 1.414
Initial S/W Revision	A.14.50

RMS Calculation Mode

Allows you to specify the mode to calculate the current RMS.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS
Remote Command	:SOURce:RADio:ARB:RMS:CALCulation:MODE AUTO M1 M2 M3 M4 :SOURce:RADio:ARB:RMS:CALCulation:MODE?
Example	:SOUR:RAD:ARB:RMS:CALC:MODE AUTO
Notes	If no waveform is selected, or selected waveform is waveform sequence, the key will grey out.
Preset	AUTO
Range	AUTO M1 M2 M3 M4
Initial S/W Revision	A.14.50

Auto

RMS will be calculated based on the whole sample range of current selected waveform.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode
Example	:SOUR:RAD:ARB:RMS:CALC:MODE AUTO
Initial S/W Revision	A.14.50

Marker 1

Selects marker 1 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker
Example	:SOUR:RAD:ARB:RMS:CALC:MODE M1
Initial S/W Revision	A.14.50

Marker 2

Selects marker 2 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker
Example	:SOUR:RAD:ARB:RMS:CALC:MODE M2
Initial S/W Revision	A.14.50

Marker 3

Selects marker 3 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker
Example	:SOUR:RAD:ARB:RMS:CALC:MODE M3
Initial S/W Revision	A.14.50

Marker 4

Selects marker 4 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker
Example	:SOUR:RAD:ARB:RMS:CALC:MODE M4
Initial S/W Revision	A.14.50

Calculate RMS

Allows you to calculate current RMS based on mode selected. This will update ["Current RMS" on page 1542](#) Current RMS setting.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS
Remote Command	:SOURce:RADio:ARB:RMS:CALCulate
Example	:SOUR:RAD:ARB:RMS:CALC
Notes	If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”. If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 1542 “RMS Calculation Mode” is set to marker, under this circumstance, invoking calculation operation will get error “-221 Setting conflict; There is no marker for currently selected waveform, auto RMS calculation mode is used instead”, and "RMS Calculation Mode" on page 1542 “RMS Calculation Mode” will be coupled to “Auto” mode automatically. RMS calculation does not suit for waveform sequence. If selected waveform is waveform sequence file, invoking this operation will get error “-221 Setting conflict; RMS calculation does not apply to waveform sequence”. But users can still edit current RMS as play parameter, and can save current RMS to waveform sequence header for later use.
Initial S/W Revision	A.14.50

Use Header RMS

Allows you to quickly set RMS in ARB header to ["Current RMS" on page 1542](#) Current RMS setting.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS,
Notes	No remote command, front panel only. If no waveform is selected, the key will grey out. If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.
Initial S/W Revision	A.14.50

Real-Time AWGN Setup

The source allows you to apply additive white Gaussian noise (AWGN) to a carrier in real time while the modulating waveform plays in the dual ARB player. Pressing this key allows access to the real time AWGN sub-menus and changes the central display area to show the AWGN Setup view.

This feature is controlled by E6650A-AW1 option

Key Path	Source, Modulation Setup, ARB, ARB Setup
Notes	This menu only appears and related SCPIs are only available when E6650A-AW1 option presents.
Initial S/W Revision	A.16.00

Real-Time AWGN

Allows you to enable or disable adding real-time AWGN to the carrier modulated by the waveform currently being played by the dual ARB.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe[:STATe] ON OFF 1 0 :SOURce:RADio:ARB:NOISe[:STATe]?
Example	:SOUR:RAD:ARB:NOIS OFF
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN state is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN state is updated with the value from the header file. The AWGN state will remain unchanged if the newly selected waveform does not have an associated header file.
Couplings	If this setting is On and "ARB" on page 1534 ARB State is On, "RF Power" on page 1499 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 1546 Power Control Mode and other noise settings
Preset	Off
Range	On Off
Initial S/W Revision	A.16.00

Carrier To Noise Ratio

Allows you to specify the carrier to noise ratio (C/N) in dB. The carrier power is defined as the total modulated signal power without noise power added. The noise power is applied over the specified bandwidth of the carrier signal.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:CN <ampl> :SOURce:RADio:ARB:NOISe:CN?
Example	:SOUR:RAD:ARB:NOIS:CN 0.00 dB
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN C/N ratio is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN C/N ratio is updated with the value from the header file. The AWGN C/N ratio will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	0.00 dB
Min	-100.00 dB
Max	100.00 dB
Initial S/W Revision	A.16.00

Carrier Bandwidth

Allows you to specify the bandwidth over which the AWGN is applied. The carrier RMS power and the noise power are integrated over the selected carrier bandwidth for the purpose of calculating carrier to noise ratio (C/N).

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:CBWidth <freq> :SOURce:RADio:ARB:NOISe:CBWidth?
Example	:SOUR:RAD:ARB:NOIS:CBW 1.00 Hz
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file.
Min	1.00 Hz
Max	200.00 MHz
Initial S/W Revision	A.16.00

Noise Bandwidth

Allows you to specify the flat noise bandwidth of the real-time noise for an ARB waveform.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:BANDwidth <freq> :SOURce:RADio:ARB:NOISe:BANDwidth?
Example	:SOUR:RAD:ARB:NOIS:BAND 1.00 Hz
Notes	Generally, flat noise bandwidth should be set slightly wider than the carrier bandwidth (typically 1.6 times wider)
Notes	Max Noise Bandwidth equals $0.8 * \text{Maximum ARB Sample Rate}$ reported in HW capability
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	1.00 Hz
Min	1.00 Hz
Max	160.00 MHz
Initial S/W Revision	A.16.00

Power Control Mode

This setting offers four ways to control the RF output power when adding AWGN to a signal.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:POWeR:CONTRol[:MODE] TOTal CARRier NOISe NCHannel :SOURce:RADio:ARB:NOISe: POWer:CONTRol[:MODE]?
Example	:SOUR:RAD:ARB:NOIS:POW:CONT NCHannel :SOUR:RAD:ARB:NOIS:POW:CONT?
Preset	TOTal
Range	Total Power Carrier Power Total Noise Power Noise Power in Channel
Initial S/W Revision	A.16.00

Total

Set the power control mode as total power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT TOTal
Couplings	Set to this value will make Carrier Power Carrier Power, Total Noise Power Total Noise Power, and Channel Noise Power Channel Noise Power buttons invisible on menu. Selecting Total as the power control mode makes the total power and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the total power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the total power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Carrier

Set the power control mode as carrier power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT CARRier
Couplings	Set to this value will make Carrier Power Carrier Power button visible, while Total Noise Power Total Noise Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Carrier as the power control mode makes the carrier power and C/N independent variables while making the total power and total noise power dependent variables. The dependent variables total power and total noise power are set by the carrier power, C/N, and the rest of the Noise settings. The total power and total noise power change as any noise parameter is adjusted to keep the carrier power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Total Noise

Set the power control mode as total noise power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT NOISe
Couplings	Set to this value will make Total Noise Power Total Noise Power button visible, while Carrier Power Carrier Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Total Noise as the power control mode makes the total noise power and C/N independent variables while making the total power and carrier power dependent variables. The dependent variables total power and carrier power are set by the total noise power, C/N, and the rest of the Noise settings. The total power and carrier power change as any noise parameter is adjusted to keep the total noise power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Channel Noise

Set the power control mode as channel noise power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT NChannel
Couplings	Set to this value will make Channel Noise Power Channel Noise Power button visible, while Total Noise Power Total Noise Power and Carrier Power Carrier Power buttons invisible from menu. Selecting Channel Noise as the power control mode makes the noise power in channel and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the channel noise power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the channel noise power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE CONTinuous SINGLE SADVance :SOURce:RADio:ARB:TRIGger:TYPE?
Example	:SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE?
Notes	Gated trigger type will be implemented at a later release
Preset	CONTinuous
Range	Continuous Single Seg Adv
Initial S/W Revision	A.05.00

Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE] FREE TRIGger RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE]?
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Preset	FREE
Range	Free Run Trigger + Run Reset + Run
Initial S/W Revision	A.05.00

Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Initial S/W Revision	A.05.00

Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG
Initial S/W Revision	A.05.00

Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT RES
Initial S/W Revision	A.05.00

Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:RETRigger ON OFF IMMediate :SOURce:RADio:ARB:RETRigger?
Example	:SOUR:RAD:ARB:RETR OFF
Notes	ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1.
Preset	ON
Range	No Retrigger Buffered Trigger Restart on Trigger
Initial S/W Revision	A.05.00

No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
Example	:SOUR:RAD:ARB:RETR OFF
Initial S/W Revision	A.05.00

Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
Example	:SOUR:RAD:ARB:RETR ON
Initial S/W Revision	A.05.00

Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
Example	:SOUR:RAD:ARB:RETR IMM
Initial S/W Revision	A.05.00

Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE CONTInuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] ?
Example	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
Preset	CONTInuous
Range	Single Continuous
Initial S/W Revision	A.05.00

Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
Example	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
Initial S/W Revision	A.05.00

Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
Example	:SOUR:RAD:ARB:TRIG:TYPE:SADV CONT
Initial S/W Revision	A.05.00

Trigger Source

The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTeRnal2 :SOURce:RADio:ARB:TRIGger[:SOURce]?
Example	:SOUR:RAD:ARB:TRIGger KEY
Dependencies	This key is grayed out if the current trigger type is Continuous, Free Run.
Preset	EXTeRnal2
Range	Trigger Key Bus External 2
Initial S/W Revision	A.05.00

Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger KEY
Initial S/W Revision	A.05.00

Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger BUS
Initial S/W Revision	A.05.00

External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger EXT2
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

Key Path	Source, Modulation Setup , ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty.
Initial S/W Revision	A.05.00

Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the

same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMORY:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
Notes	<string> - specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error. When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated. If you specify a directory over SCPI, but the directory does not exist, an error is generated. If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated. It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated. When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated. If you attempt to delete all files from ARB memory when there are waveform files used in "List

"Sequencer" on page 1584 and **"Sequencer" on page 1585** state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as **"Segments on Hard Disk" on page 1610**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform

Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as **"Load Segment To ARB Memory" on page 1610**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as **"Load All To ARB Memory" on page 1611**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as **"Change Directory..." on page 1612**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as **"Default Directory..." on page 1612**

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 1612](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Initial S/W Revision	Prior to A.09.00

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 1613](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 1613](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 1539](#).

Initial S/W Revision	Prior to A.09.00

Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, SCPI front panel only.
Preset	1
Min	1
Max	65535
Initial S/W Revision	A.05.00

Marker 1

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Delete Segment

Allows you to delete the selected segment from the waveform sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Save Sequence...

Pressing this key displays the “Save As” dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Initial S/W Revision	A.05.00

Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in ["Build New Sequence" on page 1553](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) "NVWFM" or use a real full path representation. See the example below. MSUS "NVWFM" is mapped to D: VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

Remote Command	<pre>:SOURce:RADio:ARB:SEquence[:MWAVeform] <filename>, <waveform1>, <reps>, NONE M1 M2 M3 M4 M1M2 M1M3 M1M4 M2M3 M2M4 M3M4 M1M2M3 M1M2M4 M1M3M4 M2M3M4 M1M2M3M4 ALL, {<waveform2>, <reps>, NONE M1 M2 M3 M4 M1M2 M1M3 M1M4 M2M3 M2M4 M3M4 M1M2M3 M1M2M4 M1M3M4 M2M3M4 M1M2M3M4 ALL, } ...</pre> (For additional description of each item, see Notes below "For Setup SCPI" on page 1275 "For Setup SCPI".) <pre>:SOURce:RADio:ARB:SEquence[:MWAVeform]? <filename></pre> (For additional description of each item, see Notes "For Query SCPI" on page 1276 below.)

Example	For setup: <pre>>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1M3</pre> Or <pre>>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", "D: VARB\wfmSegment1.wfm", 10, M2M3M4, "D: VARB\wfmSegment2.wfm", 20, M1M3</pre> For query, must specify which waveform sequence file to query. <pre>>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"</pre> Or <pre>>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",</pre>

Notes

For Setup SCPI

For the Setup SCPI command, the parameters are:

<filename> - String Type

This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.

<waveform1> - String Type

This variable specifies the path and name of the first existing waveform segment. The path supports

MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE - This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 - these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL - This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not ".seq", error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq",

<"wfmSegment1.wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3",

Error Checks for Query SCPI command:

If you do not specify a filename, an error is generated.
 If the waveform sequence file name is empty, an error is generated.
 If the specified waveform sequence file cannot be found, an error is generated.

Initial S/W Revision	A.05.00

Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Waveform Utilities

Allows you access to the waveform utilities sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. “Left” module for E6630A or “TRX1” module for E6640A.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities
Dependencies	This key is only available if there is at least one Multi-pack license installed on the instrument.
Initial S/W Revision	A.05.00

Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if there is at least one slot available within at least one multi-pack license.
Initial S/W Revision	A.05.00

Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
Remote Command	:SYSTem:LKEY:WAVeform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVeform:ADD <string>
Example	SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm"
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:ADD is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. .
Dependencies	This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable.
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD “D: VARB\testwaveform.bin” or :SOUR:RAD:ARB:LOAD “NVWFM:testwaveform.bin”
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operation is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
Notes	<string> - specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error. When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated. If you specify a directory over SCPI, but the directory does not exist, an error is generated. If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles"

	:SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1611](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as ["Change Directory..." on page 1612](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as ["Default Directory..." on page 1612](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision	A.05.00

Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Remote Command	<code>:SYSTem:LKEY:WAVeform:REPLace <int>, <string></code> or <code>:SYSTem:LiCense[:FPACK]:WAVeform:REPLace <int>, <string></code>
Example	<code>SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm"</code> or <code>:SYST:LiC:WAV:REPL 1, "myotherwaveform.wfm"</code>
Notes	The second SCPI <code>:SYSTem:LiCense[:FPACK]:WAVeform:REPLace</code> is provided to be consistent with the style of Keysight signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <code><int></code> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.
Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1611](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as ["Change Directory..." on page 1612](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as ["Default Directory..." on page 1612](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Remote Command	<code>:SYSTem:LKEY:WAVeform:CLEar <int></code> or <code>:SYSTem:LIcense[:FPACK]:WAVeform:CLEar <int></code>
Example	<code>SYST:LKEY:WAV:CLE 1</code> or <code>:SYST:LIC:WAV:CLE 1</code>
Notes	The second SCPI <code>:SYSTem:LIcense[:FPACK]:WAVeform:CLEar</code> is provided to be consistent with the style of Keysight signal sources. You can use either one of them.

	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.
Dependencies	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision	A.05.00

Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Remote Command	:SYSTem:LKEY:WAVeform:LOCK <int> or :SYSTem:LICense[:FPACK]:WAVeform:LOCK <int>
Example	SYST:LKEY:WAV:LOCK 1 or SYST:LIC:WAV:LOCK 1
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.
Dependencies	This key is only available if the currently selected slot is in the trial state or the lock required state.
Initial S/W Revision	A.05.00

Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

Remote Command	:SYSTem:LKEY:WAVeform:STATus? <int> or :SYSTem:LICense[:FPACK]:WAVeform:STATus? <int>
Example	:SYST:LKEY:WAV:STAT? 1 <"Locked" or :SYST:LIC:WAV:STAT? 1 <"Locked"
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

	error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.
Range	"Locked" "Available" "Trail" "LockRequired" "Nonexistent"
Initial S/W Revision	A.05.00

Slots Free Query (Remote Command Only)

Returns the number of license slots free.

Remote Command	:SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LIcense[:FPACK]:WAVeform:FREE?
Example	:SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE?
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Initial S/W Revision	A.05.00

Slot Used Query (Remote Command Only)

Returns the number of license slots used.

Remote Command	:SYSTem:LKEY:WAVeform:USED? or :SYSTem:LIcense[:FPACK]:WAVeform:USED?
Example	:SYST:LKEY:WAV:USED? or :SYST:LIC:WAV:USED?
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Initial S/W Revision	A.05.00

Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

Remote Command	:SYSTem:LKEY:WAVeform:NAME? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int>

Example	:SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm" or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then empty string is returned.
Initial S/W Revision	A.12.00

Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

Remote Command	:SYSTem:LKEY:WAVeform:UID? <int> or :SYSTem:LICense[:FPACK]:WAVeform:UID? <int>
Example	:SYST:LKEY:WAV:UID? 2 <"1346752140" or :SYST:LIC:WAV:UID? 2 <"1346752140"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then "0" is returned
Initial S/W Revision	A.12.00

Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

Remote Command	:SOURce:RADio:ARB:MPLicensed:NAME:LOCKed?
Example	SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm"
Initial S/W Revision	A.11.00

Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

Remote Command	:SOURce:RADio:ARB:MPLicensed:UID:LOCKed?
Example	SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136","3812603511","3710986266"
Notes	Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list
Initial S/W Revision	A.11.00

Marker Utilities

Allows access to the marker utilities sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

Key Path	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

Mkr 1 Polarity

Allows you to set the polarity of marker 1.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1?
Example	:SOUR:RAD:ARB:MPOL:MARK1 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Mkr 2 Polarity

Allows you to set the polarity of marker 2.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2?
Example	:SOUR:RAD:ARB:MPOL:MARK2 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Mkr 3 Polarity

Allows you to set the polarity of marker 3.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3?
Example	:SOUR:RAD:ARB:MPOL:MARK3 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Mkr 4 Polarity

Allows you to set the polarity of marker 4.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4?

Example	:SOUR:RAD:ARB:MPOL:MARK4 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

Key Path	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting maker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
Remote Command	:SOURce:RADio:ARB:MDEStination:PULSe NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:PULSe?
Example	:SOUR:RAD:ARB:MDES:PULS NONE
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range	None M1 M2 M3 M4
Initial S/W Revision	A.05.00

None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision	A.05.00

Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision	A.05.00

Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision	A.05.00

Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
Remote Command	:SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold?
Example	:SOUR:RAD:ARB:MDES:ALCH NONE
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range	None M1 M2 M3 M4
Initial S/W Revision	A.05.00

None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision	A.05.00

Marker 1

Sets marker 1 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision	A.05.00

Marker 2

Sets marker 2 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision	A.05.00

Marker 3

Sets marker 3 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

Marker 4

Sets marker 4 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

Key Path	Source, Modulation Setup, ARB, Header Utilities
Remote Command	:SOURce:RADio:ARB:HEADer:CLEar
Example	:SOUR:RAD:ARB:HEAD:CLE
Notes	Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error.
Initial S/W Revision	A.05.00

Save Setup To Header

Allows you to save new file header information details to the file.

Key Path	Source, Modulation Setup, ARB, Header Utilities
Remote Command	:SOURce:RADio:ARB:HEADer:SAVE
Example	:SOUR:RAD:ARB:HEAD:SAVE
Notes	Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error.
Initial S/W Revision	A.05.00
Modified at S/W Revision	A.16.00 (AWGN settings will be saved to header as well)

Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

Remote Command	:MMEMory:HEADer:ID? "<file name>"
Example	:MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS)
Notes	SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk. If the file cannot be found in ARB memory or on hard disk, an error is generated and value -1 is returned
Initial S/W Revision	A.09.00

Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

Remote Command	:SOURce:RADio:ARB:TRIGger:INITiate
Example	:SOUR:RAD:ARB:TRIG:INIT
Initial S/W Revision	A.05.00

AM

Allows access to the menu for configuring the Amplitude Modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, AM
Remote Command	:SOURce:AM:STATe :SOURce:AM:STATe?
Example	:SOUR:AM:STAT OFF
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

AM Depth

Allows you to set the amplitude modulation depth in percent.

Key Path	Source, Modulation Setup, AM
Remote Command	:SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear] ?
Example	:SOUR:AM 0.1
Preset	0.1 %
Min	0.1 %
Max	95.0 %
Initial S/W Revision	A.05.00

AM Rate

Allows you to set the internal amplitude modulation rate.

Key Path	Source, Modulation Setup, AM
Remote Command	:SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency?
Example	:SOUR:AM:INT:FREQ 40.0 Hz

Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

FM

Allows access to the menu for configuring the frequency modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, FM
Remote Command	:SOURce:FM:STATe :SOURce:FM:STATe?
Example	:SOUR:FM:STAT OFF
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

FM Deviation

Allows you to set the frequency modulation deviation.

Key Path	Source, Modulation Setup, FM
Remote Command	:SOURce:FM[:DEViation] :SOURce:FM[:DEViation]?
Example	:SOUR:FM 1.00 kHz
Preset	1.00 Hz
Min	1.00 Hz
Max	100.00 kHz
Initial S/W Revision	A.05.00

FM Rate

Allows you to set the internal frequency modulation rate.

Key Path	Source, Modulation Setup, FM
Remote Command	:SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency?
Example	:SOUR:FM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

PM

Allows access to the menu for configuring the phase modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM:STATe :SOURce:PM:STATe?
Example	:SOUR:PM:STAT OFF
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

PM Deviation

Allows you to set the phase modulation deviation.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM[:DEViation] :SOURce:PM[:DEViation]?

Example	:SOUR:PM 1.00 rad
Preset	0.1 rad
Min	0.1 rad
Max	20.0 rad
Initial S/W Revision	A.05.00

PM Rate

Allows you to set the internal phase modulation rate.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency?
Example	:SOUR:PM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a tabular form. The details of the SCPI for configuring the list sequencer can be found in ["Step Configuration \(Remote Command Only\)" on page 1618](#).

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

Key Path	Source
Initial S/W Revision	A.05.00

Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe] ?
Example	:SOUR:LIST OFF
Notes	When the sequencer is set to ON, the list sequencer controls the output of the source.
Couplings	When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected.
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST:TRIGger[:IMMediate]
Example	:SOUR:LIST:TRIG
Notes	When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " Query List Sequence Initiation Armed Status (Remote Command Only) " on page 1629 Query Source List Sequence Armed Status)
Dependencies	Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled.
Initial S/W Revision	A.05.00

List Sequencer Setup

Allows you access to the list sequencer setup menus.

Key Path	Source, List Sequencer

Number of Steps

Allows you to specify the number of steps within the list sequence.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:NUMBer:STEPs <integer> :SOURce:LIST:NUMBer:STEPs?
Example	:SOUR:LIST:NUMB:STEP 1
Notes	Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps.
Dependencies	The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer.
Preset	1
Min	1
Max	1000
Initial S/W Revision	A.05.00

Current Step

Allows you to select the step number you wish to view or edit.

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only.
Preset	1
Min	1
Max	Step Count
Initial S/W Revision	A.05.00

Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of

1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key.
Initial S/W Revision	A.05.00

Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key
Initial S/W Revision	A.05.00

Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

Key Path	Source, List Sequencer, List Sequencer Setup
Initial S/W Revision	A.05.00

Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE INTERNAL EXTERNAL2 KEY BUS EXTERNAL4 :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger?
Example	:SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Free Run
Range	Free Run Internal Manual (Trigger Key) Bus External 2 EXTERNAL4
Initial S/W Revision	A.05.00

Free Run

Sets the trigger input for the current step to Free Run.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG IMM
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Internal

Sets the trigger input for the current step to Internal.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG INT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG KEY
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG BUS
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

External 2

Sets the trigger input for the current step to External 2.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG EXT2
Notes	SCPI is supported after A.09.40
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

Value Changed	Recommended Transition Time
Frequency	500 μ s
Amplitude	100 μ s to within 0.1 dB 20 μ s to within 1.0 dB

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME?
Example	:SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME?

Notes	SCPI is supported after A.09.40
Preset	1.0 ms
Min	0.0 ms
Max	4.0 ks
Initial S/W Revision	A.05.00

Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
Remote Command	:SOURCE:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND27 BAND28 BAND29 BAND30 BAND31 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BAND44 BANDA BANDB BANDC BANDD BANDE BANDF :SOURCE:LIST:STEP[1] 2 3...1000:SETup: RADio:BAND?
Example	:SOUR:LIST:STEP2:SET:RAD:BAND PGSM :SOUR:LIST:STEP2:SET:RAD:BAND?
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

None

Selects no radio standard for use on the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Example	:SOUR:LIST:STEP2:SET:RAD:BAND NONE
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

P-GSM

Selects P-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

E-GSM

Selects E-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

R-GSM

Selects R-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

DCS 1800

Selects DCS 1800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

PCS 1900

Selects PCS 1900 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 450

Selects GSM 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 480

Selects GSM 480 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 850

Selects GSM 850 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 700

Selects GSM 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

T-GSM 810

Selects T-GSM 810 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

Band I

Selects Band I as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band II

Selects Band II as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band III

Selects Band III as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band IV

Selects Band IV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band V

Selects Band V as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band VI

Selects Band VI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band VII

Selects Band VII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band VIII

Selects Band VIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band IX

Selects Band IX as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band X

Selects Band X as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XI

Selects Band XI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XII

Selects Band XII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XIII

Selects Band XIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XIV

Selects Band XIV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

US CELL

Selects US Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

US PCS

Selects US PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Japan Cell

Selects Japan Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Korean PCS

Selects Korean PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

NMT 450

Selects NMT 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

IMT 2000

Selects IMT 2000 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Upper 700

Selects Upper 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Secondary 800

Selects Secondary 800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

400 Euro PAMR

Selects 400 Euro PAMR as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

800 PAMR

Selects 800 PAMR as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

AWS

Selects AWS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

700 Public Safety

Selects 700 Public Safety as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

LTE

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

BAND 1

Selects BAND 1 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 2

Selects BAND 2 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 3

Selects BAND 3 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 4

Selects BAND 4 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 5

Selects BAND 5 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 6

Selects BAND 6 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 7

Selects BAND 7 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 8

Selects BAND 8 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 9

Selects BAND 9 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 10

Selects BAND 10 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 11

Selects BAND 11 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 12

Selects BAND 12 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 13

Selects BAND 13 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 14

Selects BAND 14 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 17

Selects BAND 17 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 18

Selects BAND 18 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 19

Selects BAND 19 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 20

Selects BAND 20 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 21

Selects BAND 21 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 24

Selects BAND 24 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 25

Selects BAND 25 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 26

Selects BAND 26 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.12.53

BAND 27

Selects BAND 27 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

BAND 28

Selects BAND 28 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

BAND 31

Selects BAND 31 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND 33

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

BAND 34

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

BAND 35

Selects BAND 35 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

BAND 36

Selects BAND 36 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

BAND 37

Selects BAND 37 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

BAND 38

Selects BAND 38 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

BAND 39

Selects BAND 39 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

BAND 40

Selects BAND 40 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

BAND 41

Selects BAND 41 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

BAND 42

Selects BAND 42 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

BAND 43

Selects BAND 43 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

BAND 44

Selects BAND 44 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD
Initial S/W Revision	A.14.00

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND A

Selects BAND A as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

BAND B

Selects BAND B as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

BAND C

Selects BAND C as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

BAND D

Selects BAND D as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

BAND E

Selects BAND E as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

BAND F

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK?

Example	:SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK?
Notes	SCPI is supported after A.09.40
Preset	DOWN
Range	DOWN UP
Initial S/W Revision	A.05.00

Channel

Allows you to specify the frequency of the current step via a channel number.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRrequency?
Example	:SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	0 (Please refer to for valid ranges.)
Max	10838 (Please refer to for valid ranges.)
Initial S/W Revision	A.05.00

Frequency

Allows you to specify a frequency value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRFrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRFrequency?
Example	:SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40.

	This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated.
Preset	1.00 GHz
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

Power

Allows you to specify a power value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude?
Example	:SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL?
Notes	SCPI is supported after A.09.40
Notes	Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON.
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Preset	-100 dBm

Min	The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 1499 and the table RF Power Range for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 1499 and the table RF Power Range for the valid ranges.
Initial S/W Revision	A.05.00

Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform <string> :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform?
Example	:SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV?
Notes	SCPI is supported after A.09.40
Remote Command Notes	String type, takes "Off" "CW" "Cont" "waveform name"
Preset	CW
Range	Waveform Continue Previous CW Off
Initial S/W Revision	A.05.00

CW

Sets the current step to output a CW tone.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "CW"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "waveform name"
Notes	SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list

sequence will automatically apply header settings of the selected waveform in that step.

Initial S/W Revision	A.05.00

Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "Cont"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Off

Disable RF output of the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "Off"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

"NVWFM" (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. "NVWFM" MSUS will be mapped to the

default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD “D: VARB\testwaveform.bin” or :SOUR:RAD:ARB:LOAD “NVWFM:testwaveform.bin”
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPI command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL “D: varb”
Notes	<string> – specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a

directory to ARB memory is rejected with an error.

When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.

If you specify a directory over SCPI, but the directory does not exist, an error is generated.

If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated. It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated. When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 1584 and "Sequencer" on page 1585 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1610](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1610](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1611](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as ["Change Directory..." on page 1612](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as ["Default Directory..." on page 1612](#)

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 1612](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory
Initial S/W Revision	Prior to A.09.00

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 1613](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 1613](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME COUNT CONTinuous CABort :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE?
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE?
Notes	SCPI is supported after A.09.40
Notes	If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query Error! Reference source not found . Source Sweeping Condition Message to find out if the current list sequence is complete or not.
Range	Time Play Count Continuous Continuous Abort
Initial S/W Revision	A.05.00

Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found.** List Sequence Step Validation.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration, Time
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOUNT <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOUNT?
Example	:SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO?
Notes	SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #"
Notes	If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not.
Preset	1.00 ms
Min	100 μ s
Max	1800 s
Initial S/W Revision	A.05.00

Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE COUN
Notes	SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform.
Initial S/W Revision	A.05.00

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE CONT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select “On”, trigger event will occur on both Internal and External2 paths. Select “Off” will turn off trigger output.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON OFF 1 0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger
Example	:SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Off

Range	On Off
Initial S/W Revision	A.05.00

Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMediate INTernal KEY BUS EXTernal2, <time>, NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF, DOWN UP, <freq>, <ampl>, <string>, TIME COUNT CONTinuous, <time>, ON OFF 1 0, [<int>], :SOURce:LIST:STEP[1] 2 ... 4..1000:SETup?</pre>
Example	:SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM_Test1.bin", TIME, 10ms, OFF, 255
Notes	The parameters are: (There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.) 1. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 1587. 2. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 1589. 3. Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 1590. 4. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 1606. 5. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 1607 and "Frequency" on page 1607. 6. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 1608. 7. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The

	options for specifying these are: <filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated. CONT - continues playback of the ARB file from the previous step CW - outputs a CW tone OFF - disable RF output 8. Step Duration <enum> - specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 1615. 9. Time or Count <time/int> - specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "Time" on page 1615 and "Play Count" on page 1616. 10. Output Trigger <Boolean> - specifies the output trigger for the step. For details of the ranges for this setting see "Output Trigger" on page 1617.
Dependencies	The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586. If you attempt to remotely set or query a subopcode that is out of range, an error is generated.
Initial S/W Revision	A.05.00

Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Step Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:INPut:TRIGger?</pre>
Example	<pre>:SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG?</pre>
Notes	The command is to setup below parameter array of whole list sequence. Step Trigger <enum> - specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 1587. If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes	IMMEDIATE INTERNAL KEY BUS EXTERNAL2
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:TRANsition:TIME <time>, <time>, <time>, ... :SOURce:LIST:SETup:TRANsition:TIME?
Example	:SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms :SOUR:LIST:SET:TRAN:TIME?
Notes	The command is to setup below parameter array of whole list sequence. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 1589 If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

R e m o t e C o m m a n d	:SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND?
E x a m p l	:SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM :SOUR:LIST:SET:RAD:BAND?

e	
N	The command is to setup below parameter array of whole list sequence.
o	Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 1590.
t	If input parameter number exceeds the step number defined by "Number of Steps" on page 1586Number of Steps then
e	generate error ", and only those parametes whose index number falls in number of steps will be updated.
s	
R	NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDI
e	V BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KO
m	REAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1
o	BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND1
t	9 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAN
e	D41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF
C	
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D	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on
e	page 1586.
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Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK?
Example	:SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK?
Notes	The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 1606 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes	DOWN UP
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:CNFrequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFrequency?
Example	:SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR?

Notes	The command is to setup below parameter array of whole list sequence. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 1607 and "Frequency" on page 1607 This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?</pre>
Example	<pre>:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?</pre>
Notes	The command is to setup below parameter array of whole list sequence. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 1608. If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:SETup:WAVEform <string>, <string>, <string>, ...</pre>

	:SOURce:LIST:SETup:WAVeform?
Example	:SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV?
Notes	The command is to setup below parameter array of whole list sequence. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are: <filename> – plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it is does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated. CONT – continues playback of the ARB file from the previous step CW – outputs a CW tone OFF – disable RF output If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586.
Range	"filename" "CW" "Off" "CONT"
Initial S/W Revision	A.09.40

Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 1586 Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:DURation:TYPE <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:DURation:TYPE?
Example	:SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE?
Notes	The command is to setup below parameter array of whole list sequence. Step Duration <enum> – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 1615. If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes	TIME COUNT CONTinuous
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details

	see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure “Duration Time” or “Play Count” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:TOCount <time/int>, <time/int>, <time/int>, ... :SOURce:LIST:SETup:TOCount?
Example	:SOUR:LIST:SET:TOC 1s,2s,3s :SOUR:LIST:SET:TOC? :SOUR:LIST:SET:TOC 5,6,7 :SOUR:LIST:SET:TOC?
Notes	The command is to setup below parameter array of whole list sequence. Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "Time" on page 1615 and "Play Count" on page 1616 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. If current "Step Duration" on page 1615 is “Continuous”, then generate error -221, "Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Output Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ... :SOURce:LIST:SETup:OUTPut:TRIGger ?
Example	:SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON :SOUR:LIST:SET:OUTP:TRIG?
Notes	The command is to setup below parameter array of whole list sequence. Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see "Output Trigger" on page 1617 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in

	legal step number will be updated.
Remote Command Notes	ON OFF 1 0
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI feature described in.

Remote Command	:SOURce:LIST:SETup:CLEar
Example	:SOUR:LIST:SETup:CLE
Initial S/W Revision	A.05.00

Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST:TRIGgerout:TYPE BEGinningofstep DATamarker
Example	:SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP?
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer
Preset	BEGinningofstep
Range	BEGinningofstep DATamarker
Initial S/W Revision	A.14.00

BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type
Example	:SOUR:LIST:TRIG:TYP BEG
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP

Initial S/W Revision	A.14.00

DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

Key Path	Source, List Sequencer, Trigger Type
Example	:SOUR:LIST:TRIG:TYP DAT
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE MARKer

Initial S/W Revision	A.14.00

Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M1
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1

Initial S/W Revision	A.14.00

Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M2
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2

Initial S/W Revision	A.14.00

Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M3
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3
Initial S/W Revision	A.14.00

Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M4
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4
Initial S/W Revision	A.14.00

Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

Key Path	Source, List Sequencer
Remote Command	No remote command, front panel only.
Initial S/W Revision	A.05.00

Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to “Bus”. Sending this command will trigger the step and continue the sequence.

Remote Command	:SOURce:LIST:TRIGger:INITiate[:IMMediate]
Example	:SOUR:LIST:TRIG:INIT
Initial S/W Revision	A.05.00

Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

Remote Command	:SOURce:LIST:INITiation:ARMed?
Example	:SOUR:LIST:INIT:ARMed?
Notes	The return data is in the following format: Integer
Notes	Query only SCPI. Returning "1" if list sequence has been initiated successfully, returning "0" if not. Once get "0", you can use :SYST:ERR? to query what error happened. Just like "*OPC?", this command can be blocked until event/status "IsSourceSweeping" happens, and then returns. Doing so can help user's script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI ":SOUR:LIST:TRIGger[:IMMediate]" (see "Initiate Sequence" on page 1585 Initiate Sequence), the right usage of this command is to use it after ":SOUR:LIST:TRIG". If not, this command will return "1" immediately.
Notes	There is an alias SCPI ":SOURce:LIST:TRIGger:INITiation:ARMed?".
Initial S/W Revision	A.09.40

Source Preset

Allows you to preset the source settings to their default values.

Key Path	Source
Remote Command	:SOURce:PRESet
Example	:SOUR:PRES

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Ref Value

Allows you to set reference value by Phase Error and Phase Error w/Freq, and RF Envelope.

See also:

- ["Ref Value \(Phase Error and Phase Error w/Freq window\)" on page 1343](#)
- ["Ref Value \(RF Envelope window\)" on page 1344](#)

Key Path	SPAN X Scale
Mode	GSM
Initial S/W Revision	Prior to A.02.00

Ref Value (Phase Error and Phase Error w/Freq window)

Allows you to set the display X reference value for time axis 'bit'.

Key Path	SPAN / X Scale
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:X[:SCALe]:RLEVel <real> :DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:X[:SCALe]:RLEVel?
Example	DISP:PFER:VIEW:WIND:TRAC:X:RLEV 1.5 DISP:PFER:VIEW:WIND:TRAC:X:RLEV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	If the "Auto Scaling" on page 1346 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 1346 automatically changes to Off.
Preset	0.5
State Saved	Saved in instrument state.
Min	0.000
Max	5000000.000
Initial S/W Revision	Prior to A.02.00

Ref Value (RF Envelope window)

Allow you to set the display X reference value for time axis 'sec'.

Key Path	SPAN / X Scale
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:RLEVel <time> :DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:RLEVel?
Example	DISP:PFER:VIEW:WIND3:TRAC:X:RLEV 1.5 DISP:PFER:VIEW:WIND3:TRAC:X:RLEV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	If the "Auto Scaling" on page 1346 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 1346 automatically changes to Off.
Preset	-64.4 us
State Saved	Saved in instrument state.
Min	-1.0 s
Max	10.0 s
Initial S/W Revision	Prior to A.02.00

Scale/Div

Allows you to set the display X scale/division value using bits (Phase Error and Phase Error w/Freq) or time (RF Envelope)

See also:

"Scale/Div (Phase Error and Phase Error w/Freq window)" on page 1344

"Scale/Div (RF Envelope window)" on page 1345

Key Path	SPAN X Scale
Mode	GSM
Initial S/W Revision	Prior to A.02.00

Scale/Div (Phase Error and Phase Error w/Freq window)

Allows you to set the display X scale/division value.

Key Path	SPAN / X Scale
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:X[:SCALe]:PDIVision <real> :DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:X[:SCALe]:PDIVision?

Example	DISP:PFER:VIEW:WINDOW:TRAC:X:PDIV 15 DISP:PFER:VIEW:WINDOW:TRAC:X:PDIV?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Couplings	If the "Auto Scaling" on page 1346 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 1346 automatically changes to Off.
Preset	14.7
State Saved	Saved in instrument state.
Min	1.000
Max	500000.0
Initial S/W Revision	Prior to A.02.00

Scale/Div (RF Envelope window)

Allows you to set the display X scale/division value.

Key Path	SPAN / X Scale
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:PDIVision <time> :DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:PDIVision?
Example	DISP:PFER:VIEW:WINDOW3:TRAC:X:PDIV 1 DISP:PFER:VIEW:WINDOW3:TRAC:X:PDIV?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Couplings	If the "Auto Scaling" on page 1346 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 1346 automatically changes to Off.
Preset	532.0 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Initial S/W Revision	Prior to A.02.00

Ref Position

Allows you to set the display reference position to Left, Center or Right.

Key Path	SPAN / X Scale
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow[1] 2 3:TRACe:X[:SCALe]:RPOSition LEFT CENTER RIGHT

	:DISPlay:PFErRor:VIEW[1]:WINDow[1] 2 3:TRACe:X[:SCALe]:RPOSition?
Example	DISP:PFEr:VIEW:WIND2:TRAC:X:RPOS LEFT DISP:PFEr:VIEW:WIND2:TRAC:X:RPOS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left Ctr Right
Initial S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the scale coupling function between On and Off.

Key Path	SPAN / X Scale
Mode	GSM
Remote Command	:DISPlay:PFErRor:VIEW[1]:WINDow[1] 2 3:TRACe:X[:SCALe]:COUPle ON OFF 1 0 :DISPlay:PFErRor:VIEW[1]:WINDow[1] 2 3:TRACe:X[:SCALe]:COUPle?
Example	DISP:PFEr:VIEW:WIND:TRAC:X:COUP ON DISP:PFEr:VIEW:WIND:TRAC:X:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Upon pressing the Restart front-panel key, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either "Ref Value" on page 1343 or "Scale/Div" on page 1344 manually, Auto Scaling automatically changes to Off.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Sweep/Control

Accesses a menu that enables you to configure the Sweep and Control functions of the analyzer, such as Acquisition Time and Gating.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing **Restart**, **Single** or **Cont** does a Resume.

Key Path	Sweep/Control
Remote Command	:INITiate:PAUSE
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

Key Path	Sweep/Control
Remote Command	:INITiate:RESume
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

Abort (Remote Command Only)

This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state. If the analyzer is in the process of aligning when ABORT is sent, the alignment finishes before the abort function is performed. So ABORT does not abort an alignment.

If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is set for Single measurement, it remains in the "idle" state until an :INIT:IMM command is received.

Remote Command	:ABORt
Example	:ABOR

Notes	If :INITiate:CONTInuous is ON, then a new continuous measurement will start immediately; with sweep (data acquisition) occurring once the trigger condition has been met. If :INITiate:CONTInuous is OFF, then :INITiate:IMMediate is used to start a single measurement; with sweep (data acquisition) occurring once the trigger condition has been met.
Dependencies	For continuous measurement, ABORt is equivalent to the Restart key. Not all measurements support the abort command.
Status Bits/OPC dependencies	The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUEStionable register bit 9 (INTegrity sum) is cleared. Since all the bits that feed into OPC are cleared by the ABORt, the ABORt will cause the *OPC query to return true.
Initial S/W Revision	Prior to A.02.00

System

See "System" on page 162

Trace/Detector

There is no functionality for this Front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	Front-panel key
Mode	EDGE GSM

Trigger

See "Trigger" on page 218

Free Run

See "Free Run " on page 225

Video

See "Video (IF Envelope) " on page 226

Trigger Level

See ____ on page X

Trig Slope

See ____ on page X

Trig Delay

See ____ on page X

External 1

See "External 1 " on page 226

Trigger Level

See "Trigger Level " on page 227

Trig Slope

See "Trig Slope " on page 227

Trig Delay

See "Trig Delay " on page 228

Zero Span Delay Comp

See "Zero Span Delay Comp On/Off" on page 229

External 2

See "External 2 " on page 229

Trigger Level

See ____ on page X

Trig Slope

See ____ on page X

Trig Delay

See ___ on page X

Zero Span Delay Comp

See ___ on page X

RF Burst

See "RF Burst " on page 230

Absolute Trigger

See ___ on page X

Relative Trigger

See ___ on page X

Trig Slope

See ___ on page X

Trig Delay

See ___ on page X

Periodic Timer

See ___ on page X

Period

See ___ on page X

Offset

See ___ on page X

Offset Adjust (Remote Command Only)

See ___ on page X

Reset Offset Display

See ___ on page X

Sync Source

See ___ on page X

Off

See ___ on page X

External 1

See "External 1 " on page 226

Trigger Level

See "Trigger Level " on page 227

Trig Slope

See "Trig Slope " on page 227

External 2

See "External 2 " on page 229

Trigger Level

See ____ on page X

Trig Slope

See ____ on page X

RF Burst

See "RF Burst " on page 230

Absolute Trigger

See ____ on page X

Trig Slope

See ____ on page X

Trig Delay

See ____ on page X

Auto/Holdoff

See ____ on page X

Auto Trig

See ____ on page X

Trig Holdoff

See ____ on page X

Holdoff Type

See ____ on page X

User Preset

Accesses a menu that gives you the following three choices:

- **User Preset** – recalls a state previously saved using the Save User Preset function.
- **User Preset All Modes** – presets all of the modes in the analyzer
- **Save User Preset**– saves the current state for the current mode

Key Path	Front-panel key
Backwards Compatibility Notes	User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data. In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users. On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode. User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.
Initial S/W Revision	Prior to A.02.00

User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, `SYST:PRES:USER:SAV`. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER
Example	:SYST:PRES:USER:SAVE:SYST:PRES:USER
Notes	:SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed
Couplings	A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.
Initial S/W Revision	Prior to A.02.00

User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

NOTE

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER:ALL
Example	:SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL
Notes	Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state.
Couplings	A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.

Initial S/W Revision	Prior to A.02.00

Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER:SAVE
Example	:SYST:PRES:USER:SAVE
Notes	:SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM:STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file.
Initial S/W Revision	Prior to A.02.00

View/Display

Accesses a menu of functions that enable you to set the display parameters for the current measurement and select the View.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the **System Display Settings** key apply to all measurements in all modes.

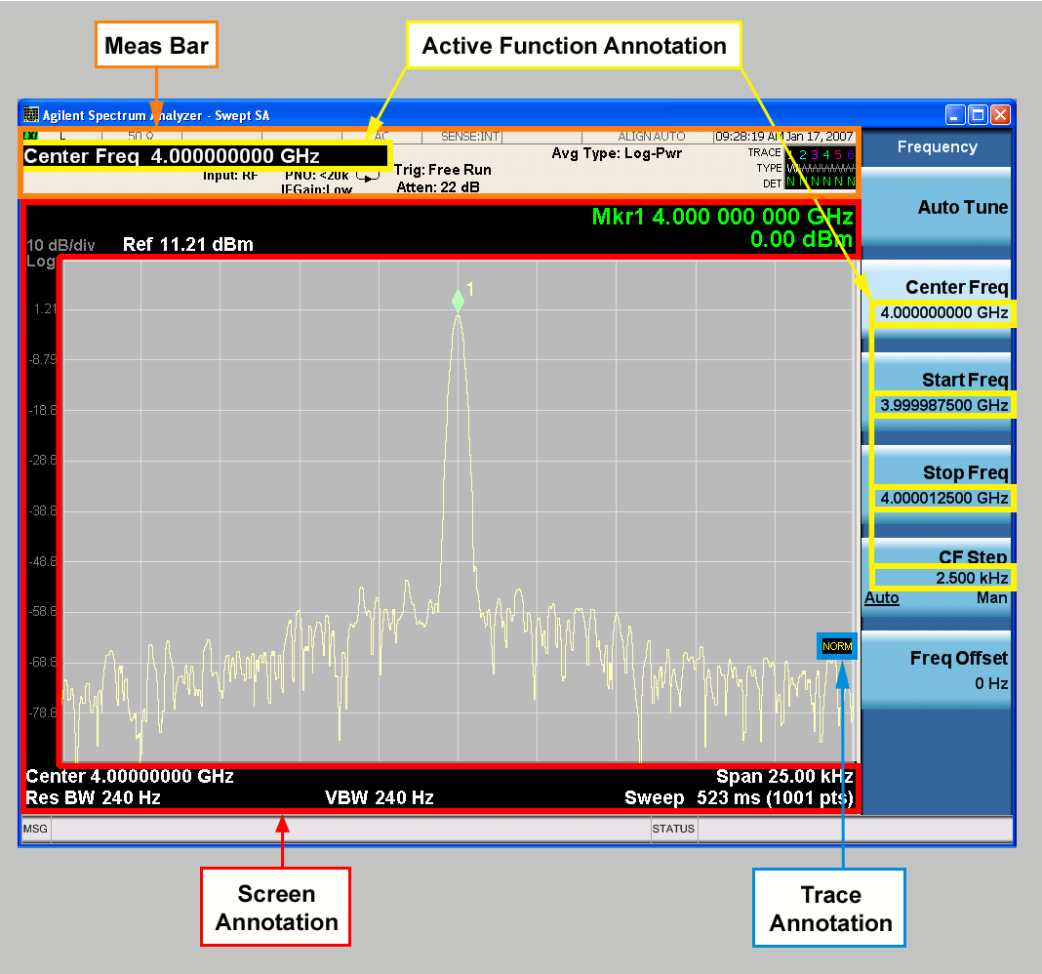
Key Path	Display
Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.



Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ANNOtation:MBAR[:STATe] OFF ON 0 1 :DISPlay:ANNOtation:MBAR[:STATe]?
Example	DISP:ANN:MBAR OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off.

State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Screen

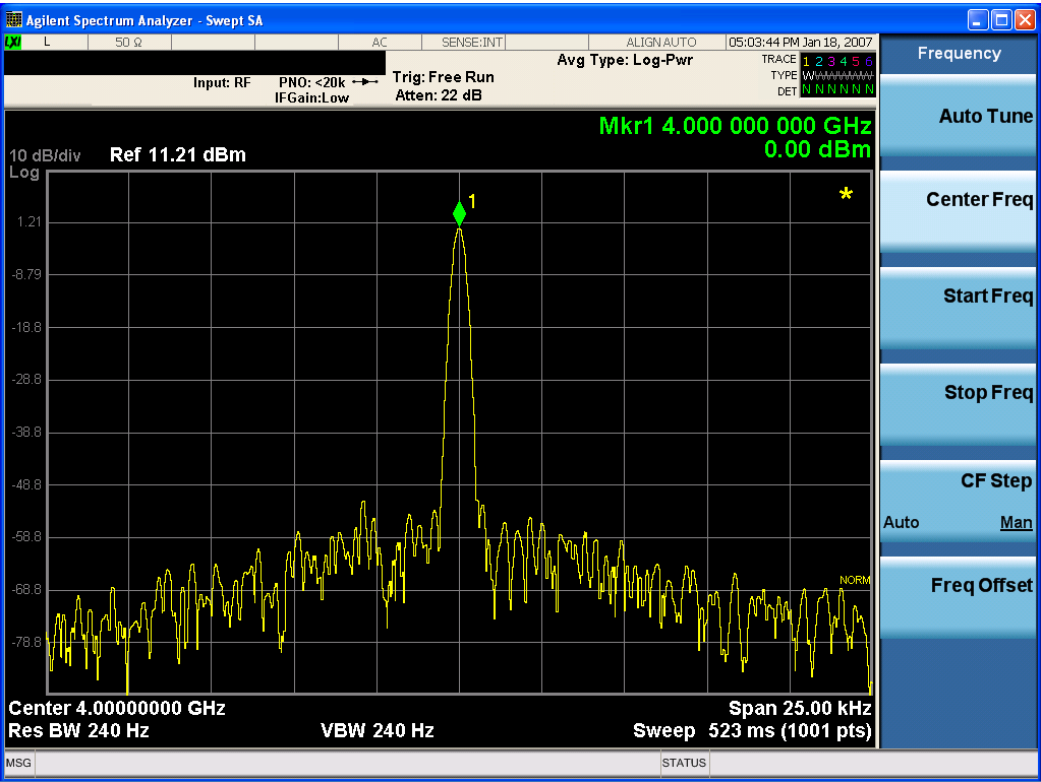
This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1 :DISPlay:ANNotation:SCReen[:STATe]?
Example	DISP:ANN:SCR OFF
Dependencies	Grayed-out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature..



Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ACTivefunc[:STATe] ON OFF 1 0 :DISPlay:ACTivefunc[:STATe] ?
Example	DISP:ACT OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Title

Displays menu keys that enable you to change or clear a title on your display.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press **Change Title** to enter a new title through the alpha editor. Press **Enter** or **Return** to complete the entry. Press **ESC** to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press **Change Title** again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing **Title**, **Clear Title**.

NOTE

Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

Key Path	View/Display, Display, Title
Mode	All
Remote Command	:DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA?
Example	DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title
Notes	Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters.
Preset	No title (measurement name instead)
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Clear Title

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

Key Path	View/Display, Display, Title
Example	The following commands clear the title and restore the measurement's original title: DISP:ANN:TITL:DATA "" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "" This example is for ACP; in measurements other than Swept SA the measurement name is required.
Notes	Uses the :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> command with an empty string (in the Swept SA, the <measurement> is omitted).

Preset	Performed on Preset.
Initial S/W Revision	Prior to A.02.00

Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

Key Path	View/Display, Display
Remote Command	:DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1 :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]?
Example	DISP:WIND:TRAC:GRAT:GRID OFF
Notes	The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis.
Preset	On
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by **Restore Misc Defaults** or **Restore System Defaults** under System.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is **All Off**, it forces **ScreenAnnotation, Meas Bar, Trace, and Active Function Values** settings to be **OFF** for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is **All Off**, the **Screen, Meas Bar, Trace, and Active Function Values** keys under the **Display, Annotation** menu are grayed out and forced to **Off**. When **Local Settings** is selected, you are able to set the local annotation settings on a measurement by measurement basis.

Key Path	View/Display, Display, System Display Settings
Remote Command	:DISPlay:WINDow[1]:ANNotation[:ALL] OFF ON 0 1 :DISPlay:WINDow[1]:ANNotation[:ALL]?
Example	:DISP:WIND:ANN OFF

Preset	On (Set by Restore Misc Defaults)
State Saved	Not saved in instrument state.
Backwards Compatibility Notes	The WINDow parameter and optional subopcode is included for backwards compatibility but ignored – all windows are equally affected.
Initial S/W Revision	Prior to A.02.00

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

Key Path	Save, Screen Image
Remote Command	:MMEMory:STORe:SCReen:THEMe TDCOLOR TDMonochrome FCOLOR FMONochrome :MMEMory:STORe:SCReen:THEMe?
Example	:MMEM:STOR:SCR:THEM TDM
Preset	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
Readback	3D Color 3D Mono Flat Color Flat Mono
Backwards Compatibility Notes	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
Initial S/W Revision	Prior to A.02.00

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDC
Readback	3D Color
Initial S/W Revision	Prior to A.02.00

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDM
Readback	3D Mono
Initial S/W Revision	Prior to A.02.00

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

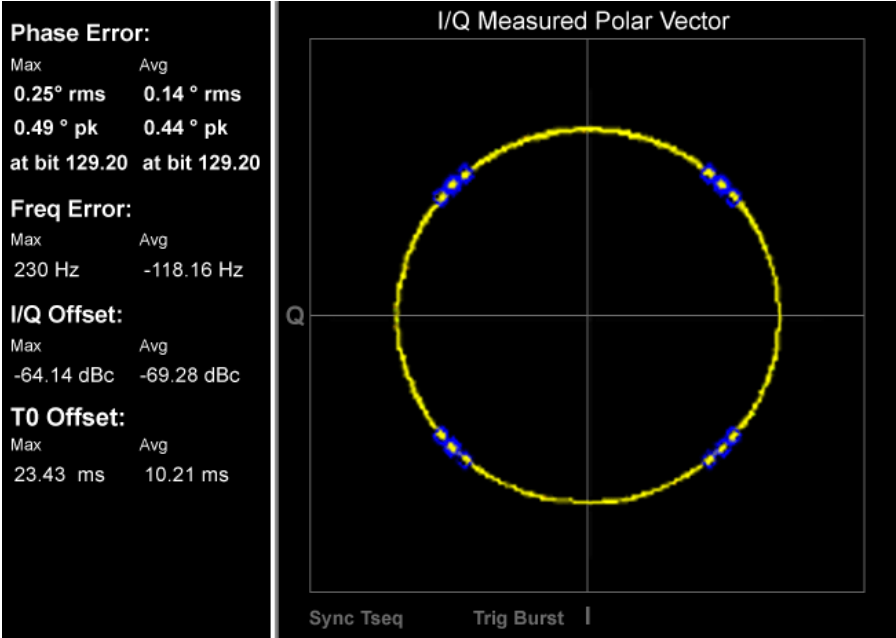
I/Q Measured Polar Graph View

This view has 2 windows, as detailed in the sections below:

"Graph Window" on page 1365

"Metrics Window" on page 1365

The figure below shows an example of this view.



For any multi-window view, you can select each window using the **Next Window** key, and make the selected window full size using the **Zoom** key.

Graph Window

Marker Operation	No
Corresponding Trace	Series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace. (n=5)

Metrics Window

The Metrics Window is identical to that of the I/Q Error view. Refer to the section "I/Q Error " on page 1373.

Key Path	View/Display
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

I/Q Polar Vect/ConstIn

I/Q Polar Vector/Constellation allows you to change the format of the polar vector graph. The following display options are available:

- Vector and Constellation (SCPI: VC)
- Vector Only (SCPI: VECTor)
- Constellation Only (SCPI: CONSTIn)

Key Path	View/Display
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow2:TRACe:POLar VC VECTor CONSTln :DISPlay:PFERror:VIEW[1]:WINDow2:TRACe:POLar?
Example	DISP:PFER:VIEW:WIND2:TRAC:POL VC DISP:PFER:VIEW:WIND2:TRAC:POL?
Notes	VC : Vect & Constln VECTor: Vector CONSTln : Constellation You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	VC
State Saved	Saved in instrument state.
Range	Vect & Constln Vector Constellation
Initial S/W Revision	Prior to A.02.00

I/Q Error

This view has 4 windows, as detailed in the sections below:

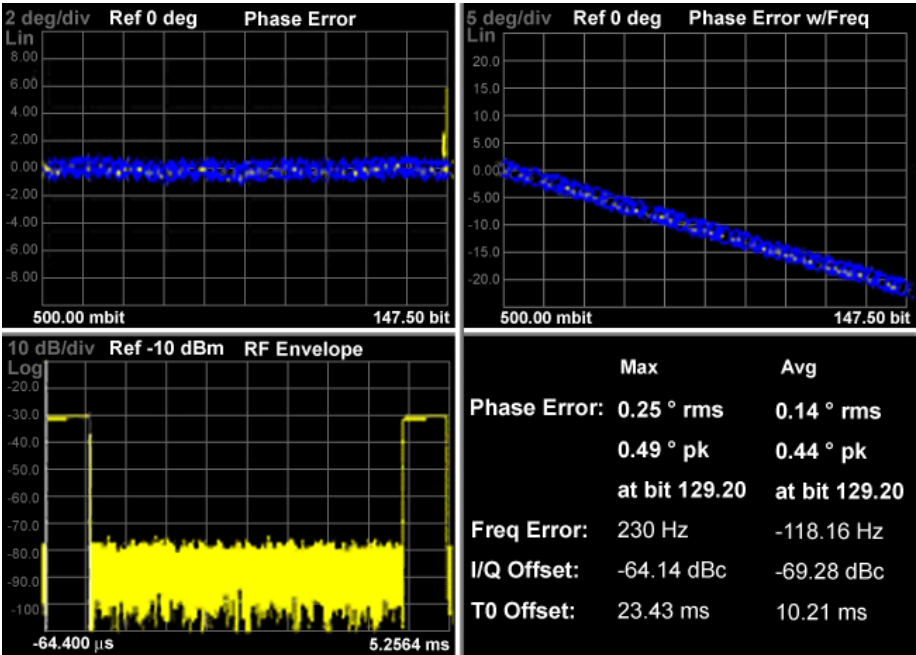
["Phase Err Window" on page 1367](#)

["Phase Err w/Freq Window" on page 1367](#)

["RF Envelope Window" on page 1367](#)

["Metrics Window" on page 1368](#)

The figure below shows an example of this view.



For any multi-window view, you can select each window using the **Next Window** key, and make the selected window full size using the **Zoom** key.

Phase Err Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in degrees) that represent each sample in the phase error trace. (n=2)

Phase Err w/Freq Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in degrees) that represent each sample in the phase error with frequency trace. (n=3)

RF Envelope Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers that represent each sample in the log magnitude trace of the original time record. (n=4)

Metrics Window

Name	Corresponding Results	Display Format
Phase Error [rms] (Avg)	n=8 1st Average RMS Phase Error	9.99 ° rms
Phase Error [rms] (Max Hold)	n=8 2nd Maximum RMS Phase Error	9.99 ° rms
Phase Error [pk] (Avg)	n=8 3rd Average Peak Phase Error	9.99 °pk
Phase Error [pk] (Max Hold)	n=8 4th Maximum Peak Phase Error	9.99 °pk
Phase Error at bit (Avg)	n=8 5th Average Peak Phase Error Symbol Position	at bit 99.99
Phase Error at bit (Max Hold)	n=8 6th Maximum Peak Phase Error Symbol Position	at bit 99.99
Freq Error (Avg)	n=8 7th Average Frequency Error	-999.99 Hz
Freq Error (Max Hold)	n=8 8th Maximum Frequency Error	-999.99 Hz
I/Q Offset (Avg)	n=8 9th Average I/Q Origin Offset	-99.99 dBc
I/Q Offset (Max Hold)	n=8 10th Maximum I/Q Origin Offset	-99.99 dBc
T0 Offset (Avg)	n=8 11th Average T0 Offset	999.999 µs
T0 Offset (Max Hold)	n=8 12th Maximum T0 Offset	999.999 µs

Key Path	View/Display
Mode	EDGE/GSM
Initial S/W Revision	Prior to A.02.00

Bit Dots

Allows you to toggle the bit dots between On and Off.

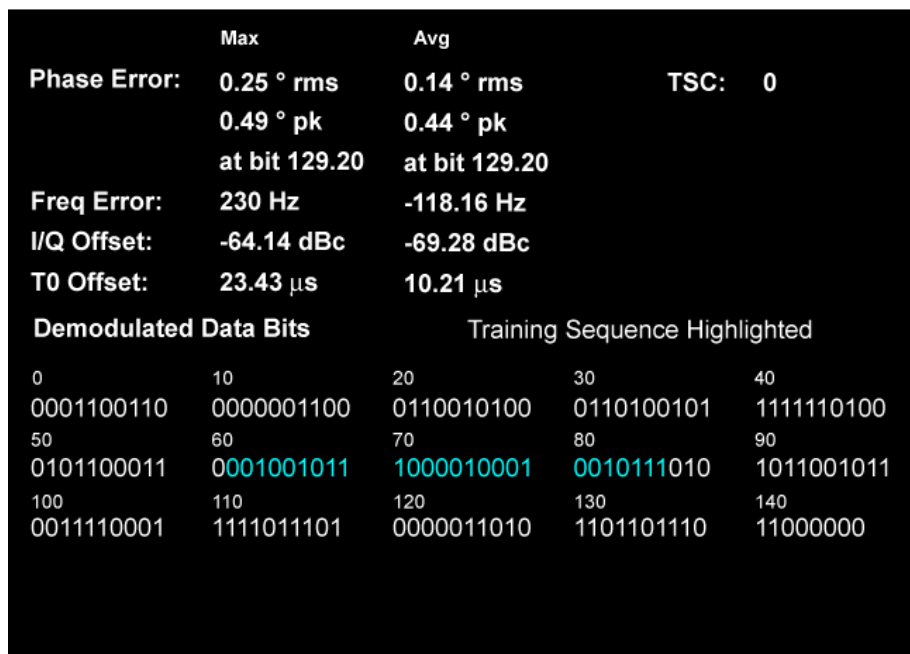
- On: turns on blue bit dots on the trace in 'Phase Error' & 'Phase Error with Freq' window.
- Off: turns off blue bit dots on the trace in 'Phase Error' & 'Phase Error with Freq' window.

Key Path	View/Display
Mode	GSM
Remote Command	:DISPlay:PFERror:BDOTs[:STATe] ON OFF 1 0 :DISPlay:PFERror:BDOTs[:STATe]?
Example	DISP:PFER:BDOT ON DISP:PFER:BDOT?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. This SCPI command is included for completeness. But only affects the traces displayed on the screen.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Data Bits

This view has only one window, as detailed in the section "[Metrics Window](#)" on page 1369 below.

The figure below shows an example of this view.



Metrics Window

Name	Corresponding Results	Display Format
Phase Error [rms] (Avg)	n=8 1st Average RMS Phase Error	9.99 ° rms

Name	Corresponding Results	Display Format
Phase Error [rms] (Max Hold)	n=8 2nd Maximum RMS Phase Error	9.99 ° rms
Phase Error [pk] (Avg)	n=8 3rd Average Peak Phase Error	9.99 °pk
Phase Error [pk] (Max Hold)	n=8 4th Maximum Peak Phase Error	9.99 °pk
Phase Error at bit (Avg)	n=8 5th Average Peak Phase Error Symbol Position	at bit 99.99
Phase Error at bit (Max Hold)	n=8 6th Maximum Peak Phase Error Symbol Position	at bit 99.99
Freq Error (Avg)	n=8 7th Average Frequency Error	-999.99 Hz
Freq Error (Max Hold)	n=8 8th Maximum Frequency Error	-999.99 Hz
I/Q Offset (Avg)	n=8 9th Average I/Q Origin Offset	-99.99 dBc
I/Q Offset (Max Hold)	n=8 10th Maximum I/Q Origin Offset	-99.99 dBc
T0 Offset (Avg)	n=8 11th Average T0 Offset	999.999 µs
T0 Offset (Max Hold)	n=8 12th Maximum T0 Offset	999.999 µs
Demodulated Data Bits	n=6	

Key Path	View/Display
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

View

Accesses a menu that allows you to select the desired view of the measurement.

For remote commands associated with view selection, see ["View Selection by name \(SCPI only\)" on page 1371](#) and ["View Selection by number \(SCPI only\)" on page 1371](#).

The 3 following view selections are available:

1. I/Q Measured Polar Graph (SCPI: POLar) or (SCPI: 1)

Provides a view of numeric results and a polar vector graph. This view has 2 windows: Numeric Results, and I/Q Polar Graph.

For full details, see Section , ["I/Q Measured Polar Graph View" on page 1372](#)

2.I/Q Error (SCPI: ERRor|QUAD) or (SCPI: 2)

Provides a combination view, with 4 windows: Phase Error, Phase Error with Freq, RF Envelope, and Numeric Results.

For full details, see ["I/Q Error " on page 1373](#)

3.Data Bits (SCPI: DBITs) or (SCPI: 3)

Provides a view of the numeric results and data bits with the sync word (TSC) highlighted.

For full details of this view, see ["Data Bits" on page 1376](#)

View Selection by name (SCPI only)

Key Path	View/Display
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[:SElect] POLar ERRor DBITs :DISPlay:PFERror:VIEW[:SElect]?
Example	DISP:PFER:VIEW ERR DISP:PFER:VIEW?
Notes	- POLar : I/Q Measured Polar Graph - ERRor : I/Q Error - DBITs : Data Bits You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	View Selection by number must be coupled with this parameter value.
Preset	ERRor
State Saved	Saved in instrument state.
Range	I/Q Error I/Q Measured Polar Graph Data Bits
Initial S/W Revision	Prior to A.02.00

View Selection by number (SCPI only)

Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW:NSElect <integer> :DISPlay:PFERror:VIEW:NSElect?
Example	DISP:PFER:VIEW:NSEL 3
Notes	1: I/Q Measured Polar Graph 2: IQ Error 3: Data Bits

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	View Selection must be coupled with this parameter value.
Preset	2
State Saved	Saved in instrument state.
Min	1
Max	3
Initial S/W Revision	Prior to A.02.00

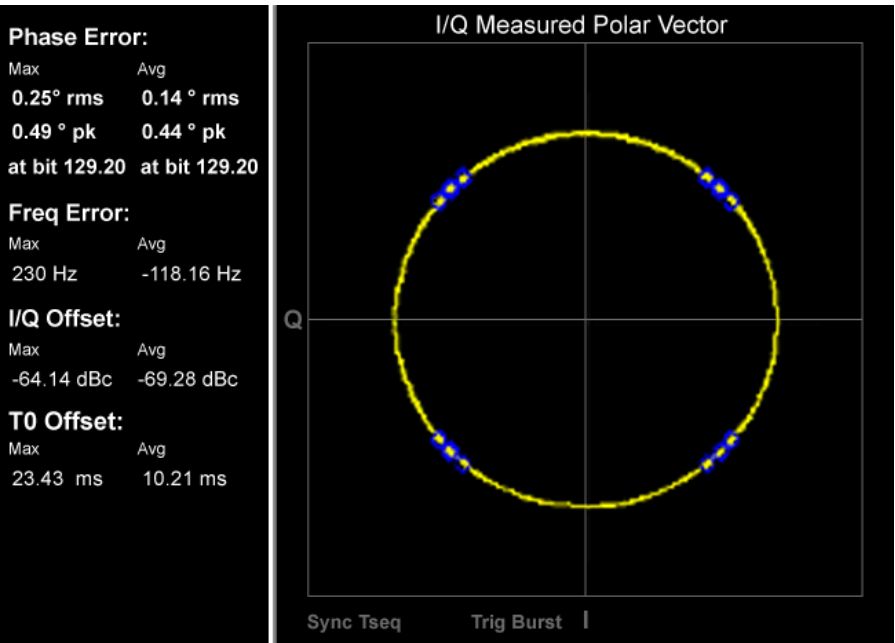
I/Q Measured Polar Graph View

This view has 2 windows, as detailed in the sections below:

"Graph Window" on page 1372

"Metrics Window" on page 1373

The figure below shows an example of this view.



For any multi-window view, you can select each window using the **Next Window** key, and make the selected window full size using the **Zoom** key.

Graph Window

Marker Operation	No
Corresponding Trace	Series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace. (n=5)

Metrics Window

The Metrics Window is identical to that of the I/Q Error view. Refer to the section ["I/Q Error " on page 1373](#).

Key Path	View/Display
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

I/Q Polar Vect/Constln

I/Q Polar Vector/Constellation allows you to change the format of the polar vector graph. The following display options are available:

- Vector and Constellation (SCPI: VC)
- Vector Only (SCPI: VECTor)
- Constellation Only (SCPI: CONSTln)

Key Path	View/Display
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow2:TRACe:POLar VC VECTor CONSTln :DISPlay:PFERror:VIEW[1]:WINDow2:TRACe:POLar?
Example	DISP:PFER:VIEW:WIND2:TRAC:POL VC DISP:PFER:VIEW:WIND2:TRAC:POL?
Notes	VC : Vect & Constln VECTor: Vector CONSTln : Constellation You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	VC
State Saved	Saved in instrument state.
Range	Vect & Constln Vector Constellation
Initial S/W Revision	Prior to A.02.00

I/Q Error

This view has 4 windows, as detailed in the sections below:

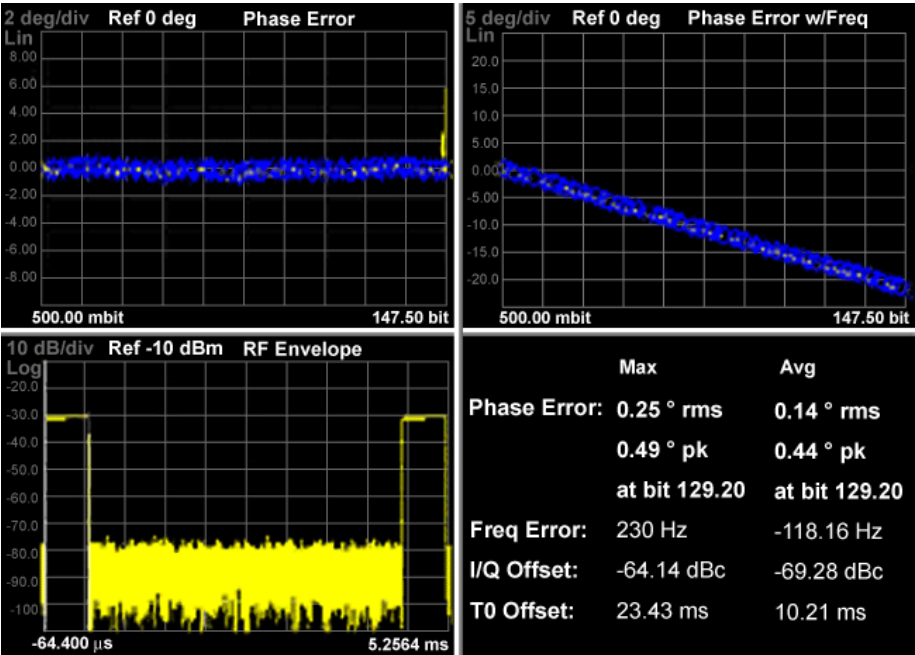
["Phase Err Window" on page 1374](#)

["Phase Err w/Freq Window" on page 1374](#)

["RF Envelope Window" on page 1374](#)

["Metrics Window" on page 1375](#)

The figure below shows an example of this view.



For any multi-window view, you can select each window using the **Next Window** key, and make the selected window full size using the **Zoom** key.

Phase Err Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in degrees) that represent each sample in the phase error trace. (n=2)

Phase Err w/Freq Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in degrees) that represent each sample in the phase error with frequency trace. (n=3)

RF Envelope Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers that represent each sample in the log magnitude trace of the original time record. (n=4)

Metrics Window

Name	Corresponding Results	Display Format
Phase Error [rms] (Avg)	n=8 1st Average RMS Phase Error	9.99 ° rms
Phase Error [rms] (Max Hold)	n=8 2nd Maximum RMS Phase Error	9.99 ° rms
Phase Error [pk] (Avg)	n=8 3rd Average Peak Phase Error	9.99 °pk
Phase Error [pk] (Max Hold)	n=8 4th Maximum Peak Phase Error	9.99 °pk
Phase Error at bit (Avg)	n=8 5th Average Peak Phase Error Symbol Position	at bit 99.99
Phase Error at bit (Max Hold)	n=8 6th Maximum Peak Phase Error Symbol Position	at bit 99.99
Freq Error (Avg)	n=8 7th Average Frequency Error	-999.99 Hz
Freq Error (Max Hold)	n=8 8th Maximum Frequency Error	-999.99 Hz
I/Q Offset (Avg)	n=8 9th Average I/Q Origin Offset	-99.99 dBc
I/Q Offset (Max Hold)	n=8 10th Maximum I/Q Origin Offset	-99.99 dBc
T0 Offset (Avg)	n=8 11th Average T0 Offset	999.999 µs
T0 Offset (Max Hold)	n=8 12th Maximum T0 Offset	999.999 µs

Key Path	View/Display
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

Bit Dots

Allows you to toggle the bit dots between On and Off.

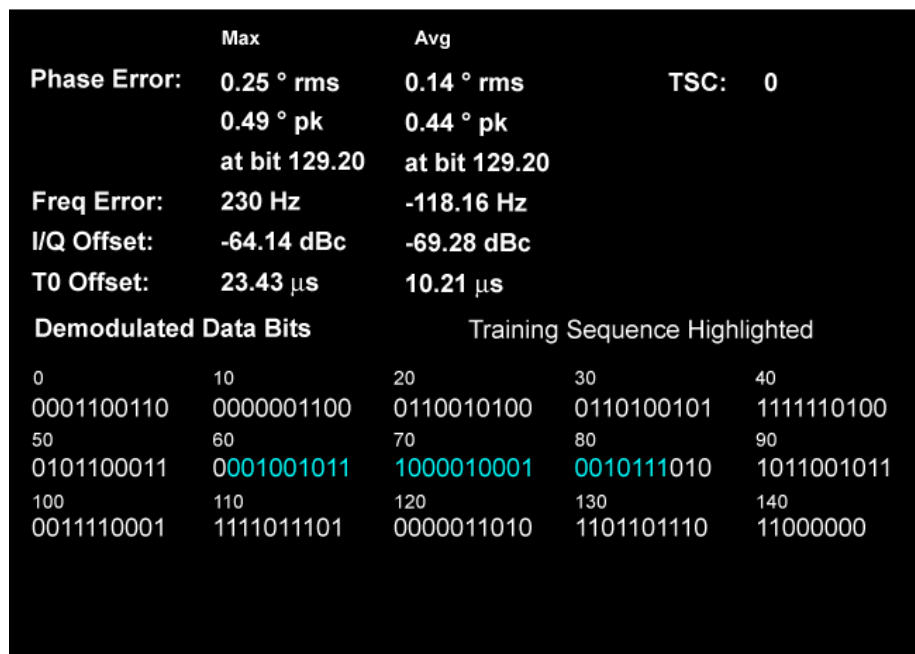
- On: turns on blue bit dots on the trace in 'Phase Error' & 'Phase Error with Freq' window.
- Off: turns off blue bit dots on the trace in 'Phase Error' & 'Phase Error with Freq' window.

Key Path	View/Display
Mode	GSM
Remote Command	:DISPlay:PFERror:BDOTs[:STATe] ON OFF 1 0 :DISPlay:PFERror:BDOTs[:STATe]?
Example	DISP:PFER:BDOT ON DISP:PFER:BDOT?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. This SCPI command is included for completeness. But only affects the traces displayed on the screen.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Data Bits

This view has only one window, as detailed in the section ["Metrics Window" on page 1376](#) below.

The figure below shows an example of this view.



Metrics Window

Name	Corresponding Results	Display Format
Phase Error [rms] (Avg)	n=8 1st Average RMS Phase Error	9.99 ° rms

Name	Corresponding Results	Display Format
Phase Error [rms] (Max Hold)	n=8 2nd Maximum RMS Phase Error	9.99 ° rms
Phase Error [pk] (Avg)	n=8 3rd Average Peak Phase Error	9.99 °pk
Phase Error [pk] (Max Hold)	n=8 4th Maximum Peak Phase Error	9.99 °pk
Phase Error at bit (Avg)	n=8 5th Average Peak Phase Error Symbol Position	at bit 99.99
Phase Error at bit (Max Hold)	n=8 6th Maximum Peak Phase Error Symbol Position	at bit 99.99
Freq Error (Avg)	n=8 7th Average Frequency Error	-999.99 Hz
Freq Error (Max Hold)	n=8 8th Maximum Frequency Error	-999.99 Hz
I/Q Offset (Avg)	n=8 9th Average I/Q Origin Offset	-99.99 dBc
I/Q Offset (Max Hold)	n=8 10th Maximum I/Q Origin Offset	-99.99 dBc
T0 Offset (Avg)	n=8 11th Average T0 Offset	999.999 μs
T0 Offset (Max Hold)	n=8 12th Maximum T0 Offset	999.999 μs
Demodulated Data Bits	n=6	

Key Path	View/Display
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

12 Burst Power (Transmit Power)

The Burst Power (Transmit Power) measurement (at the base transceiver station) is used to determine the power delivered to the antenna system on the radio-frequency channel under test. The Burst Power measurement verifies the accuracy of the mean transmitted RF carrier power. This can be done across the frequency range and at each power step. For more information, see ["Transmit Power \(Burst Power\) Measurement Description" on page 1383](#). For measurement results and views, see ["View/Display" on page 1644](#).

This topic contains the following sections.

["Measurement Commands for Burst Power \(Transmit Power\)" on page 1380](#)

["Remote Command Results for Burst Power \(Transmit Power\)" on page 1381](#)

Measurement Commands for Burst Power (Transmit Power)

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSE:TXPower|BPOWer commands for more measurement related commands.

NOTE

The BPOWer form of the commands is included for backward compatibility only. They are not recommended for use in new designs. Use the TXPower keyword.

The following commands and queries are used to retrieve the measurement results:

```
:CONFigure:TXPower|BPOWer
:CONFigure:TXPower|BPOWer:NDEFault
:INITiate:TXPower|BPOWer
:FETCh:TXPower|BPOWer[n]?
:READ:TXPower|BPOWer[n]?
:MEASure:TXPower|BPOWer[n]?
```

For more remote command information, see SENSE:TXPower|BPOWer commands and the section, ["Remote Measurement Functions" on page 1430](#).

Remote Command Results for Burst Power (Transmit Power)

For the queries listed above, the results returned depend on the value of n, as follows.

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
not specified or n = 1	Returns the following comma-separated scalar results: 1. Sample time is a floating point number representing the time between samples when using the trace queries (n=0, 2, etc). 2. Power is the mean power (in dBm) of the power value that calculated by specified method: above the threshold or measured burst width. If averaging is on, the power is for the latest acquisition. 3. Power averaged is the power (in dBm) for N averages, if averaging is on. An average consists of N acquisitions of data which represents the current trace. If averaging is off, the value of Power averaged is the same as the Power value. 4. Number of samples is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0, 2, etc.). 5. Threshold value is the absolute threshold level (in dBm) above which the power is calculated when Meas Method is set to Above Threshold. 6. Threshold points is the number of points that were above the threshold and were used to calculate Mean Transmit Power when Meas Method is set to Above Threshold. If Meas Method is set to Measured Burst Width, Measured Pts is returned. 7. Maximum value is the maximum peak level of the most recently acquired trace data (in dBm). 8. Minimum value is the minimum peak level of the most recently acquired trace data (in dBm). Full Burst width is the burst width of this signal regardless of the parameter value set for the current Measured width. The Burst width is determined by the Threshold Lvl when Meas Method is set to Measured Burst Width. If Meas Method is set to Above Threshold Lvl, this value is 0. 9. Full Burst width is the burst width of this signal regardless of the parameter value set for the current Measured width. The Burst width is determined by the Threshold Lvl when Meas Method is set to Measured Burst Width. If Meas Method is set to Above Threshold Lvl, this value is zero. 10. Measured width is the time length that is used to calculate Mean Transmit Power when Meas Method is set to Measured Burst Width. If Meas Method is set to Above Threshold, this value is zero. 11. Measured points is the number of points used to calculate Mean Transmit Power when Meas Method is set to Measured Burst Width. If Meas Method is set to Above Threshold, this value is 0.
2	Returns comma-separated trace points of the Measure Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.
3	Returns comma-separated trace points of the Max Hold Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.

n	Results Returned
	* This is not available in TD-SCDMA.
4	Returns comma-separated trace points of the Min Hold Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time. * This is not available in TD-SCDMA.

Transmit Power (Burst Power) Measurement Description

Mobile stations and base transceiver stations must transmit enough power, with sufficient modulation accuracy, to maintain a call of acceptable quality without leaking power into frequency channels or timeslots allocated for others. The Burst Power measurement determines the average power for an RF signal burst at or above a specified threshold value or during the detected burst width. The threshold value may be absolute, or relative to the peak value of the signal. Burst width can be set automatically or manually.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. Many of the parameter values are measurement dependent. Attenuation values, and the Internal Preamp selection are measurement global, so they are common across all measurements. Functions with operation unique to this measurement are described below. See ["AMPTD Y Scale" on page 1085](#) for more information.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Y Ref Value

Sets the absolute power reference.

Key Path	AMPTD Y Scale
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real> :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
Example	DISP:TXP:VIEW:WIND:TRAC:Y:RLEV 5dbm DISP:TXP:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Preset	10.00
State Saved	Saved in instrument state.
Min	-250.0
Max	250.0
Initial S/W Revision	Prior to A.02.00

Range

The Range menu allows setting amplitude controls of the instrument.

Key Path	AMPTD Y Scale
Scope	Meas Global
Initial S/W Revision	A.12.50

Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

Key Path	Range
Mode	BASIC
Remote Command	[:SENSe]:POWer[:RF]:RANGe <real> [:SENSe]:POWer[:RF]:RANGe?
Example	:POW:RANG 10.0 :POW:RANG?
Notes	The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.)
Preset	0
State Saved	Saved in instrument state.
Min	-100
Max	100
Initial S/W Revision	A.12.50

Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

Key Path	AMPTD Y Scale, Attenuation
Remote Command	[:SENSe]:POWer[:RF]:RANGe:OPTimize IMMEDIATE
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

Key Path	AMPTD Y Scale, Attenuation
Remote Command	[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation OFF ON ELEctrical COMBined

	<code>[:SENSe] :POWer [:RF] :RANGe :OPTimize :ATTenuation ?</code>
Notes	This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELECtrical and COMBined still can be used. Then, upon receiving ELECtrical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned.
Preset	OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

Key Path	AMPTD Y Scale, Range
Remote Command	<code>[:SENSe] :POWer [:RF] :RANGe :PARatio <real></code> <code>[:SENSe] :POWer [:RF] :RANGe :PARatio ?</code>
Example	POW:RANG:PAR 12 dB
Notes	In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out. Attempting to change the value via SCPI will be ignored and no error message will be generated.
Preset	10 dB
State Saved	Saved in instrument state
Min	0 dB
Max	20 dB
Initial S/W Revision	A.13.00

Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

Key Path	AMPTD Y Scale, Range
Remote Command	<code>[:SENSe] :POWer [:RF] :RANGe :MIXer :OFFSet <real></code>

	<code>[:SENSe] :POWeR [:RF] :RANGe :MIXer :OFFSet ?</code>
Example	<code>POW:RANG:MIX:OFFS -5 dB</code>
Preset	0 dB
State Saved	Saved in instrument state
Min	-35 dB
Max	30 dB
Initial S/W Revision	A.13.00

Scale/Division

Enables you to enter a numeric value to change the vertical display sensitivity.

Key Path	AMPTD Y Scale
Mode	SA, GSM, TD-SCDMA
Remote Command	<code>:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl></code> <code>:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?</code>
Example	<code>DISP:TXP:VIEW:WIND:TRAC:Y:PDIV 10dB</code> <code>DISP:TXP:VIEW:WIND:TRAC:Y:PDIV?</code>
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use <code>INSTrument:SELEct</code> to set the mode.
Couplings	When the Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets a value manually, Y Auton Scaling automatically changes to Off.
Preset	10.00 dB
State Saved	Saved in instrument state.
Min	0.1 dB
Max	20.00 dB
Initial S/W Revision	Prior to A.02.00

Ref Position

Enables you to set the display reference position to either, Top, Center or Bottom.

Key Path	AMPTD Y Scale
Mode	SA, GSM, TD-SCDMA
Remote Command	<code>:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP CENTER BOTTom</code> <code>:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?</code>
Example	<code>DISP:TXP:VIEW:WIND:TRAC:Y:RPOS CENT</code> <code>DISP:TXP:VIEW:WIND:TRAC:Y:RPOS?</code>

Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top Ctr Bot
Initial S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the Y axis auto scaling function between On and Off.

Key Path	AMPTD Y Scale
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0 1 OFF ON :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
Example	DISP:TXP:VIEW:WIND:TRAC:Y:COUP 0 DISP:TXP:VIEW:WIND:TRAC:Y:COUP?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When the user sets a value either Y Rel Value or Y Scale/Div manually, this parameter automatically is set to 'Off'.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple keyactions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See "More Information" on page 1389

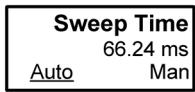
Key Path	Front-panel key
Remote Command	:COUPle ALL NONE
Example	:COUP ALL
Notes	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements.
Initial S/W Revision	Prior to A.02.00

More Information

There are two types of functions that have Auto/Manual modes.

Auto/Man Active Function keys

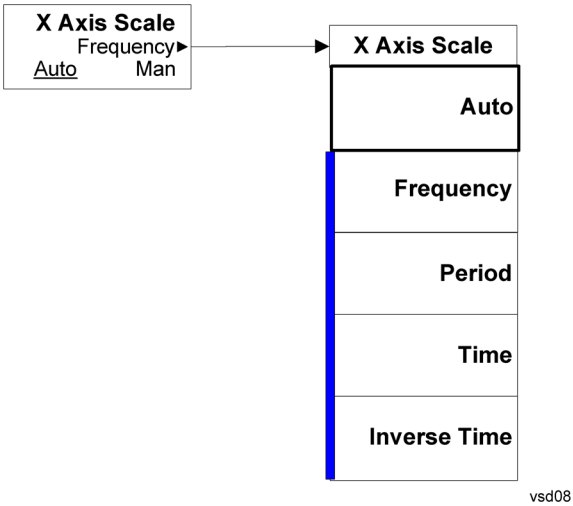
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between **Auto** (where the parameter is automatically coupled to the other parameters it is dependent upon) and **Man** (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either **Auto** or **Man** underlined as illustrated below.



vsd07

Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.



BW

Accesses a menu of functions that enable you to specify and control the video and resolution bandwidths. You can also select the type of filter for the measurement and set the filter bandwidth.

NOTE If the selected mode is TD-SCDMA, this function is **not** available.

Key Path	Front-panel key
Mode	SA, EDGE/GSM
Initial S/W Revision	Prior to A.02.00

Res BW

Sets the resolution bandwidth. This is the bandwidth used for the power measurement. The bandwidth is ideally wide enough to pass all the power of the burst signal, while not being so wide that it passes noise that reduces dynamic range and the accuracy of low level measurements.

Key Path	BW
Mode	SA, GSM
Remote Command	[:SENSe]:TXPower:BANDwidth[:RESolution] <bandwidth> [:SENSe]:TXPower:BANDwidth[:RESolution]?
Example	TXP:BAND 1000 TXP:BAND?
Notes	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	GSM: 510 kHz SA: 3 MHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	Hardware Dependent: No Option = 10 MHz WB (25 MHz or wider) = Hardware Option Limit
Backwards Compatibility SCPI	[:SENSe]:TXPower:BWIDth[:RESolution]
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

Filter Type

Besides the familiar Gaussian filter shape, there are certain special filter types, such as Flat Top, that are desirable under certain conditions.

Key Path	BW
Mode	SA, GSM
Remote Command	[:SENSe]:TXPower:BANDwidth:TYPE GAUSSian FLATtop [:SENSe]:TXPower:BANDwidth:TYPE?
Example	TXP:BAND:TYPE GAUS TXP:BAND:TYPE?
Notes	Selects the type of filter: either Gaussian or Flat (Flattop). Gaussian is the best choice when looking at the overall burst or the rising and falling edges, as it has excellent pulse response. This measurement does not trade off time domain accuracy vs. noise, just total power accuracy vs. noise level. If you want to precisely examine just the useful part of the burst, choose Flat. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default may cause invalid measurement results. FLATtop – a filter with a flat amplitude response, which provides the best amplitude accuracy. GAUSSian – a filter with Gaussian characteristics, which provides the best pulse response. You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	GAUSSian
State Saved	Saved in instrument state.
Range	Gaussian (Normal) Flattop
Backwards Compatibility SCPI	[:SENSe]:TXPower:BWIDth:TYPE
Initial S/W Revision	Prior to A.02.00

RBW Control

Accesses a menu that enables you to select the filter bandwidth and type.

Key Path	BW

Filter Type

Besides the familiar Gaussian filter shape, there are certain special filter types, such as Flat Top, that are desirable under certain conditions.

Key Path	BW
Mode	SA, GSM
Remote Command	[:SENSe]:TXPower:BANDwidth:TYPE GAUSSian FLATtop [:SENSe]:TXPower:BANDwidth:TYPE?
Example	TXP:BAND:TYPE GAUS TXP:BAND:TYPE?

Notes	Selects the type of filter: either Gaussian or Flat (Flattop). Gaussian is the best choice when looking at the overall burst or the rising and falling edges, as it has excellent pulse response. This measurement does not trade off time domain accuracy vs. noise, just total power accuracy vs. noise level. If you want to precisely examine just the useful part of the burst, choose Flat. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default may cause invalid measurement results. FLATtop – a filter with a flat amplitude response, which provides the best amplitude accuracy. GAUSSian – a filter with Gaussian characteristics, which provides the best pulse response. You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	GAUSSian
State Saved	Saved in instrument state.
Range	Gaussian (Normal) Flattop
Backwards Compatibility SCPI	[:SENSe] :TXPower:BWIDth:TYPE
Initial S/W Revision	Prior to A.02.00

Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing **Cont** does a Resume.

Key Path	Front-panel key
Remote Command	:INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous?
Example	:INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation
Preset	ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF)
State Saved	Saved in instrument state
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold . The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON) switches to continuous measurement, but never restarts a measurement and never resets a sweep.
Initial S/W Revision	Prior to A.02.00

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of **Trace Average**, **Max Hold**, or **Min Hold**.

In Other Measurements/Modes:

With **Avg/Hold Num** (in the **Meas Setup** menu) set to **Off** or set to **On** with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with **Avg/Hold Num** set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the **Cont** key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until $k = N$, at which point the current sequence will stop and the instrument will go to the idle state.

12 Burst Power (Transmit Power)
File

File

See "File" on page 156

FREQ/Channel

Accesses a menu of keys that allows you to control the Frequency parameters of the instrument.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

ARFCN

Sets the analyzer to a frequency that corresponds to the ARFCN (Absolute RF Channel Number). Used to enter the channel to be measured for the selected band. If the Center Freq value entered does not exactly correlate with an ARFCN, the softkey label changes to display the closest ARFCN to the selected frequency, along with a > or < symbol indicating whether the frequency is above or below that ARFCN.

Key Path	FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:ARFCn RFChannel <integer> [:SENSe]:CHANnel:ARFCn RFChannel?
Example	CHAN:ARFC 3 CHAN:ARFC?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	Coupled with Center Frequency . Setting ARFCN sets Center Freq to the value corresponding to that ARFCN. BMT Freq choice changes this parameter.
Preset	1
State Saved	Saved in instrument state.
Range	Different for each BAND as follows: E-GSM: 0 to 124, and 975 to 1023 P-GSM: 1 to 124 R-GSM: 0 to 124(MS), and 955 to 1023(BTS) DCS1800: 512 to 885 PCS1900: 512 to 810 GSM450: 259 to 293 GSM480: 306 to 340 GSM700: 438 to 516 GSM850: 128 to 251 T-GSM 810: 350 to 425

Min	Different for each BAND as follows: E-GSM: 0(MS), and 975(BTS) P-GSM: 1 R-GSM: 0(MS), and 955(BTS) DCS1800: 512 PCS1900: 512 GSM450: 259 GSM480: 306 GSM700: 438 GSM850: 128 T-GSM 810: 350
Max	Different for each BAND as follows: E-GSM: 124(MS), and 1023(BTS) P-GSM: 124 R-GSM: 124(MS), and 1023(BTS) DCS1800: 885 PCS1900: 810 GSM450: 293 GSM480: 340 GSM700: 516 GSM850: 251 T-GSM 810: 425
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.07.00

Center Freq

Sets the center frequency to be measured for the selected band. It is coupled with ARFCN – setting Center Freq sets ARFCN to the channel corresponding to that frequency.

For more information, see the section ["Center Freq" on page 1399](#).

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

Time Slot

This functionality is the same as that of the corresponding key in the Demod menu. See ["Time Slot" on page 1418](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

Burst Type

This functionality is the same as that of the corresponding key in the Demod menu. See ["Burst Type" on page 1419](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

TSC (Std)

This functionality is the same as that of the corresponding key in the Demod menu. See ["TSC \(Std\)" on page 1420](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is **Center Freq**.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a **Global Settings** key in its **Mode Setup** menu.

The **Center Freq** function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 1402](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 1404](#)

See ["Center Frequency Presets" on page 1401](#)

Key Path	FREQ Channel
Scope	Meas Global
Remote Command	[:SENSe] :FREQuency:CENTer <freq> [:SENSe] :FREQuency:CENTer?
Example	FREQ:CENT 50 MHz FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT?
Notes	This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated.
Dependencies	The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit.
Couplings	When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range
Preset	Depends on instrument maximum frequency, mode, measurement, and selected input. See "Center Frequency Presets" on page 1401 and "RF Center Freq" on page 1402 and Ext Mix Center Freq and "I/Q Center Freq" on page 1404 .
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 1401 and "RF Center Freq" on page 1402 and "I/Q Center Freq" on page 1404 .
Max	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 1401 and "RF Center Freq" on page 1402 and "I/Q Center Freq" on page 1404 .
Default Unit	Hz
Status Bits/OPC Dependencies	Non-overlapped
Initial S/W Revision	Prior to A.02.00

Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

Freq Option	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
503 (all but N9000A)	1.805 GHz	3.6 GHz	3.7 GHz
503 (N9000A)	1.505 GHz	3.0 GHz	3.08 GHz
507 (all but N9000A)	3.505 GHz	7.0 GHz	7.1 GHz
507 (N9000A)	3.755 GHz	7.5 GHz	7.58 GHz
508 (all but N9038A)	1.805 GHz	3.6 GHz	8.5 GHz
508 (N9038A)	4.205 GHz	8.4 GHz	8.5 GHz
513	6.805 GHz	13.6 GHz	13.8 GHz
526 (all but N9000A and N9038A)	13.255 GHz	26.5 GHz	27.0 GHz
526 (N9000A)	13.255 GHz	26.5 GHz	26.55 GHz
526 (N9038A)	1.805 GHz	3.6 GHz	27.0 GHz
532	16.005 GHz	32.0 GHz	32.5 GHz
543	21.505 GHz	43.0 GHz	TBD
544	22.005 GHz	44.0 GHz	44.5 GHz
550	25.005 GHz	50.0 GHz	51 GHz

Input 2:

Model	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
N9000A opt C75	0.7505GHz	1.5 GHz	1.58 GHz
N9038A	505 MHz	1 GHz	1.000025 GHz

Tracking Generator Frequency Limits (N9000A only):

Tracking Generator Option	Min Freq (clips to this freq when turn TG on and can't tune below while TG on)	If above this Freq, Stop Freq clipped to this Freq when TG turned on	Max Freq (can't tune above) while TG on
T03	9 kHz	3.0 GHz	3.08 GHz
T06	9 kHz	6.0 GHz	6.05 GHz

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

Mode	CF Preset for RF
WCDMA	1 GHz
WIMAXOFDMA,	1 GHz
BASIC	1 GHz
ADEMOD	1 GHz
VSA	1 GHz
TDSCDMA	1 GHz
PNOISE	1 GHz
LTE	1 GHz
LTETDD	1 GHz
MSR	1 GHz
GSM	935.2 MHz
NFIGURE	1.505 GHz

RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	<code>[:SENSe] :FREQuency:RF:CENTer <freq></code> <code>[:SENSe] :FREQuency:RF:CENTer?</code>
Example	FREQ:RF:CEN 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Dependencies	If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop

	Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep.
Preset	See table above
State Saved	Saved in instrument state.
Min	-79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source
Max	See table above. Basically instrument maximum frequency - 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	<code>[:SENSe] :FREQuency:EMIXer:CENTer <freq></code> <code>[:SENSe] :FREQuency:EMIXer:CENTer?</code>
Example	<code>:FREQ:EMIX:CENT 60 GHz</code> <code>:FREQ:EMIX:CENT?</code>
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Couplings	When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup.
Preset	When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies.

	If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table (Span=Stop Freq – Start Freq), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table. When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is 33.25 GHz. Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz.
State Saved	Saved in instrument state.
Min	The minimum frequency in the currently selected mixer band + 5 Hz
Max	The maximum frequency in the currently selected mixer band – 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	A.08.01

I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	<pre>[:SENSe] :FREQuency:IQ:CENTer <freq></pre> <pre>[:SENSe] :FREQuency:IQ:CENTer?</pre>
Example	FREQ:IQ:CEN: 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Preset	0 Hz
State Saved	Saved in instrument state.
Min	–40.049995 MHz
Max	40.049995 MHz
Initial S/W Revision	Prior to A.02.00

BMT Freq

Enables quick selection from a subset of the available ARFCN numbers for the Top, Middle, or Bottom frequency in the selected band.

Key Path	FREQ Channel

Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	BMT choice changes ARFCN and Center Freq. Chosen ARFCN will be displayed on each menu key.
Range	Top Middle Bottom
Initial S/W Revision	Prior to A.02.00

BMT Freq Top

Sets the analyzer to the frequency of the highest ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel:ARFCn RFCHannel:TOP
Example	CHAN:ARFC:TOP
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 124 P-GSM: 124 R-GSM: 124 DCS 1800: 885 PCS 1900: 810 GSM 450: 293 GSM 480: 340 GSM 700: 516 GSM 850: 251 T-GSM 810: 425 Change BMT ARFCN to BMT FreqTOP. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 959.800 MHz P-GSM: 959.800 MHz R-GSM: 959.800 MHz

	DCS 1800: 1879.80 MHz
	PCS 1900: 1989.80 MHz
	GSM 450: 467.400 MHz
	GSM 480: 495.800 MHz
	GSM 700: 792.800 MHz
	GSM 850: 893.800 MHz
	T-GSM810: 866.000 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

BMT Freq Middle

Sets the analyzer to the frequency of the middle ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :ARFCn RFCHannel :MIDDLE
Example	CHAN:ARFC:MIDD
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 38 P-GSM: 63 R-GSM: 28 DSC 1800: 699 PCS 1900: 661 GSM 450: 276 GSM 480: 323 GSM 700: 477 GSM 850: 190 T-GSM 810: 388 Change BMT ARFCN to BMT FreqMIDDLE. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 942.600 MHz P-GSM: 947.600 MHz R-GSM: 940.600 MHz

	DCS 1800: 1842.60 MHz
	PCS 1900: 1960.00 MHz
	GSM 450: 464.000 MHz
	GSM 480: 492.400 MHz
	GSM 700: 755.000 MHz
	GSM 850: 881.600 MHz
	T-GSM 810: 858.600 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

BMT Freq Bottom

Sets the analyzer to the frequency of the lowest ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel:ARFCn RFCHannel:BOTTOM
Example	CHAN:ARFC:BOTT
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 975 P-GSM: 1 R-GSM: 955 DCS 1800: 512 PCS 1900: 512 GSM 450: 259 GSM 480: 306 GSM 700: 438 GSM 850: 128 T-GSM 810: 350 Change BMT ARFCN to BMT FreqBOTTOM. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 925.200 MHz P-GSM: 935.200 MHz R-GSM: 921.200 MHz

	DCS 1800: 1805.20 MHz PCS 1900: 1930.20 MHz GSM 450: 460.600 MHz GSM 480: 489.000 MHz GSM 700: 747.2 MHz GSM 850: 869.200 MHz T-GSM 810: 851.000 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

Carrier Setup

Allows you to set carrier parameters.

Key Path	FREQ Channel
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.14.00

BTS Class

Selects a BTS class.

BTS Class	Definition
MC	Multicarrier BTS is defined as a class of BTS, characterized by the ability to, in addition to single carrier operation, process two or more carriers in common active RF components simultaneously, either in multicarrier transmitter only or, in both multicarrier transmitter and multicarrier receiver.
SC	Single carrier BTS is defined as a class of BTS, characterized by the ability to process one carrier in single carrier BTSs, not belonging to a Multicarrier BTS class.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Remote Command	[:SENSe]:CHANnel:CARRier:BASE:CLASs:AUTO ON OFF 1 0 [:SENSe]:CHANnel:CARRier:BASE:CLASs:AUTO?
Example	CHAN:CARR:BASE:CLAS:AUTO 1 CHAN:CARR:BASE:CLAS:AUTO?
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is

	sent, an undefined header error or illegal parameter error is returned.
Couplings	ON automatically changes to OFF when Multicarrier Class (MC) or Single carrier Class (SC) is selected as BTS Class.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.14.00

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
Remote Command	<code>[:SENSe]:CHANnel:CARRier:BASE:CLASs SC MC</code> <code>[:SENSe]:CHANnel:CARRier:BASE:CLASs?</code>
Example	CHAN:CARR:BASE:CLAS MC CHAN:CARR:BASE:CLAS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Selection C1 and C2 are supported for backwards compatibility. When "C1" or "C2" is passed as SCPI command parameter, the BTS Class Auto is set to ON. As a result, it's converted to "SC" if the number of carriers is one, and otherwise "MC."
Dependencies	This parameter is available when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Preset	SC
State Saved	Saved in instrument state.
Range	Single Carrier Multi Carrier
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.10.01, A14.00

Carriers

Defines the number of carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
Remote Command	<code>[:SENSe]:CHANnel:CARRier:COUNt <integer></code> <code>[:SENSe]:CHANnel:CARRier:COUNt?</code>

Example	CHAN:CARR:COUN 3 CHAN:CARR:COUN?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	This can change when the SCPI command of the Carrier Power Present or the Carrier Interval is sent.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	16
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.13.00

Reference Carrier

Defines the reference active carrier. The Reference Carrier frequency point is always aligned with the Measurement Global Center Frequency. The minimum value 1 specifies the lowest frequency carrier among the active carriers. The maximum value specifies the highest frequency carrier among the active carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :CARRier :RCARrier <integer> [:SENSe] :CHANnel :CARRier :RCARrier?
Example	CHAN:CARR:RCAR 3 CHAN:CARR:RCAR?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. If you set it to more than the number of carriers, it's clipped to the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	When you decrease the number of carriers to a value which is less than this value, this is clipped to the value.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

Configure Carriers

Opens a menu of keys that allows you to configure carriers.

Key Path	FREQ Channel, Multi Carrier Setup
Dependencies	This key is grayed out when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00

Select Carrier

Selects a carrier to configure.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	No
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:CARRier:LIST:COUPle OFF ON 0 1, ... [:SENSe]:CHANnel:CARRier:LIST:COUPle?
Example	CHAN:CARR:LIST:COUP OFF CHAN:CARR:LIST:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	When Couple is selected, the carrier settings are coupled to carrier #1. Coupled parameters are

	Carrier Power Present, Carrier Interval. When a setting is changed, the couple is set to Man automatically. Carrier #1 is always set to couple and cannot be changed. Couple/Man selection on the Carrier key is not displayed when selected carrier number is #1.
Preset	ON
State Saved	No
Range	Couple Man
Initial S/W Revision	A.06.00

Carrier Power Present

Specifies whether each of carriers is active or not.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:CARRier:LIST:PPResent YES NO, ... [:SENSe]:CHANnel:CARRier:LIST:PPResent?
Example	CHAN:CARR:LIST:PPR YES CHAN:CARR:LIST:PPR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored.
Dependencies	This parameter is unavailable when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list.
Preset	YES
State Saved	Saved in instrument state.
Range	Yes No
Initial S/W Revision	A.06.00

Carrier Interval

Specifies the frequency interval between the Carrier #n and #n+1 center frequencies.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global

Remote Command	<code>[:SENSe]:CHANnel:CARRier:LIST:INTerval <freq>, ...</code> <code>[:SENSe]:CHANnel:CARRier:LIST:INTerval?</code>
Example	CHAN:CARR:LIST:INT 600k CHAN:CARR:LIST:INT?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. The softkey for the last carrier (say, #N) is grayed out.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list. Changing Carrier Interval might affect the Span.
Preset	600kHz
State Saved	Saved in instrument state.
Min	400 kHz
Max	100 MHz
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.07.00, A.08.00

Carrier Frequency Allocation

Specifies the carrier frequency allocation. There are two types of allocation, contiguous and non-contiguous. Non-Contiguous frequency allocation is defined as an allocation where two groups of frequencies are separated with at least [3.6] MHz carrier separation between the innermost carriers. In case of the non-contiguous frequency allocation, tests will be measured between the uppermost carrier A of the lower frequency group and the lowermost carrier B of the upper frequency group.

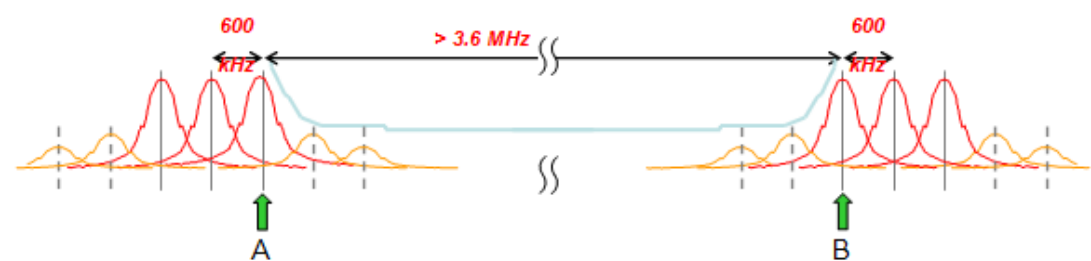
Error! Reference source not found.

See "An example of non-contiguous frequency allocation" on page 1414

Key Path	FREQ Channel, Multi Carrier Setup
Mode	GSM
Scope	Meas Global
Remote Command	<code>[:SENSe]:CHANnel:CARRier:FALLocation</code> CONTiguous NCONTiguous <code>[:SENSe]:CHANnel:CARRier:FALLocation?</code>
Example	CHAN:CARR:FALL NCON CHAN:CARR:FALL?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This menu key is available only when the number of carriers is more than one.

	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	CONTiguous
State Saved	Saved in instrument state.
Range	Contiguous Non-Contiguous
Readback Text	CONTiguous NCONTiguous
Initial S/W Revision	A.07.00

An example of non-contiguous frequency allocation



Non-Contiguous

Opens a menu of keys that allows you to set non-contiguous frequency allocation parameters.

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Initial S/W Revision	A.07.00

Allocation Break Pt

Specifies an allocation break point that is a sequence (or index) number of the uppermost carrier in the lower frequency group.

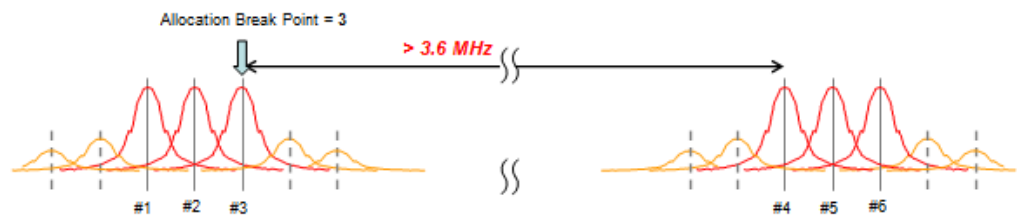
Error! Reference source not found.

See "An example of allocation break point" on page 1416

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	[[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:ABPoint <integer> [[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:ABPoint?
Example	CHAN:CARR:FALL:NCON:ABP 3 CHAN:CARR:FALL:NCON:ABP?

Notes	You must be in the GSM mode to use this command. Use INStrument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers – 1
Initial S/W Revision	A.07.00
Modified at S/W Revision	A.13.00

An example of allocation break point



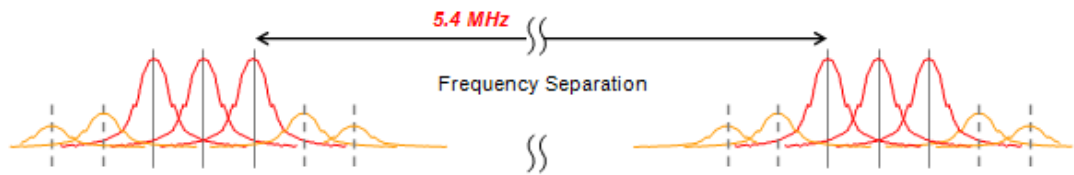
Freq Separation

Specifies frequency separation between the innermost of carriers.

See ["An example of frequency separation" on page 1417](#)

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	[[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:FSEParation <freq> [[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:FSEParation?
Example	CHAN:CARR:FALL:NCON:FSEP 5.4M CHAN:CARR:FALL:NCON:FSEP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Changing Frequency Separation might affect the Span
Preset	5.4 MHz
State Saved	Saved in instrument state.
Min	3.6 MHz
Max	100 MHz
Initial S/W Revision	A.07.00

An example of frequency separation



Carrier BPF

Selects whether to use the carrier bandpass filter.

Key Path	FREQ Channel, Multi Carrier SetupMode Setup, Demod
Mode	GSM
Remote Command	[:SENSe]:RADio:CARRier:NUMBer:AUTO ON OFF 1 0 [:SENSe]:RADio:CARRier:NUMBer:AUTO?
Example	RAD:CARR:NUMB:AUTO 1 RAD:CARR:NUMB:AUTO?
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	ON automatically changes to OFF when Multiple or Single is selected as Carrier BPF Type.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.06.00

Carrier BPF Type

Opens a menu of keys that allows you to select the type of the bandpass filter. When carriers other than the signal of interest are present, especially if they are strong, they can interfere with the measurement, making it difficult to sync and producing artificially high EVM results. When this condition exists, toggle from Single to Multi. A band-limited filter will help reduce the measurement interference.

BPF Type	Description
MULTiple	Enable multi carrier tolerance filter.
SINGLE	Disable multi carrier tolerance filter

This parameter applies only to the following measurements:

- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement
- GMSK Power vs. Time

- EDGE Power vs. Time

Key Path	FREQ Channel, Multi Carrier Setup, Carrier BPFMode Setup, Demod, Carrier BPF
Mode	GSM
Scope	Meas Global
Remote Command	[[:SENSe]:RADio:CARRier:NUMBer SINGLE MULtiple [[:SENSe]:RADio:CARRier:NUMBer?
Example	RAD:CARR:NUMB SING RAD:CARR:NUMB?
Notes	The Carrier Bandpass Filter key is in the Mode Setup menu, but only EDGE EVM and GSM PFER measurements support this feature. In other measurements, this setting is not applicable. You must be in the GSM mode to use this command. Use INSTrument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	SINGLE
State Saved	Saved in instrument state.
Range	Single Multi
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

Time Slot

Selects On or Off for slot searching. Generally, this feature is only valid in external and periodic timer trigger source modes that triggers every frame since another trigger source does not have the information that identifies the head of the frame. When Timeslot is set to On, the demodulation measurement is made on the nth timeslot specified by the trigger point + n timeslots, where n is the selected timeslot value 0 to 7.

This functionality is the same as Time Slot under the Freq/Channel menu.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[[:SENSe]:CHANnel:SLOT <integer> [[:SENSe]:CHANnel:SLOT? [[:SENSe]:CHANnel:SLOT:AUTO OFF ON 0 1 [[:SENSe]:CHANnel:SLOT:AUTO?
Example	CHAN:SLOT 0 CHAN:SLOT? CHAN:SLOT:AUTO OFF CHAN:SLOT:AUTO?
Notes	This functionality does not affect Combined GSM/EDGE measurement.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.	
Preset	0	OFF
State Saved	Saved in instrument state.	
Min	0	
Max	7	
Initial S/W Revision	Prior to A.02.00	

Burst Type

Sets the burst type that the analyzer will search for and to which it will synchronize.

This functionality is the same as Burst Type under the FREQ Channel menu.

Key	SCPI	Description
Sync (SCH)	SYNC	Burst length = 142 symbols Extended training sequences for CTS and COMPACT synchronization bursts are not supported.
Access (RACH)	ACCess	Burst length = 88 symbols Alternative training (synchronization) sequence "TS1" and "TS2" are supported only in GSMK Power vs. Time.
Normal - NB (TCH & CCH)	NORMal	Burst length = 142 symbols Softkey label will be changed to 'Normal - NB' form 'Normal'
Higher Symbol Rate - HB (TCH & CCH)	HSRate	Burst length = 169 symbols This selection key is only shown when theN9071A-3FP license is installed.
Mixed (NB/HB for TSC sync)	MIXed	Enables auto detection between Normal (NB) and HSR (HB) TCH & CCH EDGE Burst. This selection key is only shown when theN9071A-3FP license is installed.

Measurement synchronization capability (Burst Sync = Training Seq)

	GMSK		8PSK		
			16QAM		
			32QAM		
			AQPSK		
GMSK Phase & Freq Error measurement	Yes	Yes	Yes	No	N/A
GMSK Power vs. Time measurement	Yes	Yes	Yes	No	(measures as Normal GMSK when selected)

GMSK Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off)	No	No	Yes	No		
EDGE EVM measurement	No	No	No	Yes	Yes	Yes
EDGE Power vs. Time measurement	Yes	Yes	Yes	Yes	Yes	Yes
EDGE Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off.)	No	No	Yes	Yes	Yes	Yes

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe] :CHANnel :BURSt NORMal SYNC ACCess HSRate MIXed [:SENSe] :CHANnel :BURSt?
Example	CHAN:BURS NORM CHAN:BURS?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. Higher Symbol Rate and Mixed selections are only available when the N9071A-3FP license is installed. Otherwise these menu keys are blank. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Higher Symbol Rate and Mixed selection keys are not shown unless N9071A-3FP is installed. When unlicensed and SCPI is sent, an undefined header error is returned. When "Mixed" is selected, the Burst Sync menu key under the Meas Setup menu will be grayed out and Training Sequence (TSC) will be used for synchronization. The sync algorithm always runs in Training Sequence (TSC) synchronization because the Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync will become effective again when the Burst Type selection is changed from "Mixed" to another one.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Sync (SCH) Access (RACH) Normal - NB (TCH & CCH) Higher Symbol Rate - HB (TCH & CCH) Mixed (NB/HB for TSC sync)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

TSC (Std)

Allows you to select the Training Sequence Code that determines which burst is to be measured. Applicable only when Burst Sync is set to Training Sequence in the measurement. In the case of AQPSK, this parameter specifies TSC number of VAMOS sub-channel A. TSC of VAMOS sub-channel B is ignored.

This functionality is the same as TSC under the FREQ Channel menu.

This parameter applies only to the following measurements:

- GMSK/EDGE Power vs. Time measurement
- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement

Selection	SCPI	Description
AutoDet	ON 1	The measurement is made on the first burst found to have any one of the valid TSCs in the range of 0 to 7. The measurement may be made on various timeslots if more than one timeslot has one of the 8 valid TSCs.
Man	OFF 0	The measurement is made on the first burst found to have the selected TSC. TSC numbers in the range of 0 to 7 can be selected. The measurement may be made on various timeslots if more than one timeslot has this same TSC.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:TSCode <integer> [:SENSe]:CHANnel:TSCode? [:SENSe]:CHANnel:TSCode:AUTO OFF ON 0 1 [:SENSe]:CHANnel:TSCode:AUTO?
Example	CHAN:TSC 3 CHAN:TSC? CHAN:TSC:AUTO 1 CHAN:TSC:AUTO?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When Sync or Access is selected as Burst Type, this key is grayed out.
Preset	0 ON
State Saved	Saved in instrument state.
Min	0
Max	7
Initial S/W Revision	Prior to A.02.00

12 Burst Power (Transmit Power)
Input/Output

Input/Output

See ["Input/Output" on page 128](#)

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Marker Type

Sets the marker control mode as described under **Normal**, **Delta**, **Fixed** and **Off**, below. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Key Path	Marker
Mode	GSM, SA, TD-SCDMA
Remote Command	:CALCulate:TXPower:MARKer[1] 2 ...12:MODE POSition DELTA OFF :CALCulate:TXPower:MARKer[1] 2 ...12:MODE?
Example	CALC:TXP:MARK:MODE OFF CALC:TXP:MARK:MODE?
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area will display the marker value to its full entered precision. You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal Delta Off
Backwards Compatibility SCPI	:CALCulate:BPOwer:MARKer[1] 2 ...12:MODE
Initial S/W Revision	Prior to A.02.00

Properties

Accesses a menu that enables you to set marker properties and to access the marker trace menu.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Relative To

Selects the marker that the selected marker will be relative to (its reference marker).

Key Path	Marker, Properties
Mode	GSM, SA, TD-SCDMA
Remote Command	:CALCulate:TXPower:MARKer[1] 2 ...12:REFerence <integer> :CALCulate:TXPower:MARKer[1] 2 ...12:REFerence?
Example	CALC:TXP:MARK:REF 10 CALC:TXP:MARK:REF?
Notes	A marker cannot be relative to itself, so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself." You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode. When queried a single value will be returned (the specified marker numbers relative marker).
Preset	2 3 4 5 6 7 8 9 10 11 12 1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Key Path	Marker, Properties

Mode	GSM, SA, TD-SCDMA
Remote Command	:CALCulate:TXPower:MARKer[1] 2 ...12:TRACe RFENvelope MAXHold MINHold :CALCulate:TXPower:MARKer[1] 2 ...12:TRACe?
Example	CALC:TXP:MARK:TRAC MAXH CALC:TXP:MARK:TRAC?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	If Detector/Max Hold Trace is Off, Max Hold is grayed out and MAXHold parameter is not available. If Detector/Min Hold Trace is Off, Min Hold is grayed out and MINHold parameter is not available.
Preset	RFENvelope
State Saved	Saved in instrument state.
Range	RF Envelope Max Hold RF Envelope Min Hold RF Envelope
Backwards Compatibility SCPI	:CALCulate:BPOWer:MARKer[1] 2 ...12:TRACe
Initial S/W Revision	Prior to A.02.00

Couple Markers

When this function is true, moving any marker causes an equal X Axis movement of every other marker which is not **Off**. By “equal X Axis movement” we mean that we preserve the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units).

This may result in markers going off screen.

Key Path	Marker
Mode	GSM, SA, TD-SCDMA
Remote Command	:CALCulate:TXPower:MARKer:COUPle[:STATe] ON OFF 1 0 :CALCulate:TXPower:MARKer:COUPle[:STATe]?
Example	CALC:TXP:MARK:COUP ON CALC:TXP:MARK:COUP?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Key Path	Marker
Mode	GSM, SA, TD-SCDMA
Remote Command	:CALCulate:TXPower:MARKer:AOff
Example	CALC:TXP:MARK:AOff
Notes	You must be in the Spectrum Analyzer mode, TDSDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Backwards Compatibility SCPI	:CALCulate:BPOWer:MARKer:AOff
Initial S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	GSM, SA, TD-SCDMA
Remote Command	:CALCulate:TXPower:MARKer[1] 2 ...12:X:POStion <real> :CALCulate:TXPower:MARKer[1] 2 ...12:X:POStion?
Example	CALC:TXP:MARK10:X:POS 500 CALC:TXP:MARK10:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is Normal , or the offset from the marker's reference marker in trace points if the control mode is Delta . If the marker is Off the response is not a number. You must be in the Spectrum Analyzer mode, TDSCMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Max value would be changed by Sweep/Meas Time parameter value.
Preset	Markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	-9.9E+37
Max	9.9E+37
Backwards Compatibility SCPI	:CALCulate:BPOWer:MARKer[1] 2 ...12:X:POStion
Initial S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command Only)

Returns the marker Y Axis value in the current marker Y Axis unit.

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer’s Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

- Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y Axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

- Relative result: if a marker’s control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker. The ratio is expressed in dB.

Mode	GSM, SA, TD-SCDMA
Remote Command	:CALCulate:TXPower:MARKer[1] 2 ...12:Y?
Example	CALC:TXP:MARK11:Y?
Notes	The query returns the marker Y Axis result. If the marker is Off the response is not a number. You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0
State Saved	No
Backwards Compatibility SCPI	:CALCulate:TXPower:MARKer[1] 2 ...12:FUNCTION:RESult? :CALCulate:BPOWer:MARKer[1] 2 ...12:FUNCTION:RESult? :CALCulate:BPOWer:MARKer[1] 2 ...12:Y?
Initial S/W Revision	Prior to A.02.00

Marker Function

There is no ‘Marker Function’ supported in Burst (Tx) Power, so this front-panel key displays a blank menu key when pressed.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Marker To

There is no ‘Marker To’ functionality supported in Burst (Tx) Power, so this front-panel key displays a blank menu key when pressed.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

NOTE

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

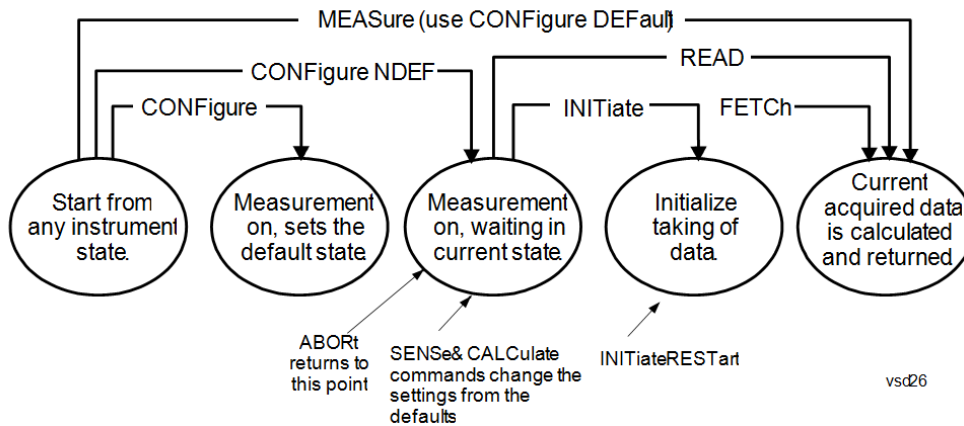
Remote Measurement Functions

This section contains the following topics:

- "Measurement Group of Commands" on page 1431
- "Current Measurement Query (Remote Command Only) " on page 1433
- "Limit Test Current Results (Remote Command Only)" on page 1433
- "Data Query (Remote Command Only)" on page 1433
- "Calculate/Compress Trace Data Query (Remote Command Only)" on page 1434
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Measurement Group of Commands



Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEFault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

Fetch Commands:

:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

INITiate Commands:

:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
 - Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
 - If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.
-

READ Commands:

:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
-

measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
 - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
 - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
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Initial S/W Revision	Prior to A.02.00

Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

Remote Command	:CONFigure?

Example	CONF?

Initial S/W Revision	Prior to A.02.00

Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

Remote Command	:CALCulate:CLIMits:FAIL?

Example	CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails.

Initial S/W Revision	Prior to A.02.00

Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

Remote Command	:CALCulate:DATA[n]?
Notes	The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCH:<measurement>? query where <measurement> is the current measurement.
Initial S/W Revision	Prior to A.02.00

Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

Remote Command	:CALCulate:DATA<n>:COMPRESS? BLOCK CFIT MAXimum MINimum MEAN DMEan RMS RMSCubed SAMPLE SDEVIation PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]]
Example	To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN, 24e-6, 526e-6 (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.)
Notes	The command supports 5 parameters. Note that the last 4 (<soffset>, <length>, <roffset>, <rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters. This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data.
Initial S/W Revision	Prior to A.02.00

- BLOCK or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

•

NOTE

If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where $|X_i|$ is the magnitude of an I/Q pair, and n is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$\text{DME} = 10 \times \log_{10} \left(\frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

NOTE For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPlE - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEViation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$SDEV = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where X_i is a data point value, $\bar{X}$ is the arithmetic mean of the data point values for the specified region (s), and n is the number of data points in the specified region(s).

$$SDEV = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where $|X_i|$ is the magnitude of an I/Q pair, $\bar{X}$ is the mean of the magnitudes for the specified region(s), and n is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector ($n=0$) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

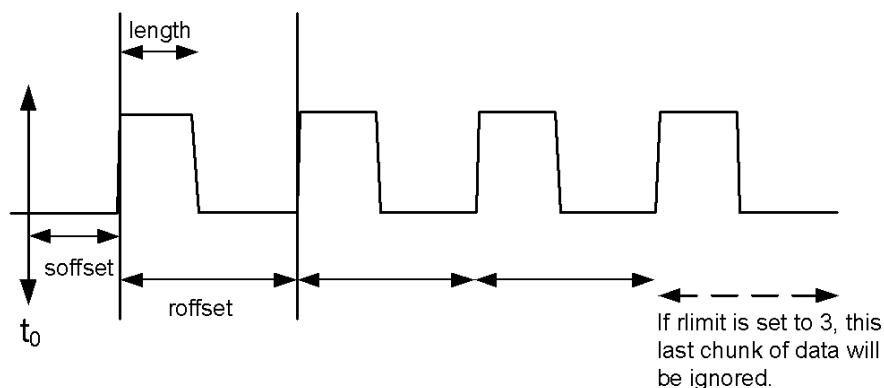
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where Y_i is the unwrapped phase of I/Q pair with applying frequency correction and n is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

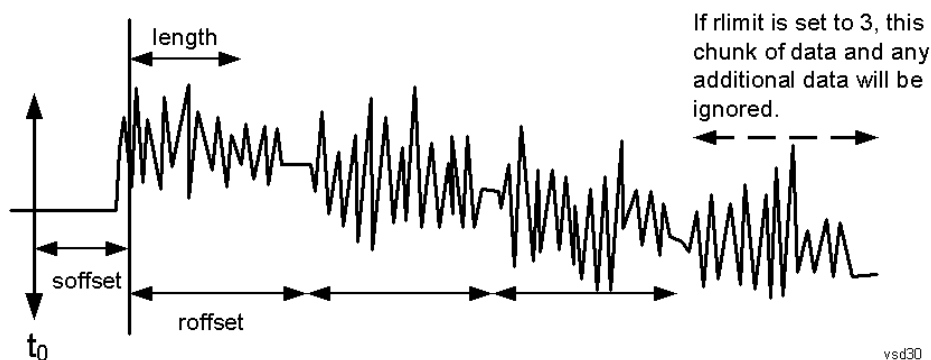
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

Remote Command	For Swept SA measurement: <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME[,ALL GTDLLine LTDLine]]</pre> For most other measurements: <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME]</pre>
Example	Example for Swept SA measurement in Spectrum Analyzer Mode: CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned. Query Results 1: With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time). If no peaks are found the peak list will consist of only the number of peaks, (0).
Notes	<n> - is the trace that will be used <threshold> - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu. <excursion> - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the

excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported.

Sorting order:
AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQuency - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

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Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:RESet
Example	:CALC:FPOW:POW1:RES

Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:DEFine "configuration string"
Example	:CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005"
Notes	See below for a list of measurement variables that can be defined in the configuration string.
Initial S/W Revision	A.14.00

Acquisition Time

Example	CALC:FPOW:POW1:DEF "AcquisitionTime=0.002"
Notes	The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability.
Preset	0.001 s
Range	0 s to 1 s
Default Unit	Time (s)
Initial S/W Revision	A.14.00

Center Frequency

Example	CALC:FPOW:POW1:DEF "CenterFrequency=2e9"
Notes	The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency.
Preset	1 GHz
Range	0 Hz to maximum instrument frequency
Default Unit	Frequency (Hz)
Initial S/W Revision	A.14.00

DC Coupled

Example	CALC:FPOW:POW1:DEF "DCCoupled=True"
Notes	The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz.
Preset	False
Range	True (DC Coupled) or False (AC Coupled)
Default Unit	Boolean
Initial S/W Revision	A.14.00

DetectorType

Example	CALC:FPOW:POW1:DEF "DetectorType=Peak"
Notes	Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement.
Preset	RmsAverage
Range	RmsAverage, Peak
Initial S/W Revision	A.14.00

Do Noise Correction

Example	CALC:FPOW:POW1:DEF "DoNoiseCorrection=True"
Notes	When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured.
Preset	False
Range	True (enable noise correction) or False (disable noise correction)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Do Spur Suppression

Example	CALC:FPOW:POW1:DEF "DoSpurSuppression=True"
Notes	When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals. When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method. Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.
Preset	False
Range	True (enable spur suppression) or False (disable spur suppression)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Electronic Attenuator Bypass

Example	CALC:FPOW:POW1:DEF "ElecAttBypass =False"
Notes	The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp.
Preset	True
Range	True (bypass electronic attenuator) or False (use electronic attenuator)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Electronic Attenuation

Example	CALC:FPOW:POW1:DEF "ElecAttenuation=10"
Notes	Option EA3 is required. The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps). Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.
Preset	0 dB
Range	0 – 24 dB (1 dB steps)

Default Unit	dB
Initial S/W Revision	A.14.00

IF Gain

Example	CALC:FPOW:POW1:DEF "IFGain=10"
Notes	The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB.
Preset	0 dB
Range	-6 - 16 dB (1 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

IF Type

Example	CALC:FPOW:POW1:DEF "IFType=B25M"
Notes	The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path.
Preset	B40M
Range	B10M, B25M, B40M
Initial S/W Revision	A.14.00

Include Power Spectrum

Example	CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True"
Notes	The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response.
Preset	False
Range	True (return both channel power and full power spectrum) or False (returns only channel power)
Default Unit	Boolean
Initial S/W Revision	A.14.00

Mechanical Attenuation

Example	CALC:FPOW:POW1:DEF "MechAttenuation=10"
Notes	The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps).
Preset	0 dB
Range	0 – 70 dB (2 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

Preamp Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps.
Preset	Off
Range	Off, Low, Full
Initial S/W Revision	A.14.00

Resolution Bandwidth Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value.
Preset	BestSpeed
Range	BestSpeed, Narrowest, Explicit
Initial S/W Revision	A.14.00

Resolution Bandwidth

Example	CALC:FPOW:POW1:DEF "ResolutionBW=25e3"
Notes	The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW.

Preset	0 Hz
Default Unit	Hz
Initial S/W Revision	A.14.00

Trigger Delay

Example	CALC:FPOW:POW1:DEF "TriggerDelay=0.025"
Notes	The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed.
Preset	0 s
Range	0 – 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

Trigger Level

Example	CALC:FPOW:POW1:DEF "TriggerLevel=2"
Notes	The trigger level parameter sets the voltage value at which an external trigger is detected.
Preset	1.2 V
Range	–5 to 5 V
Default Unit	Volts
Initial S/W Revision	A.14.00

Trigger Slope

Example	CALC:FPOW:POW1:DEF "TriggerSlope=Negative"
Notes	The trigger slope parameter indicates the direction of the edge trigger voltage for detection.
Preset	Positive
Range	Positive, Negative
Initial S/W Revision	A.14.00

Trigger Source

Example	CALC:FPOW:POW1:DEF "TriggerSource=Ext1"
Notes	The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively.
Preset	Free
Range	Free, Ext1, Ext2
Initial S/W Revision	A.14.00

Trigger Timeout

Example	CALC:FPOW:POW1:DEF "TriggerTimeout=0.1"
Notes	The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement.
Preset	1 s
Range	0 – 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

Signal Input

Example	CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW"
Notes	The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz.
Preset	FpMainRf
Range	FpMainRf, Fp50MHzCW
Initial S/W Revision	A.14.00

Use Preselector

Example	CALC:FPOW:POW1:DEF "UsePreSelector=True"
Notes	The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases.
Preset	False
Range	True (use preselector above 3.6 GHz), or False (preselector bypassed)

Default Unit	Boolean
Initial S/W Revision	A.14.00

Channel Bandwidth Array

Example	CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]"
Notes	The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[1e6]
Range	0 to 40 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

Channel Filter Type Array

Example	CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]"
Notes	The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.
Preset	[IBW]
Range	IBW, RRC
Initial S/W Revision	A.14.00

Channel Filter Alpha Array

Example	CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]"
Notes	The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[0.22]
Range	0.0 – 1.0

Initial S/W Revision	A.14.00

Channel Measurement Function Array

Example	CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]"
Notes	This parameter array defines what measurement is being made for each individually-specified channel: BandPower: Total power within the specified bandwidth of the channel (dBm) BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz) PeakPower: The peak power value within the specified bandwidth of the channel (dBm) PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz) XdBBandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdBBandwidth parameter OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.
Preset	[BandPower]
Range	BandPower, BandDensity, PeakPower, PeakFrequency, XdBBandwidth, OccupiedBandwidth
Initial S/W Revision	A.14.00

Channel Offset Frequency Array

Example	CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]"
Notes	The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel. All array parameters should have the same number of elements.
Preset	[0]
Range	0 to 20 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

Channel Occupied Bandwidth Percent Array

Example	CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]"
Notes	This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied

bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power.	
Preset	[0.99]
Range	0 – 1.0
Initial S/W Revision	A.14.00

Channel x-dB Bandwidth Array

Example	CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]"
Notes	This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number.
Preset	[-3.01]
Range	-200 to 0 dB
Default Unit	dB
Initial S/W Revision	A.14.00

Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

M o d e	All
R e m o t e	:CALCulate:FPOWer:POWer[1,2,...,999]:DEFine?
C o m m a n d	
E	:CALC:FPOW:POW1:DEF?

x
a
m
p
l
e

N This command query is used to retrieve a list of all defined parameters in an ASCII format.
o The following is an example of the returned results:
t "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset
e =0,UsePreSelector=False,ExternalReferenceFrequency=1 0000000,FrequencyReferenceSource=AutoExternalFrequencyRefer
s ence,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1 000000000,Resolution
BW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1 000000],OffsetFrequency=[0],Function=
[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-
3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False,
TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"

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Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

Mode	All
Remote Command	:CALCulate:FPOWER:POWer[1,2,...,999]:CONFigure
Example	:CALC:FPOW:POW1:CONF
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:INITiate
Example	:CALC:FPOW:POW1:INIT
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:FETCh?
Example	:CALC:FPOW:POW1:FETC?
Notes	Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel.
Initial S/W Revision	A.14.00

Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]?
Example	:CALC:FPOW:POW1?

Notes	Option FP2 is required. See notes for Fast Power Fetch for return format.
Initial S/W Revision	A.14.00

Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

Mode	All
Remote Command	:CALCulate:FPOWER:POWer[1,2,...,999]:READ? :CALCulate:FPOWER:POWer[1,2,...,999]:READ1?
Example	:CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1?
Notes	Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined.
Initial S/W Revision	A.14.00

Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

Mode	All
Remote Command	:CALCulate:FPOWER:POWer[1,2,...,999]:READ2?
Example	:CALC:FPOW:POW1:READ2?
Notes	Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float]

	3. Declared function result for the 2nd specified channel [4 byte float]
	...
	(m + 1). Declared function result for the last (mth) specified channel [4 byte float]
	ADC Over Range
	1. ADC over-range occurred (1: true, 0: false) [2 byte short]
	Spectrum Data
	1. Number of points in the spectrum data, k [4 byte int]
	2. Start frequency of spectrum data (Hz) [8 byte double]
	3. Step frequency of spectrum data (Hz) [8 byte double]
	4. FFT bin at 1st point (dBm) [4 byte float]
	5. FFT bin at 2nd point (dBm) [4 byte float]
	...
	(k + 3). FFT bin at last (kth) point (dBm) [4 byte float]
Initial S/W Revision	A.14.00

Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCH:SANalyzer[n]? commands and queries.

Remote Command	:FORMat[:TRACe][:DATA] ASCii INTEger,32 REAL,32 REAL,64 :FORMat[:TRACe][:DATA]?
Notes	The query response is: ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTEger,32: INT,32 When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTEger, data is output in units of m dBm (.001 dBm). The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block.
Dependencies	Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTEger, 32 for REAL). Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number".
Preset	ASCii
Backwards Compatibility	Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves

Notes	backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32.
Initial S/W Revision	Prior to A.02.00

The specs for each output type follow:

ASCIi - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMAl order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

Remote Command	:FORMat:BORDER NORMAl SWAPped :FORMat:BORDER?
Preset	NORMAl
Initial S/W Revision	Prior to A.02.00

Meas Setup

Displays the setup menu for the currently selected measurement. Many of the lower-level menu keys operate the same in all measurements. Unique functions are described below.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Avg/Hold Num

Specifies the number of data acquisition that will be averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

- On - Sets measurement averaging on.
- Off - Sets measurement averaging off.

Key Path	Meas Setup
Mode	SA, GSM, TD-SCDMA
Remote Command	[:SENSe]:TXPower:AVERage:COUNt <integer> [:SENSe]:TXPower:AVERage:COUNt? [:SENSe]:TXPower:AVERage[:STATe] OFF ON 0 1 [:SENSe]:TXPower:AVERage[:STATe]?
Example	TXP:AVER:COUN 100 TXP:AVER:COUN? TXP:AVER:0 TXP:AVER?
Notes	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	50 ON
State Saved	Saved in instrument state.
Min	1
Max	10000
Backwards Compatibility SCPI	[:SENSe]:BPOWer:AVERage:COUNt
Initial S/W Revision	Prior to A.02.00

Avg Mode

Selects the type of termination control used for the averaging function. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

Key	SCPI	Mode
Exponential	EXPOnential	After the average count is reached, each successive data acquisition is exponentially weighted and combined with the existing average.
Repeat	REPeat	After reaching the average count, the averaging is reset and a new average is started.

Key Path	Meas Setup
Mode	SA, GSM, TD-SCDMA
Remote Command	[:SENSe]:TXPower:AVERage:TCONtrol EXPOnential REPeat [:SENSe]:TXPower:AVERage:TCONtrol?
Example	TXP:AVER:TCON REP TXP:AVER:TCON?
Notes	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	EXPOnential
State Saved	Saved in instrument state.
Range	Exp Repeat
Backwards Compatibility SCPI	[:SENSe]:BPOWer:AVERage:TCONtrol
Initial S/W Revision	Prior to A.02.00

Avg Type

Specifies the type of trace and result averaging to use.

Key	SCPI	Type
Pwr Avg (RMS)	RMS	True power averaging that is equivalent to taking the RMS value of the voltage. It is the most accurate type of averaging.
Log-Pwr Avg (Video)	LOG	Simulates the traditional spectrum analyzer type of averaging by averaging the log of the power.
None	MAXimum	The maximum values are retained during the averaging cycle.
None	MINimum	The minimum values are retained during the averaging cycle.

SA, GSM Mode

Key Path	Meas Setup
Mode	SA, GSM
Remote Command	[:SENSe]:TXPower:AVERage:TYPE LOG MAXimum MINimum RMS [:SENSe]:TXPower:AVERage:TYPE?
Example	TXP:AVER:TYPE LOG TXP:AVER:TYPE?
Notes	Maximum Minimum are selected only via SCPI. You must be in the Spectrum Analyzer or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Selecting MAXimum MINimum force to visible Max Hold Trace or and Min Hold Trace . Measure Trace stays in RMS or Video average state.
Preset	RMS
State Saved	Saved in instrument state.
Range	Pwr Avg (RMS) Log-Pwr Avg(Video) Maximum Minimum
Backwards Compatibility SCPI	[:SENSe]:BPOWer:AVERage:TYPE
Initial S/W Revision	Prior to A.02.00

Threshold Lvl

When Meas Method is set to Above Threshold Lvl, the mean carrier power is calculated based on the trace above the threshold level. The threshold level is displayed in dB (relative to the measured carrier) or dBm (absolute).

A green line in the grid is displayed at the y-position associated with the current threshold level value. Its state is controlled by the On/Off state of the 'Display Line' under the View/Display menu.

Key Path	Meas Setup
Mode	SA, GSM, TD-SCDMA
Remote Command	[:SENSe]:TXPower:THReshold <real> [:SENSe]:TXPower:THReshold? [:SENSe]:TXPower:THReshold:TYPE ABSolute RELative [:SENSe]:TXPower:THReshold:TYPE?
Example	TXP:THR 0 TXP:THR?
Example	TXP:THR:TYPE ABS TXP:THR:TYPE?
Notes	You must be in the TD-SCDMA mode, Spectrum Analyzer mode or GSM mode to use this command. Use INSTRument:SElect to set the mode. BAF SCPI Command determines whether this command is setting an absolute or a relative power

	level. Suffix dB and dBm are allowed, but it does not change the state of Threshold Type. Suffix may not be send. If Threshold Type is set to Relative, the positive value of Threshold level was allowed to +100dB and it treated as a negative value. Now max value of Threshold level is changed to 0dB. To keep the backward compatibility, the input from SCPI command allows to +100dB.
Preset	GSM: -20.0 SA: -30.0 TD-SCDMA : -60.0 RELative
State Saved	Saved in instrument state.
Min	-100
Max	GSM, SA: Relative : 0dB Absolute : 100dBm TD-SCDMA: Relative : 0dB Absolute : 60dBm
Backwards Compatibility SCPI	[:SENSe] :BPOWer:THReshold
Initial S/W Revision	Prior to A.02.00

Meas Method

When the selected mode is SA or GSM, there are two options for this parameter: .

- **Above Threshold Level** measurement algorithm is used to capture a time record, and average only those points in the time record that exceed the user-specified threshold level. No attempt is made to position the burst, or to calculate/display burst widths. This can be used to measure continuous signals, or bursted signals where the Measured Burst Width algorithm is too restrictive.
- **Measured Burst Width** measurement algorithm uses the threshold level to calculate the burst center, and average those points that lie within a user-specified burst width that is centered upon the burst. The burst width parameter is described in more detail below.

When the selected mode is TD-SCDMA, there is a third option:

- **Single Time Slot** measurement algorithm is to capture a single time slot record, and calculate the start and stop position of the time slot in terms of the trigger position theoretically. No attempt is made to position the burst, or to calculate/display burst widths. The burst width drawn in the screen is considered to be the theoretical width of the slot. This method is recommended to measure the mean transmit power in a single slot when trigger source is External Front/Rear while the Measured Burst Width algorithm is too restrictive.

SA, GSM mode

Key Path	Meas Setup
Mode	SA, GSM
Remote Command	[:SENSe]:TXPower:METHod THReshold BWIDth [:SENSe]:TXPower:METHod?
Example	TXP:METH BWID TXP:METH?
Preset	THReshold
State Saved	Saved in instrument state.
Range	Above Threshold Lvl Measured Burst Width
Backwards Compatibility SCPI	[:SENSe]:BPOWer:METHod
Initial S/W Revision	Prior to A.02.00

Burst Width

When Burst Width Mode is set to manual, the user may enter a fixed-time value in seconds, or alternatively specify the burst width as a percentage of the last measured burst width (result in bottom-left corner of second window).

Key Path	Meas Setup
Mode	SA, GSM, TD-SCDMA
Remote Command	[:SENSe]:TXPower:BURSt:WIDTh <time> [:SENSe]:TXPower:BURSt:WIDTh? [:SENSe]:TXPower:BURSt:AUTO ON OFF 1 0 [:SENSe]:TXPower:BURSt:AUTO?
Example	TXP:BURS:WIDT 10 TXP:BURS:WIDT? TXP:BURS:AUTO 1 TXP:BURS:AUTO?
Example	TXP:BURS:AUTO 0 TXP:BURS:AUTO? TXP:BURS:AUTO 1 TXP:BURS:AUTO?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Burst Width will be grayed out if " Meas Method " on page 1459 is set to 'Above Threshold Lvl'.
Couplings	SA, GSM

	Max value depends on Sweep Time, Res BW and RBW filter type. TD-SCDMA: If the measure method is not "Measured Burst Width", this key will be grayed out. The default value is depending on the Burst type: If Burst Type = Traffic, Burst Width = 662.5us If Burst Type = Downlink Pilot, Burst Width = 50us If Burst Type = Uplink Pilot, Burst Width = 100us
Preset	SA, GSM: 255.6 us TD-SCDMA: 662.5us ON
State Saved	Saved in instrument state.
Min	100.0 ns
Max	50 s
Initial S/W Revision	Prior to A.02.00

Meas Preset

Returns parameters for this measurement to those set by the factory.

Key Path	Meas Setup
Mode	SA, GSM, TD-SCDMA
Remote Command	:CONFigure:TXPower
Example	CONF:TXP
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

12 Burst Power (Transmit Power)
Mode

Mode

See ["Mode" on page 136](#)

Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See ["How-To Preset" on page 1464](#) for more information.

Key Path	Front-panel key
Remote Command	:SYSTem:PRESet
Example	:SYST:PRES
Notes	*RST is preferred over :SYST: PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0.
Couplings	A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set.
Backwards Compatibility Notes	In the X-Series, the legacy "Factory Preset" has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no "Preset Type" as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using

	User Preset.
Initial S/W Revision	Prior to A.02.00

How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple – is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset – is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset – resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults – resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

Type Of Preset	SCPI Command	Front Panel Access
Auto Couple	:COUPle ALL	Auto Couple front-panel key
Meas Preset	:CONFigure:<Measurement>	Meas Setup Menu
Mode Preset	:SYSTem:PRESet	Mode Preset (green key)
Restore Mode Defaults	:INSTrument:DEFault	Mode Setup Menu
Restore All Mode Defaults	:SYSTem:DEFault MODes	System Menu; Restore System Default Menu
*RST	*RST	not possible (Mode Preset with Single)
Restore Input/Output Defaults	:SYSTem:DEFault INPut	System Menu; Restore System Default Menu
Restore Power On Defaults	:SYSTem:DEFault PON	System Menu; Restore System Default Menu
Restore Alignment Defaults	:SYSTem:DEFault ALIGn	System Menu; Restore System Default Menu
Restore Miscellaneous Defaults	:SYSTem:DEFault MISC	System Menu; Restore System Default Menu
Restore All System Defaults	:SYSTem:DEFault [ALL] :SYSTem:PRESet:PERSistent	System Menu; Restore System Default Menu
User Preset	:SYSTem:PRESet:USER	User Preset Menu
User Preset All Modes	:SYSTem:PRESet:USER:ALL	User Preset Menu

Power On Mode Preset	:SYSTem:PON:TYPE MODE	System Menu
Power On User Preset	:SYSTem:PON:TYPE USER	System Menu
Power On Last State	:SYSTem:PON:TYPE LAST	System Menu

Mode Setup

See "[Mode Setup](#)" on page 151

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace. Pressing Peak Search with the selected marker off causes the selected marker to be set to Normal, then a peak search is immediately performed.

Key Path	Front-panel key
Mode	GSM, SA, TD-SCDMA
Remote Command	:CALCulate:TXPower:MARKer[1] 2 ...12:MAXimum
Example	CALC:TXP:MARK2:MAX
Initial S/W Revision	Prior to A.02.00

12 Burst Power (Transmit Power)
Print

Print

See ["Print " on page 161](#)

Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

Type	Default Prefix	Menu
State	State_	(Save/Recall)
Trace + State	State_	(Save/Recall)
Screen	Screen_	(Save/Recall)
Amplitude Corrections	Ampcor_	(Import/Export)
Traces	Trace_	(Import/Export)
Limit Lines	LLine_	(Import/Export)
Measurement Result	MeasR_	(Import/Export)
Capture Buffer	CapBuf_	(Import/Export)

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State_0000.state. The next is State_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State_0010.state there is already a State_0010.state file in the current directory, it advances the counter to State_0011.state to ensure that no conflict will exist (and then it verifies that State_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred_0000.csv.

NOTE Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

NOTE If the filename you entered ends with _dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

Key Path	Front-panel key
Notes	No remote command for this key specifically.
Initial S/W Revision	Prior to A.02.00

Recall

The **Recall** menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an **Import (Data)** option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	Front-panel key
Notes	No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATE <filename>. If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.
Backwards Compatibility Notes	In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data. In the X-Series, “state” always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.
Backwards Compatibility Notes	Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows. Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible. It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user. Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.
Initial S/W Revision	Prior to A.02.00

State

The **Recall State** menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the

additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. **Recall State** will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or "Recalled State Register <register number>" is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See ["More Information" on page 1473](#).

Key Path	Recall
Mode	All
Remote Command	:MMEMory:LOAD:STATe <filename>
Example	:MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path
Example	MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state.
Notes	When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled. • If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number. After recalling the state, the Recall State function does the following: • Makes the saved measurement for the mode the active measurement. • Clears the input and output buffers. • Status Byte is set to 0. • Executes a *CLS If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If

	there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away. After the Recall, the analyzer exits the Recall menu and returns to the previous menu.
Backwards Compatibility SCPI	:MMEMory:LOAD:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored.
Initial S/W Revision	Prior to A.02.00

More Information

In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

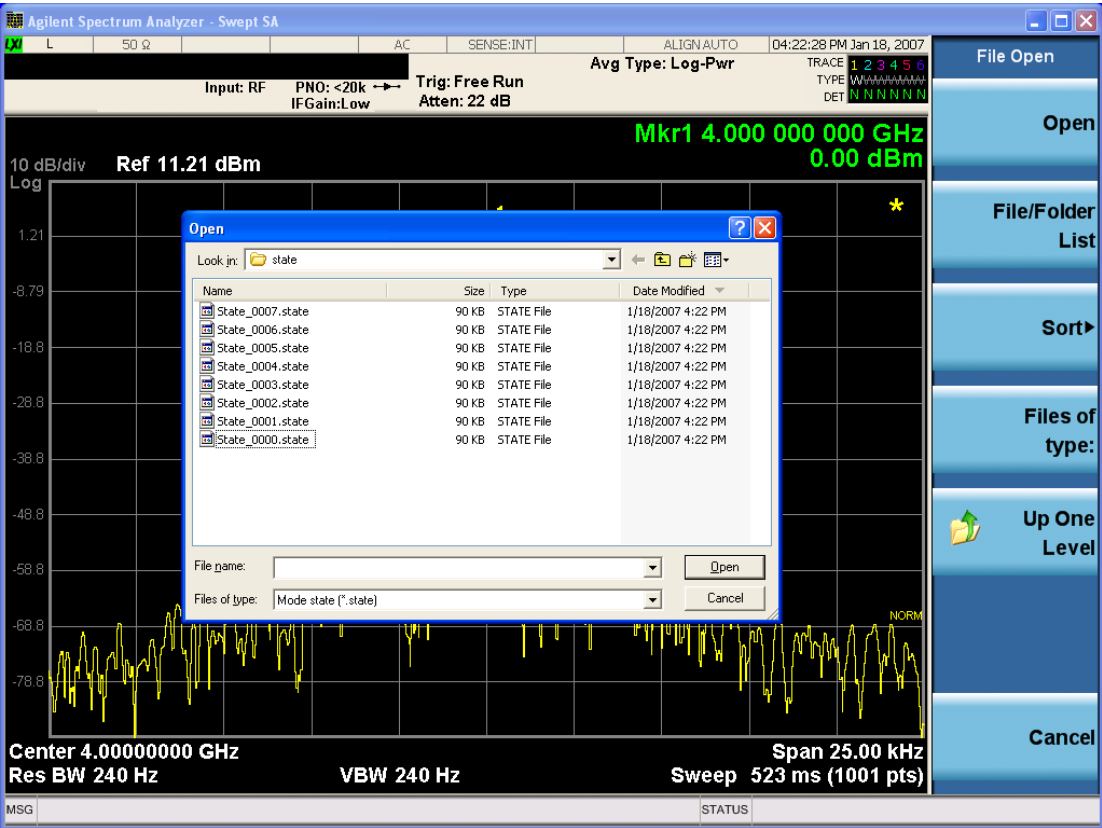
The following table describes the Trace Save and Recall possibilities:

You want to recall state and one trace's data, leaving other traces unaffected.	Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed.	On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed.
You want to recall all traces	Save Trace+State from ALL traces.	On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved)
You want all traces to load exactly as they were when saved.	Save State	On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten.

From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

12 Burst Power (Transmit Power)
Recall



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

Look In

The **Look In** field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are **By Date**, **By Name**, **By extension**, and **By Size**.

Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

Key Path	Recall, State
Notes	Brings up the Open dialog for recalling a State Save Type
Initial S/W Revision	Prior to A.02.00

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the **Save, State** function.

Key Path	Recall, State
Mode	All
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available"
Initial S/W Revision	A.11.00

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
Example	*RCL 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
Example	*RCL 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

Key Path	Recall, Sequences
Mode	All
Remote Command	:MMEMory:LOAD:SEquences: SLIS ALIS SAALIS "MySequence.txt"
Example	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Notes	Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt)
Initial S/W Revision	A.05.00

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Recall, Sequences
Example	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Dependencies	Only available in XOBT
Initial S/W Revision	A.05.00

Open...

When you press “Open”, the analyzer brings up a Windows dialog and a menu entitled “**File Open.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "From File..." on page 1473 in **Recall, State**, for a full description of this dialog and menu.

Key Path	Recall, Data
Notes	The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type
Initial S/W Revision	Prior to A.02.00

Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMEDIATE
- Sending the remote command INIT:REStart

See ["More Information" on page 1479](#)

Key Path	Front-panel key
Remote Command	:INITiate[:IMMEDIATE] :INITiate:REStart
Example	:INIT:IMM :INIT:REST
Notes	:INITiate:REStart and :INITiate:IMMEDIATE perform exactly the same function.
Couplings	Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement.
Status Bits/OPC dependencies	This is an Overlapped command. The STATUS:OPERation register bits 0 through 8 are cleared. The STATUS:QUESTionable register bit 9 (INTEgrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set.
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:REStart command restart trace averages (displayed average count reset to 1) for a trace in Clear Write , but did not restart Max Hold and Min Hold . In the X-Series, the Restart hardkey and the INITiate:REStart command restart not only Trace Average , but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:REStart command restart every measurement, which includes all traces and numeric results. There is no change to this operation.
Initial S/W Revision	Prior to A.02.00

More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average**, **Max Hold**, or **Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count k equals the number N set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC: AVER: TCON UP.

Save

The **Save** menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an **Export (Data)** option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

Key Path	Front-panel key
Mode	All
Notes	No remote command for this key specifically, but the :MMEM:STOR:STATE command is available for specific file types. An example is :MMEM:STOR:STATE <filename>.
Initial S/W Revision	Prior to A.02.00

State

The Save State menu lets you choose a register or file for saving the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent **System** settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<mode name>\state

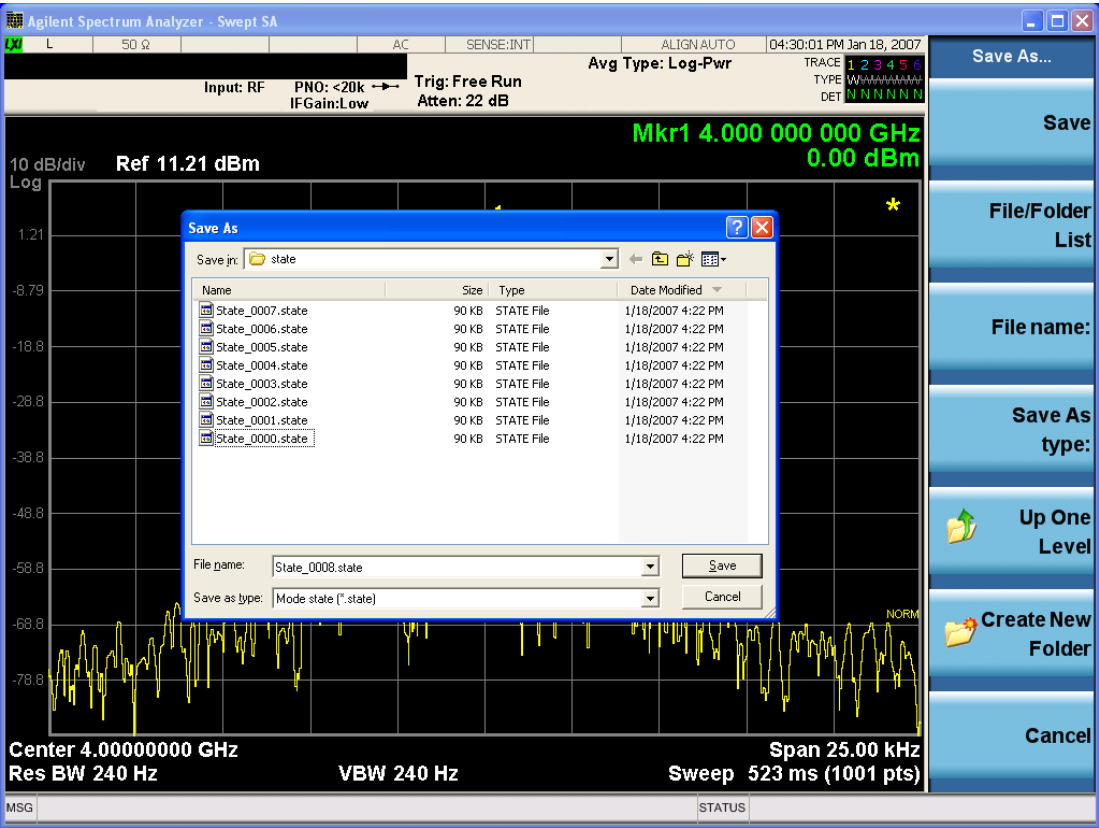
where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save
Mode	All
Remote Command	:MMEMory:STOR:STATE <filename>
Example	MMEM:STOR:STATE "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory.
Notes	Both single and double quotes are supported for any filename parameter over remote. After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key. After saving to a register, you remain in the Save State menu, so that you can see the Register key

	update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.
Backwards Compatibility SCPI	:MMEMory:STORe:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.
Initial S/W Revision	Prior to A.02.00

To File . . .

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “Save As.” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



The Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting **OK**, or you can Cancel the request. If you select OK, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

File Name

The **File Name** field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 1469](#) documentation for more on the automatic file naming algorithm.

When you press the **File Name** key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the **Done** softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Create New Folder

This key corresponds to the icon of a folder with the "*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

Key Path	Save, State
Mode	All
Notes	Brings up Save As dialog for saving a State Save Type
Initial S/W Revision	Prior to A.02.00

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See ["More Information" on page 1484](#)

Key Path	Save, State
Mode	All
Remote Command	:MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number>
Example	:MMEM:REG:STAT:LAB 1,"my label"
Notes	<reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,""
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available"
Preset	The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc"
Initial S/W Revision	A.11.00

More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The *SAV and *RCL commands will not be affected by the custom register names, nor will the MMEM commands.

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
Example	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
Example	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

Mass Storage Catalog (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:CATalog? [<directory_name>]
Notes	The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty
Initial S/W Revision	Prior to A.02.00

Mass Storage Change Directory (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory?

Notes	The string must be a valid logical path. Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value. At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal. Query returns full path of the default directory.
Initial S/W Revision	Prior to A.02.00

Mass Storage Copy (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:COpy <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Copies an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists. This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

Key path	SCPI Only
Remote Command	:MMEMory:COpy:DEvice <source_string>,<dest_string>
Notes	The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device. Valid device keywords are: SNS (smart noise source) An error is generated if the file or device is not found.

Mass Storage Delete (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:DElete <file_name>[,<directory_name>]

Notes	The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an “access denied” error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

Key path	SCPI Only
Remote Command	:MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name>
Notes	The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format.
Initial S/W Revision	Prior to A.02.00

Mass Storage Make Directory (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:MDIRectory <directory_name>
Notes	The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an “access denied” error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Mass Storage Move (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:MOVE <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source.

	The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists. This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Mass Storage Remove Directory (Remote Command Only)

Key path	SCPI Only
Remote Command	<code>:MMEMory:RDIRectory <directory_name></code>
Notes	The string must be a valid logical path. Removes a directory. The <directory_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed. This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

Key Path	Save, Sequences
Mode	All
Remote Command	<code>:MMEM:STOR:SEquences: SLISt ALISt SAALISt SSTep "MySequence.txt"</code>
Example	<code>:MMEM:STOR:SEQ:SLISt "MySequence.txt"</code>
Notes	Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt)
Initial S/W Revision	A.05.00

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Save, Sequences
Example	:MMEM:STOR:SEQ:SLIS "MySequence.txt"
Dependencies	Only available in XOBT
Initial S/W Revision	A.05.00

Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

Key Path	Save, Sequences
Mode	All
Notes	Brings up Save As dialog for saving a Sequence Save Type
Initial S/W Revision	A.05.00

Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

Key Path	Save
Mode	All
Notes	The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in

	the MMEM:STOR commands.
Dependencies	If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it.
Preset	Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults
Readback	The data type that is currently selected
Initial S/W Revision	Prior to A.02.00

Measurement Results

Pressing this key selects Meas Results as the data type to be exported.

The Meas Results file contains information which describes the current state of the analyzer. It is detailed in ["Meas Results File Contents" on page 1491](#) below.

Key Path	Save, Data
Remote Command	:MMEMory:STORe:REsults <string>
Example	:MMEM:STOR:RES "MeasR_0000.csv"
Notes	If the save is initiated via SCPI and the file already exists, the file will be overwritten. The SCPI command exports Burst Power (Transmit Power) measurement results to the file specified as the parameter in the current path. The default path is My Documents\<current mode>\data\TXP\results. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. The SCPI parameter is a quoted string that specifies the filename. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	The current active measurement must be the Burst Power (Transmit Power) measurement to use this command.
Status Bits/OPC dependencies	Sequential – waits for the previous measurement to complete
Initial S/W Revision	Prior to A.02.00

Meas Results File Contents

A Meas Results File contains measurement results with the following information.

- File ID string, which is "MeasResult"
- Measurement ID following Mode ID, which is "SA:TXP" for example.
- Firmware rev and model number
- Option string
- Center Frequency
- TXP_InfoBw

- TXP_Used_CaptureTime

The file contains these data followed by MeasResult1 to MeasResult4 that flag the start of the measurement results. Each line of Measurement Results consists of four comma separated values from MeasResult1 value to MeasResult4 value. MeasResult1 contains the same results as MEAS/READ/FETCH:TXPower|BPOwer1; MeasResult2, MEAS/READ/FETCH:TXPower|BPOwer2;... (continues in the same manner)

Exported file is .csv file. The Meas Results file, when imported into Excel, will show the following data:

MeasResult			
SA:TXP			
A.10.53	N9030A		
526 ALV ATP B1X B1Y B25 B40 BBA CR3 CRP DCF DDA DP2 DRD EA3 EDP EMC EP1 ERC ESC ESP EXM FSA LFE LNP MAT MPB NFE NUL P26 PFR PNC RTL RTS S40 SB1 SEC SM1 TVT YAS YAV	1		
Center Frequency	1.33E+10		
TXP_InfoBw	3000000		
TXP_Used_CaptureTime	0.00064		
MeasResult1	MeasResult2	MeasResult3	MeasResult4
0			
-999			

Save As . . .

When you press “Save As”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See ["To File . . ."](#) on page 1482 in **Save, State** for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<mode name>\data\limits

For all of the Measurement Results Data Files:

My Documents\<mode name>\data\<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<mode name>\data\captureBuffer

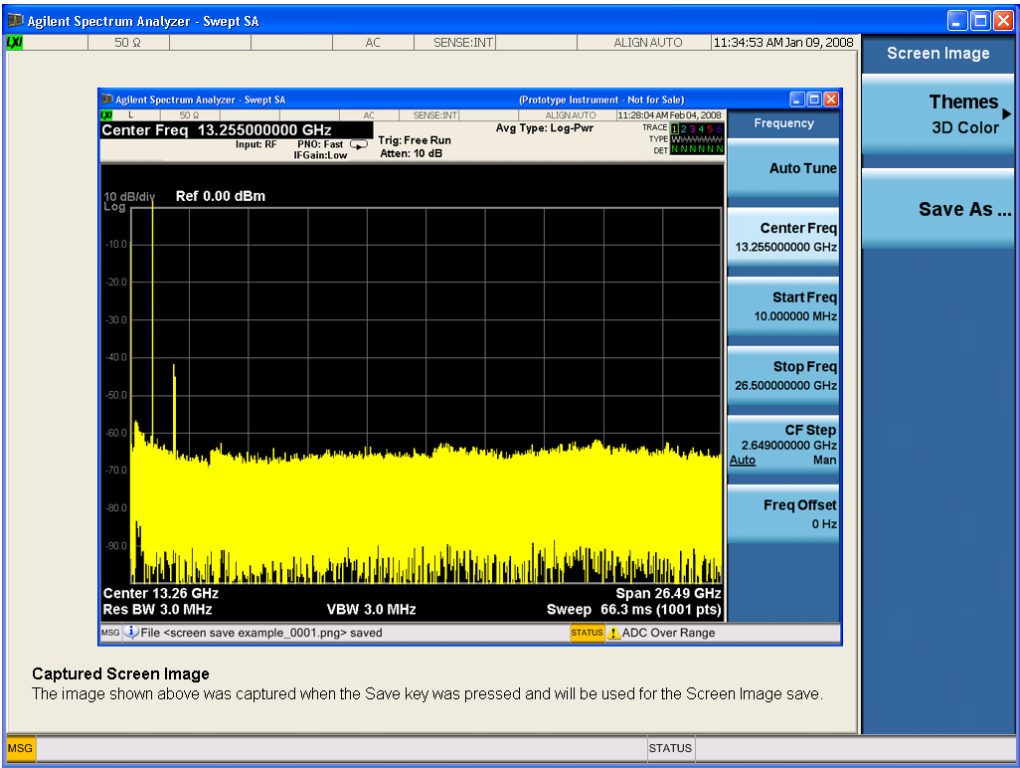
Key Path	Save, Data
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision	Prior to A.02.00

Screen Image

Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the **Save** front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the **Save As** menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the **Save** menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the **Quick Save** front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

NOTE

For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

Key Path	Save
Mode	All
Remote Command	:MMEMory:STORe:SCReen <filename>
Example	:MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory.
Initial S/W Revision	Prior to A.02.00

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

Key Path	Save, Screen Image
Remote Command	:MMEMory:STORe:SCReen:THEMe TDColor TDMonochrome FCOLor FMONochrome :MMEMory:STORe:SCReen:THEMe?
Example	:MMEM:STOR:SCR:THEM TDM
Preset	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
Readback	3D Color 3D Mono Flat Color Flat Mono
Backwards Compatibility Notes	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
Initial S/W Revision	Prior to A.02.00

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDC

Readback	3D Color
Initial S/W Revision	Prior to A.02.00

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDM
Readback	3D Mono
Initial S/W Revision	Prior to A.02.00

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 1482 in **Save, State** for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\<mode name>\screen.

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save, Screen Image
Notes	Brings up Save As dialog for saving a Screen Image Save Type
Initial S/W Revision	Prior to A.02.00

Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing **Single** does a Resume.

See ["More Information" on page 1497](#)

Key Path	Front-panel key
Example	:INIT:CONT OFF
Notes	See Cont key description.
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold. For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state. INIT[:IMM] in ESA & PSA Spectrum Analysis Mode does an implied ABORT. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.
Initial S/W Revision	Prior to A.02.00

More Information

See ["Restart" on page 1479](#) for details on the INIT:IMMediate (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the **Single** key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the **Single** key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the **Single** key in the middle of a sweep does not restart the sweep, sending INIT:IMMediate does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

Key Path	Front-panel key

RF Output

This parameter sets the source RF power output state.

Key Path	Source
Remote Command	:OUTPut[:EXTeRnal][:STATe] ON OFF 1 0 :OUTPut[:EXTeRnal][:STATe]?
Example	OUTP OFF OUTP?
Notes	The EXTeRnal node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source. This setting is for the independent mode and has no effect on the "List Sequencer" on page 1584. If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately. When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the "Sequencer" on page 1585 is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

Amplitude

Allows you to access the Amplitude sub-menu.

Key Path	Source
Notes	The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 1584. If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set "Sequencer" on page 1585 to Off will make source leave list sequencer and this button will be black out.
Initial S/W Revision	A.05.00

RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the ["RF Power Range " on page 1500](#) table below for the valid ranges.

Key Path	Source, Amplitude
Remote Command	:SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]?
Example	:SOUR:POW -100 dBm
Notes	Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel. Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Couplings	If "Real-Time AWGN" on page 1545 AWGN State is On and "ARB" on page 1534 ARB State is On, this setting will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 1546 Power Control Mode and other noise settings
Preset	-100 dBm
Min	The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 1500 table below for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 1500 table below for the valid ranges.

Initial S/W Revision	A.05.00
Modified at S/W Revision	A.16.00 (Add couplings with AWGN state)

RF Power Range

RF Output Port	Frequency Range	Min Output Power	Max Output Power
High Power RF Out	10 MHz $\leq$ f $\leq$ 6 GHz	-150 dBm	20 dBm
RFIO 1 & RFIO 2	10 MHz $\leq$ f $\leq$ 6 GHz	-150 dBm	0 dBm
GPS (Note2)	10 MHz $\leq$ f $\leq$ 6 GHz	-150 dBm	0 dBm

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power – entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

Key Path	Source, Amplitude
Dependencies	This key is unavailable, and is grayed out when the "List Sequencer" on page 1584 is turned ON.
Initial S/W Revision	A.05.00

Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 1500](#)

Key Path	Source, Amplitude
Remote Command	:SOURce:POWer:REFeRence <ampl> :SOURce:POWer:REFeRence? :SOURce:POWer:REFeRence:STATe OFF ON 0 1 :SOURce:POWer:REFeRence:STATe?
Example	:SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATe ON
Dependencies	This setting is unavailable and is grayed out when the "List Sequencer" on page 1584 is turned ON.
Couplings	This value is coupled to the "Set Reference Power " on page 1500 key such that pressing the Set Reference Power key updates the reference power with the current output power.
Preset	0.00 dBm OFF
Min	-125.00 dBm
Max	10.00 dBm
Initial S/W Revision	A.05.00

Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

Key Path	Source, Amplitude
Remote Command	:SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_amp1> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet?
Example	:SOUR:POW:OFFS 0.00 dB
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0.00 dB
Min	-200.00 dB
Max	200.00 dB
Initial S/W Revision	A.05.00

Modulation

Allows you to toggle the state of the modulation.

Key Path	Source
Remote Command	:OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]?
Example	:OUTP:MOD OFF
Notes	This setting is for independent mode and has no effect on "List Sequencer" on page 1584. If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately. When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the "Sequencer" on page 1585 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer.
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

Frequency

Allows you to access the Frequency sub-menu.

Key Path	Source
Notes	The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 1584. If the "Sequencer" on page 1585 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out.
Initial S/W Revision	A.05.00

Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW] ?
Example	:SOUR:FREQ 1.00 GHz
Notes	Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency.
Couplings	The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency.
Preset	1.00 GHz
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: "GSM/EDGE Channel Number Ranges" on page 1504,

"W-CDMA Channel Number Ranges" on page 1505, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 1506, and "LTE FDD Channel Number Ranges" on page 1508.

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:CHANnels:NUMBer <int> :SOURce:FREQuency:CHANnels:NUMBer?
Example	:SOUR:FREQ:CHAN:NUMB 1
Notes	This key is grayed out when the "Radio Standard" on page 1512 is set to NONE. This key is grayed out on E6630A.
Dependencies	This key is grayed out when the "Radio Standard" on page 1512 is set to NONE. This key is grayed out on E6630A.
Couplings	The channel number is coupled to the frequency value when the "Radio Standard" on page 1512 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	Please refer to the tables below for the valid ranges.
Max	Please refer to the tables below for the valid ranges.
Initial S/W Revision	A.05.00

GSM/EDGE Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
P-GSM	Uplink (MS)	$1 \leq n \leq 124$	$890.0 + 0.2*n$
	Downlink (BS)	$1 \leq n \leq 124$	$935.0 + 0.2*n$
E-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$975 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$975 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
DCS 1800	Uplink (MS)	$512 \leq n \leq 885$	$1710.200 + 0.20*(n-512)$
	Downlink (BS)	$512 \leq n \leq 885$	$1805.200 + 0.20*(n-512)$
PCS 1900	Uplink (MS)	$512 \leq n \leq 810$	$1850.200 + 0.2*(n-512)$
	Downlink (BS)	$512 \leq n \leq 810$	$1930.200 + 0.2*(n-512)$
R-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$955 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$955 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
GSM 450	Uplink (MS)	$256 \leq n \leq 293$	$450.6 + 0.2*(n-259)$
	Downlink (BS)	$256 \leq n \leq 293$	$460.6 + 0.2*(n-259)$

Band	Link (Device)	Range	Frequency (MHz)
GSM 480	Uplink (MS)	$306 \leq n \leq 340$	$479.000 + 0.20*(n-306)$
	Downlink (BS)	$306 \leq n \leq 340$	$489.000 + 0.20*(n-306)$
GSM 850	Uplink (MS)	$128 \leq n \leq 251$	$824.200 + 0.20*(n-128)$
	Downlink (BS)	$128 \leq n \leq 251$	$869.200 + 0.20*(n-128)$
GSM 700	Uplink (MS)	$438 \leq n \leq 516$	$777.200 + 0.20*(n-438)$
	Downlink (BS)	$438 \leq n \leq 516$	$747.200 + 0.20*(n-438)$
T-GSM810	Uplink (MS)	$350 \leq n \leq 425$	$806.0 + 0.20*(n-350)$
	Downlink (BS)	$350 \leq n \leq 425$	$851.0 + 0.20*(n-350)$

W-CDMA Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
Band I	Downlink	$10562 \leq n \leq 10838$	$n \div 5$
	Uplink	$9612 \leq n \leq 9888$	$n \div 5$
Band II	Downlink	$412 \leq n \leq 687$	$n \div 5 + 1850.1$
		$9662 \leq n \leq 9938$	$n \div 5$
	Uplink	$12 \leq n \leq 287$	$n \div 5 + 1850.1$
		$350 \leq n \leq 425$	$n \div 5$
Band III	Downlink	$1162 \leq n \leq 1513$	$n \div 5 + 1575$
	Uplink	$937 \leq n \leq 1288$	$n \div 5 + 1525$
Band IV	Downlink	$537 \leq n \leq 1738$	$n \div 5 + 1805$
		$1887 \leq n \leq 2087$	$n \div 5 + 1735.1$
	Uplink	$1312 \leq n \leq 1513$	$n \div 5 + 1450$
		$1662 \leq n \leq 1862$	$n \div 5 + 1380.1$
Band V	Downlink	$1007 \leq n \leq 1087$	$n \div 5 + 670.1$
		$4357 \leq n \leq 4458$	$n \div 5$
	Uplink	$782 \leq n \leq 862$	$n \div 5 + 670.1$
		$4132 \leq n \leq 4233$	$n \div 5$
Band VI	Downlink	$1037 \leq n \leq 1062$	$n \div 5 + 670.1$
		$4387 \leq n \leq 4413$	$n \div 5$
	Uplink	$812 \leq n \leq 837$	$n \div 5 + 670.1$
		$4162 \leq n \leq 4188$	$n \div 5$
Band VII	Downlink	$2237 \leq n \leq 2563$	$n \div 5 + 2175$
		$2587 \leq n \leq 2912$	$n \div 5 + 2105.1$
	Uplink	$2012 \leq n \leq 2338$	$n \div 5 + 2100$
		$2362 \leq n \leq 2687$	$n \div 5 + 2030.1$
Band VIII	Downlink	$2937 \leq n \leq 3088$	$n \div 5 + 340$

Band	Link (Device)	Range	Frequency (MHz)
Band IX	Uplink	$2712 \leq n \leq 2863$	$n \div 5 + 340$
	Downlink	$9237 \leq n \leq 9387$	$n \div 5$
	Uplink	$8762 \leq n \leq 8912$	$n \div 5$
Band X	Downlink	$3112 \leq n \leq 3388$	$n \div 5 + 1490$
		$3412 \leq n \leq 3687$	$n \div 5 + 1430.1$
	Uplink	$2887 \leq n \leq 3163$	$n \div 5 + 1135$
		$3187 \leq n \leq 3462$	$n \div 5 + 1075.1$
Band XI	Downlink	$3712 \leq n \leq 3812$	$n \div 5 + 736$
	Uplink	$3487 \leq n \leq 3587$	$n \div 5 + 733$
Band XII	Downlink	$3837 \leq n \leq 3903$	$n \div 5 - 37$
		$3927 \leq n \leq 3992$	$n \div 5 - 54.9$
	Uplink	$3612 \leq n \leq 3678$	$n \div 5 - 22$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIII	Downlink	$4017 \leq n \leq 4043$	$n \div 5 - 55$
		$4067 \leq n \leq 4092$	$n \div 5 - 64.9$
	Uplink	$3792 \leq n \leq 3818$	$n \div 5 + 21$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIV	Downlink	$4117 \leq n \leq 4143$	$n \div 5 - 63$
		$4167 \leq n \leq 4192$	$n \div 5 - 72.9$
	Uplink	$3892 \leq n \leq 3918$	$n \div 5 + 12$
		$3942 \leq n \leq 3967$	$n \div 5 + 2.1$
Band XIX	Downlink	$712 \leq n \leq 763$	$n \div 5 + 735$
		$787 \leq n \leq 837$	$n \div 5 + 720.1$
	Uplink	$312 \leq n \leq 363$	$n \div 5 + 770$
		$387 \leq n \leq 437$	$n \div 5 + 755.1$

CDMA 2000 / 1xEVDO Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
US Cellular	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.030 \times N + 825.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 825.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 815.040$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.030 \times N + 870.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 870.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 860.040$
US PCS	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1850.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
Japan Cellular Band	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$1930.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.0125 \times (N + 915.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 898.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 887.000$
		$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 893.000$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.0125 \times (N + 860.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 843.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 832.000$
		$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 838.000$
Korean PCS Band	Uplink (MS, reverse link)	$0 \leq N \leq 599$	$0.050 \times N + 1750.000$
	Downlink (BS, forward link)	$0 \leq N \leq 599$	$0.050 \times N + 1840.000$
NMT-450 Band	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 450.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 410.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 451.010$
		$1536 \leq N \leq 1715$	$0.025 \times (N - 1536) + 479.000$
		$1792 \leq N \leq 2016$	$0.020 \times (N - 1792) + 479.000$
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 460.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 420.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 461.010$
IMT-2000 Band	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1920.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$2100.000 + 0.050 \times N$
Upper 700 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$776.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 240$	$746.000 + 0.050 \times N$
Secondary 800 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 719$	$0.025 \times N + 806.000$
		$720 \leq N \leq 919$	$0.025 \times (N - 720) + 896.000$
	Downlink (BS, forward link)	$0 \leq N \leq 719$	$0.025 \times N + 851.000$
		$720 \leq N \leq 919$	$0.025 \times (N - 720) + 935.000$
2.5 GHz IMT Extension	Uplink (MS, reverse link)	$0 \leq N \leq 1399$	$2500.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1399$	$2620.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
US PCS 1.9 GHz	Uplink (MS, reverse link)	$0 \leq N \leq 1299$	$1850.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1299$	$1930.000 + 0.050 \times N$
AWS	Uplink (MS, reverse link)	$0 \leq N \leq 899$	$1710.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 899$	$2100.000 + 0.050 \times N$
US 2.5 GHz	Uplink (MS, reverse link)	$140 \leq N \leq 1459$	$2495.000 + 0.050 \times N$
	Downlink (BS, forward link)	$140 \leq N \leq 1459$	$2617.000 + 0.050 \times N$
700 Public Safety	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$787.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 240$	$757.000 + 0.050 \times N$
C2K Lower 700	Uplink (MS, reverse link)	$0 \leq N \leq 360$	$698.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 360$	$728.000 + 0.050 \times N$
400 Euro PAMR	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 450.000$
		$472 \leq N \leq 871$	$0.025 \times (N-472) + 410.000$
	Uplink (MS, reverse link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 479.000$
	Uplink (MS, reverse link)		
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 460.000$
		$472 \leq N \leq 871$	$0.025 \times (N-472) + 420.000$
	Downlink (BS, forward link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 489.000$
	Downlink (BS, forward link)		
800 PAMR	Uplink (MS, reverse link)	$0 \leq N \leq 239$	$870.0125 + 0.025 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 239$	$915.0125 + 0.025 \times N$

LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier

frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOffs-UL)$$

Band	Downlink	Uplink				
FDL_low (MHz)	NOffs-DL	Range of NDL	FUL_low (MHz)	NOffs-UL	Range of NUL	
1	2110	0	0 - 599	1920	18000	18000 - 18599
2	1930	600	600 - 1199	1850	18600	18600 - 19199
3	1805	1200	1200 - 1949	1710	19200	19200 - 19949
4	2110	1950	1950 - 2399	1710	19950	19950 - 20399
5	869	2400	2400 - 2649	824	20400	20400 - 20649
6	875	2650	2650 - 2749	830	20650	20650 - 20749
7	2620	2750	2750 - 3449	2500	20750	20750 - 20449
8	925	3450	3450 - 3799	880	21450	21450 - 21799
9	1844.9	3800	3800 - 4149	1749.9	21800	21800 - 22149
10	2110	4150	4150 - 4749	1710	22150	22150 - 22749
11	1475.9	4750	4750 - 4949	1427.9	22750	22750 - 22949
12	729	5010	5010 - 5179	699	23010	23010 - 23179
13	746	5180	5180 - 5279	777	23180	23180 - 23279
14	758	5280	5280 - 5379	788	23280	23280 - 23379
...						
17	734	5730	5730 - 5849	704	23730	23730 - 23849
18	860	5850	5850 - 5999	815	23850	23850 - 23999

Band	Downlink	Uplink				
19	875	6000	6000 – 6149	830	24000	24000 – 24149
20	791	6150	6150 – 6449	832	24150	24150 – 24449
21	1495.9	6450	6450 – 6599	1447.9	24450	24450 – 24599
...						
24	1525	7700	7700 – 8039	1626.5	25700	25700 – 26039
25	1930	8040	8040 – 8689	1850	26040	26040 – 26689
26	859	8690	8690 – 9039	814	26690	26690 – 27039
...						

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL_low and NOFFS-DL are given in table 5.4.4–1 and NDL is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOFFS-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOFFS-UL are given in table 5.4.4–1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOFFS-UL)$$

Band	Downlink	Uplink				
FDL_low (MHz)	NOFFS-DL	Range of NDL	FUL_low (MHz)	NOFFS-UL	Range of NUL	
33	1900	36000	36000 – 36199	1900	36000	36000 – 36199
34	2010	36200	36200 – 36349	2010	36200	36200 – 36349
35	1850	36350	36350 – 36949	1850	36350	36350 – 36949
36	1930	36950	36950 – 37549	1930	36950	36950 – 37549

Band	Downlink	Uplink				
37	1910	37550	37550 – 37749	1910	37550	37550 – 37749
38	2570	37750	37750 – 38249	2570	37750	37750 – 38249
39	1880	38250	38250 – 38649	1880	38250	38250 – 38649
40	2300	38650	38650 – 39649	2300	38650	38650 – 39649
41	2496	39650	39650 – 41589	2496	39650	39650 – 41589
42	3400	41590	41590 – 43589	3400	41590	41590 – 43589
43	3600	43590	43590 – 45589	3600	43590	43590 – 45589

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

TDSCDMA Channel Number Ranges

1.28 Mcps TDD Option

No TX–RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 \cdot F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 \cdot (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

**Table: UTRA Absolute Radio
Frequency Channel Number 1.28
Mcps TDD Option**

Frequency Band	Frequency Range	UARFCN Uplink and Downlink transmission
For operation in frequency band as defined in subclause 5.2 (a)	1900–1920 MHz	9504 to 9596
	2010–2025 MHz	10054 to 10121
For operation in frequency band as defined in subclause 5.2 (b)	1850–1910 MHz	9254 to 9546
	1930–1990 MHz	9654 to 9946
For operation in frequency band as defined in subclause 5.2 (c)	1910–1930 MHz	9554 to 9646
For operation in frequency band as defined in subclause 5.2 (d)	2570–2620 MHz	12854 to 13096
For operation in frequency band as defined in subclause 5.2 (e)	2300–2400 MHz	11504 to 11996
For operation in frequency band as defined in subclause 5.2 (f)	1880–1920 MHz	9404 to 9596

Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

Key Path	Source, Frequency
Initial S/W Revision	A.05.00

Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

Key Path	Source, Frequency, Radio Setup
Remote Command	:SOURce:FREQuency:CHANnels:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10

BAND11	BAND12	BAND13	BAND14	BAND17	BAND18	BAND19	BAND20	
BAND21	BAND24	BAND25	BAND26	BAND27	BAND28	BAND29	BAND30	
BAND31	BAND33	BAND34	BAND35	BAND36	BAND37	BAND38	BAND39	
BAND40	BAND41	BAND42	BAND43	BAND44	BANDA	BANDB	BANDC	
BANDD	BANDE	BANDE	BANDE					

:SOURce:FREQuency:CHANnels:BAND?

Example	:SOUR:FREQ:CHAN:BAND PGSM
Notes	Set this setting to "NONE" will grey out "Channel" on page 1503 Channel
Initial S/W Revision	A.05.00

None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

P-GSM

Selects P-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND PGSM
Initial S/W Revision	A.05.00

E-GSM

Selects E-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND EGSM
Initial S/W Revision	A.05.00

R-GSM

Selects R-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND RGSM
Initial S/W Revision	A.05.00

DCS 1800

Selects DCS 1800 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND DCS1800
Initial S/W Revision	A.05.00

PCS 1900

Selects PCS 1900 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND PCS1900
Initial S/W Revision	A.05.00

GSM 450

Selects GSM 450 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND GSM450
Initial S/W Revision	A.05.00

GSM 480

Selects GSM 480 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND GSM480
Initial S/W Revision	A.05.00

GSM 850

Selects GSM 850 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND GSM850
Initial S/W Revision	A.05.00

GSM 700

Selects GSM 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND GSM700
Initial S/W Revision	A.05.00

T-GSM 810

Selects T-GSM 810 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND T-GSM810
Initial S/W Revision	A.05.00

WCDMA

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

Band I

Selects Band I as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDI
Initial S/W Revision	A.05.00

Band II

Selects Band II as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDII
Initial S/W Revision	A.05.00

Band III

Selects Band III as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDIII
Initial S/W Revision	A.05.00

Band IV

Selects Band IV as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDIV
Initial S/W Revision	A.05.00

Band V

Selects Band V as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDV
Initial S/W Revision	A.05.00

Band VI

Selects Band VI as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDVI
Initial S/W Revision	A.05.00

Band VII

Selects Band VII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDVII
Initial S/W Revision	A.05.00

Band VIII

Selects Band VIII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDVIII
Initial S/W Revision	A.05.00

Band IX

Selects Band IX as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDIX
Initial S/W Revision	A.05.00

Band X

Selects Band X as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDX
Initial S/W Revision	A.05.00

Band XI

Selects Band XI as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDXI
Initial S/W Revision	A.05.00

Band XII

Selects Band XII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDXII
Initial S/W Revision	A.05.00

Band XIII

Selects band XIII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDXIII
Initial S/W Revision	A.05.00

Band XIV

Selects Band XIV as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDXIV
Initial S/W Revision	A.05.00

CDMA 2000 / 1xEVDO

Sets CDMA 2000 / 1XEVD0 as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

US CELL

Selects US Cell as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND USCELL
Initial S/W Revision	A.05.00

US PCS

Selects US PCS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PCS
Initial S/W Revision	A.05.00

Japan Cell

Selects Japan Cell as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND JAPAN
Initial S/W Revision	A.05.00

Korean PCS

Selects Korean PCS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND KOREAN
Initial S/W Revision	A.05.00

NMT 450

Selects NMT 450 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND NMT
Initial S/W Revision	A.05.00

IMT 2000

Selects IMT 2000 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND IMT2K
Initial S/W Revision	A.05.00

Upper 700

Selects Upper 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND UPPER
Initial S/W Revision	A.05.00

Secondary 800

Selects Secondary 800 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND SECOND
Initial S/W Revision	A.05.00

400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PAMR400
Initial S/W Revision	A.05.00

800 PAMR

Selects 800 PAMR as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PAMR800
Initial S/W Revision	A.05.00

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND IMTEXT
Initial S/W Revision	A.05.00

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PCS1DOT9G
Initial S/W Revision	A.05.00

AWS

Selects AWS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND AWS
Initial S/W Revision	A.05.00

US 2.5GHz

Selects US 2.5 GHz as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND US2DOT5G
Initial S/W Revision	A.05.00

700 Public Safety

Selects 700 Public Safety as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND PUBLIC
Initial S/W Revision	A.05.00

C2K Lower 700

Selects C2K Lower 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Example	:SOUR:FREQ:CHAN:BAND LOWER
Initial S/W Revision	A.05.00

LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

BAND 1

Selects BAND 1 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND1
Initial S/W Revision	A.09.50

BAND 2

Selects BAND 2 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND2
Initial S/W Revision	A.09.50

BAND 3

Selects BAND 3 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND3
Initial S/W Revision	A.09.50

BAND 4

Selects BAND 4 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND4
Initial S/W Revision	A.09.50

BAND 5

Selects BAND 5 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND5
Initial S/W Revision	A.09.50

BAND 6

Selects BAND 6 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND6
Initial S/W Revision	A.09.50

BAND 7

Selects BAND 7 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND7
Initial S/W Revision	A.09.50

BAND 8

Selects BAND 8 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND8
Initial S/W Revision	A.09.50

BAND 9

Selects BAND 9 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND9
Initial S/W Revision	A.09.50

BAND 10

Selects BAND 10 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND10
Initial S/W Revision	A.09.50

BAND 11

Selects BAND 11 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND11
Initial S/W Revision	A.09.50

BAND 12

Selects BAND 12 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND12
Initial S/W Revision	A.09.50

BAND 13

Selects BAND 13 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND13
Initial S/W Revision	A.09.50

BAND 14

Selects BAND 14 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND14
Initial S/W Revision	A.09.50

BAND 17

Selects BAND 17 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND17
Initial S/W Revision	A.09.50

BAND 18

Selects BAND 18 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND18
Initial S/W Revision	A.09.50

BAND 19

Selects BAND 19 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND19
Initial S/W Revision	A.09.50

BAND 20

Selects BAND 20 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND20
Initial S/W Revision	A.09.50

BAND 21

Selects BAND 21 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND21
Initial S/W Revision	A.09.50

BAND 24

Selects BAND 24 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND24
Initial S/W Revision	A.09.50

BAND 25

Selects BAND 25 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND25
Initial S/W Revision	A.09.50

BAND 26

Selects BAND 26 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND26
Initial S/W Revision	A.12.53

BAND 27

Selects BAND 27 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND27
Initial S/W Revision	A.14.00

BAND 28

Selects BAND 28 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
Example	:SOUR:FREQ:CHAN:BAND BAND28
Initial S/W Revision	A.14.00

BAND 31

Selects BAND 31 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE

Example	:SOUR:FREQ:CHAN:BAND BAND31
Initial S/W Revision	A.14.00

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND 33

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

BAND 34

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

BAND 35

Selects BAND 35 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

BAND 36

Selects BAND 36 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

BAND 37

Selects BAND 37 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

BAND 38

Selects BAND 38 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

BAND 39

Selects BAND 39 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

BAND 40

Selects BAND 40 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

BAND 41

Selects BAND 41 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

BAND 42

Selects BAND 42 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

BAND 43

Selects BAND 43 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

BAND 44

Selects BAND 44 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND44
Initial S/W Revision	A.14.00

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND A

Selects BAND A as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

BAND B

Selects BAND B as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

BAND C

Selects BAND C as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

BAND D

Selects BAND D as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

BAND E

Selects BAND E as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

BAND F

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

Radio Band Link

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the

source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

Key Path	Source, Frequency, Radio Setup
Remote Command	:SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK?
Example	:SOUR:RAD:BAND:LINK UP
Preset	DOWN
Range	DOWN UP
Backwards Compatibility SCPI	:SOURce:RADio:DEvice BTS MS :SOURce:RADio:DEvice?
Backwards Compatibility Notes	BTS maps to the Downlink frequency MS maps to the Uplink frequency
Initial S/W Revision	A.05.00

Set Reference Frequency

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency – entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

NOTE

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

Key Path	Source, Frequency

Remote Command	:SOURce:FREQuency:REFErence:SET
Example	:SOUR:FREQ:REF:SET
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Initial S/W Revision	A.05.00

Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency + entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 1531](#)

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:REFErence <freq> :SOURce:FREQuency:REFErence? :SOURce:FREQuency:REFErence:STATe OFF ON 0 1 :SOURce:FREQuency:REFErence:STATe?
Example	:SOUR:FREQ:REF 0.00 Hz :SOUR:FREQ:REF:STATe ON
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Couplings	The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON.
Preset	0.00 Hz OFF
Min	0.00 Hz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source>Frequency>Frequency

offset value equals the value entered under Source>Frequency>Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source>Frequency>Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source>Frequency>Frequency

offset frequency equals the value previously entered and set under Source>Frequency>Freq Offset

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:OFFSet <freq> :SOURce:FREQuency:OFFSet?
Example	:SOUR:FREQ:OFFS 0 Hz
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0 Hz
Min	-100.00 GHz
Max	100.00 GHz
Initial S/W Revision	A.05.00

Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 1534, "AM" on page 1580, "FM" on page 1582, and "PM" on page 1583.

Key Path	Source
Initial S/W Revision	A.05.00

ARB

Allows you access to the ARB sub-menus.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a “MOD” annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe]?
Example	:SOUR:RAD:ARB OFF :SOUR:RAD:ARB?
Notes	If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Dependencies	This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 1585 Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 1585 Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately. The ARB can only be turned on when there is a waveform file selected for playback. On the GUI If no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. "- When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported
Couplings	If "Real-Time AWGN" on page 1545 AWGN State is On and this setting is On, "RF Power" on page 1499 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 1546 Power Control Mode and other noise settings
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00
Modified at S/W Revision	A.16.00 (Add couplings with AWGN state)

Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Remote Command	:SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform?
Example	:SOUR:RAD:ARB:WAV "test_waveform.bin"
Notes	If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB. When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated . When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and none of the waveform segments is loaded. If the ARB is ON, and you attempt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On. If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generated and the file selection remains unchanged. If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.error is generated. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this

	case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMORY:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
Notes	<string> - specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error. When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated. If you specify a directory over SCPI, but the directory does not exist, an error is generated. If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for

selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated. It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated. When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 1584 and "Sequencer" on page 1585 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

NOTE

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use **"Query ARB Memory Full File List (Remote Command Only)" on page 1539**.

Remote Command	:SOURce:RADio:ARB:CATalog?
Example	:SOUR:RAD:ARB:CATalog?
Notes	The return data is in the following format: <integer> - memory used <integer> - memory free <string> ... - comma separated list of waveform segments within ARB memory
Initial S/W Revision	A.05.00

Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

Remote Command	:SOURce:RADio:ARB:FCATalog?
Example	:SOUR:RAD:ARB:FCATalog?
Notes	The return data is in the following format: <integer> - memory used

	<integer> - memory free <integer> - file count in ARB memory <string>, <string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm"
Initial S/W Revision	A.09.00

ARB Setup

Allows access to the ARB setup sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Sample Rate

Allows you to set the ARB waveform playback sample rate.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE?
Example	:SOUR:RAD:ARB:SCL:RATE 48.00 MHz
Notes	If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing.
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	125.00 MHz
Min	1.00 kHz
Max	125.00 MHz
Initial S/W Revision	A.05.00

Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

Key Path	Source, Modulation Setup, ARB, ARB Setup

Remote Command	:SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling?
Example	:SOUR:RAD:ARB:RSC 100.00
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	70.00 %
Min	1.00 %
Max	100.00 %
Initial S/W Revision	A.05.00

Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet?
Example	:SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	0.00 Hz
Min	-50.00 MHz
Max	50.00 MHz
Initial S/W Revision	A.05.00

Edit RMS

Allows you to edit or calculate current RMS of selected waveform.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Initial S/W Revision	A.14.50

Current RMS

Allows you to directly specify current RMS value used to playback currently selected waveform. Please note incorrect RMS value may cause inaccurate power output in E6640A that is sensitive to RMS value.

This setting is also updated by RMS in waveform header or updated when invoking RMS calculation operation.

This setting can be saved to the header of currently selected waveform by invoking ["Save Setup To Header" on page 1579](#) "Save Setup To Header".

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS
Remote Command	:SOURce:RADio:ARB:RMS <float> :SOURce:RADio:ARB:RMS?
Example	:SOUR:RAD:ARB:HEAD:RMS 0.7 :SOUR:RAD:ARB:HEAD:RMS?
Notes	Valid range is 0 to 1.414, values outside the range will be clipped to the closest boundary. Note this value does not affect "List Sequencer" on page 1584 Source List Sequencer that always uses RMS value resides in each ARB header. If want this value to take effect in list sequencer, use "Save Setup To Header" on page 1579 "Save Setup to Header" to save current RMS value to header first, then play the ARB in source list sequencer.
Dependencies	When a new waveform is selected for playback, this setting is updated by the RMS value defined in associated waveform header file. If selected waveform has no associated header file or header file does not specify RMS value, then instrument will try to calculate out one automatically. Calculating RMS can also update this setting.
Preset	0
Range	0 ~ 1.414
Initial S/W Revision	A.14.50

RMS Calculation Mode

Allows you to specify the mode to calculate the current RMS.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS
Remote Command	:SOURce:RADio:ARB:RMS:CALCulation:MODE AUTO M1 M2 M3 M4 :SOURce:RADio:ARB:RMS:CALCulation:MODE?
Example	:SOUR:RAD:ARB:RMS:CALC:MODE AUTO
Notes	If no waveform is selected, or selected waveform is waveform sequence, the key will grey out.
Preset	AUTO
Range	AUTO M1 M2 M3 M4
Initial S/W Revision	A.14.50

Auto

RMS will be calculated based on the whole sample range of current selected waveform.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode
Example	:SOUR:RAD:ARB:RMS:CALC:MODE AUTO
Initial S/W Revision	A.14.50

Marker 1

Selects marker 1 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker
Example	:SOUR:RAD:ARB:RMS:CALC:MODE M1
Initial S/W Revision	A.14.50

Marker 2

Selects marker 2 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker
Example	:SOUR:RAD:ARB:RMS:CALC:MODE M2
Initial S/W Revision	A.14.50

Marker 3

Selects marker 3 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker
Example	:SOUR:RAD:ARB:RMS:CALC:MODE M3
Initial S/W Revision	A.14.50

Marker 4

Selects marker 4 to designate sample range used for RMS calculation.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker
Example	:SOUR:RAD:ARB:RMS:CALC:MODE M4
Initial S/W Revision	A.14.50

Calculate RMS

Allows you to calculate current RMS based on mode selected. This will update ["Current RMS" on page 1542](#) Current RMS setting.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS
Remote Command	:SOURce:RADio:ARB:RMS:CALCulate
Example	:SOUR:RAD:ARB:RMS:CALC
Notes	If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”. If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 1542 “RMS Calculation Mode” is set to marker, under this circumstance, invoking calculation operation will get error “-221 Setting conflict; There is no marker for currently selected waveform, auto RMS calculation mode is used instead”, and "RMS Calculation Mode" on page 1542 “RMS Calculation Mode” will be coupled to “Auto” mode automatically. RMS calculation does not suit for waveform sequence. If selected waveform is waveform sequence file, invoking this operation will get error “-221 Setting conflict; RMS calculation does not apply to waveform sequence”. But users can still edit current RMS as play parameter, and can save current RMS to waveform sequence header for later use.
Initial S/W Revision	A.14.50

Use Header RMS

Allows you to quickly set RMS in ARB header to ["Current RMS" on page 1542](#) Current RMS setting.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS,
Notes	No remote command, front panel only. If no waveform is selected, the key will grey out. If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.
Initial S/W Revision	A.14.50

Real-Time AWGN Setup

The source allows you to apply additive white Gaussian noise (AWGN) to a carrier in real time while the modulating waveform plays in the dual ARB player. Pressing this key allows access to the real time AWGN sub-menus and changes the central display area to show the AWGN Setup view.

This feature is controlled by E6650A-AW1 option

Key Path	Source, Modulation Setup, ARB, ARB Setup
Notes	This menu only appears and related SCPIs are only available when E6650A-AW1 option presents.
Initial S/W Revision	A.16.00

Real-Time AWGN

Allows you to enable or disable adding real-time AWGN to the carrier modulated by the waveform currently being played by the dual ARB.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe[:STATe] ON OFF 1 0 :SOURce:RADio:ARB:NOISe[:STATe]?
Example	:SOUR:RAD:ARB:NOIS OFF
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN state is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN state is updated with the value from the header file. The AWGN state will remain unchanged if the newly selected waveform does not have an associated header file.
Couplings	If this setting is On and "ARB" on page 1534 ARB State is On, "RF Power" on page 1499 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 1546 Power Control Mode and other noise settings
Preset	Off
Range	On Off
Initial S/W Revision	A.16.00

Carrier To Noise Ratio

Allows you to specify the carrier to noise ratio (C/N) in dB. The carrier power is defined as the total modulated signal power without noise power added. The noise power is applied over the specified bandwidth of the carrier signal.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:CN <ampl> :SOURce:RADio:ARB:NOISe:CN?
Example	:SOUR:RAD:ARB:NOIS:CN 0.00 dB
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN C/N ratio is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN C/N ratio is updated with the value from the header file. The AWGN C/N ratio will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	0.00 dB
Min	-100.00 dB
Max	100.00 dB
Initial S/W Revision	A.16.00

Carrier Bandwidth

Allows you to specify the bandwidth over which the AWGN is applied. The carrier RMS power and the noise power are integrated over the selected carrier bandwidth for the purpose of calculating carrier to noise ratio (C/N).

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:CBWidth <freq> :SOURce:RADio:ARB:NOISe:CBWidth?
Example	:SOUR:RAD:ARB:NOIS:CBW 1.00 Hz
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file.
Min	1.00 Hz
Max	200.00 MHz
Initial S/W Revision	A.16.00

Noise Bandwidth

Allows you to specify the flat noise bandwidth of the real-time noise for an ARB waveform.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:BANDwidth <freq> :SOURce:RADio:ARB:NOISe:BANDwidth?
Example	:SOUR:RAD:ARB:NOIS:BAND 1.00 Hz
Notes	Generally, flat noise bandwidth should be set slightly wider than the carrier bandwidth (typically 1.6 times wider)
Notes	Max Noise Bandwidth equals $0.8 * \text{Maximum ARB Sample Rate}$ reported in HW capability
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	1.00 Hz
Min	1.00 Hz
Max	160.00 MHz
Initial S/W Revision	A.16.00

Power Control Mode

This setting offers four ways to control the RF output power when adding AWGN to a signal.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup
Remote Command	:SOURce:RADio:ARB:NOISe:POWer:CONTRol[:MODE] TOTal CARRier NOISe NCHannel :SOURce:RADio:ARB:NOISe: POWer:CONTRol[:MODE]?
Example	:SOUR:RAD:ARB:NOIS:POW:CONT NCHannel :SOUR:RAD:ARB:NOIS:POW:CONT?
Preset	TOTal
Range	Total Power Carrier Power Total Noise Power Noise Power in Channel
Initial S/W Revision	A.16.00

Total

Set the power control mode as total power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT TOTAl
Couplings	Set to this value will make Carrier Power Carrier Power, Total Noise Power Total Noise Power, and Channel Noise Power Channel Noise Power buttons invisible on menu. Selecting Total as the power control mode makes the total power and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the total power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the total power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Carrier

Set the power control mode as carrier power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT CARRier
Couplings	Set to this value will make Carrier Power Carrier Power button visible, while Total Noise Power Total Noise Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Carrier as the power control mode makes the carrier power and C/N independent variables while making the total power and total noise power dependent variables. The dependent variables total power and total noise power are set by the carrier power, C/N, and the rest of the Noise settings. The total power and total noise power change as any noise parameter is adjusted to keep the carrier power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Total Noise

Set the power control mode as total noise power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT NOISe
Couplings	Set to this value will make Total Noise Power Total Noise Power button visible, while Carrier Power Carrier Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Total Noise as the power control mode makes the total noise power and C/N independent variables while making the total power and carrier power dependent variables. The dependent variables total power and carrier power are set by the total noise power, C/N, and the rest of the Noise settings. The total power and carrier power change as any noise parameter is adjusted to keep the total noise power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Channel Noise

Set the power control mode as channel noise power.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode
Example	:SOUR:RAD:ARB:NOIS:POW:CONT NCHannel
Couplings	Set to this value will make Channel Noise Power Channel Noise Power button visible, while Total Noise Power Total Noise Power and Carrier Power Carrier Power buttons invisible from menu. Selecting Channel Noise as the power control mode makes the noise power in channel and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the channel noise power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the channel noise power and the C/N at their last specified values.
Initial S/W Revision	A.16.00

Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE CONTInuous SINGLE SADVance :SOURce:RADio:ARB:TRIGger:TYPE?
Example	:SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE?
Notes	Gated trigger type will be implemented at a later release
Preset	CONTInuous
Range	Continuous Single Seg Adv
Initial S/W Revision	A.05.00

Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE] FREE TRIGger RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE]?
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Preset	FREE
Range	Free Run Trigger + Run Reset + Run
Initial S/W Revision	A.05.00

Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Initial S/W Revision	A.05.00

Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG
Initial S/W Revision	A.05.00

Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT RES
Initial S/W Revision	A.05.00

Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:RETRigger ON OFF IMMediate :SOURce:RADio:ARB:RETRigger?
Example	:SOUR:RAD:ARB:RETR OFF
Notes	ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1.
Preset	ON
Range	No Retrigger Buffered Trigger Restart on Trigger
Initial S/W Revision	A.05.00

No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
Example	:SOUR:RAD:ARB:RETR OFF
Initial S/W Revision	A.05.00

Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
Example	:SOUR:RAD:ARB:RETR ON
Initial S/W Revision	A.05.00

Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
Example	:SOUR:RAD:ARB:RETR IMM
Initial S/W Revision	A.05.00

Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE CONTInuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] ?
Example	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
Preset	CONTInuous
Range	Single Continuous
Initial S/W Revision	A.05.00

Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
Example	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
Initial S/W Revision	A.05.00

Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
Example	:SOUR:RAD:ARB:TRIG:TYPE:SADV CONT
Initial S/W Revision	A.05.00

Trigger Source

The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXternal2 :SOURce:RADio:ARB:TRIGger[:SOURce] ?
Example	:SOUR:RAD:ARB:TRIGger KEY
Dependencies	This key is grayed out if the current trigger type is Continuous, Free Run.
Preset	EXternal2
Range	Trigger Key Bus External 2
Initial S/W Revision	A.05.00

Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger KEY
Initial S/W Revision	A.05.00

Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger BUS
Initial S/W Revision	A.05.00

External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger EXT2
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

Key Path	Source, Modulation Setup , ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty.
Initial S/W Revision	A.05.00

Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the

same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
Notes	<string> - specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error. When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated. If you specify a directory over SCPI, but the directory does not exist, an error is generated. If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated. It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated. When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated. If you attempt to delete all files from ARB memory when there are waveform files used in "List

Sequencer" on page 1584 and **"Sequencer" on page 1585** state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as **"Segments on Hard Disk" on page 1610**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform

Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as **"Load Segment To ARB Memory" on page 1610**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as **"Load All To ARB Memory" on page 1611**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as **"Change Directory..." on page 1612**.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as **"Default Directory..." on page 1612**

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 1612](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Initial S/W Revision	Prior to A.09.00

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 1613](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 1613](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 1539](#).

Initial S/W Revision	Prior to A.09.00

Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, SCPI front panel only.
Preset	1
Min	1
Max	65535
Initial S/W Revision	A.05.00

Marker 1

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Delete Segment

Allows you to delete the selected segment from the waveform sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Save Sequence...

Pressing this key displays the “Save As” dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Initial S/W Revision	A.05.00

Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in "Build New Sequence" on page 1553.

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) "NVWFM" or use a real full path representation. See the example below. MSUS "NVWFM" is mapped to D: VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

Remote Command	<pre>:SOURce:RADio:ARB:SEquence[:MWAVeform] <filename>, <waveform1>, <reps>, NONE M1 M2 M3 M4 M1M2 M1M3 M1M4 M2M3 M2M4 M3M4 M1M2M3 M1M2M4 M1M3M4 M2M3M4 M1M2M3M4 ALL, {<waveform2>, <reps>, NONE M1 M2 M3 M4 M1M2 M1M3 M1M4 M2M3 M2M4 M3M4 M1M2M3 M1M2M4 M1M3M4 M2M3M4 M1M2M3M4 ALL, } ...</pre> (For additional description of each item, see Notes below "For Setup SCPI" on page 1562 "For Setup SCPI".) <pre>:SOURce:RADio:ARB:SEquence[:MWAVeform]? <filename></pre> (For additional description of each item, see Notes "For Query SCPI" on page 1563 below.)
Example	For setup: <pre>>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1M3</pre> Or <pre>>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", "D: VARB\wfmSegment1.wfm", 10, M2M3M4, "D: VARB\wfmSegment2.wfm", 20, M1M3</pre> For query, must specify which waveform sequence file to query. <pre>>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"</pre> Or <pre>>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",</pre>

Notes	For Setup SCPI For the Setup SCPI command, the parameters are: <filename> - String Type This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example. <waveform1> - String Type This variable specifies the path and name of the first existing waveform segment. The path supports

MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE – This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 – these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL – This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not “.seq”, error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

>:SOUR:RAD:ARB:SEQ? “NVWFM:testSeq1.seq”,

<“wfmSegment1.wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3”,

Error Checks for Query SCPI command:

	If you do not specify a filename, an error is generated. If the waveform sequence file name is empty, an error is generated. If the specified waveform sequence file cannot be found, an error is generated.
Initial S/W Revision	A.05.00

Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Waveform Utilities

Allows you access to the waveform utilities sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. "Left" module for E6630A or "TRX1" module for E6640A.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities
Dependencies	This key is only available if there is at least one Multi-pack license installed on the instrument.
Initial S/W Revision	A.05.00

Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if there is at least one slot available within at least one multi-pack license.
Initial S/W Revision	A.05.00

Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
Remote Command	:SYSTem:LKEY:WAVEform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVEform:ADD <string>
Example	SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm"
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVEform:ADD is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. .
Dependencies	This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable.
Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
Notes	<string> - specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error. When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated. If you specify a directory over SCPI, but the directory does not exist, an error is generated. If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles"

	:SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1611](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as ["Change Directory..." on page 1612](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as ["Default Directory..." on page 1612](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive

Initial S/W Revision	Prior to A.09.00

Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision	A.05.00

Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Remote Command	:SYSTem:LKEY:WAVeform:REPLace <int>, <string> or :SYSTem:LIcense[:FPACK]:WAVeform:REPLace <int>, <string>
Example	SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" or :SYST:LIC:WAV:REPL 1, "myotherwaveform.wfm"
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Keysight signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.
Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1610](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1611](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as ["Change Directory..." on page 1612](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as ["Default Directory..." on page 1612](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Remote Command	<code>:SYSTem:LKEY:WAVeform:CLEar <int></code> or <code>:SYSTem:LICense[:FPack]:WAVeform:CLEar <int></code>
Example	<code>SYST:LKEY:WAV:CLE 1</code> or <code>:SYST:LIC:WAV:CLE 1</code>
Notes	The second SCPI <code>:SYSTem:LICense[:FPack]:WAVeform:CLEar</code> is provided to be consistent with the style of Keysight signal sources. You can use either one of them.

Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

Dependencies	This key is only available if the currently selected slot is in the trial state.

Initial S/W Revision	A.05.00

Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses

Remote Command	:SYSTem:LKEY:WAVEform:LOCK <int> or :SYSTem:LICense[:FPACK]:WAVEform:LOCK <int>

Example	SYST:LKEY:WAV:LOCK 1 or SYST:LIC:WAV:LOCK 1

Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVEform:LOCK is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

Dependencies	This key is only available if the currently selected slot is in the trial state or the lock required state.

Initial S/W Revision	A.05.00

Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

Remote Command	:SYSTem:LKEY:WAVEform:STATus? <int> or :SYSTem:LICense[:FPACK]:WAVEform:STATus? <int>

Example	:SYST:LKEY:WAV:STAT? 1 <"Locked" or :SYST:LIC:WAV:STAT? 1 <"Locked"

Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVEform:STATus is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

	error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.
Range	"Locked" "Available" "Trail" "LockRequired" "Nonexistent"
Initial S/W Revision	A.05.00

Slots Free Query (Remote Command Only)

Returns the number of license slots free.

Remote Command	:SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LIcense[:FPACK]:WAVeform:FREE?
Example	:SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE?
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Initial S/W Revision	A.05.00

Slot Used Query (Remote Command Only)

Returns the number of license slots used.

Remote Command	:SYSTem:LKEY:WAVeform:USED? or :SYSTem:LIcense[:FPACK]:WAVeform:USED?
Example	:SYST:LKEY:WAV:USED? or :SYST:LIC:WAV:USED?
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Initial S/W Revision	A.05.00

Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

Remote Command	:SYSTem:LKEY:WAVeform:NAME? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int>

Example	:SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm" or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then empty string is returned.
Initial S/W Revision	A.12.00

Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

Remote Command	:SYSTem:LKEY:WAVeform:UID? <int> or :SYSTem:LICense[:FPACK]:WAVeform:UID? <int>
Example	:SYST:LKEY:WAV:UID? 2 <"1346752140" or :SYST:LIC:WAV:UID? 2 <"1346752140"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then "0" is returned
Initial S/W Revision	A.12.00

Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

Remote Command	:SOURce:RADio:ARB:MPLicensed:NAME:LOCKed?
Example	SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm"
Initial S/W Revision	A.11.00

Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

Remote Command	:SOURce:RADio:ARB:MPLicensed:UID:LOCKed?
Example	SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136","3812603511","3710986266"
Notes	Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list
Initial S/W Revision	A.11.00

Marker Utilities

Allows access to the marker utilities sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

Key Path	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

Mkr 1 Polarity

Allows you to set the polarity of marker 1.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1?
Example	:SOUR:RAD:ARB:MPOL:MARK1 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Mkr 2 Polarity

Allows you to set the polarity of marker 2.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2?
Example	:SOUR:RAD:ARB:MPOL:MARK2 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Mkr 3 Polarity

Allows you to set the polarity of marker 3.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3?
Example	:SOUR:RAD:ARB:MPOL:MARK3 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Mkr 4 Polarity

Allows you to set the polarity of marker 4.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4?

Example	:SOUR:RAD:ARB:MPOL:MARK4 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg Pos
Initial S/W Revision	A.05.00

Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

Key Path	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting marker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
Remote Command	:SOURce:RADio:ARB:MDEStination:PULSe NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:PULSe?
Example	:SOUR:RAD:ARB:MDES:PULS NONE
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range	None M1 M2 M3 M4
Initial S/W Revision	A.05.00

None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision	A.05.00

Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision	A.05.00

Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision	A.05.00

Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
Example	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
Remote Command	:SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold?
Example	:SOUR:RAD:ARB:MDES:ALCH NONE
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range	None M1 M2 M3 M4
Initial S/W Revision	A.05.00

None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision	A.05.00

Marker 1

Sets marker 1 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision	A.05.00

Marker 2

Sets marker 2 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision	A.05.00

Marker 3

Sets marker 3 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

Marker 4

Sets marker 4 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
Example	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

Key Path	Source, Modulation Setup, ARB, Header Utilities
Remote Command	:SOURce:RADio:ARB:HEADer:CLEar
Example	:SOUR:RAD:ARB:HEAD:CLE
Notes	Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error.
Initial S/W Revision	A.05.00

Save Setup To Header

Allows you to save new file header information details to the file.

Key Path	Source, Modulation Setup, ARB, Header Utilities
Remote Command	:SOURCE:RADio:ARB:HEADer:SAVE
Example	:SOUR:RAD:ARB:HEAD:SAVE
Notes	Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error.
Initial S/W Revision	A.05.00
Modified at S/W Revision	A.16.00 (AWGN settings will be saved to header as well)

Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

Remote Command	:MMEMory:HEADer:ID? "<file name>"
Example	:MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS)
Notes	SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk. If the file cannot be found in ARB memory or on hard disk, an error is generated and value -1 is returned
Initial S/W Revision	A.09.00

Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

Remote Command	:SOURCE:RADio:ARB:TRIGger:INITiate
Example	:SOUR:RAD:ARB:TRIG:INIT
Initial S/W Revision	A.05.00

AM

Allows access to the menu for configuring the Amplitude Modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, AM
Remote Command	:SOURce:AM:STATe :SOURce:AM:STATe?
Example	:SOUR:AM:STAT OFF
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

AM Depth

Allows you to set the amplitude modulation depth in percent.

Key Path	Source, Modulation Setup, AM
Remote Command	:SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear]?
Example	:SOUR:AM 0.1
Preset	0.1 %
Min	0.1 %
Max	95.0 %
Initial S/W Revision	A.05.00

AM Rate

Allows you to set the internal amplitude modulation rate.

Key Path	Source, Modulation Setup, AM
Remote Command	:SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency?
Example	:SOUR:AM:INT:FREQ 40.0 Hz

Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

FM

Allows access to the menu for configuring the frequency modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, FM
Remote Command	:SOURce:FM:STATe :SOURce:FM:STATe?
Example	:SOUR:FM:STAT OFF
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

FM Deviation

Allows you to set the frequency modulation deviation.

Key Path	Source, Modulation Setup, FM
Remote Command	:SOURce:FM[:DEViation] :SOURce:FM[:DEViation]?
Example	:SOUR:FM 1.00 kHz
Preset	1.00 Hz
Min	1.00 Hz
Max	100.00 kHz
Initial S/W Revision	A.05.00

FM Rate

Allows you to set the internal frequency modulation rate.

Key Path	Source, Modulation Setup, FM
Remote Command	:SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency?
Example	:SOUR:FM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

PM

Allows access to the menu for configuring the phase modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM:STATe :SOURce:PM:STATe?
Example	:SOUR:PM:STAT OFF
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

PM Deviation

Allows you to set the phase modulation deviation.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM[:DEViation] :SOURce:PM[:DEViation]?

Example	:SOUR:PM 1.00 rad
Preset	0.1 rad
Min	0.1 rad
Max	20.0 rad
Initial S/W Revision	A.05.00

PM Rate

Allows you to set the internal phase modulation rate.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency?
Example	:SOUR:PM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a tabular form. The details of the SCPI for configuring the list sequencer can be found in "[Step Configuration \(Remote Command Only\)](#)" on page 1618.

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

Key Path	Source
Initial S/W Revision	A.05.00

Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe] ?
Example	:SOUR:LIST OFF
Notes	When the sequencer is set to ON, the list sequencer controls the output of the source.
Couplings	When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected.
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST:TRIGger[:IMMediate]
Example	:SOUR:LIST:TRIG
Notes	When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " Query List Sequence Initiation Armed Status (Remote Command Only) " on page 1629 Query Source List Sequence Armed Status)
Dependencies	Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled.
Initial S/W Revision	A.05.00

List Sequencer Setup

Allows you access to the list sequencer setup menus.

Key Path	Source, List Sequencer

Number of Steps

Allows you to specify the number of steps within the list sequence.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:NUMBer:STEPs <integer> :SOURce:LIST:NUMBer:STEPs?
Example	:SOUR:LIST:NUMB:STEP 1
Notes	Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps.
Dependencies	The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer.
Preset	1
Min	1
Max	1000
Initial S/W Revision	A.05.00

Current Step

Allows you to select the step number you wish to view or edit.

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only.
Preset	1
Min	1
Max	Step Count
Initial S/W Revision	A.05.00

Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of

1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key.
Initial S/W Revision	A.05.00

Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key
Initial S/W Revision	A.05.00

Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

Key Path	Source, List Sequencer, List Sequencer Setup
Initial S/W Revision	A.05.00

Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE INTERNAL EXTERNAL2 KEY BUS EXTERNAL4 :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger?
Example	:SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Free Run
Range	Free Run Internal Manual (Trigger Key) Bus External 2 EXTERNAL4
Initial S/W Revision	A.05.00

Free Run

Sets the trigger input for the current step to Free Run.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG IMM
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Internal

Sets the trigger input for the current step to Internal.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG INT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG KEY
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG BUS
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

External 2

Sets the trigger input for the current step to External 2.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG EXT2
Notes	SCPI is supported after A.09.40
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

Value Changed	Recommended Transition Time
Frequency	500 μ s
Amplitude	100 μ s to within 0.1 dB 20 μ s to within 1.0 dB

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME?
Example	:SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME?

Notes	SCPI is supported after A.09.40
Preset	1.0 ms
Min	0.0 ms
Max	4.0 ks
Initial S/W Revision	A.05.00

Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
Remote Command	:SOURCE:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND27 BAND28 BAND29 BAND30 BAND31 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BAND44 BANDA BANDB BANDC BANDD BANDE BANDF :SOURCE:LIST:STEP[1] 2 3...1000:SETup: RADio:BAND?
Example	:SOUR:LIST:STEP2:SET:RAD:BAND PGSM :SOUR:LIST:STEP2:SET:RAD:BAND?
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

None

Selects no radio standard for use on the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Example	:SOUR:LIST:STEP2:SET:RAD:BAND NONE
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

P-GSM

Selects P-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

E-GSM

Selects E-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

R-GSM

Selects R-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

DCS 1800

Selects DCS 1800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

PCS 1900

Selects PCS 1900 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 450

Selects GSM 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 480

Selects GSM 480 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 850

Selects GSM 850 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

GSM 700

Selects GSM 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

T-GSM 810

Selects T-GSM 810 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

Band I

Selects Band I as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band II

Selects Band II as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band III

Selects Band III as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band IV

Selects Band IV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band V

Selects Band V as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band VI

Selects Band VI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band VII

Selects Band VII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band VIII

Selects Band VIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band IX

Selects Band IX as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band X

Selects Band X as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XI

Selects Band XI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XII

Selects Band XII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XIII

Selects Band XIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

Band XIV

Selects Band XIV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

US CELL

Selects US Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

US PCS

Selects US PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Japan Cell

Selects Japan Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Korean PCS

Selects Korean PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

NMT 450

Selects NMT 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

IMT 2000

Selects IMT 2000 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Upper 700

Selects Upper 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

Secondary 800

Selects Secondary 800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

400 Euro PAMR

Selects 400 Euro PAMR as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

800 PAMR

Selects 800 PAMR as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

AWS

Selects AWS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

700 Public Safety

Selects 700 Public Safety as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

LTE

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

BAND 1

Selects BAND 1 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 2

Selects BAND 2 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 3

Selects BAND 3 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 4

Selects BAND 4 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 5

Selects BAND 5 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 6

Selects BAND 6 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 7

Selects BAND 7 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 8

Selects BAND 8 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 9

Selects BAND 9 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 10

Selects BAND 10 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 11

Selects BAND 11 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 12

Selects BAND 12 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 13

Selects BAND 13 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 14

Selects BAND 14 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 17

Selects BAND 17 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 18

Selects BAND 18 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 19

Selects BAND 19 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 20

Selects BAND 20 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 21

Selects BAND 21 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 24

Selects BAND 24 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 25

Selects BAND 25 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

BAND 26

Selects BAND 26 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.12.53

BAND 27

Selects BAND 27 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

BAND 28

Selects BAND 28 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

BAND 31

Selects BAND 31 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND 33

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

BAND 34

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

BAND 35

Selects BAND 35 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

BAND 36

Selects BAND 36 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

BAND 37

Selects BAND 37 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

BAND 38

Selects BAND 38 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

BAND 39

Selects BAND 39 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

BAND 40

Selects BAND 40 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

BAND 41

Selects BAND 41 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

BAND 42

Selects BAND 42 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

BAND 43

Selects BAND 43 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
Example	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

BAND 44

Selects BAND 44 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD
Initial S/W Revision	A.14.00

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

BAND A

Selects BAND A as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

BAND B

Selects BAND B as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

BAND C

Selects BAND C as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

BAND D

Selects BAND D as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

BAND E

Selects BAND E as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

BAND F

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
Example	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK?

Example	:SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK?
Notes	SCPI is supported after A.09.40
Preset	DOWN
Range	DOWN UP
Initial S/W Revision	A.05.00

Channel

Allows you to specify the frequency of the current step via a channel number.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency?
Example	:SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	0 (Please refer to for valid ranges.)
Max	10838 (Please refer to for valid ranges.)
Initial S/W Revision	A.05.00

Frequency

Allows you to specify a frequency value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency?
Example	:SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40.

	This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated.
Preset	1.00 GHz
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

Power

Allows you to specify a power value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude?
Example	:SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL?
Notes	SCPI is supported after A.09.40
Notes	Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON.
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Preset	-100 dBm

Min	The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 1499 and the table RF Power Range for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 1499 and the table RF Power Range for the valid ranges.
Initial S/W Revision	A.05.00

Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform <string> :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform?
Example	:SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV?
Notes	SCPI is supported after A.09.40
Remote Command Notes	String type, takes "Off" "CW" "Cont" "waveform name"
Preset	CW
Range	Waveform Continue Previous CW Off
Initial S/W Revision	A.05.00

CW

Sets the current step to output a CW tone.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "CW"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "waveform name"
Notes	SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list

sequence will automatically apply header settings of the selected waveform in that step.

Initial S/W Revision	A.05.00

Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform

Example	:SOUR:LIST:STEP2:SET:WAV "Cont"

Notes	SCPI is supported after A.09.40

Initial S/W Revision	A.05.00

Off

Disable RF output of the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform

Example	:SOUR:LIST:STEP2:SET:WAV "Off"

Notes	SCPI is supported after A.09.40

Initial S/W Revision	A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform

Initial S/W Revision	A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

"NVWFM" (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. "NVWFM" MSUS will be mapped to the

default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD “D: VARB\testwaveform.bin” or :SOUR:RAD:ARB:LOAD “NVWFM:testwaveform.bin”
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error. When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.
Initial S/W Revision	A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
Example	:SOUR:RAD:ARB:LOAD:ALL “D: varb”
Notes	<string> – specifies the directory on the HDD to load the files into ARB memory from. When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a

directory to ARB memory is rejected with an error.

When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.

If you specify a directory over SCPI, but the directory does not exist, an error is generated.

If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision	A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated. It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated. When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 1584 and "Sequencer" on page 1585 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision	A.05.00

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1610](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Initial S/W Revision	Prior to A.09.00

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1610](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1611](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Change Directory ...

This key functions the same as ["Change Directory..." on page 1612](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Default Directory ...

This key functions the same as ["Default Directory..." on page 1612](#)

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 1612](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory
Initial S/W Revision	Prior to A.09.00

Delete Segment From ARB Memory

This key functions the same as "Delete Segment From ARB Mem" on page 1613.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Delete All From ARB Memory

This key functions the same as "Delete All From ARB Memory" on page 1613.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME COUNT CONTInuous CABort :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE?
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE?
Notes	SCPI is supported after A.09.40
Notes	If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query Error! Reference source not found. Source Sweeping Condition Message to find out if the current list sequence is complete or not.
Range	Time Play Count Continuous Continuous Abort
Initial S/W Revision	A.05.00

Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found.** List Sequence Step Validation.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration, Time
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOunt <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOunt?
Example	:SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO?
Notes	SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #"
Notes	If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not.
Preset	1.00 ms
Min	100 μ s
Max	1800 s
Initial S/W Revision	A.05.00

Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE COUN
Notes	SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform.
Initial S/W Revision	A.05.00

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE CONT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select “On”, trigger event will occur on both Internal and External2 paths. Select “Off” will turn off trigger output.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON OFF 1 0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger
Example	:SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Off

Range	On Off
Initial S/W Revision	A.05.00

Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMEDIATE INTERNAL KEY BUS EXTERNAL2, <time>, NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF, DOWN UP, <freq>, <ampl>, <string>, TIME COUNT CONTinuous, <time>, ON OFF 1 0, [<int>], :SOURce:LIST:STEP[1] 2 ... 4..1000:SETup?</pre>
Example	:SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM_Test1.bin", TIME, 10ms, OFF, 255
Notes	The parameters are: (There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.) 1. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 1587. 2. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 1589. 3. Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 1590. 4. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 1606. 5. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 1607 and "Frequency" on page 1607. 6. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 1608. 7. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The

options for specifying these are:

<filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.

CONT - continues playback of the ARB file from the previous step

CW - outputs a CW tone

OFF - disable RF output

8. Step Duration <enum> - specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see ["Step Duration" on page 1615](#).

9. Time or Count <time/int> - specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, ["Time" on page 1615](#) and ["Play Count" on page 1616](#).

10. Output Trigger <Boolean> - specifies the output trigger for the step. For details of the ranges for this setting see ["Output Trigger" on page 1617](#).

Dependencies	The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 . If you attempt to remotely set or query a subopcode that is out of range, an error is generated.
Initial S/W Revision	A.05.00

Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Step Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:INPut:TRIGger?
Example	:SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG?
Notes	The command is to setup below parameter array of whole list sequence. Step Trigger <enum> - specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 1587 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes	IMMediate INTernal KEY BUS EXTernal2
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 1586 Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:TRANSition:TIME <time>, <time>, <time>, ... :SOURce:LIST:SETup:TRANSition:TIME?
Example	:SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms :SOUR:LIST:SET:TRAN:TIME?
Notes	The command is to setup below parameter array of whole list sequence. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 1589 If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586.
Initial S/W Revision	A.09.40

Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 1586 Number of Steps. As a step is setup, the value entered run through several levels of validation.

R e m o t e C o m m a n d	:SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND?
E x a m p l	:SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM :SOUR:LIST:SET:RAD:BAND?

e

N The command is to setup below parameter array of whole list sequence.

o Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see ["Radio Setup" on page 1590](#).

t If input parameter number exceeds the step number defined by ["Number of Steps" on page 1586](#) Number of Steps then
e generate error ", and only those parametes whose index number falls in number of steps will be updated.
s

R NONE|PGSM|EGSM|RGSM|DCS1800|PCS1900|TGSM810|GSM450|GSM480|GSM700|GSM850|BANDI|BANDII|BANDIII|BANDI
e V|BANDV|BANDVI|BANDVII|BANDVIII|BANDIX|BANDX|BANDXI|BANDXII|BANDXIII|BANDXIV|BANDXIX|USCELL|USPCS|JAPAN|KO
m REAN|NMT|IMT2K|UPPER|SECOND|PAMR400|PAMR800|IMTEXT|PCS1DOT9G|AWS|US2DOT5G|PUBLIC|LOWER|NONE|BAND1|
o BAND2|BAND3|BAND4|BAND5|BAND6|BAND7|BAND8|BAND10|BAND11|BAND12|BAND13|BAND14|BAND17|BAND18|BAND1
t 9|BAND20|BAND21|BAND24|BAND25|BAND26|BAND33|BAND34|BAND35|BAND36|BAND37|BAND38|BAND39|BAND40|BAN
e D41|BAND42|BAND43|BANDA|BANDB|BANDC|BANDD|BANDE|BANDF

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D The range is 1 to 1000 which is determined by the number of steps you have configured. For details see ["Number of Steps" on
e page 1586](#).

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Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK?
Example	:SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK?
Notes	The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 1606 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes	DOWN UP
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:CNFRequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFRequency?
Example	:SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR?

Notes	The command is to setup below parameter array of whole list sequence. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 1607 and "Frequency" on page 1607 This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?</pre>
Example	<pre>:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?</pre>
Notes	The command is to setup below parameter array of whole list sequence. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 1608. If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	<pre>:SOURce:LIST:SETup:WAVEform <string>, <string>, <string>, ...</pre>

	:SOURce:LIST:SETup:WAVeform?
Example	:SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV?
Notes	The command is to setup below parameter array of whole list sequence. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are: <filename> – plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it is does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated. CONT – continues playback of the ARB file from the previous step CW – outputs a CW tone OFF – disable RF output If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586.
Range	"filename" "CW" "Off" "CONT"
Initial S/W Revision	A.09.40

Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 1586 Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:DURation:TYPE <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:DURation:TYPE?
Example	:SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE?
Notes	The command is to setup below parameter array of whole list sequence. Step Duration <enum> – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 1615. If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes	TIME COUNT CONTinuous
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details

	see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure “Duration Time” or “Play Count” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:TOCount <time/int>, <time/int>, <time/int>, ... :SOURce:LIST:SETup:TOCount?
Example	:SOUR:LIST:SET:TOC 1s,2s,3s :SOUR:LIST:SET:TOC? :SOUR:LIST:SET:TOC 5,6,7 :SOUR:LIST:SET:TOC?
Notes	The command is to setup below parameter array of whole list sequence. Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "Time" on page 1615 and "Play Count" on page 1616 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. If current "Step Duration" on page 1615 is “Continuous”, then generate error -221,"Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Output Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1586](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command	:SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ... :SOURce:LIST:SETup:OUTPut:TRIGger ?
Example	:SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON :SOUR:LIST:SET:OUTP:TRIG?
Notes	The command is to setup below parameter array of whole list sequence. Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see "Output Trigger" on page 1617 . If input parameter number exceeds the step number defined by "Number of Steps" on page 1586 Number of Steps then generate error ", and only those parametes whose index number falls in

	legal step number will be updated.
Remote Command Notes	ON OFF 1 0
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1586 .
Initial S/W Revision	A.09.40

Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI feature described in.

Remote Command	:SOURce:LIST:SETup:CLear
Example	:SOUR:LIST:SETup:CLE
Initial S/W Revision	A.05.00

Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST:TRIGgerout:TYPE BEGinningofstep DATamarker
Example	:SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP?
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer
Preset	BEGinningofstep
Range	BEGinningofstep DATamarker
Initial S/W Revision	A.14.00

BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type
Example	:SOUR:LIST:TRIG:TYP BEG
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP

Initial S/W Revision	A.14.00

DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

Key Path	Source, List Sequencer, Trigger Type
Example	:SOUR:LIST:TRIG:TYP DAT
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE MARKer
Initial S/W Revision	A.14.00

Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M1
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1
Initial S/W Revision	A.14.00

Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M2
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2
Initial S/W Revision	A.14.00

Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M3
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3
Initial S/W Revision	A.14.00

Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
Example	:SOUR:LIST:TRIG:TYPE:MARK M4
Notes	SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4
Initial S/W Revision	A.14.00

Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

Key Path	Source, List Sequencer
Remote Command	No remote command, front panel only.
Initial S/W Revision	A.05.00

Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to “Bus”. Sending this command will trigger the step and continue the sequence.

Remote Command	:SOURce:LIST:TRIGger:INITiate[:IMMediate]
Example	:SOUR:LIST:TRIG:INIT
Initial S/W Revision	A.05.00

Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

Remote Command	:SOURce:LIST:INITiation:ARMed?
Example	:SOUR:LIST:INIT:ARMed?
Notes	The return data is in the following format: Integer
Notes	Query only SCPI. Returning “1” if list sequence has been initiated successfully, returning “0” if not. Once get “0”, you can use :SYST:ERR? to query what error happened. Just like “*OPC?”, this command can be blocked until event/status “IsSourceSweeping” happens, and then returns. Doing so can help user’s script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI “:SOUR:LIST:TRIGger[:IMMediate]” (see "Initiate Sequence" on page 1585 Initiate Sequence), the right usage of this command is to use it after “:SOUR:LIST:TRIG”. If not, this command will return “1” immediately.
Notes	There is an alias SCPI “:SOURce:LIST:TRIGger:INITiation:ARMed?”.
Initial S/W Revision	A.09.40

Source Preset

Allows you to preset the source settings to their default values.

Key Path	Source
Remote Command	:SOURce:PRESet
Example	:SOUR:PRES

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Ref Value

Enables you to set the display X reference value.

Key Path	SPAN X Scale
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time> :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel?
Example	DISP:TXP:VIEW:WIND:TRAC:X:RLEV 1s DISP:TXP:VIEW:WIND:TRAC:X:RLEV?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	If the X Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, X Auto Scaling automatically changes to Off.
Preset	0 s
State Saved	Saved in instrument state.
Min	-10.0 s
Max	10.00 s
Initial S/W Revision	Prior to A.02.00

Scale/Div

Enables you to set the display X scale/division value.

Key Path	SPAN X Scale
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time> :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision?
Example	DISP:TXP:VIEW:WIND:TRAC:X:PDIV 1ms DISP:TXP:VIEW:WIND:TRAC:X:PDIV?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	If the X Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, X Auto Scaling automatically changes to Off.

Preset	64.0 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Initial S/W Revision	Prior to A.02.00

Ref Position

Enables you to set the display X reference position to Left, Center or Right.

Key Path	SPAN X Scale
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT CENTER RIGHT :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition?
Example	DISP:TXP:VIEW:WIND:TRAC:X:RPOS LEFT DISP:TXP:VIEW:WIND:TRAC:X:RPOS?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left Ctr Right
Initial S/W Revision	Prior to A.02.00

Auto Scaling

Enables you to toggle the X auto scaling function between On and Off.

Key Path	SPAN X Scale
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle 0 1 OFF ON :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle?
Example	DISP:TXP:VIEW:WIND:TRAC:X:COUP OFF DISP:TXP:VIEW:WIND:TRAC:X:COUP?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Upon pressing the Restart front-panel key, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either X Rel Value or X Scale/Div manually, X Auto Scaling

	automatically changes to Off.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Sweep/Control

Accesses a menu of functions that enable you to set up and control the sweep for the current measurement. For details about this key, see ["Sweep/Control" on page 1347](#).

Key Path	Front-panel key
Mode	SA, EDGE/GSM, TDSCDMA
Initial S/W Revision	Prior to A.02.00

Sweep Time (for GSM mode)

Sets the number of slots which are used in each data acquisition. Each slot is approximately to 600 s.

Key Path	Sweep/Control
Mode	GSM
Remote Command	[:SENSe] :TXPower:SWEep:TIME <integer> [:SENSe] :TXPower:SWEep:TIME?
Example	TXP:SWE:TIME 4 TXP:SWE:TIME?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	50
Initial S/W Revision	Prior to A.02.00

Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing **Restart**, **Single** or **Cont** does a Resume.

Key Path	Sweep/Control
Remote Command	:INITiate:PAUSE
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

Key Path	Sweep/Control
Remote Command	:INITiate:RESume
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

Abort (Remote Command Only)

This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state. If the analyzer is in the process of aligning when ABORt is sent, the alignment finishes before the abort function is performed. So ABORt does not abort an alignment.

If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is set for Single measurement, it remains in the "idle" state until an :INIT:IMM command is received.

Remote Command	:ABORt
Example	:ABOR
Notes	If :INITiate:CONTInuous is ON, then a new continuous measurement will start immediately, with sweep (data acquisition) occurring once the trigger condition has been met. If :INITiate:CONTInuous is OFF, then :INITiate:IMMediate is used to start a single measurement; with sweep (data acquisition) occurring once the trigger condition has been met.
Dependencies	For continuous measurement, ABORt is equivalent to the Restart key. Not all measurements support the abort command.
Status Bits/OPC dependencies	The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUESTionable register bit 9 (INTEgrity sum) is cleared. Since all the bits that feed into OPC are cleared by the ABORt, the ABORt will cause the *OPC query to return true.
Initial S/W Revision	Prior to A.02.00

System

See "System" on page 162

Trace/Detector

Accesses a menu of functions that enable you to control the detectors for the current measurement.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Max Hold Trace

This key enables you to select visible/invisible Max Hold Trace.

Key Path	Trace/Detector
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe] ON OFF 1 0 :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe]?
Example	:DISP:TXP:VIEW:WIND:TRAC:MAXH ON :DISP:TXP:VIEW:WIND:TRAC:MAXH?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Selecting [:SENSe]:TXPower:AVERage:TYPE MAXimum forces this parameter to ON.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Min Hold Trace

This key enables you to select visible/invisible Min Hold Trace.

Key Path	Trace/Detector
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe] ON OFF 1 0 :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe]?
Example	:DISP:TXP:VIEW:WIND:TRAC:MINH ON :DISP:TXP:VIEW:WIND:TRAC:MINH?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Selecting [:SENSe]:TXPower:AVERage:TYPE MINimum forces this parameter to ON.

Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Trigger

See ["Trigger" on page 218](#)

Free Run

See ["Free Run " on page 225](#)

Video

See ["Video \(IF Envelope\) " on page 226](#)

Trigger Level

See [___ on page X](#)

Trig Slope

See [___ on page X](#)

Trig Delay

See [___ on page X](#)

External 1

See ["External 1 " on page 226](#)

Trigger Level

See ["Trigger Level " on page 227](#)

Trig Slope

See ["Trig Slope " on page 227](#)

Trig Delay

See ["Trig Delay " on page 228](#)

Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off" on page 229](#)

External 2

See ["External 2 " on page 229](#)

Trigger Level

See [___ on page X](#)

Trig Slope

See [___ on page X](#)

Trig Delay

See [___ on page X](#)

Zero Span Delay Comp

See [___ on page X](#)

RF Burst

See "RF Burst " on page 230

Absolute Trigger

See [___ on page X](#)

Relative Trigger

See [___ on page X](#)

Trig Slope

See [___ on page X](#)

Trig Delay

See [___ on page X](#)

Periodic Timer

See [___ on page X](#)

Period

See [___ on page X](#)

Offset

See [___ on page X](#)

Offset Adjust (Remote Command Only)

See [___ on page X](#)

Reset Offset Display

See [___ on page X](#)

Sync Source

See [___ on page X](#)

Off

See [___ on page X](#)

External 1

See ["External 1 " on page 226](#)

Trigger Level

See ["Trigger Level " on page 227](#)

Trig Slope

See ["Trig Slope " on page 227](#)

External 2

See ["External 2 " on page 229](#)

Trigger Level

See [___ on page X](#)

Trig Slope

See [___ on page X](#)

RF Burst

See ["RF Burst " on page 230](#)

Absolute Trigger

See [___ on page X](#)

Trig Slope

See [___ on page X](#)

Trig Delay

See [___ on page X](#)

Auto/Holdoff

See [___ on page X](#)

Auto Trig

See [___ on page X](#)

Trig Holdoff

See [___ on page X](#)

Holdoff Type

See [___ on page X](#)

User Preset

Accesses a menu that gives you the following three choices:

- **User Preset** – recalls a state previously saved using the Save User Preset function.
- **User Preset All Modes** – presets all of the modes in the analyzer
- **Save User Preset**– saves the current state for the current mode

Key Path	Front-panel key
Backwards Compatibility Notes	User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data. In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users. On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode. User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.
Initial S/W Revision	Prior to A.02.00

User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, `SYST:PRESET:USER:SAV`. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER
Example	:SYST:PRES:USER:SAVE:SYST:PRES:USER
Notes	:SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed
Couplings	A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.
Initial S/W Revision	Prior to A.02.00

User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

NOTE

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER:ALL
Example	:SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL
Notes	Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state.
Couplings	A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.

Initial S/W Revision	Prior to A.02.00

Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER:SAVE
Example	:SYST:PRES:USER:SAVE
Notes	:SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM: STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file.
Initial S/W Revision	Prior to A.02.00

View/Display

The View/Display key opens up the View menu for the current measurement. The views that are available are specific to the current measurement selected under the **Meas** key. Many of the lower-level menu keys are also the same across all measurements. Unique functions are described below.

This measurement has one view, which consists of two windows.

- "RF Envelope view for TX Power Measurement(Above Threshold)" on page 1644
- "RF Envelope view with Bar Graph for TX Power Measurement (Measured Burst Width)" on page 1645
- "RF Envelope view with Bar Graph for TX Power Measurement (Single TimeSlot)" on page 1646

RF Envelope view for TX Power Measurement(Above Threshold)

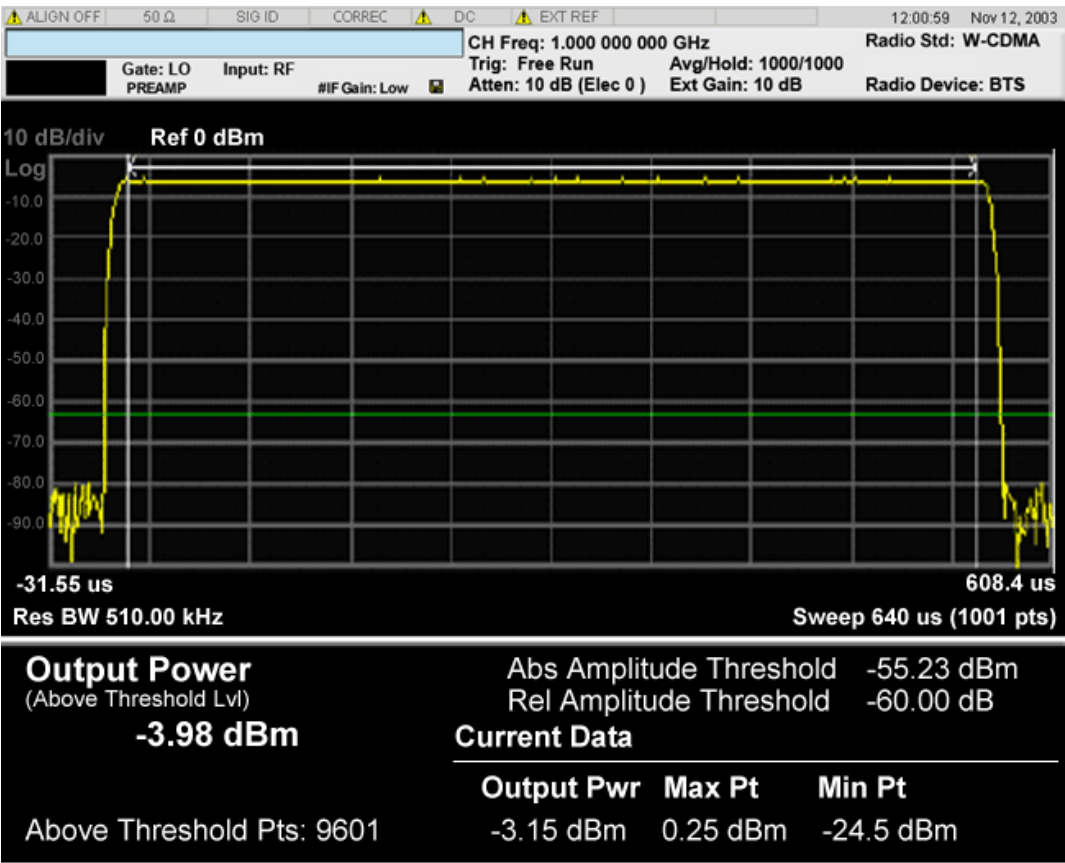


Figure 0-1 RF Envelope view for TX Power Measurement(Above Threshold)

RF Envelope view with Bar Graph for TX Power Measurement (Measured Burst Width)

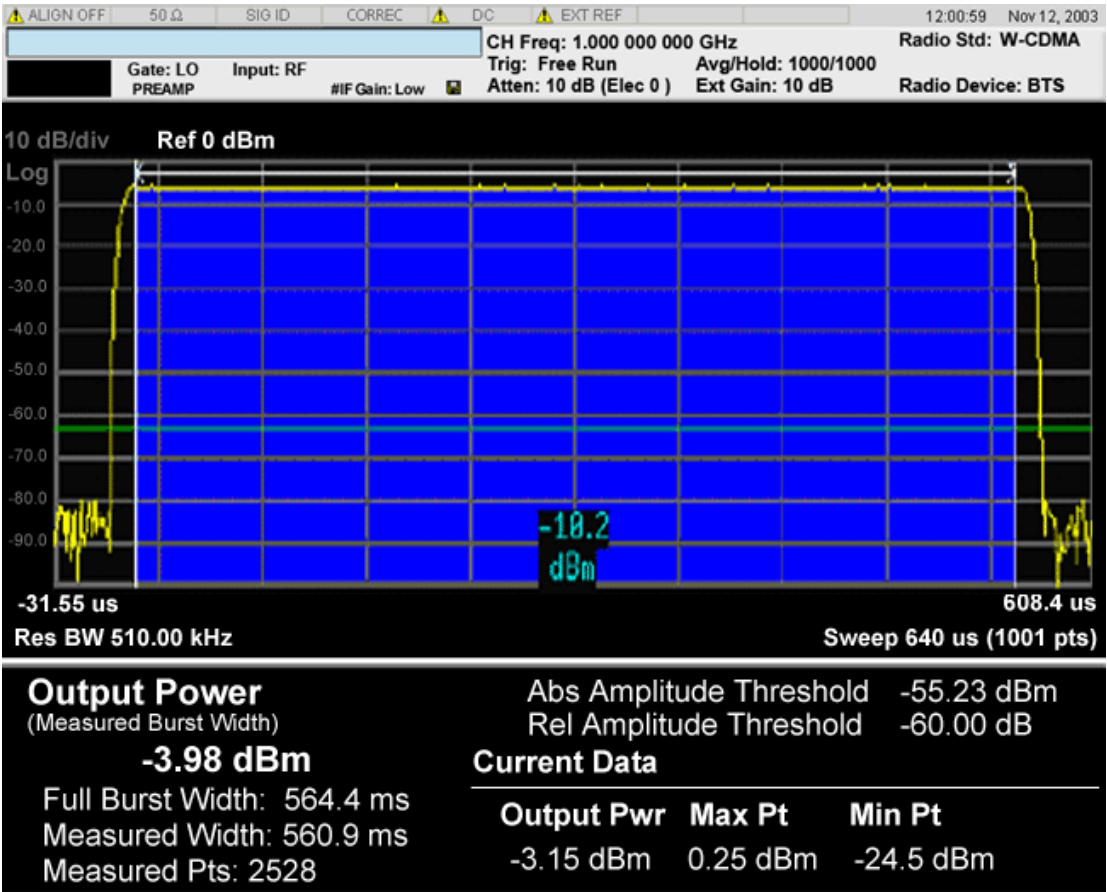


Figure 0-2 RF Envelope view with Bar Graph for TX Power Measurement (Measured Burst Width)

RF Envelope view with Bar Graph for TX Power Measurement (Single TimeSlot)

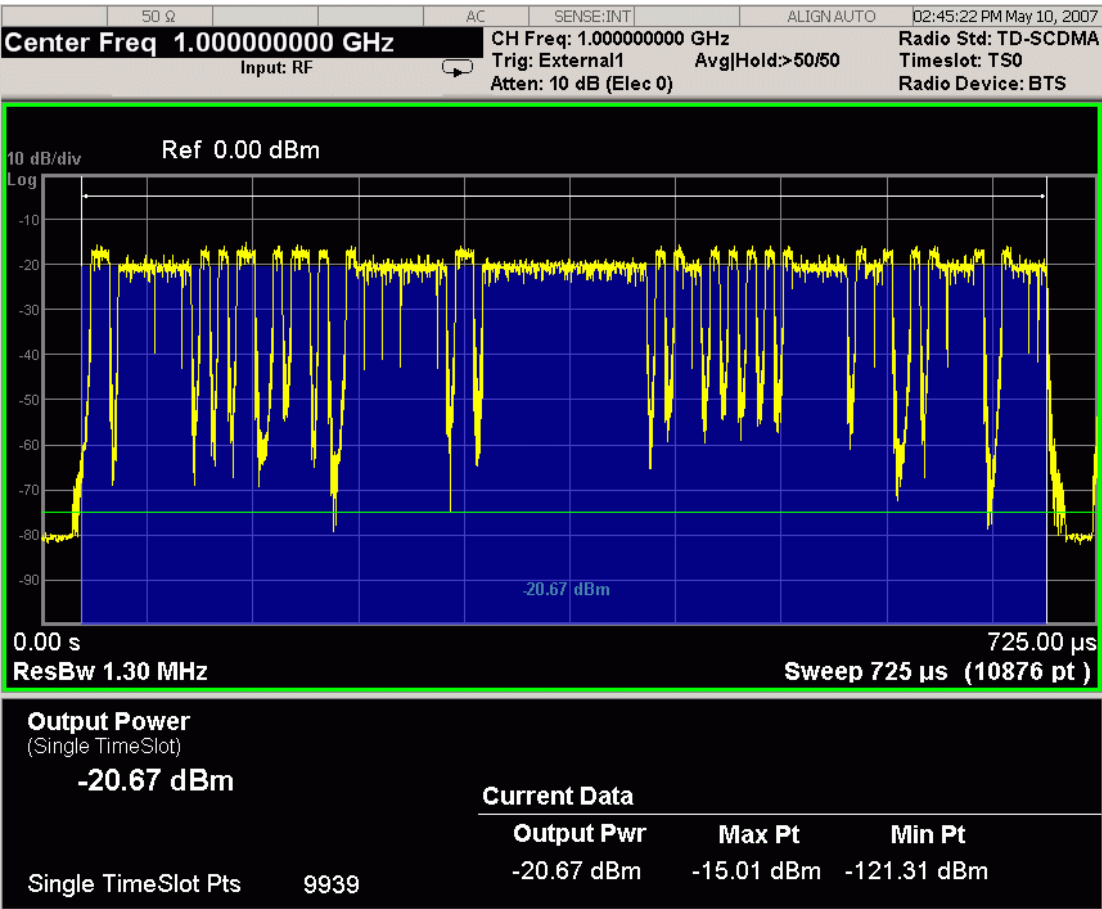


Figure 0-3 RF Envelope view with Bar Graph for TX Power Measurement (Single TimeSlot)

The bar graph represents the measured portion of the trace. It is the blue bar in the second figure. Its state (On/Off) is controlled by the **Bar Graph** key under the View/Display key.

RF Envelope window

Marker Operation	Yes
Corresponding Trace	Corrected measured trace (n=2,3,4)

Metrics window

Name	Corresponding Results	Display Format
Mean Transmit Power	n=1 3rd	99.99 dBm
Above Threshold or Measured Burst Width	Power Value above the threshold or measured burst width for N averages, if averaging is on. An average consists of N acquisitions of data which represents the current trace. If averaging is off, the value of power averaged is the same as the Mean Transmit Power of Current Data.	

Name	Corresponding Results	Display Format
Full Burst Width	n=1 9th Burst width that is determined by the Threshold Lvl.	999.9 us
Measured Width	n=1 10th Time length that is used to calculate Mean Transmit Power when Meas Method is Measured Burst Width. If Meas Method is set to Above Threshold, disappear from the window.	999.9 us
Above Thresh Pts	n=1 6th Number of points that were above the threshold level and were used for the power calculation when Meas Method is Above Threshold Level.	9999
Thresh Pts	N=1 6th Number of points that were used for the power calculation when Meas Method is Measured Burst Width.	9999
Abs Amplitude Threshold	n=1 5th Threshold value is the threshold (in dBm) above which the power is calculated.	99.99 dBm
Rel Amplitude Threshold	Threshold (in dB) relative to the peak carrier level above which the power is calculated	99.99 dB
Mean Transmit power (Current data)	n=1 2nd Power value above the threshold or measured burst width. If averaging is on, the power is for the latest acquisition.	99.99 dBm
Max Pt	n=1 7th Maximum peak level of the most recently acquired trace data.	99.99 dBm
Min Pt	n=1 8th Minimum peak level of the most recently acquired trace data.	99.99 dBm

Key Path	Front-panel key
Mode	SA, EDGE/GSM, TDSCDMA
Initial S/W Revision	Prior to A.02.00

Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the **System Display Settings** key apply to all measurements in all modes.

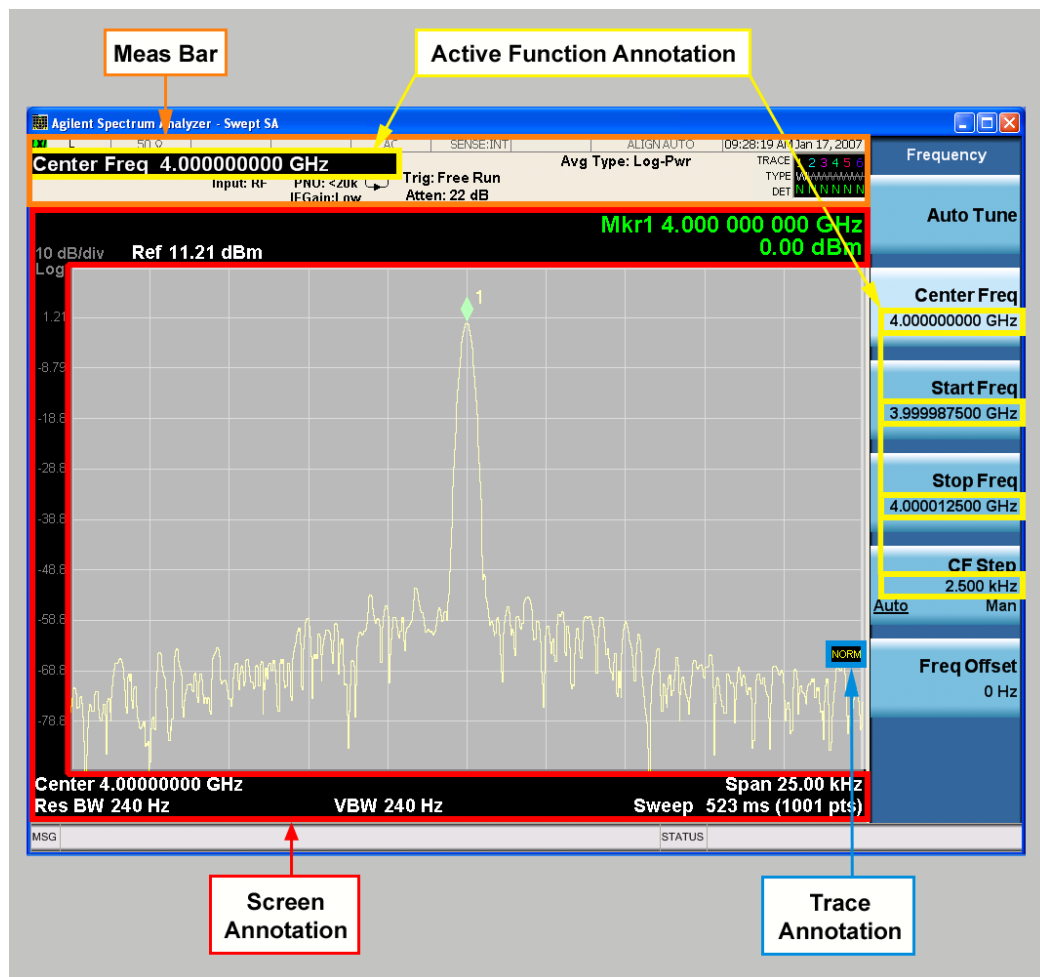
Key Path	Display
Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.



Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ANNotation:MBAR[:STATe] OFF ON 0 1 :DISPlay:ANNotation:MBAR[:STATe]?
Example	DISP:ANN:MBAR OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off.
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Screen

This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

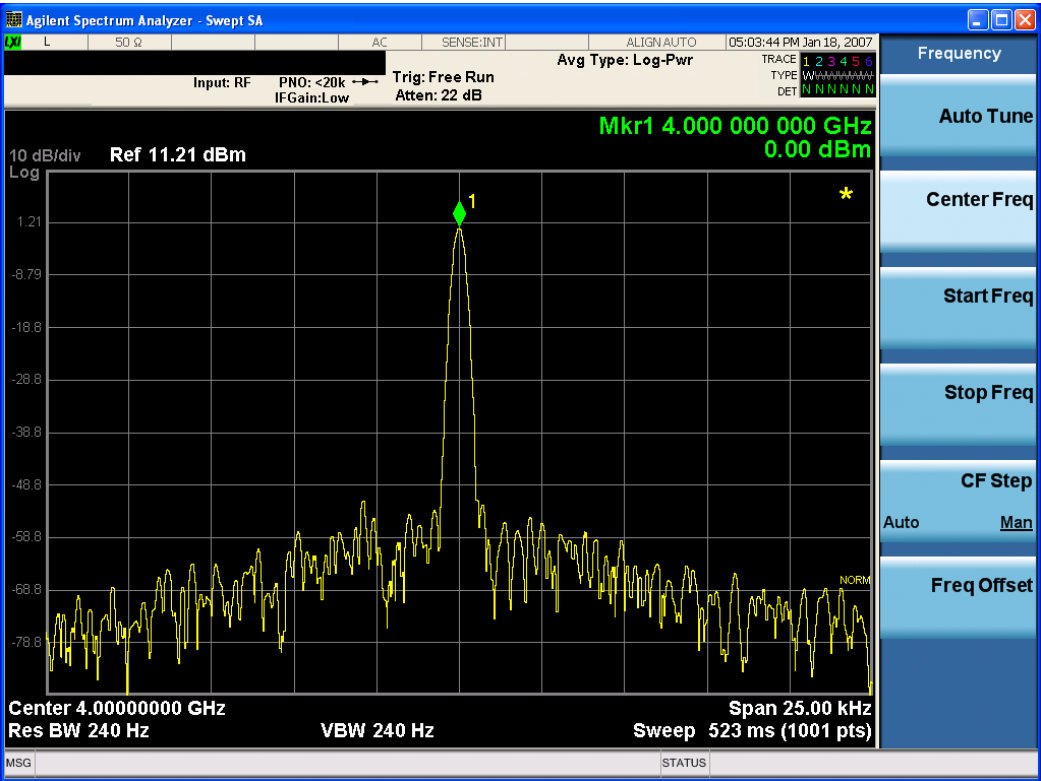
Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1 :DISPlay:ANNotation:SCReen[:STATe]?
Example	DISP:ANN:SCR OFF
Dependencies	Grayed-out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

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View/Display

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature..



Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ACTivefunc[:STATe] ON OFF 1 0 :DISPlay:ACTivefunc[:STATe] ?
Example	DISP:ACT OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Title

Displays menu keys that enable you to change or clear a title on your display.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press Change Title to enter a new title through the alpha editor. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press **Change Title** again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing **Title**, **Clear Title**.

NOTE

Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

Key Path	View/Display, Display, Title
Mode	All
Remote Command	:DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA?
Example	DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title
Notes	Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters.
Preset	No title (measurement name instead)
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Clear Title

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

Key Path	View/Display, Display, Title
Example	The following commands clear the title and restore the measurement's original title: DISP:ANN:TITL:DATA "" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "" This example is for ACP; in measurements other than Swept SA the measurement name is required.

Notes	Uses the :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> command with an empty string (in the Swept SA, the <measurement> is omitted).
Preset	Performed on Preset.
Initial S/W Revision	Prior to A.02.00

Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

Key Path	View/Display, Display
Remote Command	:DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1 :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]?
Example	DISP:WIND:TRAC:GRAT:GRID OFF
Notes	The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis.
Preset	On
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by **Restore Misc Defaults** or **Restore System Defaults** under System.

Key Path	View/Display, Display
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Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is **All Off**, it forces **ScreenAnnotation, Meas Bar, Trace, and Active Function Values** settings to be **OFF** for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is **All Off**, the **Screen, Meas Bar, Trace, and Active Function Values** keys under the **Display, Annotation** menu are grayed out and forced to **Off**. When **Local Settings** is selected, you are able to set the local annotation settings on a measurement by measurement basis.

Key Path	View/Display, Display, System Display Settings
Remote Command	:DISPlay:WINDow[1]:ANNotation[:ALL] OFF ON 0 1

	:DISPlay:WINDow[1]:ANNotation[:ALL]?
Example	:DISP:WIND:ANN OFF
Preset	On (Set by Restore Misc Defaults)
State Saved	Not saved in instrument state.
Backwards Compatibility Notes	The WINDow parameter and optional subopcode is included for backwards compatibility but ignored – all windows are equally affected.
Initial S/W Revision	Prior to A.02.00

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

Key Path	Save, Screen Image
Remote Command	:MMEMory:STORe:SCReen:THEMe TDColor TDMonochrome FCoLoR FMONochrome :MMEMory:STORe:SCReen:THEMe?
Example	:MMEM:STOR:SCR:THEM TDM
Preset	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
Readback	3D Color 3D Mono Flat Color Flat Mono
Backwards Compatibility Notes	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
Initial S/W Revision	Prior to A.02.00

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDC
Readback	3D Color
Initial S/W Revision	Prior to A.02.00

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDM
Readback	3D Mono
Initial S/W Revision	Prior to A.02.00

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

Bar Graph

Enables you to select visible/invisible Bar Graph.

Key Path	View/Display
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:BARGraph[:STATe] ON OFF 1 0 :DISPlay:TXPower:BARGraph[:STATe]?
Example	DISP:TXP:BARG ON DISP:TXP:BARG?
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
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