

Agilent Technologies 8960 Series 10 E5515B Wireless Communications Test Set
Agilent Technologies E1960A GSM Mobile Test Application
Agilent Technologies E1964A GPRS Mobile Test Application

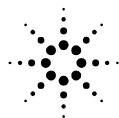
Reference Manual

GSM Test Application Revision A.05
GPRS Test Application Revision A.00

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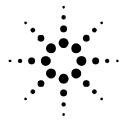
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Agilent Technologies

Legal Information

Manufacturer's Declaration

This statement is provided to comply with the requirements of the German Sound Emission Directive, from 18 January 1991.

This product has a sound pressure emission (at the operator position) < 70 dB(A).

- Sound Pressure $L_p < 70$ dB(A).
- At Operator Position.
- Normal Operation.
- According to ISO 7779:1988/EN 27779:1991 (Type Test).

Herstellerbescheinigung

- Schalldruckpegel $L_p < 70$ dB(A).
- Diese Information steht im Zusammenhang mit den Anforderungen der Maschinenlärminformationsverordnung vom 18 Januar 1991.
- Am Arbeitsplatz.
- Normaler Betrieb.
- Nach ISO 7779:1988/EN 27779:1991 (Typprüfung).

Safety Considerations

GENERAL

This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation.

This product has been designed and tested in accordance with *IEC Publication 1010, "Safety Requirements for Electronic Measuring Apparatus,"* and has been supplied in a safe condition. This instruction documentation contains information and warnings which must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

SAFETY EARTH GROUND

A uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set.

SAFETY SYMBOLS

-  Indicates instrument damage can occur if indicated operating limits are exceeded.
-  Indicates hazardous voltages.
-  Indicates earth (ground) terminal

WARNING **A WARNING note denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.**

CAUTION **A CAUTION note denotes a hazard. It calls attention to an operation procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond an CAUTION note until the indicated conditions are fully understood and met.**

WARNING

This product is a Safety Class I instrument (provided with a protective earthing ground incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited.

Whenever it is likely that the protection has been impaired, the instrument must be made inoperative and be secured against any unintended operation.

If this instrument is to be energized via an autotransformer (for voltage reduction), make sure the common terminal is connected to the earth terminal of the power source.

If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only.

No operator serviceable parts in this product. Refer servicing to qualified personnel. To prevent electrical shock, do not remove covers.

Servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.

The opening of covers or removal of parts is likely to expose dangerous voltages. Disconnect the product from all voltage sources while it is being opened.

The power cord is connected to internal capacitors that may remain live for 5 seconds after disconnecting the plug from its power supply.

For Continued protection against fire hazard, replace the line fuse(s) only with 250 V fuse(s) or the same current rating and type (for example, normal blow or time delay). Do not use repaired fuses or short circuited fuseholders.

Always use the three-prong ac power cord supplied with this product. Failure to ensure adequate earth grounding by not using this cord may cause product damage.

This product is designed for use in Installation Category II and Pollution Degree 2 per IEC 1010 and IEC 664 respectively. FOR INDOOR USE ONLY.

This product has autoranging line voltage input, be sure the supply voltage is within the specified range.

To prevent electrical shock, disconnect instrument from mains (line) before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally.

Ventilation Requirements: When installing the product in a cabinet, the convection into and out of the product must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the product by 4° C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, then forced convection must be used.

Product Markings

CE - the CE mark is a registered trademark of the European Community. A CE mark accompanied by a year indicated the year the design was proven.

CSA - the CSA mark is a registered trademark of the Canadian Standards Association.

CERTIFICATION

Agilent Technologies, Inc. certifies that this product met its published specifications at the time of shipment from the factory. Agilent Technologies further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by the Institute's calibration facility, and to the calibration facilities of other International Standards Organization members

WARRANTY

This Agilent Technologies instrument product is warranted against defects in material and workmanship for a period of one year from date of shipment. During the warranty period, Agilent Technologies, Inc. will at its option, either repair or replace products which prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by Agilent. Buyer shall prepay shipping charges to Agilent and Agilent shall pay shipping charges, duties, and taxes for products returned to Agilent from another country.

Agilent warrants that its software and firmware designated by Agilent for use with an instrument will execute its programming instructions when properly installed on that instrument. Agilent does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error free.

LIMITATION OF WARRANTY

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

NO OTHER WARRANTY IS EXPRESSED OR IMPLIED. AGILENT SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

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THE REMEDIES PROVIDED HEREIN ARE BUYER'S SOLE AND EXCLUSIVE REMEDIES. AGILENT SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASE ON CONTRACT, TORT, OR ANY OTHER LEGAL THEORY.

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Product maintenance agreements and other customer assistance agreements are available for Agilent Technologies products. For any assistance, contact your nearest Agilent Technologies Sales and Service Office.

DECLARATION OF CONFORMITY

According to ISO/IEC Guide 22 and CEN/CENELEC EN45014

Manufacturer's Name: Agilent Technologies UK Ltd. Agilent Technologies, Inc.

Manufacturer's Address: Electronic Products & Solutions Group - Queensferry South Queensferry West Lothian, EH30 9TG Scotland, United Kingdom 24001 E. Mission Avenue Liberty Lake Washington 99019-9599 USA

Declares that the product

Product Name: 8960 Series 10 Wireless Communications Test Set

Model Number: E5515B

Product Options: This declaration covers all options of the above product.

EMC:

Conforms with the following product specifications:

Standard:

CISPR11:1990 / EN55011:1991
IEC 801-2:1991 / EN 50082-1:1992
IEC 801-3:1984 / EN 50082-1:1992
IEC 801-4:1988 / EN 50082-1:1992

Limit:

Group 1 Class A
4kV CD, 8kV AD
3V/m, 27-500 MHz
0.5kV signal lines, 1kV power lines

Safety:

The product conforms to the following safety standards:

IEC 61010-1(1990) +A1(1992) +A2(1995) / EN 61010-1:1993
Canada / CSA-C22.2 No. 1010.1-93

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC, and the EMC Directive 89/336/EEC, and carries the CE mark accordingly.

South Queensferry, Scotland. 04 May 2000

R.M. Evans

R.M. Evans / Quality Manager

Spokane, Washington, USA. 04 May 2000

W.V. Roland

W.V.Roland / Reliability & Regulatory
Engineering Manager

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1 GSM Call Processing

Establishing an Active GSM Link with the Mobile Station

Making a Base Station Originated Call

The process for making a base station originated call is to:

1. If necessary, configure the traffic channel parameters for the call assignment. See “[CALL:TCHannel](#)” on [page 370](#).
2. If necessary, set the IMSI state. See “[CALL:PAGing:IMSI](#)” on [page 342](#).

Example 1.

OUTPUT 714; "CALL:PAGING:IMSI ""01012345678901"" "

would set the paging IMSI to 01012345678901.

3. If necessary, set the repeat paging state. See “[CALL:PAGing:REPeat\[:STATE\]](#)” on [page 343](#).

Example 2.

OUTPUT 714; "CALL:PAGING:REPEAT ON"

would turn on repeat paging.

4. Configure the necessary call processing connect/disconnect synchronization conditions. See “[Call Processing State Synchronization](#)” on [page 37](#).

5. Page the mobile station by sending the call originate command to the test set.

Example 3.

OUTPUT 714; "CALL:ORIGINATE"

would start the process of making a base station originated call.

IMPORTANT To verify that the origination is successfully completed, see “[Call Processing State Synchronization](#)” on [page 37](#).

Making a Mobile Station Originated Call

The process for making a mobile station originated call is to:

1. If necessary, configure the necessary traffic channel parameters for the call assignment. See "[CALL:TCChannel](#)" on page 370.
2. Configure the necessary call processing connect/disconnect synchronization conditions. See "[Call Processing State Synchronization](#)" on page 37.
3. Initiate a call from the mobile station.

NOTE There is no facility in the test set to initiate a call from the mobile station. This must be accomplished manually or through a test bus built-in to the mobile station.

IMPORTANT To verify that the origination is successfully completed, see "[Call Processing State Synchronization](#)" on page 37.

Operating Considerations

The test set must be in active cell operating mode. The correct frequency band must be selected.

Call Processing Event Synchronization

Description

Using the call processing subsystem overlapped command synchronization commands, you can query the test set to find out when an overlapped command operation is done (:DONE?, :OPC?), force the test set to not execute any more commands until an overlapped command operation has completed (:WAIT), or simply force an overlapped command to behave as a sequential command (:SEQ).

Pending Operation Flags

Associated with each overlapped command, the test set maintains a binary indicator known as a pending operation flag. A pending operation flag is set true when the operation started by the overlapped command is executing, and is set false when the operation is no longer executing.

NOTE In addition to the call processing subsystem overlapped commands, the test set also provides the measurement-related INITiate <measurement> overlapped commands.

Call Processing Subsystem Overlapped Command Synchronization Commands

Table 1. Overlapped Commands

| Command | Purpose Of Command | Example |
|-------------|---|---|
| :DONE? | Returns a 0 if the associated command's pending operation flag is true, or a 1 if it is false. | <pre> 10 OUTPUT 714;"CALL:TCH 65" 20 OUTPUT 714;"SETUP:TXP:CONT OFF" 30 OUTPUT 714;"SETUP:PFER:CONT OFF" 40 REPEAT 50 OUTPUT 714;"CALL:TCH:DONE?" 60 ENTER 714;Process_done 70 UNTIL Process_done 80 OUTPUT 714;INIT:TXP:PFER" 90 END </pre> <p>The example shown is from the E1960A GSM test application. Commands the test set to perform a traffic channel handover and execute two setup commands. After the two setup commands have finished, the :DONE? command is used to find out if the handover is finished</p> |
| :SEQuential | Forces an overlapped command to execute in a sequential manner. No subsequent commands will be executed until the pending operation flag for this operation is false. | <pre>OUTPUT 714;"CALL:TCH:SEQ 65"</pre> <p>The example shown is from the E1960A GSM test application. Commands the test set to perform a traffic channel handover and to not execute any more commands until the pending operation flag associated with the CALL:TCH command is false.</p> |
| :WAIT | Forces the test set to wait until the associated command's pending operation flag is false before executing any more commands. | <pre> 10 OUTPUT 714;"CALL:TCH 65" 20 OUTPUT 714;"SETUP:TXP:CONT OFF" 30 OUTPUT 714;"SETUP:PFER:CONT OFF" 40 OUTPUT 714;"CALL:TCH:WAIT" 50 OUTPUT 714;"INIT:TXP:PFER" 60 END </pre> <p>The example shown is from the E1960A GSM test application. Commands the test set to perform a traffic channel handover and execute two setup commands. After the two setup commands have finished, the :WAIT command is sent to prevent the test set from executing the INITiate command until the handover is finished.</p> |

Table 1. Overlapped Commands

| Command | Purpose Of Command | Example |
|--------------|--|---|
| :OPComplete? | Places a 1 in the test set's output queue when the associated command's pending operation flag goes false. Controlling program hangs on this query until the 1 is retrieved. | <pre> 10 OUTPUT 714;"CALL:TCH 65" 20 OUTPUT 714;"SETUP:TXP:CONT OFF" 30 OUTPUT 714;"SETUP:PFER:CONT OFF" 40 OUTPUT 714;"CALL:TCH:OPC?" 50 ENTER 714;Op_complete 60 OUTPUT 714;"INIT:TXP:PFER" 70 END </pre> <p>The example shown is from the E1960A GSM test application. Commands the test set to perform a traffic channel handover and execute two setup commands. After the two setup commands have finished, the :OPC? command is sent to hang program execution until a 1 is put in the test set's output queue, satisfying the ENTER statement and allowing program execution to continue with the INITiate command.</p> |

Operating Considerations

When using the call processing subsystem overlapped command synchronization commands, check the conditions that set the operation's pending operation flag (POF) false to avoid unexpected results.

Call Processing Subsystem Overlapped Commands

| Call Processing Command | Purpose Of Command | Pending Operation Flag (POF) is false when |
|--|---|---|
| CALL:ORIGINate See " CALL:ORIGINate " on page 341. | Performs a base station call origination. | The call processing state leaves the Idle state (when the operating mode is active cell), or The test set has noted this parameter change (when the operating mode is test mode). |
| CALL:END See " CALL:END " on page 318. | Performs a base station call termination. | The call processing state reaches the Idle state (when the operating mode is active cell), or The test set has noted this parameter change (when the operating mode is test mode). |
| CALL[:CELL[1]]:BCHannel[:ARFCn][:SElected] See " CALL[:CELL]:BCHannel[:ARFCn][:SElected] " on page 306. | Sets the BCH ARFCN for currently selected broadcast band. | The downlink signal is transmitting on the new broadcast channel. |
| CALL[:CELL[1]]:BCHannel[:ARFCn]:<broadcast band> See " CALL:BCHannel " on page 306. | Sets the BCH ARFCN for a broadcast band not currently selected. | The test set has noted this parameter change. |

| Call Processing Command | Purpose Of Command | Pending Operation Flag (POF) is false when |
|---|---|---|
| CALL:TCHannel[:ARFCn][:SElected] See " CALL:TCHannel[:ARFCn][:SElected] " on page 371. | Sets the TCH ARFCN for currently selected traffic band. | At least one of the following conditions has been met for all occurrences of these call processing commands that have begun execution: The channel assignment has been successfully completed (when a call is established), or |
| CALL:TCHannel[:ARFCn]:<traffic band> See " CALL:TCHannel " on page 370. | Sets the TCH ARFCN for a traffic band not currently selected. | The test set has noted this parameter change (no call established), or |
| CALL:TCHannel:TSLot See " CALL:TCHannel:TSLot " on page 376. | Sets the TCH timeslot. | The test set has noted this parameter change (not currently selected band), or |
| CALL:MS:TADVance See " CALL:MS:TADVance " on page 335. | Sets the mobile station timing advance. | An error message was generated. |
| CALL:MS:TXLevel[:SElected] See " CALL:MS:TXLevel[:SElected] " on page 336. | Sets the mobile station transmit level for currently selected band. | |
| CALL:MS:TXLevel:<traffic band>. | Sets the mobile station transmit level for a traffic band not currently selected. | |
| CALL:CONNected:ARM[:IMMEDIATE] See " CALL:CONNected:ARM[:IMMEDIATE] " on page 311. | Arms the call control status change detector. | The call control status change detector has been disarmed. See " Connected/Idle Query " on page 37. |

Related Topics

["Call Processing State Synchronization" on page 37](#)

["Measurement Event Synchronization" on page 153](#)

["Test System Synchronization Overview" on page 42](#)

Call Processing State Synchronization

Description

Call Processing State Query

The CALL:STATus[:STATe]? query returns a string indicating the current call processing state.

There are six possible call processing states for GSM.

The query returns one of the following strings:

- “IDLE”

Idle is returned when the test set is not on a call, involved with any termination, page, origination, or registration call processing procedures with the mobile station.

- “SREQ”

Set Up Request is returned when the test set is in the process of assigning a channel to a mobile station as part of a Page or a mobile station originated call setup.

- “PROC”

Proceeding is returned when the test set is in the process of connecting a call from a mobile station.

- “ALER”

Alerting is returned when the mobile station is about to receive an Alert message as part of a call setup due to a page.

- “CONN”

Connected is returned when the test set and the mobile station are connected on a call.

- “DISC”

Disconnected is returned when the test set is in the process of ending a call.

The following command returns the current state of a data connection:

```
OUTPUT 714;"CALL:STATus:STATe:DATA?"
```

Description

Connected/Idle Query

This query will determine if a call is connected or disconnected by returning an integer value. The value indicates if the call state is idle or connected, not if any call state change has occurred.

Query returns one of the following:

- 0 = idle
- 1 = connected

If the call is in the setup request, proceeding, alerting, or disconnecting state, this command will not return a

value until the call status proceeds to either connected or idle.

```
OUTPUT 714;"CALL:CONNECTED:STATE?"
```

Example 4. Using the Connected/Idle Query - Base Station Originated Call

The following example illustrates the use of the connected/idle query for a base station originated call. This code originates a call, then waits for the connected/idle query to return a result.

Note that this code does not include the CALL:CONNECTED:TIME (timeout timer) or the CALL:CONNECTED:ARM (change detector arm) commands. These commands are unnecessary since the change detector is armed automatically by the CALL:ORIGINATE command, and the timeout timer value is never applicable since a base station originated call guarantees a state change.

```
10  OUTPUT 714;"CALL:ORIGINATE" ! Begin the BS originated call.
20  OUTPUT 714;"CALL:CONNECTED:STATE?" ! The connect/idle query.
30  ENTER 714;Call_connected ! Program will hang here until state
40          ! change or protocol timer expires.
50  ! ****
60  ! If mobile is not set to auto-answer, answer the call.
70  ! ****
80  IF NOT Call_connected THEN
90      DISP "CALL NOT CONNECTED."
100 ELSE
110     DISP "CALL IS CONNECTED."
120 END IF
130 END
```

Call State Change Detector

This method provides the advantage of indicating that a call state change has occurred. The change detector works in conjunction with the Connected /Idle Query. Arming the CALL:CONNECTED query provides a way for the test set to know when the call state change process is done.

The call state change detector becomes *disarmed* when any of the following conditions have been met:

- the call processing state has progressed to either connected or idle
or...
- the attempt to connect or disconnect a call failed and one of the test set's Fixed Timers has timed out
or...
- no call processing state changes occurred within the time period specified by the timeout timer

The following command arms the call state change detector, but does not cause any call processing function to start:

```
OUTPUT 714;"CALL:CONNECTED:ARM[:IMMEDIATE]" !Used for mobile station originated calls.
```

These commands automatically arm the call state change detector, and start the base station originated call processing functions:

```
OUTPUT 714;"CALL:ORIGINATE" !Used for base station originated call connect.
```

```
OUTPUT 714;"CALL:END" !Used for base station originated call disconnect (idle).
```

Call State Change Detector Timeout

If a state change does not occur, the user needs a way to control how long to wait for the change detector. The change detector is disarmed by the timeout timer. After a timeout, the connected/idle query will return a 1 for connected or a 0 for idle. The timeout timer is user settable, but the user setting is only applied during mobile station originated call processing operations. For base station originated call processing operations, the timeout timer is automatically set to 60 seconds by the test set.

Example 5. Using the Change Detector - Mobile Station Originated Call

The following example illustrates the use of the call state change detector and connected/idle query for a mobile station originated call. This program prompts the operator to make a call from the mobile station being tested. When the CALL:CONNECTED:ARM command is sent, it causes the reply from the CALL:CONNECTED:STATE? query to be held-off temporarily until the connected or idle state is reached. The timeout is provided for cases where an expected call state change does not happen, for instance if the user does not make the call when prompted by the program.

```

10  OUTPUT 714;"CALL:CONNECTED:TIMEOUT 10S" ! Sets the time out
20                                ! time to 10 seconds.
30  OUTPUT 714;"CALL:CONNECTED:ARM" ! Arm the change detector.
40  DISP "Make a mobile station orginated call. Continue when done."
50  PAUSE
60  OUTPUT 714;"CALL:CONNECTED:STATE?" ! The connected/idle query.
70  ENTER 714;Call_connected
80  IF Call_connected=1 THEN
90    DISP "Call is connected."
100  WAIT 2
110 ELSE
120  DISP "Call is not connected."
130  WAIT 2
140 END IF
150 END

```

STATus:OPERation:CALL:GSM Status Register

The STATus subsystem provides a status register group that allows the user to query call processing states. Call processing state synchronization can be performed using the bit transitions of STATUS:OPERATION:CALL:GSM to generate interrupts to the external controller. Refer to “STATus:OPERation:CALL:GSM Condition Register Bit Assignment” on page 534 for status bit definitions and GPIB command syntax. See “Call State STATus:OPERation:CALL:GSM Program Example” on page 40.

Call State STATus:OPERation:CALL:GSM Program Example

Example 6. Generating a Service Request (SRQ) Interrupt - Dropped Call

The following example illustrates the use of the status subsystem to generate a service request when a call has been dropped.

```

10      OUTPUT 714;"*CLS"
20      OUTPUT 714;"STATUS:OPERATION:CALL:ENABLE 4" !Enable the
30                      !connected bit
40                      ! to generate a
50                      !summary message.
60      OUTPUT 714;"STATUS:OPERATION:CALL:PTR 0;NTR 4" !Enable the
70                      !negative
80                      !transition
90                      !filter for the
100                     !GSM Summary bit.
110     OUTPUT 714;"STATUS:OPERATION:CALL:GSM:PTR 0;NTR 4" !Enable the
120                     !negative
130                     !transition
140                     !filter for the
150                     !GSM connected bit.
160     OUTPUT 714;"STATUS:OPERATION:CALL:GSM:ENABLE 4" !Enable the
170                     !connected bit for
180                     !GSM to generate a
190                     !summary message.
200     OUTPUT 714;"STATUS:OPERATION:ENABLE 1024" !Enable the call sumary
210                     !bit to generate a summary
220                     !message.
230     OUTPUT 714;"*SRE 128" !Enable the service request enable register to
240                     !generate an SRQ.
250     ON INTR 7,15 CALL Err !Define the interrupt-initiated branch wiht a
260                     !priority of 15, the highest.
270     ENABLE INTR 7;2 !Enable interrupt on interface card 7 with a bit mask
280                     !(for the interface's interrupt-enable register) of 2.
290     PRINT "Make a call, type CONT when connected." !Make a Mobile Station
300                     !originated call.
310     PAUSE
320     PRINT "End the call from the mobile station and then type CONT."
330     PAUSE
340     LOOP
350     OUTPUT 714;"STATUS:OPERATION:CALL:GSM:EVENT?" !Query the event register.
360     ENTER 714;Eve
370     IF Eve=0 THEN
380         PRINT "The call is still connected, press the end key."

```

```
390      END IF
400      END LOOP
410      END
420      SUB Err
430          DISP "The call has ended."
440          Clear_interrupt=SPOLL(714)
450          OUTPUT 714;"*CLS"
460          STOP
470      SUBEND
```

Related Topics

[“Call Processing Event Synchronization” on page 32](#)

[“CALL:STATus\[:STATE\]?” on page 366](#)

[“CALL:CONNected:ARM\[:IMMEDIATE\]” on page 311](#)

[“CALL:CONNected:TIMEout” on page 312](#)

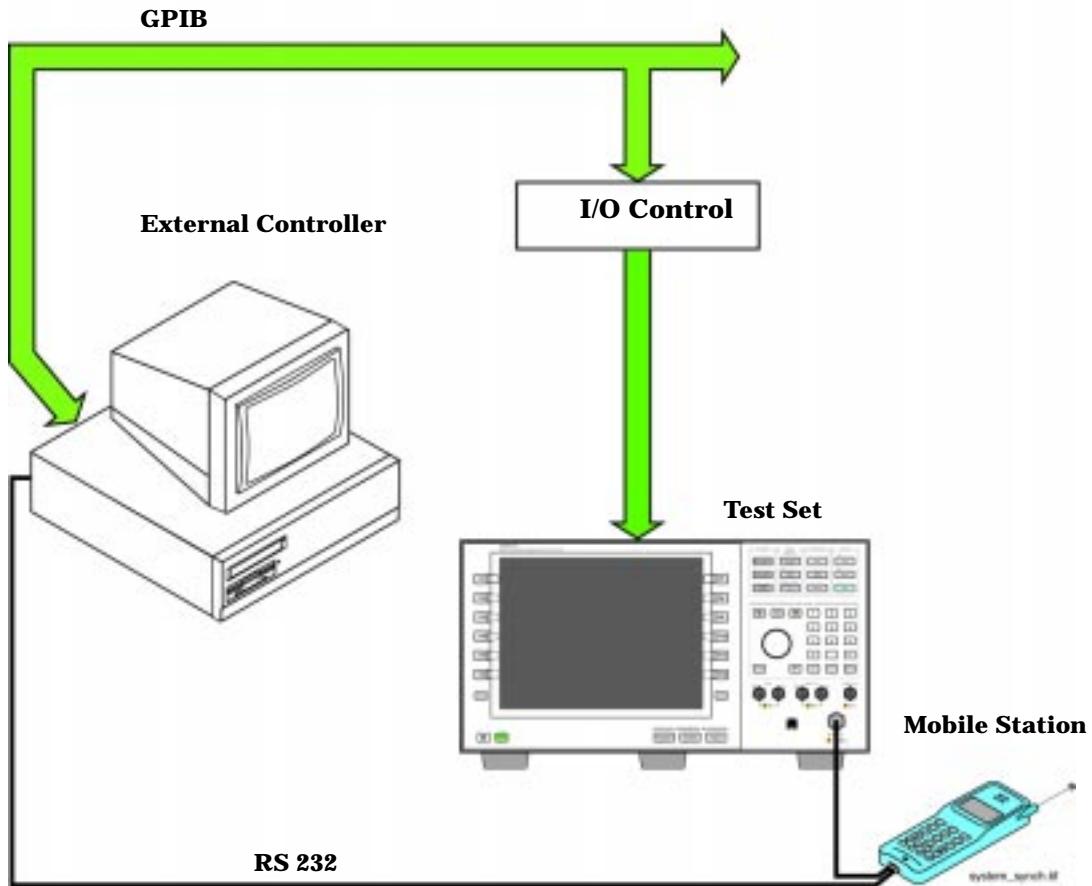
[“Instrument Status Area” on page 642](#)

Test System Synchronization Overview

Description

Typical test systems include an external controller with a GPIB connection to the test set, an RF (and possible AF) connection between the test set and a mobile station under test, and a serial connection between the mobile station and the external controller.

Synchronizing an external controller with the test set and a mobile station under test ensures that no device does something before it is supposed to, which can cause errors, or does something well after it could have, which wastes time.

Figure 1. **Test System**

Sequential versus overlapped commands

The test set uses both sequential and overlapped commands:

- Sequential commands must finish executing before the next command starts to execute.
- Overlapped commands do not finish executing before the next command starts to execute.

Overlapped commands are more difficult to synchronize because an overlapped operation that started several commands earlier may still be executing as subsequent commands are being parsed out from the input buffer and executed. This can present a problem unless the external controller is properly synchronized to the test set's execution of commands. Overlapped commands allow the test set to use its internal resources as efficiently as possible.

Methods for synchronization

The test set's GPIB command set supports the following methods to achieve synchronization for overlapped commands. In some cases, combinations of these methods will provide the best results:

Methods one and two do not require the external controller to query the test set, nor to perform any branching or decision-making associated with information acquired from the test set.

Methods three through six rely on responses from the test set to an external controller, indicating that some event has occurred. The external controller can then make decisions based on these responses to control the flow of commands to the test set and other devices in the test system.

1. Force the test set to execute overlapped commands sequentially.
2. Force the test set to wait until an overlapped command is done executing before executing any more commands.
3. Query the test set to determine when a command has finished executing.
4. Query the test set to determine when all commands sent to it have at least begun executing.
5. Query the test set to determine the current call or data connection processing state.
6. Program the test set to generate a service request when an operation has completed or the test set is in a certain state.

Commands used for synchronization:

- [“CALL:STATus\[:STATE\]?” on page 366](#)

This command queries the test set's current call processing state. This command supports synchronization method five. (See [“Call Processing State Query” on page 37](#)).

- [“CALL:CONNected\[:STATE\]?” on page 310](#)

This command determines the connected/idle state of a call. A feature called the change detector provides the user with a way to hold off the response to this query until a call processing state transition has taken place. (See [“Connected/Idle Query” on page 37](#)). This command supports synchronization method five.

- :DONE? and :OPC?

These specialized commands can be appended to call processing overlapped commands to support synchronization method three. (See “[Call Processing Subsystem Overlapped Command Synchronization Commands](#)” on page 33.)

- **:WAIT**

This specialized command can be appended to call processing overlapped commands to support synchronization method two.

(See “[Call Processing Subsystem Overlapped Command Synchronization Commands](#)” on page 33.)

- **:SEQ**

This specialized command can be appended to call processing overlapped commands to support synchronization method one.

(See “[Call Processing Subsystem Overlapped Command Synchronization Commands](#)” on page 33.)

- **“INITiate:DONE?” on page 439**

This specialized command causes the test set to return a mnemonic indicating if a measurement is done. If not, the returned mnemonic will indicate if the measurement is still executing. This command supports synchronization method three.

(See “[INITiate:DONE?” on page 153](#).)

- **STATUS:<register>**

Status bits in the “[STATus:OPERation:CALL:GSM Condition Register Bit Assignment](#)” on page 534 register are provided to indicate the test set’s call processing state. These bits support synchronization methods five and six.

Status bits in the “[STATus:OPERation:NMRReady:GSM Condition Register Bit Assignment](#)” on page 540 register are provided to indicate when a measurement is ready to be fetched. These bits support synchronization method three and six.

Many other status bits are provided in the GPIB status subsystem that are useful for synchronization. See “[STATus Subsystem Description](#)” on page 524.

- [“SYSTem:SYNChronized” on page 591](#)

This specialized command causes a condition bit to be set then cleared when all prior sequential commands have completed and all prior overlapped commands have started indicating that the input buffer is synchronized. (See [“STATus:OPERation Condition Register Bit Assignment” on page 529](#)). This command supports synchronization method four and six.

- [“*OPC” on page 592](#), [“*OPC?” on page 592](#), and [“*WAI” on page 593](#) (not recommended)

Note: These commands look at all of the test set’s operations collectively. Because multiple processes are likely to be executing at the same time, it is recommended that the other commands above be used instead.

Related Topics

[“Call Processing State Synchronization” on page 37](#)

[“Measurement Event Synchronization” on page 153](#)

[“Call Processing Event Synchronization” on page 32](#)

[“SYSTem:SYNChronized” on page 591](#)

2 GPRS Data Connection

Establishing a Data Connection with the Mobile Station

For step-by-step instructions on how to make a data connection, see [“Step 5: Establish a Data Connection with the Mobile Station” on page 253](#).

Related Topics

[“CALL:PDTCH|PDTChannel” on page 345](#)

[“CALL:FUNCTION:DATA:START” on page 321](#)

[“Data Connection Processing State Synchronization” on page 53](#)

Data Connection Processing Event Synchronization

Description

Using the call processing subsystem overlapped command synchronization commands, you can query the test set to find out when an overlapped command operation is done (:DONE?, :OPC?), force the test set to not execute any more commands until an overlapped command operation has completed (:WAIT), or simply force an overlapped command to behave as a sequential command (:SEQ).

Pending Operation Flags

Associated with each overlapped command, the test set maintains a binary indicator known as a pending operation flag. A pending operation flag is set true when the operation started by the overlapped command is executing, and is set false when the operation is no longer executing.

NOTE In addition to the call processing subsystem overlapped commands, the test set also provides the measurement-related INITiate <measurement> overlapped commands.

Call Processing Subsystem Overlapped Command Synchronization Commands

Table 2. Overlapped Commands

| Command | Purpose Of Command | Example |
|-------------|---|---|
| :DONE? | Returns a 0 if the associated command's pending operation flag is true, or a 1 if it is false. | <pre> 10 OUTPUT 714;"CALL:TCH 65" 20 OUTPUT 714;"SETUP:TXP:CONT OFF" 30 OUTPUT 714;"SETUP:PFER:CONT OFF" 40 REPEAT 50 OUTPUT 714;"CALL:TCH:DONE?" 60 ENTER 714;Process_done 70 UNTIL Process_done 80 OUTPUT 714;INIT:TXP:PFER" 90 END </pre> <p>The example shown is from the E1960A GSM test application. Commands the test set to perform a traffic channel handover and execute two setup commands. After the two setup commands have finished, the :DONE? command is used to find out if the handover is finished</p> |
| :SEQuential | Forces an overlapped command to execute in a sequential manner. No subsequent commands will be executed until the pending operation flag for this operation is false. | <pre>OUTPUT 714;"CALL:TCH:SEQ 65"</pre> <p>The example shown is from the E1960A GSM test application. Commands the test set to perform a traffic channel handover and to not execute any more commands until the pending operation flag associated with the CALL:TCH command is false.</p> |
| :WAIT | Forces the test set to wait until the associated command's pending operation flag is false before executing any more commands. | <pre> 10 OUTPUT 714;"CALL:TCH 65" 20 OUTPUT 714;"SETUP:TXP:CONT OFF" 30 OUTPUT 714;"SETUP:PFER:CONT OFF" 40 OUTPUT 714;"CALL:TCH:WAIT" 50 OUTPUT 714;"INIT:TXP:PFER" 60 END </pre> <p>The example shown is from the E1960A GSM test application. Commands the test set to perform a traffic channel handover and execute two setup commands. After the two setup commands have finished, the :WAIT command is sent to prevent the test set from executing the INITiate command until the handover is finished.</p> |

Table 2. Overlapped Commands

| Command | Purpose Of Command | Example |
|--------------|--|---|
| :OPComplete? | Places a 1 in the test set's output queue when the associated command's pending operation flag goes false. Controlling program hangs on this query until the 1 is retrieved. | <pre> 10 OUTPUT 714;"CALL:TCH 65" 20 OUTPUT 714;"SETUP:TXP:CONT OFF" 30 OUTPUT 714;"SETUP:PFER:CONT OFF" 40 OUTPUT 714;"CALL:TCH:OPC?" 50 ENTER 714;Op_complete 60 OUTPUT 714;"INIT:TXP:PFER" 70 END </pre> <p>The example shown is from the E1960A GSM test application. Commands the test set to perform a traffic channel handover and execute two setup commands. After the two setup commands have finished, the :OPC? command is sent to hang program execution until a 1 is put in the test set's output queue, satisfying the ENTER statement and allowing program execution to continue with the INITiate command.</p> |

Operating Considerations

When using the call processing subsystem overlapped command synchronization commands, check the conditions that set the operation's pending operation flag (POF) false to avoid unexpected results.

Data Connection Processing Subsystem Overlapped Commands

| Data Connection Processing Command | Purpose Of Command | Pending Operation Flag (POF) is false when |
|---|---|--|
| CALL:FUNCTION:DATA:STARt See “ CALL:FUNCTION:DATA:STARt ” on page 321. | Attempts to initiate a data connection. | The connection status is any non-transitory state other than Attached (that is Idle, or Transferring). |

Related Topics

[“Data Connection Processing State Synchronization” on page 53](#)

[“Measurement Event Synchronization” on page 153](#)

[“Test System Synchronization Overview” on page 56](#)

Data Connection Processing State Synchronization

Description

Data Connection Processing State Query

The CALL:STATus[:STATe]:DATA? query returns a string indicating the current data connection processing state.

There are seven possible data connection processing states.

The query returns one of the following strings:

- “IDLE”

Idle is returned when the mobile station is not GPRS attached.

- “ATTG”

Attaching is returned when the mobile station has sent an attach request. This is a transitory state (which means that the mobile station can only remain in this state until the protocol timer expires). At the end of the signalling exchange, the new state will either be Attached or Idle, depending on whether or not the attach procedure completes without error.

- “DET”

Detaching is returned when the attached mobile station has sent a detach request. This is a transitory state (which means that the mobile station can only remain in this state until it successfully moves to another state, or the protocol timer expires). At the end of the signalling exchange, the new state will be Idle, even if the procedure encounters an error.

- “ATT”

Attached is returned when the mobile station has performed a successful GPRS attach.

- “STAR”

Starting is returned when you have performed the “Start Data Connection” action (using [“CALL:FUNCTION:DATA:START” on page 321](#)). This is a transitory state (which means that the mobile station can only remain in this state until it successfully moves to another state, or the protocol timer expires). At the end of the signalling exchange, the new state will be either Transferring or Attached, depending on whether or not the data connection is successfully established.

- “END”

Ending is returned when you have performed the “End Data Connection” action (using [“CALL:FUNCTION:DATA:STOP” on page 321](#)). This is a transitory state (which means that the mobile station can only remain in this state until it successfully moves to another state, or the protocol timer expires). At the end of the signalling exchange, the new state will be Attached, even if the procedure encounters an error.

- “TRAN”

Transferring is returned when an ETSI test mode TBF (temporary block flow) has been established.

Data Connection Processing State Synchronization

The following command returns the current state of a data connection:

```
OUTPUT 714;"CALL:STATus:STATE:DATA?"  
ENTER 714;Inst_state$
```

Related Topics

“Test System Synchronization Overview” on page 56

“Data Connection Processing Event Synchronization” on page 50

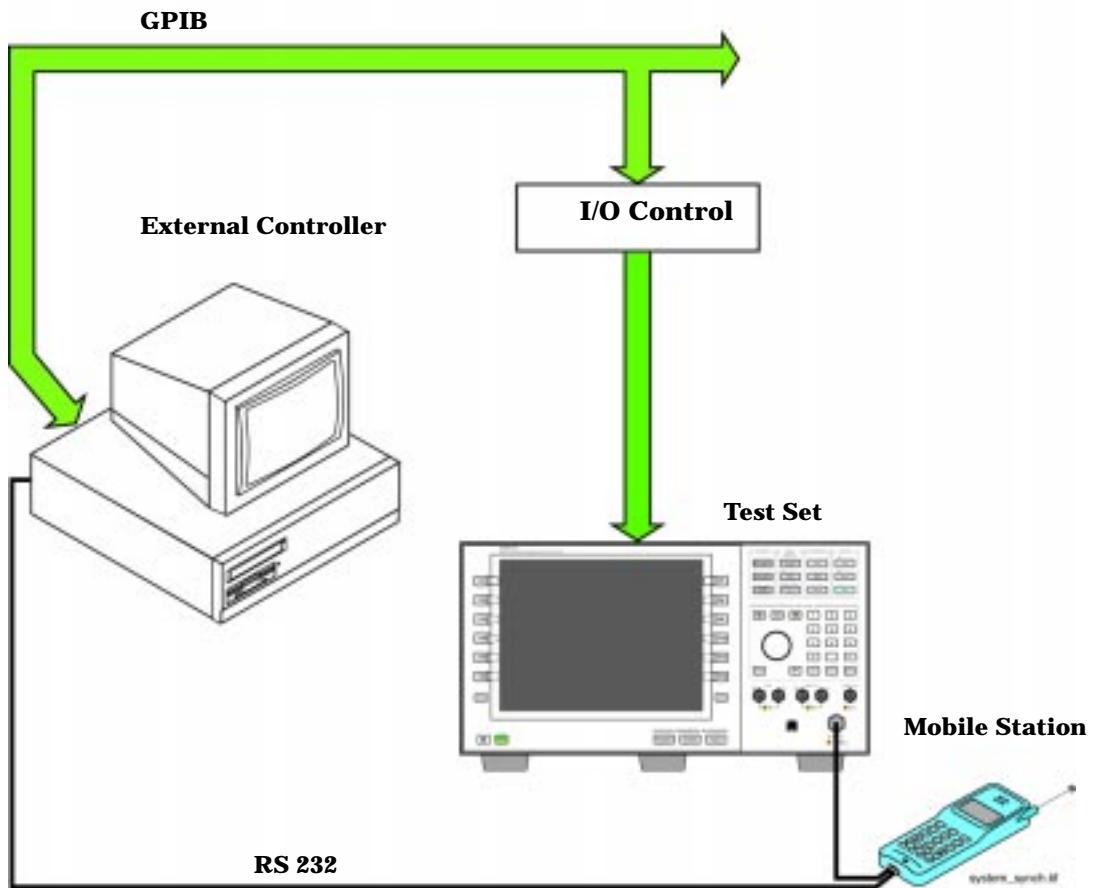
“CALL:STATus[:STATE]:DATA?” on page 366

Test System Synchronization Overview

Description

Typical test systems include an external controller with a GPIB connection to the test set, an RF (and possible AF) connection between the test set and a mobile station under test, and a serial connection between the mobile station and the external controller.

Synchronizing an external controller with the test set and a mobile station under test ensures that no device does something before it is supposed to, which can cause errors, or does something well after it could have, which wastes time.

Figure 2. **Test System**

Sequential versus overlapped commands

The test set uses both sequential and overlapped commands:

- Sequential commands must finish executing before the next command starts to execute.
- Overlapped commands do not finish executing before the next command starts to execute.

Overlapped commands are more difficult to synchronize because an overlapped operation that started several commands earlier may still be executing as subsequent commands are being parsed out from the input buffer and executed. This can present a problem unless the external controller is properly synchronized to the test set's execution of commands. Overlapped commands allow the test set to use its internal resources as efficiently as possible.

Methods for synchronization

The test set's GPIB command set supports the following methods to achieve synchronization for overlapped commands. In some cases, combinations of these methods will provide the best results:

Methods one and two do not require the external controller to query the test set, nor to perform any branching or decision-making associated with information acquired from the test set.

Methods three through six rely on responses from the test set to an external controller, indicating that some event has occurred. The external controller can then make decisions based on these responses to control the flow of commands to the test set and other devices in the test system.

1. Force the test set to execute overlapped commands sequentially.
2. Force the test set to wait until an overlapped command is done executing before executing any more commands.
3. Query the test set to determine when a command has finished executing.
4. Query the test set to determine when all commands sent to it have at least begun executing.
5. Query the test set to determine the current call or data connection processing state.
6. Program the test set to generate a service request when an operation has completed or the test set is in a certain state.

Commands used for synchronization:

- “[CALL:STATus\[:STATE\]:DATA?](#)” on page 366

This command queries the test set’s current GPRS data connection processing state. This command supports synchronization method five. See “[Data Connection Processing State Query](#)” on page 53.

- :DONE? and :OPC?

These specialized commands can be appended to GPRS data connection processing overlapped commands to support synchronization method three. See “[Call Processing Subsystem Overlapped Command Synchronization Commands](#)” on page 51.

- :WAIT

This specialized command can be appended to GPRS data connection processing overlapped commands to support synchronization method two.

See “[Call Processing Subsystem Overlapped Command Synchronization Commands](#)” on page 51.

- :SEQ

This specialized command can be appended to GPRS data connection processing overlapped commands to support synchronization method one.

See “[Call Processing Subsystem Overlapped Command Synchronization Commands](#)” on page 51.

- “[INITiate:DONE?](#)” on page 439

This specialized command causes the test set to return a mnemonic indicating if a measurement is done. If not, the returned mnemonic will indicate if the measurement is still executing. This command supports synchronization method three.

See “[INITiate:DONE?](#)” on page 153.

- “[SYSTem:SYNChronized](#)” on page 591

This specialized command causes a condition bit to be set then cleared when all prior sequential commands have completed and all prior overlapped commands have started indicating that the input buffer is synchronized. (See “[STATus:OPERation Condition Register Bit Assignment](#)” on page 529). This command supports synchronization method four and six.

- “[*OPC](#)” on page 592, “[*OPC?](#)” on page 592, and “[*WAI](#)” on page 593 (not recommended)

Note: These commands look at all of the test set’s operations collectively. Because multiple processes are likely to be executing at the same time, it is recommended that you use the other commands above instead.

Related Topics

“[Data Connection Processing State Synchronization](#)” on page 53

“[Measurement Event Synchronization](#)” on page 153

“[Data Connection Processing Event Synchronization](#)” on page 50

“[SYSTem:SYNChronized](#)” on page 591

3 Measurements

Analog Audio Measurement Description

This measurement is *not* applicable to GPRS.

How is an analog audio measurement made?

Analog audio measurement response is measured from the mobile station's audio output, which also may be an acoustic coupler or electrical connection from the mobile station connected to the test set's AUDIO IN connector.

The expected voltage is the absolute peak audio input signal voltage at the front panel BNC. The expected voltage sets the analog audio clipping level and must be set. The expected voltage is peak voltage and the results are returned as rms, so a 1-volt rms input signal would need a 1.414 V_{peak} expected voltage value.

The trigger source for analog audio is always set to Immediate.

The test set has a tunable bandpass filter with a 100 Hz bandwidth that can be used to tune out ambient noise for making 217 Hz buzz or 8 kHz whine tests. The filter's range is from 200 Hz to 8.0 kHz.

The analog audio measurement returns the following measurement results:

- Audio Measurement Integrity Indicator
- Audio Measurement Result (0 V_{rms} to +20 V_{rms})
- Audio Multi-measurement Maximum (0 V_{rms} to +20 V_{rms}) when multi-measurement count is on.
- Audio Multi-measurement Minimum (0 V_{rms} to +20 V_{rms}) when multi-measurement count is on.
- Audio Multi-measurement Standard Deviation (0 V to +14.14214 V) when multi-measurement count is on.

None of the analog audio measurement results are affected by amplitude offset.

When making an audio measurement on a single port you should terminate the other audio port with either a 50 ohm load or a short. This improves the accuracy of the measurement by reducing sensitivity to stray signals at the unused port.

If noise is making your audio measurement difficult, use the 100 Hz bandwidth tunable band pass filter. This narrow band filter reduces the noise significantly. Refer to ["SETup:AAUDio:FILTer\[:SFRequency\]" on page 466](#).

Trigger Source

Analog audio measurements are triggered immediately after being armed. Arming is not necessary if the trigger state is set to continuous.

Related Topics

["Programming an Analog Audio Measurement" on page 63](#)

["Test Adherence to Standards" on page 131](#)

Programming an Analog Audio Measurement

This measurement is *not* applicable to GPRS.

This section provides an example of how to make the analog audio (AAUDIO) measurement via GPIB.

The following procedure assumes that an audio source is connected to the AUDIO IN connector. See “[Analog Audio Measurement Description](#)” on page 62.

1. Configure analog audio measurement parameters using the SETUp subsystem.
2. Start the analog audio measurement using the INITiate subsystem.
3. Use the INITiate:DONE? command to find out if analog audio measurement results are available.
4. Use the FETCh? command to obtain analog audio measurement results.

Programming Example

```

10  OUTPUT 714;"SETUP:AAUDIO:CONTINUOUS OFF" !Configures the analog audio
20                                !measurement to single trigger mode.
30  OUTPUT 714;"SETUP:AAUDIO:EXPECTED:VOLTAGE:PEAK 3" !Set the clipping level for
40                                !audio input.
50  OUTPUT 714;"SETUP:AAUDIO:FILTER:SFREQUENCY 8KHZ" !Specifies the tunable
60                                !bandpass filter frequency to
70                                !be 8 kHz and turns the filter
80                                !state ON.
90  OUTPUT 714;"INITIATE:AAUDIO"!Start the analog audio measurement.
100 REPEAT
110 OUTPUT 714;"INITIATE:DONE?"!Check to see if analog audio measurement is done.
120 ENTER 714;Meas_complete$
130 UNTIL Meas_complete$="AAUD"
140 OUTPUT 714;"FETCH:AAUDIO?"! Fetch analog audio measurement results.
150 ENTER 714;Integrity, Analog_audio
160 END

```

Returned Values

The measurements returned by this program are:

- Integrity returns the measurement “[Integrity Indicator](#)” on page 146 (0 means a successful measurement with no errors).
- Analog_audio returns the analog audio level in volts rms.

Related Topics

[“Analog Audio Measurement Description” on page 62](#)

[“INITiate” on page 438](#)

[“SETup:AAUDio” on page 463](#)

[“FETCH:AAUDio” on page 381](#)

[“Comprehensive Program Example” on page 223](#)

AAUDio Troubleshooting

Possible Setup Issues

This measurement is *not* applicable to GPRS. To run this measurement ensure the test set is configured for GSM measurements.

During remote operation of the analog audio measurement you should configure the trigger arm to single, see “[SETup:AAUDio:CONTinuous](#)” on page 464.

If the trigger arm is not set to single, the measurement may not return a result. When trigger arm is continuous the measurement rearms itself and starts another measurement cycle, during remote operation the fetch query may not be synchronized to the measurement cycle, see “[Measurement States](#)” on page 170.

The analog audio measurement results are rms values, the Expected Peak Audio Amplitude is a peak value.

Interpreting Integrity Indicator values

See “[Integrity Indicator](#)” on page 146.

If over range (5) is returned then the input level is greater than 3dB above the Expected Peak Audio Amplitude value or the maximum input level of 20 volts peak.

If under range (6) is returned then the input level is greater than 20dB below the Expected Peak Audio Amplitude value maximum value.

If the signal has both over range and under range conditions only the over range (5) will be indicated.

Bit Error Measurement Description

This measurement is *not* applicable to GPRS.

Bit Error Measurements versus Fast Bit Error Measurements

There are three commonly used types of bit error measurements in GSM:

- “BER with Frame Erasure” or “Residual BER” when the mobile station has been configured to loopback Type A.
- “BER without Frame Erasure” or “Non-residual BER” when the mobile station has been configured to loopback Type B.
- BER using burst-by-burst loopback when the mobile station has been configured to loopback Type C.

The test set allows you to select between Loopback Type A or B, and the fast bit error measurement, which uses Loopback Type C. Refer also to “[Fast Bit Error Measurement Description](#)” on page 90.

| | |
|------|--|
| NOTE | If the test set has codeware version A.02.00 or above, unnecessary loopback commands and delays can be eliminated by taking advantage of enhancements available. Previous versions of the test set required you to set the loopback type, and did not have a feature that allowed time for the loop to close. |
|------|--|

How is a bit error (BER) measurement made?

During BER measurements, the test set generates a downlink TCH with pseudo-random binary sequence, PRBS-15, data at a known level. The mobile station receives the data, loops it back to its transmitter, and returns the data to the test set. The test set compares data sent to data received, and BER is calculated.

SETup subsystem commands are sent to the test set to specify the time taken to close it's loopback path, whether to open or close a loop during downlink signaling operations (for example, channel assignment), the number of bits to test, measurement type, speech frames delay, measurements units, trigger arm, and measurement timeout values.

When a call is established on the TCH, the loopback type corresponding to one of the BER measurement types must be sent to the mobile station. The test set closes the loopback automatically and re-opens it when the measurement is closed (that is, when INITiate:BERRor is OFF).

You must set the measurement type from one of the six measurement types available, (see “[SETup:BERRor\[:TYPE\]](#)” on page 471). If you query a residual result when a non-residual measurement is initiated, the test set returns 9.91 E+37 (NAN). Measurement type must be set before initiating a BER measurement. See “[Measurements type](#)” on page 67

The loop must be closed before a BER test can start, using the close loop signalling delay time feature allows time for the loop to close. See “[SETup:BERRor:CLSDelay\[:STIMe\]](#)” on page 470 for more details.

Each mobile station may have a different time delay between receiving a speech frame and re-sending it on the uplink. By default, the test set is configured to LDControl:AUTO:ON, and the amount of delay needed is determined automatically when the test set has, for two frames, correctly received 80% of the downlink bits back on the uplink. The test set can be queried for the speech frames delay value.

If necessary, you can manually set the delay (see [“SETup:BERRor:LDControl:AUTo” on page 473](#)).

| | |
|-------------|---|
| NOTE | In case the test set is not able to correlate the data it transmits on the downlink with the data it receives on the uplink, a Measurement Timeout value should be set. If a timeout is not set and the test set is unable to correlate, the measurement will appear to “hang”. |
|-------------|---|

The BER measurement trigger source is always set to immediate. The BER measurement does not offer multi-measurement results. See [“Statistical Measurement Results” on page 158](#)

BER, FBER, and DAUDIO (uplink speech level) measurements are mutually exclusive measurements. Whichever of these measurements is activated last forces the others to stop.

Measurements type

Residual:

- Residual Type IA (50 bits per speech frame)
- Residual Type IB (132 bits per speech frame)
- Residual Type II (78 bits per speech frame)

Loopback Type A is sent to the mobile station when one of these residual measurement types is selected. A BER measurement with FE will return the frame erasure count or ratio results. The mobile station will indicate in the speech frame, if the downlink frame was received with CRC (cyclic redundancy check) errors the speech frames are erased. The mobile station sets all bits in the uplink speech frame to 0, indicating speech frames were erased.

Non-residual:

- Type IA (50 bits per speech frame)
- Type IB (132 bits per speech frame)
- Type II (78 bits per speech frame)

Loopback Type B is sent to the mobile station when one of these non-residual measurement types is selected. A BER measurement with CRC’s (cyclic redundancy check) will return the CRC count or ratio results. The mobile station will not indicate if any speech frames in the downlink were erased.

BER measurement results

The results of a BER measurement can be displayed in two ways, (number of errors counted) or (the ratio bad bits (errors) to total bits counted). If you are using the test set manually, select either Count or % from the Measurement Units field. If you are using the test set remotely, these results are available using the FETCh command, see “[FETCh:BERRor:COUNT\[:BITS\]?](#)” on page 388 or “[FETCh:BERRor:RATio\[:BITS\]?](#)” on page 391. Alternatively the “[FETCh:BERRor\[:ALL\]?](#)” on page 387 or “[FETCh:BERRor:FULL?](#)” on page 390 can also be used to return the results.

Type A Residual Measurement Results

- Integrity Indicator
- Bit Error Ratio
- Bits Tested
- Bit Error Count
- Frame Erasure Ratio
- Frame Erasure Count

Type B Non-Residual Measurement Results

- Integrity Indicator
- Bit Error Ratio
- Bits Tested
- Bit Error Count
- CRC Ratio
- CRC Count

Related Topics

[“Programming a Bit Error Measurement” on page 69](#)

[“Test Adherence to Standards” on page 131](#)

[“Fast Bit Error Measurement Description” on page 90](#)

[“Programming a Fast Bit Error Measurement” on page 93](#)

[“CALL:TChannel:LOOPback” on page 375](#)

[“BERR Troubleshooting” on page 72](#)

Programming a Bit Error Measurement

This measurement is *not* applicable to GPRS.

This section provides an example of how to make the bit error (BER) measurement via GPIB.

The following procedure assumes that an active link is established between the test set and the mobile station. See ["Establishing an Active GSM Link with the Mobile Station" on page 30](#).

1. Set the cell power to a good level.
2. Configure BER measurement parameters using the SETUp subsystem.
3. Set the measurement type (either residual Type IA, Type IB, Type II, or non-residual Type IA, Type IB, Type II).
4. Set the cell power to a low level for BER measurement.
5. Use the INITiate command to begin a BER measurement.
6. Use the INITiate:DONE? command to find out if the BER measurement results are available.
7. Use the FETCh? command to obtain BER measurement results.
8. Set the cell power to a good level.

Programming Example

```

10    OUTPUT 714;"SETUP:BERROR:TIMEOUT:TIME 5" ! BER measurement times out after
20                                ! 5 seconds.
30    OUTPUT 714;"CALL:CELL:POWER:AMPLITUDE -102 DBM" ! Sets the cell power level
40                                ! to a "low" level for the
50                                ! BER measurement.
60    OUTPUT 714;"SETUP:BERROR:CONTINUOUS OFF" ! Configures a BER measurement to
70                                ! Single Trigger.
80    OUTPUT 714;"SETUP:BERROR:COUNT 10000" ! Sets the number of bits to measure
90                                ! at 10,000.
100   OUTPUT 714;"SETUP:BERROR:CLSDELAY:STIME 500 MS" ! Sets the Close Loop Delay
110                                ! to 500 ms.
120   OUTPUT 714;"SETUP:BERROR:SLCONTROL ON" ! Sets the Signal Loop Control state to on.
130   OUTPUT 714;"SETUP:BERROR:TYPE TYPEIA" ! Sets the Measurement Type to IA.
140   OUTPUT 714;"SETUP:BERROR:LDCONTROL:AUTO OFF" ! Configure loopback delay
150                                ! control to manual.
160   OUTPUT 714;"SETUP:BERROR:MANUAL:DELAY 6" ! Set frame delay to 6 frames in order
170                                ! to correlate uplink and downlink bits.
180   OUTPUT 714;"INITIATE:BERROR" ! Start a BER measurement.
190   REPEAT
200     OUTPUT 714;"INITIATE:DONE?"
210     ENTER 714;Meas_comp$
220     PRINT Meas_comp$
230   UNTIL Meas_comp$="BERR"
240   OUTPUT 714;"FETCH:BERROR?" ! BERR results.
250   ENTER 714;Integrity,Bits_tested,Bit_err_ratio,Bit_err_count
260   OUTPUT 714;"FETCH:BERROR:COUNT:CRC?" ! Query CRC Count results.
270   ENTER 714;Crc_count
280   OUTPUT 714;"CALL:CELL:POWER:AMPLITUDE -85 DBM" ! Sets the cell power level
290                                ! to a good level.
300   END

```

Alternatively, you could use the “[FETCH:BERRor:FULL?](#)” query to return the same results but for all bit types simultaneously.

Returned values

The measurements returned by this program are:

- Integrity Indicator returns the “[Integrity Indicator](#)” on page 146 (0 means a successful measurement with no errors).
- Bits_tested returns the number of bits tested.
- Bit_err_ratio returns the ratio of bit errors to total bits tested.
- Bit_err_count returns the number of bit errors.
- Crc_count returns the CRC count (cyclic redundancy check).

Related Topics

[“Bit Error Measurement Description” on page 66](#)

[“SETup:BERRor” on page 469](#)

[“INITiate” on page 438](#)

[“FETCH:BERRor” on page 385](#)

[“Comprehensive Program Example” on page 223](#)

[“BERR Troubleshooting” on page 72](#)

BERR Troubleshooting

Possible Setup Issues

This measurement is *not* applicable to GPRS. To run this measurement ensure the test set is configured for GSM measurements.

During remote operation of the bit error measurement you should configure the trigger arm to single, see ["SETup:BERRor:CONTinuous" on page 472](#).

If the trigger arm is not set to single, the measurement may not return a result. When trigger arm is continuous the measurement rearms itself and starts another measurement cycle, during remote operation the fetch query may not be synchronized to the measurement cycle, see ["Measurement States" on page 170](#).

If you have a BER measurement active and your mobile drops the call it may be that you have the ["SETup:BERRor:SLControl" on page 474](#) command set to OFF. This is likely to occur with mobiles that do not respond to downlink signalling when loopback is closed. To solve this problem set the command to ON.

Interpreting Integrity Indicator values

See ["Integrity Indicator" on page 146](#).

BLER Reports Measurement Description

This measurement is *not* applicable to GSM.

Block Error Rate (BLER) reports can be used in the production process to test the performance of a GPRS mobile station's receiver. The BLER result is derived from the Radio Link Control (RLC) layer's Packet ACK/NACK (Acknowledged/Not Acknowledged) message. BLER is simply the ratio of the number of negatively acknowledged packets to the total number of packets acknowledged by the mobile station.

The test set uses an Agilent proprietary data connection to enable BLER reports to be retrieved from the mobile station (see "[CALL:FUNCTION:DATA:TYPE](#)" on page 321).

When are BLER Report Measurements Made?

You obtain BLER results using the GPIB query "[CALL:STATus:PDTCH | PDTChannel:BLERror?](#)" on page 367. This query returns the percentage of blocks tested that were in error and the total number of blocks used to generate the BLER result. The BLER results are reset using "[SYSTem:MEASurement:RESet](#)" on page 587.

The BLER results are only available when the data connection status is transferring (TRAN). If you require details on data connection states, see "[Data Connection Processing State Synchronization](#)" on page 53.

Programming a BLER Report Measurement

This section provides an example of how to use BLER reports to test your mobile station's receiver via GPIB.

The following procedure assumes that a data connection has been established between the test set and the mobile station (connection status is Transferring). See "[Step 5: Establish a Data Connection with the Mobile Station](#)" on page 253.

1. Use the CALL:STATus:PDTCH:BLERror? query to obtain the first BLER results.
2. End the data connection and then re-configure the downlink PDTCH power levels using the CALL: subsystem.
3. Reset the BLER results and then re-start the data connection.
4. Use the CALL:STATus:PDTCH:BLERror? query to obtain the second BLER results.

Programming Example

```

10      ! This code assumes that the current data connection state is Transferring
20      !
30      !
40      ! Read the initial BLER result
50      OUTPUT 714;"CALL:STAT:PDTCH:BLER?"
60      ENTER 714;Bler_initial,Blocks_initial
70      !
80      ! Print results at initial downlink PDTCH power level
90      ! of -90 dBm(-60 dBm BCH level - 30 dB fixed P0 level)
100     PRINT "BLER Result at downlink PDTCH power of -90 dBm = ";Bler_initial
110     PRINT "Blocks tested at -90 dBm = ";Blocks_initial
120     !
130     !
140     ! End the data connection before changing the downlink PDTCH power level
150     OUTPUT 714;"CALL:FUNC:DATA:STOP"
160     ! Check the connection status to make sure the state is Attached
170     WAIT 4
180     OUTPUT 714;"CALL:STAT:DATA?"
190     ENTER 714;Conn_stat$
200     IF Conn_stat$<>"ATT" THEN
210         PRINT "Data Connection was not stopped"
220         STOP
230     END IF
240     !
250     ! Set up and select the downlink PDTCH power reduction levels for bursts 1 and 2
260     OUTPUT 714;"CALL:PDTCH:PRED:LEV1 10db"
270     OUTPUT 714;"CALL:PDTCH:PRED:BURS1 PRL1"
280     OUTPUT 714;"CALL:PDTCH:PRED:BURS2 PRL1"
290     OUTPUT 714;"SYST:MEAS:RES" ! Reset the BLER results
300     ! Now re-establish the data connection
310     OUTPUT 714;"CALL:FUNC:DATA:STAR:SEQ"
320     ! Check the connection status to make sure the state is Transferring
330     WAIT 4
340     OUTPUT 714;"CALL:STAT:DATA?"
350     ENTER 714;Conn_stat$
360     IF Conn_state$<>"TRAN" THEN
370         PRINT "Data connection failed. Terminated program."
380         STOP
390     END IF
400     !
410     ! Now obtain the second set of BLER results at lower downlink PDTCH power level
420     OUTPUT 714;"CALL:STAT:PDTCH:BLER?"
430     ENTER 714;Bler_second,Blocks_second
440     !
450     ! Print results at lower downlink PDTCH power level of -100 dBm
460     PRINT "BLER Result at downlink PDTCH power of -100 dBm = ";Bler_second
470     PRINT "Blocks tested at -100 dBm = ";Blocks_second
480     END

```

Returned Values

The measurement reports returned by this program are:

- `Bler_initial` returns the BLER result, in percent (%) when the downlink PDTCH power levels are at their default value of -90 dBm.
- `Blocks_initial` returns the number of blocks tested to calculate the first BLER result.
- `Bler_second` returns the second BLER result, in percent (%). This result has been obtained when the downlink PDTCH power levels have been reduced by 10 dB to -100 dBm.
- `Blocks_second` returns the number of blocks tested to calculate the second BLER result.

Related Topics

[“Testing a GPRS Mobile Station” on page 635](#)

[“CALL:STATus:PDTCH | PDTChannel:BLERror?” on page 367](#)

[“Programming the Agilent Technologies 8960 Series 10 for GPRS Mobile Testing in Active Cell Operating Mode” on page 235](#)

Decoded Audio Measurement Description

This measurement is *not* applicable to GPRS.

How is a decoded audio (DAUDIO) measurement made?

This measurement is also known as decoded audio or uplink speech level measurement. The DAUDIO measurement tests the ability of the mobile station to encode an audio signal onto the uplink traffic channel.

1. The audio signal originates from the test set's AUDIO OUT connector. The audio signal is connected to the mobile station by means of an audio frequency input connector, or acoustically through a speaker placed near the microphone of the mobile station. See ["AFGenerator" on page 290](#) for set up commands for the test set's audio generator.
2. The mobile station digitizes and encodes the audio signal that is transmitted on the uplink TCH.
3. The uplink TCH is decoded with a bit accurate GSM RPE-LTP decoder to yield a block of 13-bit PCM samples within the DSP. As described in ETSI GSM 06.10.

NOTE The MS needs to be stimulated with a pulsed audio signal during a DAUDIO measurement. The audio signal must be pulsed at a 10 Hz rate with 50% duty cycle. See ["AFGenerator:PULSe\[:STATE\]" on page 291](#).

The decoded audio measurement returns the rms value, in percent of full scale, of the speech signal present on the uplink (encoded) audio signal over a 100 ms (10 Hz) period of time.

The DAUDIO measurement performs an rms level measurement of a speech signal on the uplink TCH with optional bandpass filtering. Speech data can be filtered using a tunable 100 Hz bandpass filter prior to analysis. The center frequency of the 100 Hz bandpass filter may be tuned from 200 Hz to 3.6 kHz. Setting the frequency will activate the filter.

The trigger source for a DAUDIO measurement is always set to Immediate.

The DAUDIO measurement, BER and Fast BER measurements are mutually exclusive. Whichever of these measurements is activated last forces the other to become inactive.

Single or Multi-Measurements

The DAUDIO measurement can return single or averaged measurements defined by the multi-measurement count. A single measurement (multi-measurement count off) returns an estimate of the rms value of the decoded speech signal after removal of any dc component. The measurement units are in percent of full scale (%FS), ranging from 0 to 100%. Values greater than 70.70% may only result from non-sinusoidal signals. Multiple measurements (multi-measurement count >1) provide average, minimum, maximum, and standard deviation results. An integrity indicator is returned for both multi-measurement states. None of the results are affected by amplitude offset.

Trigger Source

DAUDIO measurement does not support any trigger source other than immediate.

Related Topics

[“Programming a Decoded Audio Measurement” on page 78](#)

[“Test Adherence to Standards” on page 131](#)

Programming a Decoded Audio Measurement

This measurement is *not* applicable to GPRS.

This section provides an example of how to make a Decoded Audio (DAUDIO) measurement. The following procedure assumes that an active link is established between the test set and the mobile station. See ["Establishing an Active GSM Link with the Mobile Station" on page 30](#).

1. Configure decoded audio measurement parameters using the SETUp subsystem.
2. Setup the audio source to stimulate the mobile station with a pulsed audio signal.
3. Start the decoded audio measurement using the INITiate subsystem.
4. Use the INITiate:DONE? command to find out if decoded audio measurement results are available.
5. Use the FETCh? command to obtain decoded audio measurement results.

Programming Example

```

10  OUTPUT 714;"SETUP:DAUDIO:CONTINUOUS OFF"          ! Configures the decoded audio
20                                         ! measurement to single trigger mode.
30  OUTPUT 714;"AFGENERATOR:PULSE:STATE ON"          ! Audio signal must be pulsed.
40  OUTPUT 714;"AFGENERATOR:VOLTAGE:SAMPLITUDE 100MV"
50  OUTPUT 714;"AFGENERATOR:FREQUENCY 2.1KHZ"
60  OUTPUT 714;"SETUP:DAUDIO:FILTER:SFREQUENCY 2.1KHZ"! Specifies the tunable
70                                         ! bandpass filter frequency
80                                         ! and set the filter state to on.
90  OUTPUT 714;"INITIATE:DAUDIO"
100 REPEAT
110    OUTPUT 714;"INITIATE:DONE?"                   ! Check to see if measurement done.
120    ENTER 714;Meas_complete$=
130    UNTIL Meas_complete$="DAUD"
140    OUTPUT 714;"FETCH:DAUDIO?"                   ! Fetch the decoded audio results.
150    ENTER 714;Ingerity,Decoded_audio
160 END

```

Returned Values

The measurements returned by this program are:

- Integrity returns the measurement ["Integrity Indicator" on page 146](#) (0 means a successful measurement with no errors).
- Decoded_audio returns the decoded audio measurement results in percent (%).

Related Topics

[“Decoded Audio Measurement Description” on page 76](#)

[“SETup:DAUDio” on page 484](#)

[“INITiate” on page 438](#)

[“FETCH:DAUDio” on page 393](#)

[“Comprehensive Program Example” on page 223](#)

Decoded Audio (DAUDio) Troubleshooting

Possible Setup Issues

This measurement is *not* applicable to GPRS. To run this measurement ensure the test set is configured for GSM measurements.

During remote operation of the analog audio measurement you should configure the trigger arm to single, see “[SETup:DAUDio:CONTinuous](#)” on page 485.

If the trigger arm is not set to single, the measurement may not return a result. When trigger arm is continuous the measurement rearms itself and starts another measurement cycle, during remote operation the fetch query may not be synchronized to the measurement cycle, see “[Measurement States](#)” on page 170.

The audio signal expected by the DAUDio measurement is, pulsed at a 10 Hz rate and has a 50% duty cycle. The device under test should have echo cancellation disabled.

The signal measured is whatever is coming back in the speech frames, this includes any electrical or acoustical coupling from the downlink signal, earpiece or any noise coupled from the microphone of the MS.

Interpreting Integrity Indicator values

See “[Integrity Indicator](#)” on page 146.

If PCM Full Scale Warning (14) is returned the measurement is accurate, however you may want to reduce the signal level applied to the test set to achieve an integrity indicator of zero.

If the DAUDio measurement is active when the channel mode is set to EFRSpeech (see “[CALL:TCHannel:CMODE](#)” on page 374), Questionable Result Due To Channel Mode (16) is returned. This is because the DAUDio measurement is not supported in this channel mode.

Dynamic Power Measurement Description

This measurement is *not* applicable to GPRS.

How is a Dynamic Power Measurement Made?

The Dynamic Power measurement performs a series of consecutive power measurements on a mobile station returning a power measurement and an integrity value for each burst measured. Dynamic Power is only available via the test set's remote user interface.

Dynamic Power is not an ETSI specified measurement.

The signal is measured at the RF IN/OUT port.

Single or Multi Measurements

The Dynamic Power measurement does not use the multi-measurement state parameter, and so does not return minimum, maximum, and standard deviation values. Instead, you specify the number of bursts that you want to measure using the Number of Bursts parameter (see ["SETup:DPOWer:COUNt:NUMBer" on page 490](#)). A single measurement returns the integrity indicator and power level for every burst measured. For example, if you set the number of bursts to 15, the returned comma-separated list contains 15 integrity values followed by 15 corresponding measurement values.

Types of Signals Dynamic Power can Measure

Dynamic Power measurements can be made on these types of input signals:

- Normal GSM TCH burst with mobile station in active cell mode.
- Normal GSM TCH burst with mobile station in test mode (no protocol).

Input Signal Requirements

The Dynamic Power measurement will complete and meet its measurement accuracy specifications when the signal meets the following input signal conditions.

- Input signal level is between -20 dBm and +43 dBm.
- Input signal level is within +3 dB and -3 dB of the expected input level.
- Input signal is within 100 kHz of the measurement frequency.
- The measurement frequency is within the currently selected band.

Trigger Source

The only trigger source that the Dynamic Power measurement supports is RF Rise.

Related Topics

[“SETup:DPOWer” on page 489](#)

[“FETCH:DPOWer” on page 397](#)

[“Test Adherence to Standards” on page 131](#)

Dynamic Power Troubleshooting

Possible Setup Issues

The Dynamic Power measurement closes all other currently active measurements when it is initiated. When this happens, the test set beeps and a measurement specific closure warning is reported via GPIB for each measurement that has been closed (see “[+700 to +799 Test Application Measurement Device-Specific Error](#)” on page 713).

Interpreting Integrity Indicator Values

See “[Integrity Indicator](#)” on page 146.

I/Q Tuning Measurement Description

This measurement is *not* applicable to GPRS.

How is an I/Q Tuning Measurement Made?

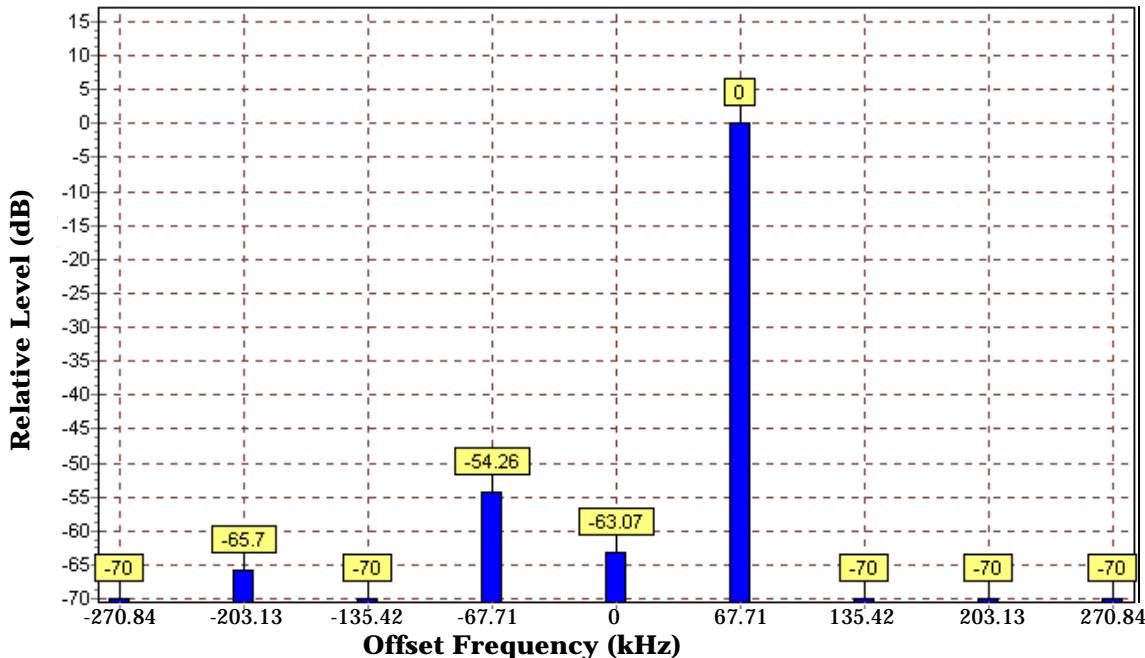
The I/Q Tuning measurement is used in the production process (normally at mobile pre-test) where the I/Q modulator of the mobile is being calibrated. The measurement is normally performed with the mobile station in test mode and transmitting a GMSK modulated sequence of all 0s or all 1s. The mobile can be transmitting either a bursted signal or a continuous wave signal. I/Q Tuning is not an ETSI specified measurement.

The carrier frequency is shifted up or down 67.7083 kHz by transmitting a sequence of all 0s (+67.7083 kHz) or all 1s (-67.7083 kHz). The accuracy of the mobile's I/Q modulator is determined by measuring the level of spurious signals relative to the desired signal (the desired signal being the carrier frequency +/-67.7083 kHz). The signals the test set measures are: the carrier frequency (Fc); Fc+/-67.7083 kHz; Fc+/-135.417 kHz; Fc+/-203.125 kHz and Fc+/-270.833 kHz. These signals are measured at the RF IN/OUT port.

The figure below shows a typical spectrum generated by a mobile transmitting a sequence of all 0s. The peak at the +67.7083 kHz offset is the one used as the reference.

The I/Q Tuning measurement also allows you to make an additional relative power measurement at any frequency you want between -13.0 MHz to -1.0 MHz and +1.0 MHz to +13.0 MHz relative to the carrier frequency.

Figure 3. Spectrum of a mobile transmitting a sequence of all 0s



Single or Multi Measurements

The I/Q Tuning measurement can return either single or averaged measurement results.

- If you set the multi-measurement state OFF then only a single measurement is made at each offset.
- If you set the multi-measurement state ON, and the multi-measurement count number to a value greater than one, then multiple measurements are made at each offset. The returned results are an average of these measurements.

Types of Signals I/Q Tuning can Measure

I/Q Tuning measurements can be made on these types of input signals.

- Normal GSM TCH burst without a midamble.
- CW signal.

I/Q Tuning Input Signal Requirements

The I/Q Tuning measurement will complete and meet its measurement accuracy specifications under the following input signal conditions.

- Input signal level is between -15 dBm and +43 dBm.
- Input signal level is within +3 dB and -10 dB of the expected input level.
- Signal must be within 500 kHz of expected frequency for RF Rise triggering to function.

Trigger Source

The trigger source depends on the type of input signal.

Recommended Trigger Source Settings

| Input Signal Type | Recommended Trigger Source |
|---|----------------------------|
| Normal GSM TCH burst without a midamble | RF Rise |
| CW signal | Immediate |

Related Topics

[“Programming an I/Q Tuning Measurement” on page 86](#)

[“Test Adherence to Standards” on page 131](#)

Programming an I/Q Tuning Measurement

This measurement is *not* applicable to GPRS.

This section provides an example of how to make an I/Q Tuning measurement via the GPIB.

1. Ensure that the mobile is in test mode and is transmitting all 1s or all 0s.
2. Ensure that the expected frequency, expected power level and trigger are appropriately set.
3. Configure the I/Q Tuning measurement parameters using the SETup subsystem.
4. Start the I/Q Tuning measurement using the INITiate subsystem.
5. Use the INITiate: DONE? command to determine if I/Q Tuning measurement results are available.
6. Use the FETCh? command to obtain I/Q Tuning measurement results.

Programming Example

The following program shows how to make an I/Q Tuning measurement on a normal GSM TCH burst. If you want to test a CW signal all you need to change in this program is the trigger type, which should be set to Immediate, rather than RF Rise.

```

10 PRINT "Ensure your mobile is transmitting:" !On-screen prompts.
20 PRINT "-all 1s or all 0s."
30 PRINT "-on ARFCN 30."
40 PRINT "-a power level of 10 dBm."
50 PRINT " "
60 PRINT "Press any key to continue."
70 LOOP
80     ON KBD GOTO Key_exit
90 END LOOP
100 Key_exit: !
110 OUTPUT 714;"RFANALYZER:MANUAL:CHANNEL:SELECTED 30" !Configures the
120             !test set to expect a transmission on ARFCN 30.
130 OUTPUT 714;"RFANALYZER:EXPECTED:POWER:SELECTED 10 DBM" !Configures
140             !the test set to expect a power level of 10 dBm.
150 OUTPUT 714;"SETUP:IQTUNING:CONTINUOUS OFF" !Configures trigger
160             !mode to single for an I/Q Tuning measurement.
170 OUTPUT 714;"SETUP:IQTUNING:COUNT:SNUMBER 50" !Configures the
180 OUTPUT 714;"SETUP:IQTUNING:SPUR:STATE ON" !Configures spur on.
190 OUTPUT 714;"SETUP:IQTUNING:SPUR:FREQUENCY 10MHZ" !Configures a
200             !power measurement at 10MHz from the carrier.
210             !multi_measurement state to ON with a measurement count value
220             !of 50.
230 OUTPUT 714;"SETUP:IQTUNING:TRIGGER:SOURCE RISE" !Configures the
240             !trigger source to RF RISE.
250 OUTPUT 714;"SETUP:IQTUNING:REFERENCE:FREQUENCY AUTO" !Sets the
260             !set to choose which offset frequency is to be used as the ref.
270 OUTPUT 714;"INITIATE:IQTUNING" !Start I/Q Tuning measurement.
280 REPEAT

```

```

290     OUTPUT 714;"INITIATE: DONE?"!Check to see if I/Q Tuning
300     !measurement complete.
310     ENTER 714;Meas_complete$
320 UNTIL Meas_complete$="IQT"
330 OUTPUT 714;"FETCH:IQTUNING:ALL?"!Fetches the measurement integrity
340 !value and the relative power levels at the offset frequencies.
350 ENTER 714;Integrity,N270,N203,N135,N67,Carrier,P67,P135,P203,P270,Sr
360 PRINT "I/Q Tuning Measurement Results"
370 PRINT "Integrity = ";Integrity
380 PRINT "Spur Power = ";Sr
390 PRINT "Offset (kHz)      Level (dB)"
400 PRINT "-----      -----"
410 PRINT "-270.334      ";N270
420 PRINT "-203.125      ";N203
430 PRINT "-135.417      ";N135
440 PRINT "-67.708      ";N67
450 PRINT "0.000      ";Carrier
460 PRINT "+67.708      ";P67
470 PRINT "+135.417      ";P135
480 PRINT "+203.125      ";P203
490 PRINT "+270.334      ";P270
500 END

```

Returned Values

The measurements returned by this program are:

- Integrity returns the measurement [“Integrity Indicator” on page 146](#) (0 means a successful measurement with no errors).
- The signal level of the following offsets are measured relative to the signal level at the reference offset (either Fc + 67.7083 kHz for all 0s or Fc -67.7083 kHz for all 1s). Note, if the TX I/Q Tuning measurement multi-measurement command is set to ON the average of all the individual results at each offset are returned.
 - -270.833 kHz
 - -203.125 kHz
 - -135.417 kHz
 - -67.7083 kHz
 - Carrier Frequency
 - +67.7083 kHz
 - +135.417 kHz
 - +203.125 kHz
 - +270.833 kHz

Related Topics

[“I/Q Tuning Measurement Description” on page 84](#)

[“SETup:IQTuning” on page 493](#)

[“INITiate” on page 438](#)

[“FETCH:IQTuning” on page 403](#)

I/Q Tuning Troubleshooting

Possible Setup Issues

This measurement is *not* applicable to GPRS. To run this measurement ensure the test set is configured for GSM measurements.

On most occasions the test set will be able to select the correct reference frequency when “[SETup:IQTuning:REFerence\[:FREQuency\]](#)” is set to AUTO. However, if the I/Q Modulator is very badly calibrated, it is possible that the test set selects the wrong offset. This could be confirmed by using the “[SETup:IQTuning:REFerence\[:FREQuency\]](#)” query.

If your measurement results are invalid or look as if they are centered around the wrong frequency it may be that the carrier frequency is not correctly specified. You must input the carrier frequency into the test set. Invalid measurements may be also be caused by modulation data other than all 1s or all 0s, for example, it may be that a midamble is being transmitted.

Interpreting Integrity Indicator Values

See “[Integrity Indicator](#)” on page 146.

Fast Bit Error Measurement Description

This measurement is *not* applicable to GPRS.

Bit Error Measurements vs. Fast Bit Error Measurements

There are three commonly used types of bit error measurements in GSM:

- “BER with Frame Erasure” or “Residual BER” when the mobile station has been configured to loopback Type A.
- “BER without Frame Erasure” or “Non-residual BER” when the mobile station has been configured to loopback Type B.
- BER using burst-by-burst loopback when the mobile station has been configured to loopback Type C.

The test set allows you to select between Loopback Type A or B, and the Fast Bit Error Measurement, which uses Loopback Type C. Refer also to “[Bit Error Measurement Description](#)” on page 66.

| | |
|------|--|
| NOTE | If the test set has codeware version A.02.00 or above, unnecessary loopback commands and delays can be eliminated by taking advantage of enhancements available. Previous versions of the test set required you to set the loopback type, and did not have a feature that allowed time for the loop to close. |
|------|--|

How is a fast bit error (FBER) measurement made?

During FBER measurements, the test set generates a downlink TCH with (Pseudo Random Binary Sequence) PRBS-15 data at a known low level. The mobile station receives the data, loops it back to its transmitter, and returns the data to the test set. The test set compares data sent to data received, and FBER is calculated. see “[CALL:TCHannel](#)” on page 370

SETup subsystem commands are sent to the test set to specify close loop delay, signal loopback control, the number of bits to test, TDMA frames delay, measurement unit, trigger arm, and measurement timeout values.

When a call is established on the TCH, the loopback type is sent to the mobile station if the signal loopback control is on, see “[SETup:FBERror:SLControl](#)” on page 480. If you set signal loopback control to off, the loopback type is controlled using “[CALL:TCHannel:LOOPback](#)” on page 375. If you are using the test set manually, the loopback type is controlled using **Mobile Loopback (F12)** on **Call Params** menu 1 of 4.

FBER measurements use mobile station burst-by-burst loopback, referred to as loopback type C. In loopback type C the comparison is made between the 114 bits of data sent from the test set to the mobile station, then looped back and received by the test set.

The loop must be closed before a FBER test can start, using the close loop signalling delay time feature allows time for the loop to close. See “[SETup:FBERror:CLSDelay\[:STIMe\]](#)” on page 477 for more details.

Each MS may have a different delay between receiving a TDMA frame and re-sending it on the uplink. By default, the test set is configured to LDControl:AUTO:ON, and the amount of delay needed is determined automatically when the test set has, for two frames, correctly received 80% of the downlink bits back on the uplink. The test set can be queried for the TDMA frames delay value.

If necessary, you can manually set the delay. See “[SETup:FBERror:LDControl:AUTO](#)” on page 479 or “[SETup:FBERror:MANual:DELay](#)” on page 480

| | |
|-------------|---|
| NOTE | In case the test set is not able to correlate the data it transmits on the downlink with the data it receives on the uplink, a Measurement Timeout value should be set. If a timeout is not set and the test set is unable to correlate, the measurement will appear to “hang”. |
|-------------|---|

The FBER, BERR and the DAUDIO (uplink speech level) measurements are mutually exclusive, that is which ever of these measurements is activated last forces the other to become inactive. see “[Decoded Audio Measurement Description](#)” on page 76

FBER measurement trigger source is always set to immediate. The FBER measurement does not offer multi-measurement results. see “[Statistical Measurement Results](#)” on page 158

FBER measurement results

These the measurement results available from an FBER measurement.

The results of a FBER measurement can be displayed in two ways, (number of errors counted) or (the ratio bad bits (errors) to total bits counted). If you are using the test set remotely these results are available by using the FETCh command, see “[FETCh:FBERror:COUNt?](#)” on page 401 or “[FETCh:FBERror:RATio?](#)” on page 402. If you are using the test set manually select either Count or % from the Measurement Units field.

Manual user interface results:

- Fast BER Ratio (bad bits to total bits tested)
- Fast BER Count (bad bits found during a measurement)
- TDMA frame Delay (if TDMA Frame Loopback Delay Control = Manual)
- RX Level
- RX Quality

Remote user interface results:

- Fast BER Ratio (bad bits to total bits tested)
- Fast BER Count (bad bits found during a measurement)
- TDMA Frame Delay (if TDMA Frame Loopback Delay Control = Manual)
- Integrity Indicator
- Intermediate Count

Related Topics

“Programming a Fast Bit Error Measurement” on page 93

“Test Adherence to Standards” on page 131

“Bit Error Measurement Description” on page 66

“Programming a Bit Error Measurement” on page 69

“CALL:TChannel:LOOPback” on page 375

Programming a Fast Bit Error Measurement

This measurement is *not* applicable to GPRS.

This section provides an example of how to make the fast bit error (FBER) measurement via GPIB.

The following procedure assumes that an active link is established between the test set and the mobile station. See ["Establishing an Active GSM Link with the Mobile Station" on page 30](#).

1. Set the cell power to a good level.
2. Configure FBER measurement parameters using the SETUp subsystem.
3. Set the cell power to a low level for a FBER measurement.
4. Start the FBER measurement using the INITiate subsystem.
5. Use the INITiate:DONE? command to find out if the FBER measurement results are available.
6. Use the FETCh? command to obtain FBER measurement results.
7. Set the cell power to a good level.

Programming Example

```

10    OUTPUT 714;"SETUP:FBERROR:TIMEOUT:TIME 5" ! BER measurement times out after
20                                ! 5 seconds.
30    OUTPUT 714;"CALL:CELL:POWER:AMPLITUDE -85 DBM" ! Sets the cell power level to
40                                ! a good level.
50    OUTPUT 714;"SETUP:FBERROR:CONTINUOUS OFF" ! Configures a BER measurement to
60                                ! Single Trigger.
70    OUTPUT 714;"SETUP:FBERROR:COUNT 10000" ! Sets the number of bits to measure
80                                ! at 10,000.
90    OUTPUT 714;"SETUP:FBERROR:CLSDELAY:STIME 500 MS" ! Sets the Close Loop Delay
100                                ! to 500 ms.
110   OUTPUT 714;"SETUP:FBERROR:SLCONTROL ON" ! Sets the Signal Loop Control state to on.
120   OUTPUT 714;"SETUP:FBERROR:LDCONTROL:AUTO OFF" ! Configure loopback delay
130                                ! control to manual.
140   OUTPUT 714;"SETUP:FBERROR:MANUAL:DELAY 6" ! Set frame delay to 6 frames in order
150                                ! to correlate uplink and downlink bits.
160   OUTPUT 714;"CALL:CELL:POWER:AMPLITUDE -102 DBM" ! Sets the cell power level
170                                ! to a "low" level for the
180                                ! BER measurement.
190   OUTPUT 714;"INITIATE:FBERROR" ! Start a FBER measurement.
200   REPEAT
210     OUTPUT 714;"INITIATE:DONE?"
220     ENTER 714;Meas_comp$
230     PRINT Meas_comp$
240     UNTIL Meas_comp$="FBER"
250     OUTPUT 714;"FETCH:FBERROR?"
260     ENTER 714;Integrity,Bits_tested,Fas_bit_ratio,Fas_bit_err_cnt
270     OUTPUT 714;"CALL:CELL:POWER:AMPLITUDE -85 DBM" ! Sets the cell power level
280                                ! to a good level.

```

290 END

Returned values

The measurements returned by this program are:

- Integrity returns the measurement “[Integrity Indicator](#)” on page 146 (0 means a successful measurement with no errors).
- Bits_tested returns the number of bits tested.
- Bit_error_ratio returns the ratio of bit errors to total bits tested, in percent (%).
- Bit_error_count returns the number of bit errors.

Related Topics

“[Fast Bit Error Measurement Description](#)” on page 90

“[SETup:FBERror](#)” on page 476

“[INITiate](#)” on page 438

“[FETCh:FBERror](#)” on page 399

“[Comprehensive Program Example](#)” on page 223

FBER Troubleshooting

Possible Setup Issues

This measurement is *not* applicable to GPRS. To run this measurement ensure the test set is configured for GSM measurements.

During remote operation of the Fast BER measurement you should configure the trigger arm to single, see "[SETup:FBERror](#)" on page 476.

If the trigger arm is not set to single, the measurement may not return a result. When trigger arm is continuous the measurement rearms itself and starts another measurement cycle, during remote operation the fetch query may not be synchronized to the measurement cycle, see "[Measurement States](#)" on page 170.

Set signalling loopback control to on; if signalling loopback control is off, set loopback to Type C, see "[CALL:TChannel:LOOPback](#)" on page 375.

The test set may never correlate the uplink and downlink, see "[SETup:FBERror:LDControl:AUTO](#)" on page 479 so that the measurement appears to hang. The mobile station may not have closed its loop after the loopback type was set. You must allow sufficient time for the mobile station to close its loop and set time out mechanisms see "[SETup:FBERror:TIMEout\[:STIMe\]](#)" on page 481.

Interpreting Integrity Indicator values

See "[Integrity Indicator](#)" on page 146.

Questionable Result for PGSM (15) Fast BER measurement appears to work but it is only possible on a Phase 2 GSM system.

Output RF Spectrum Measurement Description

How is an output RF spectrum (ORFS) measurement made?

ORFS is a narrow-band measurement that provides information about the distribution of the mobile station transmitter's out-of-channel spectral energy due to modulation and switching as defined in ETSI GSM 05.05, section 4.2, ETSI GSM 11.10, section 13.4. For GPRS mobiles which support a single uplink timeslot, the ORFS due to switching measurement conforms to ETSI GSM 11.10, section 13.16.3.

ORFS due to modulation measures out of channel interference during the useful part of the burst excluding the midamble. The measurement returns relative results in (dB) using the power in a 30 kHz bandwidth at zero offset as the reference. You can set 0 to 22 offsets.

ORFS due to switching measures out of channel interference over the entire burst, plus up to 10 additional bits on either side of the 147 bit wide normal burst. The measurement returns absolute power results (dBm) for each offset indicating the maximum value over the entire burst. You can set 0 to 8 ORFS due to switching offsets.

The test set's measurements include both ORFS due to modulation and ORFS due to switching. Switching and modulation measurements may be performed from the same burst. If you request both modulation and switching results at the same frequency offsets, measurement throughput is improved. Measurements are made using a 30 kHz IF bandwidth, 5-pole synchronously tuned filter.

The number of measurements to be averaged for each offset may be different. The test set internally controls all other aspects of the measurement, including calibration.

TX power (average power), 30 kHz bandwidth power at zero offset, ORFS due to modulation average power, and ORFS due to switching maximum power are included in an ORFS measurement, when both modulation and switching measurements are made. (TX power is performed using the same method as described in the ["Transmit Power Measurement Description" on page 127](#), which synchronizes the measurement with the burst amplitude).

ORFS due to modulation

When multiple offsets for the ORFS due to modulation measurement are set, the DSP averages the power across the appropriate time segments (40 bits) of the burst with a 30 kHz resolution bandwidth, 5-pole, synchronously tuned filter placed at the center frequency of the burst and compares it to a time segment of the response of the same filter placed at some frequency offset. The result is a relative power measurement using the 30 kHz bandwidth power at zero offset as a reference. For each offset you specify, the DSP retunes the filter and measures the 30 kHz bandwidth power and compares it to the reference, giving a relative power measurement of signal power over the entire burst. The DSP processes the data and makes the results available to you. The 30 kHz bandwidth power at zero offset is measured only if you request at least one ORFS due to modulation measurement.

For all offsets, the ORFS due to modulation measurement uses the 30 kHz resolution bandwidth filter. ETSI specifies a 100 kHz resolution bandwidth filter for the 1800 kHz offset.

The ORFS due to modulation measurement measures both the front and back data portions of the burst. Measurements occur from bit 15 to 60 and from bit 87 to 132. GSM 11.10 recommends that this measurement is performed on only the back section of the burst. Measuring both the front and back of the burst has the speed advantage of providing two modulation measurements per burst.

ORFS due to switching

When multiple offsets for the ORFS due to switching measurement are set, the DSP tunes the 30 kHz resolution bandwidth, 5-pole, synchronously tuned filter to the first requested offset and samples the power of the signal over the entire burst. The result for this measurement is the maximum of these sampled values and is reported as an absolute power measurement. The DSP then retunes the filter, samples the signal, processes the data for each requested offset, then provides the results.

The 30 kHz bandwidth power at zero offset measurement is not made during ORFS due to switching measurements. In order to make that measurement, you must request at least one ORFS due to *modulation* measurement.

Single or Multi-Measurements

To obtain statistical measurement results, the multi-measurement count must be set for both switching and modulation measurements. (See ["Statistical Measurement Results" on page 158](#) for more information.)

Changing the multi-measurement modulation or switching count number or setting multi-measurement to ON allows the test set to make multiple measurements at each frequency offset, thereby providing average power results across the number of frequency offsets selected. If you set Multi-measurement count state to OFF only one ORFS measurement is completed at each offset (that is, one ORFS due to modulation, and one ORFS due to switching measurement).

- If you want to make multiple ORFS due to *modulation* measurements and no ORFS due to switching measurements, a number must be entered in the multi-measurement modulation count, and all the *switching* offset frequencies must be off.
- In order to make multiple ORFS due to *switching* measurements and no ORFS due to modulation measurements, a number must be entered in the multi-measurement switching count, and all *modulation* offset frequencies must be off.

Making an ORFS measurement on GPRS mobiles while using the BLER data connection type.

The result of the Output RF Spectrum measurement relies on pseudo random data being present in the data field of the RF burst. When using the BLER data connection type, these data fields do not contain pseudo random data, therefore the results may be different from what would be expected.

Types of Signals ORFS can Measure

ORFS measurements can be made on these types of input signals:

- Normal GSM TCH or GPRS PDTCH burst with mobile station in active cell mode.
- Normal GSM TCH burst with mobile station in test mode.
- Non-bursted signal including GMSK modulation with mobile station in test mode.

For a non-bursted signal, an ORFS due to switching measurement result is not useful.

Input Signal Requirements

The ORFS measurement will complete and meet its accuracy specification under the following conditions:

- Input signal level is between –10 dBm and +43 dBm.
- Input signal level within +/- 3 dB of the expected input level.
- Frequency is within +/- 200 Hz of expected input frequency.

Trigger Source

Auto triggering is the recommended trigger source for each measurement, allowing the test set to choose the preferred trigger source. However, you may want to select the trigger source.

Table 3. Recommended Trigger Source Settings

| Input Signal Type | Recommended Trigger Source |
|--|----------------------------|
| Normal GSM TCH or GPRS PDTCH burst with mobile station in active cell mode | Protocol |
| Normal GSM TCH burst with mobile station in test mode | RF Rise |
| Non-bursted signal including GMSK data with mobile station in test mode | RF Rise |

Related Topics

[“Programming an Output RF Spectrum Measurement” on page 99](#)

[“Test Adherence to Standards” on page 131](#)

Programming an Output RF Spectrum Measurement

This section provides an example of how to make the output RF spectrum (ORFS) measurement via GPIB.

The following procedure assumes that an active link is established between the test set and the mobile station. See “[Establishing an Active GSM Link with the Mobile Station](#)” on page 30.

1. Configure the ORFS measurement parameters using the SETUp subsystem.
2. Start the ORFS measurement using the INITiate subsystem.
3. Use the INITiate: DONE? command to find out if ORFS measurement results are available.
4. Use the FETCh? command to obtain ORFS Power measurement results.

Programming Example

```

10  OUTPUT 714;"SETUP:ORFSPECTRUM:CONTINUOUS OFF" !Configures a ORFS measurement
20                                !to single trigger mode.
30  OUTPUT 714;"SETUP:ORFSPECTRUM:COUNT:STATE ON" !Configures a multi-measurement
40                                !state to on.
50  OUTPUT 714;"SETUP:ORFSPECTRUM:TRIGGER:SOURCE AUTO" !Configure trigger source
60                                !to auto.
70  OUTPUT 714;"SETUP:ORFSPECTRUM:SWITCHING:COUNT:NUMBER 50" !Configures ORFS due
80                                !to switching
90                                !multi-measurement
100                               !count.
110 OUTPUT 714;"SETUP:ORFSPECTRUM:SWITCHING:FREQUENCY 200KHZ,400KHZ" !Configure
120                                !switching
130                                !offsets.
140 OUTPUT 714;"SETUP:ORFSPECTRUM:MODULATION:COUNT:NUMBER 100" !Configure ORFS
150                                !due to modulation
160                                !multi-measurement
170                                !count.
180 OUTPUT 714;"SETUP:ORFSPECTRUM:MODULATION:FREQUENCY 200KHZ" !Configure
190                                !modulation offset.
200 OUTPUT 714;"INITIATE:ORFSPECTRUM" !Start ORFS measurement.
210 REPEAT
220 OUTPUT 714;"INITIATE:DONE?" !Check to see if ORFS measurement is done.
230 ENTER 714;Meas_complete$ 
240 UNTIL Meas_complete$="ORFS" !"ORFS" must be all upper case.
250 OUTPUT 714;"FETCH:ORFSPECTRUM:ALL?" !Fetch ORFS results.
260 ENTER 714;Integrity,Tx_pwr,Max_swit_200,Max_swit_400,Bw_pwr,Avg_mod_200
270 END

```

Returned values

The measurements returned by this program are:

- `Integrity` returns the measurement “[Integrity Indicator](#)” on page 146 (0 means a successful measurement with no errors).
- `Tx_pwr` returns the transmit power in dBm.
- `Max_swit_200`, `Max_swit_400` returns maximum ORFS power due to switching in dBm (one maximum power level at a 200 kHz offset and one maximum power level at a 400 kHz offset).
- `Bw_pwr` returns the power level in a 30 kHz bandwidth at zero offset in dBm (this is the reference level for ORFS power due to switching and ORFS power due to modulation).
- `Avg_mod_200` returns the average ORFS power due to modulation in dBm (one average power level at a 200 kHz offset).

Related Topics

[“Output RF Spectrum Measurement Description” on page 96](#)

[“SETup:ORFSpectrum” on page 499](#)

[“INITiate” on page 438](#)

[“FETCH:ORFSpectrum” on page 407](#)

[“Comprehensive Program Example” on page 223](#)

ORFS Troubleshooting

Possible Setup Issues

During remote operation of the Output RF Spectrum measurement you should configure the trigger arm to single, see ["SETup:ORFSpectrum" on page 499](#).

If the trigger arm is not set to single, the measurement may not return a result. When trigger arm is continuous the measurement rearms itself and starts another measurement cycle, during remote operation the fetch query may not be synchronized to the measurement cycle, see ["Measurement States" on page 170](#).

ORFS due to modulation measurements: Averaging for each measurement, including the zero offset measurement, is performed over 40 or more bits on the front and back of the burst, from bit 15 to 60 and bit 87 to 132. ETSI standards only require measuring the back bits 87 to 132. By making measurements on the front and back of the burst, two measurements per burst are achieved.

When fetching (frequency offsets) for ORFS due to modulation or switching remotely, the values for the offsets are entered after the “?”, see ["FETCH:ORFSpectrum:MODulation:FREQuency\[:OFFSet\]?" on page 410](#) or ["FETCH:ORFSpectrum:SWITCHing:FREQuency\[:OFFSet\]\[:MAXimum\]?" on page 412](#) for GPIB commands.

The ORFS Transmit Power, 30 kHz BW Power, Max switching offset level and Average switching offset level results are shifted in proportion to the value of Amplitude Offset that you set. The following table shows the measurements that are affected and how amplitude offset affects them. For more information about amplitude offset commands, see ["Measurement Related Configuration" on page 670](#).

Table 4. Measurements affected by amplitude offset

| Amplitude Offset Command | Power (dBm) | | Switching Offset Level (dBm) | | Cell Power Setting (dBm) |
|--|---------------|-----------|------------------------------|-------------------|--------------------------|
| | ORFS Transmit | 30 kHz BW | Max | Average (up to 8) | |
| OUTPUT 714;"SYSTEM:CORRECTION:SGAIN -3" !Offset for 3 dB of loss in the network. | 6.74 | -1.42 | -35.60 | -36.07 | -82 |
| OUTPUT 714;"SYSTEM:CORRECTION:SGAIN 3" !Offset for 3 dB of gain in the network. | 6.75 | -1.66 | -35.71 | -36.09 | -88 |
| OUTPUT 714;"SYSTEM:CORRECTION:SGAIN 0" !Zero dB of offset. | 6.67 | -1.18 | -35.64 | -36.09 | -85 |

Interpreting Integrity Indicator values

See “[Integrity Indicator](#)” on page 146.

If over range (5) is returned the input signal is likely to clip during the useful part of the burst or the ORFS TX Power measurement has detected an over range.

If signal too noisy (10) is returned, the actual power at certain offsets is > 8 dB off from the expected level.

If under range (6) is returned; the measured power result is more than 10 dB below the expected input power level. Under range is also indicated if, the input power is more than 2 dB below the calibrated range of the test set’s power detector for the RF Range setting. RF Range is automatically set based on the input power setting. Input power is a combination of amplitude offset and expected power settings. See “[Receiver Example](#)” on page 674.

Phase and Frequency Error Measurement Description

How is a phase and frequency error (PFER) measurement made?

The PFER measurement performs a narrow-band (<200 kHz) measurement of the modulation quality and frequency accuracy of the mobile station's transmitter. The test set measures frequency error, rms phase error and peak phase error over the useful part of the burst.

The PFER measurement demodulates the data and compares the measured wave form with the “ideal” waveform that was expected for the data received. The frequency error is the difference in frequency, after adjustment for the effect of the modulation and phase error, between the RF transmission from the mobile station and the test set. The phase error is the difference in phase, after adjustment for the effect of the frequency error, between the mobile station and the theoretical “ideal” transmission. This measurement conforms to ETSI GSM 05.05; and ETSI GSM 11.10, section 13.1. For GPRS mobiles which support a single uplink timeslot, the Phase & Frequency Error measurement conforms to ETSI GSM 11.10, section 13.16.1.

The PFER measurement is controlled by the DSP in the test set. No calibration is required by the user, the DSP gets calibration information during test set power up. PFER measurements can be initiated with any measurement made by the test set.

Single or Multi-Measurements

The DSP demodulates the data and compares the measured waveform with the “ideal” waveform created by the DSP.

A single burst for a PFER measurement calculates the following:

- peak phase error
- rms phase error
- frequency error

A multiple burst PFER measurement is made when the multi-measurement state is on and calculates the maximum, minimum and average values for the following:

- peak phase error
- rms phase error
- frequency error
- worst frequency error (worst frequency error is the frequency furthest from zero.)

All of these results are available using the FETCh command. If the most positive and the most negative frequency error are the same value, the most positive frequency will be returned. Worst frequency error is only accessible through GPIB. The test set always has an integrity indicator available regardless of whether it is a single or multiple burst measurement.

Types of Signals PFER can Measure

PFER measurements can be made on these types of input signals.

- Normal GSM TCH or GPRS PDTCH burst with mobile station in active cell mode.
- Access (RACH) burst with mobile station in active cell mode.
- Normal GSM TCH burst with mobile station in test mode.
- Access (RACH) burst with mobile station in test mode.
- Bursted signal with GMSK modulation without a valid midamble.

Input Signal Requirements

The PFER measurement will complete and meet its accuracy specification of:

- Frequency error measurement accuracy of $+\/-12$ Hz + timebase reference.
- rms phase error measurement accuracy of less than $+\/-1$ degree.
- Peak phase error measurement accuracy of less than $+\/-4$ degrees.

under these conditions:

- Level is between -15 dBm and $+43$ dBm.
- Level within $+\/-3$ dB of the expected input level.
- Frequency is within $+\/-100$ kHz of expected input frequency.

Trigger Source

Auto triggering is the recommended trigger source for each measurement allowing the test set to choose the preferred trigger source. However, you may want to select the trigger source. Immediate trigger source is not recommended for PFER measurements.

Table 5. Recommended Trigger Source settings

| Input Signal Type | Recommended Trigger Source |
|---|----------------------------|
| Normal GSM TCH or GPRS PDTCH burst with mobile station in active cell mode | Protocol or RF Rise |
| RACH burst with mobile station in active cell mode | Protocol or RF Rise |
| Normal GSM TCH burst with mobile station in test mode | RF Rise |
| RACH burst with mobile station in test mode | RF Rise |
| Bursted signal with GMSK modulation but no valid midamble | RF Rise |
| Non-bursted non-GMSK signals with a manual frequency offset of $+\/- 67.7083$ kHz | RF Rise |

Burst Synchronization

The PFER measurement provides you with a choice for the time reference (burst synchronization). see “[Burst Synchronization of Measurements](#)” on page 136

Table 6.

| Burst Synchronization | Description |
|-----------------------|--|
| Midamble | References measurement timing to the midamble transmitted within a timeslot. |
| RF Amplitude | The amplitude rise and fall of a transmitted burst determines the measurement time reference. |
| None | No edge of the burst is detected, the measurement is made using the first 87 or 147 bits of data found centered around the middle of the expected burst position. Can be used when measuring non-bursted signals |

Related Topics

[“Programming a Phase and Frequency Error Measurement” on page 106](#)

[“Test Adherence to Standards” on page 131](#)

Programming a Phase and Frequency Error Measurement

This section provides an example of how to make the phase and frequency error (PFER) measurement via GPIB.

The following procedure assumes that an active link is established between the test set and the mobile station. See ["Establishing an Active GSM Link with the Mobile Station" on page 30](#).

1. Configure PFER measurement parameters using the SETUp subsystem.
2. Start the PFER measurement using the INITiate subsystem.
3. Use the INITiate:DONE? command to find out if PFER measurement results are available.
4. Use the FETCh? command to obtain PFER measurement results.

Programming Example

```

10  OUTPUT 714;"SETUP:PFERROR:CONTINUOUS OFF" !Configures a PFER measurement to
20                                !single trigger mode.
30  OUTPUT 714;"SETUP:PFERROR:COUNT:NUMBER 100 !Configures a multi-measurment
40                                !of 100.
50  OUTPUT 714;"SETUP:PFERROR:TRIGGER:SOURCE AUTO"!Configure trigger source
60                                !to auto.
70  OUTPUT 714;"SETUP:PFERROR:BSYNC:MIDAMBLE !Configures a PFER measurement so
80                                !that burst synchronization, which
90                                !will synchronize the timing of the
100                               !measurement algorithm relative to
110                               !the data sample, will be set
120                               !to midamble.
130 OUTPUT 714;"INITIATE:PFERROR" !Starts the PFER measurement.
140 REPEAT
150 OUTPUT 714;"INITIATE:DONE?" !Query to see if PFER measurement is done
160 ENTER 714;Meas_complete$
170 UNTIL Meas_complete$="PFER"
180 OUTPUT 714;"FETCH:PFERROR:ALL?"
190 ENTER 714;Integrity, Max_phase_err, Max_peak_error, Worst_freq_err
200 END

```

Returned values

The measurements returned by this program are:

- Integrity returns the measurement ["Integrity Indicator" on page 146](#) (0 means a successful measurement with no errors).
- Max_phase_err returns the maximum rms phase error in degrees
- Max_peak_phase_error returns the maximum peak phase error in degrees
- Worst_freq_err returns the the frequency, in Hz, that is the furthest from zero, if the most positive and the most negative frequency error are the same value, the most positive will be returned.

Related Topics

[“Phase and Frequency Error Measurement Description” on page 103](#)

[“SETup:PFERror” on page 508](#)

[“INITiate” on page 438](#)

[“FETCH:PFERror” on page 414](#)

[“Comprehensive Program Example” on page 223](#)

PFER Troubleshooting

Possible Setup Issues

During remote operation of the Phase and Frequency Error measurement you should configure the trigger arm to single, see "[SETup:PFERror:CONTinuous](#)" on page 509.

If the trigger arm is not set to single, the measurement may not return a result. When trigger arm is continuous the measurement rearms itself and starts another measurement cycle, during remote operation the FETCh query may not be synchronized to the measurement cycle, see "[Measurement States](#)" on page 170.

The Manual Frequency must be offset by +/- 67.7083 kHz in order to measure non-bursted or non-GMSK modulated signals.

If the Trigger Source is set to RF Rise and the signal measured is not burst modulated the measurement will wait until aborted or timed out.

If the input signal is more than 10 dB below the Expected Power, see "[Expected Power](#)" on page 618 or if the input signal is below -30 dBm there is not enough power to generate an RF Rise trigger so the measurement will hang.

Interpreting Integrity Indicator values

See "[Integrity Indicator](#)" on page 146.

If the signal has both over range (5) and under range (6) conditions only the over range (5) is indicated.

Syn Not Found (11) will be returned if the measurement Burst Synchronization is set to Midamble synchronized and Expected Burst pattern is not set to TSC0 through TSC7, or RACH. see "[CALL:BURSt](#)" on page 309.

Power versus Time Measurement Description

How is a Power versus Time (PvT) measurement made?

PvT measurements determine if the mobile station's transmitter power falls within specified power and timing ranges. Refer to the ["Typical GSM/GPRS PvT Measurement" on page 112](#).

During a PvT measurement, the test set makes a narrowband point-by-point measurement of the instantaneous power received during the signal burst. A pass or fail result is returned based on a mask comparison (defined in "ETSI GSM 05.05 Ver 8.2.0, 7.2.0, 6.6.0 Annex B").

Included with the narrowband point-by-point measurement is a broad-band PvT carrier power measurement, labeled as Transmit Power on the Summary screen. (Note that the Summary screen is *not* available for GPRS.) The PvT Transmit Power measurement is synchronized to the burst midamble as recommended in ETSI GSM 11.10. (The test set also provides a faster transmit power measurement that is synchronized to the burst's amplitude. See ["Transmit Power Measurement Description" on page 127](#)).

The dynamic range of the PvT measurement is approximately 70 dB.

This measurement conforms to ETSI GSM 11.10, section 13.3. For GPRS mobiles which support a single uplink timeslot, the transmitter output power result conforms to ETSI GSM 11.10, section 13.16.2. These are based on ETSI GSM 05.05 Ver 8.2.0, 7.2.0, 6.6.0 Annex B.

Power versus Time Measurement Results

The primary result of a PvT measurement is the pass/fail result. The pass/fail result that the test set returns indicates whether the **entire** burst fell within power and timing ranges determined by a point-by-point comparison of the power versus time measurement mask.

The PvT measurement examines the burst to determine the points where the burst fails by the most or is closest to failing the upper and lower limits. These worst case points provide the upper and lower limit margin results. A negative value, along with the offset time, is returned for the result if the burst fails the mask. A positive value indicates the burst is within the mask. See ["FETCH:PVTIME:MASK:ALL?" on page 426](#).

For statistical analysis, the test set allows you to set up to 12 time markers. These markers do not define the mask, but are merely used to get results from specified points on the mask. See ["SETUP:PVTIME:TIME\[:OFFSet\]" on page 516](#). Note that these points are not the same as those used in the point-by-point comparison which determines the pass/fail result.

- Results for a **single** PvT measurement include:
 1. PvT pass/fail result (0 = Pass, 1 & NaN = Fail)
 2. PvT measurement integrity indicator
 3. Transmit carrier power with midamble synchronization (average power during the burst)
 4. Upper limit power margin worst case (how close to or where the signal exceeded upper power limit)
 5. Lower limit power margin worst case (how close or where the signal exceeded lower power limit)
 6. Upper limit timing margin worst case (the time offset where the signal came close to or exceeded upper timing limit)

7. Lower limit timing margin worst case (the time offset where the signal came close to or exceeded lower timing limit)

- Results for **multi-measurement** PvT measurements include:
 1. Average of transmit carrier power measurements (average of averages)
 2. Maximum transmit carrier power measured across each burst
 3. Minimum transmit carrier power measured across each burst
 4. Standard deviation of transmit carrier power measured across each burst
- Statistical PvT measurement results, calculated from measurements taken at each of the active time offset markers or across a subset of the markers and available only through programming commands, include:
 1. Average Power (in dBc) measured at the marker(s) relative to transmit power (carrier power)
 2. Maximum power (in dBc) measured at the marker(s) relative to transmit power (carrier power)
 3. Minimum power (in dBc) measured at the marker(s) relative to transmit power (carrier power)
 4. Standard deviation of power (in dBc) measured at the marker(s) relative to transmit power (carrier power)
- The measurement integrity indicator is another result available for any completed PvT measurement. This result provides information about error conditions which occurred and may have affected the accuracy of the most recently completed measurement. For more information about measurement integrity, refer to ["Integrity Indicator" on page 146](#).
- Measurement progress report is a feature that allows you to periodically see how far multi-measurement cycle has progressed. When the multi-measurement count is greater than 1, the progress report will indicate the number of individual sub-measurements that have been completed, n , out of the total number to be completed, m . " n " is referred to as ICOunt remotely. " m ," the total number of measurements to be made, is based on the PvT settings you make and the input signal attributes.

The progress report is displayed on the test set's screen in an "n of m" format. (Note that the progress report is *not* available for GPRS.) The number of measurements completed, n , increases from zero to the total number of measurements which need to be made, m .

Types of Signals Power vs. Time Can Measure

The following list summarizes the input signal attributes and mobile station operating modes for which PvT can be measured with the test set.

1. Normal GSM TCH or GPRS PDTCH burst with mobile station in active cell mode.
2. Normal GSM TCH burst with mobile station in test mode (no protocol).
3. GSM RACH burst with valid midamble with mobile station in active cell mode.

Power vs. Time Input Signal Requirements

The PvT measurement will complete and meet the PvT measurement accuracy specifications when the signal meets the following input signal conditions.

1. Input signal level is between –15 dBm and +43 dBm.
2. Transmit power is within ± 3 dB of expected input level.
3. Input signal frequency is within ± 10 kHz of expected input frequency.

Trigger Source

Triggering choices available for the PvT measurement are RF rise, protocol, immediate, and auto. In most cases, auto triggering provides the optimum measurement triggering condition for the PvT measurement.

When auto triggering is selected, the test set chooses a trigger source based on the optimum trigger source available. For example, PvT measurements will automatically be triggered by a protocol trigger if a call is connected or call processing events provide the protocol trigger source.

In situations where no protocol trigger is available, the test set will choose RF rise triggering for the PvT measurement. An example of this situation might be when the test set is in test mode operating mode.

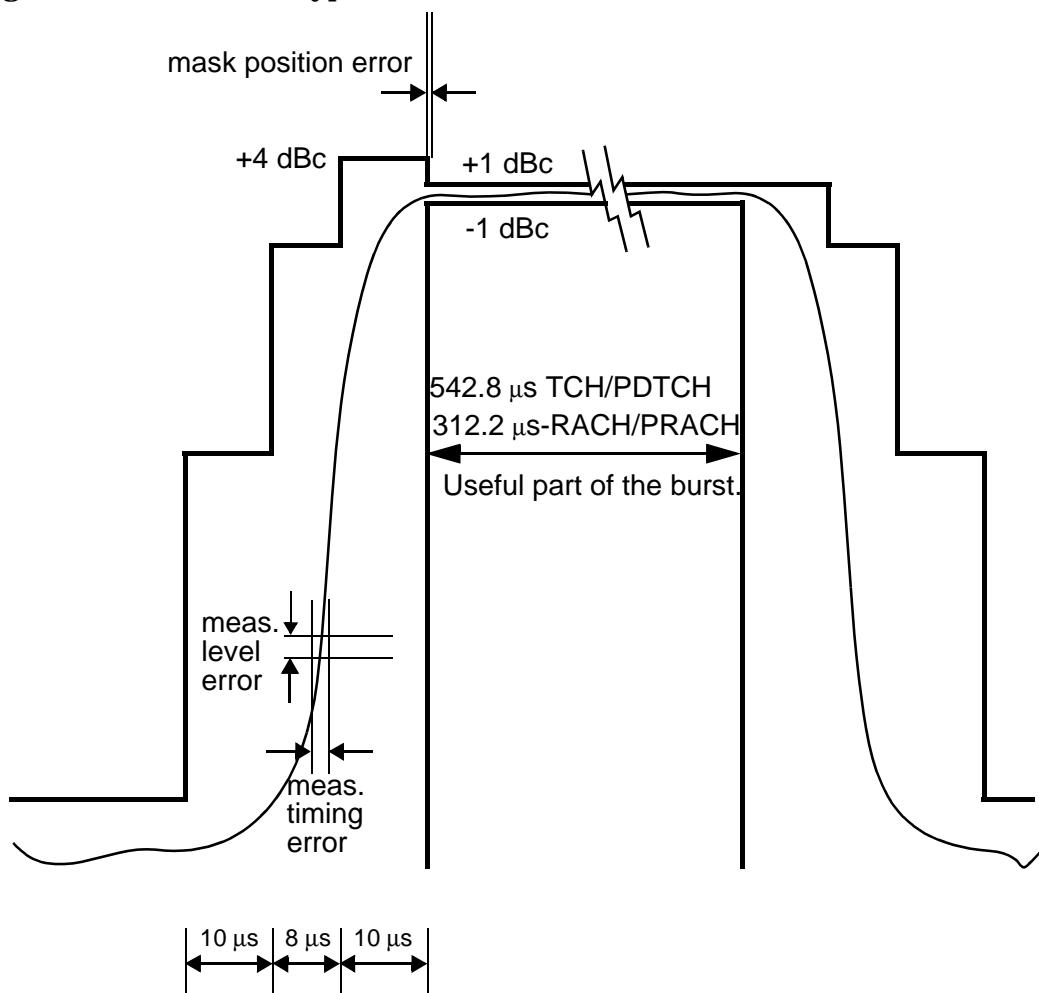
Table 7. Recommended Trigger Source Settings

| Input Signal Type | Recommended Trigger Source |
|--|----------------------------|
| Normal GSM TCH or GPRS PDTCH burst with mobile station in active cell mode | RF Rise or Protocol |
| RACH burst with mobile station in active cell mode | RF Rise or Protocol |
| Normal GSM TCH burst with mobile station in test mode | RF Rise |
| RACH burst with mobile station in test mode | RF Rise |
| Bursted signal with GMSK modulation but no valid midamble | RF Rise |
| CW signal | Immediate |

For more information on measurement triggering, refer to [“Triggering of Measurements” on page 169](#).

Figure 4.

Typical GSM/GPRS PvT Measurement



Burst Synchronization

The PvT measurement provides you with a choice for the time reference setting (burst synchronization). See “[Burst Synchronization of Measurements](#)” on page 136.

Table 8.

| Burst Synchronization | Description |
|-----------------------|--|
| Midamble | References measurement timing to the midamble transmitted within a timeslot. |
| RF Amplitude | The amplitude rise and fall of a transmitted burst determines the measurement time reference. |
| None | No edge of the burst will be detected, the measurement will be made using the first 87 or 147 bits of data found centered around the middle of the expected burst position. For may be used when measuring non-bursted signals |

Related Topics

[“Programming a Power versus Time Measurement” on page 114](#)

[“Test Adherence to Standards” on page 131](#)

Programming a Power versus Time Measurement

This section provides an example of how to make the power versus time (PvT) measurement via GPIB.

The following procedure assumes that an active link is established between the test set and the mobile station. See ["Establishing an Active GSM Link with the Mobile Station" on page 30](#).

1. Configure PvT measurement parameters using the SETUp subsystem.
2. Start the PvT measurement using the INITiate subsystem.
3. Use the INITiate:DONE? command to find out if the PvT measurement results are available.
4. Use the FETCh? command to obtain PvT measurement results.

Programming Example

```

10  OUTPUT 714;"SETUP:PVTIME:CONTINUOUS OFF" !Configures a PvT measurement to
20                      !single trigger mode.
30  OUTPUT 714;"SETUP:PVTIME:COUNT:NUMBER 100 !Configures a multi-measurment
40                      !of 100.
50  OUTPUT 714;"SETUP:PVTIME:TRIGGER:SOURCE AUTO" !Configure trigger source
60                      !to auto.
70  OUTPUT 714;"SETUP:PVTIME:BSYNC MIDAMBLE" !Configures a PvT measurement so
80                      !that burst synchronization, which
90                      !will synchronize the time of the
100                     !measurement algorithm relative to
110                     !the data sample, will be set
120                     !to midamble.
130 OUTPUT 714;"SETUP:PVTIME:TIME:OFFSET -28US,-18US !Turns on time markers
140                      !-28 and -18 microseconds.
150 OUTPUT 714;"INITIATE:PVTIME" !Start PvT measurement.
160 REPEAT
170 OUTPUT 714;"INITIATE:DONE?" !Check to see if PvT measurement is done.
180 ENTER 714;Meas_complete$
190 UNTIL Meas_complete$="PVT"
200 OUTPUT 714;"FETCH:PVTIME:ALL?" !PvT results for time measurements.
210 ENTER 714;Integrity,Pvt_mask, Pvt_power, Max_offset
220 END

```

Returned values

The measurements returned by this program are:

- `Integrity` returns the measurement ["Integrity Indicator" on page 146](#) (0 means a successful measurement with no errors).
- `Pvt_mask` returns the mask pass/fail indicator. When the multi-measurement count is greater than 1, the PvT mask pass/fail result will return Fail (1) if any single measurement fails.
- `Pvt_power` returns the PvT carrier power in dBm.
- `Max_offset` returns the maximum offset level in dB, relative to the PvT carrier power.

Related Topics

[“Power versus Time Measurement Description” on page 109](#)

[“SEUp:PVTime” on page 513](#)

[“INITiate” on page 438](#)

[“FETCH:PVTime” on page 421](#)

[“Comprehensive Program Example” on page 223](#)

PVT Troubleshooting

Possible Setup Issues

During remote operation of the Power vs. Time measurement you should configure the trigger arm to single, see “[SETup:PVTTime:CONTinuous](#)” on page 514.

If the trigger arm is not set to single, the measurement may not return a result. When trigger arm is continuous the measurement rearms itself and starts another measurement cycle, during remote operation the FETCh query may not be synchronized to the measurement cycle, see “[Measurement States](#)” on page 170.

If the Trigger Source is set to RF Rise and the signal measured is not burst modulated the measurement will wait until aborted or timed out.

If the input signal does not rise above the threshold set at 20 to 30 dB below the Expected Power, see “[Expected Power](#)” on page 618 there is not enough power to generate an RF Rise trigger so the measurement may hang.

The PvT Transmit Power measurement results are shifted in proportion to the value of Amplitude Offset that you set. The following table shows the measurements that are affected and how amplitude offset affects them. For more information about amplitude offset commands, see “[Measurement Related Configuration](#)” on page 670.

Table 9. Measurements affected by amplitude offset

| Amplitude Offset Command | PVT Transmit Power (dB) | | | Cell Power Setting (dBm) |
|---|-------------------------|---------|---------|--------------------------|
| | Minimum | Maximum | Average | |
| OUTPUT 714;"SYSTEM:CORRECTION:SGAIN -3" !Offset for 3 dB of loss in the network. | 7.123 | 7.152 | 7.136 | -82 |
| OUTPUT 714;"SYSTEM:CORRECTION:SGAIN 3" !Offset for 3 dB of gain in the network. | 7.129 | 7.16 | 7.14 | -88 |
| OUTPUT 714;"SYSTEM:CORRECTION:SGAIN 0" !Zero dB of offset. | 7.112 | 7.147 | 7.124 | -85 |

Interpreting Integrity Indicator values

See “[Integrity Indicator](#)” on page 146.

If over range (5) is returned; the PvT input power has exceeded the test set’s internal sampler maximum value during some part of the sampling or the input power has exceeded the calibrated range of the test set’s power detector for the RF Range setting. RF Range is automatically set based on the input power setting. Input power is a combination of amplitude offset and expected power settings. See “[Receiver Example](#)” on page 674.

If the signal has both over range and under range conditions only the over range (5) will be indicated.

If under range (6) is returned; the PvT Transmit Power result is more than 10 dB below the expected input power level. Under range is also indicated if, the input power is more than 2 dB below the calibrated range of the test set’s power detector for the RF Range setting. RF Range is automatically set based on the input power setting. Input power is a combination of amplitude offset and expected power settings. See “[Receiver Example](#)” on page 674.

Syn Not Found (11) will be returned if the measurement Burst Synchronization is set to Midamble synchronized and Expected Burst pattern is not set to TSC0 through TSC7, or RACH. see “[CALL:BURSt](#)” on page 309

RACH Measurement Description

This measurement is *not* applicable to GPRS.

What is a RACH?

When a mobile first attempts to originate a call it sends a RACH (Random Access Channel) burst. The RACH is transmitted on the uplink frequency of the channel number used by the Broadcast channel (BCH). The RACH is the first burst sent by the mobile. This burst is short, only 312.2 ms, as opposed to the normal GSM burst of 542.8 ms. The RACH is used by the base station to determine the timing advance which it then sends back to the mobile. Once the mobile receives this information it starts to transmit normal bursts.

Measurements that can be performed on a RACH

The test set can perform the following three measurements on a RACH in Active Cell or Test mode:

- Power versus Time
- Transmit Power
- Phase and Frequency Error

NOTE Only one measurement at a time can be made on the RACH even if two measurements are initiated.

Triggering

The type of triggering used is dependent on whether you are in Active Cell or Test mode:

Active Cell mode:

The default triggering of Auto is acceptable for most signals. (In Active Cell mode Auto is equivalent to Protocol.) However, if the mobile's RACH timing is outside the specified limits you may need to use RF Rise triggering.

Test mode:

The default triggering of Auto should be used. (In Test mode Auto is equivalent to RF Rise.)

Overview of Measurement Procedure in Active Cell Mode

1. Set operating mode to Active Cell.
2. Set the receiver control to manual.
3. Set the test set's measurement receiver to the frequency the RACH will arrive on. The simplest way to do this is to set the manual channel (that is, the expected ARFCN) to the ARFCN of the BCH. Alternatively you could set the expected frequency to the uplink frequency of the BCH ARFCN.
4. Ensure trigger mode is set to Auto.

Once the RACH measurement is completed, in order to make further measurements on the TCH, ensure you reset the receiver control to Auto.

Overview of Measurement Procedure in Test Mode

1. Set operating mode to Test.
2. Set the test function to either BCH, or, BCH + TCH.
3. Set the Broadcast Channel to the channel you wish to use.
4. Using your proprietary commands, initiate the mobile to generate a sequence of RACH bursts on the BCH.
5. Start the appropriate measurement.

Example Procedure

The following procedure details how to make a power versus time RACH measurement manually while in Active Cell mode.

1. Press the blue **SHIFT** key then the green **Preset** key. The “Call Setup Screen” is displayed.
2. Press the **More** key (which is positioned immediately below **F12**) two times. This displays screen **3 of 4**.
3. Press **Receiver Control (F7)** and set to **Manual**.
4. Press **Manual Channel (F9)** and change from 30 to 20. (This sets it to the same channel as the **Broadcast Chan** on screen **1 of 4**.)
5. Press **Measurement selection**. (This key is positioned below the display.)
6. Select **Power vs Time**.
7. Press **Power vs Time Setup (F1)**.
8. Press **Measurement Setup (F1)**.
9. Set **Trigger Arm** to **Single**, then select **Close Menu (F6)**.
10. Press **START SINGLE** on the front panel of the test set. (Note, you are starting the measurement before originating a call. This is to ensure that it is the RACH burst that is measured.)
11. Connect the mobile, then originate a call from the mobile.
12. Immediately you press send on the mobile the power versus time measurement result is displayed. You can confirm that the measurement has occurred on the RACH by examining the measurement results. With a RACH measurement, since the burst is shorter than normal, the power drops off rapidly after 331 μ s. To examine the results select **Return to PvT Control (F6)**, **Change View (F2)**, then select **Numeric 1 of 2 (F2)**, and **Numeric 2 of 2 (F3)**.
13. To do further measurements on the TCH ensure that the Receiver Control is returned to Auto.

Related Topics

[“Programming a RACH Measurement” on page 120](#)

[“RACH Troubleshooting” on page 123](#)

Programming a RACH Measurement

This section provides an example of how to make a power versus time measurement on a RACH. The same principles as used in this example can also be used for transmit power and phase and frequency error measurements.

Overview of Measurement Procedure

1. Ensure that the mobile is switched off.
2. Set the test set's measurement receiver to the frequency the RACH will arrive on. The simplest way to do this is to set the manual channel (that is, the expected ARFCN) to the ARFCN of the BCH. Alternatively you could set the expected frequency to the uplink frequency of the BCH ARFCN.
3. Set triggering to single.
4. Set trigger mode to Auto.

Once the RACH measurement is completed, in order to make further measurements on the TCH, ensure you reset the receiver control to Auto.

NOTE Only one measurement at a time can be made on the RACH even if two measurements are initiated.

Programming Example

The following example details how to make a power versus time RACH measurement on a mobile originated call in Active Cell mode.

Alternatively, the same measurement could be made on a base station originated call by replacing lines 160 and 170 with the CALL:ORIGINATE command.

```

10      INTEGER Int
20      DIM Results(11)
30      REAL Mask,Power
40      OUTPUT 714;"*RST"
50      OUTPUT 714;"RFANALYZER:MANUAL:CHANNEL:SELECTED 20" !Configures the
60          !test set to expect a transmission on ARFCN 20.
70      OUTPUT 714;"RFANALYZER:EXPECTED:POWER:SELECTED 10 DBM" !Configures
80          !the test set to expect a power level of 10 dBm.
90      OUTPUT 714;"SETUP:PVTIME:CONTINUOUS OFF" !Configures trigger
100         !mode to single for a pvt measurement.
110     OUTPUT 714;"SETUP:PVTIME:COUNT:STATE OFF" !Configures the
120         !multi_measurement state to OFF.
130     OUTPUT 714;"SETUP:PVTIME:TRIGGER:SOURCE AUTO" !Configures the
140         !trigger source to AUTO.
150     OUTPUT 714;"INITIATE:PVTIME" !Start a pvt measurement.
160     PRINT "Connect your mobile to the Test Set and initiate a call"
170     PRINT "from the mobile."
180     OUTPUT 714;"FETCH:PVTIME:ALL?"!Fetches the measurement integrity
190         !value, mask indicator, tx power, and pvt offsets.
200     ENTER 714;Int,Mask,Power,Results(*)
210     PRINT "*****"
220     PRINT "*Power vs Time RACH Measurement Results*"
230     PRINT "*****"
240     PRINT "Integrity = ";Integrity
250     PRINT "Mask = ";Mask
260     PRINT "Carrier Power = ";Power
270     PRINT "Offset      Level (dB)"
280     PRINT "(micro sec) (dB)"
290     PRINT "----- -----"
300     PRINT "-28      ";Results(0)
310     PRINT "-18      ";Results(1)
320     PRINT "-10      ";Results(2)
330     PRINT "0       ";Results(3)
340     PRINT "321.2    ";Results(4)
350     PRINT "331.2    ";Results(5)
360     PRINT "339.2    ";Results(6)
370     PRINT "349.2    ";Results(7)
380     PRINT "542.8    ";Results(8)
390     PRINT "552.8    ";Results(9)
400     PRINT "560.8    ";Results(10)
410     PRINT "570.8    ";Results(11)
420     EN

```

Related Topics

[“RACH Measurement Description” on page 118](#)

[“RACH Troubleshooting” on page 123](#)

RACH Troubleshooting

Possible Setup Issues

During manual or remote operation of a RACH measurement ensure that the multi-measurement count is set to Off. The measurement would not complete if multi-measurement count was set to On.

If required refer to the appropriate command:

- [“SETup:PVTime:COUNt:STATe” on page 515](#)
- [“SETup:TXPower:COUNt:STATe” on page 521](#)
- [“SETup:PFERror:COUNt:STATe” on page 510](#)

Interpreting Integrity Indicator values

See [“Integrity Indicator” on page 146](#).

SACCH Report Measurement Descriptions

This measurement is *not* applicable to GPRS.

When a call is established (the operating mode is active cell and the call status is not idle), the mobile station is required to report on the SACCH logical channel. The reported results available from the test set are shown here:

- MS TX Level Reported
- TCH Timing Advance Reported
- RX Level
- RX Qual
- Neighbour Channel
- Neighbour RX Level 1
- Neighbour NCC 1
- Neighbour BCC 1

When are SACCH Report Measurements Made?

When the test set receives SACCH data from the mobile station, results are reported to you in the SACCH Report window (Call Setup screen), and the Neighbour Cell Report window (Cell Info screen). The results are reported remotely with the CALL:MS:REPORTED commands. No mechanism is provided to turn off SACCH data reports.

The SACCH reports are delayed, they reflect what the mobile station is actually experiencing. It is possible for SACCH reported MS TX level results to be different than the cell power level due to limitations of the mobile station. The SACCH reported TCH timing advance should eventually match the value in the Timing Advance field once the mobile station has time to react.

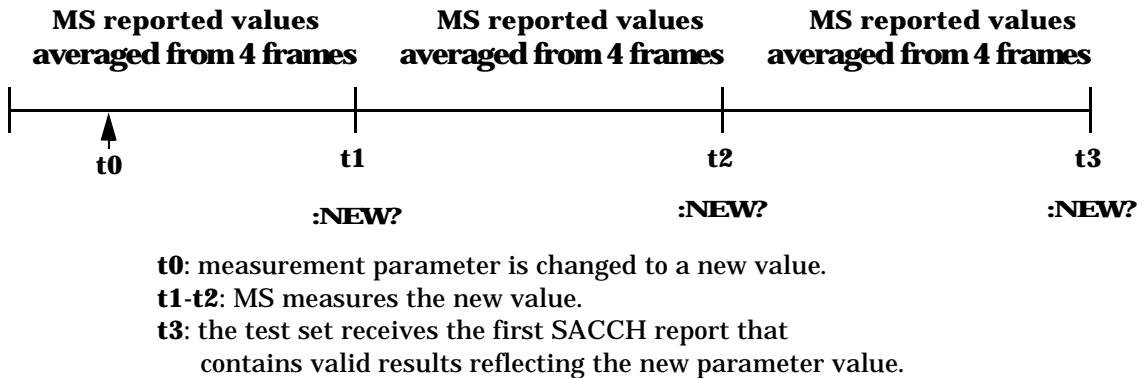
SACCH data will report any time there is a downlink TCH and the mobile station is synchronized to the test set transmitting a valid SACCH on the uplink.

:NEW? and [:LAST?] Queries

:NEW? queries hang until a new SACCH message is received by the test set. The mobile station issues data updates on the SACCH every 480 ms, (4 frames).

Measurements made during this four frame period are averaged and the result of these averaged measurements are reported by the mobile station during the next period. Measurements must be stable in order to give valid (stable) results for a :NEW? query. Therefore, it may take up to three SACCH reports before a reported value accurately reflects a change to any of its parameters. See Figure 1.

After changing measurement parameters, you must send three consecutive :NEW? queries to obtain stable, accurate results. By querying :NEW? three times the value becomes stable for the second query, and meaningful stable results are then reported for the third query. The results from the first two queries should not be used.

Figure 5. SACCH Report Measurement Cycle

If several SACCH reported values are needed from the same report, the first value needed should be queried three times (to receive a stable new report). Then the additional values should be immediately queried using the :LAST? query before the next report arrives or the measurement parameters are changed again.

The :LAST? query is not a hanging query; values are returned from the last SACCH report. As shown in the following program example (line 60), the :LAST? command is optional. If :NEW? is not used in the MS:REPORTED command, the :LAST value is automatically reported.

Programming Example

```

10  OUTPUT 714;"CALL:CELL:POW -83"
20  OUTPUT 714;"CALL:MS:TADV 11"
30  OUTPUT 714;"CALL:MS:TXL 11"
40  OUTPUT 714;"CALL:MS:REPORTED:TXL:NEW?;NEW?;NEW?"    ! Query 3 times
50  ENTER 714;Ignore_result,Ignore_result,Valid_result ! Only use Valid_result
60  OUTPUT 714;"CALL:MS:REPORTED:RXL?;TADV?"           ! Additional values
70  ENTER 714;Rceived_lvl,Timing_adv
80  END

```

SACCH Report Measurement Results

- MS TX level reported results reflect the value set in the CallParms, MS TX Level field.
- TCH timing advance reported results reflect the value set in the CallParms, Timing Advance field.
- RX Level reported reflects the received level of TCH in dB, from the CallParms, Cell Power field that the MS measured during the preceding SACCH.
- RX Qual reported reflects the perceived quality of the signal used for the RX level SACCH report.

Neighbour Report Measurement Results

The mobile station determines what neighbour cells to measure from the BA tables transmitted on the BCH and the SACCH. The test set reports results from neighbour cell 1.

- Neighbour channel 1 results reflect the first ARFCN reported by the mobile station in the SACCH report.
- Neighbour NCC 1 results reflect the first network color code reported by the mobile station in the SACCH report.
- Neighbour BCC 1 results reflect the first base station color code reported by the mobile station in the SACCH report.
- Neighbour RX level 1 results reflect the first cell power level reported by the mobile station in the SACCH report.

Related Topics

[“Configuring Mobile Station Operating Parameters” on page 613](#)

[“CALL:MS:REPorted:TXLevel\[:LAST\]?” on page 335](#)

[“CALL:MS:REPORTED:TXLEVEL:NEW?;NEW?;NEW?” on page 335](#)

[“CALL:MS:REPorted:TADVance\[:LAST\]?” on page 334](#)

[“CALL:MS:REPorted:TADVance:NEW?;NEW?;NEW?” on page 334](#)

[“CALL:MS:REPorted:RXLevel\[:LAST\]?” on page 332](#)

[“CALL:MS:REPorted:RXLevel:NEW?;NEW?;NEW?” on page 333](#)

[“CALL:MS:REPorted:RXQuality\[:LAST\]?” on page 333](#)

[“CALL:MS:REPorted:RXQuality:NEW?;NEW?;NEW?” on page 333](#)

[“CALL:MS:REPorted:NEIGHbour\[1\]?” on page 331](#)

Transmit Power Measurement Description

How is a transmit power (TXP) measurement made?

The TXP measurement performs a power measurement on a mobile station, averaged over the useful part of the burst. The signal is captured with a wide band 3 GHz fast RF power detector.

In order to provide you with a very fast TXP measurement the test set measures the power without synchronizing it to the midamble. The measurement is made with RF amplitude synchronization; therefore, the signal does not need to be demodulated to determine the midamble. This technique is different than the TXP measurement defined in ETSI GSM 11.10. (See [“Burst Synchronization of Measurements” on page 136](#).) The power versus time measurement provides a carrier power measurement that is synchronized to the burst's midamble, and conforms to ETSI GSM 11.10, section 13.3 and ETSI GSM 11.10, section 13.16.2. (See [“Power versus Time Measurement Description” on page 109](#) for more details.)

The output RF spectrum measurement makes the TXP measurement as part of its measurement process, and makes this measurement result available along with output RF spectrum due to modulation and switching.

The TXP measurement is completely controlled by the digital signal processor (DSP) in the test set. Any power measurement requires calibration to ensure accuracy. The power meter used for this measurement is zeroed automatically by the DSP as needed, with no action required by the user. No temperature dependent calibration is required because temperature compensation in the power detector circuits provide temperature stability.

Single or Multi-Measurements

The DSP analyzes the data and calculates the results. A single burst for a TXP measurement calculates the average power over the useful part of the burst. A multiple burst transmit power measurement is made when the multi-measurement state is on. This measurement calculates average, minimum, maximum, and standard deviation of the average power measured. All of these results are available to the user with the FETCh command. The test set always has an integrity indicator available to the user regardless of whether single or multiple burst measurements are selected.

Types of Signals TX Power can Measure

TXP measurements can be made on these types of input signals.

- Normal GSM TCH or GPRS PDTCH burst with mobile station in active cell mode.
- Access (RACH) burst with mobile station in active cell mode.
- Normal GSM TCH burst with mobile station in test mode.
- Access (RACH) burst with mobile station in test mode.
- Bursted signal with GMSK modulation without a valid midamble.
- CW signal.

Input Signal Requirements

The TX Power measurement will complete and meet its accuracy specification of less than ± 0.6 dB when.

- Level is between -20 dBm and $+3$ dBm.
- Level within ± 3 dB of the expected input level.
- Frequency is within ± 100 kHz of expected input frequency.

Trigger Source

Auto triggering is the recommended trigger source for each measurement. This allows the test set to choose the preferred trigger source. However you may want to select the trigger source. See Table 10. on page 128

Table 10. Recommended Trigger Source Settings

| Input Signal Type | Recommend Trigger Source |
|--|--------------------------|
| Normal GSM TCH or GPRS PDTCH burst with mobile station in active cell mode | RF Rise or Protocol |
| RACH burst with mobile station in active cell mode | RF Rise or Protocol |
| Normal GSM TCH burst with mobile station in test mode | RF Rise |
| RACH burst with mobile station in test mode | RF Rise |
| Bursted signal with GMSK modulation but no valid midamble | RF Rise |
| CW signal | Immediate |

Related Topics

[“Programming a Transmit Power Measurement” on page 129](#)

[“Test Adherence to Standards” on page 131](#)

Programming a Transmit Power Measurement

This section provides an example of how to make the transmit power (TXP) measurement via GPIB.

The following procedure assumes that an active link is established between the test set and the mobile station. See “[Establishing an Active GSM Link with the Mobile Station](#)” on page 30.

1. Configure the TXP measurement parameters using the SETUp subsystem.
2. Start the TXP measurement using the INITiate subsystem.
3. Use the INITiate:DONE? command to find out if TXP measurement results are available.
4. Use the FETCh? command to obtain TXP measurement results.

Programming Example

```

10  OUTPUT 714;"SETUP:TXPOWER:CONTINUOUS OFF" !Configures a TXP measurement to
20                                !single trigger mode.
30  OUTPUT 714;"SETUP:TXPOWER:COUNT:NUMBER 100 !Configures a multi-measurement
40                                !of 100.
50  OUTPUT 714;"SETUP:TXPOWER:TRIGGER:SOURCE AUTO" !Configure trigger source
60                                !to auto.
70  OUTPUT 714;"INITIATE:TXPOWER" !Start TXP measurement.
80  REPEAT
90  OUTPUT 714;"INITIATE:DONE?" !Check to see if TXP measurement is done.
100 ENTER 714;Meas_complete$
110 UNTIL Meas_complete$="TXP" !"TXP" must be all upper case.
120 OUTPUT 714;"FETCH:TXPOWER:ALL?" !Fetch TXP results.
130 ENTER 714;Integrity, Avg_tx_power
140 END

```

Returned Values

The measurements returned by this program are:

- Integrity returns the measurement “[Integrity Indicator](#)” on page 146 (0 means a successful measurement with no errors).
- Avg_tx_power returns the average transmit power in dBm.

Related Topics

[“Transmit Power Measurement Description” on page 127](#)

[“SETup:TXPower” on page 519](#)

[“INITiate” on page 438](#)

[“FETCh:TXPower” on page 433](#)

[“Comprehensive Program Example” on page 223](#)

Transmit Power Troubleshooting

Last updated: September 15, 2000

Possible Setup Issues

During remote operation of the Transmit Power measurement you should configure the trigger arm to single, see [“SETup:TXPower” on page 519](#).

If the trigger arm is not set to single, the measurement may not return a result. When trigger arm is continuous the measurement rearms itself and starts another measurement cycle, during remote operation the fetch query may not be synchronized to the measurement cycle, see [“Measurement States” on page 170](#).

If trigger source immediate is used for burst modulated signals the results returned will be unreliable. Burst modulated signals should be measured with Trigger Source set to RF Rise or Auto.

The Transmit Power Average, Transmit Power Maximum, Transmit Power Minimum results are shifted in proportion to the value of Amplitude Offset that a user may set. The following table shows the measurements that are affected and how amplitude offset affects them. For more information about amplitude offset commands, see [“Measurement Related Configuration” on page 670](#).

Table 11. Measurements affected by amplitude offset

| Amplitude Offset Command | Transmit Power (dBm) | | | Cell Power Setting (dBm) |
|---|----------------------|---------|---------|--------------------------|
| | Average | Maximum | Minimum | |
| OUTPUT 714;"SYSTEM:CORRECTION:SGAIN -3" !Offset for 3 dB of loss in the network. | 6.86 | 6.86 | 6.85 | -88 |
| OUTPUT 714;"SYSTEM:CORRECTION:SGAIN 3" !Offset for 3 dB of gain in the network. | 6.86 | 6.86 | 6.86 | -82 |
| OUTPUT 714;"SYSTEM:CORRECTION:SGAIN 0" !Zero dB of offset. | 6.86 | 6.87 | 6.85 | -85 |

Interpreting Integrity Indicator values

See [“Integrity Indicator” on page 146](#).

If over range (5) is returned; the input power has exceeded the test set’s internal sampler maximum value during some part of the sampling or the input power has exceeded the calibrated range of the test set’s power detector for the RF Range setting. RF Range is automatically set based on the input power setting. Input power is a combination of amplitude offset and expected power settings. See [“Receiver Example” on page 674](#).

If the signal has both over range and under range conditions only the over range (5) will be indicated.

If under range (6) is returned; the Transmit Power result is more than 10 dB below the expected input power level. Under range is also indicated if, the input power is more than 2 dB below the calibrated range of the test set’s power detector for the RF Range setting. RF Range is automatically set based on the input power setting. Input power is a combination of amplitude offset and expected power settings. See [“Receiver Example” on page 674](#).

Test Adherence to Standards

The 8960 Series 10 is compliant with ETSI GSM 11.10 Phase 2 Technical specifications - release 97.

Frequency Error and Phase Error - ETSI GSM 11.10 sections 13.1 and 13.16.1

The method of test implemented by the test set's Phase & Frequency Error measurement conforms to the measurement method defined in ETSI GSM 11.10, section 13.1. For GPRS mobiles which support a single uplink timeslot, the Phase & Frequency Error measurement conforms to ETSI GSM 11.10, section 13.16.1.

Related Topics

["Phase and Frequency Error Measurement Description" on page 103](#)

["Programming a Phase and Frequency Error Measurement" on page 106](#)

Transmitter Output Power and Burst Timing Error - ETSI GSM 11.10 sections 13.3 and 13.16.2

To make a transmitter output power measurement that conforms to ETSI GSM 11.10 standards, perform a Power versus Time measurement with the desired setup. An ETSI compliant, transmitter output power (TXPower) result is available as a result of this measurement. Pass/fail checking of the Power versus Time mask is also available by using the Power versus Time measurement. The Burst Timing Error result is available for GSM on the Call Setup screen and by issuing a query to the CALL subsystem (["CALL:STATus:TCHannel:TERRor?" on page 368](#)). The Burst Timing Error result is *not* available for GPRS.

For GPRS mobiles which support a single uplink timeslot, the transmitter output power result conforms to ETSI GSM 11.10, section 13.16.2.

Making a faster Transmitter Output Power Measurement.

An alternative method for testing the transmitter output power is using the TX Power measurement in the test set. The TX Power measurement implemented in the test set varies from the ETSI recommended method for measuring carrier power in terms of synchronization. The TX Power measurement synchronizes using RF amplitude synchronization instead of midamble synchronization. This was intentionally done to speed up the measurement, as this is one of the most common measurements performed in manufacturing. This alternative measurement technique is approximately four times faster than the synchronized method with the same accuracy. If the input signal meets the GSM Power versus Time characteristics, the TX Power measurement provides the same results as the Power versus Time - TX Power result (which is midamble synchronized and ETSI compliant).

Related Topics

["Transmit Power Measurement Description" on page 127](#)

["Programming a Transmit Power Measurement" on page 129](#)

["Power versus Time Measurement Description" on page 109](#)

["Programming a Power versus Time Measurement" on page 114](#)

Output RF Spectrum - ETSI GSM 11.10 sections 13.4 and 13.16.3

The Output RF Spectrum due to Switching method of test conforms to ETSI GSM 11.10, section 13.4 at offsets < 1800 kHz. For GPRS mobiles which support a single uplink timeslot, the measurement conforms to ETSI GSM 11.10, section 13.16.3 at offsets < 1800 kHz.

The Output RF Spectrum due to Modulation method of test conforms to ETSI GSM 11.10, section 13.4 at offsets < 1800 kHz. For GPRS mobiles which support a single uplink timeslot, the measurement conforms to ETSI GSM 11.10, section 13.16.3 at offsets < 1800 kHz (when the Multi-Measurement Count - Modulation parameter is set to Off).

Making a faster ORFS measurement.

When Multi-Measurement Count (Modulation) is greater than 1, the measurement is performed over 40 or more bits in each of the regions from bit 15 to 60 and bit 87 to 132 of the burst. In ETSI GSM 11.10, the measurement is only specified on the latter section of the burst.

Measuring on both the front and back of the burst has two advantages. First, this method provides two modulation measurements per burst, effectively doubling measurement speed. Secondly, it provides additional information regarding the spurious performance of the mobile.

The method of test in ETSI GSM 11.10 is based upon time-gated spectrum analysis; this technique only allows one measurement per burst. Modern DSP techniques employed in the test set makes it possible to measure more of the burst while still excluding the unwanted effects of the midamble and switching transients generated by burst modulation.

Making an ORFS measurement on GPRS mobiles while using the BLER data connection type.

The result of the Output RF Spectrum measurement relies on pseudo random data being present in the data field of the RF burst. When using the BLER data connection type, these data fields do not contain pseudo random data, therefore the results may be different from what would be expected.

Related Topics

["Output RF Spectrum Measurement Description" on page 96](#)

["Programming an Output RF Spectrum Measurement" on page 99](#)

Reference Sensitivity - ETSI GSM 11.10 section 14.2

The method of test implemented by the test set's Bit Error measurement conforms to the measurement method defined in ETSI GSM 11.10, section 14.2.

The Bit Error measurement is *not* applicable to GPRS.

Making a faster Reference Sensitivity measurement.

An alternative method of test for making a Reference Sensitivity measurement is to use the Fast Bit Error (FBER) measurement in the test set. The FBER measurement is five times faster than the normal BER measurement.

The Fast Bit Error measurement is *not* applicable to GPRS.

Related Topics

["Bit Error Measurement Description" on page 66](#)

["Programming a Bit Error Measurement" on page 69](#)

["Fast Bit Error Measurement Description" on page 90](#)

["Programming a Fast Bit Error Measurement" on page 93](#)

I/Q Tuning Measurement

The I/Q Tuning measurement is not an ETSI specified measurement.

The I/Q Tuning measurement is *not* applicable to GPRS.

Related Topics

["I/Q Tuning Measurement Description" on page 84](#)

["Programming an I/Q Tuning Measurement" on page 86](#)

Dynamic Power Measurement

The Dynamic Power measurement is not an ETSI specified measurement.

The Dynamic Power measurement is *not* applicable to GPRS.

Related Topics

["Dynamic Power Measurement Description" on page 81](#)

4 General Programming

Burst Synchronization of Measurements

Measurement Synchronization

Measurement Synchronization Description

Measurement synchronization determines how a measurement's time reference is determined from the measurement data (a sampled time record). Measurement synchronization occurs after the measurement data is captured.

For the transmit power and ORFS (switching and modulation) measurements, the RF amplitude of the input signal is used for measurement synchronization. For Phase and Frequency Error Measurement and the Power versus Time Measurement (see “Phase and Frequency Error Measurement Description” on page 103 and “Power versus Time Measurement Description” on page 109.) there are three possible settings for measurement synchronization:

- Midamble
- RF Amplitude
- None

Selecting midamble causes the test set to use the input signal's midamble data to determine the measurement's time reference. A measurement is capable of midamble synchronization if the test set is able to determine transmitted data from measurement samples (i.e. perform demodulation). Midamble synchronization is not available for Transmit Power measurements. However, the Power vs. Time measurement can perform an average power measurement using midamble synchronization.

NOTE

This note is *not* applicable to GPRS.

When the test set's operating mode is “test mode” or when the cell activated state is “off”, the burst type may need to be specified before the test set can synchronize to the input signal's midamble. See “Expected Burst” on page 623.

Selecting RF amplitude causes the test set to use the input signal's rising and falling edges (if edges are detected within the sampled time record) to determine the measurement's time reference. If a non-bursted signal was sampled, the measurement's time reference will be developed using the beginning and end of the sampled time record, and the samples used for making the measurement will be taken from the middle of the time record.

Selecting None causes the test set to perform measurements exactly as if RF amplitude was chosen.

An integrity indicator is returned for each completed measurement. Integrity errors are prioritized so that when multiple errors occur, the highest priority error is returned first, as the root error. The integrity indicator returns a number from 0 to 16, where 0 indicates normal. The following integrity indicators reveal problems with measurement synchronization:

- (7) Burst Short
- (8) Trigger Early
- (8) Fall Early
- (9) Trigger Late
- (9) Rise Late
- (11) Sync Not Found

Refer to [“Integrity Indicator” on page 146](#) for descriptions of integrity indicators.

Programming Example:

```
OUTPUT 714;"SETUP:PVTIME:BSYNC MIDAMBLE"!selects midamble synchronization for PVT measurements
```

Related Topics

```
*****
```

[“Integrity Indicator” on page 146](#)

[“INITiate” on page 438](#)

[“SETup Subsystem” on page 462](#)

```
*****
```

Programming a Channel Mode Change

Channel Mode Change is *not* applicable to GPRS.

This section provides an example of how to change a mobile station's channel mode to enhanced full rate speech via GPIB while a call is connected and a measurement is running.

The following procedure assumes that an active link is established between the test set and the mobile station. See ["Establishing an Active GSM Link with the Mobile Station" on page 30](#).

1. Ensure the mobile is initially in full rate speech channel mode.
2. Configure the parameters for the measurement(s) you want to run using the SETup subsystem.
3. Start the measurement(s) using the INITiate subsystem.
4. Change the mobile's channel mode to enhanced full rate speech.
5. Use the INITiate:DONE? command to find out if the measurement results are available.
6. Use the FETCh? command to obtain the measurement results.

Programming Example

The following program uses the TX Power measurement to show how to change the channel mode to enhanced full rate speech while a measurement is running. The TX Power measurement is chosen because it is one of the measurements that is supported in enhanced full rate speech mode.

```

10  OUTPUT 714;"CALL:TCHANNEL:CMODE FRSPEECH" !Ensure mobile is in
20          !full rate speech channel mode initially.
30  OUTPUT 714;"SETUP:TXPOWER:CONTINUOUS OFF" !Configures trigger
40          !mode to single for a TX Power measurement.
50  OUTPUT 714;"SETUP:TXPOWER:COUNT:NUMBER 100" !Configures a
60          !multi measurement of 100.
70  OUTPUT 714;"SETUP:TXPOWER:TRIGGER:SOURCE AUTO" !Configures the
80          !trigger source to auto.
90  OUTPUT 714;"INITIATE:TXPOWER" !Start TX Power measurement.
100  OUTPUT 714;"CALL:TCHANNEL:CMODE EFRSPEECH" !Sets the channel
110          !mode to enhanced full rate speech while
120          !the TX Power measurement is running.
130  REPEAT
140  OUTPUT 714;"INITIATE:DONE?" !Check to see if TX Power
150          !measurement is complete.
160  ENTER 714;Meas_complete$
170  UNTIL Meas_complete$="TXP"
180  OUTPUT 714;"FETCH:TXPOWER:ALL??" !Fetch TX Power results.
190  ENTER 714;Integrity,Avg_tx_pwr
200  PRINT "TX Power Measurement Results"
210  PRINT "Integrity=";Integrity
220  PRINT "TX Power=";Avg_tx_pwr
230  END

```

Returned Values

The measurements returned by this program are:

- Integrity returns the measurement “[Integrity Indicator](#)” on page 146 (0 means a successful measurement with no errors).
- Avg_tx_pwr returns the average transmit power in dBm.

Related Topics

[“Testing a Mobile for Enhanced Full Rate Speech Channel Mode” on page 632](#)

[“CALL:TChannel:CMODE” on page 374](#)

How the Test Set Performs a Dualband Handover

The dualband handover function has been implemented as an interband channel assignment for GSM and a packet timeslot reconfigure for GPRS, rather than an interband handover, since the test set currently has one BCH (cell).

The test set has the ability to switch traffic channels from:

- EGSM/PGSM to DCS/PCS
- DCS/PCS to EGSM/PGSM

No other combinations of traffic channel band handovers are supported. Also, the traffic channel band can only be changed when an active link exists between the test set and a mobile station. See ["Establishing an Active GSM Link with the Mobile Station" on page 30](#) or ["Step 5: Establish a Data Connection with the Mobile Station" on page 253](#).

There are parameters that can be set up to take on different values depending on the broadcast band currently selected. These are called ["Frequency Banded Parameters" on page 597](#). After a handover, the frequency banded parameters for the new band are active. Only one set of frequency banded parameters is active at any one time. However, you can set up any of the traffic channel parameters for bands involved in the handover because the test set remembers the settings and switches to them when the handover occurs.

Related Topics

For GSM:

- ["Performing a Dual-Band Handover" on page 215](#)
- ["CALL:TCHannel" on page 370](#)

For GPRS:

- ["Process for Reconfiguring a Data Connection" on page 267](#)

Dealing With Semicolon Separated Response Data Lists

Description

In accordance with IEEE 488.2-1992 Section 8.4.1 the test set uses the semicolon (;) as the response message unit separator (RMUS). The RMUS separates sequential response message unit elements from one another when multiple response message unit elements are sent in a response message. This condition would occur when combining multiple queries into a single GPIB transaction.

Query Response Data Types Used By Test Set

The test set can return the following data types in response to queries:

- character data (char): ASCII characters A-Z (65-90 decimal), underscore (95 decimal), digits (48-57 decimal).
- string data: ASCII characters enclosed in quotes (for example, “5551212” or “PGSM”)
- numeric response data (nr1): numeric data in the form +/- dddddddd
- numeric response data (nr3): numeric data in the form +/- ddd.ddd E +/- dddd

Semicolon Separated Response Data Lists Containing Mixed Data Types

Problems can occur when trying to enter semicolon separated response data lists containing mixed data types.

For example: If the following command string is sent to the test set, the test set will respond by constructing a response message which contains multiple response message unit elements (that is, one response message unit element for each query item contained in the command string). Some response message unit elements are string data type, some are character data type and some are nr3 data type.

```
OUTPUT 714; "CALL:MS:REP:IMSI?;PCL?;REV?;SBAN?;ONUM?;MCC?;MNC?;LAC?"
```

An example response message generated by the test set in response to the above OUTPUT statement would be:

```
"001012345678901";+4.00000000E+000;PHAS1;"PGSM";"5551212";9.91E37;9.91E37;9.91E37
```

Since the programmer knows that the control program should expect multiple responses to the above command string he or she might construct the following data entry statement:

```
ENTER 714;Imsi$,Pcl,Rev$,Sban$,Onum$,Mcc,Mnc,Lac
```

In the Basic programming environment the above ENTER statement will fail with an ‘Insufficient data for ENTER’ error. Some programming languages, Basic for example, cannot use the semicolon character as a data item terminator for string variables. In this example Basic will attempt to enter data into Imsi\$ until it sees a LF (line feed) data item terminator. The test set does not send the LF until all the data has been sent.

Consequently when Basic sees the LF it terminates entry of data into Imsi\$ and starts to look for data to enter into Pcl. Since the test set is no longer sending any data the error message ‘Insufficient data for ENTER’ is generated.

One possible workaround is to enter all the data into a single string variable, replace all semicolons with line feeds and then enter the data from the string into the individual data items. For example:

Dealing With Semicolon Separated Response Data Lists

```
DIM Response$[500]
!
!
OUTPUT 714;"CALL:MS:REP:IMSI?;PCL?;REV?;SBAN?;ONUM?;MCC?;MNC?;LAC?"
ENTER 714;Response$
Semicolon=POS(Response$,";")
WHILE Semicolon
Response$[Semicolon,Semicolon]=CHR$(10)
Semicolon=POS(Response$,";")
END WHILE
ENTER Response$;Imsi$,Pcl,Rev$,Sban$,Onum$,Mcc,Mnc,La
```

Semicolon Separated Response Data Lists Containing Only Numeric Data Types

Semicolon separated response data lists containing only numeric data types do not present the types of problem associated with semicolon separated response data lists containing mixed data types. The number building routines in most languages will use any non-numeric character (that is, anything other than +/- 0123456789 E .) as the data item terminator. Consequently when the number building routines encounter the semicolon the data item is terminated. The following example illustrates this:

```
OUTPUT 714;"FETCH:TXP:INT?;POW:MIN?;MAX?"
ENTER 714;Integrity,Min_power,Max_power
```

Concurrent Measurements

Description

A number of measurements can be initiated (with the INITiate command) while other measurements are being made, and the test set will perform as many operations simultaneously as its architecture allows. This technique is referred to as concurrency. Performing measurements concurrently can greatly improve test throughput.

Operating Considerations

The test set's block diagram includes three parallel signal paths. One path, the demodulation downconverter, is primarily used for base station emulation. This frees the measurement downconverter and power detector from performing functions necessary to maintain an active RF link. Since measurements are DSP (digital signal processor) based, and there are four A/D converters available to digitize or "sample" the input signal for analysis by the DSP, the test set will always have the capability to perform link maintenance, one transmitter, and one receiver measurement concurrently. The test set's ability to perform multiple transmitter, or multiple receiver tests concurrently will depend on the availability of resources within the test set and availability of the signal to be tested.

Concurrent Measurements for the GSM and GPRS Test Applications

This table shows the concurrency considerations for the GSM Mobile Test Application.

Table 12. GSM Concurrency Considerations

| | Transmit Power | Power vs. Time | Phase & Frequency Error | Output RF Spectrum | I/Q Tuning | Fast Bit Error | Decoded Audio | Downlink Speech Source | Audio Source | Audio Level Meas | Mobile SACCH info | Transmit Power Level change | TCH assignment/handover | Dynamic Power | BER |
|-----------------------------|----------------|----------------|-------------------------|--------------------|------------|----------------|---------------|------------------------|--------------|------------------|-------------------|-----------------------------|-------------------------|---------------|-----|
| Uplink Path Demodulation | | | | | | | | | | | | | | | |
| Transmit Power | | D | C | C | | | | | | | | | | B | |
| Power vs. Time | | D | C | | | B | | | | | | | | B | B |
| Phase & Frequency Error | | D | C | | | B | | | | | | | | B | B |
| Output RF Spectrum | | D | C | | | B | | | | | | | | B | |
| I/Q Tuning | | D | C | | | B | | | | | | | | | |
| Fast Bit Error | A | D | C | C | | | | | | | | | A | A | |
| Decoded Audio | A | D | C | | | | | | | | | | | | |
| Downlink Speech Source | A | D | | | | | | | | | | | | | |
| Audio Source | | D | | | | | | | | | | | | | |
| Audio Level Meas | | D | | | | | | | | | | | | | |
| Mobile SACCH info | | D | | | | | | | | | | | | | |
| Transmit Power Level change | C | C | | | | | | | | | | | | | |
| TCH assignment/handover | C | C | | | | | | | | | | | | | |
| Dynamic Power | D | | | | | | | | | | | | | | |
| BER | | | | | | | | | | | | | | | |

Table 13. GPRS Concurrency Considerations

| | Transmit Power | Power vs. Time | Phase & Frequency Error | Output RF Spectrum | Transmit Power Level change | PDTCH Reconfigure |
|-----------------------------|----------------|----------------|-------------------------|--------------------|-----------------------------|-------------------|
| Uplink Path Demodulation | | | | | | |
| Transmit Power | C | C | B | | B | |
| Power vs. Time | C | C | B | B | | |
| Phase & Frequency Error | C | C | B | | | |
| Output RF Spectrum | C | C | | | | |
| Transmit Power Level change | | | | | | |
| PDTCH Reconfigure | | | | | | |

Table Key

Empty cell: These measurements can operate concurrently with no conflicts.

A: Cannot operate concurrently. The measurement which is initiated most recently will cause all other conflicting measurements to be closed.

B: These measurements share a sampler path. If multiple measurements are initiated at the same time, they will execute sequentially. However, if multiple measurements are configured to operate off the same trigger event and only a single occurrence of that event happens, only the first initiated measurement will complete.

C: The traffic channel ARFCN or transmit power level can be changed while the measurement is in progress. However, this causes the measurement to re-start, obviously increasing test time.

D: When this measurement is initiated, all other measurements are closed.

The downlink speech source cannot be used when the FBER or BER measurements are running. These measurements take absolute control of the downlink speech source and use it to generate the pseudo-random data.

Related Topics

[“Measurement Event Synchronization” on page 153](#)

[“Block Diagram” on page 602](#)

Integrity Indicator

Description

The test set can evaluate its own performance and make a determination as to the validity of a measurement result. The test set evaluates the conditions surrounding a measurement and reports to the user its evaluation of these conditions in a parameter called the measurement integrity indicator. A measurement integrity indicator value is returned for every completed measurement. It is recommended that the user take advantage of this feature in every measurement.

The returned value defines whether or not a problem was encountered by the measurement process. It is not, however, guaranteed to be the only or root cause of the measurement problem. This is because some of the conditions surrounding a measurement may interact and the test set may have insufficient information to determine the root cause of the measurement problem. However, in most cases, the value returned is the most likely cause of the problem.

The values returned by the measurement integrity indicator range from 0 to 16. Not all of the values are available for each measurement or test application, if a value doesn't apply it will not be available.

Example: Questionable Result for PGSM (15) and Questionable Result Due To Channel Mode (16) are GSM only integrity indicator values.

NOTE Measurement synchronization must be set to midamble in order for GSM measurements to return integrity indicator (8, 9, 11).

Table 14.

| Integrity Indicator Number | Integrity Indicator Message |
|----------------------------|---|
| 0 | Normal: Indicates the measurement completed successfully without error and the result is accurate. |
| 1 | No Result Available: Indicates that there is no measurement result and returns NAN (not a number). |
| 2 | Measurement Timeout: Indicates that a measurement has timed out. The measurement timeout state must be set to ON. |
| 3 | Hardware Not Installed: Indicates that a piece of hardware is not installed in the test set, or the hardware has failed in a way which leads the instrument controller to believe it isn't installed. |
| 4 | Hardware Error: Indicates that a hardware failure has occurred. These include failures such as a phase lock loop out-of-lock, defective DSP samplers, or power detectors that can not be calibrated. |
| 5 | Over Range: Indicates that the input signal is over range. The amplitude of the device-under test's (DUT's) signal is causing the voltage at a DSP sampler to be above its maximum input level or the frequency is too high or the voltage measured is beyond the maximum voltmeter range, either positive or negative. |

Table 14.

| Integrity Indicator Number | Integrity Indicator Message |
|----------------------------|--|
| 6 | Under Range: Indicates that the input signal is under range. The amplitude of the DUT's signal is not high enough for the DSP sampler to produce accurate results with the measurement algorithm. |
| 7 | Burst Short: Indicates that the burst duration is too short, or part of the burst was not sampled due to improper triggering. |
| 8 | Trigger Early or Fall Early: Indicates that the DUT's burst amplitude fell prematurely or, due to an early trigger (early relative to a transmitted burst) the measurement sampling operation terminated before the falling edge of the burst. |
| 9 | Trigger Late or Rise Late: Indicates that either the rising edge of the DUT's burst was late or, due to a late trigger (late relative to a transmitted burst) the measurement sampling operation didn't start until after the rising edge of the transmitted burst. |
| 10 | Signal Too Noisy: Indicates that the measurement algorithm has found the signal measured to be too noisy to provide accurate results. |
| 11 | Sync Not Found: Indicates that the midamble was not found therefore the measurement was not synchronized. |
| 12 | Oven Out of Range: Indicates that a temperature controlled oven (other than the internal timebase oven) is outside of its operating range. The power meter's oven is checked and its condition reported with this value. (The internal timebase generates a temporary error message (out of lock) that is sent to the system error queue and the display. This is not an integrity indicator value, it is an error message.) |
| 13 | Unidentified Error: Indicates errors which are not covered by the other integrity values. Examples include: parameter errors, algorithm memory errors (too many measurements), measurements unavailable (unable to control), autorange unable to converge, default calibration data used. |
| 14 | PCM Full Scale Warning: Indicates that the PCM signal has reached plus or minus full scale. The measurement made will be accurate on the PCM signal but would typically indicate an overdriven or oscillating element in the DUT. |
| 15 | Questionable Result for PGSM: Indicates that the user attempted to make an FBER measurement in a phase 1 system. FBER is only possible in a phase 2 GSM system. This indicator is available only when the selected broadcast band is PGSM. |
| 16 | Questionable Result Due To Channel Mode: Indicates that the channel mode was set to Enhanced Full Rate Speech while a Decoded Audio measurement was active. Decoded Audio is not supported for EFR Speech. |

Programming Example

```
10  OUTPUT 714;"INITIATE:TXPOWER" !Start TXP measurement
20  OUTPUT 714;"FETCH:TXPOWER?" !Request measurement results.
30  ENTER 714;Integrity,Tx_power !Read measurement results.
40  IF Integrity = 0 THEN !Permits measurement to be printed if integrity
50                                !indicator indicates a successful measurement
60  PRINT "TX Power =";Tx_power!if 0 then measurement was successful
70  ELSE
80  PRINT "Measurement integrity questionable, integrity value = ";Integrity
90                                !If integrity not zero then print
100                               !integrity value.
110 END IF
120 END
```

Related Topics

["Classes of Errors" on page 685](#)

Measurement Timeouts

Description

The primary use of measurement timeouts is to regain control of the test set's GPIB in cases where the bus could potentially "hang."

The time normally required for a measurement to complete may vary greatly depending on the individual measurement, its settings, its multiple measurement count value, and so forth. Because of this, you may need to set the timeout longer than the default for measurements where a large number of multiple measurements are requested or where measurement triggers may be infrequent.

Be careful when setting a timeout that is shorter than the default. It is possible to specify a timeout that is so short the measurement does not even have a chance to begin. Measurement timeouts should always be at least several seconds long.

Timeout units default to S (seconds). The seconds suffix is an optional part of the command. If you want MS (milliseconds), US (microseconds) or NS (nanoseconds), you must specify these units in the suffix.

Timeout Default Values

Table 15. List of Timeouts and Default Values

| Measurement Function | Default Timeout Time | Default Timeout State | Integrity Indicator Value |
|-----------------------------------|----------------------|-----------------------|---------------------------|
| Transmit Power | 10 seconds | OFF | 2 |
| Power versus Time | 10 seconds | OFF | 2 |
| Phase and Frequency Error | 10 seconds | OFF | 2 |
| Output RF Spectrum | 10 seconds | OFF | 2 |
| Fast Bit Error Rate * | 10 seconds | OFF | 2 |
| Bit Error Rate * | 10 seconds | OFF | 2 |
| Analog Audio * | 10 seconds | OFF | 2 |
| Decoded Audio * | 10 seconds | OFF | 2 |
| also known as Uplink Speech Level | | | |
| IQ Tuning * | 10 seconds | OFF | 2 |
| Dynamic Power * | 10 seconds | OFF | 2 |

NOTE The measurements in the table marked with an * apply to GSM *only*.

Programming Example

The following program forces a timeout to occur on an attempted transmit power measurement. The integrity indicator should return a 2 (the measurement timeout indicator).

```
10 !Existing conditions: A call is not connected.
20 OUTPUT 714;"SETUP:TXPOWER:TIMEOUT:TIME 5;STATE ON" !Sets a timeout value
30                                     !of 5 seconds
40 OUTPUT 714;"INITIATE:TXPOWER" !Initiates a single TX power measurement.
50 OUTPUT 714;"FETCH:TXPOWER?" !Queries the TX Power measurement result.
60 ENTER 714;Integrity,Tx_pwr_result
70 PRINT "Integrity indicator was ";Integrity
80 IF Integrity=2 THEN    !Integrity Indicator 2 indicates TX power timed-out.
90 PRINT "Measurement timed out"
100 ELSE
110 PRINT "Measurement did not time out, TX power measurement result was ";Tx_pwr_result
120 END IF
130 END
```

In this example, if the transmit power measurement takes longer than 5 seconds to complete, the FETCh command retrieves an integrity value of 2. The test set's GPIB is then available to accept more commands.

Related Topics

[“Integrity Indicator” on page 146](#)

[“SETup Subsystem” on page 462](#)

Invalid Measurement Results

Description

Invalid measurement results are returned by the test set when conditions such as signal level are not within the present measurement range. Three different invalid measurement results are provided in order to help you understand the condition that caused the invalid result.

- $9.9E+37 = \text{INFinity}$ (Infinity)
- $-9.9E+37 = \text{NINF}$ (Negative Infinity)
- $9.91E+37 = \text{NAN}$ (Not A Number)

9.9E+37 (INFinity)

$9.9E+37$ is returned by the test set when, the measurement is out of range, results are far above the present measurement range.

-9.9E+37 (NINFinity)

$-9.91E+37$ is returned by the test set when, the measurement is out of range, results are far below the present measurement range.

9.91E+37 (NAN)

$9.91E+37$ is returned by the test set when, the measurement is out of range but it can not be determined if measurement results are far above, or far below the measurement range.

If a measurement exceeds its measurement timeout value before a valid result is determined, $9.91E+37$ is returned.

FETCH? and READ? Invalid Results

When a **FETCH?** or **READ?** query is performed on a measurement with invalid results, the integrity indicator will return a value of 1, indicating No Result Available.

Manual Users Invalid Results

Manual users will generally see four dashes , “----” on the test set display. When the measurement timeout value has been exceeded, “Measurement Timeout” is displayed as well as the four dashes .

Measurement Progress Report

Description

The measurement progress report is a query of how far along a multi-measurement cycle has progressed. When the multi-measurement count is greater than one, the measurement progress report will indicate the number of measurements that have completed. The returned value will be the last update and not the actual number, because the value is updated periodically and not for each multi-measurement cycle. Every measurement has the measurement progress report available.

Programming Example

```
OUTPUT 714;"FETCH:PVTIME:ICOUNT?" !Returns the approximate number of
!multi-measurement cycles completed during a
!multi-measurement count cycle
```

Related Topics

[“Statistical Measurement Results” on page 158](#)

Measurement Event Synchronization

Description

Measurement event synchronization saves time by controlling the communication between the controller, the test set, and the mobile station, so that no device does something before it is supposed to (which can cause errors or do something well after it could have). Because some measurements can run concurrently, it is necessary that the control program know when individual measurement results are available.

Measurement event synchronization is accomplished using the INITiate subsystem's command INITiate:DONE? or the STATus:OPERation:NMRReady status registers.

INITiate:DONE?

The INITiate:DONE? query returns a string that indicates what, if any, measurements are ready to be fetched. This query should be used inside a loop, checking each measurement that was initiated. See ["INITiate:DONE?" on page 439](#) for more details about this query.

The INITiate:DONE? query returns at least one of the following indicators for each pass through the loop:

- "TXP" - The transmit power measurement results are available.
- "PVT" - The power versus time measurement results are available.
- "PFER" - The phase and frequency error measurement results are available.
- "FBER" - The fast bit error measurement results are available.*
- "BERR" - The bit error measurement results are available.*
- "AAUD" - The analog audio measurement results are available.*
- "DAUD" - The decoded audio measurement results are available.*
- "ORFS" - The output RF spectrum measurement results are available.
- "DPOW" - The dynamic power measurement results are available.*
- "IQT" - The I/Q Tuning measurement results are available.*
- "WAIT" - There are one or more measurements which are in the measuring state which are not excluded from the query. See ["INITiate:DONE:FLAG<measurement mnemonic>" on page 441](#). When WAIT is returned at least one measurement is not ready to be fetched yet.
- "NONE" - There are no measurements currently in the measuring state. This assumes no measurements have been excluded. See ["INITiate:DONE:FLAG<measurement mnemonic>" on page 441](#). This indicates that all measurements results are available or none have been initiated.

| | |
|------|--|
| NOTE | The indicators marked with a * are not returned for GPRS as those measurements are not available in that test application. |
|------|--|

Programming Example

The following example assumes that a call is currently connected and that no measurements other than TX power (TXP) and phase and frequency error (PFER) are currently being triggered. See “[Establishing an Active GSM Link with the Mobile Station](#)” on page 30 and “[Triggering Process Description](#)” on page 169.

```

10  OUTPUT 714;"SETUP:TXPOWER:CONTINUOUS OFF" !Sets TX power trigger mode
20                                !to single.
30  OUTPUT 714;"SETUP:PFERROR:CONTINUOUS OFF" !Sets PFER trigger mode
40                                !to single.
50  OUTPUT 714;"INITiate:TXPower;PFERror" !Begins a TX power and
60                                !PFER measurement.
70  REPEAT
80  OUTPUT 714;"INITIATE:DONE?" !Queries the test set for measurements
90                                !that are done
100 ENTER 714;Meas_done$ !String value representing DONE measurements,
110                                ! NONE if no measurements are done.
120 SELECT Meas_done$ !This variable will be set to WAIT until measurements
130                                !are DONE.
140 CASE "TXP" !Characters must be upper case.
150 OUTPUT 714;"FETCH:TXPOWER:POWER?" !If this case is selected, Tx power
160                                !(no integrity indicator) is FETCHed.
170 ENTER 714;Tx_power
180 PRINT "TX_Power is ";Tx_power
190 CASE "PFER" !Characters must be uppercase.
200 OUTPUT 714;"FETCH:PFERROR:RMS?" !If this case is selected, rms phase error
210                                !measurement is FETCHed.
220 ENTER 714;Phs_error
230 PRINT "Max RMS Phase Error is ";Phs_error
240 END SELECT
250 UNTIL Meas_done$ = "NONE" !When all triggered measurements have completed,
260                                !the INITiate:DONE? query returns NONE.
270 END

```

STATUS:OPERATION:NMRREADY:GSM

This command is *not* applicable to GPRS.

The STATus:OPERation:NMRReady:GSM command allows the program to immediately branch to the next operation or command without continuing through a loop as in INITiate:DONE? See ["STATus:OPERation:NMRReady:GSM Condition Register Bit Assignment" on page 540](#) for more details about this command.

You must enable the following so that as soon as the enabled NMRReady bit is true the program moves on.

- Positive or negative transition filter. See ["Transition Filters" on page 165](#).
- STATus:OPERation:NMRReady:GSM bit for the measurement desired.
- STATus:OPERation:NMRReady bit (4 for GSM) for the required system. See ["STATus Subsystem Description" on page 524](#) or ["Status Subsystem Overview" on page 159](#).
- STATus:OPERation bit (512 for NMRReady).
- Service Request Enabling (*SRE 128 for NMRReady).

The ["STATus:OPERation:NMRReady:GSM Condition Register Bit Assignment" on page 540](#) status register provides status reporting on the following measurement completions:

- TX Power
- Power vs. Time
- Phase/Frequency Error
- Output RF Spectrum
- Analog Audio
- Decoded Audio
- Fast Bit Error
- Bit Error
- I/Q Tuning
- Dynamic Power

Example 7. Generating a Service Request (SRQ) Interrupt - Bit Error Rate NMRR

This example is *not* applicable to GPRS.

The following example illustrates the use of the STATus subsystem to generate a service request when a BERR measurement completes. This example assumes a call is already connected and the BERR measurement is setup (mobile station must be in loopback type A or B).

```
10  OUTPUT 714;"STATUS:OPERATION:NMRREADY:GSM:PTR 256" !Enable positive transition
20                                !filter on fast BER bit.
30  OUTPUT 714;"STATUS:OPERATION:NMRREADY:GSM:ENABLE 256" !Enable the fast BER Bit to
40                                !generate a summary message.
45  OUTPUT 714;"STATUS:OPERATION:NMRREADY:ENABLE 4" !Enable the GSM summary bit.
50  OUTPUT 714;"STATUS:OPERATION:ENABLE 512" !Enable the Operation summary bit to
60                                !generate a summary message.
70  OUTPUT 714;"*SRE 128" !Enable the service request enable register to generate SRQ.
80  OUTPUT 714;"*CLS" !Clear all status data structures.
90  ON INTR 7,15 CALL Meas_complete !Define interrupt-initiated branch with a priority
100                            !of 15 (highest)
110 ENABLE INTR 7;2 !Enable interrupt on interface card 7 with a bit mask
120                            !(for interface's interrupt-enable register) of 2.
130 OUTPUT 714;"SETUP:FBER:CONTINUOUS OFF;:INITIATE:FBERROR" !Initiate a single
140                            !fast BER test.
150 LOOP
160 DISP "Waiting for BERR test to complete"
170 WAIT .1 !"Dummy" loop
180 END LOOP
190 !Instead of a "dummy" loop, controlling application could be performing setups,
200 !making measurements, etc.
210 END
220 SUB Meas_complete
230 DISP "BER test complete, OK to FETCh results now"
240 Clear_interrupt=SPOLL(714) !Clear the RQS message in the status byte register.
250 STOP
260 SUBEND
```

Operating Considerations

Only one indicator is returned per query.

All active measurements must be set to single trigger mode. This ensures that when a measurement completes it remains in the “DONE” state rather than restarting. Sending the “*RST” command at the beginning of the test code or using the “SETup:CONTinuous:OFF” command during measurement setups are ways to set the trigger to single for all measurements.

Related Topics

[“INITiate Command Functions” on page 436](#)

[“What Happens When a Measurement is INITiated?” on page 436](#)

[“Concurrent Measurements” on page 143](#)

Statistical Measurement Results

Description

Most measurements have a setup window that provides for the entry of a multi-measurement count value. This specifies how many measurements the test set will perform to obtain a set of values from which to calculate the following statistical measurement results:

- Average (arithmetic mean) of measurement set
- Minimum value from measurement set
- Maximum value from measurement set
- Standard Deviation of measurement set

Operating Considerations

The advantages of using the multi-measurement feature to obtain statistical measurement data include: reduced time associated with GPIB bus traffic, and reduced time configuring hardware. This is because the number of measurements specified in the multi-measurement count value are performed during one measurement cycle.

Programming Example

```
OUTPUT 714;"SETup:TXPower:COUNt:SNUMber 10" !Enters a TX Power multi-measurement count
!value of 10, and turns the TX Power
!multi-measurement state on.
```

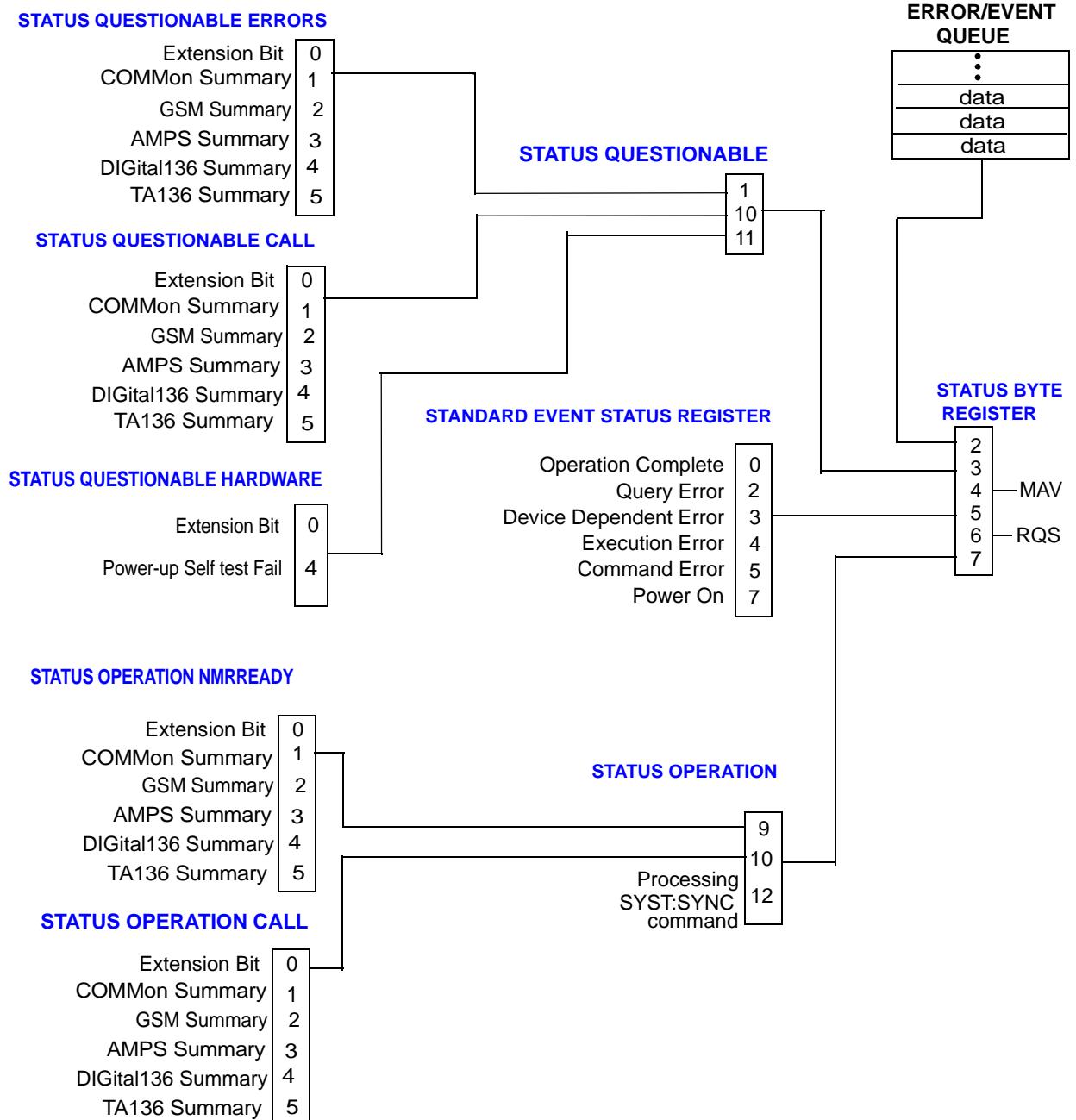
Related Topics

["Measurement Progress Report" on page 152](#)

Status Subsystem Overview

Description

Overview of STATus Reporting Structure



Status Reporting Structure For The GSM Test Application

STATUS QUESTIONABLE CALL GSM

| | |
|------------------------------|---|
| Extension Bit | 0 |
| Data Link Failure | 1 |
| Radio Link Failure | 2 |
| Immediate Assignment Failure | 3 |
| Channel Assignment Failure | 4 |
| Handover Failure | 5 |
| No Response to Page | 6 |
| Channel Assignment > Frames | 7 |
| Identification | 8 |
| Channel Mode Not Supported | 9 |

STATUS QUESTIONABLE ERRORS GSM

| | |
|---------------|---|
| Extension Bit | 0 |
| +100 Messages | 1 |
| +200 Messages | 2 |
| +300 Messages | 3 |
| +400 Messages | 4 |
| +500 Messages | 5 |
| +600 Messages | 6 |
| +700 Messages | 7 |
| +800 Messages | 8 |
| +900 Messages | 9 |

STATUS OPERATION NMRREADY GSM

| | |
|---------------------|----|
| Extension Bit | 0 |
| TX Power | 1 |
| Power vs. Time | 2 |
| Phase/Freq Error | 3 |
| Output RF Spectrum | 4 |
| Analog Audio | 5 |
| Decoded Audio | 6 |
| Fast Bit Error Rate | 7 |
| Bit Error | 8 |
| I/Q Tuning | 9 |
| Dynamic Power | 10 |

STATUS OPERATION CALL GSM

| | |
|-------------------------|---|
| Extension Bit | 0 |
| Idle | 1 |
| Connected | 2 |
| Alerting | 3 |
| BCH Changing | 4 |
| TCH Changing | 5 |
| Control Status Changing | 6 |
| BS Originating | 7 |
| BS Disconnecting | 8 |

Status Reporting Structure For The DIGital136 Registers**STATUS QUESTIONABLE ERRORS DIGITAL136**

| | |
|---------------|---|
| Extension Bit | 0 |
| +100 Messages | 1 |
| +200 Messages | 2 |
| +300 Messages | 3 |
| +400 Messages | 4 |
| +500 Messages | 5 |
| +600 Messages | 6 |
| +700 Messages | 7 |
| +800 Messages | 8 |
| +900 Messages | 9 |

Bit 4
STATUS
QUESTIONABLE
ERRORS

STATUS OPERATION NMRREADY DIGITAL136

| | |
|------------------------|---|
| Extension Bit | 0 |
| Digital Transmit Power | 1 |
| Modulation Accuracy | 2 |
| Adjacent Channel Power | 3 |
| Loopback BER | 4 |
| Digital IQ Adjust | 5 |
| Digital Dynamic Power | 6 |

Bit 4
STATUS
OPERATION
NMRREADY

Status Reporting Structure For The AMPS Registers

STATUS QUESTIONABLE ERRORS

| | | |
|---------------|---|--|
| Extension Bit | 0 | |
| +100 Messages | 1 | |
| +200 Messages | 2 | |
| +300 Messages | 3 | |
| +400 Messages | 4 | |
| +500 Messages | 5 | |
| +600 Messages | 6 | |
| +700 Messages | 7 | |
| +800 Messages | 8 | |
| +900 Messages | 9 | |

Bit 3
STATUS
QUESTIONABLE
ERRORS

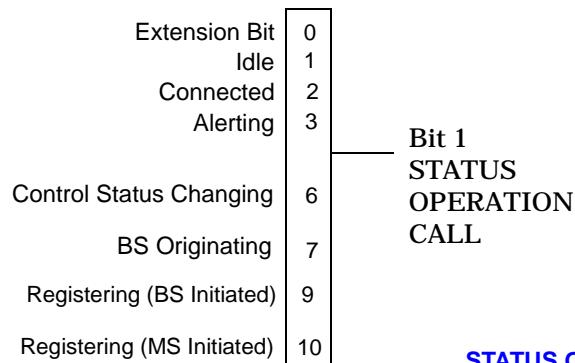
STATUS OPERATION NMRREADY AMPS

| | | |
|-----------------------|---|--|
| Extension Bit | 0 | |
| Analog Transmit Power | 1 | |
| Frequency Stability | 2 | |
| Frequency Modulation | 3 | |

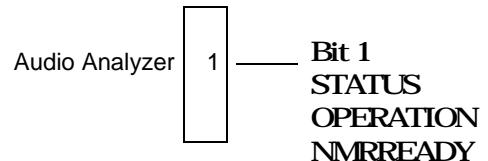
Bit 3
STATUS
OPERATION
NMRREADY

Status Reporting Structures For The COMMon Registers

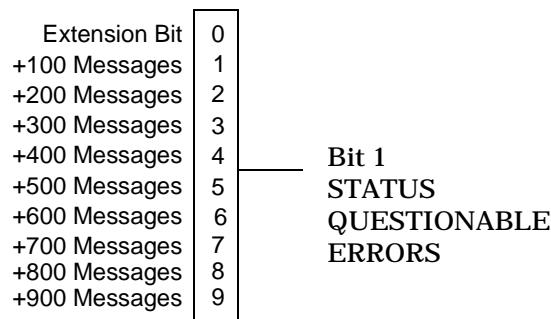
STATUS OPERATION CALL COMMON



STATUS OPERATION NMRREADY COMMON



STATUS QUESTIONABLE ERRORS COMMON



Status Reporting Structures For The TA136 Registers

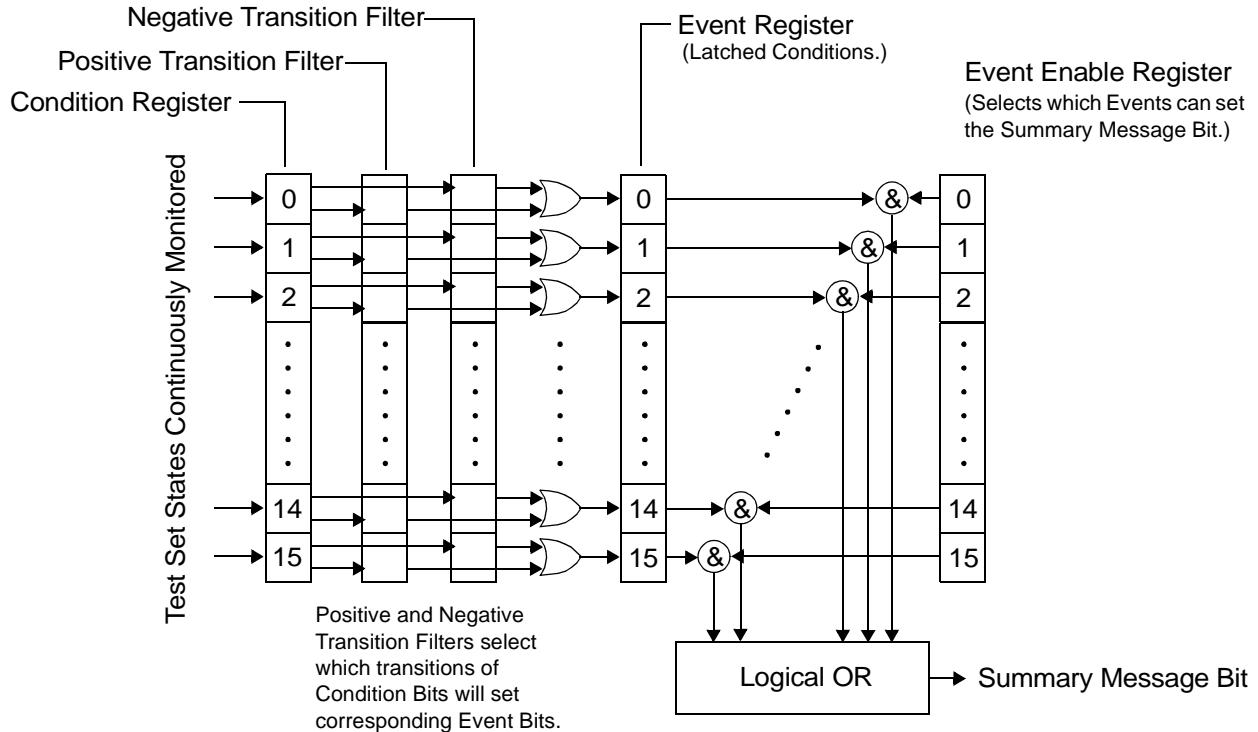
STATUS QUESTIONABLE ERRORS TA136

| | | |
|---------------|---|---|
| Extension Bit | 0 | Bit 5 STATUS QUESTIONABLE ERRORS |
| +100 Messages | 1 | |
| +200 Messages | 2 | |
| +300 Messages | 3 | |
| +400 Messages | 4 | |
| +500 Messages | 5 | |
| +600 Messages | 6 | |
| +700 Messages | 7 | |
| +800 Messages | 8 | |
| +900 Messages | 9 | |

Status Data Structure - Register Model

The generalized status register model consists of a Condition Register, Transition Filters, an Event Register,

an Enable Register, and a Summary Message Bit.



Condition Register

A condition is a test set state that is either TRUE or FALSE (a GPIB command error has occurred or a GPIB command error has not occurred). Each bit in a Condition Register is assigned to a particular test set state. A Condition Register continuously monitors the hardware and firmware states assigned to it. There is no latching or buffering of any bits in a Condition Register; it is updated in real time. Condition Registers are read-only. Condition Registers in the test set are 16 bits long and may contain unused bits. All unused bits return a zero value when read.

Transition Filters In the test set, the Transition Filters are implemented as two registers: a 16-bit positive transition (PTR) register and a 16-bit negative transition (NTR) register.

For each bit in the Condition Register, a Transition Filter bit determines the state transitions which will set a corresponding bit in the Event Register. Transition Filters may be set to pass positive transitions (PTR), negative transitions (NTR) or either (PTR or NTR). A positive transition refers to a condition bit which has changed from 0 to 1. A negative transition refers to a condition bit which has changed from 1 to 0.

A positive transition of a bit in the Condition register will be latched in the Event Register if the corresponding bit in the positive transition filter is set to 1. A positive transition of a bit in the Condition register will not be latched in the Event Register if the corresponding bit in the positive transition filter is set to 0.

A negative transition of a bit in the Condition register will be latched in the Event Register if the

corresponding bit in the negative transition filter is set to 1. A negative transition of a bit in the Condition register will not be latched in the Event Register if the corresponding bit in the negative transition filter is set to 0. Either transition (PTR or NTR) of a bit in the Condition Register will be latched in the Event Register if the corresponding bit in both transition filters is set to 1. No transitions (PTR or NTR) of a bit in the Condition Register will be latched in the Event Register if the corresponding bit in both transition filters is set to 0.

Transition Filters are read-write.

Transition Filters are unaffected by a *CLS (clear status) command.

Transitions Filters are set to pass positive transitions (all 16 bits of the PTR register are set to 1 and all 16 bits of the NTR register are set to 0) at power on or after receiving the *RST (reset) command.

Event Register The Event Register captures bit-state transitions in the Condition Register as defined by the Transition Filters. Each bit in the Event Register corresponds to a bit in the Condition Register. Bits in the Event Register are latched, and, once set, they remain set until cleared by a query of the Event Register or a *CLS (clear status) command. This guarantees that the application can't miss a bit-state transition in the Condition Register. There is no buffering; so while an event bit is set, subsequent transitions in the Condition Register corresponding to that bit are ignored. Event Registers are read-only. Event Registers in the test set are 16 bits long and may contain unused bits. All unused bits return a zero value when read.

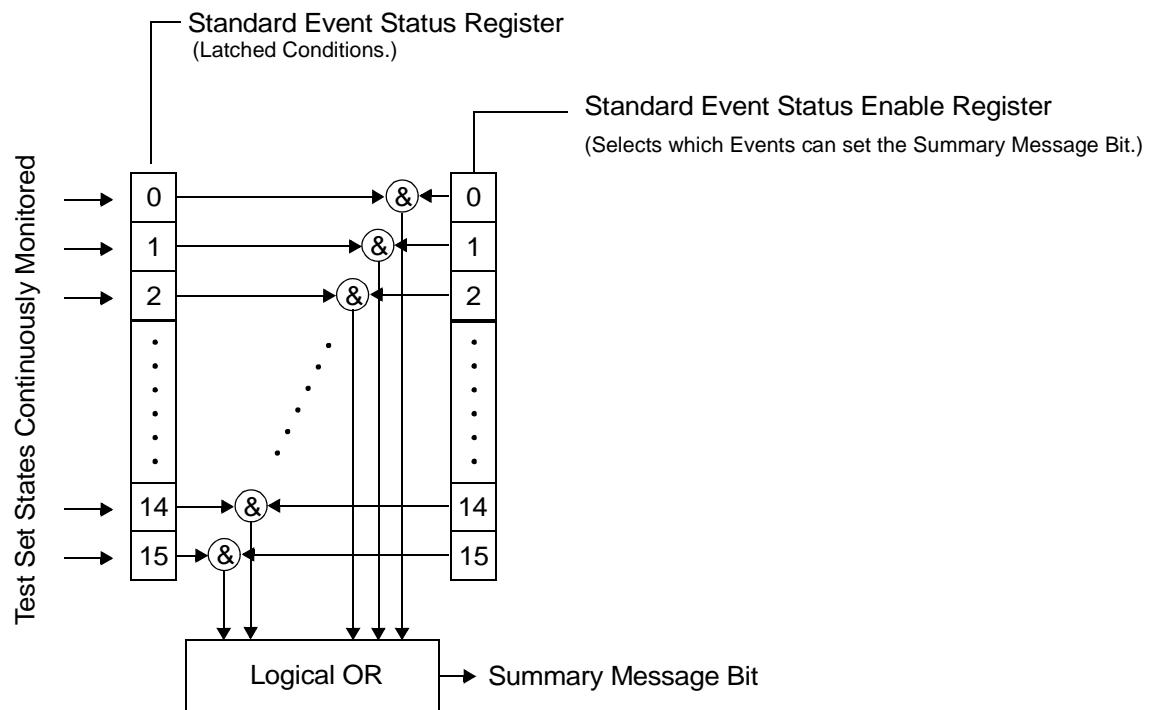
Event Enable Register The Event Enable Register defines which bits in the Event Register will be used to generate the Summary Message. Each bit in the Enable Register has a corresponding bit in the Event Register. The test set logically ANDs corresponding bits in the Event and Enable registers and then performs an inclusive OR on all the resulting bits to generate the Summary Message. By using the enable bits the application program can direct the test set to set the Summary Message to the 1 or TRUE state for a single event or an inclusive OR of any group of events. Enable Registers are read-write. Enable Registers in the test set are 16 bits long and may contain unused bits which correspond to unused bits in the associated Event Register. All unused bits return a zero value when read and are ignored when written to. Enable Registers are unaffected by a *CLS (clear status) command or queries.

Summary Message Bit The Summary Message is a single-bit message which indicates whether or not one or more of the enabled events have occurred since the last reading or clearing of the Event Register. The test set logically ANDs corresponding bits in the Event and Enable registers and then performs an inclusive OR on all the resulting bits to generate the Summary Message. By use of the enable bits, the application program can direct the test set to set the Summary Message to the 1, or TRUE, state for a single event or an inclusive OR of any group of events.

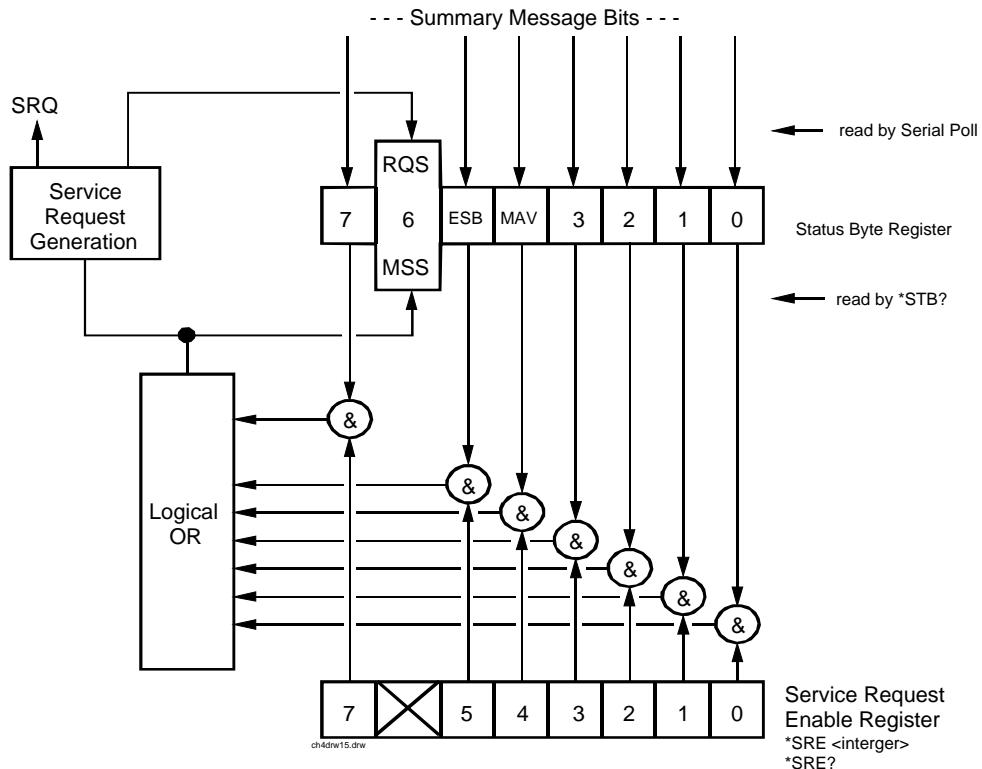
The Summary Message is TRUE, logic 1, if the register contains some information and an enabled event in the Event Register is set TRUE.

The Summary Message is FALSE, logic 0, if the queue is empty and no enabled events are TRUE. Registers can be cleared by reading all the information from the queue. Registers can also be cleared using the *CLS (clear status) command.

Standard Event Status Register Model



Service Request Enabling Register Model



Related Topics

[“STATus Subsystem Description” on page 524](#)

[“Standard Event Status Register” on page 560](#)

Triggering of Measurements

GSM and GPRS Operating Considerations

When the operating mode = active cell mode, Auto triggering sets the trigger source to Protocol. When the operating mode = test mode, auto triggering sets the trigger source to RF Rise.

Test mode operating mode is *not* available for GPRS.

Description

Trigger Source Description

A measurement trigger causes hardware (for example, a sampler) to capture data which is used by a measurement algorithm to produce a measurement result. Not all of the trigger source choices are available in every measurement, or every test application.

RF Rise Trigger Source: When RF rise triggering is selected, a measurement dependent threshold is used to define the trigger point on the envelope of the signal being measured. The envelope amplitude must fall below this threshold and remain there for a measurement-dependent period of time before the trigger is armed. After the trigger is armed, a trigger will occur as the envelope amplitude increases and passes through the threshold.

Protocol Trigger Source: When protocol triggering is selected, a data capture is triggered by a protocol generated signal. The test set's protocol engine knows when the DUT's signal should be present and generates a trigger signal for use by the measurement to trigger the data capture.

External Trigger Source: When external triggering is selected, the user supplies an external trigger signal via the rear panel TRIG IN connector in order to trigger data capture. The trigger will occur on the rising edge of this signal.

Immediate Trigger Source: When immediate triggering selected, the trigger occurs as soon as any pre-trigger samples required by the measurement algorithm are taken. Data capture is triggered when the measurement is initiated.

Auto Trigger Source: When auto triggering is selected, the test set automatically chooses the best trigger source for that measurement. This trigger source setting is convenient because the measurement trigger doesn't need to be changed when switching parameters. Auto trigger source is the best choice for most users.

Triggering Process Description

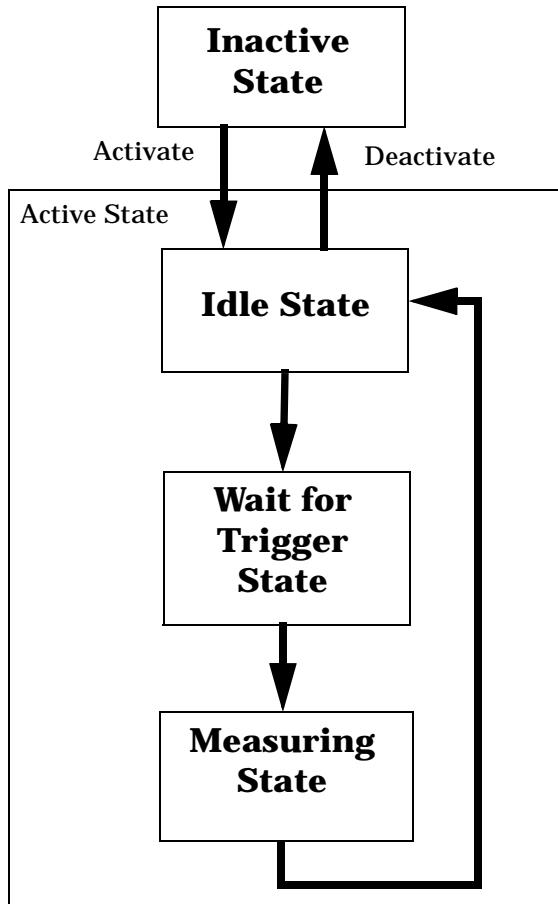
The triggering process controls the present and future states of the test set during the measurement cycle. Triggers are set up using the SETup commands and can be set up when a measurement is in the inactive state. A measurement is activated (selected) with an INITiate command. If a measurement is initiated while in its measurement cycle, it will terminate that measurement and restart it. The active state is not a single state but a collection of any state other than the inactive state. Deactivating (de-selecting) the measurement is accomplished through an INITiate:<MEAS>:OFF command.

Manually, a measurement is activated by selecting it from the Measurement Selection menu. A measurement

is inactivated by pressing the Measurement Selection key, scrolling to measurement in the Measurement Selection menu, and then pressing F4 (Close Measurement).

Figure 6.

The Test Set's Measurement States



Measurement States

The following examples describe states of the test set under various conditions. Refer to Figure 6. on page 170.

Example 8. Inactive State

If the test set has just been powered on, or any form of preset has been performed, then the measurement state is inactive.

Example 9. Wait for Trigger State

If a measurement has been initiated with the INITiate command but has not been triggered, or a measurement has been selected from the Measurement Selection menu but has not been triggered, then the measurement state is wait for trigger.

Example 10. Measuring and Idle States (Trigger Arm Single)

If the trigger arm is set to single, the trigger source is available, and the trigger qualifier (optional) is satisfied, the measurement state transitions to measuring and measurement results are now available to the user. After results are available, the state transitions to idle (awaiting another INITiate).

Example 11. Measuring State (Trigger Arm Continuous)

If the trigger arm is set to continuous, the trigger source is available, and the trigger qualifier (optional) is satisfied, the measurement state transitions to measuring and measurement results are now available to the user. The measurement is continually triggered until the measurement is deactivated. When the measurement is deactivated (INITiate:<MEAS>:OFF. or Close Measurement), it becomes inactive.

Trigger Arm (Single or Continuous) Description

Trigger arm determines if a measurement will make one measurement then return to idle (single), or automatically rearm on completion of a measurement and repeat the process (continuous).

NOTE When operating the test set remotely, trigger arm must be set to single, this causes the measurement cycle to transition to the idle state but remain active.

Pressing the Start Single key on the front panel will cause all currently active measurements with trigger arm set to single to arm and make the measurement.

Pressing Shift, Start Single (Stop) causes all measurements with trigger arm set to single to abort the measurement.

It is unnecessary to arm a measurement if trigger arm is set to continuous it will continue to cycle in the measuring state.

Table 16. Trigger Arm Default Settings

| Action | Trigger Arm Default Setting |
|---------------------------|-----------------------------|
| Power up of test set | Continuous |
| Manual Full Preset | Continuous |
| *RST (Remote) Full Preset | Single |
| Partial Preset | No change |

Trigger Delay Description

Trigger delay controls the delay time between the trigger and the start of sampling. Resolution is 1 nanosecond per measurement and the units are in seconds. A negative value indicates the sampling should occur prior to the trigger. The default is zero seconds which is preferred for most measurements.

Trigger Qualifier Description

When the trigger qualifier is on, the test set analyzes (samples) the input signal when a trigger is received. It then determines if the input signal was valid by looking at its power level. If the power level during sampling did not meet the requirements of a valid signal, the state returns to wait for trigger without making a measurement. Trigger qualifier is available for TX Power and Phase Frequency Error measurements only.

If a valid signal is present, then it is qualified, and the samples are processed.

Related Topics

[“Integrity Indicator” on page 146](#)

[“SETup:ORFSpectrum:TRIGger:SOURce” on page 507](#)

[“SETup:PFERror:TRIGger:SOURce” on page 512](#)

[“SETup:PVTIme:TRIGger:SOURce” on page 518](#)

[“SETup:IQTuning:TRIGger:SOURce” on page 498](#)

[“SETup:TXPower:TRIGger:SOURce” on page 522](#)

5 GSM Programming Guide

Programming the Agilent Technologies 8960 Series 10 for GSM Mobile Testing in Active Cell Operating Mode

Introduction

Conventions Used in This Programming Guide

Throughout this Programming Guide the term “test set” refers to an Agilent Technologies 8960 Series 10 wireless communications test set with the E1960A GSM mobile test application installed.

Purpose of This Programming Guide

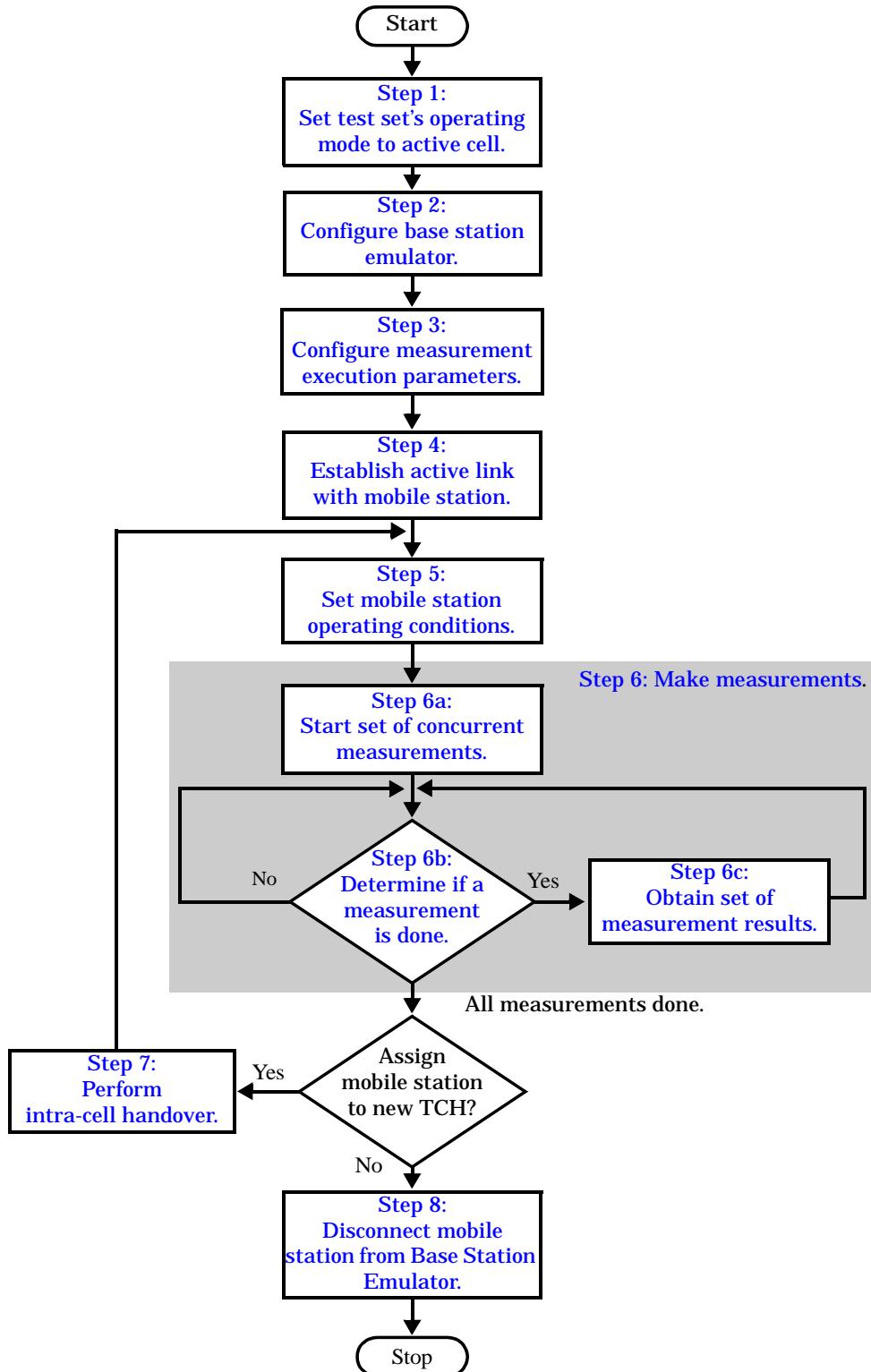
The test set represents state-of-the-art technology in one-box-testers and contains many powerful test capabilities which are accessible through easy-to-use GPIB programming commands. The purpose of this Programming Guide is to teach you how to write a basic control program, using the test set’s GPIB command set. This program will perform fundamental manufacturing tests on a GSM mobile station with the test set operating in active cell mode.

How This Programming Guide Is Organized

The Programming Guide is organized around a typical set of tasks a control program would normally perform when testing a GSM mobile station in a manufacturing environment. The set of tasks is shown in [“Figure 1. Typical Flow of Tasks Performed by Control Program” on page 177](#).

Typically in a manufacturing environment, steps 1, 2, and 3 are done once each time a production run is started, steps 4 and 8 are done once for each mobile station tested during the production run, and steps 5, 6, and 7 are done iteratively for each mobile station tested during the production run. The number of iterations for steps 5, 6, and 7 is dependent upon how many mobile station operating conditions are being tested (that is, number of channels, number of power levels, and so fourth).

Figure 1. Typical Flow of Tasks Performed by Control Program



How to Use This Programming Guide

This Programming Guide is divided into 9 sections. Sections 1 through 8 (step 1 through 8) should be read in sequence. Each section, in order, discusses one of the tasks to be performed by the control program, showing how to accomplish that task using the test set's GPIB command set. As you progress through each section your understanding of how the test set's GPIB interface operates will increase as you see the control program evolve.

The last section of the Programming Guide presents a “[Comprehensive Program Example](#)” on page 223 which uses all of the topics discussed in sections 1 through 8 together in one program to give the programmer a sense of how to tie everything together.

About the Programming Examples Presented in This Programming Guide

Programming Language:

Programming examples presented in this Programming Guide are written in the Rocky Mountain BASIC programming language, also known as RMB.

Syntax Used in Programming Examples:

1. Programming examples use the shortened form of the command syntax to minimize GPIB bus transactions. The shortened form of a command is defined by use of capital letters in the command syntax.

Example 1. Command Syntax:

CALL:STATUs:TCHannel:TSLot?

Example 2. Shortened Form:

CALL:STAT:TCH:TSL?

2. Programming examples do not include default nodes. Default nodes in the command syntax are defined by enclosing the node inside the [] brackets.

Example 3. Command Syntax:

CALL[:CELL[1]]:ACTivated[:STATe]<ON|1|OFF|0>

Example 4. Command Syntax without Default Nodes:

CALL:ACT <ON|1|OFF|0>

3. Programming examples make extensive use of compound commands using the ; and the :: separators. Refer to the test set's reference information for information on the definition and use of these command separators.

Step 1: Set the Test Set's Operating Mode to Active Cell

Background

The test set contains a GSM base station emulator. The base station emulator's primary purpose is to provide the GSM call processing necessary for parametric measurements on the RF and audio signals of a GSM mobile station.

An important characteristic of the test set's base station emulator is its operating mode. The operating mode sets the way in which the base station emulator interacts with the mobile station. The base station emulator has two operating modes; active cell mode and test mode.

Active cell mode is used when emulating a normal GSM cell. Test mode is used when it is not possible, or not desired, to communicate with the mobile station via over-the-air signaling, but downlink stimulus and uplink measurements are still needed.

This Programming Guide focuses on programming the test set's base station emulator in active cell operating mode.

Overview of Active Cell Operating Mode

Active cell is the default operating mode of the test set's base station emulator and is used when emulating a normal GSM cell (that is, active signaling between the mobile station and the base station emulator).

Active Cell Features

The basic features provided by the base station emulator when the operating mode is set to active cell are:

- Generation of a BCH (broadcast channel) without TCH (traffic channel).
- Support for location updating.
- Call setup, both mobile station and base station emulator originated.
- Changing TCH parameters during a call using over-the-air signaling.
- Base station emulator initiated and mobile station initiated call disconnection.
- All measurements supported in the test application are available.
- The base station emulator automatically controls the test set's demodulation receiver.

Setting the Test Set's Operating Mode to Active Cell

The test set's operating mode is set using the CALL:OPERATING:MODE command.

Example 1. Command Syntax:

```
CALL:OPERATING:MODE <CELL|TEST>
```

Example 2. Programming Example:

```
! ****
! Step 1: Set Test Set Operating Mode To Active Cell
! ****
!
OUTPUT Test_set;"CALL:OPER:MODE CELL
```

Step 2: Configure the Base Station Emulator

Background

In active cell operating mode the base station emulator, using the test set's GMSK modulated source, generates a downlink (base station to mobile station direction) broadcast channel (BCH) which represents a cell. The mobile station can camp to this signal, just as it would camp to a cell on a real network. The base station emulator can then page the mobile station on the BCH and listen to the response of the mobile station on the uplink (mobile station to base station direction), using the test set's demodulating receiver. Calls can then be set up with the establishment of a traffic channel (TCH) in both the downlink and uplink directions. Measurements can be made, using the base station emulator's measuring receiver, under essentially identical conditions to that which the mobile station would experience on a real network.

The base station emulator can emulate a cell in any one of the following GSM frequency bands:

- PGSM - Primary (band) GSM, also known as GSM900
- EGSM - Extension (band) GSM (includes PGSM)
- DCS - Also known as DCS1800
- PCS - Also known as PCS1900, DCS1900

NOTE The term GSM is used to refer to any combination of, or all of, the supported bands. It is not used as a shortened term for PGSM.

The task of configuring the base station emulator consists of configuring the BCH and the TCH. There are numerous parameters that can be configured for both the BCH and the TCH. It may not be necessary to configure all the parameters all the time. The test set's default settings should allow a properly functioning mobile station to successfully camp on the cell under most circumstances.

In a manufacturing environment it may be desirable to explicitly configure the BCH and TCH parameters to ensure that the settings have not been corrupted by someone setting a parameter's value through the test set's front panel.

Configuring the Broadcast Channel Parameters

The broadcast channel parameters are configured using the CALL processing subsystem commands shown in the following table.

Broadcast Channel Settable Parameters

| Parameter | Command Syntax | Footnote |
|---|--|----------------------|
| Broadcast Band | CALL[:CELL[1]]:BAND <PGSM EGSM DCS PCS> | 1 |
| Cell Power | CALL[:CELL[1]]:POWer:AMPlitude <numeric value>[<suffix>] | |
| Cell Power State | CALL[:CELL[1]]:POWer:STATe <ON 1 OFF 0> | |
| Cell Power and State | CALL[:CELL[1]]:POWer[:SAMPlitude]<numeric value>[<suffix>] | 2 |
| Cell BCH Number | CALL[:CELL[1]]:BCHannel[:ARFCn]:SElected<numeric value> OR CALL[:CELL[1]]:BCHannel[:ARFCn]:<PGSM EGSM DCS PCS><numeric value> | 3 |
| Mobile Country Code | CALL[:CELL[1]]:MCCode <numeric value> | 4 |
| PCS Mobile Country Code | CALL[:CELL[1]]:PMNCode:VALue <numeric value> | 4 |
| Use PCS MNC | CALL[:CELL[1]]:PMNCode:STATe <ON 1 OFF 0> | 4 |
| PCS Mobile Country Code and Use PCS NMC State | CALL[:CELL[1]]:PMNCode:SVALue <numeric value> | 4, 5 |
| Mobile Network Code | CALL[:CELL[1]]:MNCCode <numeric value> | 4 |
| Location Area Code | CALL[:CELL[1]]:LACode <numeric value> | 4 |
| Network Color Code | CALL[:CELL[1]]:NCCode <numeric value> | 4 |
| Base Station Color Code | CALL[:CELL[1]]:BCCode <numeric value> | 4 |
| Paging IMSI | CALL:PAGing:IMSI <string> | |
| Repeat Paging State | CALL:PAGing:REPeat[:STATe] <ON 1 OFF 0> | |
| Paging Mode | CALL:PAGing:MODE <NORMAL REORG> | 7 |
| Paging Multiframes | CALL:PAGing:MFRAMES <numeric value> | |
| Auto IMEI Request | CALL:IMEI:AUTO <ON 1 OFF 0> | |
| BA Table Entries | CALL[:CELL[1]]:BA:TABLE[:SElected][<numeric value>{<numeric value>}] OR CALL[:CELL[1]]:BA:TABLE:<PGSM EGSM DCS PCS> [<numeric value>{<numeric value>}] | 6 |

Table Footnotes

- 1 The broadcast band setting becomes the selected (:SELected) band (see note 3).
- 2 Sets amplitude to <numeric value> and state to ON in one command.
- 3 Sets the BCH channel for the broadcast band selected with the broadcast band command (see note 1).
- 4 Can only be set when Cell Activated State = OFF. See ["Things That Can Go Wrong" on page 185](#).
- 5 Sets PCS mobile country code to <numeric value> and state to ON in one command.
- 6 Sets the BA table entries for the broadcast band selected with the broadcast band command (see note 1).
- 7 Setting Paging Mode to Normal causes the mobile station to use discontinuous reception (that is, DRX = ON).

Example 1. Programming Example:

The following program example illustrates proper use of the base station emulator BCH configuration commands. Not all parameters are accessed. Note the use of the cell activated state command to set the network configuration parameters.

```
!*****
! Step 2: Configure Base Station Emulator
!*****
!
OUTPUT Test_set;"CALL:CELL:BAND PGSM"
OUTPUT Test_set;"CALL:PAG:MODE REOR" ! Sets discontinuous reception to OFF
OUTPUT Test_set;"CALL:ACT OFF"
OUTPUT Test_set;"CALL:CELL:MCC 1;LAC 1;MNC 1;NCC 1;BCC 5"
OUTPUT Test_set;"CALL:ACT ON"
OUTPUT Test_set;"CALL:BCH 20"
OUTPUT Test_set;"CALL:POW:SAMP -85"
```

Configuring the Traffic Channel Parameters

The traffic channel parameters are configured using the CALL processing subsystem commands shown in the following table.

Traffic Channel Settable Parameters

| Parameter | Command Syntax |
|-------------------------------|---|
| TCH Band (“ 1 ”) | CALL:TCHannel:BAND <PGSM EGSM DCS PCS> |
| Channel Number (“ 2 ”) | CALL:TCHannel[:ARFCn][:SElected] <numeric value> OR CALL:TCHannel[:ARFCn]:<PGSM EGSM DCS PCS> <numeric value> |
| Loopback Mode | CALL:TCHannel:LOOPback <OFF A B C> |
| Timeslot | CALL:TCHannel:TSLot <numeric value> |
| Downlink Speech Source | CALL:TCHannel:DOWNlink:SPEech <NONE ECHO PRBS15 SIN300 SIN1000 SIN3000> |

Table Footnotes

- 1 The TCH band setting becomes the selected band (see Note 2).
- 2 Sets the TCH channel for the TCH band selected with the TCH Band command (see Note 1).

Example 2. Programming Example:

The following program example illustrates proper use of the base station emulator TCH configuration commands. Not all parameters are accessed.

```
OUTPUT Test_set;"CALL:TCH 45"
OUTPUT Test_set;"CALL:TCH:TS 4"
```

Things That Can Go Wrong

Trying to Set the MCC, MNC, LAC, NCC, or BCC While the Cell Activated State = ON

Trying to set any of the network configuration parameters while the cell is in the active state will generate the following error:

```
GSM operation rejected; Attempting to set <MCC|MNC|LAC|NCC|BCC> while generating a BCH
```

Background The network configuration parameters are encoded into the messaging broadcast on the BCH. Changing the network parameter values while the BCH is active would require the BCH to be stopped, and have the new values encoded, and then the BCH would have to be re-started. This would cause calls to be dropped or disrupt a mobile station camped to the cell. Consequently the network configuration parameters cannot be changed while the cell is active.

Control of the Cell Activated State The active/inactive state of the cell is controlled using the cell activated state command. This command is only used when the operating mode is set to active cell mode.

Example 3. Command Syntax:

```
CALL[:CELL[1]]:ACTivated[:STATE]<ON|1|OFF|0>
```

Example 4. Programming Example:

```
OUTPUT Test_set;"CALL:ACT ON"
```

Effects of Activating and Deactivating the Cell

Effects of Deactivating the Cell Among others (refer to the test set's reference information for a complete listing of actions), setting the cell activated state to OFF causes the following actions to take place:

- The control program is no longer prevented from setting the following parameters: MCC, MNC, PCS MNC, Use PCS MNC, BCC, NCC and LAC.
- All signaling operations, uplink demodulation and downlink (BCH & TCH) generation are stopped.
- Any measurements that rely on uplink demodulation are aborted. No special error messages are generated.

Effects of Activating the Cell Among others (refer to the test set's reference information for a complete listing of actions), setting the cell activated state to ON causes the following actions to take place:

- The control program is prevented from setting the following parameters: MCC, MNC, PCS MNC, Use PCS MNC, BCC, NCC and LAC.
- If the cell activated state was previously OFF, the TDMA frame number of the BS emulator starts from zero, and a BCH is generated.
- If a TCH was present prior to setting cell activated state to OFF, the TCH is not reinstated.

Step 3: Configure the Measurement Execution Parameters

Background

Measurement execution parameters control the conditions under which a measurement operates. The general set of measurement execution parameters and their generic categories are as follows:

- Measurement Averaging (used by most measurements)
 - Multi-Measurement Count State
 - Multi-Measurement Count State
- Measurement Triggering (used by most measurements)
 - Trigger Arm
 - Trigger Source
 - Trigger Delay
 - Trigger Qualifier
- Measurement Synchronization (used by some measurements)
 - Burst Synchronization
- Measurement Timeouts (used by all measurements)
 - Measurement Timeout
 - Measurement Timeout State
- Measurement Specific (execution parameters specific to an individual measurement)

NOTE Not all measurements use all the execution parameters shown above. Additionally, some measurements have parameters that are specific to the measurement such as offset frequency lists or filter settings. Each measurement has its own set of parameters which are unique to it and have no affect on the execution of other measurements. Refer to the GPIB syntax listing for a detailed list of execution parameters for individual measurements.

Overview

The SETup subsystem is used to configure measurement parameters. Each individual measurement parameter can be set and queried using the associated SETup subsystem command. The general hierarchy of the SETup subsystem command structure is as follows:

```
SETup:<meas-mnemonic>:<measurement parameter><parameter setting/value>
```

The following table shows the measurements available in the Agilent E1960A GSM mobile test application and their associated <meas-mnemonic> used in the SETup command syntax.

Measurement Mnemonics Used In The SETup Subsystem

| Measurement | <meas-mnemonic> |
|-------------------------|-----------------|
| Transmit Power | TXPower |
| Power vs Time | PVTime |
| Phase & Frequency Error | PFERror |
| Output RF Spectrum | ORFSpectrum |
| Bit Error | BERRor |
| Fast Bit Error | FBERRor |
| Decoded Audio | DAUDio |
| Analog Audio | AAUDio |
| I/Q Tuning | IQTuning |
| Dynamic Power | DPOWer |

Configuring Measurement Averaging Parameters

Multi-Measurement Count State Parameter

The Multi-Measurement Count State parameter is used to turn measurement averaging on and off.

Example 1. Command Syntax:

```
SETup:<meas-mnemonic>:COUNT:STATe <ON|1|OFF|0>
```

Example 2. Programming Example:

```
OUTPUT Test_set; "SET:PVT:COUN:STATe ON"
```

would turn measurement averaging ON for the power versus time measurement.

Multi-Measurement Count Number Parameter

The Multi-Measurement Count Number parameter sets the number of measurement samples taken during each measurement cycle when the COUNT:STATe parameter is set to ON.

Example 3. Command Syntax:

```
SETup:<meas-mnemonic>:COUNT:NUMBER <numeric value>
```

Example 4. Programming Example:

```
OUTPUT Test_set; "SET:TXP:COUN:NUMB 10"
```

would set the number of averages to 10 for the transmit power measurement.

Configuring Multi-Measurement Count State and Count Number Simultaneously

The multi-measurement count state can be set to ON and the multi-measurement count number can be set to some value using a single complex command.

Example 5. Command Syntax:

```
SETup:<meas-mnemonic>:COUNT[:SNUMber] <numeric value>
```

Example 6. Programming Example:

```
OUTPUT Test_set; "SET:TXP:COUN:SNUM 10"
```

would set the multi-measurement count state to ON and set the number of averages to 10 for the transmit power measurement. Note that in this example the optional command mnemonic :SNUMber has been included for purposes of clarity.

Configuring Measurement Triggering Parameters

Trigger Source Parameter

The Trigger Source parameter selects the source of the measurement trigger signal.

Example 7. Command Syntax:

```
SETup:<meas-mnemonic>:TRIGger:SOURce <AUTO|IMMediate|PROTocol|RISE>
```

Example 8. Programming Example:

```
OUTPUT Test_set; "SET:TXP:TRIG:SOUR AUTO"
```

would set the trigger source to AUTO for the transmit power measurement.

Trigger Delay Parameter

The Trigger Delay parameter controls the delay between the trigger event (the point in time at which the trigger signal is received) and the start of sampling. Negative values indicate that the sampling should occur prior to the trigger event.

Example 9. Command Syntax:

```
SETup:<meas-mnemonic>:TRIGger:DELay <numeric value>[<suffix>]
```

Example 10. Programming Example:

```
OUTPUT Test_set; "SET:TXP:TRIG:DEL 10 US"
```

would set the trigger delay to 10 μ s for the transmit power measurement.

Trigger Qualifier Parameter

The Trigger Qualifier parameter enables or disables automatic trigger re-arming following a trigger event which occurred when no valid signal (burst) was present.

Example 11. Command Syntax:

```
SETup:<meas-mnemonic>:TRIGger:QUALifier <ON|1|OFF|0>
```

Example 12. Programming Example:

```
OUTPUT Test_set; "SET:TXP:TRIG:QUAL ON"
```

would turn the trigger qualifier on for the transmit power measurement.

Trigger Arm Parameter

The Trigger Arm parameter determines whether a measurement will make one measurement then stop (single), or automatically re-arm upon completion of one measurement and repeat the process (continuous).

Example 13. Command Syntax:

```
SETup:<meas-mnemonic>:CONTinuous <ON|1|OFF|0>
```

NOTE The recommend trigger arm setting for all measurements when using the remote user interface is single (CONTinuous OFF).

Example 14. Programming Example:

```
OUTPUT Test_set; "SET:TXP:CONT OFF"
```

would set the trigger arming to single for the transmit power measurement.

Configuring the Burst Synchronization Parameter

Burst Synchronization Parameter

The burst synchronization parameter specifies where in the sampled data stream the measurement algorithm starts making its analysis of the captured data. Burst synchronization occurs after the measurement data is captured. The burst synchronization parameter's setting determines how the measurement's time reference is developed from the sampled data.

Not all measurements will have synchronization choices and not all synchronization choices will be available in measurements that use synchronization. Measurement synchronization and measurement triggering are independent settings and may be used in any combination.

Example 15. Command Syntax:

```
SETup:<meas-mnemonic>:BSYNc <MIDamble|AMPLitude|NONE>
```

Example 16. Programming Example:

```
OUTPUT Test_set; "SET:PVT:BSYN MID"
```

would set the burst synchronization to midamble for the power versus time measurement.

Configuring Measurement Timeout Parameters

Measurement Timeout State Parameter

The Measurement Timeout State parameter is used to enable or disable measurement timeout functionality.

Example 17. Command Syntax:

```
SETup:<meas-mnemonic>:TIMEout:STATE <ON|1|OFF|0>
```

Example 18. Programming Example:

```
OUTPUT Test_set; "SET:PVT:TIM:STAT ON"
```

would enable measurement timeouts for the power versus time measurement.

Measurement Timeout Time Parameter

The Measurement Timeout Time parameter sets the maximum time that a measurement will execute before failing with a timeout error (when the TIMEout:STATe parameter is set to ON).

Example 19. Command Syntax:

```
SETup:<meas-mnemonic>:TIMEout:TIME <numeric value>[<suffix>]
```

Example 20. Programming Example:

```
OUTPUT Test_set; "SET:TXP:TIM:TIME 10 S"
```

would set the measurement timeout time to 10 seconds for the transmit power measurement.

Configuring Measurement Timeout State and Timeout Time Simultaneously

The measurement timeout state can be set to ON and the measurement timeout time can be set to some value using a single complex command.

Example 21. Command Syntax:

```
SETup:<meas-mnemonic>:TIMEout[:STIMe] <numeric value>[<suffix>]
```

Example 22. Programming Example:

```
OUTPUT Test_set; "SET:TXP:TIM:STIM 10"
```

would set the measurement timeout state to ON and set the measurement timeout time to 10 seconds for the transmit power measurement. Note that in this example the optional command mnemonic :STIMe has been included for purposes of clarity.

Configuring Measurement Specific Parameters

Background

Some measurements have parameters that are specific to the measurement. Refer to the GPIB syntax listings for a detailed list of execution parameters for individual measurements. This section gives you some insight into the possible programming techniques that can be used to configure these measurement specific execution parameters.

Sending Comma-Separated Parameter Configuration Lists to the Test Set

High-level measurements in the test application may require numerous parameters to configure the measurement. For example: the output RF spectrum measurement can require up to 22 frequency offsets for the modulation part of the measurement and up to 8 frequency offsets for the switching part of the measurement. The offsets are sent as comma separated lists. There are a variety of techniques that can be used to send these lists. Some of these techniques are shown below.

1. Include each individual parameter in the command itself. For example:

```
OUTPUT Test_set;"SET:ORFS:SWIT:FREQ .4MHZ,.6MHZ,-.4MHZ,-.6MHZ"
```

2. Store the parameter values in a data structure and send the command with the data structure appended to it. For example:

- Using a string variable:

```
DIM Swit_offs$[255]
Swit_offs$=".4MHZ,.6MHZ,-.4MHZ,-.6MHZ,1.2MHZ,-1.2MHZ"
OUTPUT Test_set;"SET:ORFS:SWIT:FREQ "&Swit_offs
```

- Using numeric arrays:

```
OPTION BASE 1
REAL Swit_offs(8),Mod_offs(22)
!
DATA 400,-400,600,-600,1200,-1200,1800,-1800
DATA .1,-.1,.2,-.2,.25,-.25,.4,-.4,.6,-.6,.8,-.8
DATA 1,-1,1.2,-1.2,1.4,-1.4,1.6,-1.6,1.8,-1.8
!
READ Swit_offs(*)
READ Mod_offs(*)
!
Swit_img:IMAGE K,7(K,"KHZ,"),K,"KHZ"
Mod_img:IMAGE K,21(K,"MHZ,"),K,"MHZ"
OUTPUT Test_set USING Swit_img;"SET:ORFS:SWIT:FREQ",Swit_offs(*)
OUTPUT Test_set USING Mod_img;"SET:ORFS:MOD:FREQ",Mod_offs(*)
```

Example 23. Programming Example:

The following example illustrates configuring the measurement execution parameters for the output RF spectrum, transmit power, and phase and frequency error measurements.

```
!*****
! Step 3: Configure Measurement Execution Parameters
!*****
!

! Configure ORFS Measurement:
!
OUTPUT Test_set;"SET:ORFS:SWIT:COUN 5"          ! Examples of using complex
OUTPUT Test_set;"SET:ORFS:MOD:COUN 10"           ! commands to set multi-meas
                                                ! state and count at same time.
OUTPUT Test_set;"SET:ORFS:TRIG:SOUR AUTO"        ! Set trig source to AUTO.
OUTPUT Test_set;"SET:ORFS:CONT OFF"               ! Set trig mode to single.
OUTPUT Test_set;"SET:ORFS:TIM 60"                 ! Set timeout time to 60 sec.
! Put switching and modulation offsets to be tested into string variables.
Swit_offs$="400KHZ,-400KHZ,600KHZ,-600KHZ,1200KHZ,-1200KHZ,1800KHZ,-1800KHZ"
Mod_offs$=".2MHZ,-.2MHZ,.4MHZ,-.4MHZ,.6MHZ,-.6MHZ,.8MHZ,-.8MHZ,1MHZ,-1MHZ"
OUTPUT Test_set;"SET:ORFS:SWIT:FREQ "&Swit_offs$
OUTPUT Test_set;"SET:ORFS:MOD:FREQ "&Mod_offs$

!
! Configure TX Power Measurement:
!
OUTPUT Test_set;"SET:TXP:COUN 3"
OUTPUT Test_set;"SET:TXP:TRIG:SOUR RISE;QUAL ON"
OUTPUT Test_set;"SET:TXP:CONT OFF"
OUTPUT Test_set;"SET:TXP:TIM 20"
!
! Configure Phase & Frequency Error Measurement:
!
OUTPUT Test_set;"SET:PFER:COUN 8"
OUTPUT Test_set;"SET:PFER:TRIG:SOUR PROT;QUAL ON"
OUTPUT Test_set;"SET:PFER:CONT OFF"
OUTPUT Test_set;"SET:PFER:TIM 30"
OUTPUT Test_set;"SET:PFER:BSYN MID
```

Step 4: Establish an Active Link with Mobile Station

Background

Call Connect/Disconnect Synchronization

When the control program requires that an active link be established/terminated between the mobile station and the test set, the commands necessary to initiate the call connect/disconnect process are sent to the test set (for a base station emulator originated/terminated call) or to the mobile station (for a mobile station originated/terminated call). In either case, synchronization is defined as the control program being able to empirically determine when the call has been successfully connected/disconnected so that the control program can proceed, or being able to empirically determine that the call has not been successfully connected/disconnected so that the control program can take appropriate action.

The determination is made by monitoring the call state as the call connect/disconnect process progresses.

Call States

At any instant in time a call can be in one of the following states:

- Idle
- Setup Request
- Proceeding
- Alerting
- Disconnecting
- Connected

Setup Request, Proceeding, Alerting and Disconnecting are referred to as transitory states because the amount of time which the call can spend in any of these states is limited by GSM protocol (that is, the call transitions through these states, it is not allowed to stay in a transitory state forever).

NOTE If repeat paging is on it is possible for the call process to stay in one of the transitory states beyond the time specified by the GSM protocol timers.

The control program can directly query the state of a call with the CALL:STATus:STATe? query command, which immediately returns the current call state (that is, Idle, Setup Request, Proceeding, Alerting, Disconnecting, or Connected)

Determining if a Call Connect/Disconnect Process is Completed

The most common technique used by control programs to determine if a call connect/disconnect process has completed (either successfully or unsuccessfully), is to repeatedly query the call state using the CALL:STATus:STATE? query command inside a program loop. The return value from each query is checked to determine if the connect/disconnect process is proceeding or has reached the desired state.

There are, however, some inherent problems associated with this technique:

- The rapid polling of the instrument increases bus traffic and places increased demand on the instrument's processors to respond to the constant stream of queries.
- The control program must handle failure conditions. For example: if a call origination process is started but the call never leaves the Idle state, the control program must incorporate some technique to prevent the program from staying in the loop forever waiting for a transition out of the Idle state.

The test set implements a set of commands designed specifically for call connect/disconnect synchronization. (see ["Step 8: Disconnect the Mobile Station from the Base Station Emulator" on page 218](#) for call disconnect synchronization). These commands directly address many of the inherent problems discussed above. When properly used these commands eliminate the need for rapid polling of the instrument, and relieve the programmer of many of the tasks associated with error handling.

Call Connect/Disconnect Synchronization Commands

Call Connected State Query Command The call-connected-state query command is used to query the connected state of a call. This command allows the control program to determine if a call is connected (that is, in the Connected state) or disconnected (that is, in the Idle state), with a built-in provision to automatically wait if the call is in one of the transitory states.

The basic operation of this query is:

- If the call is in the Connected state when the query is received by the test set, the query immediately returns a 1.
- If the call is in the Idle state (that is, disconnected) when the query is received by the test set, the query immediately returns a 0.
- If the call is in one of the transitory states (that is, Setup Request, Proceeding, Alerting, or Disconnecting) when the query is received by the test set, the query hangs (that is, does not return an answer) until the call state changes to either Idle or Connected and then behaves as above.

The call-connected-state query command can be used at any time to determine the connected state of a call. The built-in provision to automatically wait if the call is in one of the transitory states eliminates the need for rapid polling when the call-connected-state query command is used to synchronize to a call connect/disconnect process.

| | |
|-------------|--|
| NOTE | If repeat paging is on, a call origination process can stay in one of the transitory states until the mobile either answers the page or until the user stops the paging process. This means that if a call-connected-state query command is sent to the test set with repeat paging set to on, the query could hang "forever". |
|-------------|--|

Example 1. Command Syntax:

```
CALL:CONNECTED[:STATE]?
```

Using the Call Connected State Query for Call Connect Synchronization The call-connected-state query only hangs if the call is in a transitory state, otherwise it immediately returns a 1 (Connected state) or a 0 (Idle state). At the start of a call connect process the call state is Idle. Sending call-connected-state query at the start of a call connect process could immediately return a zero if the query is satisfied before the connection process has started (that is, moved from the Idle state into one of the transitory states). For correct call connect synchronization it is necessary that the query be temporarily held off until after the call connect process has started. A call-state-change-detector is provided which can be used to temporarily hold off the query from returning an answer until the appropriate state change has occurred.

Call Connected Arm Command The call-connected-arm command is used to 'arm' the call-state-change-detector.

Example 2. Command Syntax:

```
CALL:CONNECTED:ARM[:IMMEDIATE]
```

If the call-state-change-detector is armed when a call-connected-state query is received, the reply is held off until the call-state-change-detector is disarmed. The call-state-change-detector is disarmed upon a state change from any of the transitory states to the Idle or Connected state.

The call-state-change-detector is not disarmed by a state change from Idle to any of the transitory states, from Connected to any of the transitory states, nor is it disarmed by any transitions from Idle to Idle, or Connected to Connected. These restrictions ensure that when the call-connected-state query returns an answer:

- the connect process has started since the call state must have moved from Idle to one of the transitory states

AND

- the connect process has finished since the call state has moved from a transitory state to either the Idle or Connected state.

The arm state of the change detector can be queried with the call-connected-arm-state query command. This query never hangs and immediately returns a 1 if the change detector is armed and a 0 if it is not armed. The command is:

Example 3. Command Syntax:

```
CALL:CONNected:ARM:STATE?
```

Using the Call Connected Arm Command for Call Connect Synchronization The call-state-change-detector arm command is used by the control program to tell the test set that it is expecting a change to the state of a call prior to initiating the state change. By first arming the call-state-change-detector, then querying the call connected state, and then attempting a BS or MS originated call, the call-connected-state query will hang until the connection operation begins and then reaches a final (Idle or Connected) state.

However, if the change detector is armed and a call connection is attempted but the call state never progresses from the Idle state, the call-connected-state query would hang forever. This could easily happen if the mobile is badly broken, the mobile is not connected to the test set, no one pushes the “send” button on the mobile, etc.

A call-state-change-detector time-out timer is provided which is used to prevent the call-connected-state query from hanging forever.

Call Connected Time-out Command The call-connected-time-out command is used to set the time-out value for the call-state-change-detector time-out timer.

Example 4. Command Syntax:

```
CALL:CONNected:TIMEout <numeric value>[<suffix>]
```

Using the Call State Change Detector Time-out for Call Connect Synchronization The call-state-change-detector time-out mechanism allows the test set to disarm the call-state-change-detector which releases the call connected state query if it is currently hanging.

The time-out timer is started whenever the call-state-change-detector is armed or gets rearmed when already armed. The duration of the time-out is set using the call-connected-time-out command and should be set to the maximum amount of time the control program should wait between arming and the connect process to begin. Once the process starts and the call state has moved into one of the transitory states the GSM defined protocol timers take over and prevent the call state from staying in a transitory state forever.

If the timer expires while the call is in the Idle or Connected state, the call-state-change-detector is disarmed, which releases the call connected state query if it is currently hanging.

If the timer expires while the call is in one of the transitory states it is ignored as, once in any transitory state, the GSM-defined protocol timers limit the amount of time that can be spent in any transitory state.

Call-state-change-detector Auto Arming As a programming convenience the test set automatically arms the call-state-change-detector, using a fixed time-out value of 60 seconds, whenever a BS originate or BS disconnect is requested.

Because of this, there is never a need for the control program to explicitly arm the call-state-change-detector or set a call-state-change-detector time-out value before BS initiated events. If for sake of coding efficiency, the programmer wishes to use the same code segment for both BS and MS call processing events, the commands to arm the call-state-change-detector and to set the call-state-change-detector time-out time will be accepted but ignored should the control program actually send the commands to the test set for BS call processing events.

Overview

Establishing an active link with the mobile station when the test set is in active cell operating mode can be accomplished in one of two ways:

- Base station originated call
- Mobile station originated call

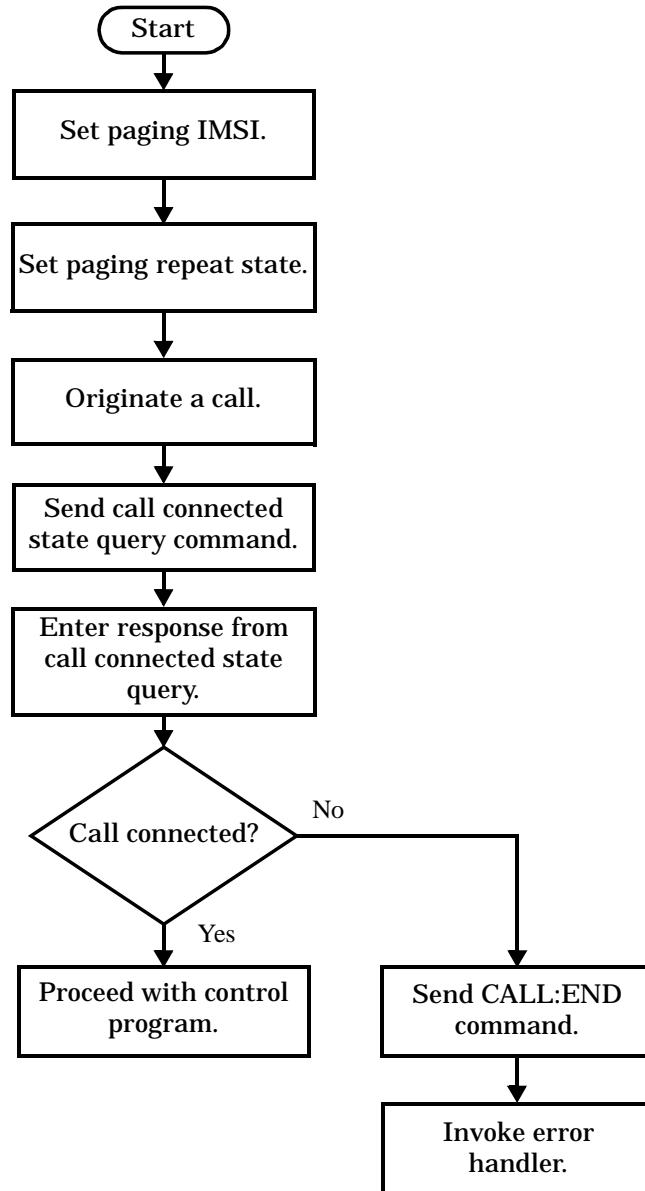
Process for Making a Base Station Originated Call

The recommended process for making a base station originated call is shown in ["Step 4: Figure 1. Process for Making a Base Station Originated Call" on page 199.](#)

The CALL:ORIGINATE command is used to initiate a base station originated call.

If the call origination process fails it is necessary to send the CALL:END command to the test set to force immediate termination of all processes associated with the current call origination. This ensures that if another CALL:ORIGINATE command is sent to the test set before all processes associated with the failed call origination have been terminated, it will not be ignored. Note that if the test set is currently executing a call origination and it receives another call origination command it will be ignored (that is, you are telling the test set to do something it is already doing and hence it will accept the command but it will be ignored).

Step 4: Figure 1. Process for Making a Base Station Originated Call



Example 5. Programming Example:

```
! ****
! Step 4: Establish Active Link with Mobile Station
! ****
!
OUTPUT Test_set;"CALL:PAG:IMSI '001012345678901'" ! Set paging IMSI
OUTPUT Test_set;"CALL:PAG:REP OFF" ! Set paging repeat state to off
OUTPUT Test_set;"CALL:ORIG" ! Start a base station originated call
OUTPUT Test_set;"CALL:CONN:STAT?" ! Hanging HP-IB query
ENTER Test_set;Call_connected ! Program will hang here until
                                ! origination passes or fails
IF NOT Call_connected THEN ! Check if connection successful
    OUTPUT Test_set;"CALL:END"
! <put error handler here>
END IF
! Call is connected so proceed with control program
```

Call Origination Process Commands

Paging the Mobile Station Paging the mobile station is accomplished using the CALL:ORIGINate command.

Example 6. Command Syntax:

CALL:ORIGINate

Example 7. Programming Example:

```
OUTPUT Test_set;"CALL:ORIG"
would start the process of making a base station originated call.
```

Setting the Paging IMSI The paging IMSI is set using the PAGing:IMSI command.

Example 8. Command Syntax:

CALL:PAGing:IMSI <string>

Example 9. Programming Example:

```
OUTPUT Test_set;"CALL:PAG:IMSI '001012345678901'"
would set the paging IMSI to 001012345678901.
```

Setting the Paging Repeat State The paging repeat state is set using the PAGing:REPeat:STATE command.

Example 10. Command Syntax:

CALL:PAGing:REPeat[:STATE] <ON|1|OFF|0>

Example 11. Programming Example:

OUTPUT Test_set;"CALL:PAG:REP ON"

would turn on paging repeat.

Process for Making a Mobile Station Originated Call

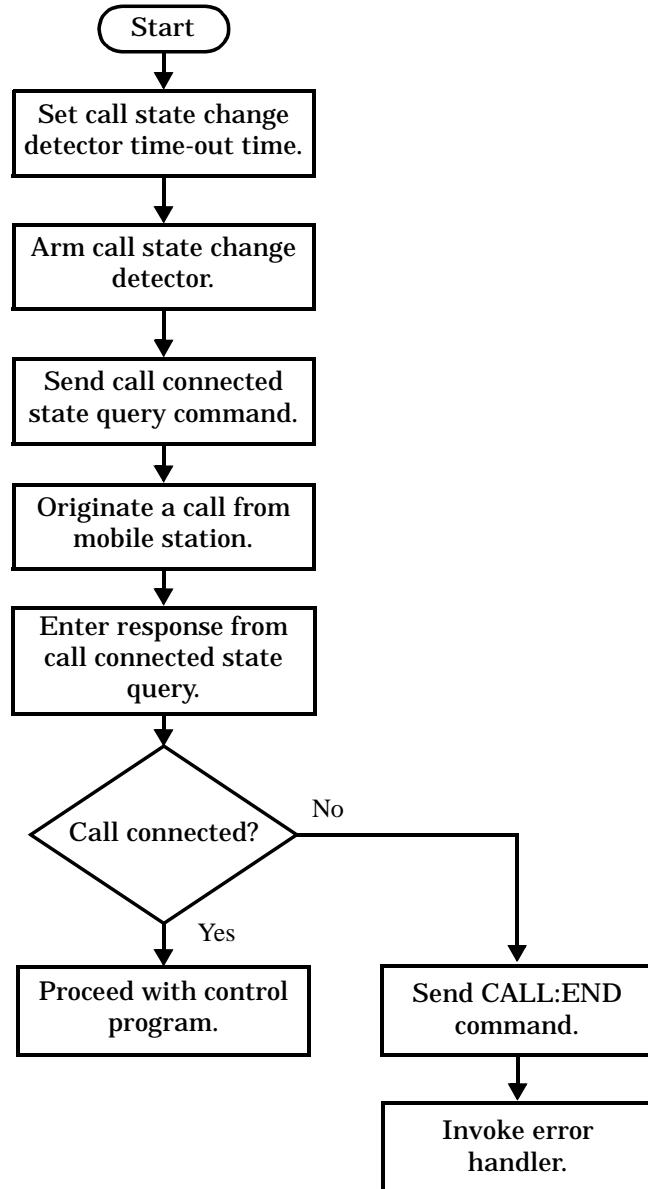
The recommended process for making a mobile station originated call is shown in ["Step 4: Figure 2. Process For Making A Mobile Station Originated Call" on page 202.](#)

There is no facility in the test set to initiate a call connect from the mobile station. This must be accomplished manually or through a test bus built into the mobile station.

If the call origination process fails it is necessary to send the CALL:END command to the test set to force immediate termination of all processes associated with the current call origination. This ensures that if the mobile station attempts another originate before all processes associated with the failed call origination have been terminated, it will not be ignored. Note that if the test set is currently executing a call origination and it receives another call origination command it will be ignored (that is, you are telling the test set to do something it is already doing and hence it will accept the command but it will be ignored).

For mobile station originated calls where the call is originated by physically dialing a number (as opposed to using a test bus) ensure that the call-state-change-detector time-out time is long enough to allow a human to dial the number.

Step 4: Figure 2. Process For Making A Mobile Station Originated Call



Example 12. Programming Example:

```
OUTPUT Test_set;"CALL:CONN:TIM 5"      ! Set timeout time to 5 seconds
OUTPUT Test_set;"CALL:CONN:ARM"        ! Arm the change detector
OUTPUT Test_set;"CALL:CONN:STAT?"     ! Initiate call connect state query
DISP "Originate call from mobile station."
ENTER Test_set;Call_connected        ! Program will hang here until
                                     ! origination passes or fails
IF NOT Call_connected THEN          ! Check if connection successful
  OUTPUT Test_set;"CALL:END"
  ! <put error handler here>
END IF
! Call is connected so proceed with control program
```

Step 5: Set the Mobile Station's Operating Conditions

Overview

The mobile station's operating conditions are set using the CALL processing subsystem commands shown in the following table.

Settable Mobile Station Operating Conditions

| Parameter | Command Syntax | Table Footnotes |
|----------------------------|---|-------------------|
| Timing Advance | CALL:MS:TADVance <numeric value> | |
| Transmit Level | CALL:MS:TXLevel[:SELected] <numeric value> OR CALL:MS:TXLevel:<PGSM EGSM DCS PCS> <numeric value> | 1 |
| Discontinuous Transmission | CALL:MS:DTX[:STATe] <ON 1 OFF 0> | |

Table Footnotes

1 The TCH band setting becomes the selected band.

Example 1. Programming Example:

```
! ****
! Step 5: Set Mobile Station Operating Conditions
! ****
!
OUTPUT Test_set;"CALL:MS:DTX OFF"
OUTPUT Test_set;"CALL:MS:TXL 14
```

Step 6: Make Measurements

Background

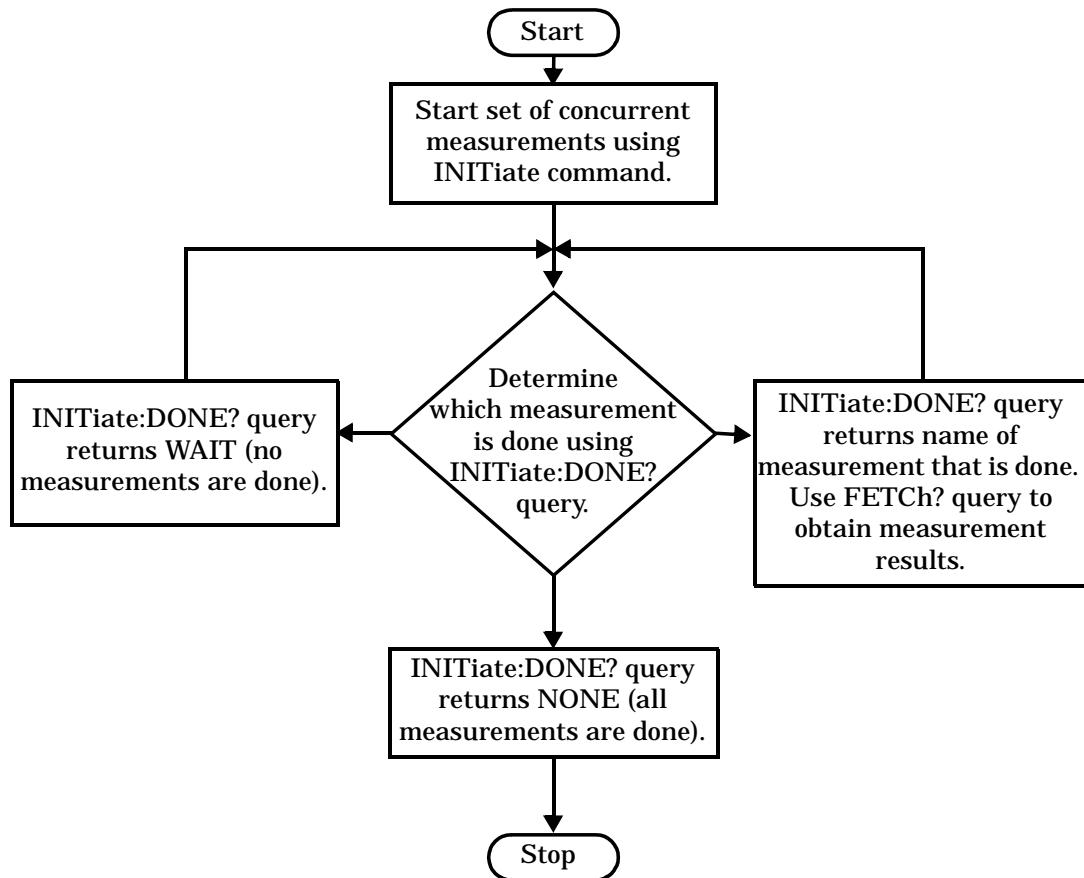
The multiple signal path, DSP based, multiple processor architecture of the test set allows the test set to make concurrent measurements. This means that:

- multiple measurements can execute and finish at the same time (concurrently)
- individual measurement completion is not influenced by other measurement processes
- availability of measurement results is not dependent upon the sequence that the measurements were requested in
- results from measurements that take few processor cycles are available without having to wait for measurements that take many processor cycles

There are no special programming commands or techniques required to implement measurement concurrency.

["Step 6: Figure 1. Process for Making Measurements" on page 206](#) shows the recommended process for making concurrent measurements using the test set's command set.

Step 6: Figure 1. Process for Making Measurements



Example 1. Programming Example:

The following program segment illustrates making a transmit power measurement and a phase and frequency error measurement concurrently using the recommended process shown in [“Step 6: Figure 1. Process for Making Measurements” on page 206](#).

```
! ****
! Step 6: Make Measurements
! ****
!
! Step 6a: Start Set of Concurrent Measurements:
!
OUTPUT Test_set;"INIT:TXP;PFER"
!
! Step 6b: Determine If A Measurement Is Done:
!
LOOP
  OUTPUT Test_set;"INIT:DONE?"
  ENTER Test_set;Meas_done$
!
! Step 6c: Obtain Measurement Results
!
  SELECT Meas_done$
    CASE "TXP"
      OUTPUT Test_set;"FETC:TXP:POW?"
      ENTER Test_set;Avg_tx_power
    CASE "PFER"
      OUTPUT Test_set;"FETC:PFER:RMS?"
      ENTER Test_set;Max_rms_phas_er
    END SELECT
  EXIT IF Meas_done$ = "NONE"
END LOOP
```

Things That Can Go Wrong

Measurement Integrity Always Returns a Value of 6

Background A measurement integrity value of 6 indicates that some characteristic of the input signal is under range. Typically this will be the amplitude (power) of the DUT signal. This low amplitude will cause the level of the DSP sampler to be below a threshold required by the measurement algorithm to produce results of specified accuracy.

Possible Cause One of the most likely causes of a measurement underrange condition is DUT signal loss caused by fixture loss or cable loss.

Suggested Workaround Fixture loss or cable loss can be compensated for by using the RF IN/OUT port's amplitude offset parameters. Twenty different offsets can be set up at twenty different frequencies. Refer to the reference documentation for more information.

Example 2. Command Syntax:

```
SYSTem:CORRection:GAIN <numeric value>[<suffix>]
```

```
SYSTem:CORRection:STATe <1|ON|0|OFF>
```

Complex form of command (sets gain to <numeric value> and state to ON using single command):

```
SYSTem:CORRection:SGAin <numeric value>[<suffix>]
```

Example 3. Programming Example:

```
OUTPUT Test_set;"SYST:CORR:SGA -6"
```

would set the RF IN/OUT port's amplitude offset to -6 dB and set the correction state to ON.

Step 6a: Start Set Of Concurrent Measurements

Starting Measurements

The INITiate command is used to start measurements. Each individual measurement in a test application can be started using the INITiate command. For starting measurements, the syntax of the INITiate command is as follows:

Example 1. Command Syntax:

INITiate:<meas-mnemonic>[:ON]

The following table shows the measurements available in the Agilent Technologies E1960A GSM mobile test application and their associated <meas-mnemonic> used in the INITiate command syntax.

Measurement Mnemonics Used In The INITiate Subsystem

| Measurement | <meas-mnemonic> |
|-------------------------|-----------------|
| Transmit Power | TXPower |
| Power vs Time | PVTime |
| Phase & Frequency Error | PFERror |
| Output RF Spectrum | ORFSpectrum |
| Bit Error | BERRor |
| Fast Bit Error | FBERRor |
| Decoded Audio | DAUDio |
| Analog Audio | AAUDio |
| I/Q Tuning | IQTuning |
| Dynamic Power | DPOWer |

Example 2. Programming Example:

OUTPUT Test_set; "INIT:TXP"

would start the transmitter power measurement.

Using Compound Commands to Start Multiple Measurements

More than one measurement can be started using a single INITiate command. For example:

OUTPUT Test_set; "INIT:TXP;PFER"

would start the transmit power measurement and the phase and frequency error measurement. These measurements would then run concurrently.

Step 6b: Determine if a Measurement Is Done

Background

After a set of concurrent measurements have been started, it is desirable that the control program be able to determine when individual measurement results are available so that the control program can request that measurement's results without having to wait on other measurements which have not yet completed.

Overview

The INITiate:DONE? query command is used to determine which measurement is finished.

As the name implies, the query returns the name of whichever active measurement is done so that the control program can request that measurement's results.

This command is query only and returns only one response per query. The responses returned and their meaning are shown in the following table.

Once a measurement is reported as being done via the INITiate:DONE? query it is removed from the done list (measurements are only reported as being done once). The design of the INITiate:DONE? query is predicated on the control program immediately fetching a measurement's results once it is reported as being done.

Responses Returned from INITiate:DONE? Query

| Response | Meaning |
|----------|---|
| TXP | The transmit power measurement is done. |
| PVT | The power versus time measurement is done. |
| PFER | The phase and frequency error measurement is done. |
| ORFS | The output RF spectrum measurement is done. |
| AAUD | The analog audio measurement is done. |
| DAUD | The decoded audio measurement is done. |
| BERR | The bit error measurement is done. |
| FBER | The fast bit error measurement is done. |
| DPOW | The dynamic power measurement is done. |
| IQT | The I/Q Tuning measurement is done. |
| WAIT | There are one or more measurements that are in progress, but none of those measurements are done yet. |
| NONE | No measurements are in progress. |

Example 1. Command Syntax:

INITiate:DONE?

Example 2. Programming Example:

See “[Programming Example:](#)” on page 207.

Step 6c: Obtain a Set of Measurement Results

Background

In order to minimize bus traffic in the manufacturing environment the test set's high-level measurements have been designed to return multiple measured values in response to a single measurement request.

For example: if a transmit power measurement with averaging is initiated there will be five measurement results available as follows:

1. Measurement integrity value
2. Average value
3. Minimum value
4. Maximum value
5. Standard deviation value

The test set has been designed with the capability to return the measurement results in a variety of formats to suit the needs of the measurement environment. For example, the transmitter power measurement results can be returned as:

- Measurement integrity and average value
OR
- Average value and minimum value and maximum value and standard deviation value
OR
- Average value only
OR
- Minimum value only
OR
- Maximum value only
OR
- Standard deviation value only
OR
- Measurement integrity value only

The formats available for individual measurements can be found in the test set's FETCh? subsystem's GPIB command syntax reference information.

Overview

The FETCh subsystem is used to query measurement results. The measurement results from each measurement in a test application can be queried using the FETCh subsystem. The general hierarchy of the FETCh command structure is as follows:

FETCh:<meas-mnemonic>:<result format>?

The following table shows the measurements available in the Agilent Technologies E1960A GSM mobile test application and their associated <meas-mnemonic> used in the FETCh command syntax.

The command syntax used to obtain the various measurement result formats (<result format>) for each measurement can be found in the test set's FETCh? subsystem's GPIB command syntax reference information.

Measurement Mnemonics Used In The FETCh Subsystem

| Measurement | <meas-mnemonic> |
|-------------------------|-----------------|
| Transmit Power | TXPower |
| Power vs Time | PVTime |
| Phase & Frequency Error | PFERror |
| Output RF Spectrum | ORFSpectrum |
| Bit Error | BERRor |
| Fast Bit Error | FBERRor |
| Decoded Audio | DAUDio |
| Analog Audio | AAUDio |
| I/Q Tuning | IQTuning |
| Dynamic Power | DPOWer |

Example 1. Command Syntax:

FETCh:<meas-mnemonic>:<result format>?

Example 2. Programming Example:

OUTPUT Test_set; "FETCh:TXP:POW:MIN?"

would return the minimum value from the set of samples taken during the transmit power measurement (when averaging is turned on and number of samples taken >1).

Step 7: Perform an Intra-Cell Handover

Background

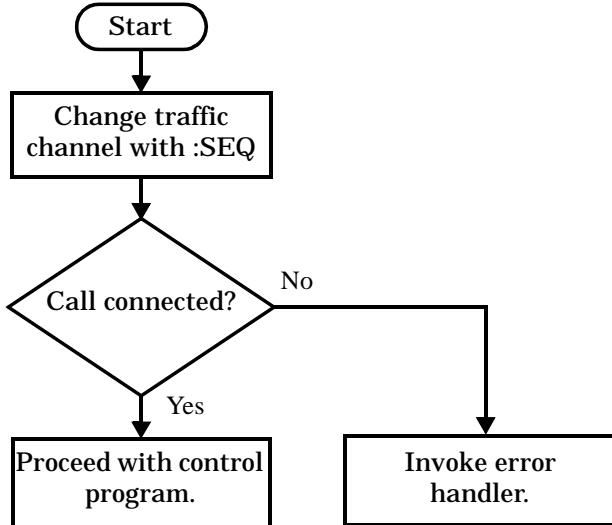
A handover is defined as assigning the mobile station to a new traffic channel. The test set is capable of performing two types of handovers:

- Intra-cell handover: assigning the mobile station to a new traffic channel within the currently active broadcast band.
- Dual-band handover: assigning the mobile station to a traffic channel in a traffic band which is different from the currently active traffic band.

Performing an Intra-Cell Handover

An intra-cell handover is accomplished using the CALL:TCHannel command in conjunction with the :SEQ synchronization command. The recommended process for performing an intra-cell handover is shown in the following figure.

Step 7: Figure 1. Process for Performing an Intra-Cell Handover



Example 1. Command Syntax:

```
CALL:TChannel[:ARFCn][:SELected]:SEQ <numeric value>
```

OR

```
CALL:TChannel[:ARFCn]:<PGSM|EGSM|DCS|PCS>:SEQ <numeric value>
```

Example 2. Programming Example:

The following example illustrates how to use these commands to perform an intra-cell handover.

```

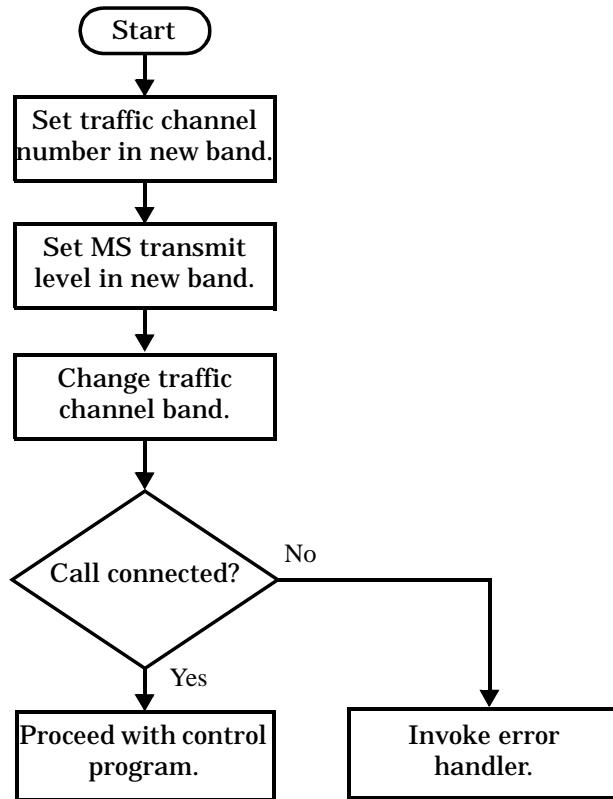
! existing conditions: a mobile station is connected to the test
! set, operating mode is set to active cell and a call is in the
! connected state.
! Step 1: Change the traffic channel number
OUTPUT Test_set;"CALL:TCH:SEQ 65"!Starts process of handing over MS
          !to new traffic channel 65.
          !No other commands will be processed
          !until this operation completes
          !because the :SEQ has been attached.
! Step #2: Check that the call is still in the connected state. It
          ! is possible that the MS did not successfully connect on the
          ! new channel.
OUTPUT Test_set;"CALL:STAT:STAT?"
ENTER Test_set;Call_status$
IF Call_status$ <> "CONN" THEN
  ! <put error handler here>
END IF
! Call is connected so proceed with control program

```

Performing a Dual-Band Handover

A dual-band handover is accomplished using the CALL:TChannel:BAND command. The recommended process for performing a dual band handover is shown in the following figure.

Step 7: Figure 2. Process for Performing a Dual-Band Handover



Example 3. Programming Example:

The following example illustrates how to use the CALL:TCHannel:BAND command to perform a dual-band handover.

```

! existing conditions: a mobile station is connected to the test
! set, MS TX Level = 11, Timeslot = 4, Timing Advance = 0,
! operating mode is set to active cell, a call is in the
! connected state, and active broadcast band is EGSM
! Step #1: Configure the traffic channel in the new broadcast band
OUTPUT Test_set;"CALL:TCH:DCS 556"
OUTPUT Test_set;"CALL:MS:TXL:DCS 4"
! Step #2: Change the traffic channel band
OUTPUT Test_set;"CALL:TCH:BAND DCS" !This is a sequential command so no
                                !other commands will be executed until
                                !the handover is complete (the
                                !MS has communicated to the BSE that it
                                !has successfully transitioned to the
                                !new channel OR a protocol timer has
                                !timed out).
! Step #3: Check that the call is still in the connected state. It
        ! is possible that the MS did not successfully connect on the
        ! new channel.
OUTPUT Test_set;"CALL:STAT:STAT?"
ENTER Test_set;Call_state$
IF Call_state$ <> "CONN" THEN
! <put error handler here>
END IF
! Call is connected so proceed with control program

```

Step 8: Disconnect the Mobile Station from the Base Station Emulator

Background

See “Step 4: Establish an Active Link with Mobile Station” for a discussion of call connect/disconnect synchronization.

Using the Call Connected State Query for Call Disconnect Synchronization

The call-connected-state query only hangs if the call is in a transitory state, otherwise it immediately returns a 1 (Connected state) or a 0 (Idle state). At the start of a call disconnect process the call state is Connected. Sending a call-connected-state query at the start of a call disconnect process could immediately return a one if the query is satisfied before the disconnection process has started (that is, moved from the Connected state into one of the transitory states). For correct call disconnect synchronization it is necessary that the query be temporarily held off until after the call disconnect process has started. The call-state-change-detector is provided which can be used to temporarily hold off the query from returning an answer until the appropriate state change has occurred.

Using the Call Connected Arm Command for Call Disconnect Synchronization

The call-state-change-detector arm command is used by the control program to tell the test set that it is expecting a change to the state of a call prior to initiating the state change. By first arming the call-state-change-detector, then querying the call connected state, and then attempting a base station or mobile station call termination, the call-connected-state query will hang until the disconnection operation begins and then reaches a final (Idle or Connected) state.

However, if the change detector is armed and a call disconnection is attempted but the call state never progresses from the Connected state, the call-connected-state query would hang forever. This could easily happen if the mobile is badly broken, no one pushes the “end” button on the mobile, etc.

The call-state-change-detector time-out timer is provided which is used to prevent the call-connected-state query from hanging forever.

Using the Call State Change Detector Time-out for Call Disconnect Synchronization

The call-state-change-detector time-out mechanism allows the test set to disarm the call-state-change-detector which releases the call connected state query if it is currently hanging.

The time-out timer is started whenever the call-state-change-detector is armed or gets rearmed when already armed. The duration of the time-out is set using the call-connected-time-out command and should be set to the maximum amount of time the control program should wait between arming and the disconnect process to begin. Once the process starts and the call state has moved into one of the transitory states the GSM defined protocol timers take over and prevent the call state from staying in a transitory state forever.

If the timer expires while the call is in the Idle or Connected state, the call-state-change-detector is disarmed, which releases the call connected state query if it is currently hanging.

If the timer expires while the call is in one of the transitory states it is ignored as, once in any transitory state, the GSM-defined protocol timers limit the amount of time that can be spent in any transitory state.

Overview

Terminating an active call with the mobile station when the test set is in active cell operating mode can be accomplished in one of two ways:

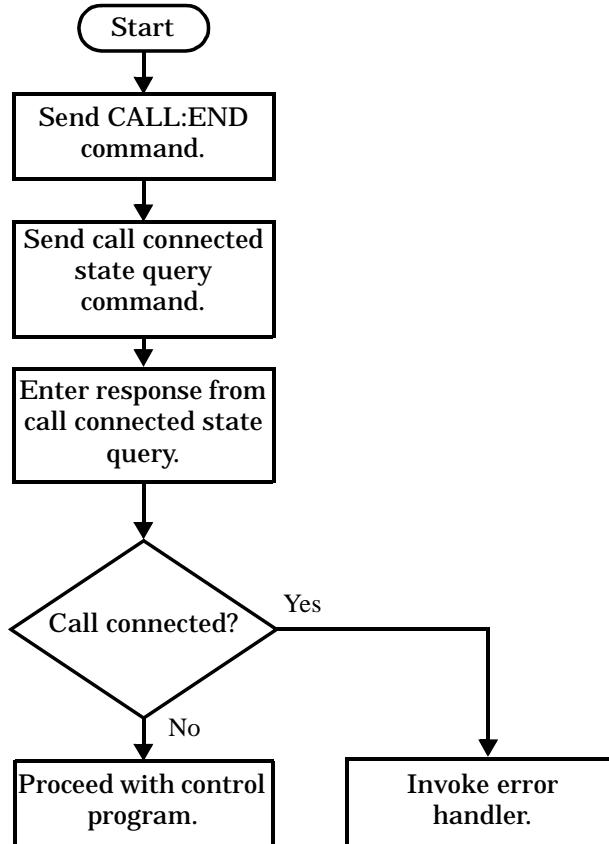
- Terminate the active call from the base station emulator
- Terminate the active call from the mobile station

Terminating an Active Call from the Base Station Emulator

The recommended process for terminating an active call from the base station emulator is shown in the following figure.

The CALL:END command is used to initiate a base station disconnect.

Step 8: Figure 1. Process for Terminating an Active Call from the Base Station Emulator



Example 1. Programming Example:

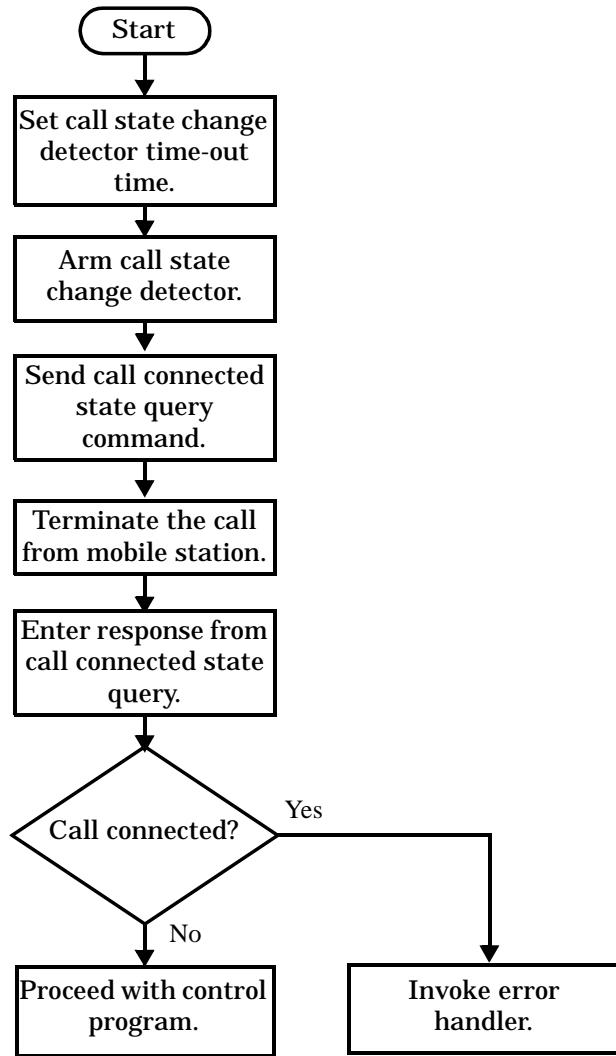
```
! ****
! Step 8: Disconnect Mobile Station From Base Station Emulator
! ****
!
OUTPUT Test_set;"CALL:END"      ! Initiate a base station disconnect.
OUTPUT Test_set;"CALL:CONN:STAT?" ! Initiate call connect state query.
ENTER Test_set;Call_connected    ! Program will hang here until state
                                ! change or timer expires.
IF Call_connected THEN          ! Check if disconnect successful
! <put error handler here>
END IF
! Call is disconnected so proceed with control program
```

Terminating an Active Call from the Mobile Station

The process for terminating an active call from the mobile station is shown in the following figure.

There is no facility in the test set to initiate a call disconnect from the mobile station. This must be accomplished manually or through a test bus built into the mobile station.

For mobile station terminated calls where the call is terminated by physically pushing a button on the phone (as opposed to using a test bus) ensure that the call-state-change-detector time-out time is long enough to allow a human to push the button.

Step 8: Figure 2. Process for Terminating an Active Call from the Mobile Station

Step 8: Disconnect the Mobile Station from the Base Station Emulator

Example 2. Programming Example:

```
OUTPUT Test_set;"CALL:CONN:TIM 5" !Set timeout time to 5 seconds.  
OUTPUT Test_set;"CALL:CONN:ARM" !Arm the change detector.  
OUTPUT Test_set;"CALL:CONN:STAT?" !Initiate call connect state query.  
DISP "Terminate the call from the mobile station."  
ENTER Test_set;Call_connected !Program will hang here until state  
                                !change or timer expires.  
IF Call_connected THEN !Check if disconnect successful.  
! <put error handler here>  
END IF  
! Call is disconnected so proceed with control program
```

Comprehensive Program Example

This section presents two example programs for making measurements using the test set. The first program follows the task flow presented at the beginning of the programming note (see ["Figure 1. Typical Flow of Tasks Performed by Control Program" on page 177](#)) and which is discussed throughout the programming guide. The second program, ["Example Program Without Comments" on page 229](#), is basically the same as the first but comments have been removed and the coding reflects the use of compound commands and complex commands to achieve coding efficiency.

Example Program With Comments

```

10      ! Prog Name: com_man_ex.txt      Rev: A.0.2      Date Code: 12/18/98
20      !
30      ! Configure the BASIC environment, dimension and initialize variables.
40      ! These actions are unrelated to programming the HP 8960.
50      !
60      OPTION BASE 1
70      COM /Address/ Test_set
80      ! Allocate arrays to hold ORFS switching & modulation frequency offsets.
90      DIM Swit_offs$[255],Mod_offs$[255]
100     ! Allocate arrays to hold measurement results.
110     REAL Txpower(4)
120     Test_set=714 ! Test set's HP-IB address.
130     PRINTER IS CRT
140     CLEAR SCREEN
150     !
160     ! Reset test set to start from a known state. Not always necessary to do full
170     ! preset in a manufacturing environment but desireable in programming example.
180     !
190     OUTPUT Test_set;"*RST"
200     !
210     ! Turn on the HP-IB debugger. This is optional but very helpful for debugging
220     ! HP-IB commands when developing new code.
230     !
240     OUTPUT Test_set;"SYST:COMM:GPIB:DEB:STAT ON"
250     !
260     ! Check error message queue and STOP if any errors present. This ensures that
270     ! the example program starts with no error conditions present in the test set.
280     !
290     CALL Chk_err_msg_que
300     !
310     ! ****
320     ! Step 1: Set Test Set's Operating Mode to Active Cell
330     ! ****
340     !
350     OUTPUT Test_set;"CALL:OPER:MODE CELL"
360     !
370     ! ****
380     ! Step 2: Configure the Base Station Emulator
390     ! ****

```

Comprehensive Program Example

```
400  !
410  ! Set RF IN/OUT port's amplitude offset to compensate for fixture loss of MS.
420  ! After setting offset, cell power settings reflect RF power at the MS antenna
430  ! input.
440  !
450  OUTPUT Test_set;"SYST:CORR:SGA -6"      ! MS has a -6 dB fixture loss.
460  !
470  OUTPUT Test_set;"CALL:CELL:BAND PGSM" ! Set active broadcast band to PGSM.
480  OUTPUT Test_set;"CALL:ACT OFF"        ! Deactivate cell to set network parms.
490  OUTPUT Test_set;"CALL:CELL:MCC 1;LAC 1;MNC 1;NCC 1;BCC 5" ! Set network parms.
500  OUTPUT Test_set;"CALL:ACT ON"        ! Reactivate the cell.
510  OUTPUT Test_set;"CALL:BCH 20"        ! Set broadcast channel to 20.
520  OUTPUT Test_set;"CALL:POW:SAMP -85" ! Set cell power to -85 dBm and cell
530  ! power state to ON with complex command.
540  OUTPUT Test_set;"CALL:TCH 45"        ! Set traffic channel to 45.
550  OUTPUT Test_set;"CALL:TCH:TSI 4"     ! Set timeslot to 4.
560  !
570  ! ****
580  ! Step 3: Configure the Measurement Execution Parameters
590  ! ****
600  !
610  ! Configure ORFS Measurement:
620  !
630  OUTPUT Test_set;"SET:ORFS:SWIT:COUN 5" ! Examples of using complex commands to
640  OUTPUT Test_set;"SET:ORFS:MOD:COUN 10" ! set multi-meas state and count at
650  ! same time.
660  OUTPUT Test_set;"SET:ORFS:TRIG:SOUR AUTO" ! Set trig source to AUTO.
670  OUTPUT Test_set;"SET:ORFS:CONT OFF"       ! Set trig mode to single.
680  OUTPUT Test_set;"SET:ORFS:TIM 60"        ! Set timeout time to 60 seconds.
690  ! Put switching and modulation offsets to be tested into string variables.
700  Swit_offs$="-400KHZ,-400KHZ,600KHZ,-600KHZ,1200KHZ,-1200KHZ,1800KHZ,-1800KHZ"
710  Mod_offs$=".2MHZ,-.2MHZ,.4MHZ,-.4MHZ,.6MHZ,-.6MHZ,.8MHZ,-.8MHZ,1MHZ,-1MHZ"
720  OUTPUT Test_set;"SET:ORFS:SWIT:FREQ "&Swit_offs$
730  OUTPUT Test_set;"SET:ORFS:MOD:FREQ "&Mod_offs$
740  !
750  ! Configure TX Power Measurement:
760  !
770  OUTPUT Test_set;"SET:TXP:COUN 3"
780  OUTPUT Test_set;"SET:TXP:TRIG:SOUR RISE;QUAL ON"
790  OUTPUT Test_set;"SET:TXP:CONT OFF"
800  OUTPUT Test_set;"SET:TXP:TIM 20"
810  !
820  ! Configure Phase & Frequency Error Measurement:
830  !
840  OUTPUT Test_set;"SET:PFER:COUN 8"
850  OUTPUT Test_set;"SET:PFER:TRIG:SOUR PROT;QUAL ON"
860  OUTPUT Test_set;"SET:PFER:CONT OFF"
870  OUTPUT Test_set;"SET:PFER:TIM 30"
880  OUTPUT Test_set;"SET:PFER:BSYN MID"
890  !
900  ! ****
910  ! Step 4: Establish an Active Link with the Mobile Station
920  ! ****
```

```

930 !
940 OUTPUT Test_set;"CALL:PAG:IMSI '001012345678901'" ! Set paging IMSI.
950 OUTPUT Test_set;"CALL:PAG:REP OFF" ! Set paging repeat state to off.
960 !
970 ! This example uses a BSE originated call. The MS must be camped to the BSE
980 ! in order for the BSE to originate a call. The following code will try to
990 ! originate a call 50 times and then STOP the program. This should give
1000 ! adequate time for the MS to camp to the BSE.
1010 !
1020 ! NOTE: This technique will cause the following error to be displayed on the
1030 ! test set's display and be put in the error message queue each time
1040 ! that the call fails to connect. This is normal for this technique.
1050 ! 'GSM call disconnected; No response to page (Timer T3113 expiry)'
1060 !
1070 Tries=1
1080 LOOP
1090     OUTPUT Test_set;"CALL:ORIG"           ! Originate a call.
1100     OUTPUT Test_set;"CALL:CONN:STAT?"   ! CALL:CONNected hanging HP-IB query.
1110     ENTER Test_set;Call_connected    ! Program will hang here until origination
1120                               ! process completes. If successful and
1130                               ! the call is connected the query will
1140                               ! return a 1. If unsuccessful and the call
1150                               ! is not connected the query returns 0.
1160 EXIT IF Call_connected
1170     OUTPUT Test_set;"CALL:END"
1180 IF Tries=50 THEN
1190     BEEP
1200     DISP ""
1210     PRINT "Call did not connect after";Tries;". Program terminated."
1220     STOP
1230 END IF
1240 DISP "Call has not connected after";Tries;"attempts. Trying again."
1250 Tries=Tries+1
1260 END LOOP
1270 DISP ""
1280 !
1290 !*****
1300 ! Step 5: Set the Mobile Station's Operating Conditions
1310 !*****
1320 !
1330 OUTPUT Test_set;"CALL:MS:DTX OFF"           ! Turn DTX off for all MS tests.
1340 !
1350 FOR Traf_chan=120 TO 124 STEP 2           ! Test channels 120, 122 & 124.
1360     OUTPUT Test_set;"CALL:TCH:SEQ ";Traf_chan ! Use :SEQ to force sequential
1370                               ! execution of the TCH command.
1380     OUTPUT Test_set;"CALL:STAT:STAT?"       ! Verify that the call is still in
1390     ENTER Test_set;Call_status$           ! the connected state after handover.
1400 IF Call_status$<>"CONN" THEN
1410     PRINT "Call handover failed. New channel assignment =";Traf_chan
1420     PRINT "Program terminated."
1430     STOP
1440 END IF
1450 FOR Ms_pwr_lvl=5 TO 15 STEP 5           ! Test power levels 5, 10 & 15.

```

Comprehensive Program Example

```
1460      OUTPUT Test_set;"CALL:MS:TXL:SEQ ";Ms_pwr_lvl ! Use :SEQ to force
1470                                ! sequential execution of
1480                                ! the TXLevel command.
1490      !
1500      ! ****
1510      ! Step 6: Make Measurements
1520      ! ****
1530      !
1540      ! Step 6a: Start a set of concurrent measurements:
1550      !
1560      OUTPUT Test_set;"INIT:TXP;PFER;ORFS"
1570      !
1580      ! Step 6b: Determine if a measurement is done:
1590      !
1600      LOOP
1610      OUTPUT Test_set;"INIT:DONE?"
1620      ENTER Test_set;Meas_done$
1630      !
1640      ! Step 6c: Obtain measurement results: Each measurement illustrates a
1650      ! different way of reading in results. There is no one right way. The
1660      ! method used is application dependent. Note that the examples do not
1670      ! show all possible ways.
1680      !
1690      SELECT Meas_done$
1700      !
1710      CASE "TXP" ! TX Power measurement done.
1720      OUTPUT Test_set;"FETC:TXP:INT?;POW:ALL?"
1730      ENTER Test_set;Integrity,Txpower(*)
1740      IF (Integrity=0) THEN ! Always check integrity value.
1750      PRINT "TX Power results: TCH =";Traf_chan;"and TXL =";Ms_pwr_lvl
1760      PRINT USING "5X,,""Minimum:"",M2D.2D,"" dBm""";Txpower(1)
1770      PRINT USING "5X,,""Maximum:"",M2D.2D,"" dBm""";Txpower(2)
1780      PRINT USING "5X,,""Average:"",M2D.2D,"" dBm""";Txpower(3)
1790      PRINT USING "5X,,""Std Dev:"",M2D.2D,"" dB""";Txpower(4)
1800      ELSE
1810      GOSUB Bad_measurement
1820      END IF
1830      !
1840      CASE "PFER" ! Phase & Frequency Error measurement done.
1850      OUTPUT Test_set;"FETC:PFER:ALL?"
1860      ENTER Test_set;Integrity,Rms_phas_err,Peak_phas_err,Worst_freq_err
1870      IF (Integrity=0) THEN
1880      PRINT "PFError results: TCH =";Traf_chan;"and TXL =";Ms_pwr_lvl
1890      PRINT USING "5X,,""RMS Phase Error:"",M2D.2D,"" deg""";Rms_phas_err
1900      PRINT USING "5X,,""Peak Phase Error:"",M2D.2D,"" deg""";Peak_phas_err
1910      PRINT USING "5X,,""Worst Freq Error:"",M3D.2D,"" Hz""";Worst_freq_err
1920      ELSE
1930      GOSUB Bad_measurement
1940      END IF
1950      !
1960      CASE "ORFS" ! ORFS measurement done.
1970      !
1980      ! This code illustrates a more 'generic' approach to reading measurement
```

```

1990      ! results. By using the capabilities designed into high-level
2000      ! measurements, routines that access measurement results do not have to
2010      ! explicitly know what the measurement execution conditions were. That
2020      ! information can be determined at the time the measurement results are
2030      ! queried.
2040      !
2050      OUTPUT Test_set;"FETC:ORFS:INT?"           ! Check measurement integrity.
2060      ENTER Test_set;Integrity
2070      IF (Integrity=0) THEN
2080          OUTPUT Test_set;"SET:ORFS:SWIT:FREQ:POIN?" ! Get number of offsets
2090                                ! tested.
2100          ENTER Test_set;Points
2110          IF Points THEN ! Only query if one or more offsets tested.
2120              ALLOCATE Orfs_swit_res(Points),Orfs_swit_offs(Points)
2130              OUTPUT Test_set;"SET:ORFS:SWIT:FREQ?" ! Get measurement offsets.
2140              ENTER Test_set;Orfs_swit_offs(*)
2150              OUTPUT Test_set;"FETC:ORFS:POW?;:FETC:ORFS:SWIT?" ! Get results.
2160              ENTER Test_set;Tx_power,Orfs_swit_res(*)
2170              PRINT "ORFS Swit Results: TCH =";Traf_chan;"and TXL =";Ms_pwr_lvl
2180              PRINT USING "19X,""TX Power =",M2D.2D,"" dBm""";Tx_power
2190              PRINT "      Offset(kHz)          Level(dBm)"
2200              PRINT "      -----          -----"
2210 Orfs_image: IMAGE 6X,M4D.2D,12X,M4D.2D
2220      FOR J=1 TO Points
2230          PRINT USING Orfs_image;(Orfs_swit_offs(J)/1.E+3),Orfs_swit_res(J)
2240      NEXT J
2250      DEALLOCATE Orfs_swit_res(*),Orfs_swit_offs(*)
2260      END IF
2270      OUTPUT Test_set;"SET:ORFS:MOD:FREQ:POIN?" ! Get number of offsets
2280                                ! tested.
2290      ENTER Test_set;Points
2300      IF Points THEN ! Only query if one or more offsets tested.
2310          ALLOCATE Orfs_mod_res(Points),Orfs_mod_offs(Points)
2320          OUTPUT Test_set;"SET:ORFS:MOD:FREQ?" ! Get measurement offsets.
2330          ENTER Test_set;Orfs_mod_offs(*)
2340          OUTPUT Test_set;"FETC:ORFS:POW?;:FETC:ORFS:MOD?" ! Get results.
2350          ENTER Test_set;Tx_power,Pwr_30khz,Orfs_mod_res(*)
2360          PRINT "ORFS Mod Results: TCH =";Traf_chan;"and TXL =";Ms_pwr_lvl
2370          PRINT USING "18X,""30 KHz BW Power =",M2D.2D,"" dBm""";Pwr_30khz
2380          PRINT "      Offset(kHz)          Level(db)"
2390          PRINT "      -----          -----"
2400      FOR J=1 TO Points
2410          PRINT USING Orfs_image;(Orfs_mod_offs(J)/1.E+3),Orfs_mod_res(J)
2420      NEXT J
2430      DEALLOCATE Orfs_mod_res(*),Orfs_mod_offs(*)
2440      END IF
2450      ELSE
2460          GOSUB Bad_measurement
2470      END IF
2480      END SELECT
2490      EXIT IF Meas_done$="NONE"
2500      END LOOP ! If 'WAIT' is returned from 'INIT:DONE?' query, it just falls
2510                                ! through the loop.

```

Comprehensive Program Example

```
2520     NEXT Ms_pwr_lvl
2530     !
2540 ! ****
2550 ! Step 7: Perform an Intra-cell Handover
2560 ! ****
2570 !
2580 NEXT Traf_chan ! The handover is performed at the top of the FOR loop at line
2590           ! 1300
2600 !
2610 ! ****
2620 ! Step 8: Disconnect the Mobile Station From the Base Station Emulator
2630 ! ****
2640 !
2650 OUTPUT Test_set;"CALL:END"
2660 OUTPUT Test_set;"CALL:CONN:STAT?"
2670 ENTER Test_set;Call_connected
2680 IF Call_connected THEN
2690   BEEP
2700   PRINT "Unable to complete BS termination. Program terminated."
2710   STOP
2720 END IF
2730 PRINT "Program completed."
2740 STOP
2750 !
2760 Bad_measurement: !
2770 PRINT "Measurement error: "&Meas_done$
2780 PRINT "Measurement Integrity value =";Integrity
2790 RETURN
2800 !
2810 END ! End of program
2820 !
2830 SUB Chk_err_msg_que
2840   COM /Address/ Test_set
2850   DIM Error_message$[255]
2860   Error_flag=0
2870   LOOP
2880     OUTPUT Test_set;"SYST:ERR?"
2890     ENTER Test_set;Error_number,Error_message$
2900     EXIT IF Error_number=0
2910     IF Error_number=-350 THEN
2920       Error_flag=1
2930       PRINT "Error Message Queue overflow. Error messages have been lost."
2940     ELSE
2950       Error_flag=1
2960       PRINT Error_number,Error_message$
2970     END IF
2980   END LOOP
2990   IF NOT Error_flag THEN
3000     PRINT "No errors in Error Message Queue."
3010     SUBEXIT
3020   END IF
3030   STOP
3040 SUBEND
```

Example Program Without Comments

The following program is basically the same as the example program presented in ["Example Program With Comments" on page 223](#) but comments have been removed and the coding reflects the use of compound commands and complex commands to achieve coding efficiency.

```

10      ! Prog Name: sim_man_ex.txt      Rev: A.0.2      Date Code: 12/18/98
20      OPTION BASE 1
30      COM /Address/ Test_set
40      DIM Swit_offs$[255],Mod_offs$[255]
50      REAL Txpower(4)
60      Test_set=714
70      PRINTER IS CRT
80      CLEAR SCREEN
90      OUTPUT Test_set;"*RST;SYST:COMM:GPIB:DEB:STAT ON"
100     CALL Chk_err_msg_que
110     OUTPUT Test_set;"CALL:OPER:MODE CELL::SYST:CORR:SGA -6"
120     OUTPUT Test_set;"CALL:CELL:BAND PGSM:BCH 20;POW:SAMP -85;:CALL:TCH:ARFC 45;TSL 4"
130     OUTPUT Test_set;"CALL:CELL:ACT OFF;MCC 1:LAC 1:MNC 1:NCC 1:BCC 5;ACT ON"
140     OUTPUT Test_set;"SET:ORFS:SWIT:COUN 5::SET:ORFS:MOD:COUN 10"
150     OUTPUT Test_set;"SET:ORFS:CONT OFF;TIM 60;TRIG:SOUR AUTO"
160     Swit_offs$="400KHZ,-400KHZ,600KHZ,-600KHZ,1200KHZ,-1200KHZ,1800KHZ,-1800KHZ"
170     Mod_offs$=".2MHZ,-.2MHZ,.4MHZ,-.4MHZ,.6MHZ,-.6MHZ,.8MHZ,-.8MHZ,1MHZ,-1MHZ"
180     OUTPUT Test_set;"SET:ORFS:SWIT:FREQ "&Swit_offs$&":SET:ORFS:MOD:FREQ "&Mod_offs$"
190     OUTPUT Test_set;"SET:TXP:COUN 3;CONT OFF;TIM 20;TRIG:SOUR RISE;QUAL ON"
200     OUTPUT Test_set;"SET:PFER:COUN 8;CONT OFF;TIM 30;BSYN MID;TRIG:SOUR PROT;QUAL ON"
210     OUTPUT Test_set;"CALL:PAG:REP OFF;IMSI '001012345678901'"
220     Tries=1
230     LOOP
240     OUTPUT Test_set;"CALL:ORIG;CONN:STAT?"
250     ENTER Test_set;Call_connected
260     EXIT IF Call_connected
270     OUTPUT Test_set;"CALL:END"
280     IF Tries=50 THEN
290       BEEP
300       DISP ""
310       PRINT "Call did not connect after";Tries;". Program terminated."
320       STOP
330     END IF
340     DISP "Call has not connected after";Tries;"attempts. Trying again."
350     Tries=Tries+1
360   END LOOP
370   DISP ""
380   OUTPUT Test_set;"CALL:MS:DTX OFF"
390   FOR Traf_chan=120 TO 124 STEP 2
400     OUTPUT Test_set;"CALL:TCH:SEQ ";Traf_chan;":CALL:STAT:STAT?"
410     ENTER Test_set;Call_status$
420     IF Call_status$<>"CONN" THEN
430       PRINT "Call handover failed. New channel assignment =";Traf_chan
440       PRINT "Program terminated."
450       STOP
460     END IF
470     FOR Ms_pwr_lvl=5 TO 15 STEP 5

```

Comprehensive Program Example

```
480      OUTPUT Test_set;"CALL:MS:TXL:SEQ ";Ms_pwr_lvl;"::INIT:TXP;PFER;ORFS"
490      LOOP
500          OUTPUT Test_set;"INIT:DONE?"
510          ENTER Test_set;Meas_done$
520          SELECT Meas_done$
530          CASE "TXP"
540              OUTPUT Test_set;"FETC:TXP:INT?;POW:ALL?"
550              ENTER Test_set;Integrity,Txpower(*)
560              IF (Integrity=0) THEN
570                  PRINT "TX Power results: TCH =";Traf_chan;"and TXL =";Ms_pwr_lvl
580                  PRINT USING "5X,""Minimum:\"",M2D.2D,"" dBm""";Txpower(1)
590                  PRINT USING "5X,""Maximum:\"",M2D.2D,"" dBm""";Txpower(2)
600                  PRINT USING "5X,""Average:\"",M2D.2D,"" dBm""";Txpower(3)
610                  PRINT USING "5X,""Std Dev:\"",M2D.2D,"" dB""";Txpower(4)
620              ELSE
630                  GOSUB Bad_measurement
640              END IF
650          CASE "PFER"
660              OUTPUT Test_set;"FETC:PFER:ALL?"
670              ENTER Test_set;Integrity,Rms_phas_err,Peak_phas_err,Worst_freq_err
680              IF (Integrity=0) THEN
690                  PRINT "PFError results: TCH =";Traf_chan;"and TXL =";Ms_pwr_lvl
700                  PRINT USING "5X,""RMS Phase Error:\"",M2D.2D,"" deg""";Rms_phas_err
710                  PRINT USING "5X,""Peak Phase Error:\"",M2D.2D,"" deg""";Peak_phas_err
720                  PRINT USING "5X,""Worst Freq Error:\"",M3D.2D,"" Hz""";Worst_freq_err
730              ELSE
740                  GOSUB Bad_measurement
750              END IF
760          CASE "ORFS"
770              OUTPUT Test_set;"FETC:ORFS:INT?"
780              ENTER Test_set;Integrity
790              IF (Integrity=0) THEN
800                  OUTPUT Test_set;"SET:ORFS:SWIT:FREQ:POIN?"
810                  ENTER Test_set;Points
820                  IF Points THEN
830                      ALLOCATE Orfs_swit_res(Points),Orfs_swit_offs(Points)
840                      OUTPUT Test_set;"SET:ORFS:SWIT:FREQ?;:FETC:ORFS:POW?;:FETC:ORFS:SWIT?"
850                      ENTER Test_set;Orfs_swit_offs(*),Tx_power,Orfs_swit_res(*)
860                      PRINT "ORFS Swit Results: TCH =";Traf_chan;"and TXL =";Ms_pwr_lvl
870                      PRINT USING "19X,""TX Power =\"",M2D.2D,"" dBm""";Tx_power
880                      PRINT "Offset(kHz)           Level(dBm)"
890                      PRINT "-----           -----"
900 Orfs_image: IMAGE 6X,M4D.2D,12X,M4D.2D
910          FOR J=1 TO Points
920              PRINT USING Orfs_image;(Orfs_swit_offs(J)/1.E+3),Orfs_swit_res(J)
930          NEXT J
940          DEALLOCATE Orfs_swit_res(*),Orfs_swit_offs(*)
950      END IF
960      OUTPUT Test_set;"SET:ORFS:MOD:FREQ:POIN?"
970      ENTER Test_set;Points
980      IF Points THEN
990          ALLOCATE Orfs_mod_res(Points),Orfs_mod_offs(Points)
1000         OUTPUT Test_set;"SET:ORFS:MOD:FREQ?;:FETC:ORFS:POW?;:FETC:ORFS:MOD?"
```

```

1010      ENTER Test_set;Orfs_mod_offs(*),Tx_power,Pwr_30khz,Orfs_mod_res(*)
1020      PRINT "ORFS Mod Results: TCH =" ;Traf_chan;" and TXL =" ;Ms_pwr_lvl
1030      PRINT USING "18X,""30 KHz BW Power =" ,M2D.2D,"" dBm""";Pwr_30khz
1040      PRINT "      Offset(kHz)          Level(dB)"
1050      PRINT "      -----          -----"
1060      FOR J=1 TO Points
1070          PRINT USING Orfs_image;(Orfs_mod_offs(J)/1.E+3),Orfs_mod_res(J)
1080      NEXT J
1090      DEALLOCATE Orfs_mod_res(*),Orfs_mod_offs(*)
1100      END IF
1110      ELSE
1120          GOSUB Bad_measurement
1130      END IF
1140      END SELECT
1150      EXIT IF Meas_done$="NONE"
1160      END LOOP
1170      NEXT Ms_pwr_lvl
1180      NEXT Traf_chan
1190      OUTPUT Test_set;"CALL:END;CONN:STAT?"
1200      ENTER Test_set;Call_connected
1210      IF Call_connected THEN
1220          BEEP
1230          PRINT "Unable to complete BS termination. Program terminated."
1240          STOP
1250      END IF
1260      PRINT "Program completed."
1270      STOP
1280      !
1290      Bad_measurement: !
1300      PRINT "Measurement error: "&Meas_done$
1310      PRINT "Measurement Integrity value =" ;Integrity
1320      RETURN
1330      !
1340      END
1350      !
1360      SUB Chk_err_msg_que
1370          COM /Address/ Test_set
1380          DIM Error_message$[255]
1390          Error_flag=0
1400          LOOP
1410          OUTPUT Test_set;"SYST:ERR?"
1420          ENTER Test_set;Error_number,Error_message$
1430          EXIT IF Error_number=0
1440          IF Error_number=-350 THEN
1450              Error_flag=1
1460              PRINT "Error Message Queue overflow. Error messages have been lost."
1470          ELSE
1480              Error_flag=1
1490              PRINT Error_number,Error_message$
1500          END IF
1510      END LOOP
1520      IF NOT Error_flag THEN
1530          PRINT "No errors in Error Message Queue."

```

Comprehensive Program Example

```
1540      SUBEXIT
1550      END  IF
1560      STOP
1570      SUBEND
```

6 GPRS Programming Guide

Programming the Agilent Technologies 8960 Series 10 for GPRS Mobile Testing in Active Cell Operating Mode

Introduction

- “[Conventions used in this Programming Guide](#)”
- “[Purpose of this Programming Guide](#)”
- “[How this Programming Guide is Organized](#)”
- “[How to use this Programming Guide](#)”
- “[About the Programming Examples Presented in This Programming Guide](#)”

Conventions used in this Programming Guide

Throughout this Programming Guide the term “test set” refers to an Agilent Technologies 8960 Series 10 wireless communications test set with the GPRS mobile test application installed.

Purpose of this Programming Guide

The test set represents state-of-the-art technology in one-box-testers and contains many powerful test capabilities which are accessible through easy-to-use GPIB programming commands. The purpose of this Programming Guide is to teach you how to write a basic control program, using the test set’s GPIB command set. This program will perform fundamental manufacturing tests on a mobile station with the test set operating in active cell mode.

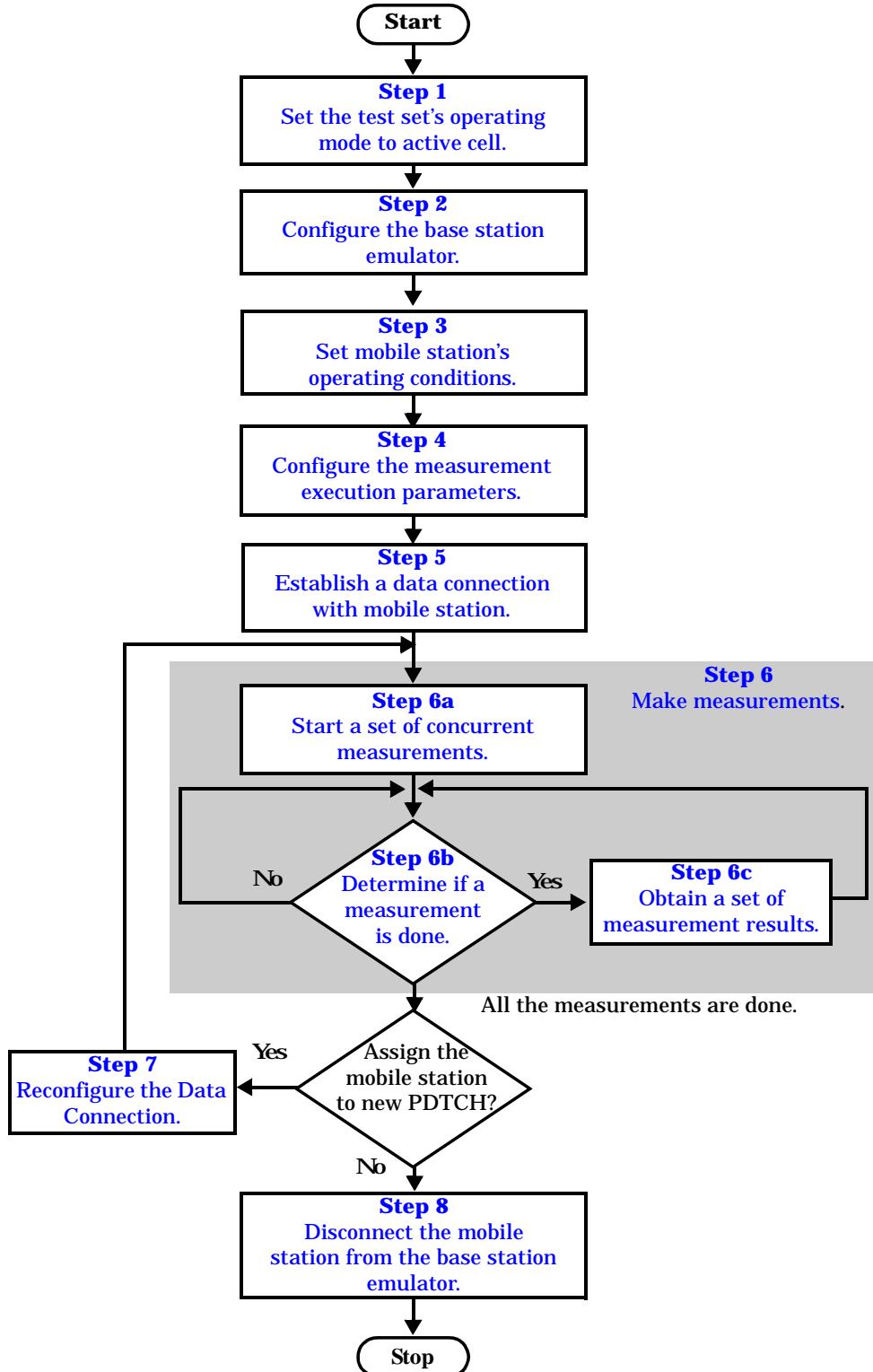
How this Programming Guide is Organized

The Programming Guide is organized around a typical set of tasks a control program would normally perform when testing a mobile station in a manufacturing environment. The set of tasks is shown in “[Figure 1. Typical Flow of Tasks Performed by a Control Program](#)” on page 237.

Typically in a manufacturing environment:

- steps 1, 2, 3, and 4 are done once each time a production run is started,
- steps 5 and 8 are done once for each mobile station tested during the production run,
- steps 6 and 7 are done iteratively for each mobile station tested during the production run. The number of iterations for these steps is dependent upon how many mobile station operating conditions are being tested (that is, number of channels, number of power levels, and so fourth).

Figure 1. Typical Flow of Tasks Performed by a Control Program



How to use this Programming Guide

This Programming Guide is divided into 9 sections. Sections 1 through 8 (Step 1 through Step 8) should be read in sequence. Each section, in order, describes one of the tasks to be performed by the control program and shows how to accomplish that task using the test set's GPIB command set. As you progress through each section your understanding of how the test set's GPIB interface operates will increase as you see the control program evolve.

The last section of the Programming Guide presents a ["Comprehensive Programming Example" on page 275](#) which uses all of the topics discussed in sections 1 through 8 together in one program to give you a sense of how to tie everything together.

About the Programming Examples Presented in This Programming Guide

Programming Language:

The programming examples presented in this guide are written in the HP BASIC programming language, also known as Rocky Mountain BASIC or RMB.

Syntax Used in Programming Examples:

- The programming examples use the shortened form of the command syntax to reduce test time by minimizing GPIB bus transactions. The shortened form of a command is defined by use of capital letters in the command syntax. For example, for the command syntax:

SETup:TXPower:CONTinuous <ON|1|OFF|2>

the shortened form would be:

SET:TXP:CONT <ON|1|OFF|2>

- The programming examples do not include optional nodes. Optional nodes in the command syntax are defined by enclosing the node inside the [] brackets. For example, the command syntax:

CALL:PDTCH[:ARFCn][:SElected] <numeric value>

appears in the programming examples as:

CALL:PDTCH <numeric value>

- The programming examples make extensive use of compound commands using the ; and the :: separators. Refer to the test set's reference documentation for details on the definition and use of these command separators.

Step 1: Set the Test Set's Operating Mode to Active Cell

Background

The test set contains a base station emulator with the primary purpose of providing the call processing necessary for parametric measurements on the RF signals of a mobile station with GPRS capability.

An important characteristic of the test set's base station emulator is its operating mode. The operating mode sets the way in which the base station emulator interacts with the mobile station. Active cell mode is used when emulating a normal cell.

This Programming Guide focuses on programming the test set's base station emulator in active cell operating mode.

Overview of Active Cell Operating Mode

Active cell is the only operating mode currently available. It provides active signaling between the mobile station and the base station emulator.

Active Cell Features

The basic features provided by the base station emulator when the operating mode is set to active cell are:

- Generation of a BCH (broadcast channel).
- Support for Routing Area and Location Area updates.
- Support for the Agilent proprietary BLER data connection.
- The ATTACH procedure is supported.
- The DETACH procedure is supported.
- Packet data transfers on the uplink and downlink are supported.
- All measurements supported in the test application are available.
- The base station emulator automatically controls the test set's receiver.

Step 1: Set the Test Set's Operating Mode to Active Cell

Step 2: Configure the Base Station Emulator

- [“The Base Station Emulator”](#)
- [“Configuring the Broadcast Channel Parameters”](#)
- [“Configuring the Packet Data Traffic Channel Parameters”](#)
- [“Programming Example”](#)

The Base Station Emulator

In active cell operating mode the base station emulator, using the test set's GMSK modulated source, generates a downlink (base station to mobile station direction) broadcast channel (BCH) which represents a cell. The mobile station can “camp” to this signal, just as it would camp to a cell on a real network, and performs an attach procedure to register the mobile station with the network. A Packet Data Traffic Channel (PDTCH) can then be established using an Agilent proprietary data connection designed to accommodate block error rate reports from the mobile station. You can also make transmitter measurements using this data connection. Data is transferred in both the downlink and uplink directions. Measurements can be made, using the base station emulator's measurement receiver, under essentially identical conditions to that which the mobile station would experience on a real network.

The base station emulator emulates a cell in any one of the following GSM frequency bands:

- PGSM - Primary (band) GSM, also known as GSM900
- EGSM - Extension (band) GSM (includes PGSM)
- DCS - Also known as DCS1800

NOTE The term GSM is used to refer to any combination of, or all of, the supported bands. It is not used as a shortened term for PGSM.

To configure the base station emulator, you must configure the BCH and PDTCH as described in the following sections. It may not be necessary to configure all the parameters all the time. The test set's default settings allow a properly functioning mobile station to successfully camp on the cell under most circumstances.

In a manufacturing environment it may be desirable to explicitly configure parameters to ensure that the required settings have not been changed by someone setting a parameter's value through the test set's front panel.

Configuring the Broadcast Channel Parameters

The BCH parameters are configured using the CALL processing subsystem commands shown in the following table.

Table 1. Broadcast Channel Settable Parameters

| Parameter | Command Syntax | Footnote |
|------------|--|----------|
| Cell Band | CALL[:CELL[1]]:BAND <PGSM EGSM DCS> | |
| Cell Power | CALL[:CELL[1]]:POWer:AMPLitude <numeric value>[<suffix>] | |

Configuring the Packet Data Traffic Channel Parameters

The PDTCH parameters are configured using the CALL processing subsystem commands shown in the following table.

Table 2. Packet Data Traffic Channel Settable Parameters

| Parameter | Command Syntax | Footnote |
|--|---|----------|
| Packet Data Traffic Channel Band | CALL:<PDTCH PDTChannel>:BAND <PGSM EGSM DCS> | 1 |
| Packet Data Traffic Channel Number (ARFCN) | CALL:<PDTCH PDTChannel>[:ARFCn][:SElected] <numeric value> OR CALL:<PDTCH PDTChannel>[:ARFCn]:<PGSM EGSM DCS> <numeric value> | 2 |
| Data Connection Type | CALL:FUNCTION:DATA:TYPE <BLER> | 3 |
| Power Reduction Downlink Level | CALL:<PDTCH PDTChannel>:PREduction:LEVel<1 2> <numeric value>[<suffix>] | 4 |
| Downlink Burst Power Reduction Selection | CALL:<PDTCH PDTChannel>:PREduction:BURSt<1 2> <PRL1 PRL2> | 5 |

Table Footnotes

1. The PDTCH band setting becomes the selected band (see Note 2).
2. Sets the PDTCH channel for the PDTCH band selected with the PDTCH Band command (see Note 1).
3. The BLER data connection type is Agilent proprietary. It allows block error rate measurements to be made.
4. Assigns power reduction level values to PRL1 and PRL2.
5. Assigns either PRL1 or PRL2 power reduction levels to a downlink burst.

The following program example illustrates the use of the base station emulator BCH and PDTCH configuration commands.

```
OUTPUT Test_set;"CALL:BAND EGSM;POW:AMPL -60"
OUTPUT Test_set;"CALL:PDTCH 1023"
OUTPUT Test_set;"CALL:FUNC:DATA:TYPE BLER"
OUTPUT Test_set;"CALL:PDTCH:PRED:LEV1 2 DB"
OUTPUT Test_set;"CALL:PDTCH:PRED:LEV2 10 DB"
OUTPUT Test_set;"CALL:PDTCH:PRED:BURS1 PRL2"
OUTPUT Test_set;"CALL:PDTCH:PRED:BURS2 PRL1"
```

Step 2: Configure the Base Station Emulator

Step 3: Set the Mobile Station's Operating Conditions

Mobile Station Uplink Burst Transmit Power Level

The mobile station's uplink burst transmit power level is specified by the test set in a command sent to the mobile station. In this way, the test set emulates a base station, which sends transmit level change commands to a mobile. The test set also uses the mobile station's uplink burst TX level parameter to determine the power to expect from the mobile station when making measurements on the mobile station's transmitter.

Overview

You can set the mobile station's operating conditions using the CALL processing subsystem commands shown in the following table.

Table 3. Settable Mobile Station Operating Conditions

| Parameter | Command Syntax | Footnote |
|-----------------------|---|----------|
| Uplink Burst TX Level | CALL:<PDTCH PDTChannel>:MS:TXLevel[:SElected]:BURSt< n > <numeric value> OR CALL:<PDTCH PDTChannel>:MS:TXLevel:<PGSM EGSM DCS>:BURSt< n > <numeric value> | 1,2 |

Table Footnotes

1. The Packet Data Traffic Channel band setting is the selected band.
2. There is only one uplink burst available for this release. Therefore, it is not necessary to specify a value in your code for <n>. It defaults to 1.

Programming Example

The following example illustrates how to set the mobile station's operating conditions. The first line sets the mobile station's transmit power level for the currently active band to 14. The second line sets the power level when the DCS band becomes the active band.

```
OUTPUT Test_set;"CALL:PDTCH:MS:TXL:BURS 14"
OUTPUT Test_set;"CALL:PDTCH:MS:TXL:DCS:BURS 8
```

Step 3: Set the Mobile Station's Operating Conditions

Step 4: Configure the Measurement Execution Parameters

- [“Measurement Execution Parameters”](#)
- [“Overview of the SETUp subsystem”](#)
- [“Configuring Measurement Averaging Parameters”](#)
- [“Configuring Measurement Triggering Parameters”](#)
- [“Configuring the Burst Synchronization Parameter”](#)
- [“Configuring Measurement Timeout Parameters”](#)
- [“Configuring Measurement Specific Parameters”](#)
- [“Programming Example”](#)

Measurement Execution Parameters

Measurement execution parameters allow you to control the conditions under which a measurement operates. Not all measurements use all the execution parameters shown below. Additionally, some measurements have parameters that are specific to the measurement such as offset frequency lists or filter settings. Each measurement has its own set of parameters which are unique to it and have no affect on the execution of other measurements. Refer to the GPIB syntax listing in the reference documentation for a detailed list of execution parameters for individual measurements. The general set of measurement execution parameters and their generic categories are:

- Measurement Averaging (used by most measurements)
 - Multi-Measurement Count
 - Multi-Measurement Count State
- Measurement Triggering (used by most measurements)
 - Trigger Arm
 - Trigger Source
 - Trigger Delay
 - Trigger Qualifier
- Measurement Synchronization (used by some measurements)
 - Burst Synchronization
- Measurement Timeouts (used by all measurements)
 - Measurement Timeout
 - Measurement Timeout State
- Measurement Specific (execution parameters specific to an individual measurement)

Overview of the SETUp subsystem

The SETUp subsystem allows you to configure the measurement parameters. Each individual measurement parameter can be set and queried using the associated SETUp subsystem command. The general hierarchy of the SETUp subsystem command structure is as follows:

```
SETUp:<measurement mnemonic>:<measurement parameter> <parameter setting/value>
```

For example, the SETUp subsystem is used below to set a timeout value for the transmit power measurement:

```
SET:TXP:TIM 5
```

The following table shows the measurements available in the test application and their associated <measurement mnemonic> used in the SETUp command syntax.

Table 4. Measurement Mnemonics used in the SETUp Subsystem

| Measurement | <measurement mnemonic> |
|-------------------------|------------------------|
| Transmit Power | TXPower |
| Power vs Time | PVTime |
| Phase & Frequency Error | PFERror |
| Output RF Spectrum | ORFSpectrum |

Configuring Measurement Averaging Parameters

Table 1. Measurement Averaging Parameters

| Parameter | Command Syntax |
|------------------------------------|--|
| Measurement Count Number and State | SETUp:<measurement mnemonic>:COUNT[:SNUMber] <numeric value> |
| Measurement Count State | SETUp:<measurement mnemonic>:COUNT:STATE <ON 1 OFF 0> |
| Measurement Count Number | SETUp:<measurement mnemonic>:COUNT:NUMBER <numeric value> |

Configuring Multi-Measurement Count State and Count Number Simultaneously

The multi-measurement count state can be set to ON and the multi-measurement count number can be set to some value using a single command. For example:

```
OUTPUT Test_set;"SET:TXP:COUN 10"
```

would set the multi-measurement count state to ON and set the number of averages to 10 for the transmit power measurement.

Multi-Measurement Count State Parameter

The Multi-Measurement Count State parameter is used to turn measurement averaging on and off.

Multi-Measurement Count Number Parameter

The Multi-Measurement Count Number parameter sets the number of measurement samples taken during each measurement cycle when the COUNT:STATE parameter is set to ON.

Configuring Measurement Triggering Parameters

Table 2. Measurement Triggering Parameters

| Parameter | Command Syntax |
|-------------------|--|
| Trigger Arm | SETup:<measurement mnemonic>:CONTinuous <ON 1 OFF 0> |
| Trigger Source | SETup:<measurement mnemonic>:TRIGger:SOURce <AUTO IMMEDIATE PROTOCOL RISE> |
| Trigger Delay | SETup:<measurement mnemonic>:TRIGger:DELay <numeric value>[<suffix>] |
| Trigger Qualifier | SETup:<measurement mnemonic>:TRIGger:QUALifier <ON 1 OFF 0> |

Trigger Arm Parameter

The Trigger Arm parameter allows you to set whether a measurement either:

- make one measurement then stop (single), or
- automatically re-arm upon completion of one measurement and repeat the process (continuous).

For example,

```
OUTPUT Test_set; "SET:TXP:CONT OFF"
```

would set the trigger arming to single for the transmit power measurement.

NOTE If you are using the test set remotely, set the trigger arm to single (CONTinuous OFF) for each measurement or, a single command (SET:CONT:OFF) or the *RST command can be used to set the trigger arm to single for all measurements.

Trigger Source Parameter

The Trigger Source parameter selects the source of the measurement trigger signal.

```
OUTPUT Test_set; "SET:TXP:TRIG:SOUR AUTO"
```

would set the trigger source to AUTO for the transmit power measurement.

Trigger Delay Parameter

The Trigger Delay parameter controls the delay between the trigger event (the point in time at which the trigger signal is received) and the start of sampling. Negative values indicate that the sampling occurs prior to the trigger event.

```
OUTPUT Test_set; "SET:TXP:TRIG:DEL 10 US"
```

would set the trigger delay to 10 μ s for the transmit power measurement.

Trigger Qualifier Parameter

The Trigger Qualifier parameter allows you to enable or disable automatic trigger re-arming following a trigger event which occurred when no valid signal (burst) was present.

```
OUTPUT Test_set; "SET:TXP:TRIG:QUAL ON"
```

would turn the trigger qualifier on for the transmit power measurement.

Configuring the Burst Synchronization Parameter

Burst Synchronization Parameter

The burst synchronization parameter allows you to specify where in the sampled data stream the test set starts analyzing the captured data. Burst synchronization occurs after the measurement data is captured. The burst synchronization parameter's setting determines how the measurement's time reference is developed from the sampled data.

Not all measurements have synchronization choices and not all synchronization choices are available in measurements that use synchronization. Measurement synchronization and measurement triggering are independent from each other and may be used in any combination.

The command syntax for setting the burst synchronization parameter is:

```
SETup:<measurement mnemonic>:BSYNC <MIDamble|AMPLitude|NONE>
```

The burst synchronization is set to midamble for the power versus time measurement in the following example:

```
OUTPUT Test_set; "SET:PVT:BSYN MID"
```

Configuring Measurement Timeout Parameters

Table 3. Measurement Timeout Parameters

| Parameters | Command Syntax |
|------------------------------------|---|
| Measurement Timeout Time and State | SETup:<meas-mnemonic>:TIMEout[:STIMe] <numeric value>[<suffix>] |
| Measurement Timeout State | SETup:<meas-mnemonic>:TIMEout:STATE <ON 1 OFF 0> |
| Measurement Timeout Time | SETup:<meas-mnemonic>:TIMEout:TIME <numeric value>[<suffix>] |

Configuring Measurement Timeout State and Timeout Time Simultaneously

The measurement timeout state can be set to ON and the measurement timeout time can be set to some value using a single complex command.

```
OUTPUT Test_set; "SET:TXP:TIM:STIM 10"
```

would set the measurement timeout state to ON and set the measurement timeout time to 10 seconds for the transmit power measurement. Note that in this example the optional command mnemonic :STIMe has been included for purposes of clarity.

Measurement Timeout State Parameter

The Measurement Timeout State parameter allows you to enable or disable measurement timeouts.

```
OUTPUT Test_set;"SET:PVT:TIM:STAT ON"
```

would enable measurement timeouts for the power versus time measurement.

Measurement Timeout Time Parameter

The Measurement Timeout Time parameter allows you to set the maximum time that a measurement executes before failing with a timeout error (when the TIMEOut:STATe parameter is set to ON).

```
OUTPUT Test_set;"SET:TXP:TIM:TIME 10 S"
```

would set the measurement timeout time to 10 seconds for the transmit power measurement.

Configuring Measurement Specific Parameters

Some measurements have parameters that are specific to the measurement. Refer to the GPIB syntax listings for a detailed list of execution parameters for individual measurements. Some of the possible programming techniques that you can use to configure measurement specific execution parameters are described below.

Sending Comma-Separated Parameter Configuration Lists to the Test Set

Numerous parameters may be necessary to configure a measurement. For example, the output RF spectrum measurement can require up to 22 frequency offsets for the modulation part of the measurement and up to 8 frequency offsets for the switching part of the measurement. You send these offsets as comma separated lists. There are a variety of techniques that you can use to send these lists. Some of these techniques are shown below.

1. Include each individual parameter in the command itself. For example:

```
OUTPUT Test_set;"SET:ORFS:SWIT:FREQ .4MHZ,.6MHZ,-.4MHZ,-.6MHZ"
```

2. Store the parameter values in a data structure and send the command with the data structure appended to it. For example:

- Using a string variable:

```
DIM Swit_offs$[255]
Swit_offs$=".4MHZ,.6MHZ,-.4MHZ,-.6MHZ,1.2MHZ,-1.2MHZ"
OUTPUT Test_set;"SET:ORFS:SWIT:FREQ "&Swit_offs$
```

Step 4: Configure the Measurement Execution Parameters

- Using numeric arrays:

```
OPTION BASE 1
REAL Swit_offs(8),Mod_offs(22)
!
DATA 400,-400,600,-600,1200,-1200,1800,-1800
DATA .1,-.1,.2,-.2,.25,-.25,.4,-.4,.6,-.6,.8,-.8
DATA 1,-1,1.2,-1.2,1.4,-1.4,1.6,-1.6,1.8,-1.8
!
READ Swit_offs(*)
READ Mod_offs(*)
!
Swit_img:IMAGE K,7(K,"KHZ,"),K,"KHZ"
Mod_img:IMAGE K,21(K,"MHZ,"),K,"MHZ"
OUTPUT Test_set USING Swit_img;"SET:ORFS:SWIT:FREQ",Swit_offs(*)
OUTPUT Test_set USING Mod_img;"SET:ORFS:MOD:FREQ",Mod_offs(*)
```

Programming Example

The following example illustrates configuring the measurement execution parameters for the output RF spectrum, transmit power, and phase and frequency error measurements.

```
! Configure ORFS Measurement:
!
OUTPUT Test_set;"SET:ORFS:SWIT:COUN 5"      ! Examples of using complex
OUTPUT Test_set;"SET:ORFS:MOD:COUN 10"        ! commands to set multi-meas
                                                ! state and count at same time.
OUTPUT Test_set;"SET:ORFS:TRIG:SOUR AUTO"     ! Set trig source to AUTO.
OUTPUT Test_set;"SET:ORFS:CONT OFF"            ! Set trig mode to single.
OUTPUT Test_set;"SET:ORFS:TIM 60"              ! Set timeout time to 60 sec.
! Put switching and modulation offsets to be tested into string variables.
Swit_offs$="400KHZ,-400KHZ,600KHZ,-600KHZ,1200KHZ,-1200KHZ,1800KHZ,-1800KHZ"
Mod_offs$=".2MHZ,-.2MHZ,.4MHZ,-.4MHZ,.6MHZ,-.6MHZ,.8MHZ,-.8MHZ,1MHZ,-1MHZ"
OUTPUT Test_set;"SET:ORFS:SWIT:FREQ "&Swit_offs$
OUTPUT Test_set;"SET:ORFS:MOD:FREQ "&Mod_offs$
!
! Configure TX Power Measurement:
!
OUTPUT Test_set;"SET:TXP:COUN 3;CONT OFF;TIM 20"
OUTPUT Test_set;"SET:TXP:TRIG:SOUR RISE;QUAL ON"
!
! Configure Phase & Frequency Error Measurement:
!
OUTPUT Test_set;"SET:PFER:COUN 8;CONT OFF;TIM 30;BSYN MID"
OUTPUT Test_set;"SET:PFER:TRIG:SOUR PROT;QUAL ON"
```

Step 5: Establish a Data Connection with the Mobile Station

- [“Data Connection Status Synchronization” on page 253](#)
- [“Process for Establishing a Data Connection” on page 254](#)

Data Connection Status Synchronization

When the control program requires that a data connection be established between the mobile station and the test set, it must also be able to obtain knowledge about the status of the connection. The control program issues the commands necessary to initiate the connection process to the test set. The control program must then be able to determine when the connection has transitioned through various states successfully so that it can proceed. The control program must also be able to determine that the transition has not been successful so appropriate action can be taken.

Data Connection States

At any instant in time a data connection is in one of the following states:

- Idle
- Attaching*
- Detaching*
- Attached
- Starting*
- Ending*
- Transferring

The states marked by a * are referred to as transitory states because the amount of time which the connection spends in any of these states is limited. Therefore, the connection is not allowed to stay in a transitory state forever.

CALL:STATus:DATA? Query

The CALL:STATus:DATA? query immediately returns the state of the data connection at the time the query is received.

Table 5. Responses Returned from the CALL:STAT:DATA? Query

| Response | Meaning |
|----------|--|
| IDLE | The connection is in the Idle state. |
| ATTG | The connection is in the Attaching transitory state. |
| DET | The connection is in the Detaching transitory state. |
| ATT | The connection is in the Attached state. |
| STAR | The connection is in the Starting transitory state. |
| END | The connection is in the Ending transitory state. |
| TRAN | The connection is in the Transferring state. |

Using the CALL:STATus[:DATA]? query for Connection State Synchronization

The most common technique used to determine if a process has completed (either successfully or unsuccessfully), is to repeatedly query the connection state using the CALL:STATus:DATA? query command inside a program loop. The return value from each query is checked to determine if the process is proceeding or has reached the desired state.

There are, however, some inherent problems associated with this technique:

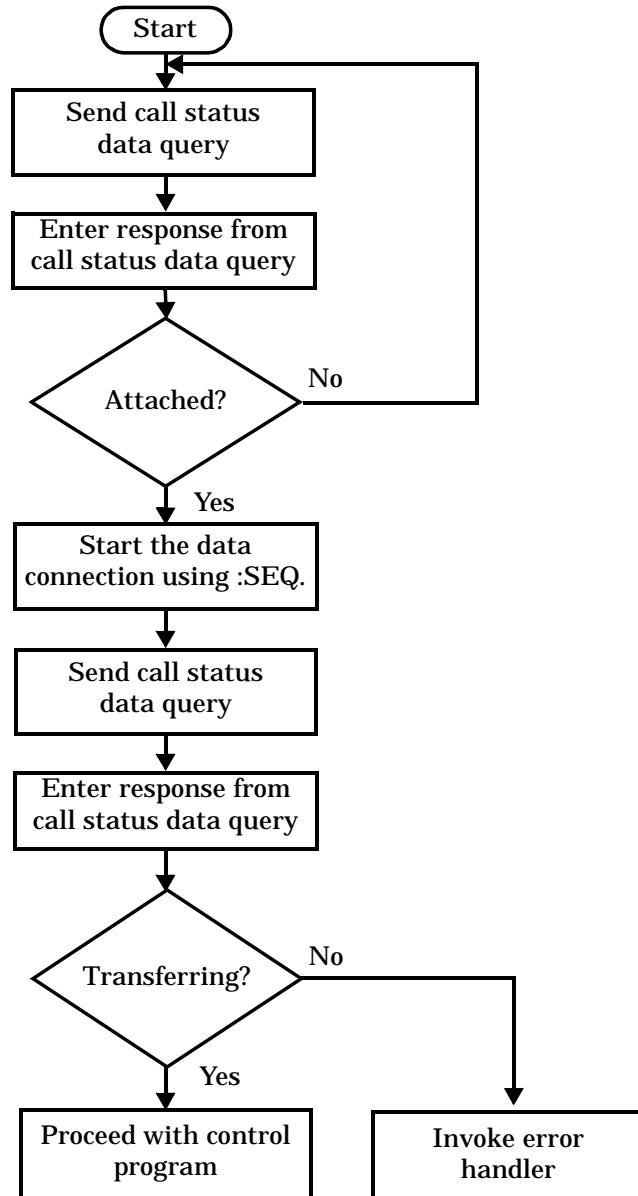
- The rapid polling of the instrument increases bus traffic and places increased demand on the instrument's processors to respond to the constant stream of queries.
- The control program must handle failure conditions. For example: if a call origination process is started but the call never leaves the Idle state, the control program must incorporate some technique to prevent the program from staying in the loop forever waiting for a transition out of the Idle state.

You can avoid rapidly polling the test set by attaching the :SEQuential synchronization command to the command used to initiate the data connection. This will force the test set to complete this command before executing any other commands. Therefore, the status of the data connection is stable and only needs to be queried once to determine if the connection succeeded or failed.

Process for Establishing a Data Connection

Use the CALL:FUNCTION:DATA:STARt command in conjunction with the :SEQuential synchronization command to establish a data connection.

The recommended process for establishing a data connection is shown in the following figure.

Figure 1. Process for Establishing a Data Connection

Programming Example

The following programming example illustrates the process for establishing a data connection.

```
REPEAT                                ! Loop to determine when connection state
                                         ! is Attached
OUTPUT Test_set;"CALL:STAT:DATA?" ! Query state of data connection
ENTER Test_set;Conn_stat$
! <code to prevent infinite looping>
UNTIL Conn_stat$="ATT"
!
OUTPUT Test_set;"CALL:FUNC:DATA:STAR:SEQ" ! Start the data connection
!
OUTPUT Test_set;"CALL:STAT:DATA?"
ENTER Test_set;Conn_stat$
IF Conn_stat$<>"TRAN" THEN
! <put error handler here>
END IF
! Data Connection is established so proceed with control program
```

Step 6: Make Measurements

- [“Measurement Concurrency”](#)
- [“Programming Example”](#)
- [“Things That Can Go Wrong”](#)

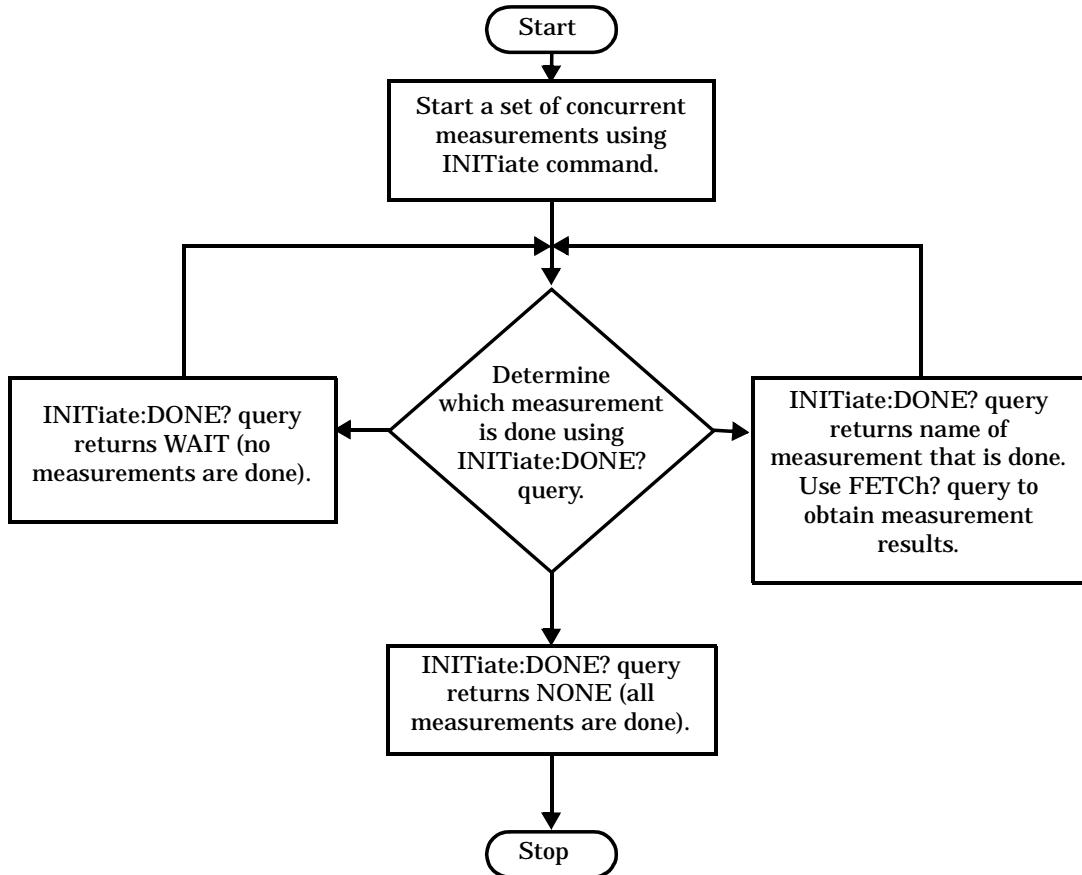
Measurement Concurrency

The multiple signal path, DSP based, multiple processor architecture of the test set allows the test set to make concurrent measurements. This means that:

- multiple measurements can execute and finish at the same time.
- individual measurement completion is not influenced by other measurement processes.
- availability of measurement results is not dependent upon the sequence that the measurements were requested in.
- results from measurements that take few processor cycles are available without having to wait for measurements that take many processor cycles.

[“Figure 1. Process for Making Measurements” on page 258](#) shows the recommended process for making concurrent measurements using the test set’s command set.

Figure 1. Process for Making Measurements



Programming Example

The following programming example shows you how to make a transmit power measurement and a phase and frequency error measurement concurrently using the process shown in “[Figure 1. Process for Making Measurements](#)” on page 258.

```

! Step 6a: Start Set of Concurrent Measurements:
!
OUTPUT Test_set;"INIT:TXP;PFER"
!
! Step 6b: Determine If A Measurement Is Done:
!
LOOP
    OUTPUT Test_set;"INIT:DONE?"
    ENTER Test_set;Meas_done$
!
! Step 6c: Obtain Measurement Results
!
SELECT Meas_done$
    CASE "TXP"
        OUTPUT Test_set;"FETC:TXP:POW?"
        ENTER Test_set;Avg_tx_power
    CASE "PFER"
        OUTPUT Test_set;"FETC:PFER:RMS?"
        ENTER Test_set;Max_rms_phas_er
    END SELECT
EXIT IF Meas_done$="NONE"
END LOOP

```

Things That Can Go Wrong

Measurement Integrity Always Returns a Value of 6

A measurement integrity value of 6 indicates that some characteristic of the input signal is under range. Typically this is the amplitude (power) of the signal. This low amplitude causes the level of the DSP sampler to be below a threshold required by the test set to produce results with the accuracy specified for the test set.

Possible Cause One of the most likely causes of a measurement underrange condition is signal loss caused by either the test fixture or cabling.

Suggested Workaround You can compensate for fixture or cable loss by using the RF IN/OUT port's amplitude offset parameters. Twenty different offsets can be set up for twenty different frequencies. To set the frequencies use the command:

```
SYSTem:CORRection:SFREquency (comma separated numeric values)<suffix>
```

Similarly, to then set the offsets for these frequencies, use the following command syntax:

```
SYSTem:CORRection:SGAin (comma separated numeric values)<suffix>
```

Refer to the reference documentation for details about how to use these commands properly.

Step 6: Make Measurements

Step 6a: Start Set Of Concurrent Measurements

Starting Measurements

The INITiate command is used to start measurements. Each individual measurement can be started using the INITiate command. For starting measurements, the syntax of the INITiate command is as follows:

INITiate:<measurement mnemonic>[:ON]

The following table shows the measurements available in the test application and their associated <measurement mnemonic> used in the INITiate command syntax.

Table 6. Measurement Mnemonics Used In The INITiate Subsystem

| Measurement | <measurement mnemonic> |
|-------------------------|------------------------|
| Transmit Power | TXPower |
| Power vs Time | PVTime |
| Phase & Frequency Error | PFERror |
| Output RF Spectrum | ORFSpectrum |

Programming Example

The following command starts the transmitter power measurement.

OUTPUT Test_set; "INIT:TXP"

Using Compound Commands to Start Multiple Measurements

More than one measurement can be started using a single INITiate command. For example:

OUTPUT Test_set; "INIT:TXP;PFER"

starts the transmit power measurement and the phase and frequency error measurement. These measurements then run concurrently.

Step 6a: Start Set Of Concurrent Measurements

Step 6b: Determine if a Measurement Is Done

Background

After a set of concurrent measurements have been started, you can set up your control program to determine when individual measurement results are available. This enables you to request results for a completed measurement while other measurements are still running.

Overview

Use the INITiate:DONE? query command to determine which measurement has completed.

This command is a query only and returns only one response per query. The responses returned and their meaning are shown in the following table.

Once a measurement is reported as being complete via the INITiate:DONE? query it is removed from the done list (it is not reported again). To use the INITiate:DONE? query properly, your control program should immediately fetch a measurement's results once it is reported as being complete.

Table 7. Responses Returned from INITiate:DONE? Query

| Response | Meaning |
|----------|---|
| TXP | The transmit power measurement is done. |
| PVT | The power versus time measurement is done. |
| PFER | The phase and frequency error measurement is done. |
| ORFS | The output RF spectrum measurement is done. |
| WAIT | There are one or more measurements that are in progress, but none of those measurements are done yet. |
| NONE | No measurements are in progress. |

For an example of how the INIT:DONE? query is used, see ["Programming Example" on page 259](#).

Step 6b: Determine if a Measurement Is Done

Step 6c: Obtain a Set of Measurement Results

Background

In order to minimize bus traffic and reduce test time, the test set's measurements are designed to return multiple measured values in response to a single measurement request.

For example, if a transmit power measurement with averaging is initiated there are five measurement results available. These are:

1. Measurement integrity value
2. Average value
3. Minimum value
4. Maximum value
5. Standard deviation value

The test set can return the measurement results in a variety of formats to suit your needs. For example, the transmitter power measurement results can be returned as:

- Measurement integrity and average value,
or
- Average value and minimum value and maximum value and standard deviation value,
or
- Average value only,
or
- Minimum value only,
or
- Maximum value only,
or
- Standard deviation value only,
or
- Measurement integrity value only.

The formats available for individual measurements are specifically defined in the reference documentation and can be found in the FETCh? subsystem's GPIB command syntax.

Overview

After a measurement is initiated, the measurement results can be queried using the FETCh? subsystem. The general structure of the FETCh? command is as follows:

```
FETCh:<measurement mnemonic>:<result format>?
```

The following table shows the measurements available in the test application and their associated <measurement mnemonic> used in the FETCh? command syntax.

The command syntax used to obtain the various measurement result formats (<result format>) for each measurement can be found in the test set's FETCh? subsystem's GPIB command syntax reference information.

Table 8. Measurement Mnemonics Used In The FETCh? Subsystem

| Measurement | <measurement mnemonic> |
|-------------------------|------------------------|
| Transmit Power | TXPower |
| Power vs Time | PVTime |
| Phase & Frequency Error | PFERror |
| Output RF Spectrum | ORFSpectrum |

Programming Example

The following command returns the minimum value from the set of samples taken during the transmit power measurement (when averaging is turned on and number of samples taken >1).

```
OUTPUT Test_set; "FETCh:TXP:POW:MIN?"
```

Step 7: Reconfigure the Data Connection

Process for Reconfiguring a Data Connection

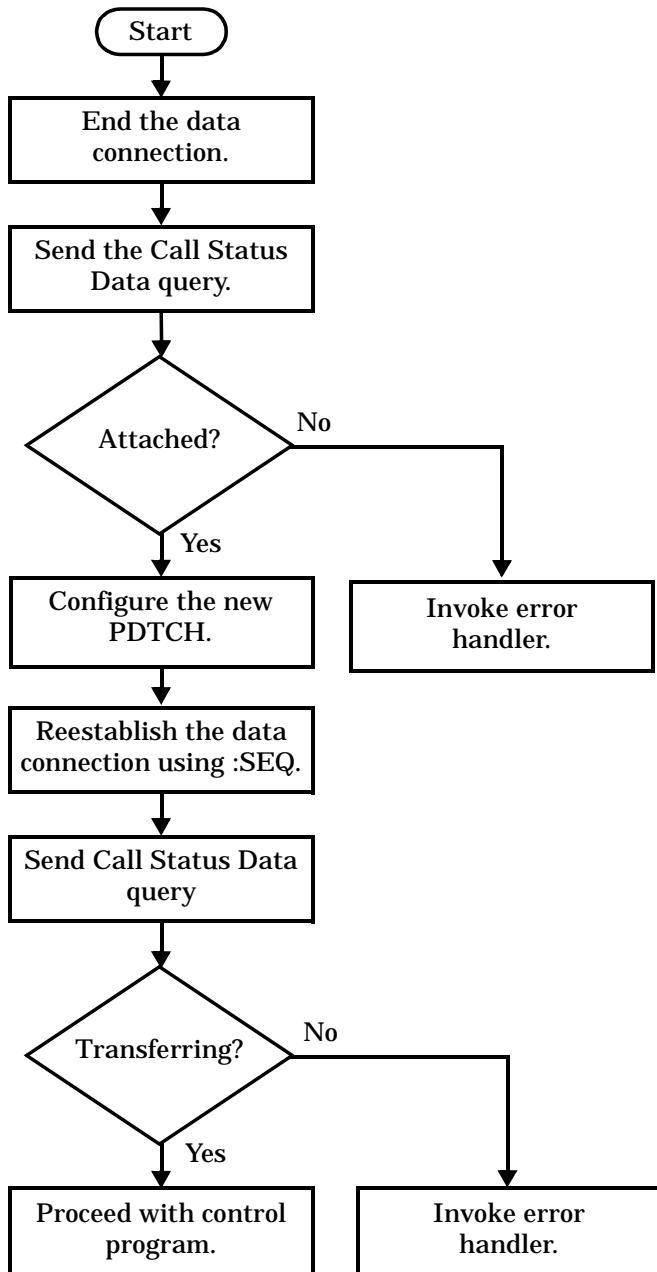
If you want to test the mobile station using different parameters, such as channel number, channel band, or mobile station transmit level, you must reconfigure the data connection.

To reconfigure a data connection you must:

- first end the data connection,
- use the PDTCH commands to setup the new channel, and
- reestablish the data connection using the CALL:FUNCTION:DATA:STARt:SEQuential command.

This process is shown in more detail [“Figure 1. Process for Reconfiguring the Data Connection” on page 268](#) and the [“Programming Example” on page 269](#).

Figure 1. Process for Reconfiguring the Data Connection



Programming Example

The following example illustrates how to reconfigure the data connection. Notice the packet data traffic channel commands are used to change several parameters.

```

! Existing conditions: a mobile station is connected to the test
! set, operating mode is set to active cell and a data connection
! is in the transferring state.
! Step 1: End the data connection
OUTPUT Test_set;"CALL:FUNC:DATA:STOP"
OUTPUT Test_set;"CALL:STAT:DATA?"
ENTER Test_set;Conn_stat$
IF Conn_stat$<>"ATT" THEN
!<put error handler here>
END IF
! Step 2: Change the packet data traffic channel band, number, and
!         MS TX Level
OUTPUT Test_set;"CALL:PDTCH:BAND DCS"
OUTPUT Test_set;"CALL:PDTCH 556"
OUTPUT Test_set;"CALL:PDTCH:MS:TXL:BURS 4"
OUTPUT Test_set;"CALL:FUNC:DATA:STAR:SEQ"!Reestablish the data connection
!No other commands will be processed
!until this operation completes
!because the :SEQ has been attached.

! Step #2: Check connection status
OUTPUT Test_set;"CALL:STAT:DATA?"
ENTER Test_set;Conn_stat$
IF Conn_stat$<>"TRAN" THEN
! <put error handler here>
END IF
! Data Connection is established

```

Step 7: Reconfigure the Data Connection

Step 8: Disconnect the Mobile Station from the Base Station Emulator

- “Data Connection Status Synchronization”
- “End the Data Connection”
- “Initiate the GPRS detach procedure from the Mobile Station”

Data Connection Status Synchronization

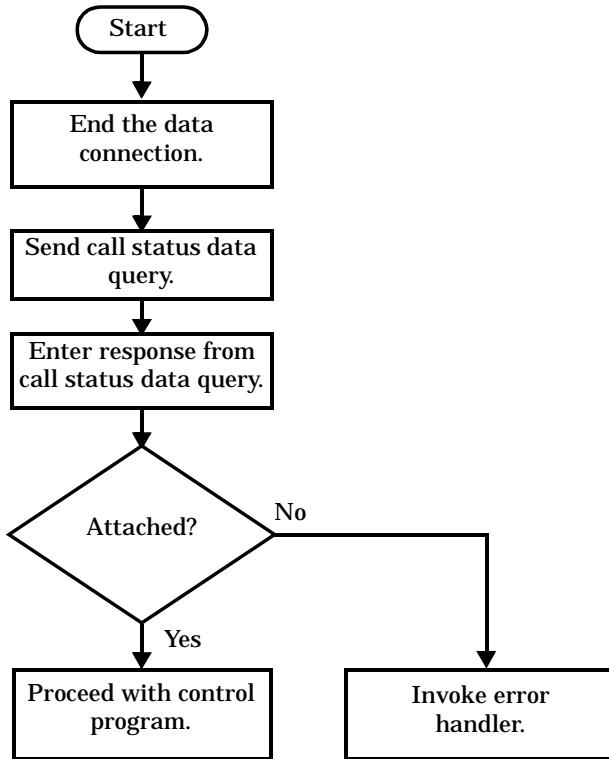
After you have completed the testing of the phone, the last step will be to disconnect the data connection established between the mobile station and the test set. As detailed in “[Step 5: Establish a Data Connection with the Mobile Station](#)” on page 253, the control program must also be able to obtain knowledge about the status of the connection. The control program issues the commands to the test set necessary to begin the disconnect process. It must be able to determine what state the connection is in so that it can proceed or take appropriate action if the disconnect is not progressing correctly.

End the Data Connection

The recommended process for ending the data connection is shown in the following figure.

Use the CALL:FUNCTION:DATA:STOP command.

Figure 1. Process for Stopping ETSI Test Mode



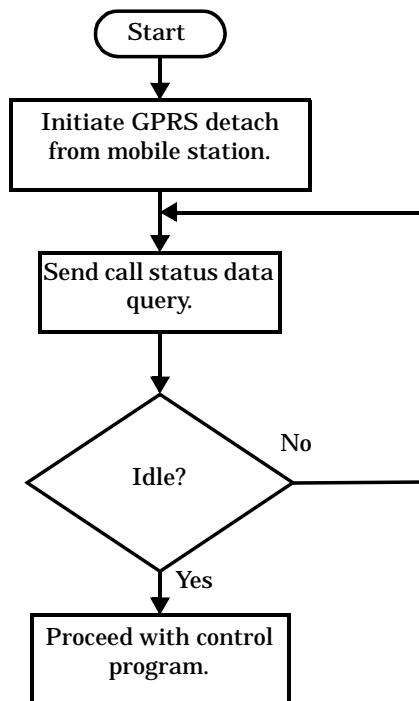
Programming Example

The programming example below illustrates how to return the data connection status to “Attached” by ending the data connection and how to maintain synchronization with the control program.

```
OUTPUT Test_set;"CALL:FUNC:DATA:STOP"    ! End the data connection.
OUTPUT Test_set;"CALL:STAT:DATA?"        ! Send call status data query.
ENTER Test_set;Conn_stat$
IF Conn_stat$<>"ATT" THEN           ! Check if exit was successful
! <put error handler here>
END IF
! The data connection has been ended. Proceed with control program.
```

Initiate the GPRS detach procedure from the Mobile Station

There is no facility in the test set to initiate a call disconnect from the mobile station. This must be done manually or through a test bus built into the mobile station.

Figure 2. Process for Initiating GPRS detach from the Mobile Station**Programming Example**

This example is one way to do data connection synchronization while ending the data connection.

```

! Manually initiate a GPRS Detach or send commands via a bus
DISP "Initiate a GPRS Detach."
REPEAT
    ! Loop to determine when connection state
    ! is Idle
OUTPUT Test_set;"CALL:STAT:DATA?" ! Query state of data connection
ENTER Test_set;Conn_stat$
! <code to prevent infinite looping>
UNTIL Conn_stat$="IDLE"
!
! Data Connection is established so proceed with control program
  
```

Step 8: Disconnect the Mobile Station from the Base Station Emulator

Comprehensive Programming Example

This section contains an example program for making measurements using the test set. The program follows the task flow shown in “[Figure 1. Typical Flow of Tasks Performed by a Control Program](#)” on page 237.

Example Program

```

10      ! Prog Name: P1_ex.txt      Rev: A.0.1      Date Code: 07 September 2000
20      !
30      ! Configure the BASIC environment, dimension and initialize variables.
40      ! These actions are unrelated to programming the Agilent Technologies 8960.
50      !
60      OPTION BASE 1
70      COM /Address/Test_set
80      ! Allocate arrays to hold ORFS switching & modulation frequency offsets.
90      DIM Swit_offs$[255],Mod_offs$[255]
100     ! Allocate arrays to hold measurement results.
110     REAL Txpower(4)
120     Test_set=714      ! Test set's GPIB address.
130     PRINTER IS CRT
140     CLEAR SCREEN
150     !
160     ! Reset test set to start from a known state. Not always necessary to do full
170     ! preset in a manufacturing environment but desireable in programming example.
180     !
190     OUTPUT Test_set;"*RST"
200     !
210     ! Turn on the GPIB debugger. This is optional but very helpful for debugging
220     ! GPIB commands when developing new code.
230     !
240     OUTPUT Test_set;"SYST:COMM:GPIB:DEB:STAT ON"
250     !
260     ! Check error message queue and STOP if any errors present. This ensures that
270     ! the example program starts with no error conditions present in the test set.
280     !
290     CALL Chk_err_msg_que
300     !
310     ****
320     ! Step 1: Set Test Set's Operating Mode to Active Cell
330     ****
340     !
350     ! Active Cell operating mode is the only mode available in this release.
360     ! There is no GPIB command to specify operating mode in this release.
370     !
380     ****
390     ! Step 2: Configure the Base Station Emulator
400     ****
410     !
420     OUTPUT Test_set;"CALL:BAND PGSM;POW:AMPL -60"! Set active broadcast band to
430                                     ! PGSM and cell power to -60 dBm.
440     OUTPUT Test_set;"CALL:PDTCH 45"           ! Set packet data traffic channel to 45

```

Comprehensive Programming Example

```
450  OUTPUT Test_set;"CALL:FUNC:DATA:TYPE BLER" ! Set ETSI Test Mode Type to BLER
460  !
470  ! Assign values to the power reduction levels
480  OUTPUT Test_set;"CALL:PDTCH:PRED:LEV1 12 DB"
490  OUTPUT Test_set;"CALL:PDTCH:PRED:LEV2 3 DB"
500  !
510  ! Assign power levels to the downlink bursts
520  OUTPUT Test_set;"CALL:PDTCH:PRED:BURS1 PRL2"
530  OUTPUT Test_set;"CALL:PDTCH:PRED:BURS2 PRL1"
540  !
550  !*****
560  ! Step 3: Set the Mobile Station's Operating Conditions
570  !*****
580  !
590  ! Assign a power level to the uplink burst
600  OUTPUT Test_set;"CALL:PDTCH:MS:TXL:BURS 14"
610  !
620  !*****
630  ! Step 4: Configure the Measurement Execution Parameters
640  !*****
650  !
660  ! Configure ORFS Measurement:
670  !
680  OUTPUT Test_set;"SET:ORFS:SWIT:COUN 5" ! Examples of using complex commands to
690  OUTPUT Test_set;"SET:ORFS:MOD:COUN 10" ! set multi-meas state and count at
700  ! same time.
710  OUTPUT Test_set;"SET:ORFS:TRIG:SOUR AUTO" ! Set trig source to AUTO.
720  OUTPUT Test_set;"SET:ORFS:CONT OFF" ! Set trig mode to single.
730  OUTPUT Test_set;"SET:ORFS:TIM 20" ! Set timeout time to 20 seconds.
740  ! Put switching and modulation offsets to be tested into string variables.
750  Swit_offs$="-400KHZ,-400KHZ,600KHZ,-600KHZ,1200KHZ,-1200KHZ,1800KHZ,-1800KHZ"
760  Mod_offs$=".2MHZ,-.2MHZ,.4MHZ,-.4MHZ,.6MHZ,-.6MHZ,.8MHZ,-.8MHZ,1MHZ,-1MHZ"
770  OUTPUT Test_set;"SET:ORFS:SWIT:FREQ "&Swit_offs$
780  OUTPUT Test_set;"SET:ORFS:MOD:FREQ "&Mod_offs$
790  !
800  ! Configure TX Power Measurement:
810  !
820  OUTPUT Test_set;"SET:TXP:COUN 3;CONT OFF;TIM 20"
830  OUTPUT Test_set;"SET:TXP:TRIG:SOUR AUTO;QUAL ON"
840  !
850  ! Configure Phase & Frequency Error Measurement:
860  !
870  OUTPUT Test_set;"SET:PFER:COUN 8;CONT OFF;TIM 30;BSYN MID"
880  OUTPUT Test_set;"SET:PFER:TRIG:SOUR AUTO;QUAL ON"
890  !
900  !*****
910  ! Step 5: Establish a Data Connection with the Mobile Station
920  !*****
930  !
940  ! This example assumes the MS has initiated a GPRS attach.
950  ! The following code will query the test set for the connection status 50
960  ! times and then stop the program if an attached state is not reached. This
970  ! should give adequate time for the MS to attach.
```

```

980  !
990  Tries=1
1000 LOOP
1010   OUTPUT Test_set;"CALL:STAT:DATA?" ! Query the connection's state
1020   ENTER Test_set;Conn_state$
1030 EXIT IF Conn_state$="ATT"
1040 IF Tries=50 THEN
1050   BEEP
1060   DISP ""
1070   PRINT "GPRS attach did not complete. Program terminated."
1080   STOP
1090 END IF
1100 IF Conn_state$="ATTG" THEN
1110   DISP "GPRS attach has started."
1120 END IF
1130 Tries=Tries+1
1140 END LOOP
1150 DISP ""
1160 FOR Traf_chan=15 TO 115 STEP 50      ! Test channels 15, 65, and 115
1170   OUTPUT Test_set;"CALL:PDTCH ";Traf_chan
1180   FOR Ms_pwr_lvl=5 TO 15 STEP 5      ! Test power levels 5, 10, and 15
1190     OUTPUT Test_set;"CALL:PDTCH:MS:TXL:BURS1 ";Ms_pwr_lvl
1200     OUTPUT Test_set;"CALL:FUNC:DATA:STAR:SEQ" ! Starts Data Connection
1210                                         ! No other commands will be processed
1220                                         ! until this operation completes
1230                                         ! because the :SEQ has been attached
1240     OUTPUT Test_set;"CALL:STAT:DATA?"
1250     ENTER Test_set;Conn_state$
1260     IF Conn_state$<>"TRAN" THEN
1270       PRINT "Data connection failed. Terminated program."
1280       STOP
1290     END IF
1300 !
1310 ! ****
1320 ! Step 6: Make Measurements
1330 ! ****
1340 !
1350 ! Step 6a: Start a set of concurrent measurements:
1360 !
1370   OUTPUT Test_set;"INIT:TXP;PFER;ORFS"
1380 !
1390 ! Step 6b: Determine if a measurement is done:
1400 !
1410   LOOP
1420     OUTPUT Test_set;"INIT:DONE?"
1430     ENTER Test_set;Meas_done$
1440 !
1450 ! Step 6c: Obtain measurement results: Each measurement illustrates a
1460 !       different way of reading in results. There is no one right way. The
1470 !       method used is application dependent. Note that the examples do not
1480 !       show all possible ways.
1490 !
1500   SELECT Meas_done$
```

Comprehensive Programming Example

```
1510 !
1520 CASE "TXP" ! TX Power measurement done.
1530   OUTPUT Test_set;"FETC:TXP:INT?;POW:ALL?"
1540   ENTER Test_set;Integrity,Txpower(*)
1550   IF (Integrity=0) THEN ! Always check integrity value.
1560     PRINT "TX Power results: TCH =";Traf_chan;"and TXL =";Ms_pwr_lvl
1570     PRINT USING "5X,""Minimum:\"",M2D.2D,"" dBm""";Txpower(1)
1580     PRINT USING "5X,""Maximum:\"",M2D.2D,"" dBm""";Txpower(2)
1590     PRINT USING "5X,""Average:\"",M2D.2D,"" dBm""";Txpower(3)
1600     PRINT USING "5X,""Std Dev:\"",M2D.2D,"" dB""";Txpower(4)
1610   ELSE
1620     GOSUB Bad_measurement
1630   END IF
1640 !
1650 CASE "PFER" ! Phase & Frequency Error measurement done.
1660   OUTPUT Test_set;"FETC:PFER:ALL?"
1670   ENTER Test_set;Integrity,Rms_phas_err,Peak_phas_err,Worst_freq_err
1680   IF (Integrity=0) THEN
1690     PRINT "PFError results: TCH =";Traf_chan;"and TXL =";Ms_pwr_lvl
1700     PRINT USING "5X,""RMS Phase Error:\"",M2D.2D,"" deg""";Rms_phas_err
1710     PRINT USING "5X,""Peak Phase Error:\"",M2D.2D,"" deg""";Peak_phas_err
1720     PRINT USING "5X,""Worst Freq Error:\"",M3D.2D,"" Hz""";Worst_freq_err
1730   ELSE
1740     GOSUB Bad_measurement
1750   END IF
1760 !
1770 CASE "ORFS" ! ORFS measurement done.
1780 !
1790 ! This code illustrates a more 'generic' approach to reading measurement
1800 ! results. By using the capabilities designed into high-level
1810 ! measurements, routines that access measurement results do not have to
1820 ! explicitly know what the measurement execution conditions were. That
1830 ! information can be determined at the time the measurement results are
1840 ! queried.
1850 !
1860   OUTPUT Test_set;"FETC:ORFS:INT?" ! Check measurement integrity.
1870   ENTER Test_set;Integrity
1880   IF (Integrity=0) THEN
1890     OUTPUT Test_set;"SET:ORFS:SWIT:FREQ:POIN?" ! Get number of offsets
1900                           ! tested.
1910     ENTER Test_set;Points
1920     IF Points THEN ! Only query if one or more offsets tested.
1930       ALLOCATE Orfs_swit_res(Points),Orfs_swit_offs(Points)
1940       OUTPUT Test_set;"SET:ORFS:SWIT:FREQ?" ! Get measurement offsets.
1950       ENTER Test_set;Orfs_swit_offs(*)
1960       OUTPUT Test_set;"FETC:ORFS:POW?;:FETC:ORFS:SWIT?" ! Get results.
1970       ENTER Test_set;Tx_power,Orfs_swit_res(*)
1980       PRINT "ORFS Swit Results: TCH =";Traf_chan;"and TXL =";Ms_pwr_lvl
1990       PRINT USING "19X,""TX Power =\"",M2D.2D,"" dBm""";Tx_power
2000       PRINT "      Offset(kHz)           Level(dBm)"
2010       PRINT "      -----           -----"
2020 Orfs_image: IMAGE 6X,M4D.2D,12X,M4D.2D
2030           FOR J=1 TO Points
```

```

2040      PRINT USING Orfs_image;(Orfs_swit_offs(J)/1.E+3),Orfs_swit_res(J)
2050      NEXT J
2060      DEALLOCATE Orfs_swit_res(*),Orfs_swit_offs(*)
2070      END IF
2080      OUTPUT Test_set;"SET:ORFS:MOD:FREQ:POIN?" ! Get number of offsets
2090                           ! tested.
2100      ENTER Test_set;Points
2110      IF Points THEN ! Only query if one or more offsets tested.
2120          ALLOCATE Orfs_mod_res(Points),Orfs_mod_offs(Points)
2130          OUTPUT Test_set;"SET:ORFS:MOD:FREQ?" ! Get measurement offsets.
2140          ENTER Test_set;Orfs_mod_offs(*)
2150          OUTPUT Test_set;"FETC:ORFS:POW?::FETC:ORFS:MOD?" ! Get results.
2160          ENTER Test_set;Tx_power,Pwr_30khz,Orfs_mod_res(*)
2170          PRINT "ORFS Mod Results: TCH =" ;Traf_chan;" and TXL =" ;Ms_pwr_lvl
2180          PRINT USING "18X,";"30 KHz BW Power =" ,M2D.2D," dBm" ;Pwr_30khz
2190          PRINT "      Offset(kHz)           Level(db)"
2200          PRINT "      -----           -----"
2210          FOR J=1 TO Points
2220              PRINT USING Orfs_image;(Orfs_mod_offs(J)/1.E+3),Orfs_mod_res(J)
2230              NEXT J
2240              DEALLOCATE Orfs_mod_res(*),Orfs_mod_offs(*)
2250          END IF
2260      ELSE
2270          GOSUB Bad_measurement
2280      END IF
2290      END SELECT
2300      EXIT IF Meas_done$="NONE"
2310      END LOOP ! If 'WAIT' is returned from 'INIT:DONE?' query, it just falls
2320                           ! through the loop.
2330 !
2340 ! ****
2350 ! Step 7: Reconfigure the Data Connection
2360 ! ****
2370 !
2380 OUTPUT Test_set;"CALL:FUNC:DATA:STOP" ! Ends the Data Connection
2390 OUTPUT Test_set;"CALL:STAT:DATA?"      ! Check connection status
2400 ENTER Test_set;Conn_state$
2410 IF Conn_state$<>"ATT" THEN
2420     PRINT "Data Connection was not stopped"
2430     STOP
2440 END IF
2450 !
2460     NEXT Ms_pwr_lvl
2470 NEXT Traf_chan
2480 !
2490 ! ****
2500 ! Step 8: Disconnect the Mobile Station From the BSE
2510 ! ****
2520 !
2530 ! Data Connction was stopped at the end of the FOR loop above.
2540 !
2550 ! MS must initiate GPRS detach
2560 DISP "Initiate a GPRS Detach"

```

Comprehensive Programming Example

```
2570  Tries=1
2580  LOOP
2590    OUTPUT Test_set;"CALL:STAT:DATA?"
2600    ENTER Test_set;Conn_state$
2610  EXIT IF Conn_state$="IDLE"
2620  IF Tries=50 THEN
2630    DISP ""
2640    PRINT "GPRS detach did not occur.  Program terminated"
2650    STOP
2660  END IF
2670  IF Conn_state$="DET" THEN
2680    DISP "GPRS detach is in process."
2690  END IF
2700  Tries=Tries+1
2710 END LOOP
2720 PRINT "Program completed."
2730 STOP
2740 !
2750 Bad_measurement: !
2760 PRINT "Measurement error: "&Meas_done$
2770 PRINT "Measurement Integrity value =";Integrity
2780 RETURN
2790 !
2800 END ! End of program
2810 !
2820 SUB Chk_err_msg_que
2830   COM /Address/Test_set
2840   DIM Error_message$[255]
2850   Error_flag=0
2860   LOOP
2870     OUTPUT Test_set;"SYST:ERR?"
2880     ENTER Test_set;Error_number,Error_message$
2890   EXIT IF Error_number=0
2900   IF Error_number=-350 THEN
2910     Error_flag=1
2920     PRINT "Error Message Queue overflow. Error messages have been lost."
2930   ELSE
2940     Error_flag=1
2950     PRINT Error_number,Error_message$
2960   END IF
2970 END LOOP
2980 IF NOT Error_flag THEN
2990   PRINT "No errors in Error Message Queue."
3000   SUBEXIT
3010 END IF
3020 STOP
3030 SUBEND
```

7 GPIB Command Syntax

Diagram Conventions

Description

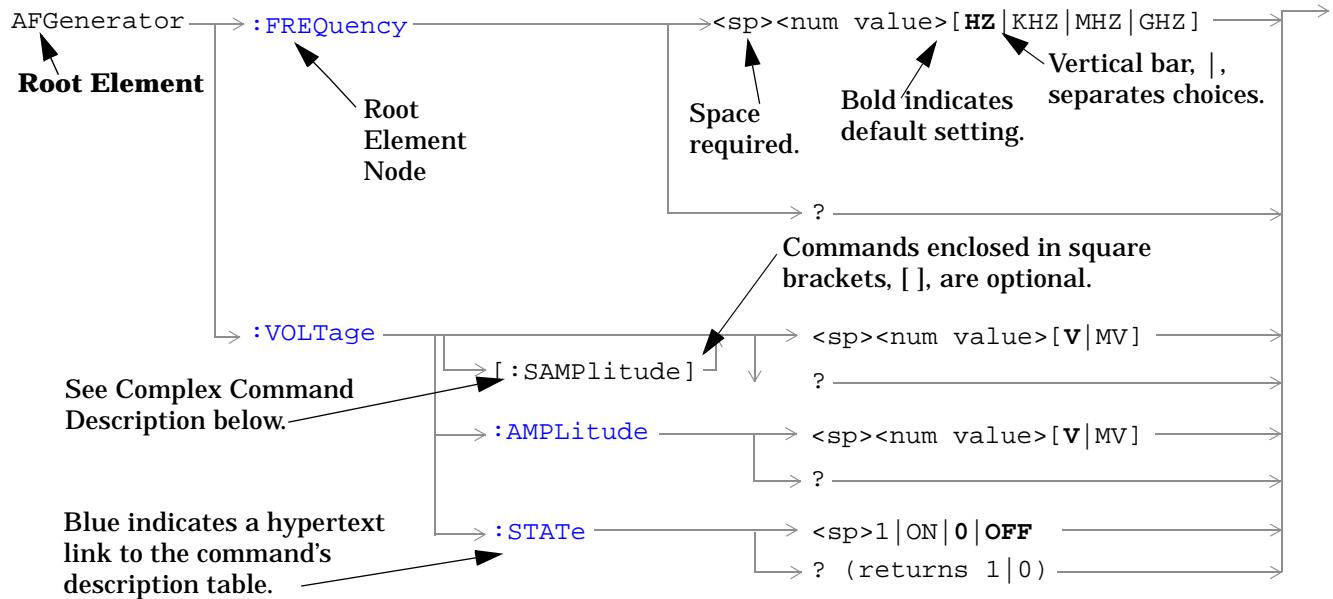


Diagram Description

Statement elements are connected by lines. Each line can be followed in only one direction, as indicated by the arrow at the end of the line. Any combination of statement elements that can be generated by starting at the **Root Element** and following the line the **direction of the arrow** is syntactically correct. The drawings show the proper use of spaces. Where spaces are required they are indicated by **<sp>**, otherwise no spaces are allowed between statement elements.

Complex Command Description A complex command sets the state of the parameter to ON, and is used to set a value for that parameter. These parameters; amplitude, frequency, gain, number, time, and value can be used as a complex command. Refer to the specific command for the parameter that applies.

Developing Code

It is recommended that you set the Test Set's operating environment to debug. To set the Test Set debug mode to "ON" use the following syntax:

```
SYSTem:COMMUnicAtE:GPIB:DEBug ON
```

Units-of-Measure If you do not specify units-of-measure in your code the following table indicates the default units-of-measure that will be assumed.

| | |
|---------------------|-----|
| Amplitude (linear) | V |
| Frequency | Hz |
| Power (logarithmic) | dBm |
| Time | s |

ABORt Subsystem

Description

The ABORt command causes a measurement cycle in progress to stop. If the measurement is not being continuously armed (trigger arm set to single), the measurement will remain in the idle state after this event. If the measurement is being continuously armed (trigger arm set to continuous), a new measurement cycle will begin after ABORt. If an ABORt command is issued from any measurement state other than measuring, the command is ignored.

Other Commands that Execute an ABORt Action

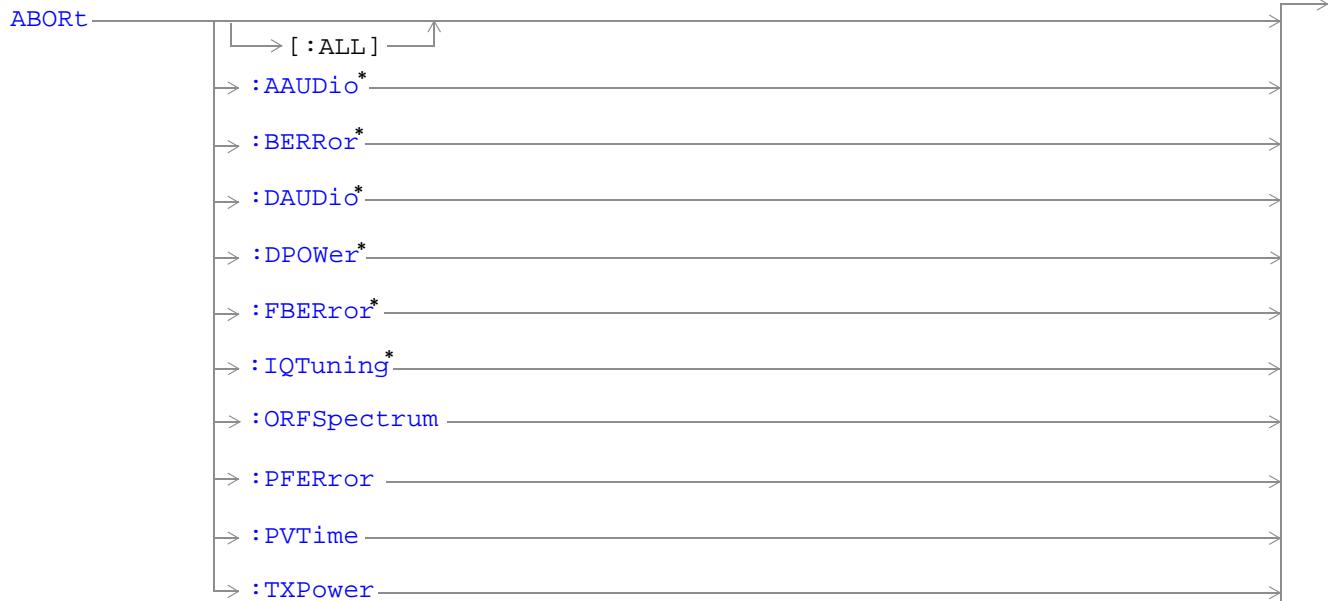
INITiate:<meas> will execute an ABORt:<meas> as part of the INITiate:<meas> command.

READ:<meas>? will execute an ABORt:<meas> action that aborts just one trigger sequence and then combines the INITiate and FETCh? commands.

Syntax Diagram and Command Descriptions

“ABORt”

ABORT



* Not applicable to GPRS.

[“Diagram Conventions” on page 283](#)

ABORT[:ALL]

| | | |
|----------|------|--|
| Function | GSM | Stops any and all measurements that are active. See “Measurement States” on page 170 |
| | GPRS | <p>If the trigger arm is set to single, see “Trigger Arm (Single or Continuous) Description” on page 171 the measurements will go to the idle state.</p> <p>If the trigger arm is set to continuous the measurements will re-arm and initiate again.</p> |

| | | |
|----------------------------|------|---|
| Setting | GSM | Range <ul style="list-style-type: none">• AAUDIO• BERROR• DAUDIO• DPOWER• FBERROR• IQTUNING• ORFSPECTRUM• PFERROR• PVTIME• TXPOWER |
| | GPRS | Range <ul style="list-style-type: none">• ORFSPECTRUM• PFERROR• PVTIME• TXPOWER |
| Programming Example | | OUTPUT 714; "ABORT:ALL" !Aborts all active measurements in progress. |

ABORt

ABORt:<meas-mnemonic>

| | | |
|---------------------|------|---|
| Function | GSM | Stops the selected measurement if it is active. See “ Measurement States ” on page 170 |
| | GPRS | If the trigger arm is set to single, see “ Trigger Arm (Single or Continuous) Description ” on page 171 the measurements will go to the idle state. If the trigger arm is set to continuous the measurements will re-arm and initiate again. |
| Setting | GSM | <p>Range</p> <ul style="list-style-type: none">• AAUDio• BERRor• DAUDio• DPOWer• FBERRor• ORFSpectrum• IQTuning• PFERror• PVTime• TXPower |
| | GPRS | <p>Range</p> <ul style="list-style-type: none">• ORFSpectrum• PFERror• PVTime• TXPower |
| Programming Example | | <pre>OUTPUT 714; "ABORT:PVTIME" !Aborts a PvT measurement.</pre> |

AFGenerator Subsystem

This section is *not* applicable to GPRS.

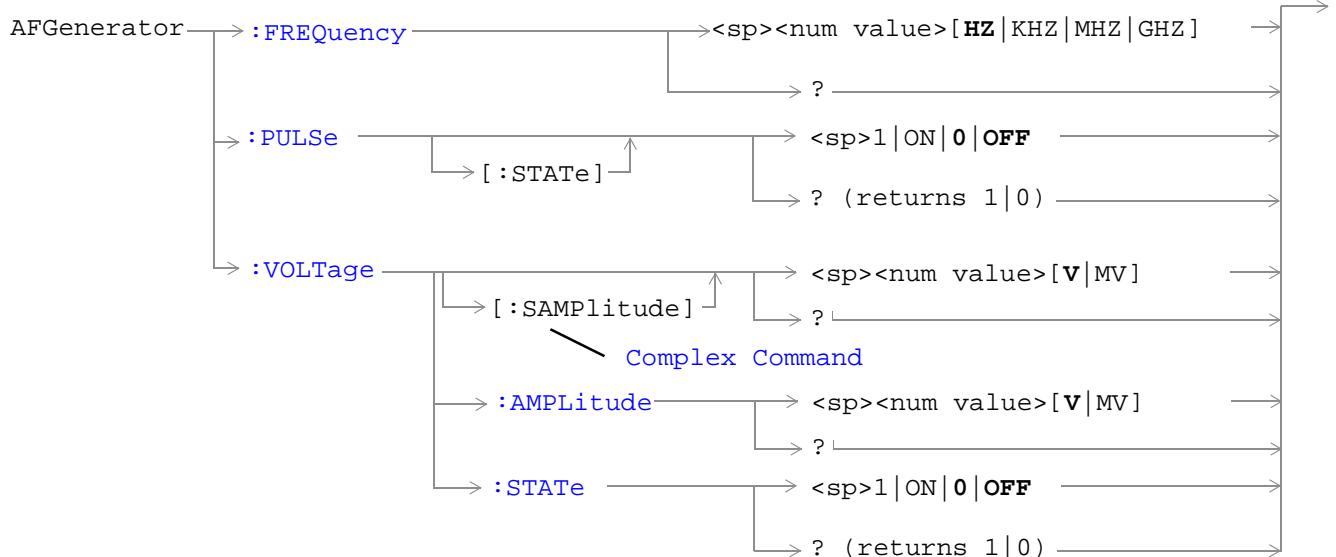
Description

The AFGenerator subsystem is used to control the audio source that is available at the Audio Output connector.

Syntax Diagram and Command Descriptions

[“AFGenerator”](#)

AFGenerator



These commands are not applicable to GPRS.

“Diagram Conventions” on page 283

AFGenerator:FREQuency

| | | |
|---|------|---|
| Function | GSM | Sets/queries the frequency of the audio generator. The units (HZ KHZ MHZ GHZ) are optional, if no units are specified then units default to Hz. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 1 Hz to 20 kHz Resolution: .1 Hz |
| Query | | Range: 1 Hz to 20 kHz Resolution: .1 Hz |
| *RST setting | | 1 kHz |
| Programming Example | | |
| OUTPUT 714;"AFGENERATOR:FREQUENCY 1000" !Sets the audio generator frequency to 1000 Hz. | | |

AFGenerator:PULSe[:STATe]

| | | |
|--|------|--|
| Function | GSM | <p>Sets/queries the audio generator pulse state.</p> <p>The pulse state must be on when the test set's audio generator is used for audio stimulation during a decoded audio measurement.</p> <p>When the state is on, the audio signal from the test set is pulsed at a 10 Hz rate with a 50% duty cycle.</p> <p>The amplitude and frequency of the pulse is set with afgenerator commands. See ""AFGenerator" on page 290".</p> |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 0 OFF 1 ON |
| Query | | Range: 0 1 |
| *RST setting | | 0 off |
| Programming Example | | |
| OUTPUT 714;"AFGENERATOR:PULSE ON" !Sets the audio generator pulse to ON. | | |

AFGenerator:VOLTage[:SAMPlitude]

| | | |
|--|------|--|
| Function | GSM | Sets /queries the amplitude of the audio generator in volts and turns the state to on. The units (V MV) are optional, if no units are specified then units default to V. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | <p>Range: 0 - 9 V pk.</p> <p>Resolution:</p> <ul style="list-style-type: none"> .5 mV pk. <= 1 V pk. output 5 mV pk. > 1 V pk. output |
| Query | | <p>Range: 0 - 9 v peak</p> <p>Resolution:</p> <ul style="list-style-type: none"> .5 mV pk. <= 1 V pk. output 5 mV pk. > 1 V pk. output |
| *RST setting | | zero volts |
| Programming Example | | |
| OUTPUT 714;"AFGENERATOR:VOLTAGE 2.1" !Sets the state to on and the output !voltage to 2.1 volts. | | |

AFGenerator

AFGenerator:VOLTage:AMPLitude

| | | |
|--|------|--|
| Function | GSM | Sets/queries the amplitude for the audio generator when the audio generator state is on. The units (V MV) are optional, if no units are specified then units default to V. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 0 - 9 V pk. Resolution: <ul style="list-style-type: none">.5 mV pk. <= 1 V pk. output5 mV pk. > 1 V pk. output |
| Query | | Range: 0 - 9 V pk. Resolution: <ul style="list-style-type: none">.5 mV pk. <= 1 V pk. output5 mV pk. > 1 V pk. output |
| *RST setting | | zero volts |
| Programming Example | | |
| OUTPUT 714;"AFGENERATOR:VOLTAGE:AMPLITUDE 1.414" !Sets the audio generator output !voltage to 1.414 volts peak. | | |

AFGenerator:VOLTage:STATE

| | | |
|---|------|---|
| Function | GSM | Sets/queries the audio generator state |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | 0 OFF 1 ON |
| Query | | 0 1 |
| *RST setting | | 0 off |
| Programming Example | | |
| OUTPUT 714;"AFGENERATOR:VOLTAGE:STATE ON" !Set the audio generator state to ON. | | |

CALibration Subsystem

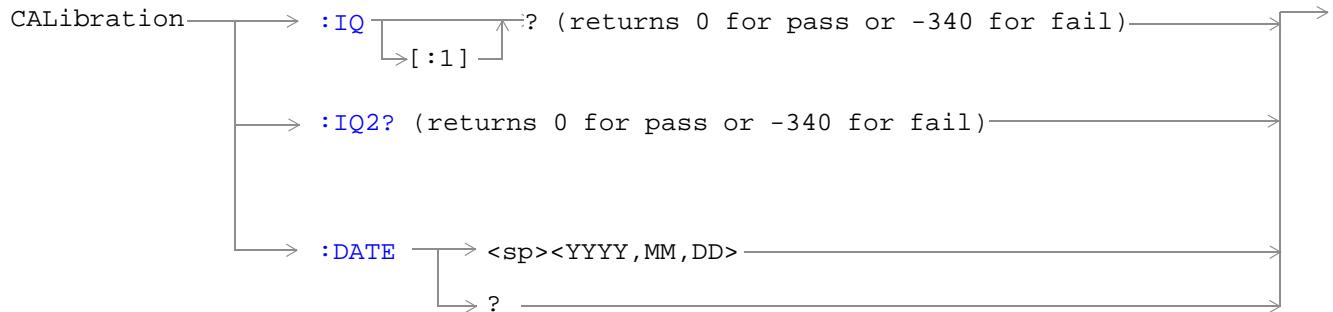
Description

The only user calibration that can be performed is for the IQ modulator. This calibration is required if the Baseband Generator or the Vector Output modules are serviced or swapped. The CALibration:IQ subsystem should not be used as part of frequent (i.e. daily, weekly or monthly) test set calibration.

Syntax Diagram and Command Descriptions

[“CALibration”](#)

CALibration



["Diagram Conventions" on page 283](#)

CALibration:IQ[:1]?

| | | |
|--|------|---|
| Function | GSM | Sets/queries the calibration of the IQ modulator for RF generator 1. It takes some time to complete calibration and can't be aborted except by cycling the power switch. <ul style="list-style-type: none"> • Calibrates the IQ modulator for RF generator 1. • Returns a value indicating success or failure of calibration. |
| | GPRS | |
| Query | | Range <ul style="list-style-type: none"> • 0 = Pass • -340 = Fail |
| Programming Example | | |
| <pre>OUTPUT 714;"CALIBRATION:IQ1?" !Performs a calibration of the IQ modulator !for RF generator 1 and returns 0 or -340</pre> | | |

NOTE

When the the calibration is done the test set display will display:

IQ Calibration completed successfully for modulator 1. Cycle power to continue.

CALibration:IQ2?

| | | |
|--|------|---|
| Function | GSM | Sets/queries the calibration of the IQ modulator for RF generator 2. It takes some time to complete calibration and can't be aborted except by cycling the power switch. <ul style="list-style-type: none"> • Calibrates the IQ modulator for RF generator 2. • Returns a value indicating success or failure of calibration. |
| | GPRS | |
| Query | | Range <ul style="list-style-type: none"> • 0 = Pass • -340 = Fail |
| Programming Example | | |
| <pre>OUTPUT 714;"CALIBRATION:IQ2?" !Performs a calibration of the IQ modulator !for RF generator 2 and returns 0 or -340</pre> | | |

NOTE When the the calibration is done the test set display will display:
IQ Calibration completed successfully for modulator 2. Cycle power to continue.

CALibration:DATE

| | | |
|---|------|--|
| Function | GSM | Sets/queries the date of the last system calibration done to the test set not the IQ calibration date. Returns a comma separated list YYYY,MM,DD in that order. |
| | GPRS | |
| Setting | | Sets the system calibration date. Range <ul style="list-style-type: none"> • Year = 0000 to 9999 • Month = 01 to 12 • Day = 01 to 31 |
| Programming Example | | |
| <pre>OUTPUT 714;"CALIBRATION:DATE 1999,01,04" !Sets the date of the last system !calibration year, month and day.</pre> | | |

CALL Subsystem

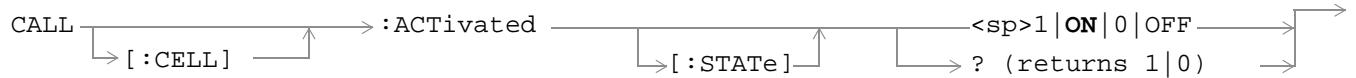
Description

The CALL subsystem handles all setup, control, and query functions for call processing. This includes mobile station (MS) and Base Station (cell) functions.

Syntax Diagrams and Command Descriptions

| | |
|--|---|
| “CALL:ACTivated” on page 297 | “CALL:MNCode” on page 326 |
| “CALL:BA” on page 298 | “CALL:MS” on page 327 |
| “CALL:BAND” on page 304 | “CALL:NCCode” on page 339 |
| “CALL:BCCode” on page 305 | “CALL:OPERating” on page 340 |
| “CALL:BCHannel” on page 306 | “CALL:ORIGinate” on page 341 |
| “CALL:BURSt” on page 309 | “CALL:PAGing” on page 342 |
| “CALL:CONNected” on page 310 | “CALL:PDTCH PDTChannel” on page 345 |
| “CALL:COUNT” on page 313 | “CALL:PMNCode” on page 353 |
| “CALL:END” on page 317 | “CALL:POWER” on page 355 |
| “CALL:FUNCTION” on page 320 | “CALL:RFGenerator” on page 357 |
| “CALL:IMEI” on page 323 | “CALL:SIGNaling” on page 364 |
| “CALL:LACode” on page 324 | “CALL:STATus” on page 365 |
| “CALL:MCCode” on page 325 | “CALL:TChannel” on page 370 |

CALL:ACTivated

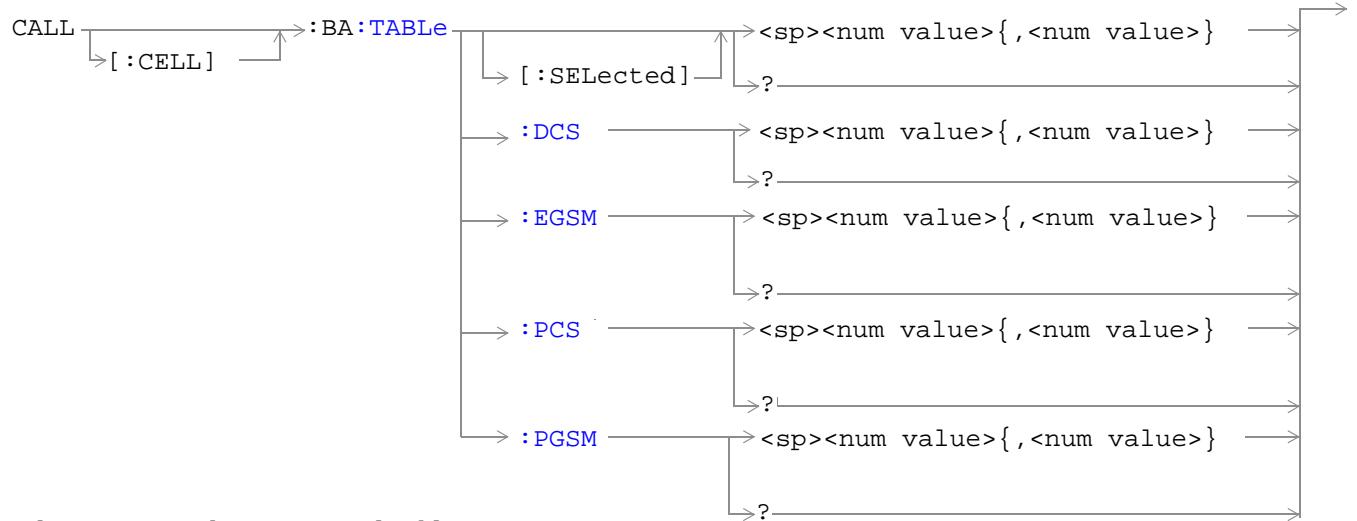


This command is not applicable to GPRS.

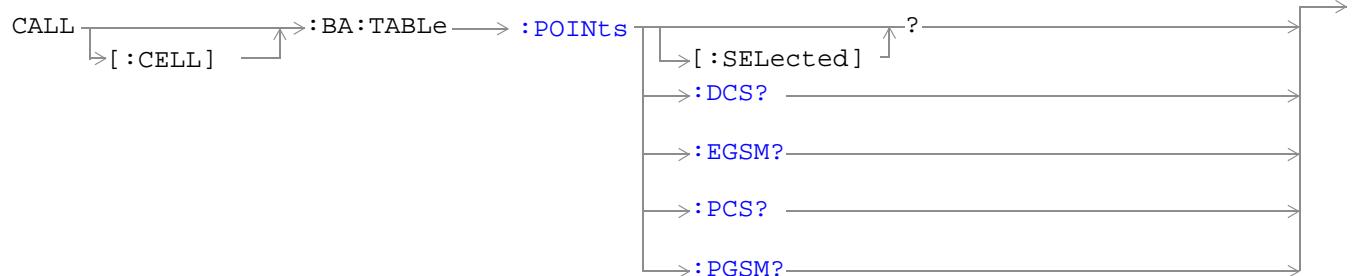
["Diagram Conventions" on page 283](#)

CALL[:CELL]:ACTivated[:STATe]

| | | |
|--|------|--|
| Function | GSM | <p>This command turns on or off, BS Emulator control of all signalling operations, uplink demodulation and downlink (BCH & TCH) generation. The query form returns a 1 (state = on) or a 0 (state = off).</p> <p>When cell activated state is on and the test set is in active cell operating mode, burst type is determined by protocol. When the test set is in test mode operating mode, or when the cell activated state is off, the burst type may need to be specified before the test set can synchronize to the input signal's midamble. You specify the burst type using the command "CALL:BURSt:TYPE" on page 309.</p> |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 1 ON 0 OFF |
| Query | | range: 1 0 |
| *RST Setting | | 1 (state = ON) |
| Related Topics | | "Configuring the Broadcast Channel (BCH)" on page 609 |
| <p>Programming Example</p> <pre>OUTPUT 714;"CALL:CELL:ACTIVATED:STATE OFF" !Turns all signalling operations, !uplink demodulation and downlink !(BCH & TCH) generation off.</pre> | | |

CALL:BA

These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

["Diagram Conventions" on page 283](#)

CALL[:CELL]:BA:TABLE[:SELected]

| | | |
|--|------|---|
| Function | GSM | Sets/queries the BA Table entries for the selected broadcast band. Entries are set (value entered into table and state set to ON) using a comma separated list of 1 to 16 values. States of table entries not included in setting list are set to OFF. Sending a null list (no values) sets states of all table entries to OFF. Query returns a comma separated list of the table entries that are in the ON state. If states of all table entries are set to OFF, query returns 9.91E+37 (NAN). |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Depends upon the selected broadcast band: range: <ul style="list-style-type: none"> • PGSM broadcast band range: 1 to 124 • EGSM broadcast band range: 0 to 124 975 to 1023 • DCS broadcast band range: 512 to 885 • PCS broadcast band range: 512 to 810 resolution: 1 |
| Query | | range: 0 to 9.91 E +37 |
| *RST Setting | | Depends upon the selected broadcast band: entries: <ul style="list-style-type: none"> • PGSM BA Table: 20, 1, 62, 124, 9, 18, 36, 45, 54, 63, 72, 81, 90, 99, 108, 117 • EGSM BA Table: 20, 975, 37, 124, 986, 1008, 1019, 7, 18, 30, 53, 64, 76, 87, 99, 110 • DCS BA Table: 512, 698, 885, 537, 562, 587, 612, 637, 662, 712, 737, 762, 787, 812, 837, 862 • PCS BA Table: 512, 660, 810, 530, 550, 570, 590, 610, 630, 650, 690, 710, 730, 750, 770, 790 states: <ul style="list-style-type: none"> • first entry = ON, all others = OFF |
| Programming Example | | |
| <pre>OUTPUT 714;"CALL:CELL:BA:TABLE:SELECTED 512,689,885" !Sets 3 table entries for the !selected broadcast band. !States of the remaining 13 !entries are set to OFF.</pre> | | |
| OUTPUT 714;"CALL:CELL:BA:TABLE:SELECTED" !Sets states of all table entries to OFF. | | |

CALL:BA

CALL[:CELL]:BA:TABLE:DCS

| | | |
|---|------|---|
| Function | GSM | Sets/queries the BA Table entries for the DCS broadcast band. Entries are set (value entered into table and state set to ON) using a comma separated list of 1 to 16 values. States of table entries not included in setting list are set to OFF. Sending a null list (no values) sets states of all table entries to OFF. Query returns a comma separated list of the table entries that are in the ON state. If states of all table entries are set to OFF, query returns NAN (9.91E+37). |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 512 to 885 resolution: 1 |
| Query | | range: 0 to 9.91E+37 |
| *RST Setting | | entries: 512, 698, 885, 537, 562, 587, 612, 637, 662, 712, 737, 762, 787, 812, 837, 862 states: 512 = ON, all others = OFF |
| Programming Example <pre>OUTPUT 714;"CALL:CELL:BA:TABLE:DCS 512,612,787" !Sets three BA table entries for !the DCS broadcast band. States !of the remaining 13 entries are !set to OFF. OUTPUT 714;"CALL:CELL:BA:TABLE:DCS" !Sets states of all table entries to OFF.</pre> | | |

CALL[:CELL]:BA:TABLE:EGSM

| | | |
|---|------|--|
| Function | GSM | Sets/queries the BA Table entries for the EGSM broadcast band. Entries are set (value entered into table and state set to ON) using a comma separated list of 1 to 16 values. States of table entries not included in setting list are set to OFF. Sending a null list (no values) sets states of all table entries to OFF. Query returns a comma separated list of the table entries that are in the ON state. If states of all table entries are set to OFF, query returns NAN (9.91E+37). |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 0 to 124 975 to 1023 resolution: 1 |
| Query | | range: 0 to 9.91E+37 |
| *RST Setting | | entries: 20, 975, 37, 124, 986, 1008, 1019, 7, 18, 30, 53, 64, 76, 87, 99, 110 states: 20 = ON, all others = OFF |
| Programming Example <pre>OUTPUT 714;"CALL:CELL:BA:TABLE:EGSM 120,975,1012" !Sets three BA table entries for !the EGSM broadcast band. States !of the remaining 13 entries are !set to OFF. OUTPUT 714;"CALL:CELL:BA:TABLE:EGSM" !Sets states of all table entries to OFF.</pre> | | |

CALL[:CELL]:BA:TABLE:PCS

| | | |
|---|------|---|
| Function | GSM | Sets/queries the BA Table entries for the PCS broadcast band. Entries are set (value entered into table and state set to ON) using a comma separated list of 1 to 16 values. States of table entries not included in setting list are set to OFF. Sending a null list (no values) sets states of all table entries to OFF. Query returns a comma separated list of the table entries that are in the ON state. If states of all table entries are set to OFF, query returns NAN (9.91E+37). |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 512 to 810 resolution: 1 |
| Query | | range: 0 to 9.91E+37 |
| *RST Setting | | entries: 512, 660, 810, 530, 550, 570, 590, 610, 630, 650, 690, 710, 730, 750, 770, 790 states: 512 = ON, all others = OFF |
| Programming Example | | |
| <pre>OUTPUT 714;"CALL:CELL:BA:TABLE:PCS 660,710,790" !Sets three BA table entries for !the PCS broadcast band. States !of the remaining 13 entries are !set to OFF.</pre> | | |
| <pre>OUTPUT 714;"CALL:CELL:BA:TABLE:PCS" !Sets states of all table entries to OFF.</pre> | | |

CALL[:CELL]:BA:TABLE:PGSM

| | | |
|---|------|--|
| Function | GSM | Sets/queries the BA Table entries for the PGSM broadcast band. Entries are set (value entered into table and state set to ON) using a comma separated list of 1 to 16 values. States of table entries not included in setting list are set to OFF. Sending a null list (no values) sets states of all table entries to OFF. Query returns a comma separated list of the table entries that are in the ON state. If states of all table entries are set to OFF, query returns NAN (9.91E+37). |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 1 to 124 resolution: 1 |
| Query | | range: 0 to 9.91E+37 |
| *RST Setting | | entries: 20, 1, 62, 124, 9, 18, 36, 45, 54, 63, 72, 81, 90, 99, 108, 117 states: 20 = ON, all others = OFF |
| Programming Example | | |
| <pre>OUTPUT 714;"CALL:CELL:BA:TABLE:PGSM 20,36,120" !Sets three BA Table entries for !the PGSM broadcast band. States !of the remaining 13 entries are !set to OFF.</pre> | | |
| <pre>OUTPUT 714;"CALL:CELL:BA:TABLE:PGSM" !Sets states of all BA Table entries to OFF.</pre> | | |

CALL:BA

CALL[:CELL]:BA:TABLE:POINts[:SElected]?

| | | |
|--|------|---|
| Function | GSM | Queries the number of entries that are in the ON state in the selected broadcast band's BA Table. This is the number of values that will be returned from the CALL[:CELL]:BA:TABLE[:SElected]? query. A return value of zero indicates that there are no table entries in the ON state. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: 0 to 16 resolution: 1 |
| *RST Setting | | 1 |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:BA:TABLE:POINTS:SELECTED?" !Queries the number of entries !that are in the ON state in the !selected broadcast band's BA Table. | | |

CALL[:CELL]:BA:TABLE:POINts:DCS?

| | | |
|--|------|---|
| Function | GSM | Queries the number of entries that are in the ON state in the DCS broadcast band BA Table. This is the number of values that will be returned from the CALL[:CELL]:BA:TABLE:DCS? query. A return value of zero indicates that there are no table entries in the ON state. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: 0 to 16 resolution: 1 |
| *RST Setting | | 1 |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:BA:TABLE:POINTS:DCS?" !Queries the number of entries that are !in the ON state in the DCS broadcast !band BA Table. | | |

CALL[:CELL]:BA:TABLE:POINts:EGSM?

| | | |
|--|------|---|
| Function | GSM | Queries the number of entries that are in the ON state in the EGSM broadcast band BA Table. This is the number of values that will be returned from the CALL[:CELL]:BA:TABLE:EGSM? query. A return value of zero indicates that there are no table entries in the ON state. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: 0 to 16 resolution: 1 |
| *RST Setting | | 1 |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:BA:TABLE:POINTS:EGSM?" !Queries the number of entries that !are in the ON state in the EGSM !broadcast band BA Table. | | |

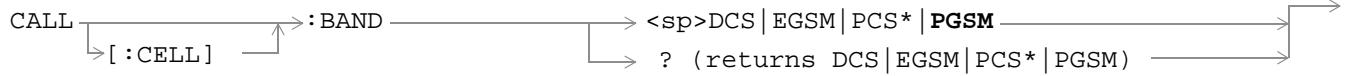
CALL[:CELL]:BA:TABLE:POINts:PCS?

| | | |
|--|------|---|
| Function | GSM | Queries the number of entries that are in the ON state in the PCS cellband BA Table. This is the number of values that will be returned from the CALL[:CELL]:BA:TABLE:PCS? query. A return value of zero indicates that there are no table entries in the ON state. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: 0 to 16 resolution: 1 |
| *RST Setting | | 1 |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:BA:TABLE:POINTS:PCS?" !Queries the number of entries that !are in the ON state in the PCS !broadcast band BA Table. | | |

CALL[:CELL]:BA:TABLE:POINts:PGSM?

| | | |
|--|------|---|
| Function | GSM | Queries the number of entries that are in the ON state in the PGSM broadcast band BA Table. This is the number of values that will be returned from the CALL[:CELL]:BA:TABLE:PGSM? query. A return value of zero indicates that there are no table entries in the ON state. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: 0 to 16 resolution: 1 |
| *RST Setting | | 1 |
| Related Topics | | See " Configuring the Broadcast Channel (BCH) " on page 609 |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:BA:TABLE:POINTS:PGSM?" !Queries the number of entries that !are in the ON state in the PGSM !broadcast band BA Table. | | |

CALL:BAND



* Not applicable to GPRS

["Diagram Conventions" on page 283](#)

CALL[:CELL]:BAND

| | | | | |
|--|---|--|--|--|
| Function | GSM | This command sets/queries the band in which the broadcast channel (BCH) is transmitted. Setting the BCH will change the receiver control to auto (see "RFANalyzer:CONTrol:AUTO" on page 455). | | |
| | GPRS | This command sets/queries the band in which the broadcast channel (BCH) is transmitted. Note that the PCS band is not currently supported for GPRS. | | |
| Setting | GSM | range: PGSM EGSM DCS PCS | | |
| | GPRS | range: PGSM EGSM DCS | | |
| Query | GSM | range: PGSM EGSM DCS PCS | | |
| | GPRS | range: PGSM EGSM DCS | | |
| *RST Setting | PGSM | | | |
| Related Topics | "Cell Band Parameter" on page 599 . | | | |
| Programming Example | | | | |
| OUTPUT 714;"CALL:CELL:BAND PGSM" !Sets the band for the BCH to PGSM. | | | | |

CALL:BCCode



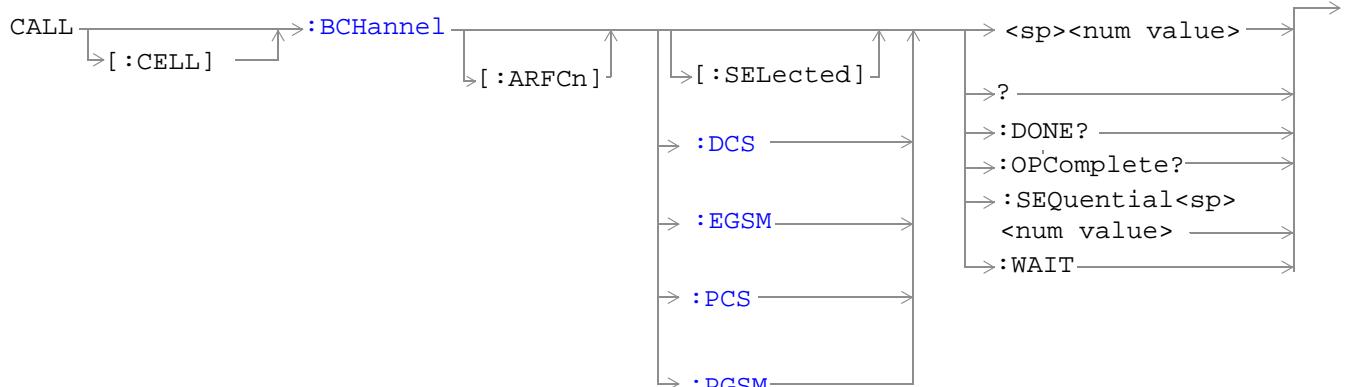
This command is not applicable to GPRS.

["Diagram Conventions" on page 283](#)

CALL[:CELL]:BCCode

| | | | | |
|--|---|---|--|--|
| Function | GSM | Sets/queries the value of the Base Station Colour Code (BCC). This can only be set when the Cell Activated State parameter is set to Off (see "CALL:ACTivated" on page 297). | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Setting | | range: 0 to 7 resolution: 1 | | |
| Query | | range: 0 to 7 resolution: 1 | | |
| *RST Setting | 5 | | | |
| Related Topics | See "Configuring the Broadcast Channel (BCH)" on page 609 . | | | |
| Programming Example | | | | |
| OUTPUT 714;"CALL:CELL:BCCODE 4" !Sets the cell's base station color code to 4. | | | | |

CALL:BChannel



These commands are not applicable to GPRS.

["Diagram Conventions" on page 283](#)

CALL[:CELL]:BChannel[:ARFCn][:SElected]

| | | | | |
|---|---|--|--|--|
| Function | GSM | Sets/queries the Broadcast Channel number for the currently active (that is, the selected) broadcast band. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Setting | Depends upon the selected broadcast band. range: <ul style="list-style-type: none">• PGSM broadcast band range: 1 to 124• EGSM broadcast band range: 0 to 124 975 to 1023• DCS broadcast band range: 512 to 885• PCS broadcast band range: 512 to 810 resolution: 1 | | | |
| Query | Depends upon the selected broadcast band. range: <ul style="list-style-type: none">• PGSM broadcast band range: 1 to 124• EGSM broadcast band range: 0 to 124 975 to 1023• DCS broadcast band range: 512 to 885• PCS broadcast band range: 512 to 810 resolution: 1 | | | |
| *RST Setting | 20 | | | |
| Programming Example | | | | |
| OUTPUT 714; "CALL:CELL:BCHANNEL:ARFCN:SELECTED 512" !Sets BCH ARFCN for the selected broadcast band to channel 512. | | | | |

CALL[:CELL]:BChannel[:ARFCn]:DCS

| | | | | |
|--|--|---|--|--|
| Function | GSM | Sets/queries the Broadcast Channel number for the DCS broadcast band. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Setting | range: 512 to 885 resolution: 1 | | | |
| Query | range: 512 to 885 resolution: 1 | | | |
| *RST Setting | 512 | | | |
| Related Topics | "Configuring the Broadcast Channel (BCH)" on page 609. | | | |
| Programming Example | | | | |
| OUTPUT 714;"CALL:CELL:BCHANNEL:ARFCN:DCS 810" !Sets BCH ARFCN for DCS broadcast !band to 810. | | | | |

CALL[:CELL]:BChannel[:ARFCn]:EGSM

| | | | | |
|--|--|--|--|--|
| Function | GSM | Sets/queries the Broadcast Channel number for the EGSM broadcast band. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Setting | range: 0 to 124 975 to 1023 resolution: 1 | | | |
| Query | range: 0 to 124 975 to 1023 resolution: 1 | | | |
| *RST Setting | 20 | | | |
| Programming Example | | | | |
| OUTPUT 714;"CALL:CELL:BCHANNEL:ARFCN:EGSM 120" !Sets BCH ARFCN for EGSM broadcast !band to 120. | | | | |

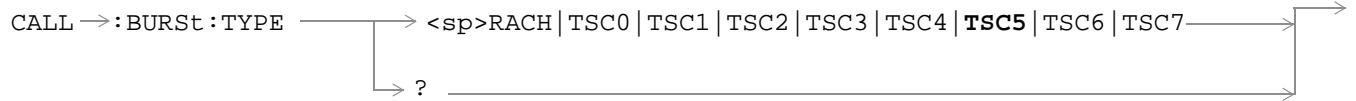
CALL:BChannel**CALL[:CELL]:BChannel[:ARFCn]:PCS**

| | | | | |
|---|--|---|--|--|
| Function | GSM | Sets/queries the Broadcast Channel number for the PCS broadcast band. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Setting | | range: 512 to 810 resolution: 1 | | |
| Query | | range: 512 to 810 resolution: 1 | | |
| *RST Setting | | 512 | | |
| Related Topics | “Configuring the Broadcast Channel (BCH)” on page 609. | | | |
| Programming Example | | | | |
| OUTPUT 714; "CALL:CELL:BCHANNEL:ARFCN:PCS 800" !Sets BCH ARFCN for PCS broadcast !band to 800. | | | | |

CALL[:CELL]:BChannel[:ARFCn]:PGSM

| | | | | |
|---|--|--|--|--|
| Function | GSM | Sets/queries the Broadcast Channel number for the PGSM broadcast band. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Setting | | range: 1 to 124 resolution: 1 | | |
| Query | | range: 1 to 124 resolution: 1 | | |
| *RST Setting | | 20 | | |
| Related Topics | “Configuring the Broadcast Channel (BCH)” on page 609. | | | |
| Programming Example | | | | |
| OUTPUT 714; "CALL:CELL:BCHANNEL:ARFCN:PGSM 113" !Sets BCH ARFCN for PGSM broadcast !band to 113. | | | | |

CALL:BURSt



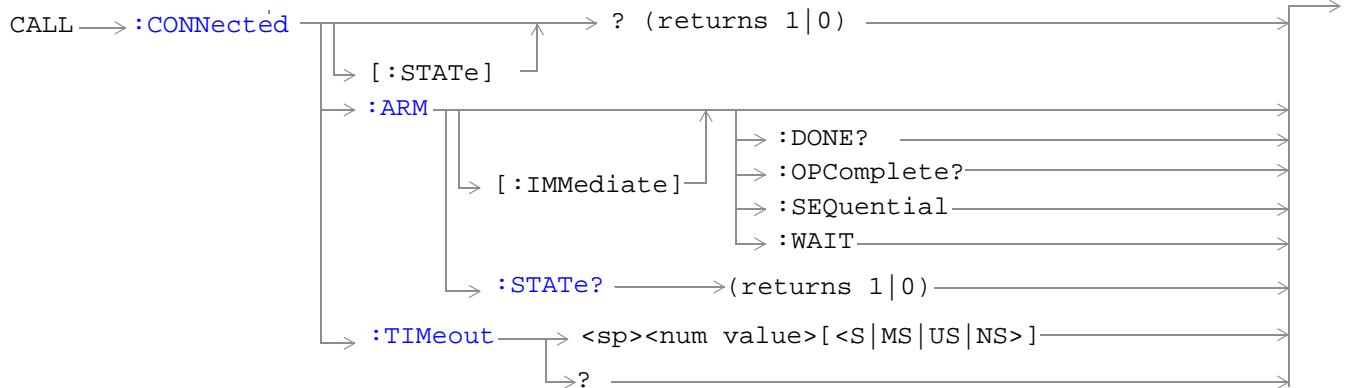
This command is not applicable to GPRS.

["Diagram Conventions" on page 283](#)

CALL:BURSt:TYPE

| | | |
|--|------|---|
| Function | GSM | Sets/queries the Expected Burst parameter. This parameter is used for measurement synchronization when the test set's operating mode is set to Test Mode or the Cell Activated state is set to Off. (If it is not set, the test set may not synchronize to the input signal's midamble.) For more details on this parameter, see "Expected Burst" on page 623 . |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: RACH TSC0 TSC1 TSC2 TSC3 TSC4 TSC5 TSC6 TSC7 |
| Query | | range: RACH TSC0 TSC1 TSC2 TSC3 TSC4 TSC5 TSC6 TSC7 |
| *RST Setting | | TSC5 |
| Related Topics | | "Test Mode Operating Mode" on page 621 . |
| Programming Example | | |
| OUTPUT 714; "CALL:BURST:TYPE TSC2" !Sets the test set to expect a TCH with midamble !pattern TSC2. | | |

CALL:CONNected



These commands are not applicable to GPRS.

["Diagram Conventions" on page 283](#)

CALL:CONNected[:STATE]?

| | | |
|---|------|--|
| Function | GSM | Queries the connected/disconnected state of the call. 1 is returned if the call is in the connected state. 0 is returned if the call is in the idle (that is, disconnected) state. If the call is in any state other than connected or idle, the query will hang until the call state transitions to the connected or idle state. When used in conjunction with the CALL:CONNected:ARM and CALL:CONNected:TIMEout commands, the CALL:CONNected:STATE? command allows the control program to synchronize to call connection/disconnection. See "Call Processing State Synchronization" on page 37 . |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 1 |
| *RST Setting | | 0 |
| Programming Example | | |
| OUTPUT 714; "CALL:CONNECTED:STATE?" !Returns 1 if call connected, !0 if call disconnected. | | |

CALL:CONNected:ARM[:IMMEDIATE]

| | | |
|----------|------|--|
| Function | GSM | <p>Sets (arms) the call-state-change detector. Arming the call-state-change detector allows the control program to tell the test set that it is expecting a change to the state of a call prior to initiating the state change.</p> <p>Once armed, The detector remains armed until there is a call state change to Idle or Connected from one of the transitory states. The call-state-change-detector is not disarmed by a call state change to one of the transitory states, nor is it disarmed by any transitions from Idle to Idle, or Connected to Connected.</p> <p>When used in conjunction with the CALL:CONNected:STATE? and the CALL:CONNected:TIMEout commands, the CALL:CONNected:ARM command allows the control program to synchronize to call connection/disconnection. See "Call Processing State Synchronization" on page 37.</p> |
| | GPRS | This command is not applicable to GPRS. |

Programming Example

```
OUTPUT 714; "CALL:CONNECTED:ARM:IMMEDIATE" !Arms the call-state-change detector.
```

CALL:CONNected:ARM:STATE?

| | | |
|--------------|------|---|
| Function | GSM | Queries the arm state of the call-state-change detector. This command never hangs and immediately returns a 1 if the call-state-change detector is armed and a 0 if it is not armed. See "Call Processing State Synchronization" on page 37 . |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 1 |
| *RST Setting | | 0 |

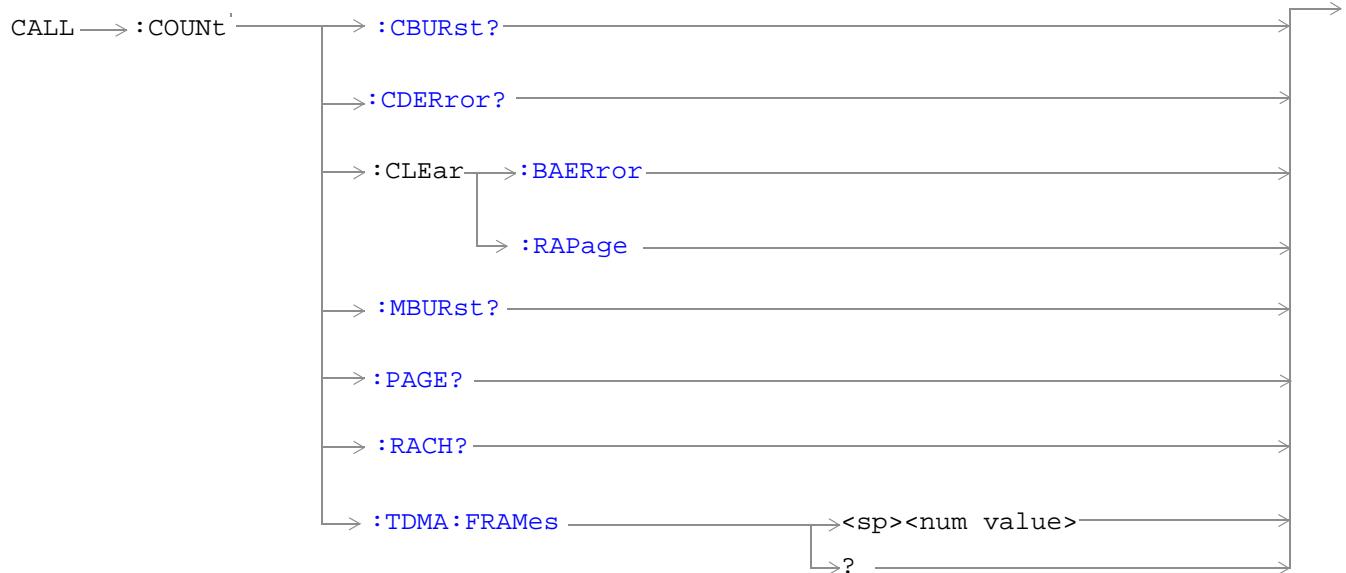
Programming Example

```
OUTPUT 714; "CALL:CONNECTED:ARM:STATE?" !Returns arm state of
!call-state-change detector.
```

CALL:CONNected:TIMEout

| | | |
|----------------|--|--|
| Function | GSM | <p>Sets/queries the maximum time the test set will wait for a hanging CALL:CONNected:STATE? query to complete. Default setting units are seconds. To set timeout time in units other than seconds include optional unit specifier in command string.</p> <p>A timeout timer is started whenever the call-state-change-detector becomes armed or gets rearmed when already armed. The duration of this timeout is a set using the CALL:CONNected:TIMEout command and should be greater than the maximum amount of time the control program needs/wants to wait between arming the call-state-change detector and the connect/disconnect operation starting. Once the process starts and the call state has moved into one of the transitory states the GSM defined protocol timers take over and prevent the call state from staying in a transitory state forever. See "Call Processing State Synchronization" on page 37.</p> |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | <p>Range: 0 to 100 seconds</p> <p>Resolution: 0.1 seconds</p> |
| Query | | <p>Range: 0 to 100 seconds</p> <p>Resolution: 0.1 seconds</p> |
| *RST Setting | | 10 seconds |
| Related Topics | "Call Processing State Synchronization" on page 37 | |
| | "Call Processing Event Synchronization" on page 32 | |

CALL:COUNT



These commands are not applicable to GPRS.

[“Diagram Conventions” on page 283](#)

CALL:COUNT:CBURst?

| | | |
|--|------|--|
| Function | GSM | Queries the corrupt burst counter. The corrupt burst counter keeps track of the number of uplink bursts where power was detected but the expected midamble could not be found. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 99999 Resolution: 1 |
| *RST Setting | | 0 |
| Programming Example | | |
| OUTPUT 714; "CALL:COUNT:CBURST?" !Queries the corrupt burst counter. | | |

CALL:COUNT

CALL:COUNT:CDERRor?

| | | |
|--|------|---|
| Function | GSM | Queries the channel decode error counter. The channel decode error counter keeps track of how many channel decoder errors have occurred. Channel decode errors include convolutional, FIRE, and block errors, but not CRC errors. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 99999 Resolution: 1 |
| *RST Setting | | 0 |
| Programming Example | | |
| OUTPUT 714; "CALL:COUNT:CDERROR?" !Queries the channel decode error counter. | | |

CALL:COUNT:CLEAr:BAERror

| | | |
|----------|------|--|
| Function | GSM | Sets the corrupt burst, missing burst, and decode error counters' count to zero. |
| | GPRS | This command is not applicable to GPRS. |

Programming Example

OUTPUT 714; "CALL:COUNT:CLEAr:BAERror"

CALL:COUNT:CLEAr:RAPage

| | | |
|----------|------|---|
| Function | GSM | Sets the RACH and page counters' count to zero. |
| | GPRS | This command is not applicable to GPRS. |

Programming Example

OUTPUT 714; "CALL:COUNT:CLEAr:RAPage"

CALL:COUNT:MBURst?

| | | |
|----------------------------------|------|---|
| Function | GSM | Queries the missing burst counter. The missing burst counter keeps track of how many uplink bursts, that should have been there, were missing. The missing burst counter does not count idle frames as missing. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 99999 Resolution: 1 |
| *RST Setting | | 0 |
| Programming Example | | |
| OUTPUT 714; "CALL:COUNT:MBURST?" | | |

CALL:COUNT:PAGE?

| | | |
|--------------------------------|------|---|
| Function | GSM | Queries the page counter. The page counter keeps track of the number of pages sent by the base station (BS) emulator during a BS originated call setup. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 9999 Resolution: 1 |
| *RST Setting | | 0 |
| Programming Example | | |
| OUTPUT 714; "CALL:COUNT:PAGE?" | | |

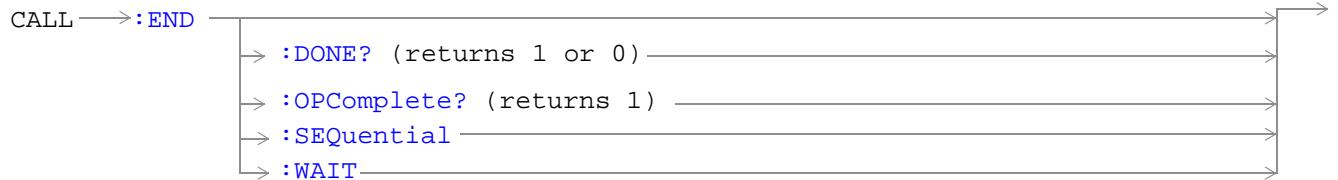
CALL:COUNT**CALL:COUNT:RACH?**

| | | |
|--------------------------------|------|---|
| Function | GSM | Queries the RACH counter. The RACH counter keeps track of the number of RACH bursts received by the base station emulator during call setup attempts. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 9999 Resolution: 1 |
| *RST Setting | | 0 |
| Programming Example | | |
| OUTPUT 714; "CALL:COUNT:RACH?" | | |

CALL:COUNT:TDMA:FRAMES

| | | |
|--|------|--|
| Function | GSM | Sets/queries the Max Frames Allowed for Assignment field. The Max Frames Allowed for Assignment field specifies the maximum number of TDMA frames the mobile station is allowed to take, from the start of the assignment or handover command, for a channel assignment. This is only applicable to changes in TCH band, TCH ARFCN or TCH timeslot. Changes to any other TCH parameter will not cause an error to be generated if the number of frames taken to perform the change exceeds the setting of the Max Frames Allowed for Assignment field. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 15 to 999 Resolution: 1 |
| Query | | Range: 15 to 999 Resolution: 1 |
| *RST Setting | | 28 |
| Programming Example | | |
| OUTPUT 714; "CALL:COUNT:TDMA:FRAMES 15" !Sets the number of TDMA frames allowed !before transmitting the new TCH. | | |

CALL:END



These commands are not applicable to GPRS.

["Diagram Conventions" on page 283](#)

CALL:END

CALL:END

| | | |
|----------|------|---|
| Function | GSM | Overlapped command used to terminate the active call. |
| | GPRS | This command is not applicable to GPRS. |

Programming Example

```
OUTPUT 714; "CALL:END" !Terminate the call.
```

CALL:END:DONE?

| | | |
|--------------|------|--|
| Function | GSM | Query only command which returns a 1 if the previously issued overlapped CALL:END command is done, or a 0 if the previously issued overlapped CALL:END command is not done. This command does not terminate the active call. This command is used to determine if a previously issued overlapped command is done or not. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: 0 1 |
| *RST Setting | | 1 |

Programming Example

```
OUTPUT 714; "CALL:END" !Send command to terminate active call.
LOOP
OUTPUT 714; "CALL:END:DONE?" !Send query to see if CALL:END command is done.
                                !Returns 1 if CALL:END command is finished.
                                !Returns 0 if CALL:END command is not finished.
ENTER 714; Callend_is_done
EXIT IF Callend_is_done
END LOOP
```

CALL:END:OPComplete?

| | | |
|--------------|------|---|
| Function | GSM | Query only command which places a 1 in the output queue when the previously issued overlapped CALL:END command is done. This command does not terminate the active call. This command is used to determine when a previously issued overlapped command is done. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: 1 |
| *RST Setting | | 1 |

Programming Example

```
OUTPUT 714; "CALL:END" !Send command to terminate active call.
OUTPUT 714; "CALL:END:OPC?" !Send query to determine when CALL:END command is
                                !done.
ENTER 714; Callend_is_done !Program hangs here until CALL:END command
                                !is finished.
                                !When CALL:END is done a 1 is put in output queue, ENTER
                                !is satisfied and program continues execution.
```

CALL:END:SEQUENTIAL

| | | |
|----------|------|--|
| Function | GSM | Terminate the active call but force the overlapped CALL:END command to execute as a sequential command. This command does terminate the active call. The :SEQUENTIAL modifier forces an overlapped command to execute as a sequential command. |
| | GPRS | This command is not applicable to GPRS. |

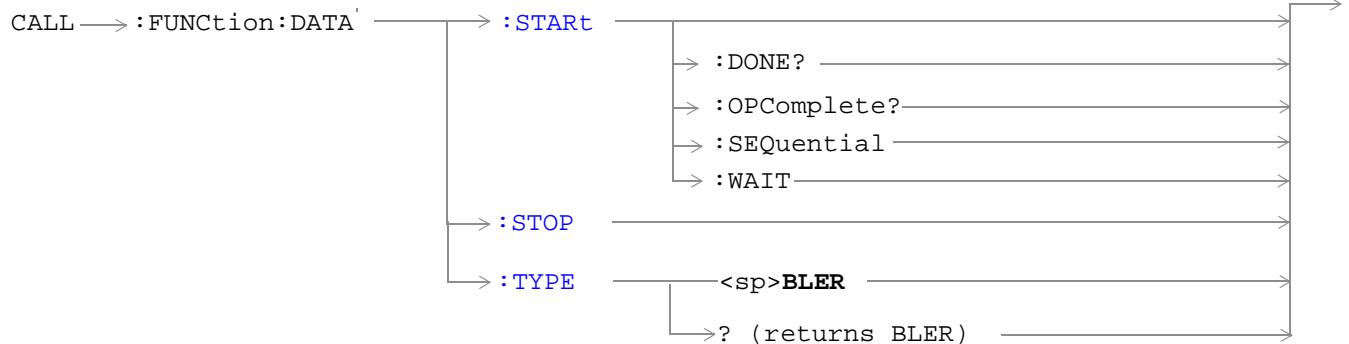
Programming Example

```
OUTPUT 714;"CALL:END:SEQUENTIAL" !Terminate the active call with
!sequential operation.
```

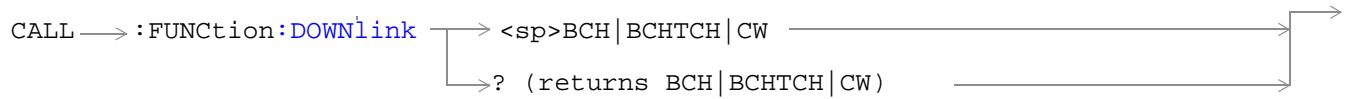
CALL:END:WAIT

| | | |
|----------------------------|------|--|
| Function | GSM | Terminate the active call but force the test set to process no more GPIB commands until the previously issued overlapped CALL:END command is finished. This command does not terminate the active call. This command is used to halt processing of GPIB commands from the test set's GPIB input buffer until the previously issued overlapped command is finished. |
| | GPRS | This command is not applicable to GPRS. |
| Related Topics | | "Call Processing Event Synchronization" on page 32 "Call Processing State Synchronization" on page 37 |
| Programming Example | | <pre>OUTPUT 714;"CALL:END" ! Terminate the active call. OUTPUT 714;"CALL:COUNT:CLEAR:BAERROR" !Clear the burst and decode !error counters. OUTPUT 714;"CALL:COUNT:CLEAR:RAPAGE" !Clear the RACH and Page counters. OUTPUT 714;"CALL:END:WAIT" !Wait here until CALL:END is finsihed. OUTPUT 714;"CALL:ORIGINATE" !Originate a new call.</pre> |

CALL:FUNCTION



These commands are not applicable to GSM.



This command is not applicable to GPRS.

["Diagram Conventions" on page 283](#)

CALL:FUNCTION:DATA:STARt

| | | |
|----------|------|--|
| Function | GSM | This command is not applicable to GSM. |
| | GPRS | This command attempts to start the data connection. See " "Data Connection Processing Event Synchronization" on page 50 ". Additional commands can be appended to aid in controller/Mobile Station synchronization. |

Programming Example

```
OUTPUT 714; "CALL:FUNCTION:DATA:START" !Starts data connection.
```

CALL:FUNCTION:DATA:STOP

| | | |
|----------|------|---|
| Function | GSM | This command is not applicable to GSM. |
| | GPRS | This command ends the data connection. See " "Data Connection Processing Event Synchronization" on page 50 ". |

Programming Example

```
OUTPUT 714; "CALL:FUNCTION:DATA:STOP" !Ends data connection.
```

CALL:FUNCTION:DATA:TYPE

| | | |
|--------------|------|---|
| Function | GSM | This command is not applicable to GSM. |
| | GPRS | This command sets/queries the type of data connection that is used when you use the command " "CALL:FUNCTION:DATA:STARt" on page 321 to start a data connection. Currently, this parameter can only be set to BLER. This setting ensures that an Agilent proprietary data connection type is used which allows the test set to obtain Block Error Rate (BLER) measurement reports from the mobile station (see " "BLER Reports Measurement Description" on page 73 "). |
| Setting | | Range: BLER |
| Query | | Range: BLER |
| *RST Setting | | BLER |

Programming Example

```
OUTPUT 714; "CALL:FUNCTION:DATA:TYPE BLER" !Sets the data connection type to BLER.
```

CALL:FUNCTION

CALL:FUNCTION:DOWNlink

| | | |
|---|------|--|
| Function | GSM | This command sets/queries the downlink signal configuration when Operating Mode = Test mode. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: BCH BCHTCH CW |
| Query | | Range: BCH BCHTCH CW |
| *RST Setting | | BCH |
| Related Topics | | "Test Mode Operating Mode" on page 621 |
| Programming Example | | |
| OUTPUT 714; "CALL:FUNCTION:DOWNLINK BCHTCH" !Sets Test Mode downlink !configuration to generate a !broadcast channel (BCH) and a !traffic channel (TCH). | | |

CALL:IMEI

CALL → :IMEI:AUTO →

↓
 <sp>1 | ON | 0 | OFF
 ↓ ? (returns 1 | 0)

This command is not applicable to GPRS.

[“Diagram Conventions” on page 283](#)

CALL:IMEI:AUTO

| | | |
|--|------|--|
| Function | GSM | Sets/queries whether or not the base station emulator should request the international mobile equipment identity (IMEI) on call setup. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 1 ON 0 OFF |
| Query | | Range: 1 0 |
| *RST Setting | | 1 |
| Related Topics | | “Configuring the Broadcast Channel (BCH)” on page 609 |
| Programming Example | | |
| OUTPUT 714;"CALL:IMEI:AUTO OFF" !Sets automatically get IMEI state to OFF. | | |

CALL:LACode



This command is not applicable to GPRS.

["Diagram Conventions" on page 283](#)

CALL[:CELL]:LACode

| | | |
|--|------|--|
| Function | GSM | Sets/queries the value of the cell's Location Area Code (LAC). This can only be set when the Cell Activated State parameter is set to Off (see "CALL:ACTivated" on page 297). |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 0 to 65535 resolution: 1 |
| Query | | range: 0 to 65535 resolution: 1 |
| *RST Setting | | 1 |
| Related Topics | | "Configuring the Broadcast Channel (BCH)" on page 609 |
| Programming Example | | |
| OUTPUT 714;"CALL:CELL:LACODE 456" !Sets the cell's location area code 456. | | |

CALL:MCCode



This command is not applicable to GPRS.

["Diagram Conventions" on page 283](#)

CALL[:CELL]:MCCode

| | | |
|---|------|--|
| Function | GSM | Sets/queries the value of the Mobile Country Code (MCC). This can only be set when the Cell Activated State parameter is set to Off (see "CALL:ACTivated" on page 297). |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 0 to 999 resolution: 1 |
| Query | | range: 0 to 999 resolution: 1 |
| *RST Setting | | 1 |
| Related Topics | | "Configuring the Broadcast Channel (BCH)" on page 609 |
| Programming Example | | |
| OUTPUT 714;"CALL:CELL:MCODE 4" !Sets the cell's mobile country code to 4. | | |

CALL:MNCode



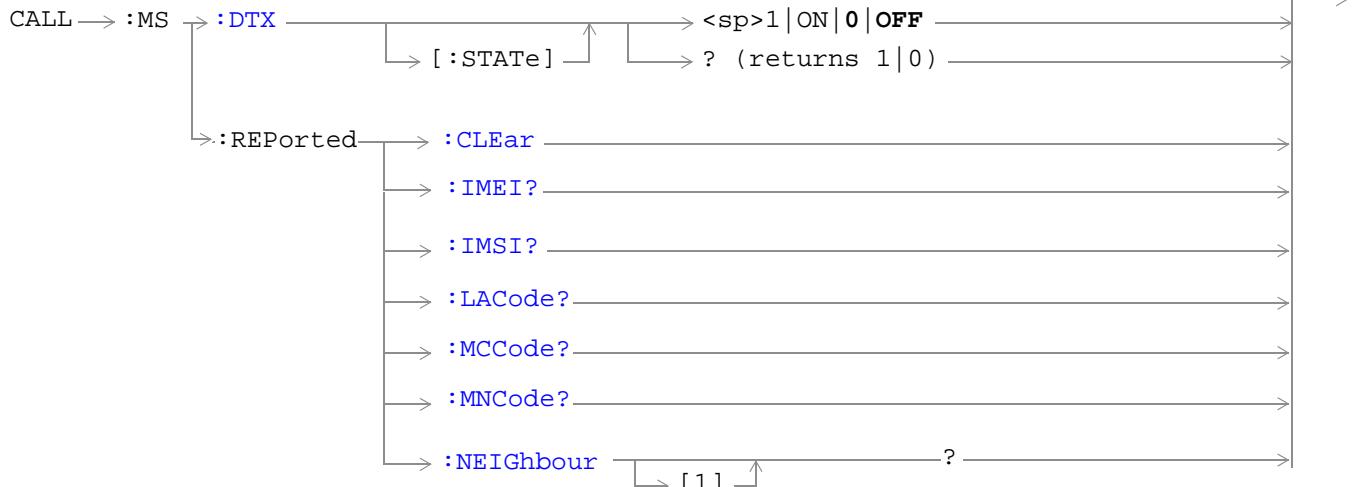
This command is not applicable to GPRS.

["Diagram Conventions" on page 283](#)

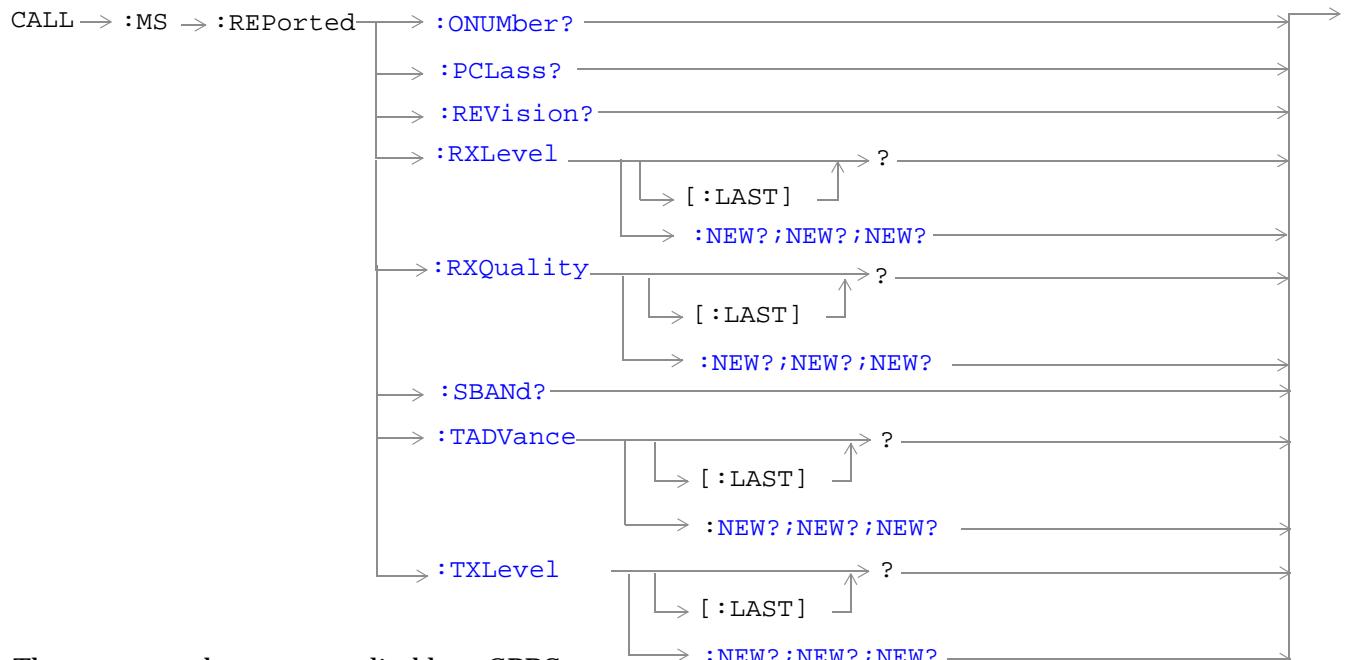
CALL[:CELL]:MNCode

| | | | | |
|--|---|--|--|--|
| Function | GSM | Sets/queries the value of the Mobile Network Code (MNC). This can only be set when the Cell Activated State parameter is set to Off (see "CALL:ACTivated" on page 297). | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Setting | | range: 0 to 99 resolution: 1 | | |
| Query | | range: 0 to 99 resolution: 1 | | |
| *RST Setting | 1 | | | |
| Related Topics | "Configuring the Broadcast Channel (BCH)" on page 609 | | | |
| Programming Example | | | | |
| OUTPUT 714;"CALL:CELL:MNCODE 45" !Sets the cell's mobile network code to 45. | | | | |

CALL:MS

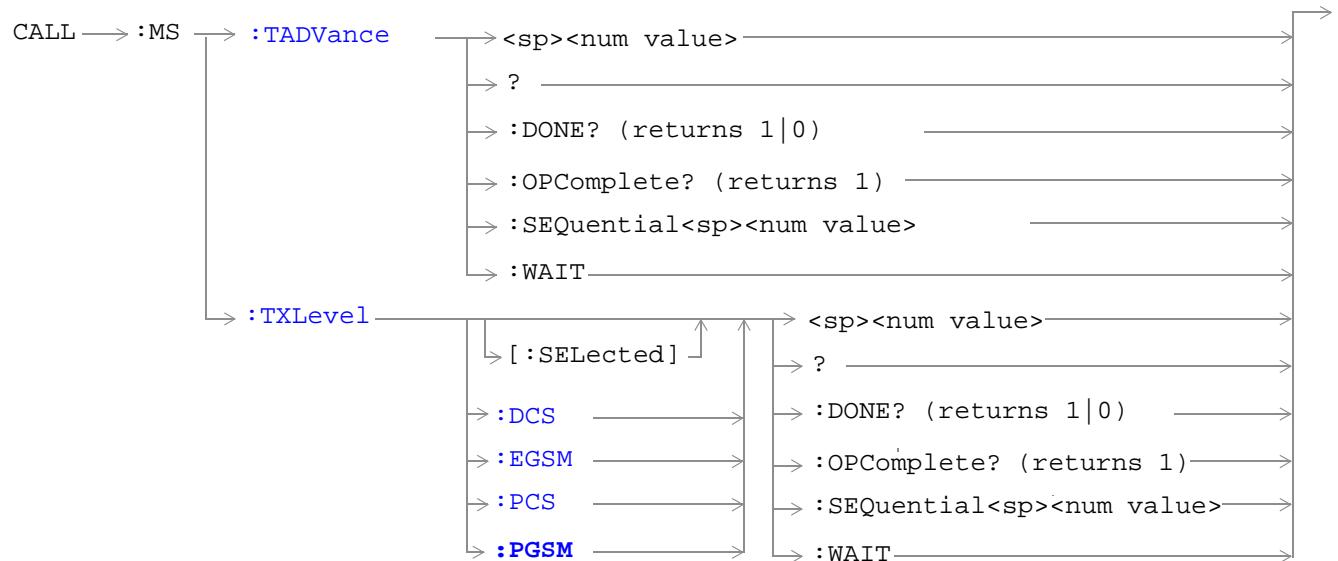


These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

CALL:MS



These commands are not applicable to GPRS.

["Diagram Conventions" on page 283](#)

CALL:MS:DTX[:STATe]

| | | |
|---|------|--|
| Function | GSM | Turns mobile station Discontinuous Transmission (DTX) on or off. Query form returns a 1 (state = on) or a 0 (state = off). See "Configuring Mobile Station Operating Parameters" on page 613 . |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 1 ON 0 OFF |
| Query | | range: 0 1 |
| *RST Setting | | 0 (state = OFF) |
| Programming Example | | |
| OUTPUT 714; "CALL:MS:DTX OFF" !Turns mobile station discontinuous !transmission OFF. | | |

CALL:MS:REPorted:CLEar

| | | |
|--------------------------------------|------|---|
| Function | GSM | Clears the mobile station SAACH reported items. The values of the four mobile reported items - that is, Timing Adv, Tx Level, Rx Level and Rx Qual - are set to 9.91E+37 (NAN). |
| | GPRS | This command is not applicable to GPRS. |
| Programming Example | | |
| OUTPUT 714; "CALL:MS:REPORTED:CLEAR" | | |

CALL:MS:REPorted:IMEI?

| | | |
|--------------------------------------|------|---|
| Function | GSM | Query of the International Mobile Equipment Identity of the ME. ME is an MS without a SIM. This parameter is reported if the IMEI:AUTO state is ON, see "CALL:IMEI" on page 323 or the MS has no SIM. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: up to 15 decimal digits and "" resolution: 1 |
| *RST Setting | | "" (null string) |
| Programming Example | | |
| OUTPUT 714; "CALL:MS:REPORTED:IMEI?" | | |

CALL:MS**CALL:MS:REPorted:IMSI?**

| | | | | |
|--------------------------------------|--|---|--|--|
| Function | GSM | Query of the International Mobile Subscriber Identity of the SIM in the MS. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Query | range: up to 15 decimal digits and ““ resolution: 1 | | | |
| *RST Setting | ““ (null string) | | | |
| Programming Example | | | | |
| OUTPUT 714; "CALL:MS:REPORTED:IMSI?" | | | | |

CALL:MS:REPorted:LACode?

| | | | | |
|--|---|--|--|--|
| Function | GSM | Query of the last Location Area Code the MS was camped on. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Range | 0 to 65535 (default: NAN) | | | |
| Data Type | Real | | | |
| Query | range: 0 to 65535 and 9.91E+37 resolution: 1 | | | |
| *RST Setting | 9.91E+37 (NAN) | | | |
| Programming Example | | | | |
| OUTPUT 714; "CALL:MS:REPORTED:LACODE?" | | | | |

CALL:MS:REPorted:MCCode?

| | | | | |
|--|---|---|--|--|
| Function | GSM | Query of the last Mobile Country Code the MS was camped on. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Query | range: 0 to 999 and 9.91E+37 resolution: 1 | | | |
| *RST Setting | 9.91E+37 (NAN) | | | |
| Programming Example | | | | |
| OUTPUT 714; "CALL:MS:REPORTED:MCCODE?" | | | | |

CALL:MS:REPorted:MNCode?

| | | | | |
|--|--|---|--|--|
| Function | GSM | Query of the last Mobile Network Code the MS was camped on. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Query | range: 0 to 99 and 9.91E+37 resolution: 1 | | | |
| *RST Setting | 9.91E+37 (NAN) | | | |
| Programming Example | | | | |
| OUTPUT 714; "CALL:MS:REPORTED:MNCODE?" | | | | |

CALL:MS:REPorted:NEIGHbour[1]?

| | | | | |
|--|--|---|--|--|
| Function | GSM | This query will return 4 data items separated by commas for neighbour cell one. ARFCN, RFLEVEL, NCC, BCC are returned in that order. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Query | range: 1 to 1023 and 9.91E+37 resolution: 1 | | | |
| *RST Setting | 9.91E+37 (NAN) | | | |
| Programming Example | | | | |
| OUTPUT 714; "CALL:MS:REPORTED:NEIGHBOUR?" ! Returns ARFCN, RFLEVEL, NCC, BCC in ! that order. | | | | |

CALL:MS:REPorted:ONUMber?

| | | | | |
|---|--|--|--|--|
| Function | GSM | Query the MS for the originated number keyed in on the MS. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Query | range: up to 21 ASCII characters and "" resolution: 1 | | | |
| *RST Setting | "" (null string) | | | |
| Programming Example | | | | |
| OUTPUT 714; "CALL:MS:REPORTED:ONUMBER?" | | | | |

CALL:MS**CALL:MS:REPorted:PClAss?**

| | | |
|---------------------|------|---|
| Function | GSM | Query the MS for its Power Class mark. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: PGSM EGSM = 1 to 5 and 9.91E+37 DCS PCS = 1 to 3 and 9.91E+37 resolution: 1 |
| *RST Setting | | 9.91E+37 (NAN) |
| Programming Example | | OUTPUT 714; "CALL:MS:REPORTED:PClASS?" |

CALL:MS:REPorted:REViSion?

| | | |
|---------------------|------|--|
| Function | GSM | Query the MS to determine which Phase of GSM standards it complies with. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: UNKNown PHASe1 PHASe2 |
| *RST Setting | | PHAS2 |
| Programming Example | | OUTPUT 714; "CALL:MS:REPORTED:REVISION?" |

CALL:MS:REPorted:RXLevel[:LAST]?

| | | |
|---------------------|------|--|
| Function | GSM | Received level of the TCH in dB (relative to -110 dBm) which the MS measured during the last SACCH multiframe. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: 0 to 63 and 9.91E+37 resolution: 1 |
| *RST Setting | | 9.91E+37 (NAN) |
| Programming Example | | OUTPUT 714; "CALL:MS:REPORTED:RXLEVEL:LAST?" |

CALL:MS:REPorted:RXLevel:NEW?;NEW?;NEW?

| | | |
|---|------|--|
| Function | GSM | Queries the received level of the TCH in dB (relative to -110 dBm) which the MS measured. Each time the :NEW? query is sent the test set hangs until report results from that measurement period are sent. A hanging query that will not return until the MS reports a new SACCH message to test set. This will return 3 variables the first two must be ignored, the value from the third new query is valid data. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: 0 to 68 and 9.91E+37 resolution: 1 |
| *RST Setting | | 9.91E+37 (NAN) |
| Programming Example | | |
| OUTPUT 714; "CALL:MS:REPORTED:RXLEVEL:NEW?;NEW?;NEW?" !The third result is valid. | | |

CALL:MS:REPorted:RXQuality[:LAST?]

| | | |
|--|------|---|
| Function | GSM | The MS reported quality of the signal used for the RX Level during the last SACCH report. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: 0 to 7 and 9.91E+37 resolution: 1 |
| *RST Setting | | 9.91E+37 (NAN) |
| Programming Example | | |
| OUTPUT 714; "CALL:MS:REPORTED:RXQUALITY:LAST?" | | |

CALL:MS:REPorted:RXQuality:NEW?;NEW?;NEW?

| | | |
|--|------|---|
| Function | GSM | Queries the MS reported received quality from the SACCH report. Each time the :NEW? query is sent the test set hangs until report results from that measurement period are sent. A hanging query that will not return until the MS reports a new SACCH message to test set. This will return 3 variables the first two must be ignored, the value from the third new query is valid data. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: 0 to 7 and 9.91E+37 resolution: 1 |
| *RST Setting | | 9.91E+37 (NAN) |
| Programming Example | | |
| OUTPUT 714; "CALL:MS:REPORTED:RXQUALITY:NEW?;NEW?;NEW?" ! The third result is valid. | | |

CALL:MS

CALL:MS:REPorted:SBAND?

| | | |
|---------------------------------------|------|---|
| Function | GSM | Query for the frequency band supported by the MS. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: PGSM EGSM DCS PCS ““ |
| *RST Setting | | ““ (null string) |
| Programming Example | | |
| OUTPUT 714; "CALL:MS:REPORTED:SBAND?" | | |

CALL:MS:REPorted:TADVance[:LAST]?

| | | |
|---|------|---|
| Function | GSM | Query the MS for the last TCH Timing Advance actually used by the MS. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: 0 to 63 and 9.91E+37 resolution: 1 |
| *RST Setting | | 9.91E+37 (NAN) |
| Programming Example | | |
| OUTPUT 714; "CALL:MS:REPORTED:TADVANCE:LAST?" | | |

CALL:MS:REPorted:TADVance:NEW?;NEW?;NEW?

| | | |
|---|------|---|
| Function | GSM | Queries the MS reported timing advance from the SACCH report. Each time the :NEW? query is sent the test set hangs until report results from that measurement period are sent. A hanging query that will not return until the MS reports a new SACCH message to test set. This will return 3 variables the first two must be ignored, the value from the third new query is valid data. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: 0 to 63 and 9.91E+37 resolution: 1 |
| *RST Setting | | 9.91E+37 (NAN) |
| Programming Example | | |
| OUTPUT 714; "CALL:MS:REPORTED:TADVANCE:NEW?;NEW?;NEW?" ! The third result is valid. | | |

CALL:MS:REPorted:TXLevel[:LAST]?

| | | | | |
|--|--|--|--|--|
| Function | GSM | Query the MS for the last reported transmit level. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Query | range: 0 to 31 and 9.91E+37 resolution: 1 | | | |
| *RST Setting | 9.91E+37 (NAN) | | | |
| Programming Example | | | | |
| OUTPUT 714; "CALL:MS:REPORTED:TXLEVEL:LAST?" | | | | |

CALL:MS:REPORTED:TXLEVEL:NEW?;NEW?;NEW?

| | | | | |
|--|--|---|--|--|
| Function | GSM | Queries the MS reported transmit level from the SACCH report. Each time the :NEW? query is sent the test set hangs until report results from that measurement period are sent. A hanging query that will not return until the MS reports a new SACCH message to test set. This will return 3 variables the first two must be ignored, the value from the third new query is valid data. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Query | range: 0 to 31 and 9.91E+37 resolution: 1 | | | |
| *RST Setting | 9.91E+37 (NAN) | | | |
| Programming Example | | | | |
| OUTPUT 714; "CALL:MS:REPORTED:TXLEVEL:NEW?;NEW?;NEW?" The third result is valid. | | | | |

CALL:MS:TADVance

| | | | | |
|--|---------------------------------|---|--|--|
| Function | GSM | Commands the MS what TCH timing advance to use on the uplink. Additional commands can be appended to aid in controller/Mobile Station synchronization. See " Call Processing Subsystem Overlapped Commands " on page 35. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Query | range: 0 to 63 resolution: 1 | | | |
| *RST Setting | zero | | | |
| Programming Example | | | | |
| OUTPUT 714; "CALL:MS:TADVANCE 3" !Sets the MS TCH Timing Advance to 3 on !the uplink. | | | | |

CALL:MS

CALL:MS:TXLevel[:SELected]

| | | |
|---|------|---|
| Function | GSM | Selects the MS uplink power control level for the band already selected. See " GSM Frequency Banded Parameters " on page 597. Additional commands can be appended to aid in controller/Mobile Station synchronization. See " Call Processing Subsystem Overlapped Commands " on page 35. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 0 to 31 resolution: 1 |
| Query | | range: 0 to 31 resolution: 1 |
| *RST Setting | | Band: PGSM TXLevel: 15 |
| Programming Example | | |
| OUTPUT 714; "CALL:MS:TXLEVEL:SELECTED 10" | | |

CALL:MS:TXLevel:DCS

| | | |
|-------------------------------------|------|--|
| Function | GSM | Selects the mobile station uplink power control level for the DCS band. See " GSM Frequency Banded Parameters " on page 597. Additional commands can be appended to aid in controller/Mobile Station synchronization. See " Call Processing Subsystem Overlapped Commands " on page 35. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 0 to 31 (default 10) resolution: 1 |
| Query | | range: 0 to 31 resolution: 1 |
| *RST Setting | | Band: PGSM TXLevel: 15 |
| Programming Example | | |
| OUTPUT 714; "CALL:MS:TXLEVEL:DCS 8" | | |

CALL:MS:TXLevel:EGSM

| | | |
|---------------------------------------|------|---|
| Function | GSM | Selects the mobile station uplink power control level for the EGSM band. See " GSM Frequency Banded Parameters " on page 597. Additional commands can be appended to aid in controller/Mobile Station synchronization. See " Call Processing Subsystem Overlapped Commands " on page 35. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 0 to 31 (default 15) resolution: 1 |
| Query | | range: 0 to 31 resolution: 1 |
| *RST Setting | | Band: PGSM TXLevel: 15 |
| Programming Example | | |
| OUTPUT 714; "CALL:MS:TXLEVEL:EGSM 20" | | |

CALL:MS:TXLevel:PCS

| | | |
|--------------------------------------|------|--|
| Function | GSM | Selects the mobile station uplink power control level for the PCS band. See " GSM Frequency Banded Parameters " on page 597. Additional commands can be appended to aid in controller/Mobile Station synchronization. See " Call Processing Subsystem Overlapped Commands " on page 35. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 0 to 31 (default 10) resolution: 1 |
| Query | | range: 0 to 31 resolution: 1 |
| *RST Setting | | Band: PGSM TXLevel: 15 |
| Programming Example | | |
| OUTPUT 714; "CALL:MS:TXLEVEL:PCS 31" | | |

CALL:MS:TXLevel:PGSM

| | | |
|---------------------------------------|------|---|
| Function | GSM | Selects the mobile station uplink power control level for the PGSM band. See “ GSM Frequency Banded Parameters ” on page 597. Additional commands can be appended to aid in controller/Mobile Station synchronization. See “ Call Processing Subsystem Overlapped Commands ” on page 35. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 0 to 31 (default 15) resolution: 1 |
| Query | | range: 0 to 31 resolution: 1 |
| *RST Setting | | Band: PGSM TXLevel: 15 |
| Programming Example | | |
| OUTPUT 714; "CALL:MS:TXLEVEL:PGSM 22" | | |

CALL:NCCode



This command is not applicable to GPRS.

["Diagram Conventions" on page 283](#)

CALL[:CELL]:NCCode

| | | |
|---------------------------------|------|---|
| Function | GSM | Sets/queries the Network Color Code. See "Configuring the Broadcast Channel (BCH)" on page 609 . This can only be set when the Cell Activated State parameter is set to Off (see "CALL:ACTivated" on page 297). |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 0 to 7 resolution: 1 |
| Query | | range: 0 to 7 resolution: 1 |
| *RST Setting | | 1 |
| Programming Example | | |
| OUTPUT 714;"CALL:CELL:NCCODE 2" | | |

CALL:OPERating



This command is not applicable to GPRS.

["Diagram Conventions" on page 283](#)

CALL:OPERating:MODE

| | | |
|--|------|--|
| Function | GSM | Sets/queries the operating mode (behavior) of the test set. See "Test Mode Operating Mode" on page 621 or "Active Cell Operating Mode" on page 607 . |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: cell test |
| Query | | range: CELL TEST |
| *RST Setting | | CELL |
| Programming Example | | |
| OUTPUT 714;"CALL:OPERATING:MODE TEST" !Places the Test Set into Test Mode. | | |

CALL:ORIGINATE

CALL → :ORIGINATE



These commands are not applicable to GPRS.

["Diagram Conventions" on page 283](#)

CALL:ORIGINATE

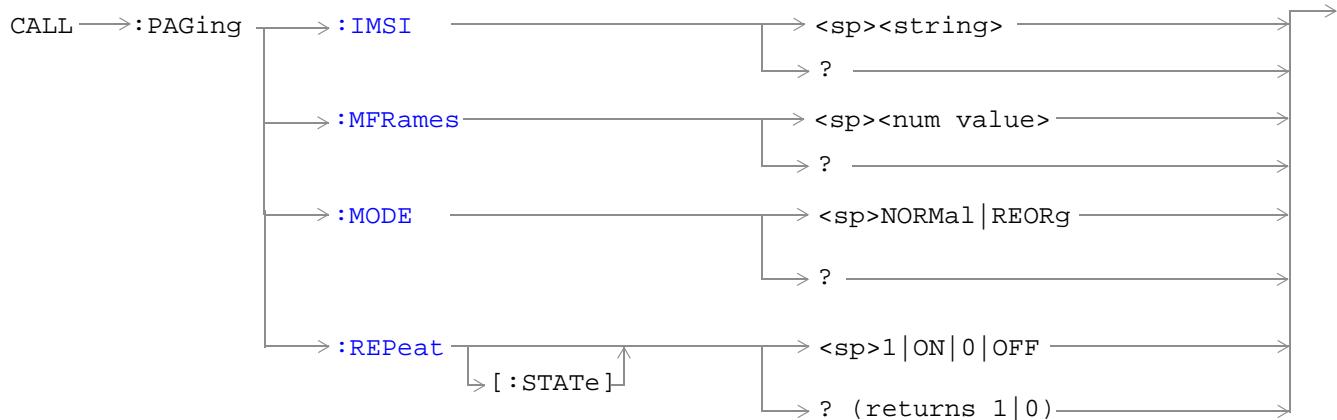
| | | |
|----------|------|---|
| Function | GSM | Performs a BS Originated call. See "Call Processing Event Synchronization" on page 32 . Additional commands can be appended to aid in controller/Mobile Station synchronization. |
| | GPRS | This command is not applicable to GPRS. |

Programming Example

```

OUTPUT 714;"CALL:ORIGINATE:SEQUENTIAL" !Orignates a base station call.
          !Appending SEQUENTIAL to this command
          !causes the command to be
          !performed sequentially.
  
```

CALL:PAGing



These commands are not applicable to GPRS.

“Diagram Conventions” on page 283

CALL:PAGInq:IMSI

| | | |
|--------------|---|--|
| Function | GSM | Sets/queries the paging IMSI (International Mobile Subscriber Identity) field, used for paging the MS. The test set will stay in Active Cell Status (Setup Request), see " Call Processing State Synchronization " on page 37 until the paging IMSI is returned if the state is on. The paging IMSI is automatically updated by the test set during an MS originated call using the IMSI reported by the MS. If the MS has no SIM, the paging IMSI is left unchanged. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | range: up to 15 decimal digits resolution: 1 | |
| Query | range: up to 15 decimal digits resolution: 1 | |
| *RST Setting | 001012345678901 | |

CALL:PAGing:REPeat[:STATe]

| | | |
|---|------|---|
| Function | GSM | Sets/queries repeat paging state. When the state is ON paging repeats until the test set receives a RACH. When the state is off the test set returns the No response to page timer T3113 expiry. See "Fixed Timer Messages" on page 687 . |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | 0 OFF 1 ON |
| Query | | 0 1 |
| *RST Setting | | 0 OFF |
| Programming Example | | |
| OUTPUT 714;"CALL:PAGING:REPEAT:STATE ON" !Turns paging repeat ON. | | |

CALL:PAGing:MODE

| | | |
|--|------|---|
| Function | GSM | Sets/queries the paging mode that the test set will use to page the MS. Some mobile stations can be set to a discontinuous reception mode (DRX), which configures the MS to look for a page in a pre-defined paging subchannel only. When paging mode is set to Reorg (DRX off), the test set will page the MS on the paging channel in the next available paging subchannel without waiting for the defined paging group. When paging mode is set to Normal (DRX on), the test set will page the MS on the correct paging subchannel defined by the mobile station's paging group. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: REORg NORMAl |
| Query | | range: REOR NORM |
| *RST Setting | | Reorg |
| Programming Example | | |
| OUTPUT 714;"CALL:PAGING:MODE REOR" ! MS will be sent a page on the ! next available paging subchannel | | |

CALL:PAGing

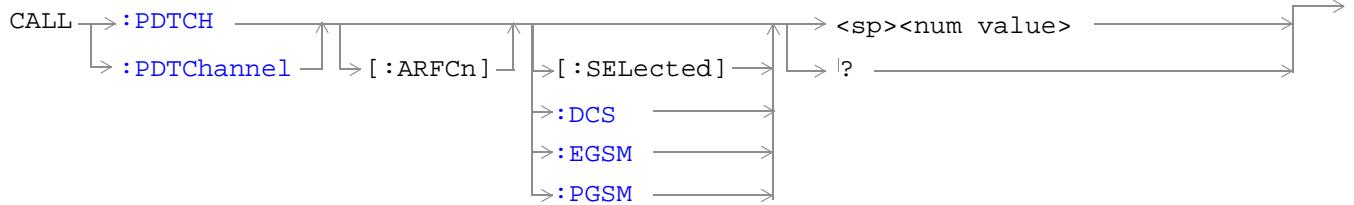
CALL:PAGing:MFrames

| | | |
|--------------|------|---|
| Function | GSM | Sets/queries the number of multiframe between paging subchannels. This parameter is used when the paging mode is normal. MFrames and IMSI are used to define the mobile station's paging group. The paging group determines when an MS can expect a page if paging mode is normal. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 2 to 9 resolution: 1 |
| Query | | range: 2 to 9 resolution: 1 |
| *RST Setting | | 2 |

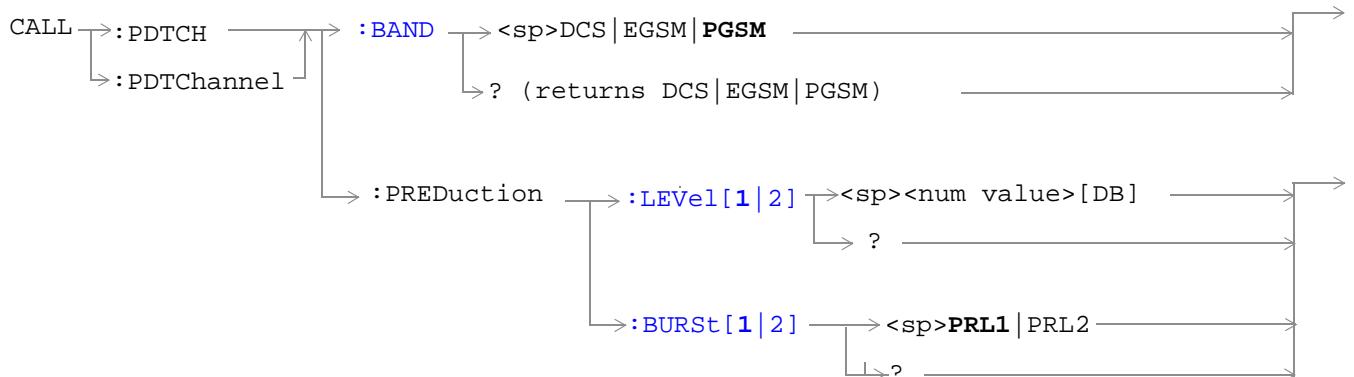
Programming Example

```
OUTPUT 714; "CALL:PAGING:MFrames 5" ! Sets the number of multiframe
! between paging subchannels.
```

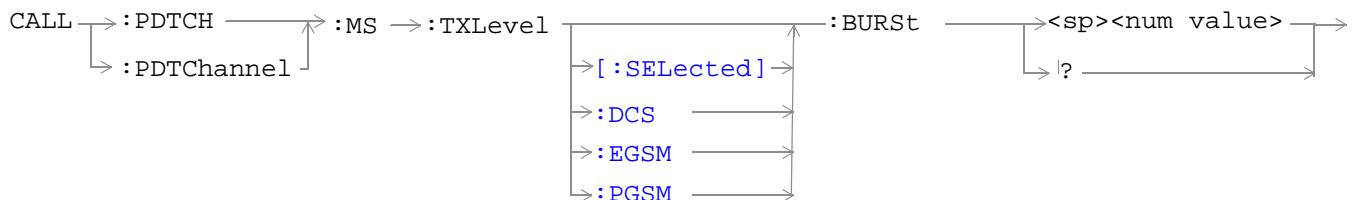
CALL:PDTCH | PDTChannel



These commands are not applicable to GSM.



These commands are not applicable to GSM.



These commands are not applicable to GSM.

["Diagram Conventions" on page 283](#)

CALL:PDTCH | PDTChannel[:ARFCn][:SELected]

| | | |
|--|---|---|
| Function | GSM | This command is not applicable to GSM. |
| | GPRS | <p>This command sets/queries the channel number of the downlink and uplink PDTCH for the band already selected.</p> <p>Note that the PCS band is not currently supported for GPRS.</p> <p>For this setting to be implemented, you must stop the data connection (using “CALL:FUNCTION:DATA:STOP” on page 321) and then restart it (using “CALL:FUNCTION:DATA:START” on page 321).</p> |
| Setting | <p>range:</p> <ul style="list-style-type: none"> DCS band, channels 512 to 885 (default: 698) EGSM band, channels 0 to 124 and 975 to 1023 (default: 30) PGSM band, channels 1 to 124 (default: 30) <p>resolution: 1</p> | |
| Query | <p>range:</p> <ul style="list-style-type: none"> DCS band, channels 512 to 885 EGSM band, channels 0 to 124 and 975 to 1023 PGSM band, channels 1 to 124 <p>resolution: 1</p> | |
| *RST setting | PGSM and EGSM bands: 30, DCS band: 698 | |
| <p>Programming Example</p> <pre>OUTPUT 714;"CALL:PDTCH:ARFCN:SELECTED 512" !Sets the ARFCN of the selected band to !512, if 512 is valid for the selected band.</pre> | | |

CALL:PDTCH | PDTChannel[:ARFCn]:DCS

| | | |
|--|------|--|
| Function | GSM | This command is not applicable to GSM. |
| | GRPS | <p>This command sets/queries the channel number for downlink and uplink PDTCH for the DCS band. See "Configuring the Packet Data Traffic Channel (PDTCH)" on page 615.</p> <p>The value you set for the channel number will only be applied when the data connection state changes to TRAN (transferring). See "CALL:STATus[:STATe]:DATA?" on page 366.</p> <p>For this setting to be implemented, you must stop the data connection (using "CALL:FUNCTION:DATA:STOP" on page 321) and then restart it (using "CALL:FUNCTION:DATA:STARt" on page 321). The PDTCH band must also be set to DCS.</p> |
| Setting | | range: 512 to 885 (default: 698) resolution: 1 |
| Query | | range: 512 to 885 resolution: 1 |
| *RST setting | | 698 |
| Programming Example | | |
| OUTPUT 714;"CALL:PDTCH:ARFCN:DCS 512" !Sets the PDTCH for the DCS band to ARFCN !512. | | |

CALL:PDTCH | PDTChannel[:ARFCn]:EGSM

| | | |
|--|------|--|
| Function | GSM | This command is not applicable to GSM. |
| | GPRS | <p>This command sets/queries the channel number for downlink and uplink PDTCH for the EGSM band. See “Configuring the Packet Data Traffic Channel (PDTCH)” on page 615.</p> <p>The value you set for the channel number will only be applied when the data connection state changes to TRAN (transferring). See “CALL:STATus[:STATe]:DATA?” on page 366.</p> <p>For this setting to be implemented, you must stop the data connection (using “CALL:FUNCTION:DATA:STOP” on page 321) and then restart it (using “CALL:FUNCTION:DATA:STARt” on page 321). The PDTCH band must also be set to EGSM.</p> |
| Setting | | <p>range: 0 to 124 975 to 1023 (default: 30)</p> <p>resolution: 1</p> |
| Query | | <p>range: 0 to 124 975 to 1023</p> <p>resolution: 1</p> |
| *RST setting | | 30 |
| Programming Example | | |
| OUTPUT 714;"CALL:PDTCH:ARFCN:EGSM 124" !Sets the PDTCH for the EGSM band to ARFCN !124. | | |

CALL:PDTCH | PDTChannel[:ARFCn]:PGSM

| | | |
|---|------|--|
| Function | GSM | This command is not applicable to GSM. |
| | GPRS | <p>This command sets/queries the channel number for downlink and uplink PDTCH for the PGSM band. See “Configuring the Packet Data Traffic Channel (PDTCH)” on page 615.</p> <p>The value you set for the channel number will only be applied when the data connection state changes to TRAN (transferring). See “CALL:STATus[:STATe]:DATA?” on page 366.</p> <p>For this setting to be implemented, you must stop the data connection (using “CALL:FUNCTION:DATA:STOP” on page 321) and then restart it (using “CALL:FUNCTION:DATA:START” on page 321). The PDTCH band must also be set to PGSM.</p> |
| Setting | | range: 1 to 124 (default: 30) resolution: 1 |
| Query | | range: 1 to 124 resolution: 1 |
| *RST setting | | 30 |
| Programming Example <pre>OUTPUT 714;"CALL:PDTCH:PGSM 124" !Sets the PDTCH for the PGSM band to ARFCN 124.</pre> | | |

CALL:PDTCH | PDTChannel:BAND

| | | |
|--|------|--|
| Function | GSM | This command is not applicable to GSM. |
| | GPRS | <p>This command sets/queries the PDTCH band, therefore constraining the range of PDTCH ARFCNs.</p> <p>Note that the PCS band is not currently supported for GPRS.</p> <p>For this setting to be implemented, you must stop the data connection (using “CALL:FUNCTION:DATA:STOP” on page 321) and then restart it (using “CALL:FUNCTION:DATA:START” on page 321).</p> |
| Setting | | range: PGSM EGSM DCS |
| Query | | range: PGSM EGSM DCS |
| *RST setting | | PGSM |
| Programming Example <pre>OUTPUT 714;"CALL:PDTCH:BAND DCS" !Sets the band to DCS.</pre> | | |

CALL:PDTCH | PDTChannel:MS:TXLevel[:SELected]:BURSt

| | | |
|--|------|--|
| Function | GSM | This command is not applicable to GSM. |
| | GPRS | <p>This command selects the mobile station uplink power control level for the band already selected. See "GPRS Frequency Banded Parameters" on page 598.</p> <p>Note that the PCS band is not currently supported for GPRS.</p> <p>For this setting to be implemented, you must stop the data connection (using "CALL:FUNCTION:DATA:STOP" on page 321) and then restart it (using "CALL:FUNCTION:DATA:START" on page 321).</p> |
| Setting | | range: 0 to 31 resolution: 1 |
| Query | | range: 0 to 31 resolution: 1 |
| *RST Setting | | PGSM and EGSM bands: 15, DCS band: 10 |
| Programming Example <pre>OUTPUT 714; "CALL:PDTCH:MS:TXLEVEL:BURST 10" !Sets the uplink power level of the burst in the !selected band to 10.</pre> | | |

CALL:PDTCH|PDTChannel:MS:TXLevel:DCS:BURSt

| | | |
|---|------|--|
| Function | GSM | This command is not applicable to GSM. |
| | GPRS | <p>This command selects/queries the mobile station uplink power control level for the DCS band. See "GPRS Frequency Banded Parameters" on page 598.</p> <p>For this setting to be implemented, you must stop the data connection (using "CALL:FUNCTION:DATA:STOP" on page 321) and then restart it (using "CALL:FUNCTION:DATA:START" on page 321).</p> |
| Setting | | range: 0 to 31 (default 10) resolution: 1 |
| Query | | range: 0 to 31 resolution: 1 |
| *RST Setting | | 10 |
| Programming Example <pre>OUTPUT 714; "CALL:PDTCH:MS:TXLEVEL:DCS:BURST 8" !Sets the uplink power level of the burst in !the DCS band to 8.</pre> | | |

CALL:PDTCH|PDTChannel:MS:TXLevel:EGSM:BURSt

| | | |
|---|-------|---|
| Function | GSM | This command is not applicable to GSM. |
| | GPRES | <p>This command selects/queries the mobile station uplink power control level for the EGSM band. See "GPRS Frequency Banded Parameters" on page 598.</p> <p>For this setting to be implemented, you must stop the data connection (using "CALL:FUNCTION:DATA:STOP" on page 321) and then restart it (using "CALL:FUNCTION:DATA:START" on page 321).</p> |
| Setting | | range: 0 to 31 (default 15) resolution: 1 |
| Query | | range: 0 to 31 resolution: 1 |
| *RST Setting | | 15 |
| Programming Example | | |
| OUTPUT 714;"CALL:PDTCH:MS:TXLEVEL:EGSM:BURST 15" !Sets the uplink power level of the burst !in the EGSM band to 15. | | |

CALL:PDTCH|PDTChannel:MS:TXLevel:PGSM:BURSt

| | | |
|---|-------|---|
| Function | GSM | This command is not applicable to GSM. |
| | GPRES | <p>This command selects/queries the mobile station uplink power control level for the PGSM band. See "GPRS Frequency Banded Parameters" on page 598.</p> <p>For this setting to be implemented, you must stop the data connection (using "CALL:FUNCTION:DATA:STOP" on page 321) and then restart it (using "CALL:FUNCTION:DATA:START" on page 321).</p> |
| Setting | | range: 0 to 31 (default 15) resolution: 1 |
| Query | | range: 0 to 31 resolution: 1 |
| *RST Setting | | 15 |
| Programming Example | | |
| OUTPUT 714;"CALL:PDTCH:MS:TXLEVEL:PGSM:BURST 8" !Sets the uplink power level of the burst in !the PGSM band to 8. | | |

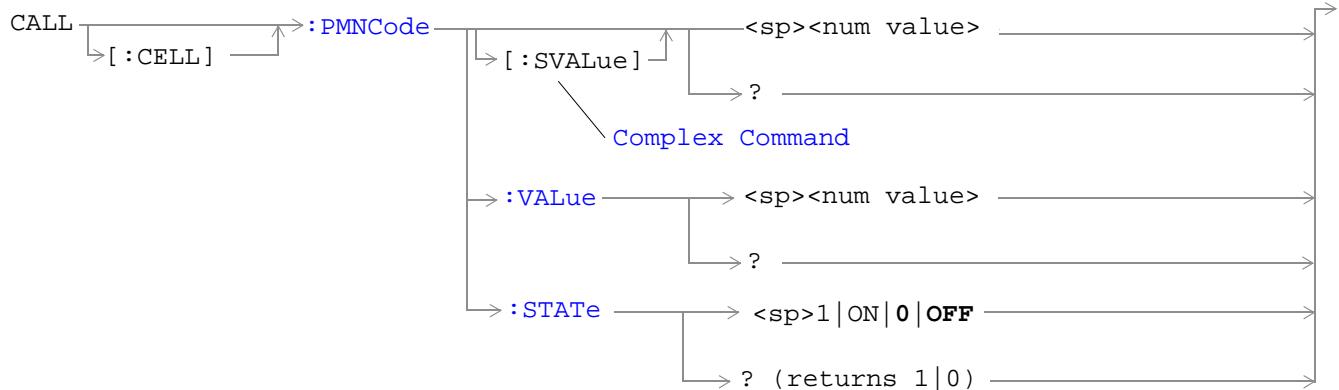
CALL:PDTCH | PDTChannel:PREduction:BURSt[1|2]

| | | |
|--|------|---|
| Function | GSM | This command is not applicable to GSM. |
| | GRPS | This command sets/queries the power reduction level for any of the two downlink bursts. You can define the levels of PRL1 and PRL2 using " "CALL:PDTCH PDTChannel:PREduction:LEVel[1 2]" on page 352 ". If you do not specify a burst then burst one is assumed. |
| Setting | | range: PRL1 PRL2 |
| Query | | range: PRL1 PRL2 |
| *RST setting | | PRL1 |
| Programming Example | | |
| OUTPUT 714;"CALL:PDTCH:PRE:BURS PRL1" !Sets the power reduction level of the first burst to !PRL1. | | |

CALL:PDTCH | PDTChannel:PREduction:LEVel[1|2]

| | | |
|---|------|---|
| Function | GSM | This command is not applicable to GSM. |
| | GRPS | In GPRS, power levels are often referred to as power reduction levels relative to the BCCH. This command sets/queries two power reduction levels. These levels can then be applied to up to two bursts using " "CALL:PDTCH PDTChannel:PREduction:BURSt[1 2]" on page 352 ". |
| Setting | | range: 0 to 12 dB resolution: 0.1 dB |
| Query | | range: 0 to 12 dB resolution: 0.1 dB |
| *RST setting | | 0 dB |
| Programming Example | | |
| OUTPUT 714;"CALL:PDTCH:PRE:LEV2 3" !Sets the second power reduction level (PRL2) to 3 dB. | | |

CALL:PMNCode



These commands are not applicable to GPRS.

["Diagram Conventions" on page 283](#)

CALL[:CELL]:PMNCode[:SValue]

| | | |
|---|------|---|
| Function | GSM | This command sets/queries the 3 digit mobile network code. This command is used for the PCS band only. This command sets the PMNCode state to ON. This can only be set when the Cell Activated State parameter is set to Off (see "CALL:ACTivated" on page 297). |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 0 to 999 resolution: 1 |
| Query | | range: 0 to 999 resolution: 1 |
| *RST Setting | 1 | |
| Programming Example | | |
| OUTPUT 714;"CALL:CELL:PMNCODE:SVALUE 798" !Sets the value to 798 and the state !to ON. Only used for PCS 1900 band. | | |

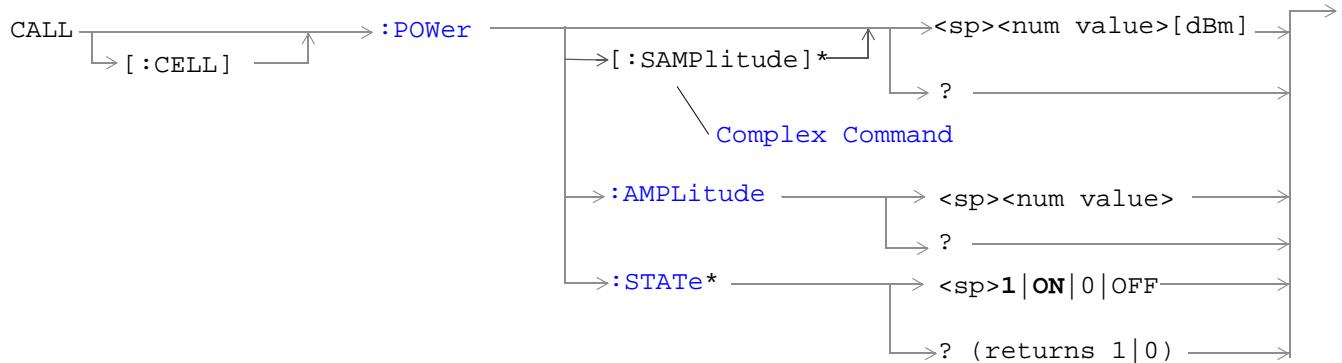
CALL:PMNCode**CALL[:CELL]:PMNCode:VALue**

| | | |
|---|------|---|
| Function | GSM | Sets/queries the 3 digit mobile network code value. This command is used for PCS band only. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 0 to 999 resolution: 1 |
| Query | | range: 0 to 999 resolution: 1 |
| *RST Setting | | 1 |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:PMNCode 798" !Sets the 3 digit MNCode for PCS 1900 to 798. | | |

CALL[:CELL]:PMNCode:STATE

| | | |
|--|------|--|
| Function | GSM | Sets/queries the MNC state. This command is used for the PCS band only. Setting it to ON will configure the BCCH to use the 3 digit MNC. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 0 OFF 1 ON |
| Query | | range: 0 OFF 1 ON |
| *RST Setting | | OFF |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:PMNCode:STATE ON" | | |

CALL:POWER



* These commands are not applicable to GPRS.

[“Diagram Conventions” on page 283](#)

CALL[:CELL]:POWeR[:SAMPlitude]

| | | |
|--|------|---|
| Function | GSM | This command sets/queries the value for Cell Power and turns the state to ON. This is the same for BCH and TCH. The suffix dBm is optional. The Cell Power field is affected when there is an amplitude offset, see “Measurement Related Configuration” on page 670 . |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: -10 dBm to -127 dBm resolution: .01 dBm |
| Query | | range: -10 dBm to -127 dBm resolution: .01 dBm |
| *RST Setting | | -60 dBm |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:POWER:SAMPLITUDE -50dBm" !Sets the value to -50dBm !and the state to ON. | | |

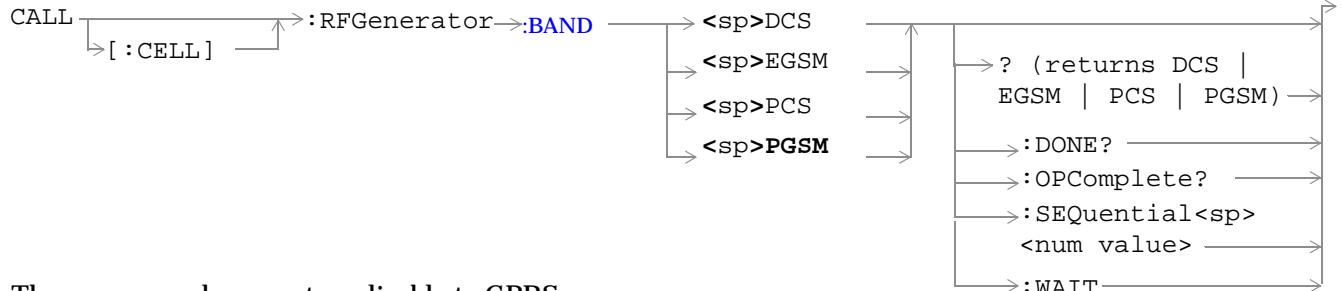
CALL:POWER

CALL[:CELL]:POWer:AMPLitude

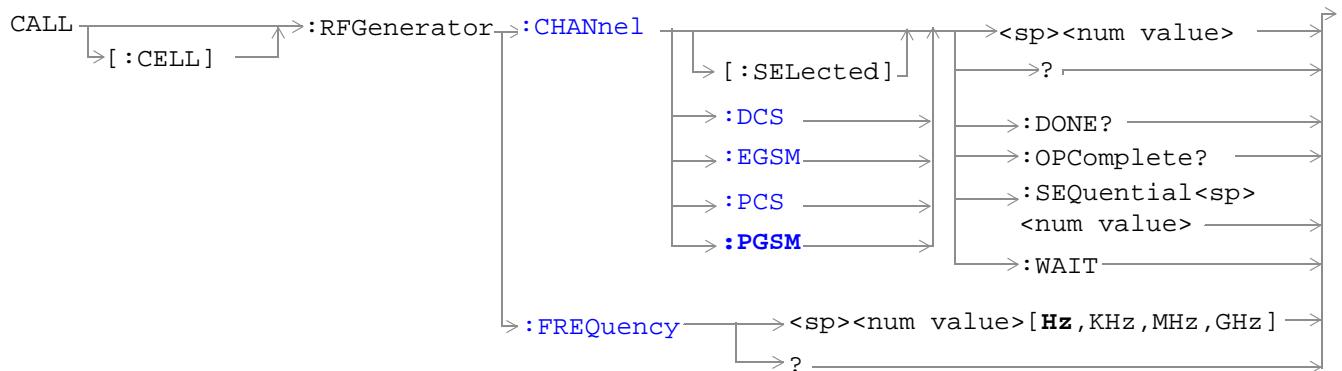
| | | |
|---|------|---|
| Function | GSM | This command sets/queries the Cell Power of the test set. This is the same for the BCH and TCH. The suffix dBm is optional. The Cell Power field is affected when there is an amplitude offset, see " Measurement Related Configuration " on page 670. |
| | GPRS | This command sets/queries the Cell Power (BCH). The suffix dBm is optional. The power level of the PDTCH is also affected by the setting of this command. However, the PDTCH level is also affected by other settings, see " Configuring the Packet Data Traffic Channel (PDTCH) " on page 615. The Cell Power is affected when there is an amplitude offset, see " Measurement Related Configuration " on page 670. |
| Setting | | range: -10 dBm to -127 dBm resolution: .01 dBm |
| Query | | range: -10 dBm to -127 dBm resolution: .01dBm |
| *RST Setting | | -60 dBm |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:POWER:AMPLITUDE -50dBm" !Set the cell power from test !set to -50dBm. | | |

CALL[:CELL]:POWer:STATE

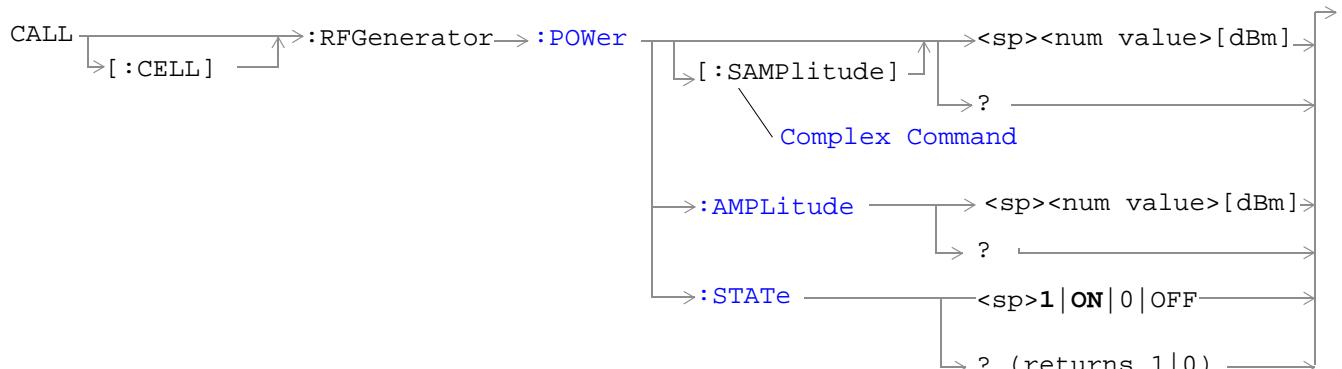
| | | |
|---|------|---|
| Function | GSM | This command sets/queries the RF Power state. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 0 OFF 1 ON |
| Query | | range: 0 1 |
| *RST Setting | | ON |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:POWER:STATE 1" !Sets the cell power state to ON. | | |

CALL:RFGenerator

These commands are not applicable to GPRS.



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

["Diagram Conventions" on page 283](#)

CALL[:CELL]:RFGenerator:BAND

| | | |
|---|------|---|
| Function | GSM | Sets/queries the RF Gen Channel band. Operating mode = Test Mode and Downlink Function = CW. See " "CW Test Function Behavior" on page 628. Additional commands can be appended to aid in controller/Mobile Station synchronization. See " "Call Processing Subsystem Overlapped Commands" on page 35 for examples. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: <ul style="list-style-type: none">DCS channels 512 to 885EGSM channels 975 to 1023 and 0 to 124PCS channels 512 to 810PGSM channels 1 to 124 |
| Query | | range: <ul style="list-style-type: none">DCS channels 512 to 885EGSM channels 975 to 1023 and 0 to 124PCS channels 512 to 810PGSM channels 1 to 124 |
| *RST Setting | | 20 (PGSM band) |
| Programming Example | | |
| OUTPUT 714;"CALL:CELL:RFGENERATOR:BAND DCS" !Sets the RF Generator band to DCS. | | |

CALL[:CELL]:RFGenerator:CHANnel[:SELected]

| | | |
|---|------|---|
| Function | GSM | Sets/queries the RF Gen Channel for the band already selected. Operating mode = Test Mode and Downlink Function = CW. See “ CW Test Function Behavior ” on page 628 . Additional commands can be appended to aid in controller/Mobile Station synchronization. See “ Call Processing Subsystem Overlapped Commands ” on page 35 for examples. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: <ul style="list-style-type: none">• DCS channels 512 to 885• EGSM channels 975 to 1023 and 0 to 124• PCS channels 512 to 810• PGSM channels 1 to 124 |
| Query | | range: <ul style="list-style-type: none">• DCS channels 512 to 885• EGSM channels 975 to 1023 and 0 to 124• PCS channels 512 to 810• PGSM channels 1 to 124 |
| *RST Setting | | 20 (PGSM band) |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:RFGENERATOR:CHANNEL:SELECTED 512" !Sets the RF Generator !channel to 512 for the !band already selected. | | |

CALL:RFGenerator**CALL[:CELL]:RFGenerator:CHANnel:DCS**

| | | |
|---|------|---|
| Function | GSM | Sets/queries the RF Gen Channel for the DCS band using the RF Generator. Operating mode = Test Mode and Downlink Function = CW. See “ CW Test Function Behavior ” on page 628 . Additional commands can be appended to aid in controller/Mobile Station synchronization. See “ Call Processing Subsystem Overlapped Commands ” on page 35 for examples. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 512 to 885 (default 512) resolution: 1 |
| Query | | range: 512 to 885 resolution: 1 |
| *RST Setting | | 20 (PGSM band) |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:RFGENERATOR:CHANNEL:DCS 512" | | |

CALL[:CELL]:RFGenerator:CHANnel:EGSM

| | | |
|--|------|--|
| Function | GSM | Sets/queries the RF Gen Channel for the EGSM band using the RF Generator. Operating mode = Test Mode and Downlink Function = CW. See “ CW Test Function Behavior ” on page 628 . Additional commands can be appended to aid in controller/Mobile Station synchronization. See “ Call Processing Subsystem Overlapped Commands ” on page 35 for examples. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 0 to 124 975 to 1023 (default: 20) resolution: 1 |
| Query | | range: 0 to 124 975 to 1023 resolution: 1 |
| *RST Setting | | 20 (PGSM band) |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:RFGENERATOR:CHANNEL:EGSM 124" | | |

CALL[:CELL]:RFGenerator:CHANnel:PCS

| | | |
|---|------|---|
| Function | GSM | Sets/queries the RF Gen Channel for the PCS band using the RF Generator. Operating mode = Test Mode and Downlink Function = CW. See " CW Test Function Behavior " on page 628 . Additional commands can be appended to aid in controller/Mobile Station synchronization. See " Call Processing Subsystem Overlapped Commands " on page 35 for examples. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 512 to 810 (default: 512) resolution: 1 |
| Query | | range: 512 to 810 resolution: 1 |
| *RST Setting | | 20 (PGSM band) |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:RFGENERATOR:CHANNEL:PCS 512" | | |

CALL[:CELL]:RFGenerator:CHANnel:PGSM

| | | |
|--|------|--|
| Function | GSM | Sets/queries the RF Gen Channel for the PGSM band using the RF Generator. Operating mode = Test Mode and Downlink Function = CW. See " CW Test Function Behavior " on page 628 . Additional commands can be appended to aid in controller/Mobile Station synchronization. See " Call Processing Subsystem Overlapped Commands " on page 35 for examples. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 1 to 124 (default: 20) resolution: 1 |
| Query | | range: 1 to 124 resolution: 1 |
| *RST Setting | | 20 (PGSM band) |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:RFGENERATOR:CHANNEL:PGSM 124" | | |

CALL:RFGenerator

CALL[:CELL]:RFGenerator:FREQuency

| | | |
|--|------|--|
| Function | GSM | Sets/queries the RF Gen Frequency selection. Operating mode = Test Mode and Downlink Function = CW. See “ CW Test Function Behavior ” on page 628 . The units (Hz KHz MHz GHz) are optional, if no units are specified then units default to Hz. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 292 MHz to 2700 MHz resolution: 1 |
| Query | | range: 292 MHz to 2700 MHz resolution: 1 |
| *RST Setting | | 939 MHz |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:RFGENERATOR:FREQUENCY 896.2MHz" | | |

CALL[:CELL]:RFGenerator:POWer[:SAMPLitude]

| | | |
|---|------|--|
| Function | GSM | Sets/queries the value for RF Gen Power and turns the state to ON. The suffix dBm is optional. Operating mode = Test Mode and Downlink Function = CW. See “ CW Test Function Behavior ” on page 628 . The RF Gen Power field is affected when there is an amplitude offset, see “ Measurement Related Configuration ” on page 670 . |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: -10 to -100 dBm resolution: .01 dBm |
| Query | | range: -10 to -100 dBm resolution: .01 dBm |
| *RST Setting | | -85 dBm |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:RFGENERATOR:POWER:SAMPLITUDE -50dBm" | | |

CALL[:CELL]:RFGenerator:POWeR:AMPLItude

| | | |
|--|------|---|
| Function | GSM | Set/queries Rf Gen Power. The suffix dBm is optional. Operating mode = Test Mode and Downlink Function = CW. see " “CW Test Function Behavior” on page 628 ". The RF Gen Power field is affected when there is an amplitude offset, see " “Measurement Related Configuration” on page 670 ". |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: -10 to -100 dBm resolution: .01 dBm |
| Query | | range: -10 to -100 dBm resolution: .01 dBm |
| *RST Setting | | -85 dBm |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:RFGENERATOR:POWER:AMPLITUDE -50DBM" | | |

CALL[:CELL]:RFGenerator:POWeR:STATe

| | | |
|---|------|---|
| Function | GSM | Sets/queries the RF Gen Power State. Operating mode = Test Mode and Downlink Function = CW. See " “CW Test Function Behavior” on page 628 ". |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 0 OFF 1 ON |
| Query | | range: 0 OFF 1 ON |
| *RST Setting | | ON |
| Programming Example | | |
| OUTPUT 714; "CALL:CELL:RFGENERATOR:POWER:STATE OFF" | | |

CALL:SIGNaling



This command is not applicable to GPRS.

["Diagram Conventions" on page 283](#)

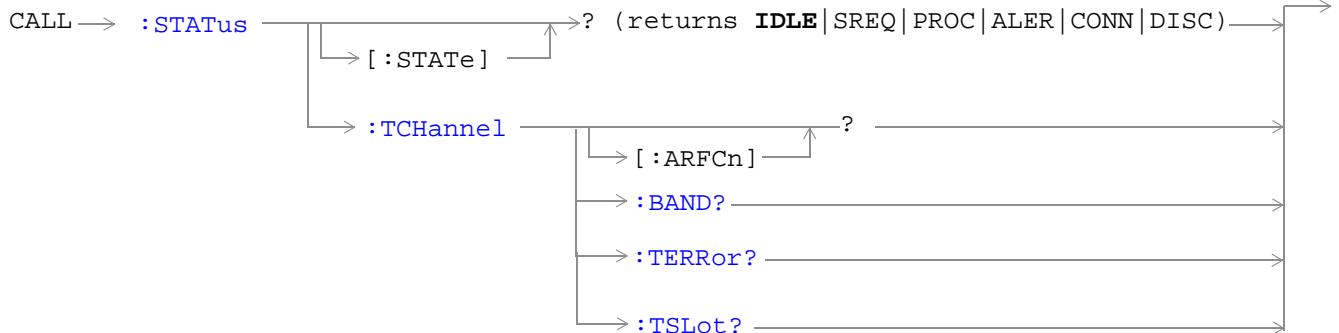
CALL:SIGNaling:MS:TXLevel:FACCH

| | | |
|--|------|--|
| Function | GSM | <p>Sets/queries the TX Level FACCH Signaling parameter.</p> <p>When TX Level FACCH Signaling is set to on, the base station emulator uses both a FACCH (Fast Associated Control CHannel) channel assignment and an update to the SACCH (Slow Associated Control CHannel) header to signal the mobile to change to a new power level.</p> <p>When TX Level FACCH Signaling is set to off, the base station emulator uses only an update to the SACCH header to signal the mobile to change to a new power level. A FACCH channel assignment message is not sent. This setting is useful if you want to update the SACCH header's TX Level field without performing a channel assignment.</p> <p>The setting of TX Level FACCH Signaling can be changed in either of the test set's two operating modes, Active Cell or Test mode.</p> |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 1 ON 0 OFF |
| Query | | 1 0 |
| *RST Setting | | 1 ON |
| Programming Example | | |
| OUTPUT 714;"CALL:SIGNALING:MS:TXLEVEL:FACCH 0" | | |

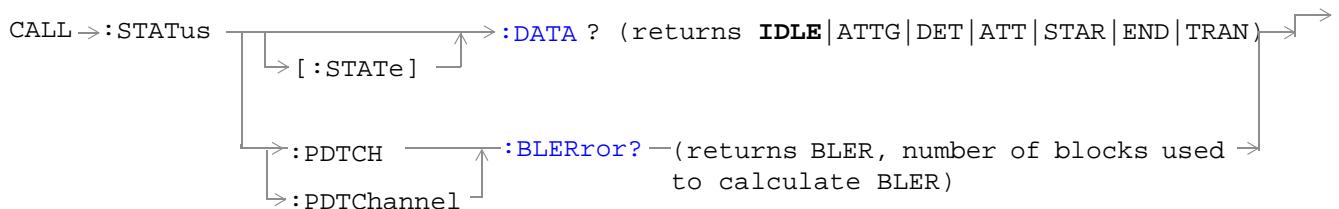
Related Topics

["Configuring the Broadcast Channel \(BCH\)" on page 609](#)

CALL:STATUS



These commands are not applicable to GPRS.



These commands are not applicable to GSM.

“Diagram Conventions” on page 283

CALL:STATus**CALL:STATus[:STATe]?**

| | | | | |
|----------------------------------|--|--|--|--|
| Function | GSM | This query returns the status of the call. See " "Call Processing State Synchronization" on page 37. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Query | range: IDLE SREQ PROC ALER CONN DISC | | | |
| *RST setting | IDLE | | | |
| Programming Example | | | | |
| OUTPUT 714; "CALL:STATUS:STATE?" | | | | |

CALL:STATus[:STATe]:DATA?

| | | | | |
|---------------------------------|--|--|--|--|
| Function | GSM | This command is not applicable to GSM. | | |
| | GPRS | This query returns the status of the data connection. See " "Data Connection Processing State Synchronization" on page 53. | | |
| Query | range: IDLE ATTG DET ATT STAR END TRAN | | | |
| *RST setting | IDLE | | | |
| Programming Example | | | | |
| OUTPUT 714; "CALL:STATUS:DATA?" | | | | |

CALL:STATus:PDTCH | PDTChannel:BLERror?

| | | |
|---------------------|------|---|
| Function | GSM | This command is not applicable to GSM. |
| | GRPS | <p>This query returns the block error rate (BLER) result and the number of blocks tested to calculate the BLER result.</p> <p>The BLER result is only available when the data connection state is transferring (TRAN). See ""CALL:STATus[:STATe]:DATA?" on page 366.</p> <p>The BLER results are reset using ""SYSTem:MEASurement:RESet" on page 587.</p> <p>If you require more details on BLER, see ""BLER Reports Measurement Description" on page 73.</p> |
| Query | | <p>Block error rate</p> <ul style="list-style-type: none"> Range: 0 to 100 and 9.91E+37 (NAN) Resolution: 1 <p>Blocks tested</p> <ul style="list-style-type: none"> Range: 0 to 100000 and 9.91E+37 (NAN) Resolution: 1 |
| *RST setting | | Block error rate: 9.91E+37 (NAN), Blocks tested: 9.91E+37 (NAN) |
| Programming Example | | <pre>OUTPUT 714; "CALL:STATus:PDTCH:BLERror?"</pre> |

CALL:STATus:TCHannel[:ARFCN]?

| | | |
|---------------------|------|---|
| Function | GSM | <p>This query returns the TCH ARFCN for the current band.</p> <p>The call status must be connected (CONN), see ""CALL:STATus[:STATe]?" on page 366.</p> |
| | GRPS | This command is not applicable to GPRS. |
| Query | | <p>range:</p> <ul style="list-style-type: none"> DCS band, channels 512 to 885 EGSM band, channels 975 to 1023 and 0 to 124 PCS band, channels 512 to 810 PGSM band, channels 1 to 124 9.91E+37 <p>resolution: 1</p> |
| *RST setting | | 9.91E+37 (NAN) |
| Programming Example | | <pre>OUTPUT 714; "CALL:STATus:TCHANNEL:ARFCN?"</pre> |

CALL:STATus:TCHannel:BAND?

| | | |
|--|------|---|
| Function | GSM | This query returns the current TCH band. See " Configuring the Traffic Channel (TCH) " on page 619. The CALL:STATUS:STATE must be connected, see " CALL:STATus[:STATe]? " on page 366. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: DCS EGSM PCS PGSM "" |
| *RST setting | | "" (null string) |
| Programming Example | | |
| OUTPUT 714; "CALL:STATUS:TCHANNEL:BAND?" | | |

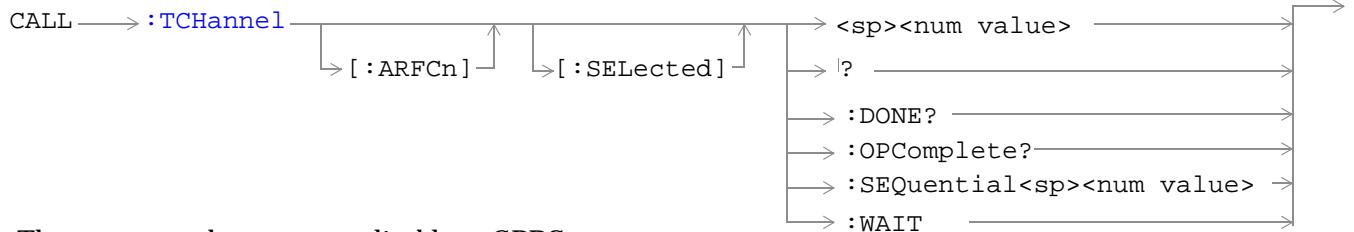
CALL:STATus:TCHannel:TERRor?

| | | |
|--|------|--|
| Function | GSM | This query returns the last burst timing error measurement. This indicates the worst case timing error of all bursts received in a reporting period. If all of the bursts reporting in a period are missing, the query returns 9.91E+37 (NAN). The reference for burst timing error measurements is with respect to the (downlink TCH slot) + (3 slot TX/RX delay [468.75 bits]) - (TCH Timing Advance). The CALL:STATUS:STATE must be connected, see " CALL:STATus[:STATe]? " on page 366. Burst timing error is continuously updated every 480 ms. Burst timing error is displayed in the Call Setup window. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: -8 to +30 T [T=48/13,000,000 seconds approximately 3.69 μ s] and 9.91E+37 resolution: .25 T [approximately .923 μ s] |
| *RST setting | | 9.91E+37 (NAN) |
| Programming Example | | |
| OUTPUT 714; "CALL:STATUS:TCHANNEL:TERROR?" ! Returns Burst Timing Error. | | |

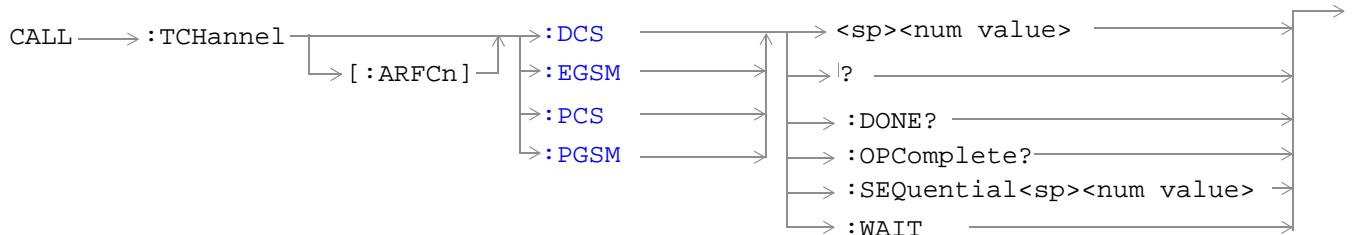
CALL:STATus:TCHannel:TSLOT?

| | | |
|--|------|---|
| Function | GSM | This query returns the Timeslot that the BS Emulator is using for the TCH. See " Configuring the Traffic Channel (TCH) " on page 619. The CALL:STATUS:STATE must be connected, see " CALL:STATus[:STATe]? " on page 366. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | range: 3 4 5 9.91E+37 |
| *RST setting | | 9.91E+37 (NAN) |
| Programming Example <pre>OUTPUT 714; "CALL:STATUS:TCHANNEL:TSLOT?"</pre> | | |

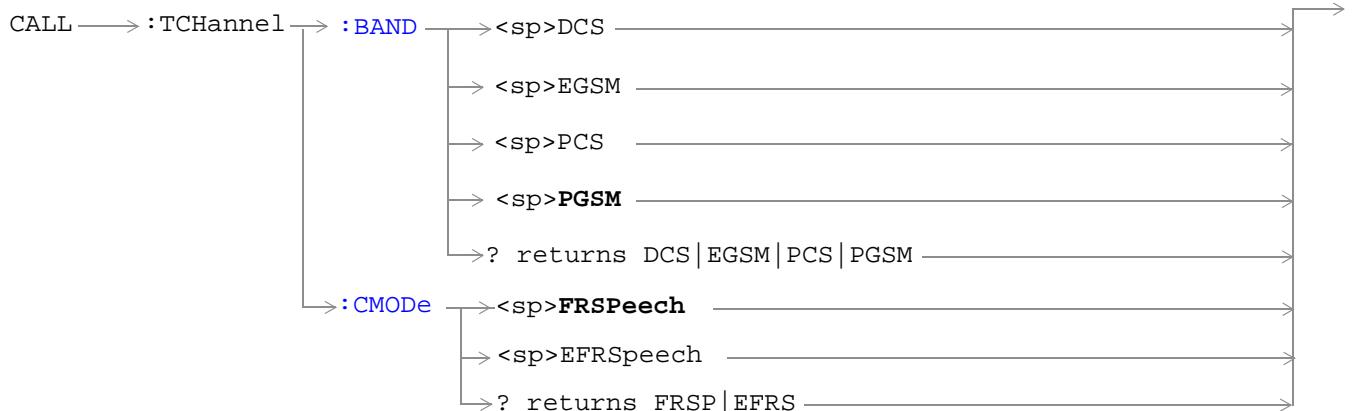
CALL:TChannel



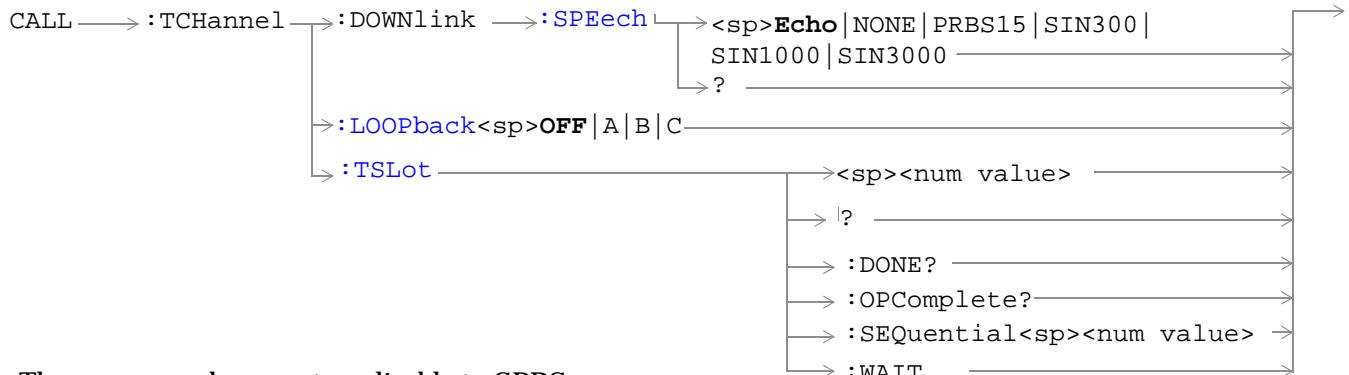
These commands are not applicable to GPRS.



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

[“Diagram Conventions” on page 283](#)

CALL:TChannel[:ARFCn][:SElected]

| | | |
|--|------|---|
| Function | GSM | Sets/queries the channel number of downlink and uplink TCH for the band already selected. Additional commands can be appended to aid in controller/Mobile Station synchronization. See for examples. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | <p>range:</p> <ul style="list-style-type: none"> DCS band, channels 512 to 885 (default: 698) EGSM band, channels 0 to 124 and 975 to 1023 (default: 30) PCS band, channels 512 to 810 (default: 698) PGSM band, channels 1 to 124 (default: 30) <p>resolution: 1</p> |
| Query | | <p>range:</p> <ul style="list-style-type: none"> DCS band, channels 512 to 885 EGSM band, channels 0 to 124 and 975 to 1023 PCS band, channels 512 to 810 PGSM band, channels 1 to 124 <p>resolution: 1</p> |
| *RST Setting | | PGSM and EGSM bands: 30, DCS and PCS bands: 698 |
| Programming Example | | |
| OUTPUT 714; "CALL:TCHANNEL:ARFCN:SELECTED 512" !Selects ARFCN of 512 on the !test set. | | |

CALL:TChannel[:ARFCn]:DCS

| | | |
|---|------|--|
| Function | GSM | Sets/queries the channel number for downlink and uplink TCH for DCS band. See "Configuring the Traffic Channel (TCH)" on page 619 . TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see "CALL:STATus[:STATE]?" on page 366 . Additional commands can be appended to aid in controller/Mobile Station synchronization. See "Call Processing Subsystem Overlapped Command Synchronization Commands" on page 33 for examples. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 512 to 885 (default: 698) resolution: 1 |
| Query | | range: 512 to 885 resolution: 1 |
| *RST Setting | | 698 |
| Programming Example | | |
| OUTPUT 714; "CALL:TCHANNEL:ARFCN:DCS 512" | | |

CALL:TChannel[:ARFCn]:EGSM

| | | |
|--|------|---|
| Function | GSM | Sets/queries channel number for downlink and uplink TCH for EGSM band. See "Configuring the Traffic Channel (TCH)" on page 619 . TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see "CALL:STATus[:STATE]?" on page 366 . Additional commands can be appended to aid in controller/Mobile Station synchronization. See "Call Processing Subsystem Overlapped Command Synchronization Commands" on page 33 for examples. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 0 to 124 975 to 1023 (default: 30) resolution: 1 |
| Query | | range: 0 to 124 975 to 1023 resolution: 1 |
| *RST Setting | | 30 |
| Programming Example | | |
| OUTPUT 714; "CALL:TCHANNEL:ARFCN:EGSM 124" | | |

CALL:TChannel[ARFCN]:PCS

| | | |
|---|------|--|
| Function | GSM | Sets/queries channel number for downlink and uplink TCH for PCS band. See "Configuring the Traffic Channel (TCH)" on page 619 . TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see "CALL:STATus[:STATe]?" on page 366 . Additional commands can be appended to aid in controller/Mobile Station synchronization. See "Call Processing Subsystem Overlapped Command Synchronization Commands" on page 33 for examples. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 512 to 810 (default: 698) resolution: 1 |
| Query | | range: 512 to 810 resolution: 1 |
| *RST Setting | | 698 |
| Programming Example | | |
| OUTPUT 714; "CALL:TCHANNEL:ARFCN:PCS 512" | | |

CALL:TChannel[:ARFCn]:PGSM

| | | |
|--|------|--|
| Function | GSM | Set channel number for downlink and uplink TCH for PGSM band. See "Configuring the Traffic Channel (TCH)" on page 619 . TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see "CALL:STATus[:STATe]?" on page 366 . Additional commands can be appended to aid in controller/Mobile Station synchronization. See "Call Processing Subsystem Overlapped Command Synchronization Commands" on page 33 for examples. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 1 to 124 (default: 30) resolution: 1 |
| Query | | range: 1 to 124 resolution: 1 |
| *RST Setting | | 30 |
| Programming Example | | |
| OUTPUT 714; "CALL:TCHANNEL:ARFCN:PGSM 124" | | |

CALL:TChannel:BAND

| | | |
|---|------|---|
| Function | GSM | Sets/queries which GSM band the BS Emulator should use for the TCH. The test set may be queried for the current TCH band when the CALL:STATUS:STATE is idle or connected, see " CALL:STATus[:STATe]? " on page 366. The test set uses this command to perform a channel assignment, see " How the Test Set Performs a Dualband Handover " on page 140 when the MS will support the band and the CALL:STATUS:STATE is CONNECTed. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: DCS EGSM PCS PGSM bands resolution: 1 |
| Query | | range: DCS EGSM PCS PGSM bands resolution: 1 |
| *RST Setting | | PGSM |
| Related Topic | | See " Traffic Band Parameter " on page 599 . |
| Programming Example <pre>OUTPUT 714; "CALL:TCHANNEL:BAND DCS"</pre> | | |

CALL:TChannel:CMODE

| | | |
|--|------|--|
| Function | GSM | Sets/queries which channel mode the mobile station should use for speech data. This setting is either full rate speech (FRSPeech) or enhanced full rate speech (EFRSpeech). See " Programming a Channel Mode Change " on page 138. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: FRSPeech EFRSpeech |
| Query | | range: FRSP EFRS |
| *RST Setting | | FRSPeech |
| Programming Example <pre>OUTPUT 714; "CALL:TCHANNEL:CMODE EFRSPEECH"</pre> | | |

CALL:TChannel:DOWNlink:SPeech

| | | |
|--|------|--|
| Function | GSM | Set which kind of Speech data is transmitted on the downlink TCH. See “ Configuring the Traffic Channel (TCH) ” on page 619 or “ Fast Bit Error Measurement Description ” on page 90 or “ Test Mode Operating Mode ” on page 621. |
| | GRPS | This command is not applicable to GPRS. |
| Setting | | range: ECHO NONE PRBS15 SIN300 SIN1000 SIN3000 |
| Query | | range: ECHO NONE PRBS15 SIN300 SIN1000 SIN3000 |
| *RST Setting | | ECHO |
| Programming Example | | |
| OUTPUT 714; "CALL:TCHANNEL:DOWNLINK:SPEECH ECHO" | | |

CALL:TChannel:LOOPback

| | | |
|---|------|---|
| Function | GSM | Sets traffic channel loopback state and type for the MS. The loopback type must be set before a Fast Bit Error or a Bit Error measurement will function. The test set will automatically set the correct loopback type if the signalling loopback control is set to on, after the measurement the test set will automatically set the loopback to off. See “ SETup:BERRor:SLControl ” on page 474 or “ SETup:FBERRor:SLControl ” on page 480. See “ Fast Bit Error Measurement Description ” on page 90 or “ Bit Error Measurement Description ” on page 66. |
| | GRPS | This command is not applicable to GPRS. |
| Setting | | range: <ul style="list-style-type: none">• OFF - Sets the TCH Loop state for the MS to OFF. The loop back is open.• A- Sets the TCH Loop state for the MS to type A. Full-rate speech TCH loopback with signalling of erased frames, (residual).• B- Sets the TCH Loop state for the MS to type B. Full-rate speech TCH loopback without signalling of erased frames, (non-residual).• C - Sets the TCH Loop state for the MS to type C. TCH burst by burst loopback. |
| *RST Setting | | OFF |
| Programming Example | | |
| OUTPUT 714; "CALL:TCHANNEL:LOOPBACK C" !Sets loopback type. | | |

CALL:TChannel:TSLOT

| | | |
|---|------|---|
| Function | GSM | Sets the Timeslot number used for downlink and uplink Traffic Channel. See “ Configuring the Traffic Channel (TCH) ” on page 619. Additional commands can be appended to aid in controller/Mobile Station synchronization. See “ Call Processing Subsystem Overlapped Command Synchronization Commands ” on page 33 for examples. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | range: 3 4 5 resolution: 1 |
| Query | | range: 3 4 5 resolution: 1 |
| *RST Setting | | 4 |
| Programming Example | | |
| OUTPUT 714; "CALL:TCHANNEL:TSLOT 5" !Sets time slot number. | | |

DISPlay Subsystem

Description

The DISPlay subsystem is used to configure the test set's display mode or display brightness . Use of the DISPlay subsystem is not required to set or query any data or results.

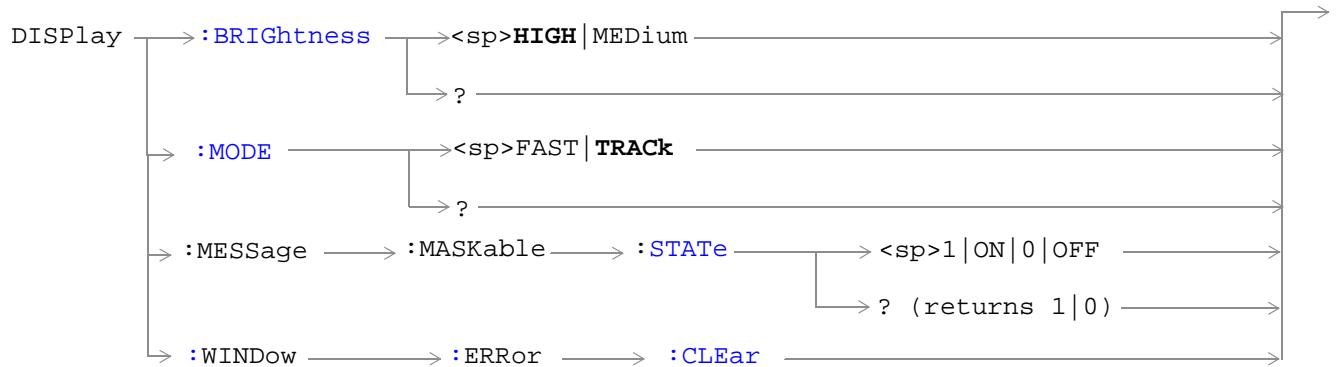
Display Backlight Dimming

The test set's display brightness parameter has two settings at this time, high and medium. The life of the display's backlight will be maximized when brightness is set to medium. The test set has an auto dimming feature that will lower the display brightness automatically if approximately 10 minutes pass without a key being pressed on the test set's front panel. The display will return to the brightness level shown in the Display Brightness field when the test set is set to local and any front panel key is pressed. There is no other user control for this feature.

Syntax Diagram and Command Descriptions

[“DISPlay”](#)

DISPlay



[“Diagram Conventions” on page 283](#)

DISPlay:BRIGHTness

| | |
|--|--|
| Function | Sets/queries the test set's display brightness. A display backlight dimming feature lowers the display brightness after approximately 10 minutes without any manual user interaction with the test set. See "Display Backlight Dimming" on page 377 . |
| Setting | Range: MEDIUM HIGH |
| Query | Range: MED HIGH |
| Factory setting | HIGH (this parameter is not affected by any reset operation and can only be changed by direct user access) |
| Programming Example | |
| OUTPUT 714;"DISPLAY:BRIGHTNESS MEDIUM" !Sets display brightness to medium. | |

DISPlay:MODE

| | |
|--|--|
| Function | Sets/queries the test set's display mode. See "Display Mode (Track/Fast)" on page 676 . |
| Setting | Range: FAST TRACK |
| Query | Range: FAST TRAC |
| *RST setting | TRACK |
| Programming Example | |
| OUTPUT 714;"DISPLAY:MODE FAST" !Sets display mode to fast. | |

DISPlay:MESSAge:MASKable:STATe

| | |
|---|---|
| Function | Blocks maskable messages from appearing on the test set display screen but not from the Message Log. Maskable messages are reported to the Message Log in either state. |
| Setting | Range: On Off |
| Query | Range: On Off |
| Factory setting | On |
| Programming Example | |
| OUTPUT 714;"DISPLAY:MESSAGE:MASKABLE:STATE OFF" !Prevents certain messages from appearing on the display. | |

DISPlay:WINDOW:ERRor:CLEar

| | |
|--|--|
| Function | Clears the error message from the display screen but not from the Message Log. |
| Programming Example | |
| OUTPUT 714;"DISPLAY:WINDOW:ERROR:CLEAR" !Clears an error message from the display. | |

FETCh? Subsystem

Description

The FETCh? query is a function that allows users to query results from a measurement that was previously INITiated or READ. It does NOT begin a measurement. If no measurement is in progress it will return the integrity and measurement values from the last measurement made, or return an integrity of No Result Available and results of NAN. If a measurement is in process, the query will hang until the results are available, or the measurement fails or times out. The exact results returned with a FETCh? will depend on the specific measurement. A measurement may have a number of different results or combination of results for a FETCh?. The FETCh? queries are intended to be used to provide overlapped operation access to measurement results from the test set. When used along with SETup and INITiate commands , FETCh? is the primary way for the user to retrieve measurement results. In order to use the test set's concurrent test capabilities the overlapped commands of INITiate and FETCh? must be used. Overlapped commands allow the user to send commands and not wait for completion.

Syntax Diagrams and Command Descriptions

[“FETCh:AAUDio” on page 381](#)

[“FETCh:BERRor” on page 385](#)

[“FETCh:DAUDio” on page 393](#)

[“FETCh:DPOWer” on page 397](#)

[“FETCh:FBERRor” on page 399](#)

[“FETCh:IQTuning” on page 403](#)

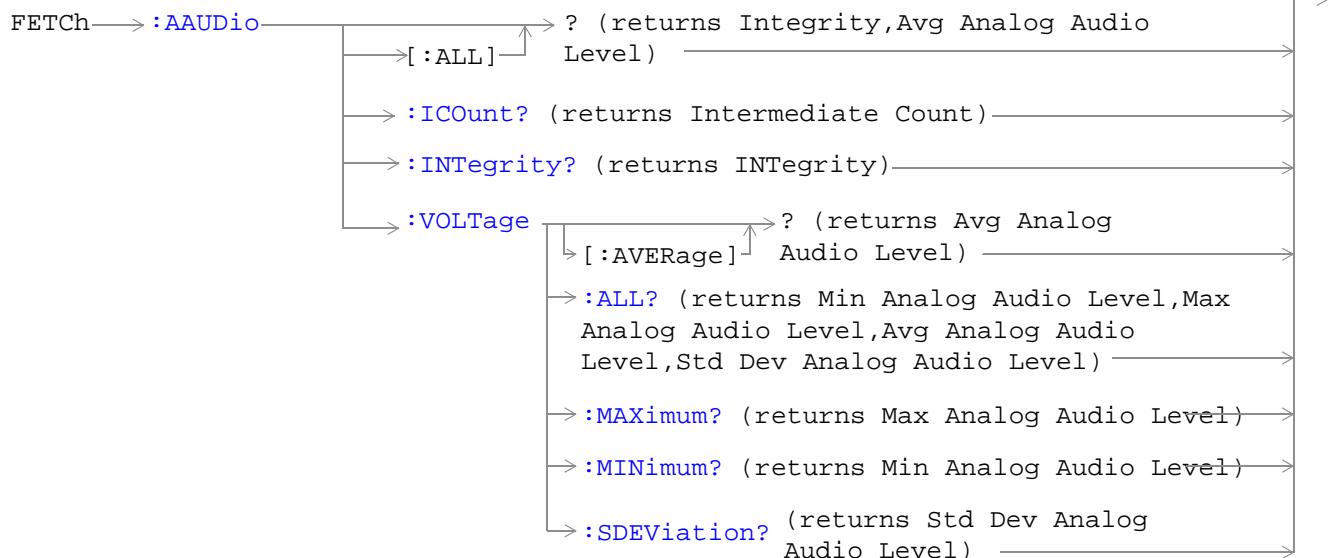
[“FETCh:ORFSpectrum” on page 407](#)

[“FETCh:PFERRor” on page 414](#)

[“FETCh:PVTIme” on page 421](#)

[“FETCh:TXPower” on page 433](#)

FETCh:AAUDio



These commands are not applicable to GPRS.

[“Diagram Conventions” on page 283](#)

FETCh:AAUDio[:ALL]?

| | | |
|----------|------|---|
| Function | GSM | Queries the analog audio measurement results. This query returns an integrity indicator and average analog audio level. Values are returned in a comma-separated list. If the analog audio multi-measurement count field is off, the level returned by this command is displayed in the Analog Audio In Level field. If the analog audio multi-measurement count is on, the level returned by this command is displayed in the Analog Audio Average field. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Integrity indicator</p> <ul style="list-style-type: none"> Range: 0 to 16 Resolution: 1 <p>Analog audio level</p> <ul style="list-style-type: none"> Range: 10 mV_{rms} to 20 V_{rms} Resolution: 0.1 mV_{rms} |

FETCh:AAUDio:ICount?

| | | |
|----------|------|---|
| Function | GSM | Queries the intermediate count of analog audio multi-measurements completed. This value is not displayed on the test set. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Range: 1 to 999</p> <p>Resolution: 1</p> |

FETCh:AAUDio:INTegrity?

| | | |
|----------|------|--|
| Function | GSM | Queries the integrity indicator for the last analog audio measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 146 for descriptions of non-zero integrity indicators. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Range: 0 to 16</p> <p>Resolution: 1</p> |

FETCh:AAUDIO:VOLTage[:AVERage]?

| | | |
|----------|------|---|
| Function | GSM | Queries the average analog audio level. Value is returned in units of V_{rms} . If the analog audio multi-measurement count field is off, the level returned by this command is displayed in the Analog Audio In Level field. If the analog audio multi-measurement count is on, the level returned by this command is displayed in the Analog Audio Average field |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 10 mV_{rms} to 20 V_{rms} Resolution: 0.1 mV_{rms} |

FETCh:AAUDIO:VOLTage:ALL?

| | | |
|----------|------|--|
| Function | GSM | Queries the analog audio multi-measurement minimum, maximum, average and standard deviation. Values are returned in a comma-separated list The values returned are displayed in the Analog Audio Minimum, Maximum, Average, and Std. Dev. fields, which are displayed when the Analog Audio multi-measurement count is not off. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Minimum</p> <ul style="list-style-type: none"> Range: 10 mV_{rms} to 20 V_{rms} Resolution: 0.1 mV_{rms} <p>Maximum</p> <ul style="list-style-type: none"> Range: 10 mV_{rms} to 20 V_{rms} Resolution: 0.1 mV_{rms} <p>Average</p> <ul style="list-style-type: none"> Range: 10 mV_{rms} to 20 V_{rms} Resolution: 0.1 mV_{rms} <p>Standard deviation</p> <ul style="list-style-type: none"> Range: 0 V to 14.14214 V Resolution: 0.01 mV |

FETCh:AAUDio:VOLTage:MAXimum?

| | | |
|----------|------|---|
| Function | GSM | Queries the analog audio multi-measurement maximum analog audio voltage. The value returned is displayed in the Analog Audio Maximum field, which is displayed when the analog audio multi-measurement count is not off. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 10 mV _{rms} to 20 V _{rms} Resolution: 0.1 mV _{rms} |

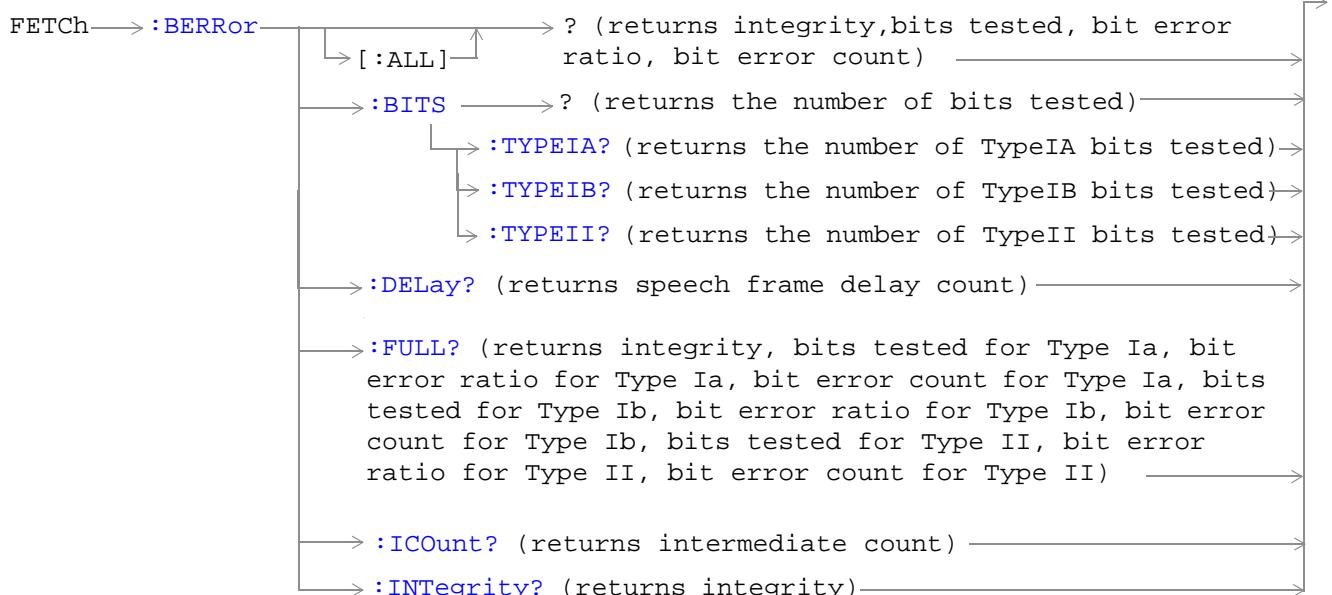
FETCh:AAUDio:VOLTage:MINimum?

| | | |
|----------|------|--|
| Function | GSM | Queries the analog audio multi-measurement minimum analog audio voltage The value returned is displayed in the Analog Audio Minimum field, which is displayed when the analog audio multi-measurement count is not off. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 10 mV _{rms} to 20 V _{rms} Resolution: 0.1 mV _{rms} |

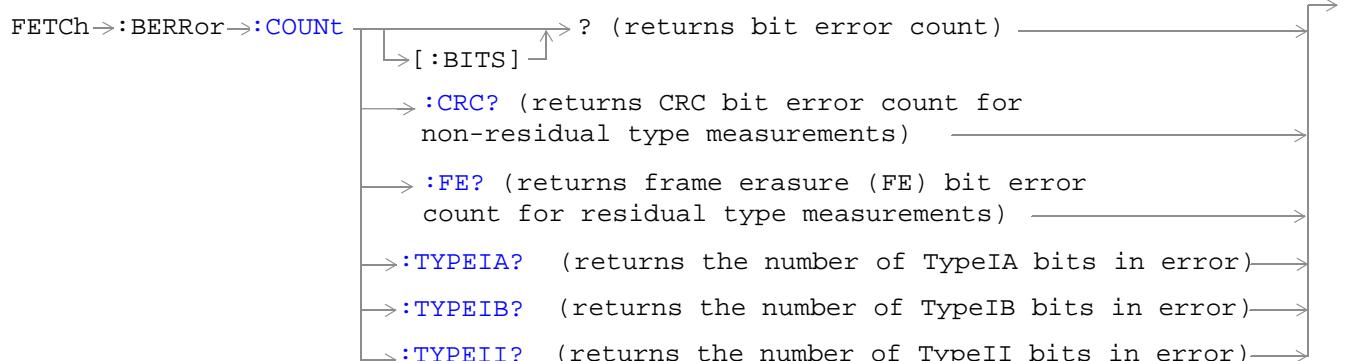
FETCh:AAUDio:VOLTage:SDEViation?

| | | |
|----------|------|--|
| Function | GSM | Queries the analog audio multi-measurement standard deviation. The value returned is displayed in the Analog Audio Std Dev. field, which is displayed when the Analog Audio multi-measurement count is not off. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 V to 14.14214 V Resolution: 0.01 mV |

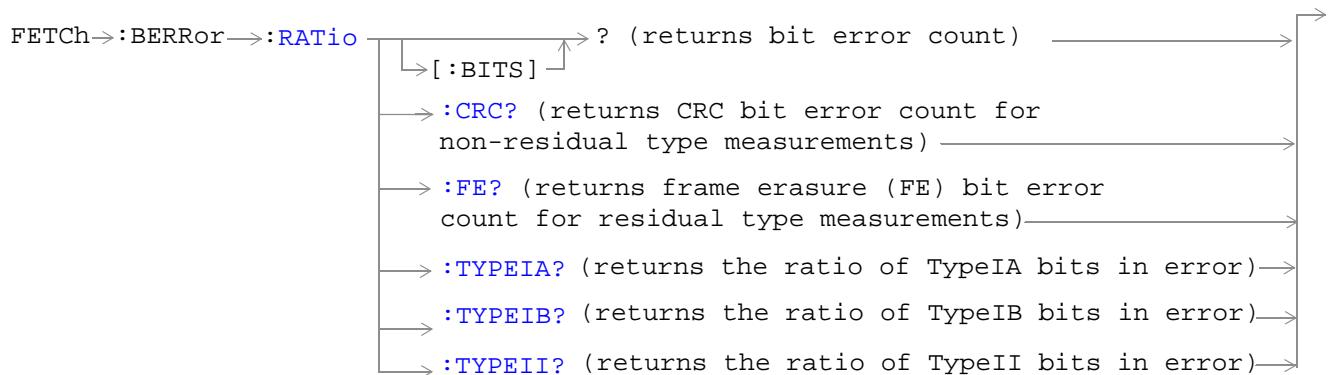
FETCh:BERRor



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

[“Diagram Conventions” on page 283](#)

FETCh:BERRor[:ALL]?

| | | |
|----------|------|---|
| Function | GSM | Queries the bit error measurement. Query returns integrity indicator, bits tested, bit error ratio, and bit error count. (A similar query, "FETCh:BERRor:FULL?" on page 390 , returns the same results but for all bit types simultaneously.) See "Bit Error Measurement Description" on page 66 . |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Integrity indicator</p> <ul style="list-style-type: none"> • Range: 0 to 16 • Resolution: 1 <p>Bits tested</p> <ul style="list-style-type: none"> • Range: 0 to 999,131 and 9.91 E+37 (NAN) • Resolution: 1 <p>Bit error ratio</p> <ul style="list-style-type: none"> • Range: 0 to 100 and 9.91 E+37 (NAN) • Resolution: 0.01 <p>Bit error count</p> <ul style="list-style-type: none"> • Range: 1 to 999,131 and 9.91 E+37 (NAN) • Resolution: 1 |

FETCh:BERRor:BITS?

| | | |
|--------------|------|--|
| Function | GSM | Queries the number of bits actually tested. This query only returns the result of the bit type set using the SETup:BERRor[:TYPE] command. The number of bits actually tested will exceed the number requested because the test set rounds up the number requested to the nearest number that results in an integral number of speech frames. One speech frame is 132 bits. The test set measures complete a speech frame and it is queried for bits. See "Bit Error Measurement Description" on page 66 |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Bits tested</p> <ul style="list-style-type: none"> • Range: 0 to 999,131 and 9.91 E+37 (NAN) • Resolution: 1 |
| *RST Setting | | 10,000 |

FETCH:BERRor:BITS:TYPEIa|TYPEIb|TYPEII?

| | | |
|----------|------|---|
| Function | GSM | Queries the number of bits which have been tested. This query allows you to select the bit type you want to query; either Type Ia, Type Ib or Type II. See " Bit Error Measurement Description " on page 66 |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range for Type Ia: 0 to 999,000 and 9.91 E+37 (NAN) Range for Type Ib: 0 to 2,637,369 and 9.91 E+37 (NAN) Range for Type II: 0 to 1,558,440 and 9.91 E+37 (NAN) Resolution: 1 |

FETCH:BERRor:COUNT[:BITS]?

| | | |
|----------|------|---|
| Function | GSM | Queries the number of bits that were in error during the last bit error test. See " Bit Error Measurement Description " on page 66 The manual user must set the measurement unit to count. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 1 to 999,131 and 9.91 E+37 (NAN) Resolution: 1 |

FETCH:BERRor:COUNT:CRC?

| | | |
|----------|------|---|
| Function | GSM | Queries the number of bad cyclic redundancy checks (CRCs) for a non-residual measurement type, loopback type B test. See " Bit Error Measurement Description " on page 66 The mobile station re-transmits the CRC it received from the test set on the uplink. A bad CRC occurs when the CRC transmitted by the test set does not match what is received back from the mobile station. The manual user must set the measurement unit to count. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 19,980 and 9.91 E+37 (NAN) Resolution: 1 |

FETCh:BERRor:COUNT:FE?

| | | |
|----------|------|--|
| Function | GSM | Queries the number of frames erased during a residual measurement type, looback type A test. The manual user must set the measurement's unit to count. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 19,980 and 9.91 E+37 (NAN) Resolution: 1 |

FETCh:BERRor:COUNT:TYPEIa|TYPEIb|TYPEII?

| | | |
|----------|------|---|
| Function | GSM | Queries the number of bits in error. This query allows you to select the bit type you want to query; either Type Ia, Type Ib or Type II. See "Bit Error Measurement Description" on page 66 |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range for Type Ia: 0 to 999,000 and 9.91 E+37 (NAN) Range for Type Ib: 0 to 2,637,369 and 9.91 E+37 (NAN) Range for Type II: 0 to 1,558,440 and 9.91 E+37 (NAN) Resolution: 1 |

FETCh:BERRor:DELay?

| | | |
|--------------|------|---|
| Function | GSM | Queries the delay (in speech frames) that the test set used during the last bit error measurement to correlate uplink information bits with downlink information bits. This value is displayed in the Speech Frames Delay field. This value can be determined automatically, or manually set by the user. See "SETup:BERRor:MANual:DELay" on page 473 and "SETup:BERRor:LDControl:AUTO" on page 473 . Refer also to the "Bit Error Measurement Description" on page 66 for a description of frame delay and how it is used in the bit error measurement. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 15 and 9.91 E+37 (NAN) Resolution: 1 |
| *RST Setting | | Auto |

FETCH:BERRor:FULL?

| | | |
|----------|------|---|
| Function | GSM | Queries the bit error measurement. Returns Integrity Indicator see "Integrity Indicator" on page 146 , Bits Tested, Bit Error Ratio and Bit Error Count for Type Ia, Type Ib and Type II bits. (A similar query, "FETCH:BERRor[:ALL]?" on page 387 , returns the same results but only for the bit type previously set using the SETup:BERRor[:TYPE] command.) See "Bit Error Measurement Description" on page 66 |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Integrity indicator</p> <ul style="list-style-type: none"> • Range: 0 to 16 • Resolution: 1 <p>Type Ia Bits tested</p> <ul style="list-style-type: none"> • Range: 0 to 999,000 and 9.91E+37 (NAN) • Resolution: 1 <p>Type Ia Bit error ratio</p> <ul style="list-style-type: none"> • Range: 0 to 100 and 9.91E+37 (NAN) • Resolution: 0.01 <p>Type Ia Bit error count</p> <ul style="list-style-type: none"> • Range: 0 to 999,000 and 9.91E+37 (NAN) • Resolution: 1 <p>Type Ib Bits tested</p> <ul style="list-style-type: none"> • Range: 0 to 2,637,369 and 9.91E+37 (NAN) • Resolution: 1 <p>Type Ib Bit error ratio</p> <ul style="list-style-type: none"> • Range: 0 to 100 and 9.91E+37 (NAN) • Resolution: 0.01 <p>Type Ib Bit error count</p> <ul style="list-style-type: none"> • Range: 0 to 2,637,369 and 9.91E+37 (NAN) • Resolution: 1 <p>Type II Bits tested</p> <ul style="list-style-type: none"> • Range: 0 to 15,584,400 and 9.91E+37 (NAN) • Resolution: 1 <p>Type II Bit error ratio</p> <ul style="list-style-type: none"> • Range: 0 to 100 and 9.91E+37 (NAN) • Resolution: 0.01 <p>Type II Bit error count</p> <ul style="list-style-type: none"> • Range: 0 to 1,558,440 and 9.91E+37 (NAN) • Resolution: 1 |

FETCh:BERRor:ICount?

| | | |
|----------|------|--|
| Function | GSM | Queries the intermediate count of bits tested (measurement progress report). See "Measurement Progress Report" on page 152 |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 999 Resolution: 1 |

FETCh:BERRor:INTegrity?

| | | |
|----------|------|---|
| Function | GSM | Returns the integrity indicator value for the last bit error measurement performed. Zero indicates a normal result. See "Integrity Indicator" on page 146 for descriptions of non-zero integrity indicators. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 16 Resolution: 1 |

FETCh:BERRor:RATio[:BITS]?

| | | |
|----------|------|--|
| Function | GSM | Queries the ratio of bits in error to the number of bits tested during the last bit error test and returns it as a percentage. See "Bit Error Measurement Description" on page 66 The manual user must set the measurement unit to %. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 1 to 100 and 9.91 E+37 (NAN) Resolution: 0.01 |

FETCh:BERRor:RATio:CRC?

| | | |
|----------|------|---|
| Function | GSM | Queries the ratio of bad cyclic redundancy checks (CRCs) to the total number of CRCs received for a non-residual measurement type, looback type B test and returns it as a percentage. See " Bit Error Measurement Description " on page 66 The mobile station re-transmits the CRC it received from the test set on the uplink. A bad CRC occurs when the CRC transmitted by the test set does not match what is received back from the mobile station. The manual user must set the measurement's unit to %. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 100 and 9.91 E+37 (NAN) Resolution: 0.01 |

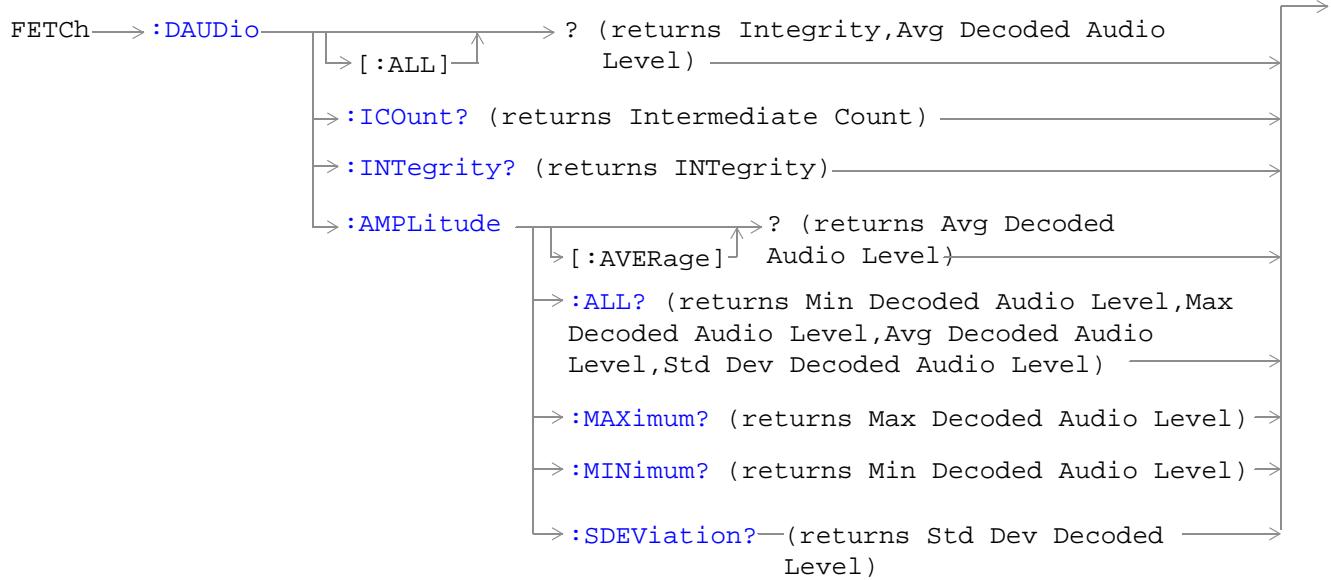
FETCh:BERRor:RATio:FE?

| | | |
|----------|------|--|
| Function | GSM | Queries the ratio of erased frames to the total number of frames received for a residual measurement type, looback type A test and returns them as a percentage. See " Bit Error Measurement Description " on page 66 The manual user must set the measurement's unit to %. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 100 and 9.91 E+37 (NAN) Resolution: 0.01 |

FETCh:BERRor:RATio:TYPEIa|TYPEIb|TYPEII?

| | | |
|----------|------|--|
| Function | GSM | Queries the number of bits in error to the number of bits tested. This query allows you to select the bit type you want to query; either Type Ia, Type Ib or Type II. The result is returned as a percentage. See " Bit Error Measurement Description " on page 66 |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 100 and 9.91 E+37 (NAN) Resolution: 0.01 |

FETCh:DAUDIO



These commands are not applicable to GPRS.

“Diagram Conventions” on page 283

FETCH:DAUDIO[:ALL]?

| | | |
|----------|------|--|
| Function | GSM | Queries integrity indicator and average decoded audio results. Values are returned in a comma-separated list. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Integrity indicator:</p> <ul style="list-style-type: none"> • Range: 0 to 16 • Resolution: 1 <p>Decoded audio:</p> <ul style="list-style-type: none"> • Range: 0 to 100% • Resolution: 0.01% FS |

FETCH:DAUDIO:ICOUNT?

| | | |
|----------|------|---|
| Function | GSM | Queries the intermediate count of decoded audio multi-measurements completed. This value is not displayed on the test set. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Range: 1 to 999</p> <p>Resolution: 1</p> |

FETCH:DAUDIO:INTEGRITY?

| | | |
|----------|------|--|
| Function | GSM | Queries the integrity indicator for the last decoded audio measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 146 for descriptions of non-zero integrity indicators. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Range: 0 to 16</p> <p>Resolution: 1</p> |

FETCh:DAUDio:AMPLitude[:AVERage]?

| | | |
|----------|--|--|
| Function | GSM | Queries the average decoded audio result from an uplink speech level measurement in percent full scale. If the decoded audio multi-measurement count field is off, the level returned by this command is displayed in the Decoded Audio Level field. If the decoded audio multi-measurement count is on, the level returned by this query is displayed in the Average field |
| | GPRS | This command is not applicable to GPRS. |
| Query | Range: 0 to 100% Resolution: 0.01% FS | |

FETCh:DAUDio:AMPLitude:ALL?

| | | |
|----------|--|--|
| Function | GSM | Queries the decoded audio multi-measurement minimum, maximum, average and standard deviation. Values are returned in a comma-separated list. The values returned are displayed in the Minimum, Maximum, Average, and Std. Dev. fields, which are displayed when the decoded audio multi-measurement count is not off. |
| | GPRS | This command is not applicable to GPRS. |
| Query | <p>Minimum:</p> <ul style="list-style-type: none"> Range: 0 to 100% Resolution: 0.01% FS <p>Maximum:</p> <ul style="list-style-type: none"> Range: 0 to 100% Resolution: 0.01% FS <p>Average:</p> <ul style="list-style-type: none"> Range: 0 to 100% Resolution: 0.01% FS <p>Standard deviation:</p> <ul style="list-style-type: none"> Range: 0 to 71% Resolution: 0.001% FS | |

FETCh:DAUDio:AMPLitude:MAXimum?

| | | |
|----------|------|---|
| Function | GSM | Queries the decoded audio multi-measurement maximum decoded audio voltage. The value returned is displayed in the Decoded Audio Maximum field, which is displayed when the decoded audio multi-measurement count is not off. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 100% Resolution: 0.01% FS |

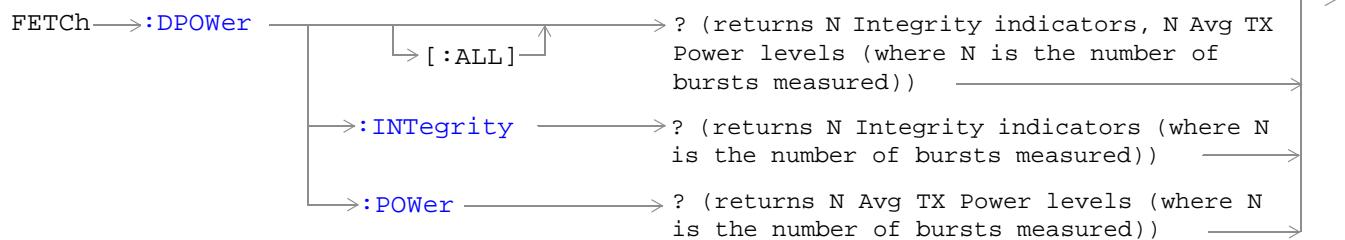
FETCh:DAUDio:AMPLitude:MINimum?

| | | |
|----------|------|--|
| Function | GSM | Queries the decoded audio multi-measurement minimum decoded audio voltage The value returned is displayed in the Decoded Audio Minimum field, which is displayed when the decoded audio multi-measurement count is not off. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 100% Resolution: 0.01% FS |

FETCh:DAUDio:AMPLitude:SDEViation?

| | | |
|----------|------|---|
| Function | GSM | Queries the decoded audio multi-measurement standard deviation. The value returned is displayed in the Decoded Audio Std Dev. field, which is displayed when the Decoded Audio multi-measurement count is not off. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 71% Resolution: 0.001% FS |

FETCh:DPOWer



These commands are not applicable to GPRS.

[“Diagram Conventions” on page 283](#)

FETCH:DPOWер[:ALL]?

| | | |
|----------|------|--|
| Function | GSM | Queries the Dynamic Power measurement results. Query returns N integrity indicators and N average TX power levels (where N is the number of bursts measured). To set the number of bursts you want to measure, use “ SETup:DPOWер:COUNT:NUMBER ” on page 490. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Integrity indicators for each individual burst</p> <ul style="list-style-type: none"> Range: 0 to 16 Resolution: 1 <p>Average TX power levels for each individual burst</p> <ul style="list-style-type: none"> Range: -100 to +100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dBm |

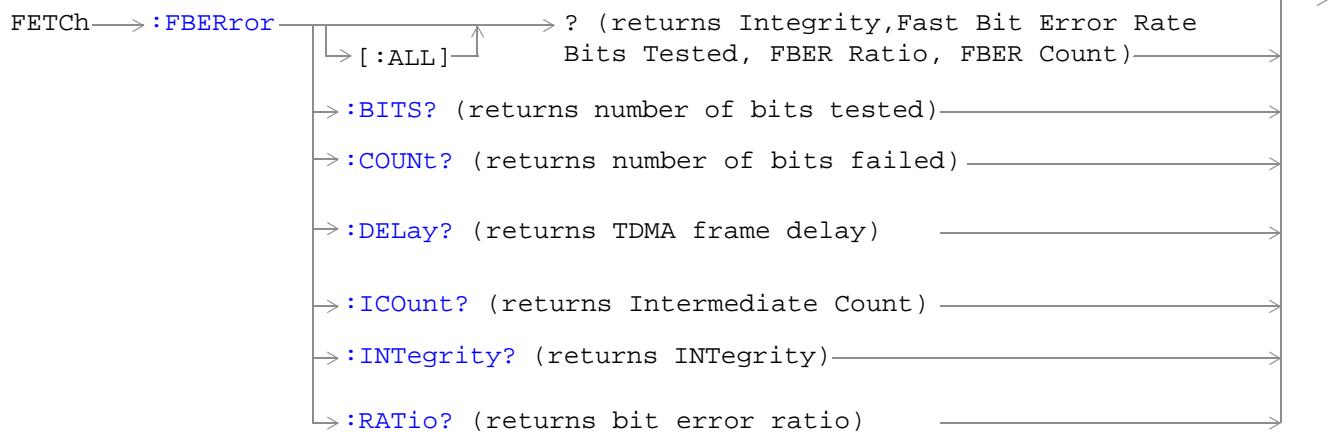
FETCH:DPOWер:INTegrity?

| | | |
|----------|------|--|
| Function | GSM | Returns N integrity indicators (where N is the number of bursts measured). To set the number of bursts you want to measure, use “ SETup:DPOWер:COUNT:NUMBER ” on page 490. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Range: 0 to 16</p> <p>Resolution: 1</p> |

FETCH:DPOWер:POWER?

| | | |
|----------|------|---|
| Function | GSM | Queries the average TX power levels for the Dynamic Power measurement. Returns N average power levels (where N is the number of bursts measured). To set the number of bursts you want to measure, see “ SETup:DPOWер:COUNT:NUMBER ” on page 490. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Range: -100 to +100 dB and 9.91 E+37 (NAN)</p> <p>Resolution: 0.01 dB</p> |

FETCh:FBERror



These commands are not applicable to GPRS.

[“Diagram Conventions” on page 283](#)

FETCh:FBERror

FETCh:FBERror[:ALL]?

| | | |
|----------|------|--|
| Function | GSM | Queries the fast bit error measurement. Query returns integrity indicator, bits tested, bit error ratio, and bit error count. Bit error ratio is displayed in the Fast Bit Error field. The other values returned by this query are not available on the front panel display. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Integrity indicator:</p> <ul style="list-style-type: none">• Range: 0 to 16• Resolution: 1 <p>Bits tested:</p> <ul style="list-style-type: none">• Range: 1 to 999,455 and 9.91 E+37 (NAN)• Resolution: 1 <p>Bit error ratio:</p> <ul style="list-style-type: none">• Range: 0 to 100 and 9.91 E+37 (NAN)• Resolution: 0.01 <p>Fast bit error count:</p> <ul style="list-style-type: none">• Range: 1 to 999,455 and 9.91 E+37 (NAN)• Resolution: 1 |

FETCh:FBERror:BITS?

| | | |
|----------|------|---|
| Function | GSM | Queries the total number of information bits tested during the last fast bit error measurement. See " SETup:FBERror:COUNt " on page 479 This value is not available on the front panel display. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 1 to 999,455 and 9.91 E+37 (NAN) Resolution: 1 |

FETCh:FBERror:COUNt?

| | | |
|----------|------|---|
| Function | GSM | Queries the number of information bits that were deemed errors during the last fast bit error test. This value is not available on the front panel display. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 1 to 999,455 and 9.91 E+37 (NAN) Resolution: 1 |

FETCh:FBERror:DELay?

| | | |
|----------|------|--|
| Function | GSM | Queries the delay (in TDMA frames) the test set used during the last fast bit error measurement to correlate uplink information bits with downlink information bits. This value is displayed in the TDMA Frame Delay field. This value can be determined automatically, or set by the user. See "SETup:FBERror:MANual:DELAY" on page 480 and "SETup:FBERror:LDControl:AUTO" on page 479 for setting this value manually. Refer also to the "Fast Bit Error Measurement Description" on page 90 for a description of frame delay and how it is used in the fast bit error measurement. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 26 and 9.91 E+37 Resolution: 1 |

FETCh:FBERror:ICount?

| | | |
|----------|------|---|
| Function | GSM | Queries the intermediate count (measurement progress report) of bits tested |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 999,455 and 99.9 E+37 |

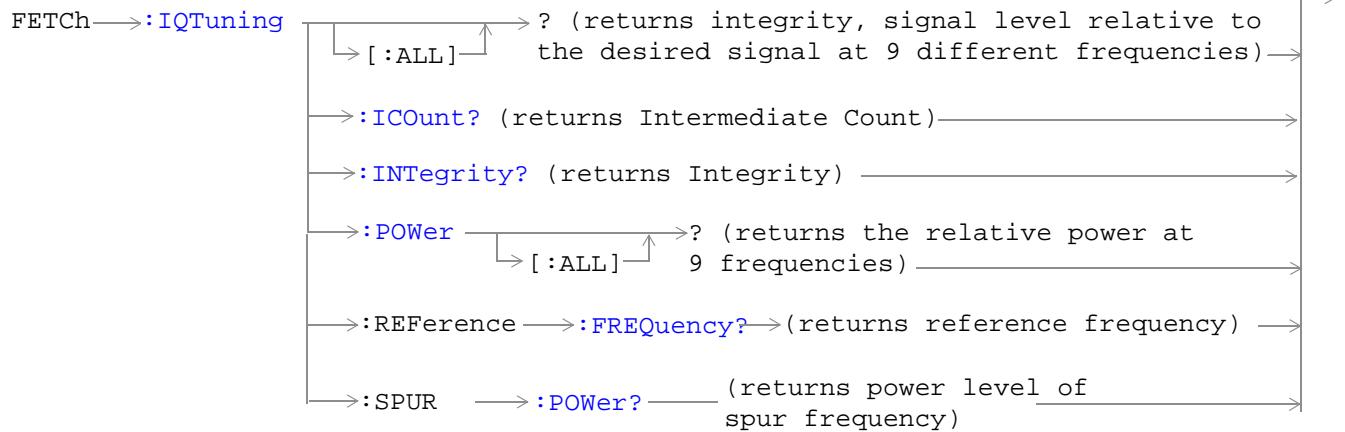
FETCH:FBERror:INTegrity?

| | | |
|----------|------|--|
| Function | GSM | Returns the integrity indicator value for the last fast bit error measurement performed. Zero indicates a normal result. See “ Integrity Indicator ” on page 146 for descriptions of non-zero integrity indicators. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 16 Resolution: 1 |

FETCH:FBERror:RATio?

| | | |
|----------|------|---|
| Function | GSM | Queries the ratio of bits deemed bad to total bits tested during the last fast bit error measurement performed. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 100 and 9.99 E+37 Resolution: 0.01 |

FETCh:IQTuning



These commands are not applicable to GPRS.

[“Diagram Conventions” on page 283](#)

FETCh:IQTuning

FETCh:IQTuning[:ALL]?

| | | |
|----------|------|---|
| Function | GSM | Queries the I/Q Tuning measurement results. Query returns the integrity indicator and the relative power level at the following offset frequencies: carrier frequency, +/-67.7083 kHz, +/-135.417 kHz, +/-203.125 kHz, +/-270.833 kHz. The spur measurement result is also returned. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Integrity indicator</p> <ul style="list-style-type: none">• Range: 0 to 16• Resolution: 1 <p>Signal level relative to the desired signal at 9 different frequencies</p> <ul style="list-style-type: none">• Range: -100 to +100 dB and 9.91 E+37 (NAN)• Resolution: 0.01 dB <p>The order of the signal level results are:</p> <ul style="list-style-type: none">• -270.833 kHz• -203.125 kHz• -135.417 kHz• -67.7083 kHz• carrier frequency• +67.7083 kHz• +135.417 kHz• +203.125 kHz• +270.833 kHz <p>Relative power of the spur frequency:</p> <ul style="list-style-type: none">• Range: -100 to +100 dB and 9.91E+37 (NAN)• Resolution: 0.01 dB |

FETCh:IQTuning:ICount?

| | | |
|----------|------|---|
| Function | GSM | Queries the intermediate number of I/Q Tuning multi-measurements completed. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Range: 0 to 999</p> <p>Resolution: 1</p> |

FETCh:IQTuning:INTegrity?

| | | |
|----------|------|--|
| Function | GSM | Returns the integrity indicator value for the last I/Q Tuning measurement performed. Zero indicates a normal result. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: 0 to 16 Resolution: 1 |

FETCh:IQTuning:POWeR[:ALL]?

| | | |
|----------|------|---|
| Function | GSM | Queries the I/Q Tuning measurement results. Query returns the relative power level at the following offset frequencies: carrier frequency, ± 67.7083 kHz, ± 135.417 kHz, ± 203.125 kHz, ± 270.833 kHz. The spur measurement result is also returned. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Signal level relative to the desired signal at 9 different frequencies</p> <ul style="list-style-type: none"> Range: -100 to +100 dB and 9.91 E+37 (NAN) Resolution: 0.01 dB <p>The order of the signal level results are:</p> <ul style="list-style-type: none"> -270.833 kHz -203.125 kHz -135.417 kHz -67.7083 kHz carrier frequency +67.7083 kHz +135.417 kHz +203.125 kHz +270.833 kHz <p>Relative power of the spur frequency:</p> <ul style="list-style-type: none"> Range: -100 to +100 dB and 9.91E+37 (NAN) Resolution: 0.01 dB |

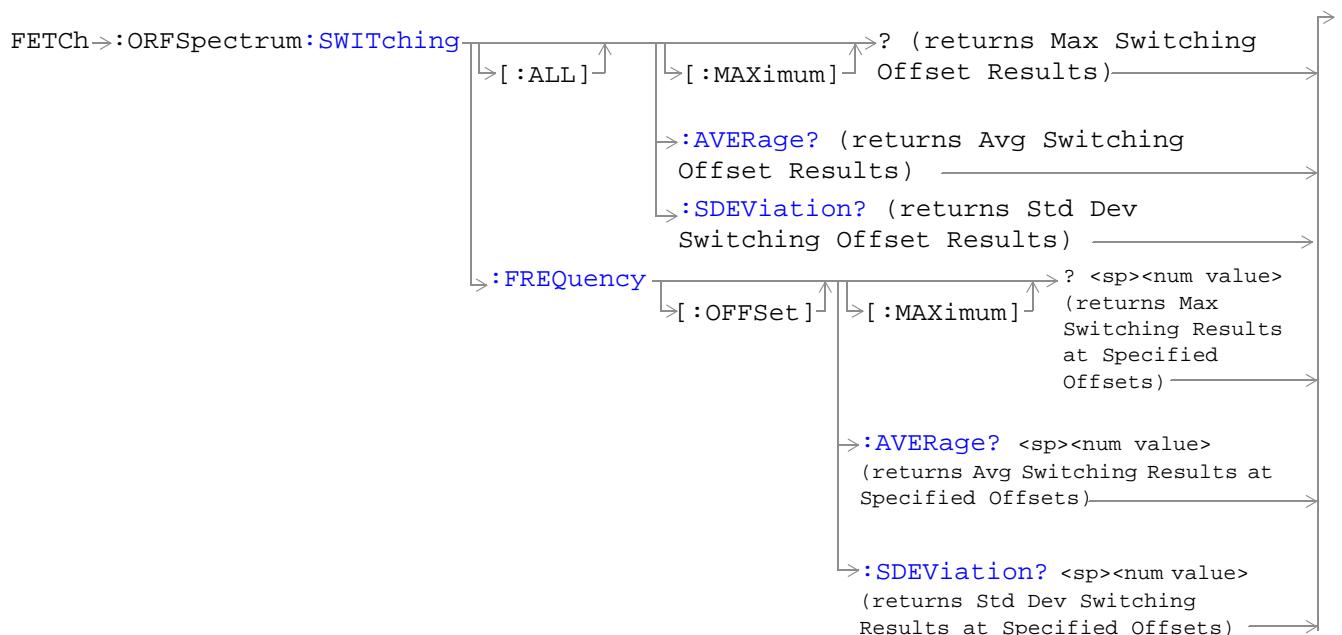
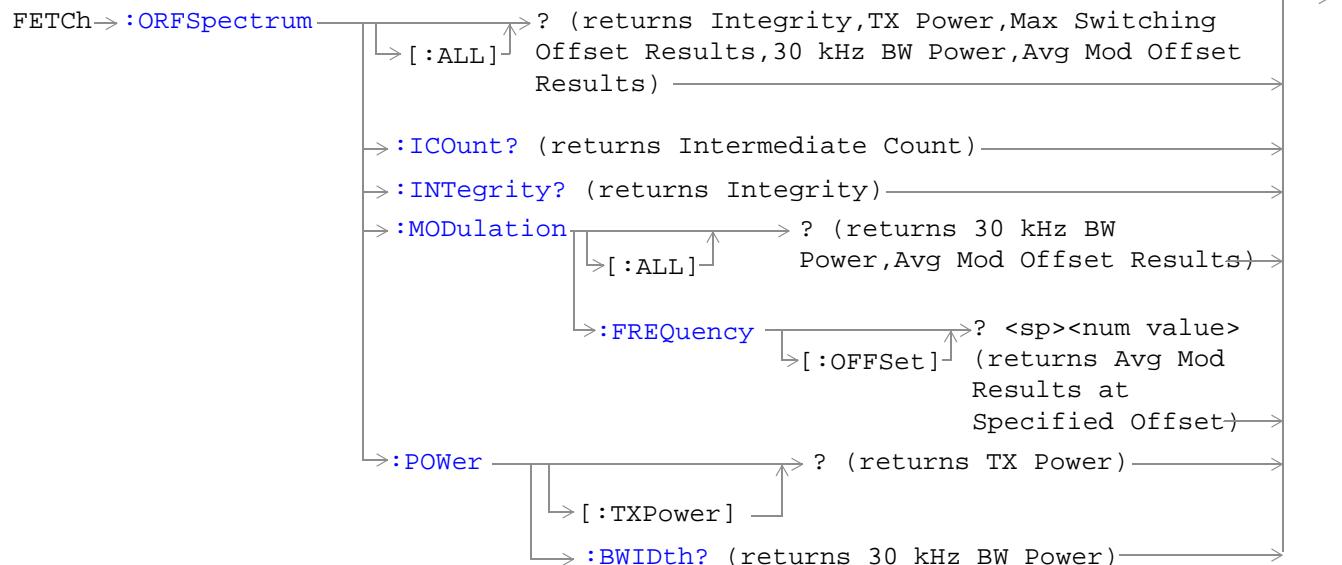
FETCh:IQTuning**FETCh:IQTuning:REFerence:FREQuency?**

| | | |
|----------|------|---|
| Function | GSM | Queries the offset frequency being used as the reference for the measurement. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | NEG67KHZ ZEROKHZ POS67KHZ UNKNOWN |

FETCh:IQTuning:SPUR:POWeR?

| | | |
|----------|------|---|
| Function | GSM | Queries the relative power level of the spur frequency. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | Range: -100 to +100 dB and 9.91 E+37 (NAN) Resolution: 0.01 dB |

FETCh:ORFSpectrum



[“Diagram Conventions” on page 283](#)

FETCh:ORFSpectrum[:ALL]?

| | | |
|----------|---|--|
| Function | GSM | Queries integrity indicator, TX carrier power, up to eight comma-separated output RF spectrum due to switching (max) results, 30 kHz bandwidth power, and up to 22 output RF spectrum due to modulation (average) results. |
| | GPRS | <p>The “SETup:ORFSpectrum:SWITching:FREQuency[:OFFSet]” command sets up the number of output RF spectrum due to switching offsets that are turned on and their frequency values. The “SETup:ORFSpectrum:SWITching:FREQuency:POINts?” queries the number of output RF spectrum due to switching points that are turned on, indicating the number of output RF spectrum due to switching (max) values to expect when you FETCh results.</p> <p>The “SETup:ORFSpectrum:MODulation:FREQuency[:OFFSet]” command sets up the number of output RF spectrum due to modulation offsets that are turned on and their frequency values. The “SETup:ORFSpectrum:MODulation:FREQuency:POINts?” command queries the number of output RF spectrum due to modulation points that are turned on, indicating the number of output RF spectrum due to modulation (average) values to expect when you FETCh results.</p> |
| Query | <p>Integrity indicator</p> <ul style="list-style-type: none"> Range: 0 to 16 Resolution: 1 <p>TX Carrier Power</p> <ul style="list-style-type: none"> Range: -100 dBm to +100 dBm and 9.91 E+37 Resolution: 0.01 dB <p>Output RF Spectrum Due to Switching (Max)</p> <ul style="list-style-type: none"> Range: -100 dBm to +100 dBm and 9.91 E+37 Resolution: 0.01 dB <p>30 kHz Bandwidth Power</p> <ul style="list-style-type: none"> Range: -100 dBm to +100 dBm and 9.91 E+37 Resolution: 0.01 dB <p>Output RF Spectrum due to Modulation (Average)</p> <ul style="list-style-type: none"> Range: -200 dB to +100 dB and 9.91 E+37 Resolution: 0.01 dB | |

FETCh:ORFSpectrum:ICount?

| | | |
|----------|---|--|
| Function | GSM | Queries the intermediate count of ORFS multi-measurements completed. This number will climb to the number returned by “ SETup:ORFSpectrum:ICount:MAXimum? ” on page 501. |
| | GPRS | |
| Query | <p>Range: 0 to 29971</p> <p>Resolution: 1</p> | |

FETCh:ORFSpectrum:INTegrity?

| | | |
|----------|------|--|
| Function | GSM | Queries the integrity indicator for the output RF spectrum analyzer measurement. Zero indicates a normal result. |
| | GPRS | See “ Integrity Indicator ” on page 146 for descriptions of non-zero integrity indicators. |
| Query | | <p>Range: 0 to 16</p> <p>Resolution: 1</p> |

FETCh:ORFSpectrum:MODulation[:ALL]?

| | | |
|----------|------|--|
| Function | GSM | Queries TX Carrier Power, 30 kHz BW Power, and up to 22 comma-separated output RF spectrum due to modulation (average) results |
| | GPRS | The “ SETup:ORFSpectrum:MODulation:FREQuency[:OFFSet] ” command sets up the number of output RF spectrum due to modulation offsets that are turned on and their frequency values. The “ SETup:ORFSpectrum:MODulation:FREQuency:POINTs? ” command queries the number of output RF spectrum due to modulation points that are turned on, indicating the number of output RF spectrum due to modulation (average) values to expect when you FETCh output RF spectrum due to modulation results. |
| Query | | <p>TX Carrier Power</p> <ul style="list-style-type: none"> Range: -100 dBm to +100 dBm and 9.91 E+37 Resolution: 0.01 dB <p>30 kHz Bandwidth Power</p> <ul style="list-style-type: none"> Range: -100 dBm to +100 dBm and 9.91 E+37 Resolution: 0.01 dB <p>Output RF Spectrum due to Modulation (Average)</p> <ul style="list-style-type: none"> Range: -200 dB to +100 dB and 9.91 E+37 Resolution: 0.01 dB |

FETCh:ORFSpectrum

FETCh:ORFSpectrum:MODulation:FREQuency[:OFFSet]?

| | | |
|--|------|---|
| Function | GSM | Queries the ORFS due to modulation measurement, allowing frequency offset values to be appended to the command. Returns ORFS due to modulation (average) measurements at the frequencies listed, in the order they are listed. |
| | GPRS | Frequencies must have a one-to-one correspondence to ORFS due to modulation frequency offsets that are currently turned on. Frequencies must be separated by commas. (See "SETup:ORFSpectrum:MODulation:FREQuency[:OFFSet]" for the command that turns on frequency offsets.) Each frequency value is (optionally) followed by: HZ KHZ MHZ GHZ . The default units are HZ (hertz). |
| Query | | Range: -200 dB to +100 dB and 9.91 E+37 Resolution: 0.01 dB |
| Programming Example | | |
| <pre>OUTPUT 714; "FETCh:ORFSPECTRUM:MODULATION:FREQUENCY:OFFSET? 200 KHZ, 400 KHZ" !Returns the ORFS due to modulation (average) measurement !results at the 200 kHz and 400 kHz offsets only, assuming these offsets are turned on.</pre> | | |

FETCh:ORFSpectrum:POWer?

| | | |
|--|------|---|
| Function | GSM | Returns the TX carrier power measurement result from the last ORFS measurement. This measurement is made using the method described in the "Transmit Power Measurement Description" on page 127 . |
| | GPRS | |
| Query | | Range: -100 dBm to +100 dBm and NAN. Resolution: 0.01 dB |
| Programming Example | | |
| <pre>OUTPUT 714; "FETCh:ORFSPECTRUM:POWER:TXPOWER?" !Returns TX carrier power.</pre> | | |

FETCh:ORFSpectrum:POWer:BWIDth?

| | | |
|----------|------|--|
| Function | GSM | Queries the ORFS 30 kHz bandwidth power measurement. See "Output RF Spectrum Measurement Description" on page 96 . |
| | GPRS | |
| Query | | Range: -100 dBm to +100 dBm and NAN. Resolution: 0.01 dB |

FETCh:ORFSpectrum:SWITChing[:ALL][:MAXimum]?

| | | |
|---------------------|------|--|
| Function | GSM | Queries output RF spectrum due to switching (maximum) measurement results at all frequency offsets currently turned on (there can be up to eight). |
| | GPRS | The “ SETup:ORFSpectrum:SWITChing:FREQuency[:OFFSet] ” command sets up the number of output RF spectrum due to switching offsets that are turned on and their frequency values. The “ SETup:ORFSpectrum:SWITChing:FREQuency:POINts? ” queries the number of output RF spectrum due to switching points that are turned on, indicating the number of output RF spectrum due to switching (max) values to expect when you FETCh results. |
| Query | | Range: -100 dBm to +100 dBm and 9.91 E+37 Resolution: 0.01 dB |
| Programming Example | | <pre>OUTPUT 714; "FETCh:ORFSPECTRUM:SWITCHING:ALL:MAXIMUM?" ! Returns the ORFS due to ! switching (maximum) ! measurement results at ! all frequency offsets ! currently turned on.</pre> |

FETCh:ORFSpectrum:SWITChing[:ALL]:AVERage?

| | | |
|---------------------|------|--|
| Function | GSM | Queries output RF spectrum due to switching (average) measurement results at all frequency offsets currently turned on (there can be up to eight). |
| | GPRS | The “ SETup:ORFSpectrum:SWITChing:FREQuency[:OFFSet] ” command sets up the number of output RF spectrum due to switching offsets that are turned on and their frequency values. The “ SETup:ORFSpectrum:SWITChing:FREQuency:POINts? ” queries the number of output RF spectrum due to switching points that are turned on, indicating the number of output RF spectrum due to switching values to expect when you FETCh results. |
| Query | | Range: -100 dBm to +100 dBm and 9.91 E+37 Resolution: 0.01 dB |
| Programming Example | | <pre>OUTPUT 714; "FETCh:ORFSPECTRUM:SWITCHING:ALL:AVERAGE?" ! Returns the ORFS due to ! switching (average) ! measurement results at ! all frequency offsets ! currently turned on.</pre> |

FETCH:ORFSpectrum:SWITCHing:FREQuency[:OFFSet][:MAXimum]?

| | | |
|--|------|---|
| Function | GSM | Queries the ORFS due to switching measurement, allowing frequency offset values to be appended to the command. Returns ORFS due to switching (maximum) measurements at the frequencies listed, in the order they are listed. |
| | GPRS | Frequencies must have a one-to-one correspondence to ORFS due to switching frequency offsets that are currently turned on. Frequencies must be separated by commas. (See " SETup:ORFSpectrum:SWITCHing:FREQuency[:OFFSet] " for the command that turns on frequency offsets.) Each value is (optionally) followed by: HZ KHZ MHZ GHZ . The default units are HZ (hertz). |
| Query | | Range: -100 dB to +100 dB and 9.91 E+37 Resolution: 0.01 dB |
| Programming Example | | |
| <pre>OUTPUT 714; "FETCH:ORFSPECTRUM:SWITCHING:FREQUENCY:OFFSET:MAXIMUM? 200 KHZ, 400 KHZ" !Returns the ORFS due to switching (maximum) measurement results !at the 200 kHz and 400 kHz offsets only, assuming these offsets are !turned on</pre> | | |

FETCH:ORFSpectrum:SWITCHing:FREQuency[:OFFSet]:AVERage?

| | | |
|--|------|---|
| Function | GSM | Queries the ORFS due to switching measurement, allowing frequency offset values to be appended to the command. Returns ORFS due to switching (average) measurements at the frequencies listed, in the order they are listed. |
| | GPRS | Frequencies must have a one-to-one correspondence to ORFS due to switching frequency offsets that are currently turned on. Frequencies must be separated by commas. (See " SETup:ORFSpectrum:SWITCHing:FREQuency[:OFFSet] " for the command that turns on frequency offsets.) Each value is (optionally) followed by: HZ KHZ MHZ GHZ . The default units are HZ (hertz). |
| Query | | Range: -100 dB to +100 dB and 9.91 E+37 Resolution: 0.01 dB |
| Programming Example | | |
| <pre>OUTPUT 714; "FETCH:ORFSPECTRUM:SWITCHING:FREQUENCY:OFFSET:AVERAGE? 200 KHZ, 400 KHZ" !Returns the ORFS due to switching (average) measurement results at the !200 kHz and 400 kHz offsets only, assuming these offsets are turned on.</pre> | | |

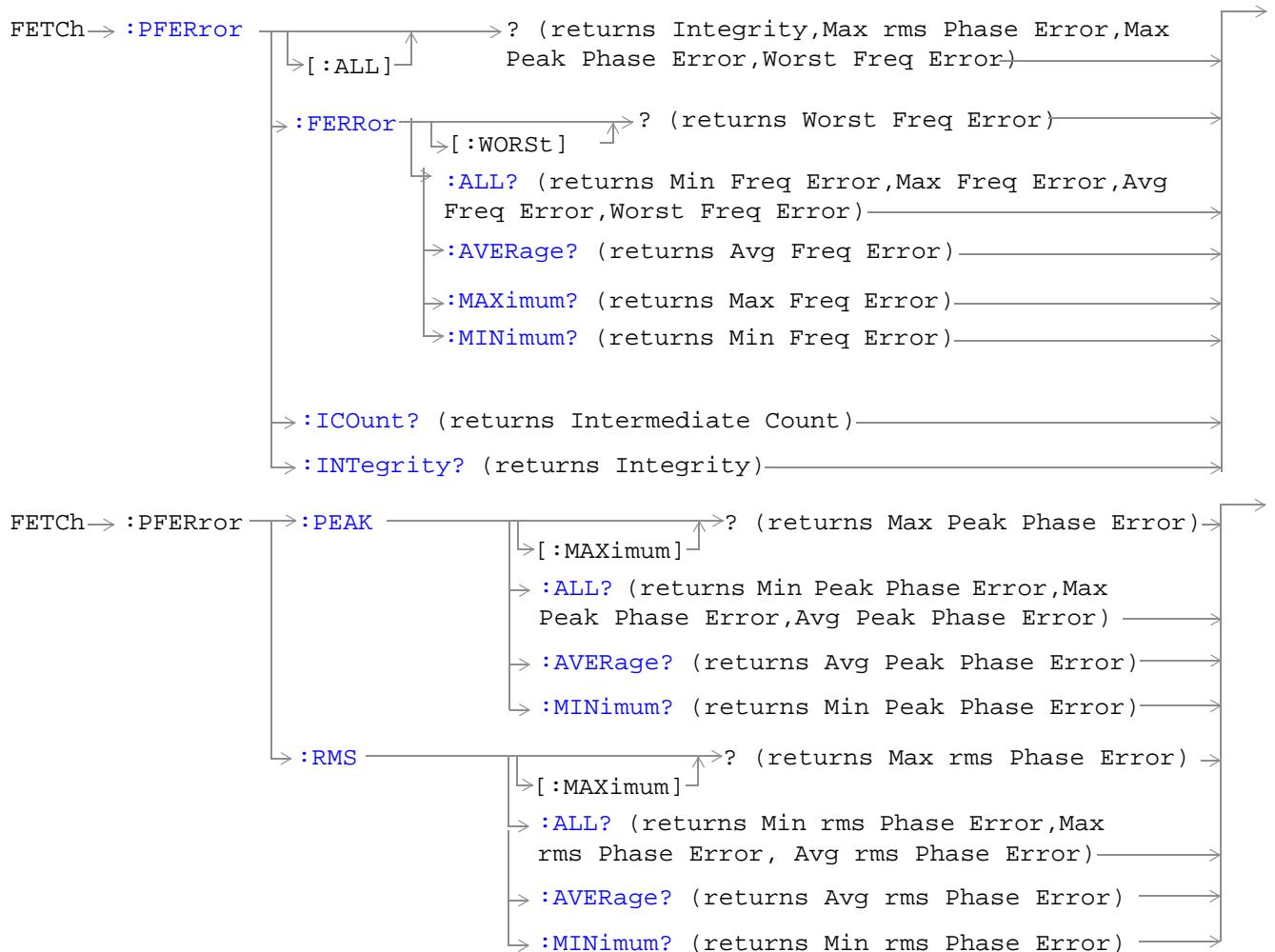
FETCh:ORFSpectrum:SWITCHing:FREQuency[:OFFSet]:SDEViation?

| | | |
|---|------|---|
| Function | GSM | Queries the ORFS due to switching measurement, allowing frequency offset values to be appended to the command. Returns ORFS due to switching (standard deviation) measurements at the frequencies listed, in the order they are listed. |
| | GPRS | Frequencies must have a one-to-one correspondence to ORFS due to switching frequency offsets that are currently turned on. Frequencies must be separated by commas. (See " SETup:ORFSpectrum:SWITCHing:FREQuency[:OFFSet] " for the command that turns on frequency offsets.) Each value is (optionally) followed by: HZ KHZ MHZ GHZ . The default units are HZ (hertz). |
| Query | | Range: 0 dB to +150 dB and 9.91 E+37 Resolution: 0.001 dB |
| Programming Example | | |
| <pre>OUTPUT 714;"FETCh:ORFSPECTRUM:SWITCHing:FREQUENCY:OFFSET:STDEVIATION? 200 KHZ, 400 KHZ" !Returns the ORFS due to switching (standard deviation) measurement !results at the 200 kHz and 400 kHz offsets only, assuming these !offsets are turned on.</pre> | | |

FETCh:ORFSpectrum:SWITCHing[:ALL]:SDEViation?

| | | |
|--|------|--|
| Function | GSM | Queries output RF spectrum due to switching (standard deviation) measurement results at all frequency offsets currently turned on (there can be up to eight). |
| | GPRS | The " SETup:ORFSpectrum:SWITCHing:FREQuency[:OFFSet] " command sets up the number of output RF spectrum due to switching offsets that are turned on and their frequency values. The " SETup:ORFSpectrum:SWITCHing:FREQuency:POINts? " queries the number of output RF spectrum due to switching points that are turned on, indicating the number of output RF spectrum due to switching values to expect when you FETCh results. |
| Query | | Range: -100 dBm to +100 dBm and 9.91 E+37 Resolution: 0.01 dB |
| Programming Example | | |
| <pre>OUTPUT 714;"FETCh:ORFSPECTRUM:SWITCHing:ALL:SDEVIATION?" !Returns the ORFS due !to switching !(standard !deviation) !measurement !results at all !frequency offsets !currently turned on.</pre> | | |

FETCh:PFERror



[“Diagram Conventions” on page 283](#)

FETCh:PFERor[:ALL]?

| Function | GSM | Queries integrity indicator, maximum rms phase error, maximum peak phase error and worst frequency error. |
|----------------------------|---|--|
| Query | Integrity indicator <ul style="list-style-type: none"> Range: 0 to 16 Resolution: 1 Maximum rms Phase Error <ul style="list-style-type: none"> Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees Maximum Peak Phase Error <ul style="list-style-type: none"> Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees Worst Frequency Error <ul style="list-style-type: none"> Range: -750 kHz to +750 kHz and 9.91 E+37 (NAN) Resolution: 0.1 kHz | |
| Programming Example | | <pre>OUTPUT 714; "FETCH:PFERROR:ALL?" !Returns integrity, maximum rms phase error, !maximum peak phase error and worst !frequency error.</pre> |

FETCh:PFERor:FERRor[:WORSt]?

| Function | GSM | Queries the frequency error from the individual multi-measurements that is furthest from 0 Hz. If the most positive and the most negative frequency errors are the same, the positive value will be returned. |
|----------|--|---|
| Query | Range: -750 kHz to +750 kHz and 9.91 E+37 (NAN) Resolution: 0.1 kHz | |

FETCH:PFERror:FERRor:ALL?

| | | |
|---------------------|-------|---|
| Function | GSM | Queries minimum, maximum, average, and worst frequency error, in Hz. |
| | GPRES | The minimum frequency error is the value closest to negative infinity from the last multi-measurement cycle. The maximum frequency error is the value closest to positive infinity from the last multi-measurement cycle. |
| Query | | <p>Minimum Frequency Error</p> <ul style="list-style-type: none"> Range: -750 kHz to +750 kHz and 9.91 E+37 (NAN) Resolution: 0.1 kHz <p>Maximum Frequency Error</p> <ul style="list-style-type: none"> Range: -750 kHz to +750 kHz and 9.91 E+37 (NAN) Resolution: 0.1 kHz <p>Average Frequency Error</p> <ul style="list-style-type: none"> Range: -750 kHz to +750 kHz and 9.91 E+37 (NAN) Resolution: 0.1 kHz <p>Worst Frequency Error</p> <ul style="list-style-type: none"> Range: -750 kHz to +750 kHz and 9.91 E+37 (NAN) Resolution: 0.1 kHz |
| Programming Example | | <pre>OUTPUT 714; "FETCH:PFERROR:FERROR:ALL?" !Returns minimum, maximum, average and !worst frequency error results.</pre> |

FETCH:PFERror:FERRor AVERage?

| | | |
|----------|-------|---|
| Function | GSM | Queries the single or average (from a multi-measurement) frequency error measurement result, in Hz. |
| | GPRES | |
| Query | | Range: -750 kHz to +750 kHz and 9.91 E+37 (NAN) Resolution: 0.1 kHz |

FETCH:PFERror:FERRor: MAXimum?

| | | |
|----------|-------|---|
| Function | GSM | Queries the maximum (from a multi-measurement) frequency error measurement result, in Hz. |
| | GPRES | |
| Query | | Range: -750 kHz to +750 kHz and 9.91 E+37 (NAN) Resolution: 0.1 kHz |

FETCh:PFERror:FERRor:MINimum?

| | | |
|----------|------|---|
| Function | GSM | Queries the minimum (from a multi-measurement) frequency error measurement result, in Hz. |
| | GPRS | |
| Query | | Range: -750 kHz to +750 kHz and 9.91 E+37 (NAN) Resolution: 0.1 kHz |

FETCh:PFERror:ICount?

| | | |
|----------|------|--|
| Function | GSM | Queries the intermediate count of phase and frequency multi-measurements completed. This number will increase to the value returned by "SETup:PFERror:COUNt:NUMBER" on page 510. |
| | GPRS | |
| Query | | Range: 0 to 999 Resolution: 1 |

FETCh:PFERror:INTegrity?

| | | |
|----------|------|--|
| Function | GSM | Queries the integrity indicator for the phase and frequency error measurement. Zero indicates a normal result. See "Integrity Indicator" on page 146 for descriptions of non-zero integrity indicators. |
| | GPRS | |
| Query | | Range: 0 to 16 Resolution: 1 |

FETCh:PFERror:PEAK[:MAXimum]?

| | | |
|----------|------|---|
| Function | GSM | Queries the maximum (from a multi-measurement) peak phase error result, in degrees. |
| | GPRS | |
| Query | | Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees |

FETCH:PFERror:PEAK:ALL?

| Function | GSM | Queries the minimum, maximum, and average peak phase error measurement result, in degrees. |
|---------------------|------|---|
| Query | GPRS | <p>Minimum Peak Phase Error</p> <ul style="list-style-type: none"> Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees <p>Maximum Peak Phase Error</p> <ul style="list-style-type: none"> Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees <p>Average Peak Phase Error</p> <ul style="list-style-type: none"> Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees |
| Programming Example | | <pre>OUTPUT 714; "FETCH:PFERROR:PEAK:ALL?" !Returns minimum, maximum, and average peak phase error results.</pre> |

FETCH:PFERror:PEAK:AVERage?

| Function | GSM | Queries the single or average (from a multi-measurement) peak phase error measurement result, in degrees. |
|----------|------|---|
| Query | GPRS | <p>Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN)</p> <p>Resolution: 0.01 degrees</p> |

FETCH:PFERror:PEAK:MINimum?

| Function | GSM | Queries the minimum (from a multi-measurement) peak phase error measurement result, in degrees. |
|----------|------|---|
| Query | GPRS | <p>Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN)</p> <p>Resolution: 0.01 degrees</p> |

FETCh:PFERror:rms[:MAXimum]?

| | | |
|--|---|--|
| Function | GSM | Queries the Maximum (from a multi-measurement) rms phase error measurement result, in degrees. |
| | GPRS | |
| Query | Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees | |
| Programming Example OUTPUT 714; "FETCH:PFERROR:rms:MAXIMUM?" !Returns the maximum rms phase error. | | |

FETCh:PFERror:rms:ALL?

| | | |
|--|--|---|
| Function | GSM | Queries the minimum, maximum, and average rms phase error measurement result, in degrees. |
| | GPRS | |
| Query | Minimum rms Phase Error <ul style="list-style-type: none"> Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees Maximum rms Phase Error <ul style="list-style-type: none"> Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees Average rms Phase Error <ul style="list-style-type: none"> Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees | |
| Programming Example OUTPUT 714; "FETCH:PFERROR:rms:ALL?" !Returns minimum, maximum, and average rms phase error. | | |

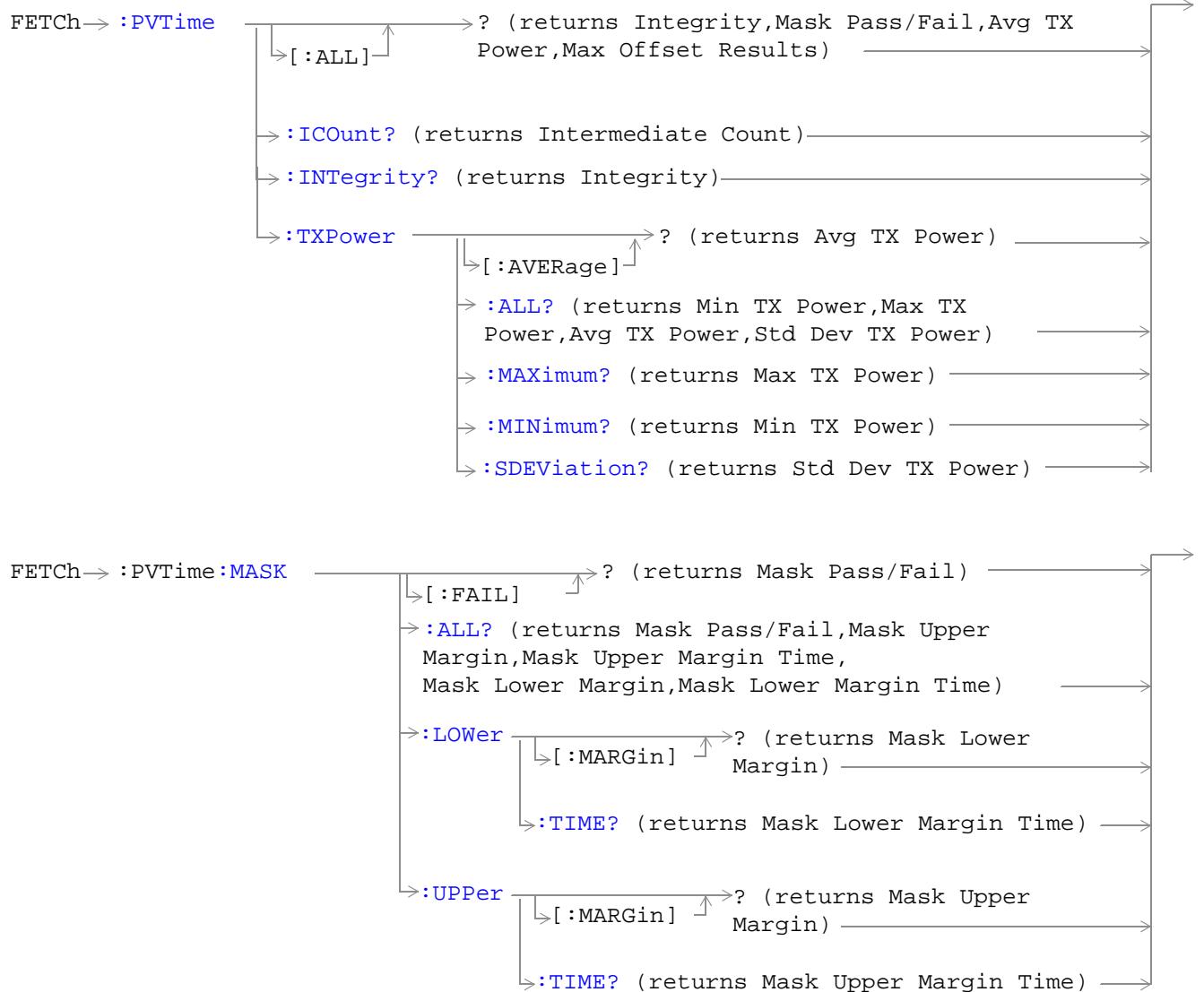
FETCh:PFERror:rms:AVERage?

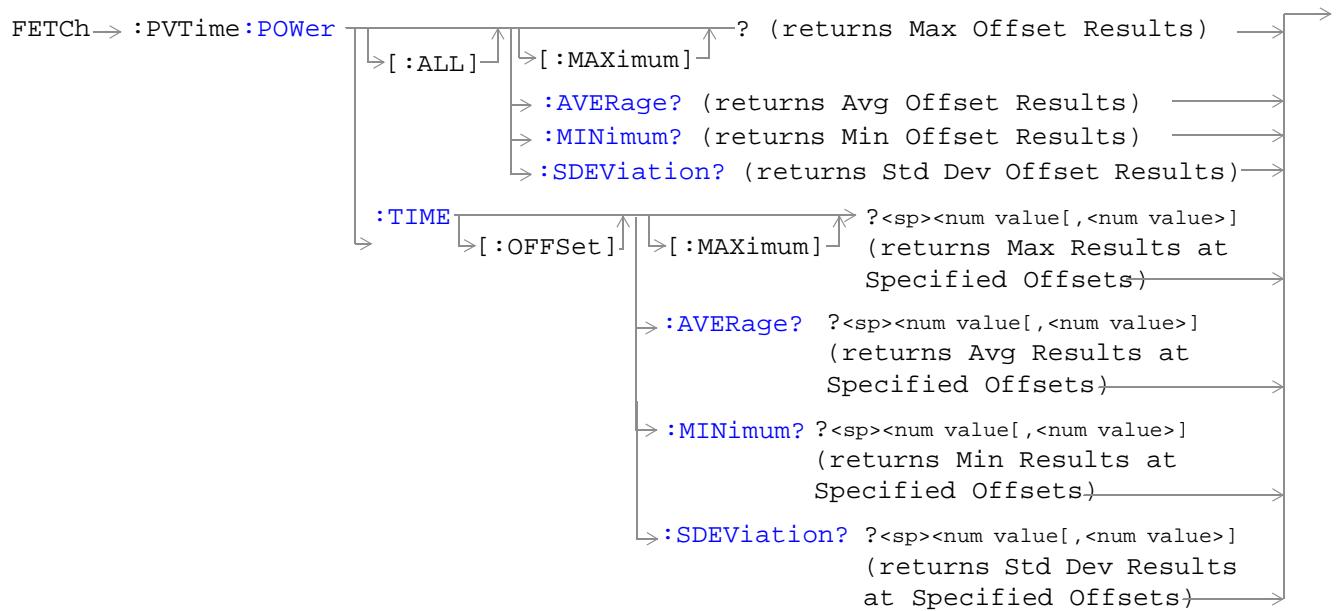
| | | |
|----------|---|--|
| Function | GSM | Queries the single or average (from a multi-measurement) rms phase error measurement result, in degrees. |
| | GPRS | |
| Query | Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees | |

FETCH:PFERror:rms:MINimum?

| | | |
|----------|-----|--|
| Function | GSM | Queries the minimum (from a multi-measurement) rms phase error measurement result, in degrees. |
| Query | | Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees |

FETCh:PVTime





["Diagram Conventions" on page 283](#)

FETCh:PVTime[:ALL]?

| | | |
|----------|------|---|
| Function | GSM | Queries integrity indicator, mask pass/fail indicator, power versus time (PvT) transmit power (average), and PvT power (maximum) at up to 12 time offsets. |
| | GPRS | The number of PvT measurement offsets that will be returned can be queried using the “ SETup:PVTime:TIME:POINTs? ” on page 517. The time offsets are set up using the command “ SETup:PVTime:TIME[:OFFSet] ” on page 516. |
| Query | | <p>Integrity indicator</p> <ul style="list-style-type: none"> • Range: 0 to 16 • Resolution: 1 <p>Power versus time mask pass/fail</p> <ul style="list-style-type: none"> • Range: 0 (pass) or 1 (fail) and 9.91 E+37 (NAN) <p>Power versus time TX carrier power</p> <ul style="list-style-type: none"> • Range: -100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB <p>Power versus time power (maximum)</p> <ul style="list-style-type: none"> • Range: -100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB |

FETCh:PVTime:TXPower:ALL?

| Function | GSM | Queries power versus time carrier power (average), power versus time carrier power (minimum), power versus time carrier power (maximum), and power versus time carrier power (standard deviation). |
|----------|-----|--|
| Query | | Power versus time carrier power (average) <ul style="list-style-type: none"> Range: -100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB Power versus time carrier power (minimum) <ul style="list-style-type: none"> Range: -100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB Power versus time carrier power (maximum) <ul style="list-style-type: none"> Range: -100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB Power versus time carrier power (standard deviation) <ul style="list-style-type: none"> Range: 0 dB to 100 dB and 9.91 E+37 (NAN) Resolution: 0.001 dB |

FETCh:PVTime:TXPower:MINimum?

| Function | GSM | Queries power versus time carrier power (minimum). |
|----------|-----|---|
| Query | | Range: -100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB |

FETCh:PVTime:TXPower:MAXimum?

| Function | GSM | Queries power versus time carrier power (maximum). |
|----------|-----|---|
| Query | | Range: -100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB |

FETCh:PVTime:TXPower[:AVERage]?

| | | |
|----------|------|---|
| Function | GSM | Queries power versus time carrier power (average). |
| | GPRS | |
| Query | | Range: -100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB |

FETCh:PVTime:TXPower:SDEViation?

| | | |
|----------|------|---|
| Function | GSM | Queries power versus time carrier power (standard deviation). |
| | GPRS | |
| Query | | Range: 0 dB to 100 dB and 9.91 E+37 (9.91 E+37 (NAN)) Resolution: 0.001 dB |

FETCh:PVTime:MASK:ALL?

| | | |
|----------|------|--|
| Function | GSM | <p>Queries the power versus time measurement mask pass/fail indicator and the following worst case margins:</p> <ul style="list-style-type: none"> Upper limit margin time Upper limit margin result Lower limit margin time Lower limit margin result <p>Margin time is the point in time, relative to burst bit 0, that corresponds with the worst case measurement result (the measurement with the least difference between measured power and the power level boundary specified by the power versus time mask). See the "Typical GSM/GPRS PvT Measurement" on page 112.</p> <p>Margin result is the difference between the measured power and the power level boundary specified by the power versus time mask. See the "Typical GSM/GPRS PvT Measurement" on page 112.</p> |
| | GPRS | |
| Query | | <p>Power versus time mask pass/fail</p> <ul style="list-style-type: none"> Range: 0 (pass) or 1 (fail) and 9.91 E+37 (NAN) <p>Power versus time upper limit margin time worst case result</p> <ul style="list-style-type: none"> Range: -50 μs to 593 μs and 9.91 E+37 (NAN) Resolution: 1 ns <p>Power versus time upper limit margin worst case result:</p> <ul style="list-style-type: none"> Range: -100 dB to 0 dB and 9.91 E+37 (NAN) Resolution: 0.01 dB <p>Power versus time lower limit margin time worst case result</p> <ul style="list-style-type: none"> Range: -50 μs to 593 μs and 9.91 E+37 (NAN) Resolution: 1 ns <p>Power versus time lower limit margin worst case result</p> <ul style="list-style-type: none"> Range: -100 dB to 0 dB and 9.91 E+37 (NAN) Resolution: 0.01 dB |

FETCh:PVTime:MASK[:FAIL]?

| | | |
|----------|------|---|
| Function | GSM | Queries power versus time measurement mask pass/fail indicator. |
| | GPRS | |
| Query | | Range: 0 (pass) or 1 (fail) and 9.91 E+37 (NAN) |

FETCH:PVTIME:MASK:UPPER[:MARGIN]?

| | | |
|----------|------|--|
| Function | GSM | Queries the power versus time measurement upper limit margin worst case result. |
| | GPRS | The upper limit margin, worst case result is the power versus time measurement with the least difference between measured power and the power level boundary specified by the power versus time mask. See the "Typical GSM/GPRS PvT Measurement" on page 112 . |
| Query | | Range: -100 dB to 0 dB and 9.91 E+37 (NAN) Resolution: 0.01 dB |

FETCH:PVTIME:MASK:UPPER:TIME?

| | | |
|----------|------|--|
| Function | GSM | Queries the power versus time measurement's upper limit margin time, worst case result. |
| | GPRS | The upper limit margin time result is the point in time, relative to bit 0 in the GSM burst, that corresponds with the worst case measurement result (the measurement with the least difference between measured power and the upper power level boundary specified by the power versus time mask). See the "Typical GSM/GPRS PvT Measurement" on page 112 . |
| Query | | Range: -50 µs to 593 µs and 9.91 E+37 (NAN) Resolution: 1 ns |

FETCH:PVTIME:MASK:LOWER[:MARGIN]?

| | | |
|----------|------|--|
| Function | GSM | Queries the power versus time measurement's lower limit margin, worst case result. |
| | GPRS | The lower limit margin, worst case result is the power versus time measurement with the least difference between measured power and the lower power level boundary specified by the power versus time mask. See the "Typical GSM/GPRS PvT Measurement" on page 112 . |
| Query | | Range: -100 dB to 0 dB and 9.91 E+37 (NAN) Resolution: 0.01 dB |

FETCH:PVTIME:MASK:LOWER:TIME?

| | | |
|----------|------|---|
| Function | GSM | Queries the power versus time measurement's lower limit margin time, worst case result. |
| | GPRS | The lower limit margin time result is the point in time, relative to bit 0 in the GSM burst, that corresponds with the worst case measurement (the measurement with the least difference between measured power and the lower power level boundary specified by the power versus time mask). See the "Typical GSM/GPRS PvT Measurement" on page 112 . |
| Query | | Range: -50 µs to 593 µs and 9.91 E+37 (NAN) Resolution: 1 ns |

FETCh:PVTime

FETCh:PVTime:POWer[:ALL]:MINimum?

| | | |
|----------|------|--|
| Function | GSM | Queries the minimum power levels, from a number of multi-measurements, at each user-settable time offset that is currently turned on. Power levels are relative to the power versus time carrier power measurement. |
| | GPRS | The “SETup:PVTime:TIME[:OFFSet]” command sets up the number of offsets that are turned on and their time values. The “SETup:PVTime:TIME:POINTs?” queries the number of offset points that are turned on, indicating the number of values to expect when you send this command. |
| Query | | Range: -100 dBc to +10 dBc and 9.91 E+37 (NAN) Resolution: 0.01 dB |

FETCh:PVTime:POWer[:ALL][:MAXimum]?

| | | |
|----------|------|--|
| Function | GSM | Queries the maximum power levels, from a number of multi-measurements, at each user-settable time offset that is currently turned on. Power levels are relative to the power versus time carrier power measurement. |
| | GPRS | The “SETup:PVTime:TIME[:OFFSet]” command sets up the number of offsets that are turned on and their time values. The “SETup:PVTime:TIME:POINTs?” queries the number of offset points that are turned on, indicating the number of values to expect when you send this command. |
| Query | | Range: -100 dBc to +10 dBc and 9.91 E+37 (NAN) Resolution: 0.01 dB |

FETCh:PVTime:POWer[:ALL]:AVERage?

| | | |
|----------|------|--|
| Function | GSM | Queries the average power levels, from a number of multi-measurements, at each user-settable time offset that is currently turned on. Results are relative to the power versus time carrier power measurement. |
| | GPRS | The “SETup:PVTime:TIME[:OFFSet]” command sets up the number of offsets that are turned on and their time values. The “SETup:PVTime:TIME:POINTs?” queries the number of offset points that are turned on, indicating the number of values to expect when you send this command. |
| Query | | Range: -100 dBc to +10 dBc and 9.91 E+37 (NAN) Resolution: 0.01 dB |

FETCh:PVTime:POWer[:ALL]:SDEViation?

| | | |
|----------|------|--|
| Function | GSM | Queries the standard deviation, from a number of multi-measurements, at each user-settable time offset that is currently turned on. |
| | GPRS | The “ SETup:PVTime:TIME[:OFFSet] ” command sets up the number of offsets that are turned on and their time values. The “ SETup:PVTime:TIME:POInts? ” queries the number of offset points that are turned on, indicating the number of values to expect when you send this command. |
| Query | | <p>Range: 0 dBc to +100 dBc and 9.91 E+37 (NAN)</p> <p>Resolution: 0.001 dB</p> |

FETCh:PVTime:POWer:TIME[OFFSet]:MINimum?

| | | |
|----------|------|---|
| Function | GSM | Queries the minimum power levels, from a number of multi-measurements, at each user-settable time offset appended to this command. Specified time values must correspond to user-settable time offsets that are currently turned on, and must be rounded to the same values. (9.91 E+37 (NAN) will be returned for specified offsets that do not correspond to offsets currently turned on). Power levels are relative to the power versus time carrier power measurement. |
| | GPRS | The “ SETup:PVTime:TIME[:OFFSet] ” command sets up the number of offsets that are turned on and their time values. Measurements will be returned by this query in the same order they are listed in the command. |
| Query | | <p>Power levels:</p> <ul style="list-style-type: none"> Range: -100 dBc to +10 dBc and 9.91 E+37 (NAN) Resolution: 0.01 dB <p>Time offsets:</p> <ul style="list-style-type: none"> Range: Up to 12 time offset values, corresponding to entries in the Power vs Time table of user-defined time offsets currently turned on. The default units are s (seconds). Resolution: Rounded to the same value as displayed in the Power vs Time table and returned by the “SETup:PVTime:TIME[:OFFSet]” query. |

Programming Example

```
OUTPUT 714; "FETCH:PVTIME:POWER:TIME:OFFSET:MINIMUM? 0 US, 570.8 US"
!Returns the !minimum of power versus time measurements at the 0.0 ms and
!570.8 ms offsets.
```

FETCH:PVTIME:POWER:TIME[:OFFSet][:MAXimum]?

| | | |
|---------------------|------|---|
| Function | GSM | Queries the maximum power levels, from a number of multi-measurements, at each user-settable time offset appended to this command. Specified time values must correspond to user-settable time offsets that are currently turned on, and must be rounded to the same values. (9.91 E+37 (NAN) will be returned for specified offsets that do not correspond to offsets currently turned on). Power levels are relative to the power versus time carrier power measurement. |
| | GPRS | The “ SETup:PVTIME:TIME[:OFFSet] ” command sets up the number of offsets that are turned on and their time values. Measurements will be returned by this query in the same order they are listed in the command. |
| Query | | <p>Power levels:</p> <ul style="list-style-type: none"> Range: -100 dBc to +10 dBc and 9.91 E+37 (NAN) Resolution: 0.01 dB <p>Time offsets:</p> <ul style="list-style-type: none"> Range: Up to 12 time offset values, corresponding to entries in the Power vs Time table of user-defined time offsets currently turned on. The default units are s (seconds). Resolution: Rounded to the same value as displayed in the Power vs Time table and returned by the “SETup:PVTIME:TIME[:OFFSet]” query. |
| Programming Example | | <pre>OUTPUT 714; "FETCH:PVTIME:POWER:TIME:OFFSET:MAXIMUM? 0 US, 570.8 US" !Returns the maximum of power versus time measurements at the 0.0 ms !and 570.8 ms offsets.</pre> |

FETCh:PVTime:POWer:TIME[:OFFSet]:AVERage?

| | | |
|---------------------|------|---|
| Function | GSM | Queries the average power levels, from a number of multi-measurements, at each user-settable time offset appended to this command. Specified time values must correspond to user-settable time offsets that are currently turned on, and must be rounded to the same values. (9.91 E+37 (NAN) will be returned for specified offsets that do not correspond to offsets currently turned on). Power levels are relative to the power versus time carrier power measurement. |
| | GPRS | The “ SETup:PVTime:TIME[:OFFSet] ” command sets up the number of offsets that are turned on and their time values. Measurements will be returned by this query in the same order they are listed in the command. |
| Query | | <p>Power levels:</p> <ul style="list-style-type: none"> Range: -100 dBc to +10 dBc and 9.91 E+37 (NAN) Resolution: 0.01 dB <p>Time offsets:</p> <ul style="list-style-type: none"> Range: Up to 12 time offset values, corresponding to entries in the Power vs Time table of user-defined time offsets currently turned on. The default units are s (seconds). Resolution: Rounded to the same value as displayed in the Power vs Time table and returned by the “SETup:PVTime:TIME[:OFFSet]” query. |
| Programming Example | | <pre>OUTPUT 714; "FETCH:PVTIME:POWER:TIME:OFFSET:AVERAGE? 0 US, 570.8 US" !Returns the average of power versus time measurements at the !0.0 ms and 570.8 ms offsets.</pre> |

FETCH:PVTIME:POWER:TIME[:OFFSet]:SDEVIation?

| | | |
|---------------------|------|--|
| Function | GSM | Queries the standard deviation, from a number of multi-measurements, at each user-settable time offset appended to this command. Specified time values must correspond to user-settable time offsets that are currently turned on, and must be rounded to the same values. (9.91 E+37 (NAN) will be returned for specified offsets that do not correspond to offsets currently turned on). |
| | GPRS | Power levels are relative to the power versus time carrier power measurement. The “ SETup:PVTIME:TIME[:OFFSet] ” command sets up the number of offsets that are turned on and their time values. Measurements will be returned by this query in the same order they are listed in the command. |
| Query | | <p>Power levels:</p> <ul style="list-style-type: none"> Range: 0 dBc to +100 dBc and 9.91 E+37 (NAN) Resolution: 0.001 dB <p>Time offsets:</p> <ul style="list-style-type: none"> Range: Up to 12 time offset values, corresponding to entries in the Power vs Time table of user-defined time offsets currently turned on. The default units are s (seconds). Resolution: Rounded to the same value as displayed in the Power vs Time table and returned by the “SETup:PVTIME:TIME[:OFFSet]” query. |
| Programming Example | | <pre>OUTPUT 714; "FETCH:PVTIME:POWER:TIME:OFFSET:SDEVIATION? 0 US, 570.8 US" !Returns the standard deviation of power versus time measurements at the 0.0 ms and 570.8 ms offsets.</pre> |

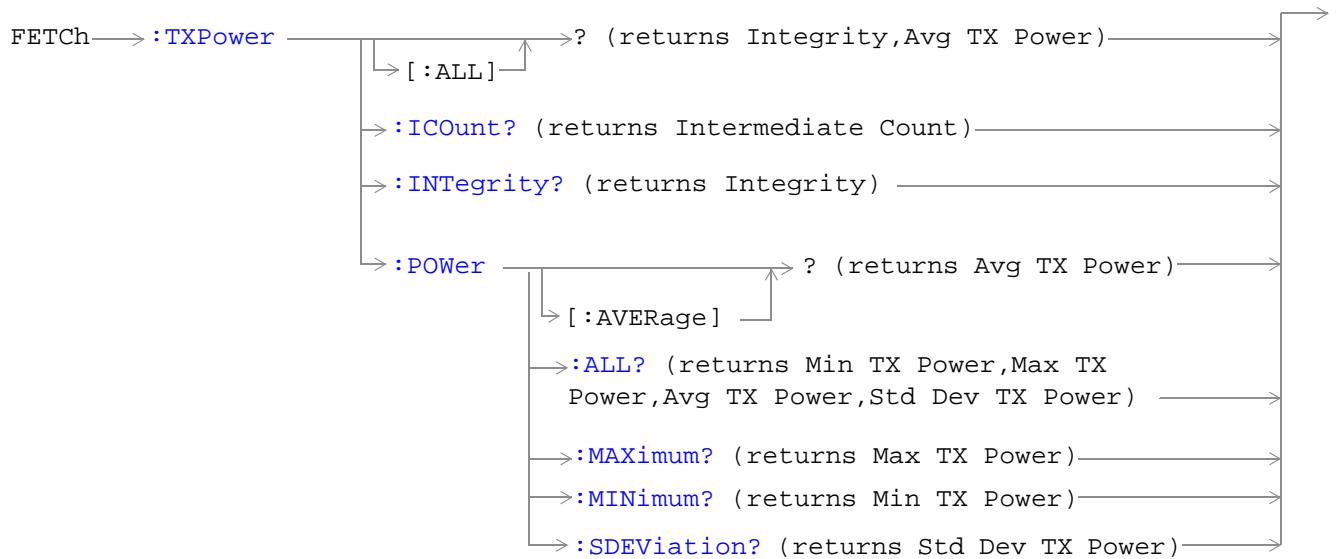
FETCH:PVTIME:ICount?

| | | |
|----------|------|---|
| Function | GSM | Queries the intermediate count of power versus time multi-measurements completed. |
| | GPRS | |
| Query | | <p>Range: 0 to 999</p> <p>Resolution: 1</p> |

FETCH:PVTIME:INTegrity?

| | | |
|----------|------|--|
| Function | GSM | Queries the integrity indicator for the power versus time measurement. Zero indicates a normal result. |
| | GPRS | See “ Integrity Indicator ” on page 146 for descriptions of non-zero integrity indicators. |
| Query | | <p>Range: 0 to 16</p> <p>Resolution: 1</p> |

FETCh:TXPower



[“Diagram Conventions” on page 283](#)

FETCH:TXPower[:ALL]?

| | | |
|----------|------|--|
| Function | GSM | Queries integrity indicator and average transmit power. |
| | GPRS | A value of zero for the integrity indicator is normal. See "Integrity Indicator" on page 146 for non-zero integrity indicators. |
| Query | | <p>Integrity:</p> <ul style="list-style-type: none"> Range: 0 to 16 Resolution: 1 <p>Transmit power:</p> <ul style="list-style-type: none"> Range: -100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB |

FETCH:TXPower:ICount?

| | | |
|----------|------|--|
| Function | GSM | Queries the intermediate count of transmit power measurements completed. |
| | GPRS | |
| Query | | <p>Range: 1 to 999</p> <p>Resolution: 1</p> |

FETCH:TXPower:INTegrity?

| | | |
|----------|------|---|
| Function | GSM | Queries the integrity indicator. Zero indicates normal. |
| | GPRS | For non-zero integrity indicators, refer to "Integrity Indicator" on page 146 . |
| Query | | <p>Range: 0 to 16</p> <p>Resolution: 1</p> |

FETCH:TXPower:POWer[:AVERage]?

| | | |
|----------|------|--|
| Function | GSM | Queries average transmit power. |
| | GPRS | |
| Query | | <p>Range: -100 dBm to 100 dBm and 9.91 E+37 (NAN)</p> <p>Resolution: 0.01 dB</p> |

FETCh:TXPower:POWer:ALL?

| | | |
|----------|------|--|
| Function | GSM | Queries average, minimum, maximum and standard deviation of transmit power multi-measurement results. |
| | GPRS | |
| Query | | <p>Average:</p> <ul style="list-style-type: none"> Range: -100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB <p>Minimum:</p> <ul style="list-style-type: none"> Range: -100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB <p>Maximum:</p> <ul style="list-style-type: none"> Range: -100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB <p>Standard deviation:</p> <ul style="list-style-type: none"> Range: 0 dB to 100 dB and 9.91 E+37 (NAN) Resolution: 0.001 dB |

FETCh:TXPower:POWer:MAXimum?

| | | |
|----------|------|--|
| Function | GSM | Queries maximum transmit power results from a multi-measurement. |
| | GPRS | |
| Query | | <p>Range: -100 dBm to 100 dBm and 9.91 E+37 (NAN)</p> <p>Resolution: 0.01 dB</p> |

FETCh:TXPower:MINimum?

| | | |
|----------|------|--|
| Function | GSM | Queries minimum transmit power results from a multi-measurement. |
| | GPRS | |
| Query | | <p>Range: -100 dBm to 100 dBm and 9.91 E+37 (NAN)</p> <p>Resolution: 0.01 dB</p> |

FETCh:TXPower:SDEViation?

| | | |
|----------|------|--|
| Function | GSM | Queries the standard deviation from a transmit power multi-measurement. |
| | GPRS | |
| Query | | <p>Range: 0 dB to 100 dB and 9.91 E+37 (NAN)</p> <p>Resolution: 0.001 dB</p> |

INITiate Subsystem

Syntax Diagrams and Command Descriptions

["INITiate" on page 438](#)

Description

INITiate Command Functions

The INITiate subsystem is used to:

- Start (activate) individual or multiple (concurrent) measurements.
- Turn individual measurements off.
- Determine the number of measurements currently active (INIT:COUNT?).
- Determine the names of the measurements currently active (INIT:ON?).
- Determine which measurements are finished (INIT:DONE?).

What Happens When a Measurement is INITiated?

When a measurement is started using INITiate commands, a new measurement cycle is started. If the selected measurement is currently in a measurement cycle, it is aborted. If a timeout is specified, the timeout period begins when a measurement is initiated.

| | |
|------|--|
| NOTE | The INITiate subsystem is derived from SCPI, but has some modifications to make it more compatible with the manual operation of the test set. Most notably, the choice of single or continuous measurement triggering is made using the SETup subsystem. |
|------|--|

INITiate Programming Examples (how INIT commands are used)

The INITiate command is used to start measurements. INITiate commands allow multiple measurements to be started without waiting for other measurement processes to complete. For example, the following code starts the Transmit Power and PFER measurements, and then uses the INITiate:DONE? command in a loop to query the status of these measurements, see ["Measurement Event Synchronization" on page 153](#).

When the measurements are done, the FETCh command is used to acquire the results, and the results are entered into variables in the controlling application. The program ends when the INITiate:DONE? command returns the string "NONE" indicating that all initiated measurements have gone through the measuring state see ["Measurement States" on page 170](#).

| | |
|------|---|
| NOTE | Trigger arming for each measurement is controlled in the SETup subsystem. The choices are single or continuous. The best practice (during remote operation) is to use single measurement mode. This simplifies the tasks of starting concurrent measurements, then using the INIT subsystem commands to determine which measurements are ready to be FETChed. |
|------|---|

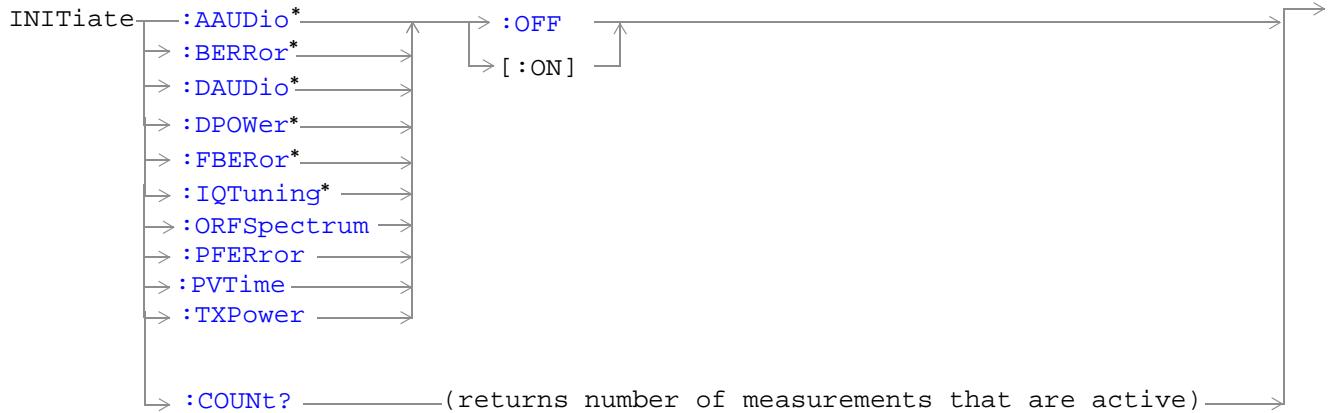
```
10 OUTPUT 714;"SETup:ALL:CONTinuous:OFF" ! selects single measurement mode
20 OUTPUT 714;"INITiate:TXPower;PFError" ! starts TX power/phase frequency error measurement
30 LOOP
40 OUTPUT 714;"INITiate:DONE?" !query to find out if any measurements are done
50 ENTER 714;Meas_complete$
60 SELECT Meas_complete$
70 CASE "TXP" !tests for the string "TXP" which would indicate TX power measurement is done
80 OUTPUT 714;"FETCH:TXPower:POWer?" !Queries average TX power measurement
90 ENTER 714;Avg_tx_power
100 CASE "PFEr"!tests for the string "PFEr" which would indicate phase/frequency error
measurement is done
110 OUTPUT 714;"FETCH:PFError:RMS?" !Queries PFER maximum phase error measurement
120 ENTER 714;Max_phs_error
130 END SELECT
140 EXIT IF Meas_complete$ = "NONE"
150 END LOOP
160 END
```

INITiate commands should be sent only when the test set has finished performing any operations, such as handovers, that require settling. For example, the following code performs a handover to a new traffic channel using the :SEQ (sequential) appendage, then initiates a TX power measurement.

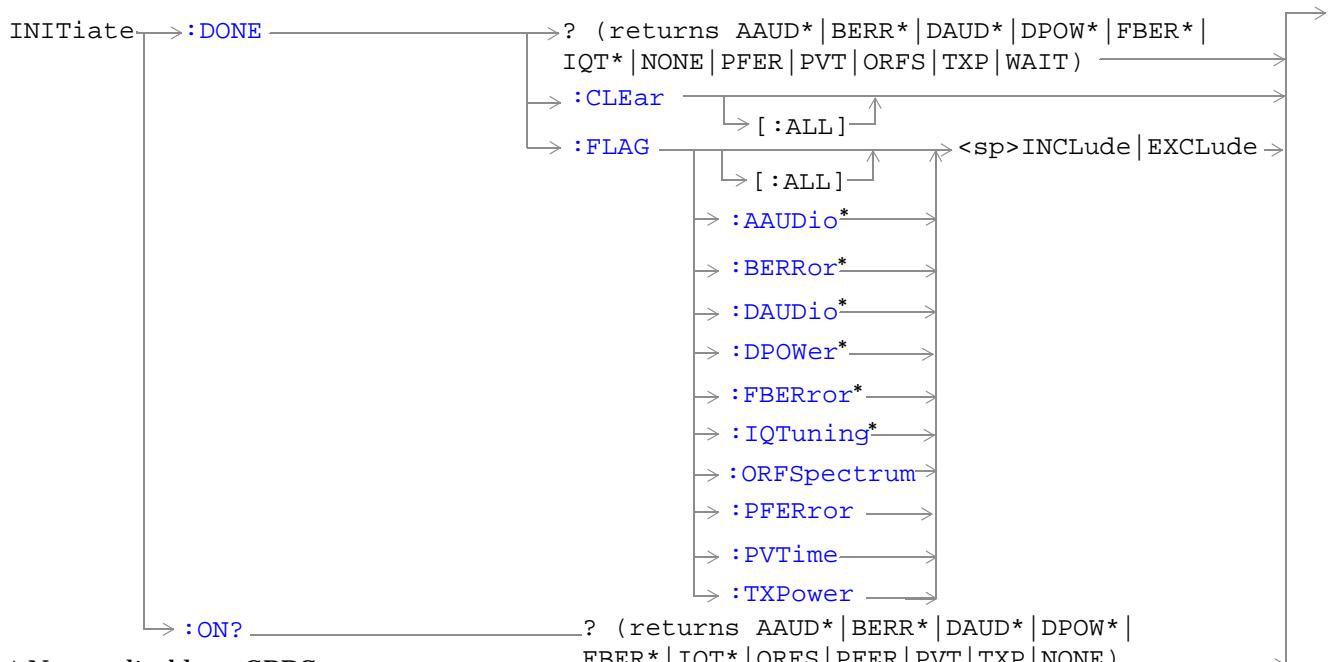
```
OUTPUT 714;"CALL:TCH:SEQ 65"
!Hands over traffic channel to channel 65, waits for process to complete before accepting next
command

OUTPUT 714;"INITiate:TXPower"
!Initiates TX power measurement
```

INITiate



* Not applicable to GPRS.



* Not applicable to GPRS.

["Diagram Conventions" on page 283](#)

INITiate:<measurement mnemonic>[:ON]

| | | |
|----------|------|---|
| Function | GSM | Starts measurements with the test set. |
| | GPRS | <p>The INITiate command is associated with the SETup command, and the FETCh? command, see “SETup Subsystem” on page 462 and “FETCh? Subsystem” on page 380.</p> <p>One or more measurements may be initiated on the same program line. See “Concurrent Measurements” on page 143.</p> <p>This command is also used to activate a measurement. See “INITiate Programming Examples (how INIT commands are used)” on page 436.</p> |

Programming Example

```
OUTPUT 714;"INITIATE:TXPOWER:ON" !Initiates a TX Power measurement.
OUTPUT 714;"INITIATE:TXPOWER:PFERROR:ON" !Initiates TX Power and
!phase and frequency error measurements.
OUTPUT 714;"INITIATE:PVTIME;ORFSPECTRUM;FBERROR:ON" !Initiates power
!versus time output RF spectrum, and fast bit error rate measurements.
```

INITiate:<measurement mnemonic>:OFF

| | | |
|----------|------|--|
| Function | GSM | Deactivates the selected measurement. See “ Measurement States ” on page 170. |
| | GPRS | Only one measurement can be deactivated at a time, to stop one or more measurements and leave them in the active state, see “ ABORT ” on page 286. |

Programming Example

```
OUTPUT 714;"INITIATE:TXPOWER:OFF" !Deactivates TX power measurement.
```

INITiate:COUNt?

| | | |
|----------|------|--|
| Function | GSM | Queries the number of measurements that have been initiated (that are active). See “ Measurement States ” on page 170. |
| | GPRS | |

| | | |
|-------|----------------|--|
| Query | Range: 0 to 10 | |
| | Resolution: 1 | |

INITiate:DONE?

| | | |
|----------|------|--|
| Function | GSM | Queries (one at a time) which measurements if any are available or have timed out. |
| | GPRS | See “ Measurement Event Synchronization ” on page 153 for how to use this command. |

| | | |
|-------|------|---|
| Query | GSM | Range: NONE TXP PVT PFER ORFS AAUD DAUD DPOW FBER BERR IQT WAIT |
| | GPRS | Range: NONE TXP PVT PFER ORFS WAIT |

INITiate

INITiate:DONE:CLEar

| | | |
|----------|------|---|
| Function | GSM | Clears the done flag from all measurements. See " INITiate:DONE? " on page 439. |
| | GPRS | |

Programming Example

```
OUTPUT 714;"INITIATE:DONE:CLEAR" !clears done flag.
```

INITiate:DONE:FLAG[:ALL]

| | | |
|----------------------------|------|---|
| Function | GSM | Specifies that all measurements are considered, (included or excluded) when the DONE? query is sent. |
| | GPRS | If a measurements trigger arm, see " Trigger Arm (Single or Continuous) Description " on page 171, has been left in continuous mode, the done flag for that measurement will toggle between DONE and WAIT, see " INITiate:DONE? " on page 153. The INITiate:DONE? query will probably not be able to catch the measurement at the instant it is done, therefore the measurement will never appear to be done. If a measurement trigger arm must be left in continuous mode the user should (exclude) it, using this command, from the INITiate:DONE? query results. Once the INITiate:DONE:FLAG has been set to EXCLude for a measurement, the user must send the INCLude command for that measurement in order to query that measurement with, the INITiate:DONE? query. The test set will not reset any (excluded measurement) to be an (included measurement) with any form of preset, see " Preset Descriptions " on page 640. |
| Setting | | Range <ul style="list-style-type: none">INCLude: include all measurementsEXCLude: exclude all measurements |
| Programming Example | | <pre>OUTPUT 714;"INITIATE:DONE:FLAG:ALL EXCLUDE" !Excludes all measurements from !contributing the INITIATE:DONE? !query, see "INITiate:DONE?" on !page 6.</pre> |

INITiate:DONE:FLAG<measurement mnemonic>

| | | |
|--|------|--|
| Function | GSM | Specifies which measurements are considered, (included or excluded) when the DONE? query is sent. |
| | GPRS | If a measurements trigger arm, see "Trigger Arm (Single or Continuous) Description" on page 171 , has been left in continuous mode, the done flag for that measurement will toggle between DONE and WAIT, see "INITiate:DONE?" on page 153 . The INITiate:DONE? query will probably not be able to catch the measurement at the instant it is done, therefore the measurement will never appear to be done. If a measurement trigger arm must be left in continuous mode the user should (exclude) it, using this command, from the INITiate:DONE? query results. Once the INITiate:DONE:FLAG has been set to EXCLude for a measurement, the user must send the INCLude command for that measurement in order to query that measurement with, the INITiate:DONE? query. The test set will not reset any (excluded measurement) to be an (included measurement) with any form of preset, see "Preset Descriptions" on page 640 . |
| Setting | GSM | Range <ul style="list-style-type: none"> INCLude :AAUDio :BERRor :DAUDio :DPOWER :FBERror :IQTuning :ORFSpectrum :PFERror :PVTime :TXPower EXCLude :AAUDio :BERRor :DAUDio :DPOWER :FBERror :IQTuning :ORFSpectrum :PFERror :PVTime :TXPower |
| | GPRS | Range <ul style="list-style-type: none"> INCLude :ORFSpectrum :PFERror :PVTime :TXPower EXCLude :ORFSpectrum :PFERror :PVTime :TXPower |
| Related Topics | | "INITiate:DONE?" . |
| Programming Example | | |
| OUTPUT 714;"INITIATE:DONE:FLAG:AAUDIO EXCLUDE" !excludes AAUDIO measurements !from contributing the !INITiate:DONE? query. | | |

INITiate:ON?

| | | |
|----------|------|--|
| Function | GSM | Queries the names of the measurements (none, one, or more than one) that are ON in a comma separated list of measurement mnemonics. See "INITiate:<measurement mnemonic>[:ON]" on page 439 . |
| | GPRS | |
| Query | | Range: ORFS PFER PVT TXP NONE |

READ? Subsystem

Syntax Diagram and Command Descriptions

“READ”

Description

The READ? command provides a sequential method to make measurements and retrieve the results. READ? will hang the GPIB bus until the measurement is completed, or until the timeout value has been exceeded. Associated SETup commands (for each measurement) are used with the READ? command to retrieve desired measurement results in a sequential manner.

Sending a READ? command is equivalent to an INITiate/FETCh cycle for a measurement. A READ? command executes an abort action on that measurement followed by an INITiate and a FETCh?.

READ? commands can be mixed with FETCh? queries in order to make combinations of sequential and overlapped operations. One measurement can be issued a READ? command (sequential), and the next measurement can be issued INITiate/FETCh? commands (overlapped), if necessary.

The advantage of using the READ? commands to obtain measurement results, as opposed to the INITiate/FETCh method is:

- It is simpler. Fewer commands are required to obtain measurement results.

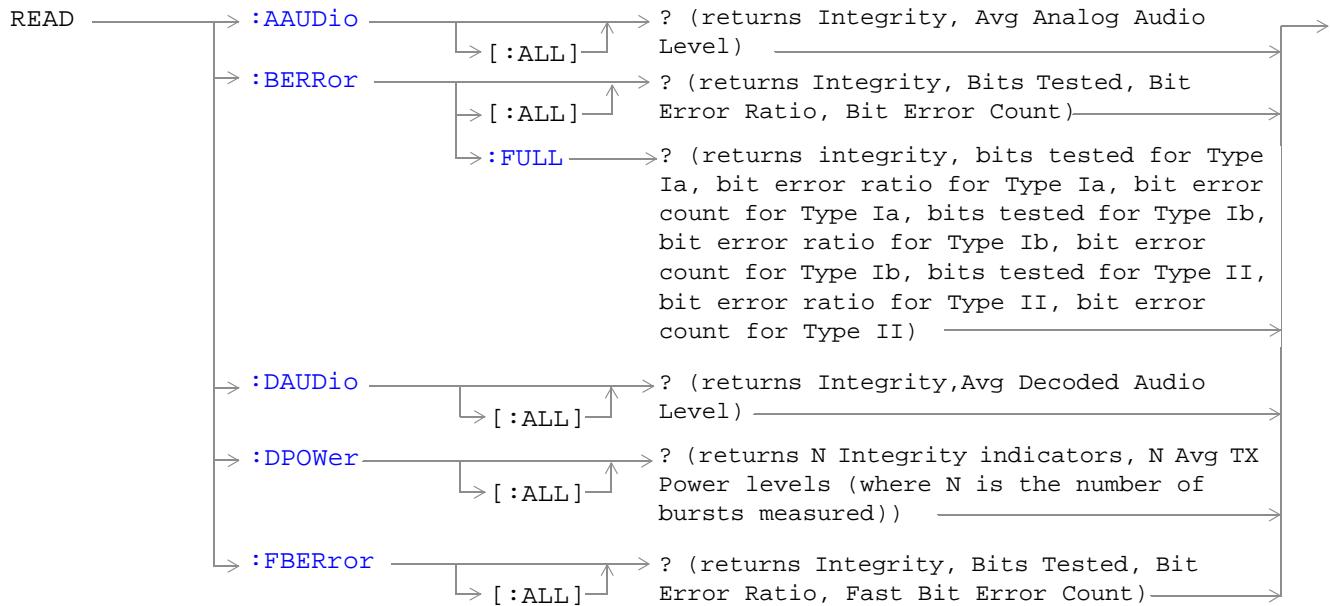
Some disadvantages of using READ? over INITiate and FETCh are:

- The test set does not process any additional GPIB commands until the requested measurement results are available.
- The sequential nature of the READ? command does not allow the user to make concurrent measurements. Concurrent measurements require the overlapped commands INITiate, DONE? and FETCh? .
- The READ? command does not provide measurement results such as statistics that are available using the INITiate/FETCh method.
- The READ? commands have pre-defined measurement results. If additional results are needed from a measurement they may be obtained with a FETCh? query.

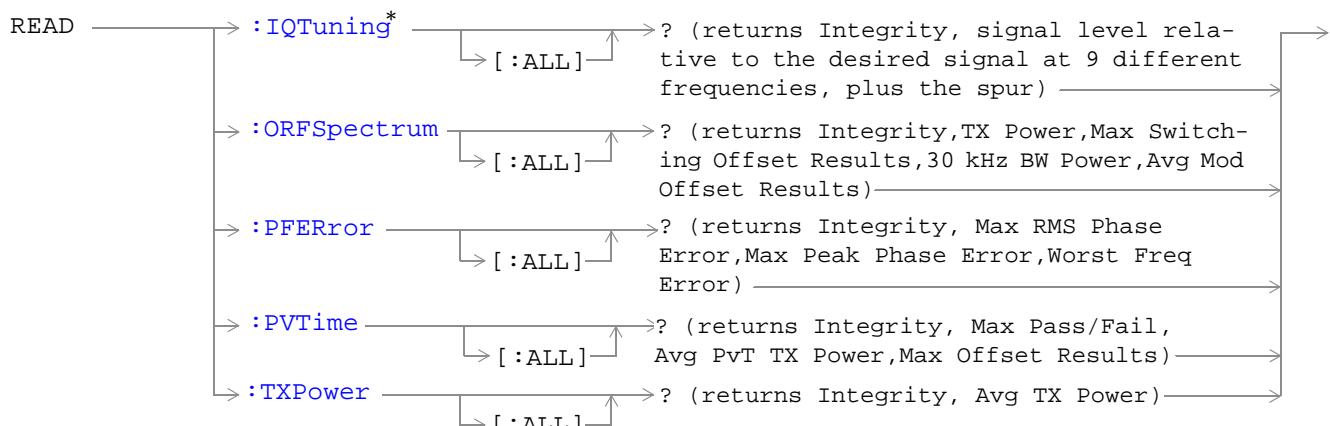
| | |
|------|---|
| NOTE | Trigger arming for each measurement is controlled in the SETup subsystem. Best practice during remote operation is to set trigger arm to single (Continuous Off). |
|------|---|

Programming Example

```
OUTPUT 714;"READ:TXPower?" !Starts TX power measurement. As soon as the
!measurement cycle has completed, the test set
!provides the TX power measurement results to the
!controlling application.
ENTER 714:integrity, tx_carrier_power !Enters the integrity indicator and
!TX carrier power measurement into
!controlling application.
```

READ

These commands are not applicable to GPRS.



* Not applicable to GPRS.

["Diagram Conventions" on page 283](#)

READ

READ:AAUDIO[:ALL]?

| | | |
|----------|------|--|
| Function | GSM | Queries (initiates and fetches) one analog audio measurement as a sequential operation. Returns Integrity Indicator, see "Integrity Indicator" on page 146 and analog audio (average). The FETCh command should be used to obtain other measurement results. See "FETCh:AAUDIO" on page 381 . |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Integrity indicator</p> <ul style="list-style-type: none">• Range: 0 to 16• Resolution: 1 <p>Analog audio (average)</p> <ul style="list-style-type: none">• Range: 0 to 20 volts• Resolution: 0.1mv |

READ:BERROR[:ALL]?

| | | |
|----------|------|---|
| Function | GSM | Queries (initiates and fetches) one RX bit error measurement as a sequential operation. Returns Integrity Indicator see "Integrity Indicator" on page 146 , Bits Tested, Bit Error Ratio and Bit Error Count for the bit type set using the SETup:BERROR[:TYPE] command. (A similar query, "READ:BERROR:FULL?" on page 445 , returns the same results but for all bit types simultaneously.) The FETCh command should be used to obtain other measurement results. See "FETCh:BERROR" on page 385 . |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Integrity indicator</p> <ul style="list-style-type: none">• Range: 0 to 16• Resolution: 1 <p>Bits tested</p> <ul style="list-style-type: none">• Range: 0 to (<RX bits to test +131) and 9.91E+37 (NAN)• Resolution: 1 <p>Bit error ratio</p> <ul style="list-style-type: none">• Range: 0 to 100 and 9.91E+37 (NAN)• Resolution: 1 <p>Bit error count</p> <ul style="list-style-type: none">• Range: 0 to (<RX bits to test +131) and 9.91E+37 (NAN)• Resolution: 1 |

READ:BERRor:FULL?

| | | |
|----------|------|---|
| Function | GSM | Queries (initiates and fetches) one RX bit error measurement as a sequential operation. Returns Integrity Indicator, see “Integrity Indicator” on page 146 , Bits Tested, Bit Error Ratio and Bit Error Count for Type Ia, Type Ib and Type II. (A similar query, “READ:BERRor[:ALL]?” on page 444 , returns the same results but only for the bit type previously set using the SETup:BERRor[:TYPE] command.) The FETCh command should be used to obtain other measurement results. See “FETCh:BERRor” on page 385 . |
| | GPRS | This command is not applicable to GPRS. |

| | |
|-------|--|
| Query | <p>Integrity indicator</p> <ul style="list-style-type: none"> • Range: 0 to 16 • Resolution: 1 <p>Type Ia Bits tested</p> <ul style="list-style-type: none"> • Range: 0 to 999000 and 9.91E+37 (NAN) • Resolution: 1 <p>Type Ia Bit error ratio</p> <ul style="list-style-type: none"> • Range: 0 to 100 and 9.91E+37 (NAN) • Resolution: 0.01 <p>Type Ia Bit error count</p> <ul style="list-style-type: none"> • Range: 0 to 999000 and 9.91E+37 (NAN) • Resolution: 1 <p>Type Ib Bits tested</p> <ul style="list-style-type: none"> • Range: 0 to 2637369 and 9.91E+37 (NAN) • Resolution: 1 <p>Type Ib Bit error ratio</p> <ul style="list-style-type: none"> • Range: 0 to 100 and 9.91E+37 (NAN) • Resolution: 0.01 <p>Type Ib Bit error count</p> <ul style="list-style-type: none"> • Range: 0 to 2637369 and 9.91E+37 (NAN) • Resolution: 1 <p>Type II Bits tested</p> <ul style="list-style-type: none"> • Range: 0 to 15584400 and 9.91E+37 (NAN) • Resolution: 1 <p>Type II Bit error ratio</p> <ul style="list-style-type: none"> • Range: 0 to 100 and 9.91E+37 (NAN) • Resolution: 0.01 <p>Type II Bit error count</p> <ul style="list-style-type: none"> • Range: 0 to 15584400 and 9.91E+37 (NAN) • Resolution: 1 |
|-------|--|

READ:DAUDIO[:ALL]?

| | | |
|----------|------|--|
| Function | GSM | Queries (initiates and fetches) one decoded audio (uplink speech level) measurement as a sequential operation. Returns Integrity Indicator see “ Integrity Indicator ” on page 146 and decoded audio (average). The FETCh command should be used to obtain other measurement results. See “ FETCh:DAUDIO ” on page 393. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Integrity indicator</p> <ul style="list-style-type: none"> • Range: 0 to 16 • Resolution: 1 <p>Decoded audio (average)</p> <ul style="list-style-type: none"> • Range: 0 to 100% FS (full scale) • Resolution: 0.01% FS |

READ:DPOWER[:ALL]?

| | | |
|----------|------|--|
| Function | GSM | Queries the Dynamic Power measurement results. Query returns N integrity indicators and N average TX power levels (where N is the number of bursts measured). To set the number of bursts you want to measure, use “ SETup:DPOWER:COUNT:NUMBER ” on page 490. |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Integrity indicators for each individual burst</p> <ul style="list-style-type: none"> • Range: 0 to 16 • Resolution: 1 <p>Average TX power levels for each individual burst</p> <ul style="list-style-type: none"> • Range: -100 to +100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dBm |

READ

READ:FBERror[:ALL]?

| | | |
|----------|------|--|
| Function | GSM | Queries (initiates and fetches) one fast bit error measurement as a sequential operation. Returns Integrity Indicator see "Integrity Indicator" on page 146 , Bits Tested, Bit Error Ratio, and Fast Bit Error Count using mobile station burst-by-burst looback (type C loopback). The FETCh command should be used to obtain other measurement results. See "FETCh:FBERror" on page 399 . |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Integrity indicator</p> <ul style="list-style-type: none">• Range: 0 to 16• Resolution: 1 <p>Bits tested</p> <ul style="list-style-type: none">• Range: 0 to (RX Fast BER bits to test + 455) and 9.91E+37 (NAN)• Resolution: 1 <p>Bit error ratio</p> <ul style="list-style-type: none">• Range: 0 to 100 and 9.91E+37 (NAN)• Resolution: 1 <p>Fast bit error count</p> <ul style="list-style-type: none">• Range: 0 to (RX Fast BER bits to test + 455) and 9.91E+37 (NAN)• Resolution: 1 |

READ:IQTuning[:ALL]?

| | | |
|----------|------|--|
| Function | GSM | <p>Queries (initiates and fetches) the I/Q Tuning measurement results. Query returns the integrity indicator and the relative power level at the following offset frequencies: carrier frequency, ± 67.7083 kHz, ± 135.417 kHz, ± 203.125 kHz, ± 270.833 kHz. The spur measurement result is also returned.</p> <p>The FETCh command should be used to return other measurement results. See "FETCh:IQTuning" on page 403.</p> |
| | GPRS | This command is not applicable to GPRS. |
| Query | | <p>Integrity indicator</p> <ul style="list-style-type: none"> Range: 0 to 16 Resolution: 1 <p>Signal level relative to the desired signal at 9 different frequencies</p> <ul style="list-style-type: none"> Range: -100 to +100 dB and 9.91 E+37 (NAN) Resolution: 0.01 dB <p>The order of the signal level results are:</p> <ul style="list-style-type: none"> -270.833 kHz -203.125 kHz -135.417 kHz -67.7083 kHz carrier frequency +67.7083 kHz +135.417 kHz +203.125 kHz +270.833 kHz <p>Relative power of the spur frequency:</p> <ul style="list-style-type: none"> Range: -100 to +100 dB and 9.91E+37 (NAN) Resolution: 0.01 dB |

READ:ORFSpectrum[:ALL]?

| | | |
|----------|--|--|
| Function | GSM | Queries (initiates and fetches) one output RF spectrum measurement as a sequential operation. |
| | GPRS | Returns Integrity Indicator see "Integrity Indicator" on page 146 , TX Power, Output RF Spectrum due to Switching (Max), 30 kHz Bandwidth Power, and Output RF Spectrum due to Modulation (Average). The FETCh command should be used to obtain other measurement results. See "FETCh:ORFSpectrum" on page 407 . |
| Query | <p>Integrity indicator</p> <ul style="list-style-type: none"> Range: 0 to 16 Resolution: 1 <p>TX power</p> <ul style="list-style-type: none"> Range: -100 to +100 dBm and 9.91E+37 (NAN) Resolution: 0.01 dB <p>Output RF spectrum due to switching (Max)</p> <ul style="list-style-type: none"> Range: 0 to 8 comma separated values -100 to +100 dBm and 9.91E+37 (NAN) Resolution: 0.01 dB <p>30 kHz bandwidth power</p> <ul style="list-style-type: none"> Range: -100 to +100 dBm and 9.91E+37 (NAN) Resolution: 0.01 dB <p>Output RF spectrum due to modulation (average)</p> <ul style="list-style-type: none"> Range: 0 to 22 comma separated values -200 to +100 dBm and 9.91E+37 (NAN) Resolution: 0.01 dB | |

READ:PFERror[:ALL]?

| | | |
|----------|---|--|
| Function | GSM | Queries (initiates and fetches) one Phase and Frequency Error measurement as a sequential operation. |
| | GPRS | Returns Integrity Indicator see "Integrity Indicator" on page 146 , RMS Phase Error (Max), Peak Phase Error (Max), Frequency Error (Worst). The FETCh command should be used to obtain other measurement results. See "FETCh:PFERror" on page 414 . Worst frequency error (negative or positive) is the value furthest from zero. |
| Query | <p>Integrity indicator</p> <ul style="list-style-type: none"> • Range: 0 to 16 • Resolution: 1 <p>rms phase error (max)</p> <ul style="list-style-type: none"> • Range: 0 to 180 degrees and 9.91E+37 (NAN) • Resolution: 0.01 dB <p>Peak phase error (max)</p> <ul style="list-style-type: none"> • Range: 0 to 180 degrees and 9.91E+37 (NAN) • Resolution: 0.01 degrees <p>Frequency error (worst)</p> <ul style="list-style-type: none"> • Range: -750 kHz to +750 kHz and 9.91E+37 (NAN) • Resolution: 0.01 Hz | |

READ

READ:PVTime?

| | | |
|----------|---|--|
| Function | GSM | Queries (initiates and fetches) one power versus time measurement as a sequential operation. |
| | GPRS | Returns Integrity Indicator see " Integrity Indicator on page 146, Mask pass/fail, power versus time transmit power and up to 12 power versus time offset (max) results. The FETCh command should be used to obtain other measurement results. See " FETCh:PVTime " on page 421. |
| Query | <p>Integrity indicator</p> <ul style="list-style-type: none">• Range: 0 to 16• Resolution: 1 <p>Mask pass/fail</p> <ul style="list-style-type: none">• Range: 0 1 and 9.91E+37 (NAN) <p>Power versus time transmit power</p> <ul style="list-style-type: none">• Range: -100 to +100 dBm and 9.91E+37 (NAN)• Resolution: 0.01 dB <p>Power versus time offset (max)</p> <ul style="list-style-type: none">• Range: Up to 12 comma-separated power versus time values returned with max power = -100 dBc to +100 dBc (relative to power versus time carrier power) and 9.91E+37 (NAN)• Resolution: 0.01 dB | |

READ:TXPower[:ALL]?

| | | |
|----------|--|--|
| Function | GSM | Queries (initiates and fetches) one TX power measurement as a sequential operation. |
| | GPRS | Returns Integrity Indicator see " Integrity Indicator on page 146 and transmit power (average). The FETCh command should be used to obtain other measurement results. See " FETCh:TXPower " on page 433. |
| Query | <p>Integrity indicator</p> <ul style="list-style-type: none">• Range: 0 to 16• Resolution: 1 <p>Transmit power (average)</p> <ul style="list-style-type: none">• Range: -100 to +100 dBm and 9.91E+37 (NAN)• Resolution: 0.01 dB | |

RFANalyzer Subsystem

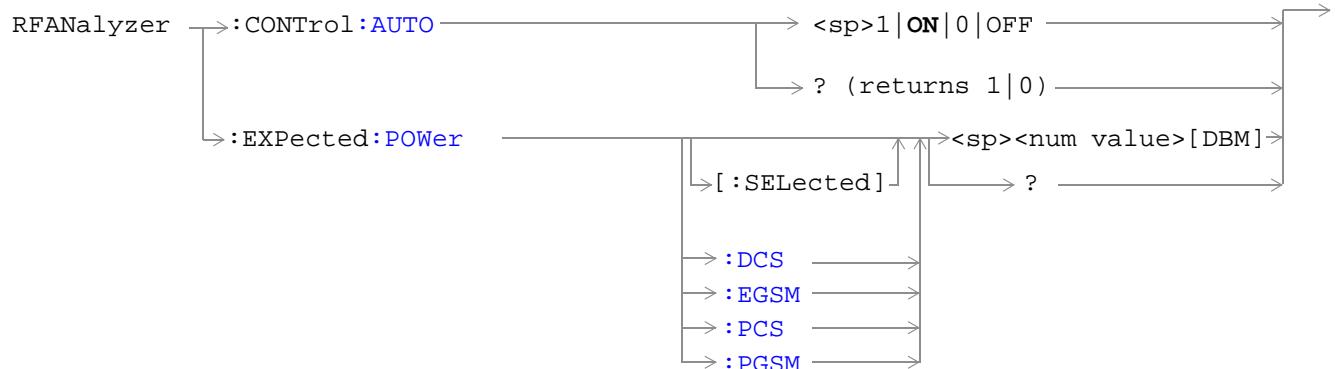
Description

The RFANalyzer command subsystem performs “lower-level” functions that control the Test Set’s measuring receiver. Most of these functions are normally controlled indirectly by commands in other subsystems. One exception would be when operating in Test Mode. For example, the command CALL:TCHannel:<channel number> would set the RFANalyzer:EXPected:FREQuency parameter to the frequency that maps to the uplink traffic channel specified.

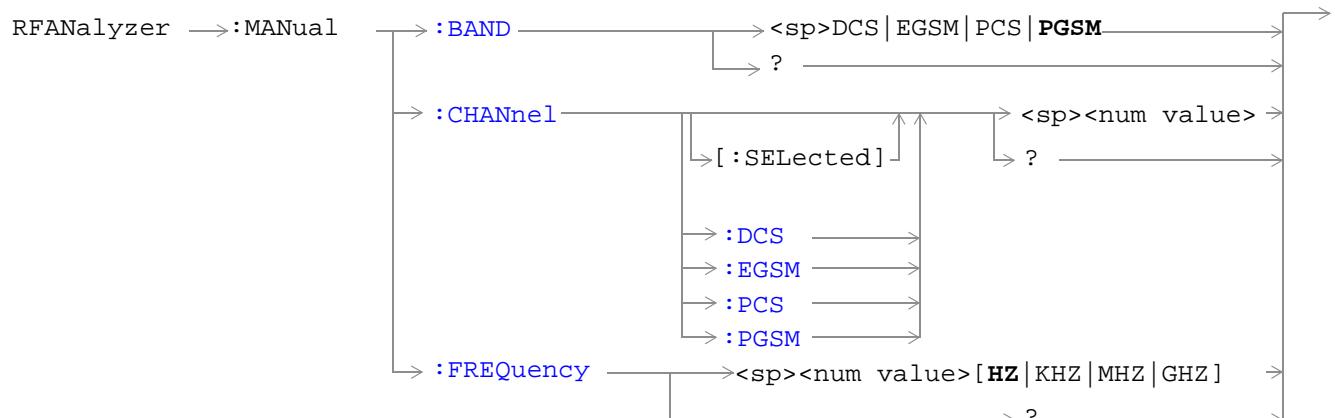
Syntax Diagrams and Command Descriptions

[“RFANalyzer” on page 454](#)

RFANalyzer



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

[“Diagram Conventions” on page 283](#)

RFANalyzer:CONTrol:AUTo

| | | |
|---|------|--|
| Function | GSM | Sets/queries the test set's receiver control. The measuring receiver is under the control of the test set's base station emulator (auto) or under the control of the user (manual). see " Receiver Control " on page 616 Setting the manual band will change the receiver control to manual. see " RFANalyzer:MANual:BAND " on page 458 Setting the manual channel in the band that is currently active will change the receiver control to manual. see " RFANalyzer:MANual:CHANnel[:SELected] " on page 458 Setting the manual frequency will change the receiver control to manual. see " RFANalyzer:MANual:FREQuency " on page 461 Setting the broadcast band will change the receiver control to auto. See " CALL:BAND " on page 304 |
| | GRPS | This command is not applicable to GPRS. |
| Setting | | Manual = 0 OFF , Auto = 1 ON (default ON) |
| Query | | 0 1 |
| *RST setting | | 0 on |
| Programming Example | | |
| OUTPUT 714; "RFANALYZER:CONTROL:CONTROL:AUTo 0" !Sets receiver control to manual. | | |

RFANalyzer:EXPected:POWer[:SELected]

| | | |
|--|------|---|
| Function | GSM | Sets/queries the power level in DBM that the mobile station is expected to transmit for the selected band. The units DBM are optional. The test set will set up its input signal path to measure this power level when a user is in manual control. See " Expected Power " on page 618. |
| | GRPS | This command is not applicable to GPRS. |
| Setting | | Range: -60 to +53 dBm, after the Amplitude Offset (optional) has been factored in. see " Measurement Related Configuration " on page 670 Resolution: .01 DBM |
| Query | | Range: -60 to +53 dBm, after the Amplitude Offset (optional) has been factored in. see " Measurement Related Configuration " on page 670 Resolution: .01 DBM |
| *RST setting | | Sets the receiver control to auto Band: PGSM Expected Power: +13DBM |
| Programming Example | | |
| OUTPUT 714; "RFANALYZER:EXPECTED:POWER:SELECTED 10" !Sets the test set expected input level to 10 DBM. | | |

RFANalyzer:EXPected:POWer:DCS

| | | |
|---|------|--|
| Function | GSM | Sets/queries the power level in DBM that the mobile station is expected to transmit at. The units DBM are optional. The test set will set up its input signal path to measure this power level. see " Receiver Control " on page 616 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: -60 to +53 dBm, after the Amplitude Offset (optional) has been factored in. see " Measurement Related Configuration " on page 670 Resolution: .01 DBM |
| Query | | Range: -60 to +53 dBm, after the Amplitude Offset (optional) has been factored in. see " Measurement Related Configuration " on page 670 Resolution: .01 DBM |
| *RST setting | | Sets the receiver control to auto Band: PGSM Expected Power: +13DBM |
| Programming Example | | |
| OUTPUT 714;"RFANALYZER:EXPECTED:POWER:DCS -10" !Sets expected power in DCS band !to -10 DBM. | | |

RFANalyzer:EXPected:POWer:EGSM

| | | |
|---|------|--|
| Function | GSM | Sets/queries the power level in DBM that the mobile station is expected to transmit at. The units DBM are optional. The test set will set up its input signal path to measure this power level. see " Receiver Control " on page 616 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: -60 to +53 dBm, after the Amplitude Offset (optional) has been factored in. see " Measurement Related Configuration " on page 670 Resolution: .01 DBM |
| Query | | Range: -60 to +53 dBm, after the Amplitude Offset (optional) has been factored in. see " Measurement Related Configuration " on page 670 Resolution: .01 DBM |
| *RST setting | | Sets the receiver control to auto Band: PGSM Expected Power: +13DBM |
| Programming Example | | |
| OUTPUT 714;"RFANALYZER:EXPECTED:POWER:EGSM -10" !Sets expected power in EGSM !band to -10 DBM. | | |

RFANalyzer:EXPected:POWer:PCS

| | | |
|---|------|--|
| Function | GSM | Sets/queries the power level in DBM that the mobile station is expected to transmit at. The units DBM are optional. The test set will set up its input signal path to measure this power level. see "Receiver Control" on page 616 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: -60 to +53 dBm, after the Amplitude Offset (optional) has been factored in. see "Measurement Related Configuration" on page 670 Resolution: .01 DBM |
| Query | | Range: -60 to +53 dBm, after the Amplitude Offset (optional) has been factored in. see "Measurement Related Configuration" on page 670 Resolution: .01 DBM |
| *RST setting | | Sets the receiver control to auto Band: PGSM Expected Power: +13DBM |
| Programming Example <pre>OUTPUT 714;"RFANALYZER:EXPECTED:POWER:PCS -10" !Sets expected power in PCS band !to -10 DBM.</pre> | | |

RFANalyzer:EXPected:POWer:PGSM

| | | |
|---|------|--|
| Function | GSM | Sets/queries the power level in DBM that the mobile station is expected to transmit at. The units DBM are optional. The test set will set up its input signal path to measure this power level. see "Receiver Control" on page 616 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: -60 to +53 dBm, after the Amplitude Offset (optional) has been factored in. see "Measurement Related Configuration" on page 670 Resolution: .01 DBM |
| Query | | Range: -60 to +53 dBm, after the Amplitude Offset (optional) has been factored in. see "Measurement Related Configuration" on page 670 Resolution: .01 DBM |
| *RST setting | | Sets the receiver control to auto Band: PGSM Expected Power: +13DBM |
| Programming Example <pre>OUTPUT 714;"RFANALYZER:EXPECTED:POWER:PGSM -10" !Sets expected power in PGSM !band to -10 DBM.</pre> | | |

RFANalyzer:MANual:BAND

| | | |
|---|------|---|
| Function | GSM | Sets/queries the frequency band that the test set will expect the mobile station to operate on. This setting is used by the test set to map an expected channel (ARFCN) to an uplink frequency. see " "Receiver Control" on page 616 The receiver control is set to manual when a manual band is selected. see " "RFANalyzer:CONTrol:AUTO" on page 455 The manual band must be set before manual channel will update. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: DCS EGSM PCS PGSM |
| Query | | Range: DCS EGSM PCS PGSM |
| *RST setting | | PGSM |
| Programming Example | | |
| OUTPUT 714; "RFANALYZER:MANUAL:BAND DCS" !Sets the band in manual !receiver control. | | |

RFANalyzer:MANual:CHANnel[:SElected]

| | | |
|---|------|---|
| Function | GSM | Sets/queries the ARFCN that the mobile station is expected to transmit on for the band selected. The test set will tune to the corresponding uplink frequency for the frequency band currently selected. see " "Receiver Control" on page 616 The manual band must be set before manual channel will update. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Any ARFCN within the currently selected frequency band. |
| Query | | Any ARFCN within the currently selected frequency band. |
| *RST setting | | Sets the receiver control to auto Band: PGSM Traffic Channel: 30 |
| Programming Example | | |
| OUTPUT 714; "RFANALYZER:MANUAL:SELECTED 512" !Configures the test set to !ARFCN 512. | | |

RFANalyzer:MANual:CHANnel:DCS

| | | |
|--|------|---|
| Function | GSM | Sets/queries the ARFCN that the mobile station is expected to transmit on. The test set will tune to the corresponding uplink frequency for the DCS frequency band. see " "Receiver Control" on page 616 The manual band must be set before manual channel will update. see " "RFANalyzer:MANual:BAND" on page 458 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 512 to 885 Resolution: 1 |
| Query | | Range: 512 to 885 Resolution: 1 |
| *RST setting | | Sets the receiver control to auto Band: PGSM Traffic Channel: 30 |
| Programming Example | | |
| OUTPUT 714; "RFANALYZER:MANUAL:CHANNEL:DCS 512" !Sets ARFCN for DSC in manual !receiver mode. | | |

RFANalyzer:MANual:CHANnel:EGSM

| | | |
|--|------|---|
| Function | GSM | Sets /queries the ARFCN that the mobile station is expected to transmit on. The test set will tune to the corresponding uplink frequency for the EGSM frequency band. see " "Receiver Control" on page 616 The manual band must be set before manual channel will update. see " "RFANalyzer:MANual:BAND" on page 458 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 0 to 124 and 975 to 1023 Resolution: 1 |
| Query | | Range: 0 to 124 and 975 to 1023 Resolution: 1 |
| *RST setting | | Sets the receiver control to auto Band: PGSM Traffic Channel: 30 |
| Programming Example | | |
| OUTPUT 714; "RFANALYZER:MANUAL:CHANNEL:EGSM 975" !Sets ARFCN for EGSM in manual !receiver mode. | | |

RFANalyzer:MANual:CHANnel:PCS

| | | |
|--|------|---|
| Function | GSM | Sets/queries the ARFCN that the mobile station is expected to transmit on. The test set will tune to the corresponding uplink frequency for the PCS frequency band. see " Receiver Control " on page 616 . The manual band must be set before manual channel will update. see " RFANalyzer:MANual:BAND " on page 458 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 512 to 810 Resolution: 1 |
| Query | | Range: 512 to 810 Resolution: 1 |
| *RST setting | | Sets the receiver control to auto Band: PGSM Traffic Channel: 30 |
| Programming Example <pre>OUTPUT 714; "RFANALYZER:MANUAL:CHANNEL:PCS 512" !Sets ARFCN for PCS in manual !receiver mode.</pre> | | |

RFANalyzer:MANual:CHANnel:PGSM

| | | |
|--|------|--|
| Function | GSM | Sets/queries the ARFCN that the mobile station is expected to transmit on. The test set will tune to the corresponding uplink frequency for the PGSM frequency band. see " Receiver Control " on page 616 . The manual band must be set before manual channel will update. see " RFANalyzer:MANual:BAND " on page 458 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 1 to 124 Resolution: 1 |
| Query | | Range: 1 to 124 Resolution: 1 |
| *RST setting | | Sets the receiver control to auto Band: PGSM Traffic Channel: 30 |
| Programming Example <pre>OUTPUT 714; "RFANALYZER:MANUAL:CHANNEL:PGSM 124" !Sets ARFCN for PGSM in manual !receiver mode.</pre> | | |

RFANalyzer:MANual:FREQuency

| | | |
|--|------|---|
| Function | GSM | Sets/queries the frequency that the mobile station is expected to transmit on. See " Receiver Control " on page 616 . The units (HZ KHZ MHZ GHZ) are optional, if no units are specified then units default to HZ. Setting the manual frequency changes the receiver control to manual. see " RFANalyzer:CONTrol:AUTO " on page 455 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 292.5 MHz to 2700 MHz Resolution: .01 Hz |
| Query | | Range: 292.5 MHz to 2700 MHz Resolution: .01 Hz |
| *RST setting | | 896 MHz |
| Programming Example | | |
| OUTPUT 714;"RFANALYZER:MANUAL:FREQUENCY 942.6MHZ" !Sets the expected frequency !to 942.6 MHz in manual !receiver mode. | | |

SETUp Subsystem

Description

The SETUp subsystem is used to configure the test set for each measurement. Typical settings include:

- Multi-Measurement Count, how many measurements will be made each time a measurement is initiated.
- Trigger Arm, determines if a measurement will make one measurement then return to idle (single), or automatically rearm on completion of a measurement and repeat the process (continuous).
- Trigger Source, how a measurement is triggered.
- Trigger Delay, controls the delay time between the trigger and the start of sampling.
- Measurement Timeout, length of time before a measurement times out.

NOTE Trigger arming for each measurement is controlled in the SETUp subsystem. The choices are single or continuous. In most cases, it is a best practice (during remote operation) to use “single” measurement mode. This simplifies the tasks of starting concurrent measurements, using the INIT subsystem commands to determine which measurements are ready to be fetched, then using the FETCh subsystem to obtain results. The command “SETUp:CONTinuous:OFF sets all measurements to “single” trigger mode.

Syntax Diagrams and Command Descriptions

[“SETUp:AAUDio” on page 463](#)

[“SETUp:BERRor” on page 469](#)

[“SETUp:CONTinuous” on page 483](#)

[“SETUp:DAUDio” on page 484](#)

[“SETUp:DPOWer” on page 489](#)

[“SETUp:FBERRor” on page 476](#)

[“SETUp:IQTuning” on page 493](#)

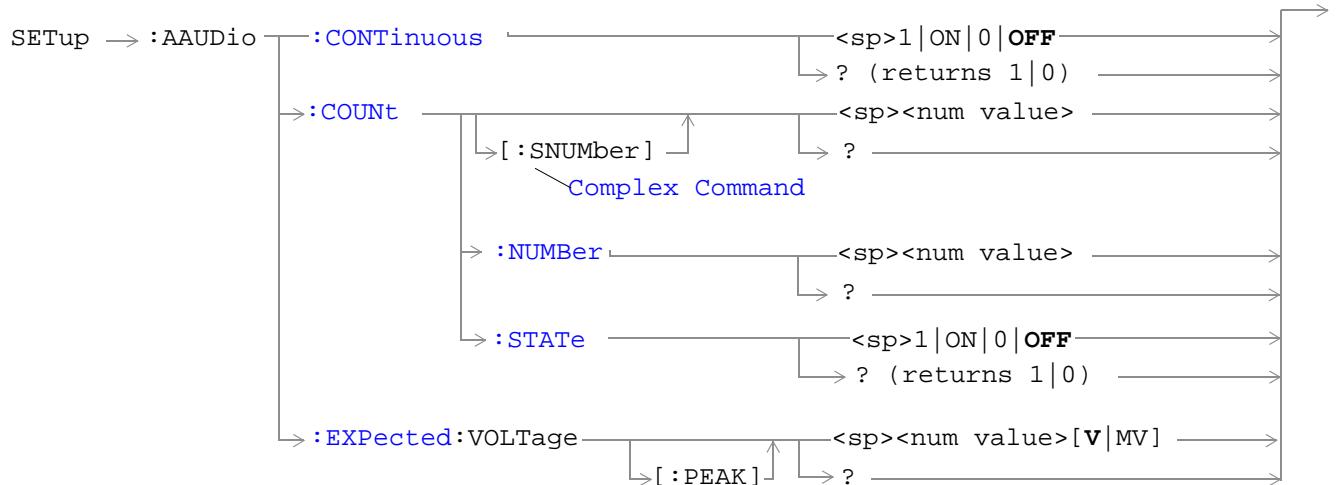
[“SETUp:ORFSpectrum” on page 499](#)

[“SETUp:PFERRor” on page 508](#)

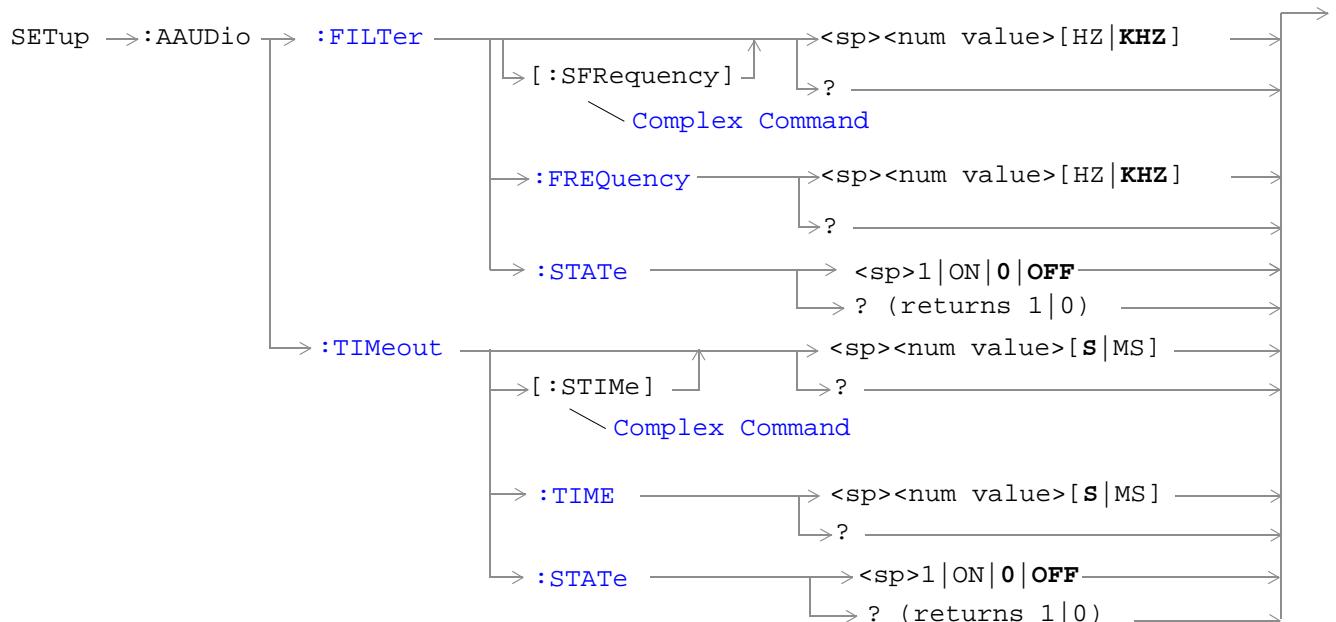
[“SETUp:PVTIme” on page 513](#)

[“SETUp:TXPower” on page 519](#)

SETup:AAUDio



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

["Diagram Conventions" on page 283](#)

SETup:AAUDIO

SETup:AAUDIO:CONTinuous

| | | | | |
|--|--|--|--|--|
| Function | GSM | Selects/queries the trigger arm state for Analog Audio measurements. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Setting | Continuous trigger arm mode = 1 ON Single trigger arm mode = 0 OFF | | | |
| Query | 0 1 | | | |
| *RST setting | Single | | | |
| Programming Example | | | | |
| 10 OUTPUT 714;"AAUDIO:COUNTINUOUS OFF" !Selects single trigger mode. | | | | |

SETup:AAUDIO:COUNT[:SNUMBER]

| | | | | |
|--|----------------------------------|--|--|--|
| Function | GSM | Selects the number of Analog Audio multi-measurements the Test Set will make and sets the count state to ON. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Setting | Range: 1 to 999 Resolution: 1 | | | |
| *RST setting | OFF | | | |
| Programming Example | | | | |
| OUTPUT 714;"AAUDIO:COUNT :SNUMBER 5" !Sets the value to 5 and the state to on. | | | | |

SETup:AAUDIO:COUNT:NUMBER

| | | | | |
|--|----------------------------------|---|--|--|
| Function | GSM | Selects/queries the number of Analog Audio measurements the Test Set will make when the "SETup:AAUDIO:COUNT:STATE" is on. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Setting | Range: 1 to 999 Resolution: 1 | | | |
| Query | Range: 1 to 999 Resolution: 1 | | | |
| *RST setting | 10 | | | |
| Programming Example | | | | |
| OUTPUT 714;"ABORT:ALL" !Aborts all active measurements in progress. | | | | |
| OUTPUT 714;"SETUP:AAUDIO:COUNT:NUMBER 10" !Sets the audio multi-measurement !count number. | | | | |

SETup:AAUDIO:COUNt:STATe

| | | |
|---|------|---|
| Function | GSM | Selects/queries the Analog Audio multi-measurement count state. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | 1 ON 0 OFF |
| Query | | 1 0 |
| *RST setting | | 0 OFF |
| Programming Example | | |
| OUTPUT 714; "SETUP:AAUDIO:COUNT:STATE ON" !Turns the analog audio measurement !multi-measurement count state on. | | |

SETup:AAUDIO:EXPected:VOLTage[:PEAK]

| | | |
|---|------|--|
| Function | GSM | Sets/queries the maximum expected peak voltage (clipping level) of the Analog Audio signal to be measured. The units (V MV UV) are optional, if no units are specified then units default to V. see "SETup:AAUDIO" on page 463 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 10 mV to 20 V peak Resolution: 0.1 mV |
| Query | | Range: 10 mV to 20 V peak Resolution: 0.1 mV |
| *RST setting | | 20 V |
| Programming Example | | |
| OUTPUT 714; "SETUP:AAUDIO: EXPECTED:VOLTAGE 5 V" !Sets the clipping level of !Analog Audio measurements !to +5 volts. | | |

SETup:AAUDIO:FILTER[:SFREQUENCY]

| | | |
|---|------|---|
| Function | GSM | Sets/queries the state to on and the center frequency for the 100 Hz bandpass filter applied to Analog Audio measurements. Units (KHZ HZ) are optional, if no units are specified then units default to Hz. see " Analog Audio Measurement Description " on page 62 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 200 Hz to 8.0 kHz Resolution: 1 Hz |
| Query | | Range: 200 Hz to 8.0 kHz Resolution: 1 Hz |
| *RST setting | | 1000 Hz |
| Programming Example | | |
| OUTPUT 714;"SETUP:AAUDIO:FILTER :SFREQUENCY 1000" !This is a complex command that !sets the aaudio filter state !to on and sets the bandpass !filter frequency to 1 kHz. | | |

SETup:AAUDIO:FILTER:FREQUENCY

| | | |
|--|------|--|
| Function | GSM | Sets/queries the center frequency for the 100 Hz bandpass filter applied to Analog Audio measurements. Units (KHZ HZ) are optional, if no units are specified then units default to Hz. see " SETup:AAUDIO " on page 463 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 200 Hz to 8.0 kHz Resolution: 1 Hz |
| Query | | Range: 200 Hz to 8.0 kHz Resolution: 1 Hz |
| *RST setting | | 1 kHz |
| Programming Example | | |
| OUTPUT 714;"SETUP:AAUDIO:FREQUENCY 217HZ" !Set aaudio bandpass filter to 217 hz. | | |

SETup:AAUDIO:FILTER:STATE

| | | |
|---|------|---|
| Function | GSM | Selects/queries the state of the Analog Audio bandpass filter. see “ SETup:AAUDIO ” on page 463 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | 1 ON 0 OFF |
| Query | | 1 0 |
| *RST setting | | 0 OFF |
| Programming Example | | |
| OUTPUT 714; “SETUP:AAUDIO:FILTER:STATE ON” !Sets filter state on. | | |

SETup:AAUDIO:TIMEout[:STIME]

| | | |
|---|------|--|
| Function | GSM | Selects/queries the timeout value in seconds that will be used for Analog Audio measurements and sets the timeout state to ON. Units (S MS) are optional, if no units are specified then units default to S. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: .1 to 999 seconds Resolution: .1 seconds |
| Query | | Range: .1 to 999 seconds Resolution: .1 seconds |
| *RST setting | | 10 seconds |
| Programming Example | | |
| OUTPUT 714; “SETUP:AAUDIO:TIMEOUT:STIME 3” !A complex command that sets timeout state to on and sets the timeout value. | | |

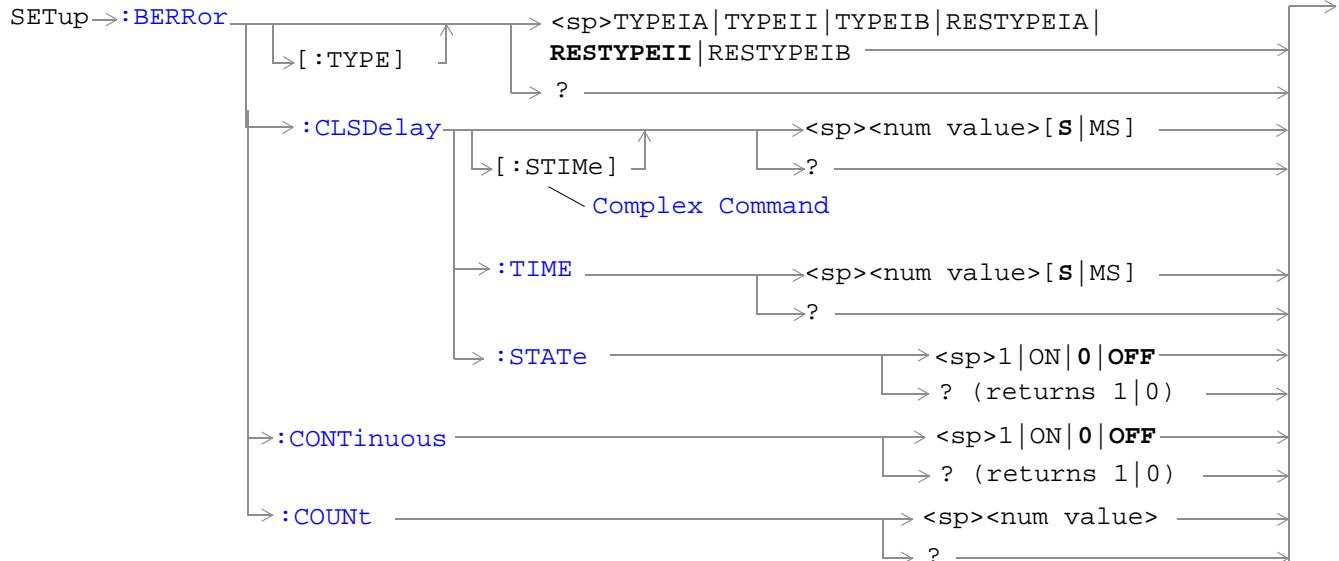
SETup:AAUDIO:TIMEout:STATE

| | | |
|--|------|---|
| Function | GSM | Selects/queries the Analog Audio measurement timeout state. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | 1 ON 0 OFF |
| Query | | 1 0 |
| *RST setting | | 0 OFF |
| Programming Example | | |
| OUTPUT 714; “SETUP:AAUDIO:TIMEOUT:STATE ON” !Sets timeout state to on. | | |

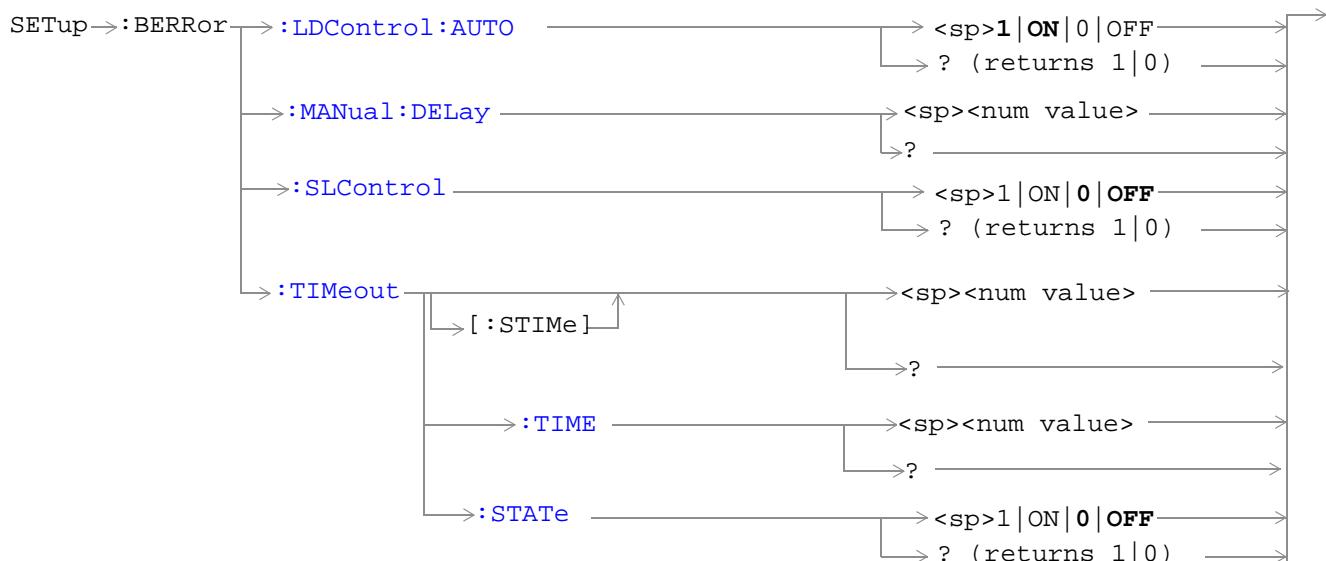
SETup:AAUDIO:TIMEout:TIME

| | | |
|--|------|---|
| Function | GSM | Selects/queries the timeout value in seconds that will be used for Analog Audio measurements when the timeout state is ON. Unit (S MS) are optional, if no units are specified then units default to S. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: .1 to 999 seconds Resolution: .1 seconds |
| Query | | Range: .1 to 999 seconds Resolution: .1 seconds |
| *RST setting | | 10 seconds |
| Programming Example | | |
| OUTPUT 714;"SETUP:AAUDIO:TIMEOUT:TIME 5" !Sets timeout value to 5 seconds. | | |

SETup:BERRor



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

“Diagram Conventions” on page 283

SETup:BERRor:CLSDelay[:STIMe]

| | | |
|---|------|---|
| Function | GSM | Selects/queries the closed loop signalling delay time in seconds for Bit Error measurements and sets the delay state to ON. The units (S MS) are optional, if no units are specified than units default to S. The delay time defines how long the test set should wait before starting a BERR measurement. The downlink signalling operation must be completed and the test set must send a close loop command to the MS before the measurement can begin. The delay time allows time for the loop to close. When a close loop message is set to the MS the closed loop signalling delay time will hold off the BERR measurement from starting for the specified time period. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 0 to 5 seconds Resolution: 100 ms |
| Query | | Range: 0 to 5 seconds Resolution: 100 ms |
| *RST Setting | | 500 ms |
| Programming Example | | |
| OUTPUT 714;"SETUP:BERROR:CLSDelay:STIME 400 MS" ! Set state to on ! and delay time | | |

SETup:BERRor:CLSDelay:TIME

| | | |
|--|------|--|
| Function | GSM | Selects/queries the closed loop signalling delay time in seconds for Bit Error measurements. The units (S MS) are optional, if no units are specified than units default to S. The delay time defines how long the test set should wait before starting a BERR measurement. The downlink signalling operation must be completed and the test set must send a close loop command to the MS before the measurement can begin. The delay time allows time for the loop to close. When a close loop message is set to the MS the closed loop signalling delay time will hold off the BERR measurement from starting for the specified time period. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 0 to 5 seconds Resolution: 100 ms |
| Query | | Range: 0 to 5 seconds Resolution: 100 ms |
| *RST Setting | | 500 ms |
| Programming Example | | |
| OUTPUT 714;"SETUP:BERROR:CLSDelay:TIME 600MS" ! Set delay time | | |

SETup:BERRor:CLSDelay:STATE

| | | |
|--|------|---|
| Function | GSM | Selects/queries the closed loop signalling delay state for Bit Error measurements. If the state is off the test set will not wait to start a BERR measurement after a downlink signalling operation has completed. The delay time defines how long the test set should wait before starting and BERR measurement after a downlink signalling operation has completed and after the test set has sent a close loop command to the MS. When a close loop message is set to the MS the closed loop signalling delay time will hold off the BERR measurement from starting for the specified time period. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 1 ON 0 OFF |
| Query | | Range: 1 0 |
| *RST Setting | | 1 ON |
| Programming Example | | |
| OUTPUT 714; "SETUP:BERRor:CLSDELAY:STATE ON" | | |

SETup:BERRor[:TYPE]

| | | |
|---|------|---|
| Function | GSM | Sets the measurement type for BER measurements including Type A (residual) and Type B (non-residual). |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: TYPEIA TYPEII TYPEIB RESTYPEIA RESTYPEII RESTYPEIB |
| Query | | Range: TYPEIA TYPEII TYPEIB RESTYPEIA RESTYPEII RESTYPEIB |
| *RST Setting | | RESTYPEII |
| Programming Example | | |
| OUTPUT 714; "SETUP:BERRor:TYPE TYPEIA" !Sets type of BER measurement. | | |

SETup:BERRor

SETup:BERRor:CONTinuous

| | | |
|---|------|---|
| Function | GSM | Sets/queries the trigger state to single trigger mode or continuous trigger mode for BER measurement. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 0 OFF 1 ON |
| Query | | 0 1 |
| *RST Setting | | 0 off |
| Programming Example | | |
| OUTPUT 714; "BERROR:CONTINUOUS OFF" !Sets BER measurement to single trigger mode. | | |

SETup:BERRor:COUNT

| | | |
|---|------|---|
| Function | GSM | Sets/queries the number of BER measurements the test set will make when the count state is on |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 1 to 999,000 Resolution: 1 |
| Query | | Range: 1 to 999,000 Resolution: 1 |
| *RST Setting | | 10,000 |
| Programming Example | | |
| OUTPUT 714; "SETUP:BERROR:COUNT 880" !Set BER multi-measurement count !to 880. | | |

SETup:BERRor:LDControl:AUto

| | | |
|--|------|---|
| Function | GSM | Sets/queries speech frames delay control mode. If speech frames delay control mode is automatic (Auto), the test set will determine the frame delay value that will allow correlation between uplink information bits with downlink information bits. If speech frames delay control mode is manual (not Auto), the test set will use the frame delay value entered in the Speech Frames Delay field. Refer to. see " SETup:BERRor:MANual:DELay " on page 473 Refer also to the " Bit Error Measurement Description " on page 66 for a description of frame delay and its use in the BER measurement. |
| | GPRS | |
| Setting | | Range: 0 OFF 1 ON |
| Query | | 0 1 |
| *RST Setting | | 1 auto |
| Related Topics | | "SETup:BERRor:MANual:DELay" on page 473 |
| Programming Example | | |
| <pre>OUTPUT 714; "SETUP:BERROR:LDCONTROL:AUto OFF" !sets BER delay to manual the user !must select the manual frame !delay number.</pre> | | |

SETup:BERRor:MANual:DELay

| | | |
|---|------|---|
| Function | GSM | Sets/queries the number of frames the test set will use to correlate uplink information bits with downlink information bits when loop delay control mode is manual (AUTO OFF). To set the delay mode to manual, refer to " SETup:BERRor:LDControl:AUto " on page 473. This value is displayed in the Speech Frames Delay field when Auto is not displayed. (If you want to display this value and Auto is currently displayed, press the front-panel key labeled OFF). Refer to " Bit Error Measurement Description " on page 66 for a description of frame delay and how it is used in this measurement. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 1 to 15 Resolution : 1 |
| Query | | Range: 1 to 15 Resolution : 1 |
| *RST Setting | | 5 |
| Programming Example | | |
| <pre>OUTPUT 714; "SETUP:BERROR:MANUAL:DELAY 4" !Set delay of 4 speech frames.</pre> | | |

SETup:BERRor

SETup:BERRor:SLControl

| | | |
|---|------|---|
| Function | GSM | Selects/queries the Signalling loopback control state for an BER measurement. When signalling loopback control is set to on, the test set will automatically send the loopback for Type A (residual) or Type B (non-residual) loopback to the MS, based on the measurement type selected, and then set loopback to off when the measurement is complete. The loopback type is controlled manually using Mobile Loopback (F12) on Call Params menu 1 of 4. See " CALL:TChannel:LOOPback " on page 375 for a programming example and details about the command. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 1 ON 0 OFF |
| Query | | Range: 1 0 |
| *RST Setting | | 1 ON |
| Programming Example | | |
| OUTPUT 714; "SETUP:BERROR:SLCONTROL ON" ! Test set will send ! loopback type automatically | | |

SETup:BERRor:TIMEout[:STIMe]

| | | |
|--|------|---|
| Function | GSM | Sets/queries the timeout value in seconds for the trigger state during BER measurements and turns the timeout state on. The units (S MS) are optional, if no units are specified than units default to S. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: .1 to 999 Resolution: .1 |
| Query | | Range: .1 to 999 Resolution: .1 |
| *RST Setting | | 10 seconds |
| Programming Example | | |
| OUTPUT 714; "SETUP:BERR:TIMEOUT:STIME 8" !Sets BER measurement timeout to !8 seconds and the state to on. | | |

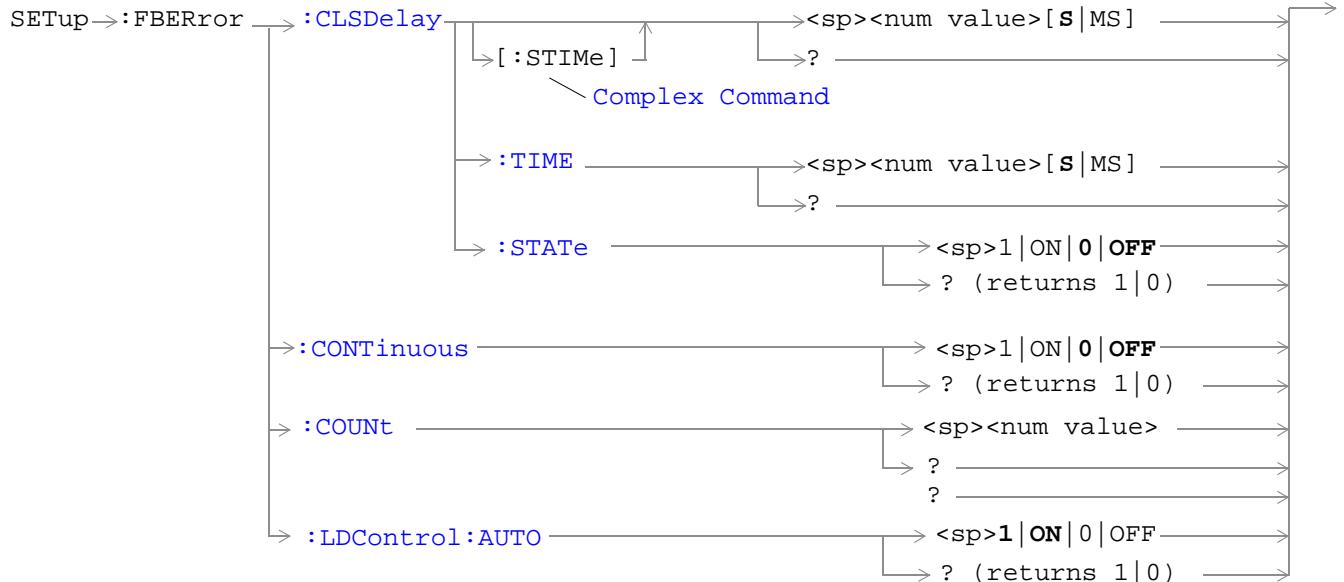
SETup:BERRor:TIMEout:TIME

| | | |
|---|------|--|
| Function | GSM | Sets/queries the timeout value in seconds for the trigger state during BER measurements. The units (S MS) are optional, if no units are specified than units default to S (seconds). |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: .1 to 999 Resolution: .1 |
| Query | | Range: .1 to 999 Resolution: .1 |
| *RST Setting | | 10 seconds |
| Programming Example | | |
| OUTPUT 714; "SETUP:BERR:TIMEOUT:TIME 8" !Sets BER measurement timeout to !8 seconds. | | |

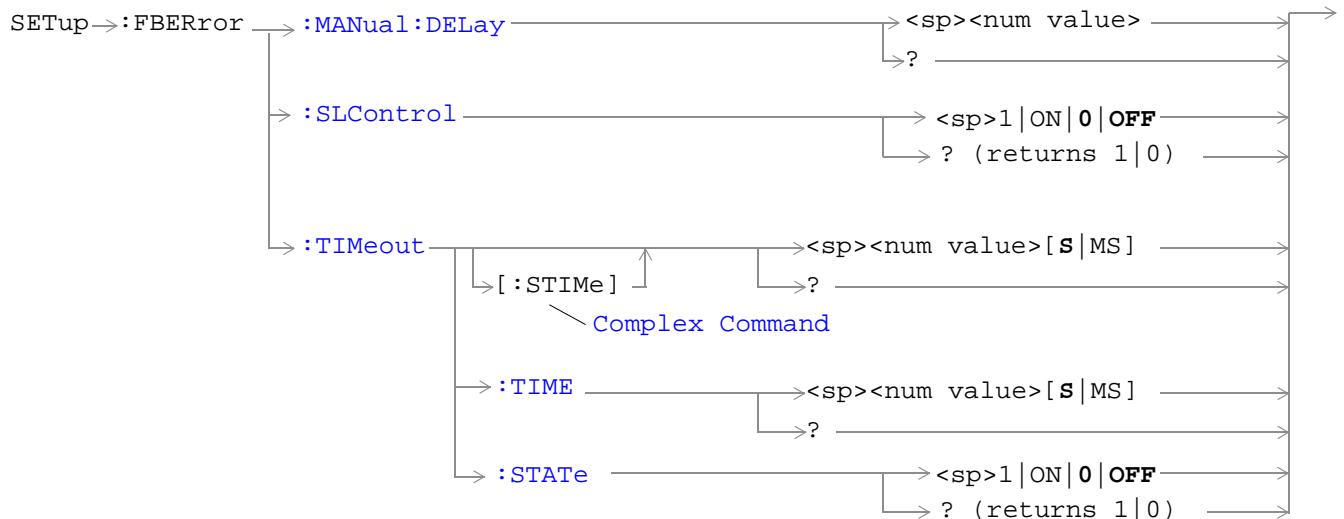
SETup:BERRor:TIMEout:STATe

| | | |
|--|------|--|
| Function | GSM | Sets/queries the timeout state for BER measurements. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 0 OFF 1 ON |
| Query | | 0 1 |
| *RST Setting | | 0 off |
| Programming Example | | |
| OUTPUT 714; "SETUP:BERR:TIMEOUT:STATE ON" !Sets the timeout state to on. | | |

SETup:FBERror



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

["Diagram Conventions" on page 283](#)

SETup:FBERror:CLSDelay[:STIMe]

| | | |
|--|------|--|
| Function | GSM | <p>This command selects/queries the closed loop signalling delay time in seconds for Fast Bit Error measurements and sets the delay state to ON. The units (S MS) are optional, if no units are specified than units default to S.</p> <p>The delay time defines how long the test set should wait before starting a FBER measurement. The downlink signalling operation must be completed and the test set must send a close loop command to the MS before the measurement can begin. The delay time allows time for the loop to close.</p> <p>When a close loop message is set to the MS the closed loop signalling delay time will hold off the FBER measurement from starting for the specified time period.</p> |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | <p>Range: 0 to 5 seconds</p> <p>Resolution: 100 ms</p> |
| Query | | <p>Range: 0 to 5 seconds</p> <p>Resolution: 100 ms</p> |
| *RST Setting | | 500 ms |
| <p>Programming Example</p> <pre>OUTPUT 714;"SETUP:FBERROR:CLSDELAY:STIME 500 MS" ! Sets the Close Loop Delay ! to 500 ms.</pre> | | |

SETup:FBERror:CLSDelay:TIME

| | | |
|---|------|---|
| Function | GSM | <p>This command selects/queries the closed loop signalling delay time in seconds for Fast Bit Error measurements. The units (S MS) are optional, if no units are specified than units default to S.</p> <p>The delay time defines how long the test set should wait before starting a FBER measurement. The downlink signalling operation must be completed and the test set must send a close loop command to the MS before the measurement can begin. The delay time allows time for the loop to close.</p> <p>When a close loop message is set to the MS the closed loop signalling delay time will hold off the FBER measurement from starting for the specified time period.</p> |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | <p>Range: 0 to 5 seconds</p> <p>Resolution: 100 ms</p> |
| Query | | <p>Range: 0 to 5 seconds</p> <p>Resolution: 100ms</p> |
| *RST Setting | | 500 ms |
| <p>Programming Example</p> <pre>OUTPUT 714;"SETUP:FBERROR:CLSDELAY:TIME 500 MS" ! Sets the Close Loop Delay ! to 500 ms.</pre> | | |

SETup:FBERror

SETup:FBERror:CLSDelay:STATE

| | | |
|--|------|--|
| Function | GSM | <p>This command selects/queries the closed loop signalling delay state for Fast Bit Error measurements. If the state is off the test set will not wait to start a FBER measurement after a downlink signalling operation has completed.</p> <p>The delay time defines how long the test set should wait before starting and FBER measurement after a downlink signalling operation has completed and after the test set has sent a close loop command to the MS.</p> <p>When a close loop message is set to the MS the closed loop signalling delay time will hold off the FBER measurement from starting for the specified time period.</p> |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 1 ON 0 OFF |
| Query | | Range: 1 0 |
| *RST Setting | | 1 ON |
| Programming Example | | |
| OUTPUT 714;"SETUP:FBERROR:CLSDELAY:STATE ON" ! Sets the Close Loop Delay ! state to on. | | |

SETup:FBERror:CONTinuous

| | | |
|---|------|--|
| Function | GSM | This command selects/queries the trigger state for Fast Bit Error Rate tests. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | <p>Range:</p> <p>1 ON = Continuous trigger mode</p> <p>0 OFF = Single trigger mode</p> |
| Query | | Range: 1 0 |
| *RST Setting | | 0 single |
| Programming Example | | |
| OUTPUT 714;"SETUP:FBERROR:CONTINUOUS 0" ! Specifies single trigger mode for Fast ! BER measurements. | | |

SETup:FBERror:COUNT

| | | |
|---|------|--|
| Function | GSM | This command sets/queries the number of bits to test during each Fast Bit Error Rate test. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 1 to 999,000 Resolution: 1 |
| Query | | Range: 1 to 999,000 Resolution: 1 |
| *RST Setting | | 10,000 |
| Comments | | The actual number of bits that are tested will be determined by the number of frames tested, and will be at least as great as this count |
| Programming Example | | |
| OUTPUT 714; ``SETUP:FBERROR:COUNT 10000" !Specifies the number of Fast BER bits !to test at 10,000 bits. | | |

SETup:FBERror:LDControl:Auto

| | | |
|--|------|--|
| Function | GSM | This command sets/queries loopback delay control mode. If loopback control mode is automatic (auto on), the test set will determine the frame delay value that will allow correlation between uplink information bits with downlink information bits. . If loopback delay control mode is manual (auto off) , the test set will use the frame delay value entered in the TDMA Frames Delay field. Refer to " SETup:FBERror:MANual:DELay " on page 480 . Refer also to the " Fast Bit Error Measurement Description " on page 90 for a description of frame delay and its use in the fast bit error rate measurement. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 1 ON 0 OFF |
| Query | | Range: 1 0 |
| *RST Setting | | 1 AUTO |
| Related Topics | | see " SETup:FBERror:MANual:DELay " on page 480 |
| Programming Example | | |
| OUTPUT 714; "SETUP:FBERROR:LDCONTROL OFF" !Set delay control to manual the user !must select the manual frame !delay number. | | |

SETup:FBERror:MANual:DElay

| | | |
|---|------|---|
| Function | GSM | <p>This command sets/queries the number of frames the test set will use to correlate uplink information bits with downlink information bits when loopback delay control mode is manual (auto off). To set the loopback delay mode to manual, refer to "SETup:FBERror:LDControl:Auto" on page 479.</p> <p>This value is displayed in the TDMA Frames Delay field when Auto is not displayed. (If you want to display this value and Auto is currently displayed, press the front panel key labeled MANUAL).</p> <p>Refer to "Fast Bit Error Measurement Description" on page 90 for a description of frame delay and how it is used in this measurement.</p> |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 0 to 26 |
| Resolution: | | 1 |
| Query | | Range: 0 to 26 |
| Resolution: | | 1 |
| *RST Setting | | 5 (loopback delay control is reset to automatic (auto on)). |
| Related Topics | | see "SETup:FBERror:LDControl:Auto" on page 479 |
| Programming Example | | |
| OUTPUT 714;"SETUP:FBERROR:MANUAL:DELAY 6" !Set frame delay to 6 frames. | | |

SETup:FBERror:SLControl

| | | |
|---|------|--|
| Function | GSM | <p>This command selects/queries the Signalling loopback control state for an FBER measurement. When the state is set to on, the test set will automatically send the command for Type C (burst-by-burst) loopback to the MS when a FBER measurement is activated, and then set loopback to off when the measurement is complete.</p> <p>The loopback type is controlled manually from the Mobile Loopback F12 key, see "CALL:TChannel:LOOPback" on page 375 for a program example and details about the command.</p> |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 1 ON 0 OFF |
| Query | | Range: 1 0 |
| *RST Setting | | 1 ON |
| Programming Example | | |
| OUTPUT 714;"SETUP:FBERROR:SLCONTROL ON" ! Sets the Signal Loop Control state to on. | | |

SETup:FBERror:TIMEout[:STIMe]

| | | |
|---|------|--|
| Function | GSM | This command selects/queries the timeout value in seconds for the trigger state during Fast Bit Error measurements and sets the timeout state to ON. The units (S MS) are optional, if no units are specified than units default to S. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: .1 to 999 seconds Resolution: .1 seconds |
| Query | | Range: .1 to 999 seconds Resolution: .1 seconds |
| *RST Setting | | 10 seconds |
| Programming Example <pre>OUTPUT 714; "SETUP:FBERROR:TIMEOUT:STIME 20" !Sets the timeout value to !20 seconds and the state to on.</pre> | | |

SETup:FBERror:TIMEout:TIME

| | | |
|--|------|---|
| Function | GSM | This command selects/queries the timeout value in seconds for the trigger state during Fast Bit Error measurements. The units (S MS) are optional, if no units are specified than units default to S. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: .1 to 999 seconds Resolution: .1 seconds |
| Query | | Range: .1 to 999 seconds Resolution: .1 seconds |
| *RST Setting | | 10 seconds |
| Programming Example <pre>OUTPUT 714; "SETUP:FBERROR:TIMEOUT:TIME 20" !Sets the timeout value to !20 seconds.</pre> | | |

SETup:FBERror**SETup:FBERror:TIMEout:STATE**

| | | |
|---|------|--|
| Function | GSM | This command sets/queries the timeout state for Fast BER measurements. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 0 OFF 1 ON |
| Query | | Range: 0 1 |
| *RST Setting | | 0 OFF |
| Programming Example | | |
| OUTPUT 714; "SETUP:FBERROR:TIMEOUT:STATE ON" !Sets the timeout state to on. | | |

SETup:CONTinuous

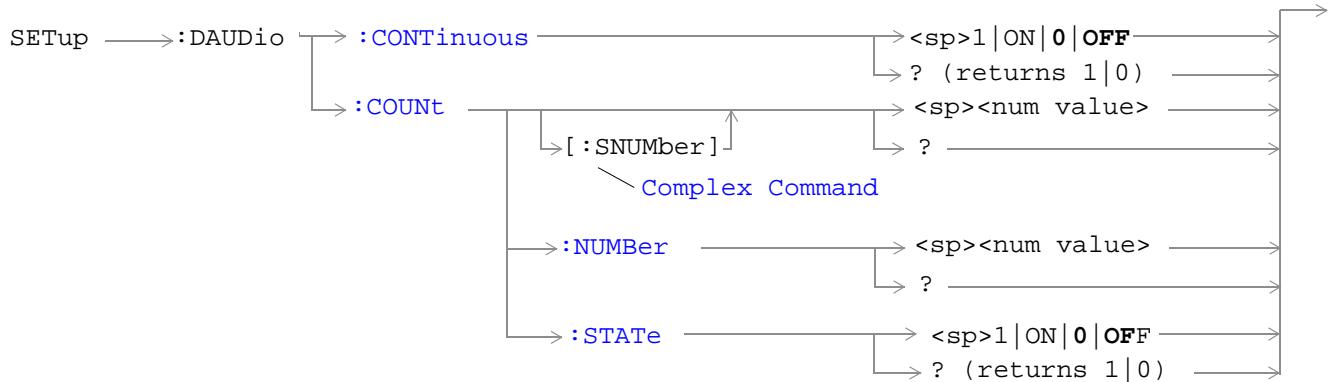
SETup :CONTinuous :OFF | :ON

“Diagram Conventions” on page 283

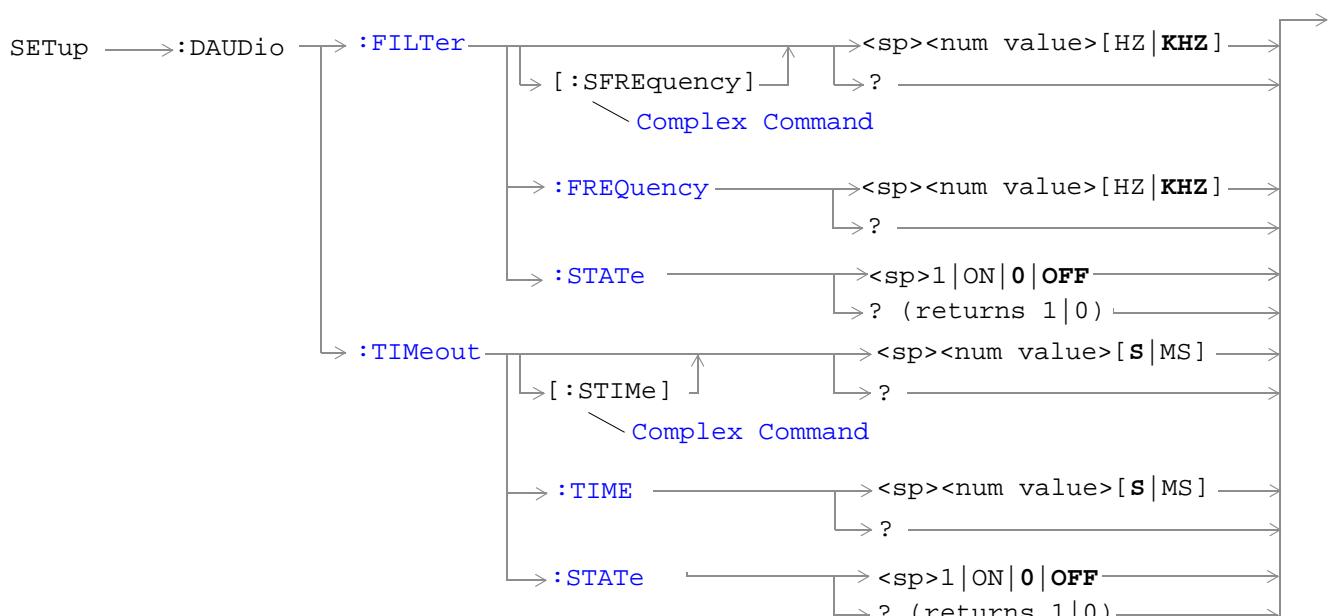
SETup[:ALL]:CONTinuous

| | | |
|--------------|--------|--|
| Function | GSM | This command sets trigger arm to OFF (single trigger) or ON (continuous trigger) for all measurements. See "Trigger Arm (Single or Continuous) Description" on page 171 . At power-on and a (manual user) full preset the trigger arm is set to continuous. Partial preset has no effect on the trigger arm state. See "Preset Descriptions" on page 640 . |
| | GPRS | Remote full preset sets the trigger arm to single, this is the recommended trigger arm for any remote measurements. Trigger arm may be set and queried for each individual measurement. For GPIB command syntax, see the measurement's SETUp<meas-mnemonic>:CONTinuous command description. (For example, "SETUp:PVTime:CONTinuous" on page 514 allows you to set the trigger arm for the Power versus Time measurement.) |
| Setting | Range | <ul style="list-style-type: none"> Continuous trigger = ON Single trigger = OFF |
| *RST Setting | Single | |

SETup:DAUDIO



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

“Diagram Conventions” on page 283

SETup:DAUDIO:CONTinuous

| | | | | |
|---|------------------------------------|--|--|--|
| Function | GSM | This command selects/queries the trigger state for Decoded Audio measurements. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Setting | Continuous 1 ON Single 0 OFF | | | |
| Query | 1 0 | | | |
| *RST Setting | 0 Single | | | |
| Programming Example | | | | |
| OUTPUT 714; "SETUP:DAUDIO:CONTINUOUS OFF" !Set DAUDIO measurement to single !trigger mode. | | | | |

SETup:DAUDIO:COUNT[:SNUMBER]

| | | | | |
|--|----------------------------------|--|--|--|
| Function | GSM | This command selects/queries the number of Decoded Audio multi-measurements the Test Set will make. This command sets the count state to ON. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Setting | Range: 1 to 999 Resolution: 1 | | | |
| Query | Range: 1 to 999 Resolution: 1 | | | |
| *RST Setting | 10 | | | |
| Programming Example | | | | |
| OUTPUT 714; "SETUP:DAUDIO:COUNT:SNUMBER 10" !Sets the value to 10 and the state !to on. | | | | |

SETup:DAUDIO:COUNT:NUMBER

| | | | | |
|---|----------------------------------|--|--|--|
| Function | GSM | This command selects/queries the number of Decoded Audio measurements the test set will make when the multi-measurement count state is on. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Setting | Range: 1 to 999 Resolution: 1 | | | |
| Query | Range: 1 to 999 Resolution: 1 | | | |
| *RST Setting | 10 | | | |
| Programming Example | | | | |
| OUTPUT 714; "SETUP:DAUDIO:COUNT:NUMBER 25" !Sets the number of DAUDIO !measurements that will be made. | | | | |

SETup:DAUDIO

SETup:DAUDIO:COUNT:STATE

| | | |
|--|------|---|
| Function | GSM | This command selects/queries the Decoded Audio multi-measurement count state. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | 1 ON 0 OFF |
| Query | | 1 0 |
| *RST Setting | | 0 OFF |
| Programming Example | | |
| OUTPUT 714; "SETUP:DAUDIO:COUNT:STATE OFF" !Sets trigger state for !DAUDIO measurement. | | |

SETup:DAUDIO:FILTter [:SFREquency]

| | | |
|---|------|--|
| Function | GSM | This command sets/queries the center frequency for the 100 Hz bandpass filter applied to Decoded Audio measurements. This command sets the count state to ON. The units (HZ KHZ) are optional, if no units are specified then units default to KHZ. see " Decoded Audio Measurement Description " on page 76 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 200 Hz to 3.6 kHz Resolution: 1 Hz |
| Query | | Range: 200 Hz to 3.6 kHz Resolution: 1 Hz |
| *RST Setting | | 1000 Hz |
| Programming Example | | |
| OUTPUT 714; "SETUP:DAUDIO:FILTER:SFREQUENCY 2.2KHZ" !This is a complex command !that sets the value and the !state to on. | | |

SETup:DAUDIO:FILTER:FREQuency

| | | |
|--|------|---|
| Function | GSM | This command sets/queries the center frequency for the 100 Hz bandpass filter applied to Decoded Audio measurements. The units (HZ KHZ) are optional, if no units are specified then units default to KHZ. see "Decoded Audio Measurement Description" on page 76 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 200 Hz to 3.6 kHz Resolution: 1 Hz |
| Query | | Range: 200 Hz to 3.6 kHz Resolution: 1 Hz |
| *RST Setting | | 1000 Hz |
| Programming Example <pre>OUTPUT 714;"DAUDIO:FILTER:FREQUENCY 217HZ" !Sets bandpass filter frequency.</pre> | | |

SETup:DAUDIO:FILTER:STATE

| | | |
|---|------|--|
| Function | GSM | This command selects/queries the Decoded Audio bandpass filter state. see "Decoded Audio Measurement Description" on page 76 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | 1 ON 0 OFF |
| Query | | 1 0 |
| Programming Example <pre>OUTPUT 714;"ABORT:ALL" !Aborts all active measurements in progress.</pre> | | |
| Programming Example <pre>OUTPUT 714;"SETUP:DAUDIO:FILTER:STATE OFF" !Sets bandpass filter state to off.</pre> | | |

SETup:DAUDIO

SETup:DAUDIO:TIMEout[:STIMe]

| | | |
|--|------|--|
| Function | GSM | This command selects/queries the timeout value in seconds that will be used for Decoded Audio measurements. This command sets the timeout state to ON. The units (S MS) are optional, if no units are specified then units default to S. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: .1 to 999 Resolution: .1 |
| Query | | Range: .1 to 999 Resolution: .1 |
| *RST Setting | | 10 seconds |
| Programming Example | | |
| OUTPUT 714; "SETUP:DAUDIO:TIMEOUT:STIME 6" !Sets the value to 6 seconds and the state to on. | | |

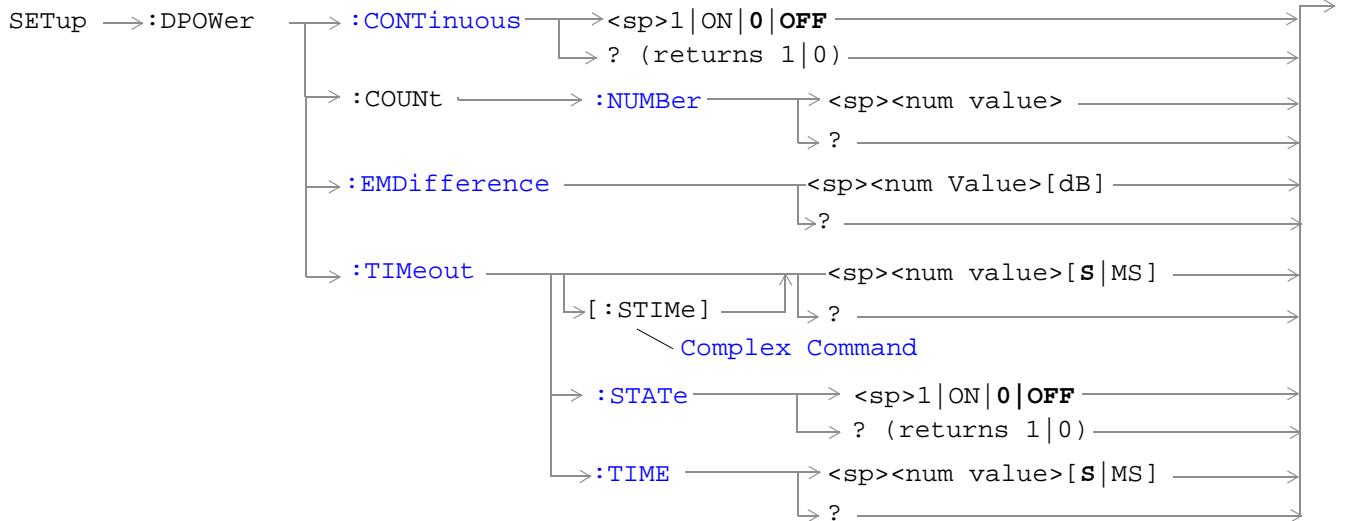
SETup:DAUDIO:TIMEout:TIME

| | | |
|---|------|--|
| Function | GSM | This command selects/queries the timeout value used for Decoded Audio measurements when the timeout state is ON. The units (S MS) are optional, if no units are specified then units default to S. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: .1 to 999 seconds Resolution: .1 seconds |
| Query | | Range: .1 to 999 seconds Resolution: .1 seconds |
| *RST Setting | | 10 seconds |
| Programming Example | | |
| OUTPUT 714; "SETUP:DAUDIO:TIMEOUT:TIME 15" !Sets timeout value to 15 seconds. | | |

SETup:DAUDIO:TIMEout:STATE

| | | |
|--|------|---|
| Function | GSM | This command selects/queries the Decoded Audio measurement timeout state. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | 1 ON 0 Off |
| Query | | 1 0 |
| *RST Setting | | 0 OFF |
| Programming Example | | |
| OUTPUT 714; "SETUP:DAUDIO:TIMEOUT:STATE ON" !Sets timeout state to on. | | |

SETup:DPOWer



These commands are not applicable to GPRS.

["Diagram Conventions" on page 283](#)

SETup:DPOWer:CONTinuous

| | | |
|---|------|--|
| Function | GSM | This command selects/queries the trigger state for Dynamic Power measurements. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Continuous trigger mode: 1 ON Single trigger mode: 0 OFF |
| Query | | 1 0 |
| *RST Setting | | 0 OFF |
| Programming Example | | |
| OUTPUT 714;"SETUP:DPOWER:CONTINUOUS ON" !Sets trigger mode to continuous for a Dynamic Power measurement. | | |

SETup:DPOWer

SETup:DPOWer:COUNT:NUMBER

| | | |
|---|------|---|
| Function | GSM | This command sets/queries the number of bursts for the Dynamic Power measurement. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 1 to 100 Resolution: 1 |
| Query | | Range: 1 to 100 Resolution: 1 |
| *RST Setting | | 10 |
| Programming Example | | |
| OUTPUT 714;"SETUP:DPOWER:COUNT:NUMBER 30" !Sets the number of bursts for the Dynamic Power measurement to 30. | | |

SETup:DPOWer:EMDifference

| | | |
|---|------|---|
| Function | GSM | This command sets/queries the Expected Maximum Difference from Previous Measurement parameter for the Dynamic Power measurement. The units dB are optional. The Expected Maximum Difference from Previous Measurement parameter is used with the measured transmit power from the previous burst to set the maximum RF power that the base station emulator is expecting the mobile to transmit in the next burst. The setting of this parameter does not affect the receiver Expected Power parameter. See " RFAnalyzer:EXPected:POWer[:SELected] " on page 455. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: -30 dB to +30 dB Resolution: 0.01 dB |
| Query | | Range: -30 dB to +30 dB Resolution: 0.01 dB |
| Programming Example | | |
| OUTPUT 714;"SETUP:DPOWER:EMDIFFERENCE 3" !Sets the Expected Maximum Difference from previous measurement parameter to 3 dB. (Example: If the previous burst measures 30 dBm and you expect the maximum amplitude of the next burst to be 3 dB lower, set the Expected Maximum Difference parameter to 3). | | |

SETup:DPOWer:TIMEout[:STIMe]

| | | |
|--|------|---|
| Function | GSM | This command sets/queries the Dynamic Power measurement timeout value in seconds and sets the time-out state to on. The units (S MS) are optional, if no units are specified then the default is S. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: .1 to 999 seconds Resolution: .1 seconds |
| Query | | Range: .1 to 999 seconds Resolution: .1 seconds |
| *RST Setting | | 10 seconds |
| Programming Example <pre>OUTPUT 714;"SETUP:DPOWer:TIMEout:STIMe 5" !Sets the timeout state to on and the timeout value to 5 seconds for the Dynamic Power measurement.</pre> | | |

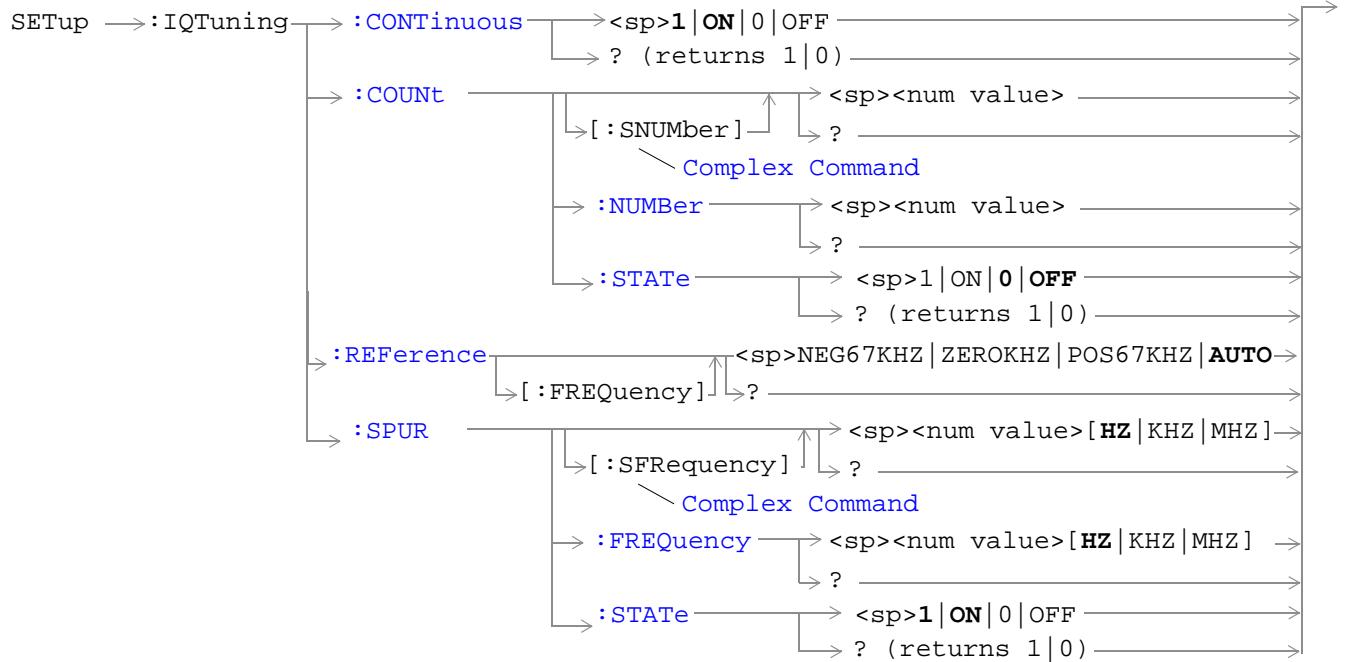
SETup:DPOWer:TIMEout:STATe

| | | |
|---|------|---|
| Function | GSM | This command sets/queries the time-out state for the Dynamic Power measurement. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | 0 OFF 1 ON |
| Query | | 0 1 |
| *RST Setting | | 0 OFF |
| Programming Example <pre>OUTPUT 714;"SETUP:DPOWer:IQTUNING:TIMEout:STATe ON" !Sets the timeout state to on for a Dynamic Power measurement.</pre> | | |

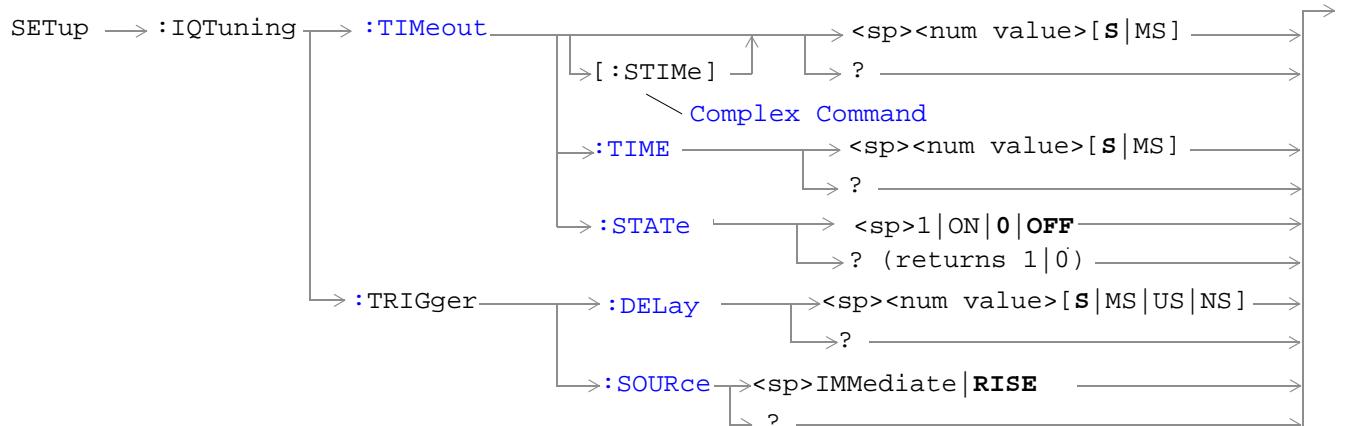
SETup:DPOWer:TIMEout:TIME

| | | |
|--|------|--|
| Function | GSM | This command sets/queries the time-out value in seconds that is used for the Dynamic Power measurements when the time-out state is ON. The units (S MS) are optional, if no units are specified then the default is S. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: .1 to 999 seconds Resolution: .1 seconds |
| Query | | Range: .1 to 999 seconds Resolution: .1 seconds |
| *RST Setting | | 10 seconds |
| Programming Example | | |
| OUTPUT 714;"SETUP:DPOWer:TIMEout:TIME 6" !Sets the timeout value to 6 seconds for a dynamic power measurement. | | |

SETup:IQTuning



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

[“Diagram Conventions” on page 283](#)

SETup:IQTuning

SETup:IQTuning:CONTinuous

| | | | | |
|---|---|---|--|--|
| Function | GSM | This command selects/queries the trigger state for I/Q Tuning measurements. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Setting | Continuous trigger mode: 1 ON Single trigger mode: 0 OFF | | | |
| Query | 1 0 | | | |
| *RST Setting | 1 ON | | | |
| Programming Example | | | | |
| OUTPUT 714;"SETUP: IQTUNING:CONTINUOUS OFF" !Sets trigger mode to single for an I/Q Tuning measurement. | | | | |

SETup:IQTuning:COUNT:STATE

| | | | | |
|---|-------------------------|---|--|--|
| Function | GSM | This command sets/queries the I/Q Tuning multi-measurement count state. | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Setting | Range: 0 OFF 1 ON | | | |
| Query | 0 1 | | | |
| *RST Setting | 0 OFF | | | |
| Programming Example | | | | |
| OUTPUT 714;"SETUP: IQTUNING:COUNT:STATE ON" !Turns on the multi-measurement mode for I/Q Tuning measurements. | | | | |

SETup:IQTuning:COUNT:NUMBER

| | | | | |
|--|----------------------------------|--|--|--|
| Function | GSM | This command sets/queries the number of I/Q Tuning multi-measurements the test set makes when the multi-measurement count state is on. See " I/Q Tuning Measurement Description " on page 84 . | | |
| | GPRS | This command is not applicable to GPRS. | | |
| Setting | Range: 1 to 999 Resolution: 1 | | | |
| Query | Range: 1 to 999 Resolution: 1 | | | |
| *RST Setting | 10 | | | |
| Programming Example | | | | |
| OUTPUT 714;"SETUP: IQTUNING:COUNT:NUMBER 80" !Sets the multi-measurement count number for I/Q Tuning measurements to 80. | | | | |

SETup:IQTuning:COUNT[:SNUMBER]

| | | |
|--|------|--|
| Function | GSM | This command sets/queries the number of I/Q Tuning multi-measurements the test set makes. This command sets the count state to ON. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 1 to 999 Resolution: 1 |
| Query | | Range: 1 to 999 Resolution: 1 |
| *RST Setting | | 10 |
| Programming Example | | |
| OUTPUT 714;"SETUP: IQTUNING:COUNT:SNUMBER 25" !Sets the state to ON and the multi-measurement count value to 25. | | |

SETup:IQTuning:REFERENCE[:FREQuency]

| | | |
|---|------|--|
| Function | GSM | This command sets/queries the reference offset frequency to be used for the measurement. This means that if your mobile is transmitting all 1s you should set this command to NEG67KHZ, and if your mobile is transmitting all 0s it should be set to POS67KHZ. Alternatively you could select AUTO which allows the test set to select the most appropriate offset. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | NEG67KHZ ZEROKHZ POS67KHZ AUTO |
| Query | | NEG67KHZ ZEROKHZ POS67KHZ AUTO |
| *RST Setting | | AUTO |
| Programming Example | | |
| OUTPUT 714;"SETUP: IQTUNING:REFERENCE:FREQUENCY NEG67KHZ" !Sets the I/Q Tuning measurements reference frequency to -67 kHz. | | |

SETup:IQTuning

SETup:IQTuning:SPUR:FREQuency

| | | |
|--|------|---|
| Function | GSM | This command sets/queries the spur frequency for the I/Q Tuning measurement. The units (HZ KHZ MHZ) are optional, if no units are specified then the default is HZ. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: -13.0 MHz to -1.0 MHz and +1.0 MHz to +13 MHz Resolution: 100 Hz |
| Query | | Range: -19 MHz to +19 MHz Resolution: 100 Hz |
| *RST Setting | | 0 MHz |
| Programming Example | | |
| OUTPUT 714;"SETUP: IQTUNING:SPUR:FREQUENCY 10MHZ" !Sets the I/Q Tuning spur measurement to 10 MHz. | | |

SETup:IQTuning:SPUR:STATe

| | | |
|--|------|--|
| Function | GSM | This command sets/queries the spur state for the I/Q Tuning measurement. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | 0 OFF 1 ON |
| Query | | 0 1 |
| *RST Setting | | 0 OFF |
| Programming Example | | |
| OUTPUT 714;"SETUP: IQTUNING:SPUR:STATE ON" !Sets the spur state to on. | | |

SETup:IQTuning:SPUR[:SFREQuency]

| | | |
|---|------|---|
| Function | GSM | This command sets/queries the spur frequency for the I/Q Tuning measurement. The units (HZ KHZ MHZ) are optional, if no units are specified then the default is HZ. This command sets the spur state to ON. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: -13.0 MHz to -1.0 MHz and +1.0 MHz to +13 MHz Resolution: 100 Hz |
| Query | | Range: -13.0 MHz to -1.0 MHz and +1.0 MHz to +13 MHz Resolution: 100 Hz |
| *RST Setting | | 0 OFF |
| Programming Example | | |
| OUTPUT 714;"SETUP: IQTUNING:SFREQuency 10MHZ" !Sets the spur state on with a frequency of 10 MHz. | | |

SETUp:IQTuning:TIMEout:STATE

| | | |
|--|------|---|
| Function | GSM | This command sets/queries the timeout state for the I/Q Tuning measurement. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | 0 OFF 1 ON |
| Query | | 0 1 |
| *RST Setting | | 0 OFF |
| Programming Example | | |
| OUTPUT 714;"SETUP: IQTUNING:TIMEout:STATE ON" !Sets the timeout state to on for an I/Q Tuning measurement. | | |

SETUp:IQTuning:TIMEout[:STIMe]

| | | |
|--|------|---|
| Function | GSM | This command sets/queries the I/Q Tuning measurement time-out value in seconds and sets the time-out state to on. The units (S MS) are optional, if no units are specified then the default is S. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: .1 to 999 seconds Resolution: .1 seconds |
| Query | | Range: .1 to 999 seconds Resolution: .1 seconds |
| *RST Setting | | 10 seconds |
| Programming Example | | |
| OUTPUT 714;"SETUP: IQTUNING:TIMEOUT:STIME 3" !Sets the timeout state to on and the timeout value to 3 seconds. | | |

SETUp:IQTuning:TIMEout:TIME

| | | |
|---|------|---|
| Function | GSM | This command sets/queries the time-out value in seconds that is used for the I/Q Tuning measurements when the time-out state is ON. The units (S MS) are optional, if no units are specified then the default is S. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: .1 to 999 seconds Resolution: .1 seconds |
| Query | | Range: .1 to 999 seconds Resolution: .1 seconds |
| *RST Setting | | 10 seconds |
| Programming Example | | |
| OUTPUT 714;"SETUP: IQTUNING:TIMEOUT:TIME 4" !Sets the timeout value to 4 seconds. | | |

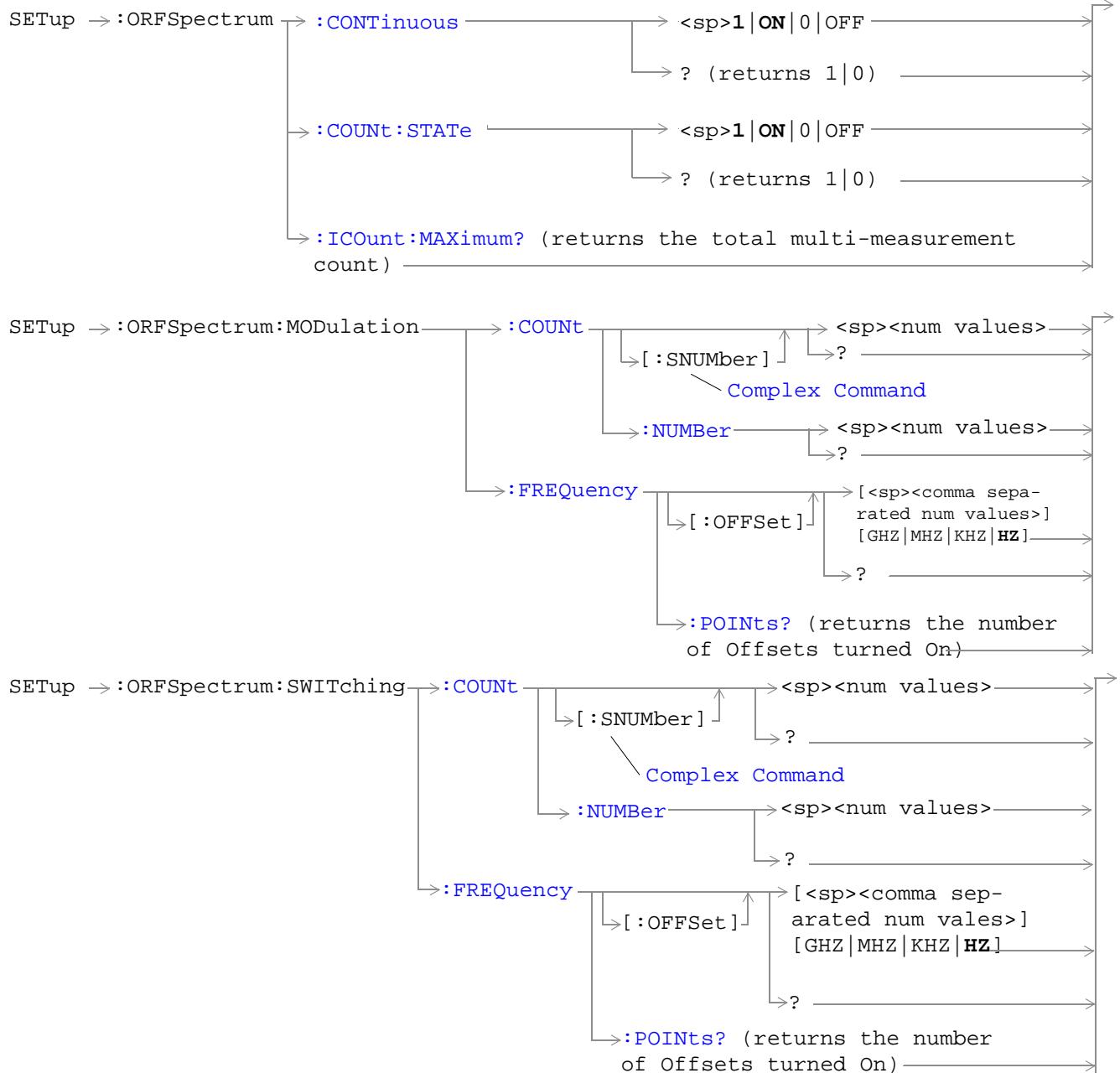
SETup:IQTuning:TRIGger:DELay

| | | |
|--|------|--|
| Function | GSM | This command sets/queries the trigger delay time in seconds for an I/Q Tuning measurement. The units (S MS US NS) are optional, if no units are specified then the default is S. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: -2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater |
| Query | | Range: -2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater |
| *RST Setting | | zero seconds |
| Programming Example | | |
| OUTPUT 714;"SETUP:IQTUNING:TRIGGER:DELAY 1.2MS" !Sets the trigger delay time to 1.2 milli seconds. | | |

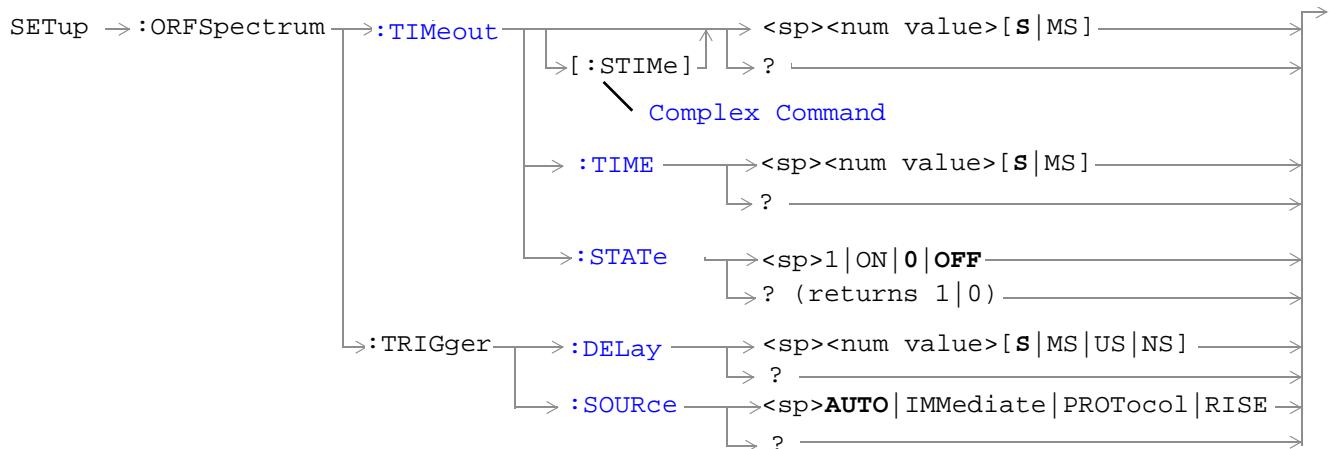
SETup:IQTuning:TRIGger:SOURce

| | | |
|---|------|---|
| Function | GSM | This command sets/queries the trigger source for an I/Q Tuning measurement. |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | RISE IMMEDIATE See " Triggering of Measurements " on page 169. |
| Query | | RISE IMM |
| *RST Setting | | RISE |
| Programming Example | | |
| OUTPUT 714;"SETUP:IQTUNING:TRIGGER:SOURCE IMM" !Sets the trigger source to immediate. | | |

SETup:ORFSpectrum



SETup:ORFSpectrum



["Diagram Conventions" on page 283](#)

SETup:ORFSpectrum:CONTinuous

| Function | GSM | This command selects/queries the trigger state for output RF spectrum measurements. |
|--|------|---|
| | GPRS | |
| Setting | | Continuous trigger mode: 1 ON Single trigger mode: 0 OFF |
| Query | | 1 0 |
| *RST Setting | | 1 on |
| Programming Example | | |
| OUTPUT 714;"ABORT:ALL" !Aborts all active measurements in progress. | | |
| OUTPUT 714;"SETUP:CONTINUOUS OFF" !Sets trigger mode to single for an !ORFS measurement. | | |

SETup:ORFSpectrum:COUNt:STATe

| Function | GSM | This command selects/queries the ORFS due to switching and modulation multi-measurement count state. |
|---|------|--|
| | GPRS | |
| Setting | | 0 OFF 1 ON |
| Query | | 0 1 |
| *RST Setting | | 1 on |
| Programming Example | | |
| OUTPUT 714;"SETUP:ORFSPECTRUM:COUNT:STATE ON" !Sets count state for both ORFS !due to switching and !modulation measurements. | | |

SETup:ORFSpectrum:ICount:MAXimum?

| | | |
|----------|------|---|
| Function | GSM | This command queries the total number of measurements made each time an ORFS measurement is initiated. This number will vary depending on the number of offsets and number of multi-measurements that you choose. |
| | GPRS | <p>The total number of measurements is calculated using the following formula:</p> $\text{ICO MAX} = 1 + M + S$ <p>Where:</p> <p>$M = (\text{the number of modulation offsets}) \times (\text{the number of multi-measurements for ORFS due to modulation})$.</p> <p>$S = (\text{the number of switching offsets}) \times (\text{the number of multi-measurements for ORFS due to switching})$.</p> <p>See "Output RF Spectrum Measurement Description" on page 96 for a description of modulation and switching offsets.</p> |
| Query | | <p>Range: 1 to 29971</p> <p>Resolution: 1</p> |

SETup:ORFSpectrum:MODulation:COUNT[:SNUMber]

| | | |
|--------------|------|--|
| Function | GSM | This command sets/queries the number of ORFS due to modulation multi-measurements the test set will make. This command sets the count state to ON. |
| | GPRS | |
| Setting | | Range: 1 to 999 Resolution: 1 |
| Query | | Range: 1 to 999 Resolution: 1 |
| *RST Setting | 20 | |

SETup:ORFSpectrum:MODulation:COUNT:NUMBER

| | | |
|--|------|---|
| Function | GSM | This command sets/queries the number of ORFS due to modulation multi-measurements the test set will make when the multi-measurement count state is on. See " Output RF Spectrum Measurement Description " on page 96. |
| | GPRS | |
| Setting | | Range: 1 to 999 Resolution: 1 |
| Query | | Range: 1 to 999 Resolution: 1 |
| *RST Setting | | 20 |
| Programming Example | | |
| OUTPUT 714; "SETUP:ORFSPECTRUM:MODULATION:COUNT:NUMBER 75" !Sets the !multi-measurement !count number for ORFS !due to modulation !measurements to 75. | | |

SETup:ORFSpectrum:MODulation:FREQuency[:OFFSet]

| | | |
|--------------|------|--|
| Function | GSM | This command sets/queries the list of ORFS due to modulation frequency offsets. Each offset listed in the command is turned on by default. If no frequency offsets (null list) are sent, the output RF spectrum due to modulation measurement will not be made. The units (GHZ MHZ KHZ HZ) are optional, if no units are specified than units default to HZ. see "Output RF Spectrum Measurement Description" on page 96 . |
| | GPRS | |
| Setting | | Range: 0 to 22 comma-separated values ranging from -1.8 MHz to -10 Hz, and +10 Hz to +1.8 MHz Resolution: 10 Hz |
| Query | | Range: 0 to 22 comma-separated values ranging from -1.8 MHz to -10 Hz, and +10 Hz to +1.8 MHz Resolution: 10 Hz |
| *RST Setting | | Offset 1: 400.0 kHz Offset 2: 600.0 kHz Offsets 3 to 22: off |

Programming Example

```
OUTPUT 714; "SETUP:ORFSPECTRUM:MODULATION:FREQUENCY:OFFSET 400 KHZ, 700 KHZ"
!Turns on the first two ORFS due to modulation measurement offsets and sets
!them to 400 kHz and 700 kHz offsets. All other offsets are in the off state.

OUTPUT 714; "SETUP:ORFSPECTRUM:MODULATION:FREQUENCY:OFFSET 700 KHZ" !Turns on
!the first
!ORFS due to
!modulation
!measurement
!offset and
!sets it to
!A 700 kHz
!offset. All
!other
!offsets are
!in the off
!state.

OUTPUT 714; "SETUP:ORFSPECTRUM:MODULATION:FREQUENCY:OFFSET" !Turns all offsets
!for ORFS due to
!modulation
!measurement to the
!off state.
```

SETup:ORFSpectrum

SETup:ORFSpectrum:MODulation:FREQuency:POINts?

| | | |
|----------|------|--|
| Function | GSM | This command queries the number of frequency offsets currently on during an ORFS due to modulation measurement. See " Output RF Spectrum Measurement Description " on page 96. |
| | GPRS | |
| Query | | Range: 0 to 22 Resolution: 1 |
| | | |

SETup:ORFSpectrum:SWITching:COUNT[:SNUMber]

| | | |
|---|------|---|
| Function | GSM | This command sets/queries the ORFS due to switching multi-measurement count value and turns the state on. |
| | GPRS | |
| Setting | | Range: 1 to 999 Resolution: 1 |
| Query | | Range: 1 to 999 Resolution: 1 |
| *RST Setting | 10 | |
| Programming Example | | |
| OUTPUT 714; "SETUP:ORFSPECTRUM:SWITCHING:COUNT:SNUMBER 55" !Sets the !multi-measurement !value to 10 and the !state to on. | | |

SETup:ORFSpectrum:SWITching:COUNT:NUMBER

| | | |
|---|------|---|
| Function | GSM | This command sets/queries the ORFS due to switching multi-measurement count value. See " Output RF Spectrum Measurement Description " on page 96. |
| | GPRS | |
| Setting | | Range: 1 to 999 Resolution: 1 |
| Query | | Range: 1 to 999 Resolution: 1 |
| *RST Setting | 10 | |
| Programming Example | | |
| OUTPUT 714; "SETUP:ORFSPECTRUM:SWITCHING:COUNT:NUMBER 15" !Sets the !multi-measurement !count number for ORFS !due to switching !to 15. | | |

SETup:ORFSpectrum:SWITching:FREQuency[:OFFSet]

| | | |
|---|------|--|
| Function | GSM | This command sets/queries the list of ORFS due to switching frequency offsets. Each offset listed in the command is turned on by default. If no frequency offsets (null list) are sent, the output RF spectrum due to switching measurement will not be made. The units (GHZ MHZ KHZ HZ) are optional, if no units are specified than units default to HZ. See "Output RF Spectrum Measurement Description" on page 96 . |
| | GPRS | |
| Setting | | Range: 0 to 8 comma-separated values ranging from -1.8 MHz to -10 Hz, and +10 Hz to +1.8 MHz Resolution: 10 Hz |
| Query | | Range: 0 to 8 comma-separated values ranging from -1.8 MHz to -10 Hz, and +10 Hz to +1.8 MHz Resolution: 10 Hz |
| *RST Setting | | Offset 1 = 400.0 kHz Offset 2 = 600.0 kHz Offsets 3 to 8 off |
| Programming Example | | |
| <pre>OUTPUT 714; "SETUP:ORFSPECTRUM:SWITCHING:FREQUENCY:OFFSET 400 KHZ, 700 KHZ" !Turns on the first two ORFS due to switching measurement offsets and sets them !to 400 kHz and 700 kHz offsets. All other offsets are in the off state.</pre> | | |
| <pre>OUTPUT 714; "SETUP:ORFSPECTRUM:SWITCHING:FREQUENCY:OFFSET 700 KHZ" !Turns on the !first ORFS !due to !switching !measurement !offset and !sets it to !700 kHz !offsets. All !other offsets !are in the !off state.</pre> | | |
| <pre>OUTPUT 714; "SETUP:ORFSPECTRUM:SWITCHING:FREQUENCY:OFFSET" !Turns all of the ORFS !due to switching !measurements offsets !to off.</pre> | | |

SETup:ORFSpectrum

SETup:ORFSpectrum:SWITching:FREQuency:POINts?

| | | |
|----------|-----|--|
| Function | GSM | This command queries the number of frequency offsets currently on during an ORFS due to switching measurement. See "Output RF Spectrum Measurement Description" on page 96 . |
| Query | | Range: 0 to 8 Resolution: 1 |

SETup:ORFSpectrum:TIMEout:TIME

| | | |
|---|-----|---|
| Function | GSM | This command selects/queries the timeout value in seconds that will be used for ORFS measurements when the "SETup:ORFSpectrum:TIMEout:STATe" is ON. The units (S MS) are optional. If no units are specified than units default to S. |
| Setting | | Range: .1 to 999 seconds Resolution: .1 seconds |
| Query | | Range: .1 to 999 seconds Resolution: .1 seconds |
| *RST Setting | | 10 seconds |
| Programming Example | | |
| OUTPUT 714; "SETUP:ORFSPECTRUM:TIMEOUT:TIME 1" !Sets the timeout value to !15 seconds. | | |

SETup:ORFSpectrum:TIMEout[:STIMe]

| | | |
|---|-----|--|
| Function | GSM | This command sets/queries the timeout value in seconds that will be used for ORFS measurements and turns the timeout state on. The units (S MS) are optional. If no units are specified than units default to S. |
| Setting | | Range: .1 to 999 seconds Resolution: .1 seconds |
| Query | | Range: .1 to 999 seconds Resolution: .1 seconds |
| *RST Setting | | 10 seconds |
| Programming Example | | |
| OUTPUT 714; "SETUP:ORFSPECTRUM:TIMEOUT:STIME 12" !Sets the timeout value to !10 seconds and the state to on. | | |

SETUp:ORFSpectrum:TIMEout:STATe

| | | | | | |
|---|--------------|--|--|--|--|
| Function | GSM | This command selects/queries the ORFS measurement timeout state. | | | |
| | GPRS | | | | |
| Setting | 0 OFF 1 ON | | | | |
| Query | 0 1 | | | | |
| *RST Setting | 0 off | | | | |
| Programming Example | | | | | |
| OUTPUT 714; "SETUP:ORFSPECTRUM:TIMEOUT:STATE ON" !Sets timeout state to on. | | | | | |

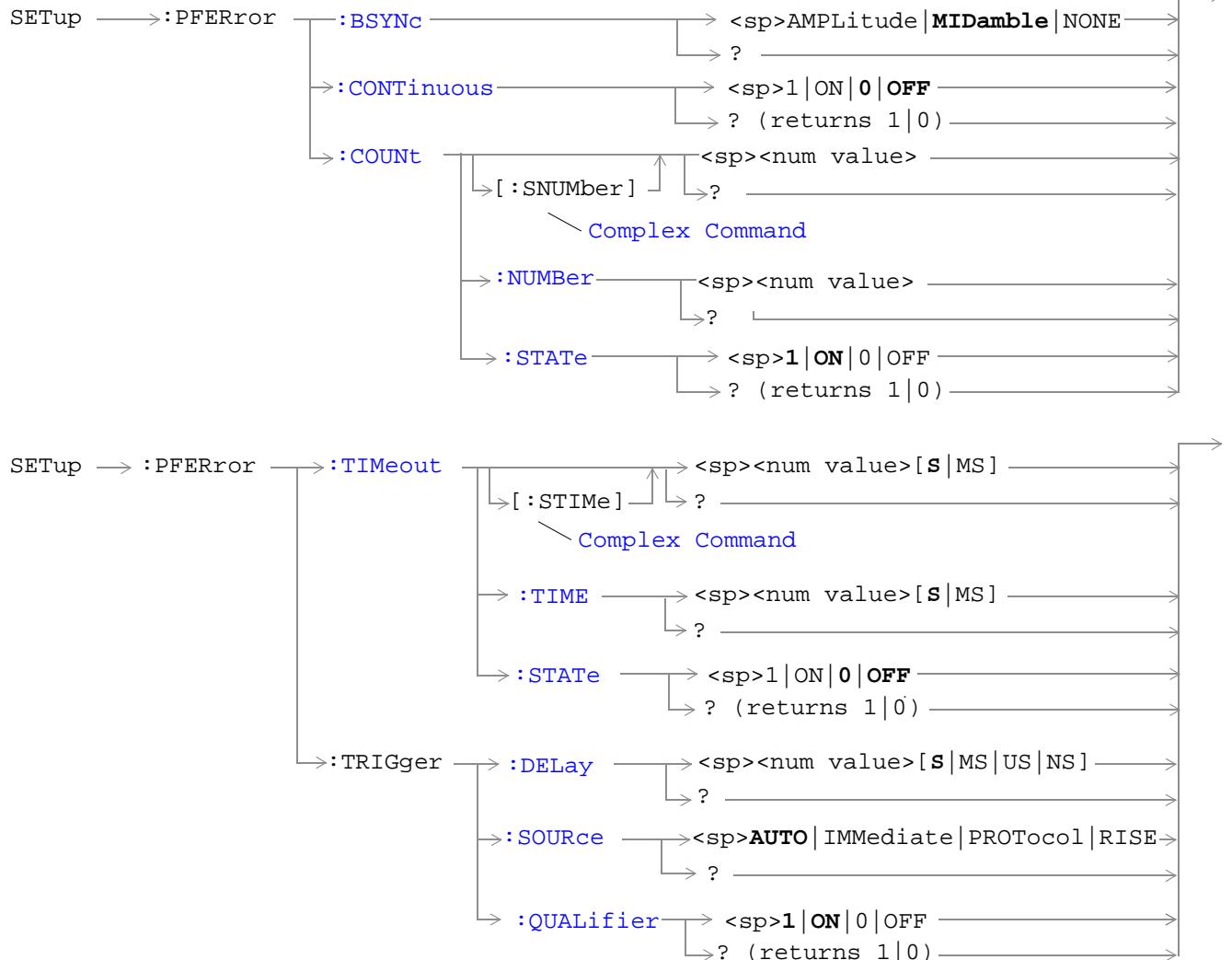
SETUp:ORFSpectrum:TRIGger:DELay

| | | | | | |
|---|---|--|--|--|--|
| Function | GSM | This command sets/queries the trigger delay for ORFS measurements. The units (S MS US NS) are optional, if no units are specified than units default to S. | | | |
| | GPRS | | | | |
| Setting | Range: -2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 nanoseconds whichever is greater | | | | |
| Query | Range: -2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 nanoseconds whichever is greater | | | | |
| *RST Setting | 0 seconds | | | | |
| Programming Example | | | | | |
| OUTPUT 714; "SETUP:ORFSPECTRUM:TRIGGER:DELAY 1MS" !Sets the trigger delay value !to 1 millisecond. | | | | | |

SETUp:ORFSpectrum:TRIGger:SOURce

| | | | | | |
|---|--|---|--|--|--|
| Function | GSM | This command selects/queries the trigger source for ORFS measurements. See " Output RF Spectrum Measurement Description " on page 96. | | | |
| | GPRS | | | | |
| Setting | Range: AUTO IMMEDIATE PROTOCOL RISE See " Triggering of Measurements " on page 169. | | | | |
| Query | Range: AUTO IMM PROT RISE | | | | |
| *RST Setting | AUTO | | | | |
| Programming Example | | | | | |
| OUTPUT 714; "SETUP:ORFSPECTRUM:TRIGGER:SOURCE AUTO" !Sets the trigger source to Auto. | | | | | |

SETup:PFERror



[“Diagram Conventions” on page 283](#)

SETup:PFERror:BSYNc

| | | | | |
|---|------------------------------------|---|--|--|
| Function | GSM GPRS | This command sets/queries the burst synchronization mode for phase/frequency measurements. See “ Burst Synchronization of Measurements ” on page 136. | | |
| Setting | Range: MIDamble AMPLitude NONE | | | |
| Query | Range: MID AMPL NONE | | | |
| *RST Setting | MIDamble | | | |
| Programming Example | | | | |
| OUTPUT 714; "SETUP:PFERROR:BSYNC MIDAMBLE" !Sets the burst synchronization. | | | | |

SETup:PFERror:CONTinuous

| | | | | |
|--|---|---|--|--|
| Function | GSM GPRS | This command sets/queries the trigger state for phase/frequency measurements. | | |
| Setting | Single trigger mode = 0 OFF Continuous trigger mode = 1 ON | | | |
| Query | 0 1 | | | |
| *RST Setting | 0 off | | | |
| Programming Example | | | | |
| OUTPUT 714; "SETUP:PFERROR: CONTINUOUS OFF" !Specifies single trigger mode for !phase/frequency measurements. | | | | |

SETup:PFERror:COUNT[:SNUMber]

| | | | | |
|--|----------------------------------|---|--|--|
| Function | GSM GPRS | This command sets/queries the number of phase/frequency measurements the test set will make and turns the multi-measurement count state on. | | |
| Setting | Range: 1 to 999 Resolution: 1 | | | |
| Query | Range: 1 to 999 Resolution: 1 | | | |
| *RST Setting | 0 off | | | |
| Programming Example | | | | |
| OUTPUT 714; "SETUP:PFERROR:COUNT:SNUMBER 100" !Sets the value to 100 and the !state to on | | | | |

SETup:PFERror

SETup:PFERror:COUNT:NUMBER

| | | |
|---|------|---|
| Function | GSM | This command sets/queries the number of phase/frequency measurements the Test Set will make when the multi-measurement count state is on. |
| | GPRS | |
| Setting | | Range: 1 to 999 Resolution: 1 |
| Query | | Range: 1 to 999 Resolution: 1 |
| *RST Setting | | 10 |
| Programming Example | | |
| OUTPUT 714; "SETUP:PFERROR:COUNT:NUMBER 55" !Sets the multi-measurement count !value to 55. | | |

SETup:PFERror:COUNT:STATE

| | | |
|---|------|--|
| Function | GSM | This command sets/queries the phase/frequency multi-measurement count state. |
| | GPRS | |
| Setting | | Range: 0 OFF 1 ON |
| Query | | 0 1 |
| *RST Setting | | 0 off |
| Programming Example | | |
| OUTPUT 714; "SETUP:PFERROR:COUNT:STATE ON" !Turns on multi-measurement mode for !the phase/frequency measurement. | | |

SETup:PFERror:TIMEout[:STIMe]

| | | |
|--|------|---|
| Function | GSM | This command sets/queries the phase/frequency measurement timeout value in seconds and sets the timeout state to on. The units (S MS) are optional, if no units are specified then unit default to S. |
| | GPRS | |
| Setting | | Range: .1 to 999 seconds Resolution: .1 seconds |
| Query | | Range: .1 to 999 seconds Resolution: .1 seconds |
| *RST Setting | | 10 seconds |
| Programming Example | | |
| OUTPUT 714; "SETUP:PFERROR:TIMEOUT:STIME 3" !Sets the timeout state to on and the !timeout value to 3 seconds. | | |

SETup:PFERror:TIMEout:TIME

| | | |
|--|------|--|
| Function | GSM | This command sets/queries the timeout value in seconds that will be used for phase/frequency measurements when the timeout state is ON. The units (S MS) are optional, if no units are specified then unit default to S. |
| | GPRS | |
| Setting | | Range: .1 to 999 seconds Resolution: .1 seconds |
| Query | | Range: .1 to 999 seconds Resolution: .1 seconds |
| *RST Setting | | 10 seconds |
| Programming Example | | |
| OUTPUT 714; "SETUP:PFERROR:TIMEOUT:TIME 4" !Sets the timeout value to 4 seconds. | | |

SETup:PFERror:TIMEout:STATe

| | | |
|---|------|---|
| Function | GSM | This command selects/queries the timeout state for a phase/frequency measurement. |
| | GPRS | |
| Setting | | 0 OFF 1 ON |
| Query | | 0 1 |
| *RST Setting | | 0 off |
| Programming Example | | |
| OUTPUT 714; "SETUP:PFERROR:TIMEOUT:STATE ON" !Sets the timeout state to on for a Phase/Frequency measurement. | | |

SETup:PFERror:TRIGger:DELay

| | | |
|---|------|---|
| Function | GSM | This command sets/queries the trigger delay time in seconds for a phase/frequency measurement. The units (S MS US NS) are optional, if no units are specified then units default to S. See " Phase and Frequency Error Measurement Description " on page 103. |
| | GPRS | |
| Setting | | Range: -2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater |
| Query | | Range: -2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater |
| *RST Setting | | 0 seconds |
| Programming Example | | |
| OUTPUT 714; "SETUP:PFERROR:TRIGGER:DELAY 1.2MS" !Sets trigger delay time to 1.2 milli-seconds | | |

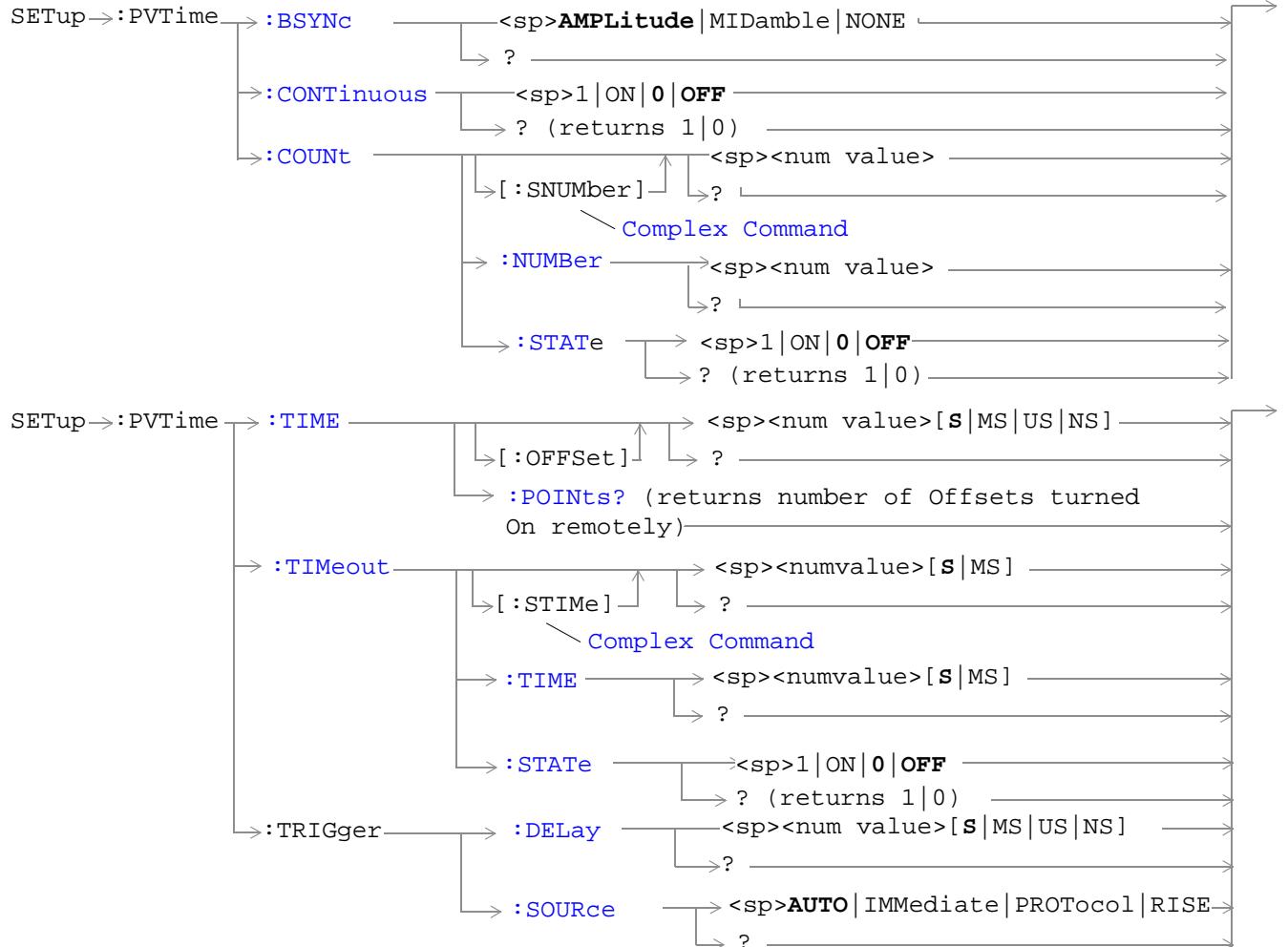
SETup:PFERror:TRIGger:SOURce

| | | |
|---|-------------|--|
| Function | GSM GPRS | This command sets/queries the trigger source for phase/frequency measurements. See "Phase and Frequency Error Measurement Description" on page 103 . |
| Setting | | AUTO PROTocol RISE IMMEDIATE See "Triggering of Measurements" on page 169 . |
| Query | | AUTO PROT RISE IMM |
| *RST Setting | | AUTO |
| Programming Example | | |
| OUTPUT 714; "SETUP:PFERROR:TRIGGER:SOURCE AUTO" !Sets trigger source to AUTO. | | |

SETup:PFERror:TRIGger:QUALifier

| | | |
|---|-------------|--|
| Function | GSM GPRS | This command selects/queries the trigger qualifier for phase/frequency measurements. See "Trigger Qualifier Description" on page 172 . |
| Setting | | Range: 0 OFF 1 ON |
| Query | | 0 1 |
| *RST Setting | | 1 on |
| Programming Example | | |
| OUTPUT 714; "SETUP:PFERROR:TRIGGER:QUALIFIER OFF" !Sets trigger qualifier state to off. | | |

SETup:PVTime



["Diagram Conventions" on page 283](#)

SETup:PVTime

SETup:PVTime:BSYNc

| | | |
|---|------|--|
| Function | GSM | This command sets/queries the burst synchronization mode for power versus time measurements. See "Burst Synchronization of Measurements" on page 136 . |
| | GPRS | |
| Setting | | MIDamble AMPLitude NONE |
| Query | | MID AMPL NONE |
| *RST Setting | | MID |
| Programming Example | | |
| OUTPUT 714; "SETUP:PVTIME:BSYNC MIDAMBLE" !Selects burst synchronization to on !midamble for power versus time !measurements. | | |

SETup:PVTime:CONTinuous

| | | |
|---|------|--|
| Function | GSM | This command sets/queries the trigger state for power versus time measurements. See "Measurement States" on page 170 . |
| | GPRS | |
| Setting | | Single trigger mode = 0 OFF Continuous trigger mode = 1 ON |
| Query | | 0 1 |
| *RST Setting | | 0 OFF |
| Programming Example | | |
| OUTPUT 714; "SETUP:PVTIME: CONTINUOUS OFF" !Specifies single trigger mode for !power versus time measurements. | | |

SETup:PVTime:COUNT[:SNUMber]

| | | |
|--|------|---|
| Function | GSM | This command sets/queries the number of power versus time measurements the test set will make and turns the multi-measurement count state on. |
| | GPRS | |
| Setting | | Range: 1 to 999 Resolution: 1 |
| Query | | Range: 1 to 999 Resolution: 1 |
| *RST Setting | | 10 |
| Programming Example | | |
| OUTPUT 714; "SETUP:PVTIME:COUNT:SNUMBER 25" !Sets the state to on and the !multi-measurement count value to 25. | | |

SETup:PVTime:COUNT:NUMBER

| | | |
|---|------|--|
| Function | GSM | This command sets/queries the number of Power vs. Time measurements the test set will make when multi-measurement state is on. |
| | GPRS | |
| Setting | | Range: 1 to 999 Resolution: 1 |
| Query | | Range: 1 to 999 Resolution: 1 |
| *RST Setting | | 10 |
| Programming Example | | |
| OUTPUT 714; "SETUP:PVTIME:COUNT:NUMBER 20" !Sets multi-measurement count value !to 20. | | |

SETup:PVTime:COUNT:STATE

| | | |
|--|------|--|
| Function | GSM | This command sets/queries the power versus time multi-measurement count state. |
| | GPRS | |
| Setting | | 0 OFF 1 ON |
| Query | | 0 1 |
| *RST Setting | | 0 OFF |
| Programming Example | | |
| OUTPUT 714; "SETUP:PVTIME:COUNT:STATE ON" !Sets multi-measurement count state !to on. | | |

SETup:PVTime:TIME[:OFFSet]

| | | |
|--|------|--|
| Function | GSM | This command sets/queries the time offsets in seconds for power vs time power measurement, (not the mask measurement). |
| | GPRS | All 12 time offsets are set to on by default. If less than 12 values are sent with this command, the remaining offsets are turned off, see "Power versus Time Measurement Description" on page 109 . These values are referenced to the occurrence of bit 0 in a normal burst. The units (S MS US NS) are optional, if no units are specified then units default to S. |
| Setting | | Range: 0 to 12 comma-separated values ranging from: -50 μ s to 593 μ s Resolution: 1 ns |
| Query | | Range: 0 to 12 comma-separated values ranging from: -50 μ s to 593 μ s and 9.91E+37 if no offsets are specified Resolution: 1 ns |
| *RST Setting | | Time offsets 1 through 12 are on and set to these values: time offset 1 = -28 μ s time offset 2 = -18 μ s time offset 3 = -10 μ s time offset 4 = 0 μ s time offset 5 = 321.2 μ s time offset 6 = 331.2 μ s time offset 7 = 339.2 μ s time offset 8 = 349.2 μ s time offset 9 = 542.8 μ s time offset 10 = 552.8 μ s time offset 11 = 560.8 μ s time offset 12 = 570.8 μ s |
| Programming Example | | |
| <pre>OUTPUT 714; "SETUP:PVTIME:TIME:OFFSET -28.0 US, -18.0 US, -10.0 US, 0" !Configures the first four time offset points and turns the remaining eight off. !Using the query form of this command would return four time offset values OUTPUT 714; "SETUP:PVTIME:TIME:OFFSET -28.0 US" !Configures the first time offset !point and turns the remaining !eleven off. Using the query form !of this command would return one !time offset value OUTPUT 714; "SETUP:PVTIME:TIME:OFFSET" !Turns all 12 offset points off. Using the !query form of this command would return !9.91E+37 (NAN)</pre> | | |

SETup:PVTime:TIME:POINts?

| | | |
|--------------|------|--|
| Function | GSM | This command queries the number of Measurement Offset points that are turned on during a power versus time measurement. |
| | GPRS | This command is useful for determining how many time values will be returned in a comma-separated list when the "SETup:PVTime:TIME[:OFFSet]" query is sent, and how many power values will be returned when the "FETCh:PVTime:POWer[:ALL][:MAXimum]?" on page 428 command is sent. |
| Query | | Range: 0 to 12 Resolution: 1 |
| *RST Setting | | 12 |

SETup:PVTime:TIMEout[:STIMe]

| | | |
|--|------|--|
| Function | GSM | This command sets/queries the timeout value in seconds that will be used for power versus time measurements. This command also sets the timeout state to on. The units (S MS) are optional, if no units are specified then units default to S. |
| | GPRS | |
| Setting | | Range: .1 to 999 seconds Resolution: .1 seconds |
| Query | | Range: .1 to 999 seconds Resolution: .1 seconds |
| *RST Setting | | 10 seconds |
| Programming Example | | |
| OUTPUT 714; "SETUP:PVTIME:TIMEOUT:STIME 4" !Sets the state to on and the timeout value to 4 seconds. | | |

SETup:PVTime:TIMEout:TIME

| | | |
|---|------|--|
| Function | GSM | This command sets/queries the timeout value in seconds that will be used for power versus time measurements. The units (S MS) are optional, if no units are specified then units default to S. |
| | GPRS | |
| Setting | | Range: .1 to 999 seconds Resolution: .1 seconds |
| Query | | Range: .1 to 999 seconds Resolution: .1 seconds |
| *RST Setting | | 10 seconds |
| Programming Example | | |
| OUTPUT 714; "SETUP:PVTIME:TIMEOUT:TIME 6" !Sets the timeout value to 6 seconds. | | |

SETup:PVTime

SETup:PVTime:TIMEout:STATE

| | | |
|--|------------------|--|
| Function | GSM | This command sets/queries power versus time timeout state. |
| | GPRS | |
| Setting | 0 OFF 1 ON | |
| Query | 0 1 | |
| *RST Setting | 0 OFF | |
| Programming Example | | |
| OUTPUT 714; "SETUP:PVTIME:TIMEOUT:STATE ON" !Sets timeout state to on. | | |

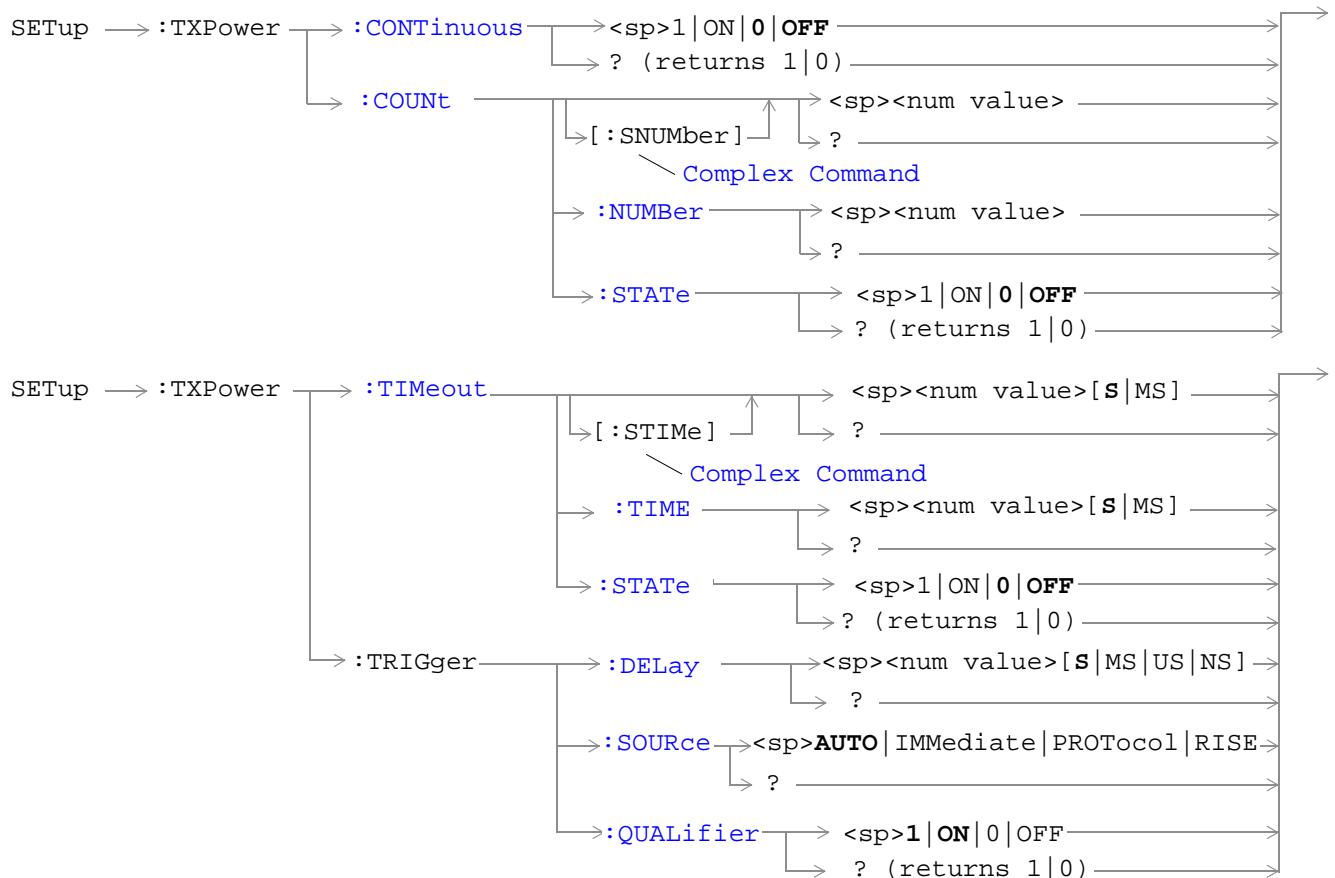
SETup:PVTime:TRIGger:DELay

| | | |
|--|---|---|
| Function | GSM | This command selects/queries the trigger delay in seconds for power versus time measurements. The units (S MS US NS) are optional, if no units are specified then units default to S. |
| | GPRS | |
| Setting | Range: -2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater | |
| Query | Range: -2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater | |
| *RST Setting | 0 seconds | |
| Programming Example | | |
| OUTPUT 714; "SETUP:PVTIME:TRIGGER:DELAY 1.1MS" !Sets trigger delay value to 1.1 !milli-seconds. | | |

SETup:PVTime:TRIGger:SOURce

| | | |
|--|------------------------------------|--|
| Function | GSM | This command selects/queries the trigger source for power versus time measurements. See "Triggering of Measurements" on page 169 . |
| | GPRS | |
| Setting | AUTO PROTOCOL RISE IMMEDIATE | |
| Query | AUTO PROT RISE IMM | |
| *RST Setting | AUTO | |
| Programming Example | | |
| OUTPUT 714; "SETUP:PVTIME:TRIGGER:SOURCE AUTO" !Sets trigger source to Auto. | | |

SETup:TXPower



“Diagram Conventions” on page 283

SETup:TXPower

SETup:TXPower:CONTinuous

| | | |
|---|------|--|
| Function | GSM | This command sets/queries the trigger state for TX carrier power measurements. |
| | GPRS | |
| Setting | | Single trigger mode = 0 OFF Continuous trigger mode = 1 ON |
| Query | | 0 1 |
| *RST Setting | | 0 off |
| Programming Example | | |
| OUTPUT 714; "SETUP:TXPOWER: CONTINUOUS OFF" !Specifies single trigger mode for !TX Carrier Power measurements. | | |

SETup:TXPower:COUNt[:SNUMber]

| | | |
|---|------|--|
| Function | GSM | This command sets/queries the number of TX carrier power measurements the test set will make and turns the multi-measurement count state on. |
| | GPRS | |
| Setting | | Range: 1 to 999 Resolution: 1 |
| Query | | Range: 1 to 999 Resolution: 1 |
| *RST Setting | | 10 |
| Programming Example | | |
| OUTPUT 714; "SETUP:TXPOWER:COUNT:SNUMBER 99" !Sets the state to on and the !multi-measurement count value !to 99. | | |

SETup:TXPower:COUNt:NUMBER

| | | |
|--|------|--|
| Function | GSM | This command sets/queries the number of TX power measurements the test set will make when the multi-measurement state is on. |
| | GPRS | |
| Setting | | Range: 1 to 999 Resolution: 1 |
| Query | | Range: 1 to 999 Resolution: 1 |
| *RST Setting | | 10 |
| Programming Example | | |
| OUTPUT 714; "SETUP:TXPOWER:COUNT:NUMBER 5" !Sets the TX Power multi-measurement !count number to 5. | | |

SETUp:TXPower:COUNT:STATE

| | | |
|---|--------------|---|
| Function | GSM | This command sets/queries the TX power multi-measurement count state. |
| | GPRS | |
| Setting | 0 Off 1 On | |
| Query | 0 1 | |
| *RST Setting | 0 off | |
| Programming Example | | |
| OUTPUT 714; "SETUP:TXPOWER:COUNT:STATE ON" !Sets the multi-measurement count !state to on. | | |

SETUp:TXPower:TIMEout[:STIMe]

| | | |
|---|--|---|
| Function | GSM | This command sets/queries TX carrier power measurement timeout value and also sets the state to on. The units (S MS) are optional, if no units are specified then units default to S. |
| | GPRS | |
| Setting | Range: .1 to 999 seconds Resolution: .1 seconds | |
| Query | Range: .1 to 999 seconds Resolution: .1 seconds | |
| *RST Setting | 10 seconds | |
| Programming Example | | |
| OUTPUT 714; "SETUP:TXPOWER:TIMEOUT:STIME 20" !Sets the state to on and the !timeout value to 20 seconds. | | |

SETUp:TXPower:TIMEout:TIME

| | | |
|---|--|---|
| Function | GSM | This command sets/queries the timeout value in seconds that will be used for TX power measurements. The units (S MS) are optional, if no units are specified then units default to S. |
| | GPRS | |
| Setting | Range: .1 to 999 seconds Resolution: .1 seconds | |
| Query | Range: .1 to 999 seconds Resolution: .1 seconds | |
| *RST Setting | 10 seconds | |
| Programming Example | | |
| OUTPUT 714; "SETUP:TXPOWER:TIMEOUT:TIME 20" !Sets the TX power measurement !timeout to 20 seconds. | | |

SETup:TXPower

SETup:TXPower:TIMEout:STATE

| | | | | | |
|---|------------------|--|--|--|--|
| Function | GSM | This command selects/queries TX carrier power measurement timeout state. | | | |
| | GPRS | | | | |
| Setting | 0 OFF 1 ON | | | | |
| Query | 0 1 | | | | |
| *RST Setting | 0 off | | | | |
| Programming Example | | | | | |
| OUTPUT 714; "SETUP:TXPOWER:COUNT:STATE 1" !Turns the TX carrier power timeout !state on. | | | | | |

SETup:TXPower:TRIGger:DELay

| | | | | | |
|---|---|---|--|--|--|
| Function | GSM | This command sets/queries the trigger delay in seconds for TX carrier power measurements. The units (S MS US NS) are optional, if no units are specified then units default to S. | | | |
| | GPRS | | | | |
| Setting | Range: -2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater | | | | |
| Query | Range: -2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater | | | | |
| *RST Setting | zero seconds | | | | |
| Programming Example | | | | | |
| OUTPUT 714; "SETUP:TXPOWER:TRIGGER:DELAY 1.5MS" !Set trigger delay time to !1.5 milliseconds | | | | | |

SETup:TXPower:TRIGger:SOURce

| | | | | | |
|---|------------------------------------|---|--|--|--|
| Function | GSM | This command selects/queries the trigger source for TX carrier power measurements. See "Triggering of Measurements" on page 169 . | | | |
| | GPRS | | | | |
| Setting | AUTO PROTocol RISE IMMEDIATE | | | | |
| Query | AUTO PROT RISE IMM | | | | |
| *RST Setting | AUTO | | | | |
| Programming Example | | | | | |
| OUTPUT 714; "SETUP:TXPOWER:TRIGGER:SOURCE AUTO" !Sets trigger source to AUTO. | | | | | |

SETUp:TXPower:TRIGger:QUALifier

| | | |
|---|--------------|---|
| Function | GSM | This command sets/queries the trigger qualification for TX carrier power measurements. When ON, an automatic trigger re-arm occurs if a measurement is triggered when no valid signal (burst) is present. See "Trigger Qualifier Description" on page 172 . |
| | GPRS | |
| Setting | 0 OFF 1 ON | |
| Query | 0 1 | |
| *RST Setting | 1 on | |
| Programming Example | | |
| OUTPUT 714; "SETUP:TXPOWER:TRIGGER:QUALIFIER ON" !Sets trigger qualifier state !to on. | | |

STATus Subsystem Description

Description

The STATus subsystem is used to communicate current test set status information to the controlling application program.

Syntax Diagrams and Command Descriptions

["STATus:OPERation" on page 525](#)

["STATus:PRESet" on page 543](#)

["STATus:QUESTIONable" on page 544](#)

["Standard Event Status Register" on page 560](#)

["Status Byte Register" on page 559](#)

Status Register Bit Definitions

["Status Byte Register Bit Assignments" on page 559](#)

["Standard Event Status Register Bit Assignment" on page 561](#)

["STATus:QUESTIONable Condition Register Bit Assignment" on page 548](#)

["STATus:QUESTIONable:CALL Condition Register Bit Assignment" on page 549](#)

["STATus:QUESTIONable:CALL:GSM Condition Register Bit Assignment" on page 550](#)

["STATus:QUESTIONable:ERRors Condition Register Bit Assignment" on page 552](#)

["STATus:QUESTIONable:ERRors:GSM Condition Register Bit Assignment" on page 555](#)

["STATus:QUESTIONable:HARDware Condition Register Bit Assignment" on page 558](#)

["STATus:OPERation Condition Register Bit Assignment" on page 529](#)

["STATus:OPERation:CALL Condition Register Bit Assignment" on page 531](#)

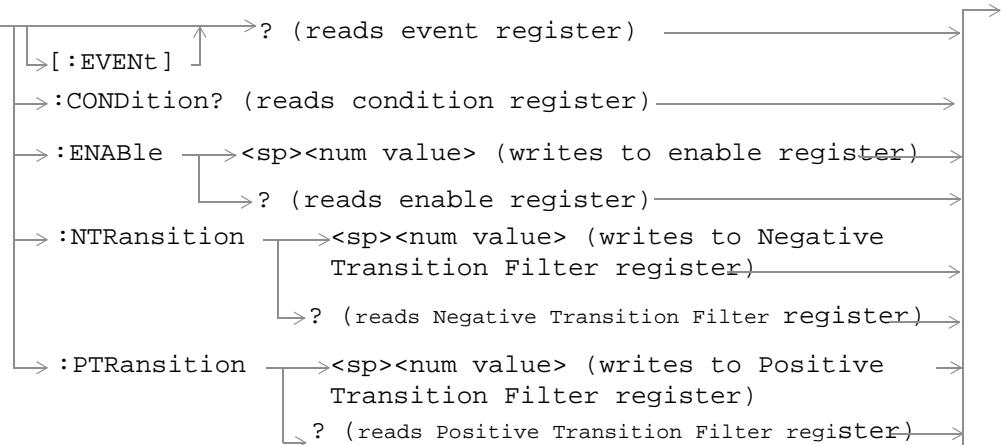
["STATus:OPERation:CALL:GSM Condition Register Bit Assignment" on page 534](#)

["STATus:OPERation:NMRReady Condition Register Bit Assignment" on page 536](#)

["STATus:OPERation:NMRReady:GSM Condition Register Bit Assignment" on page 540](#)

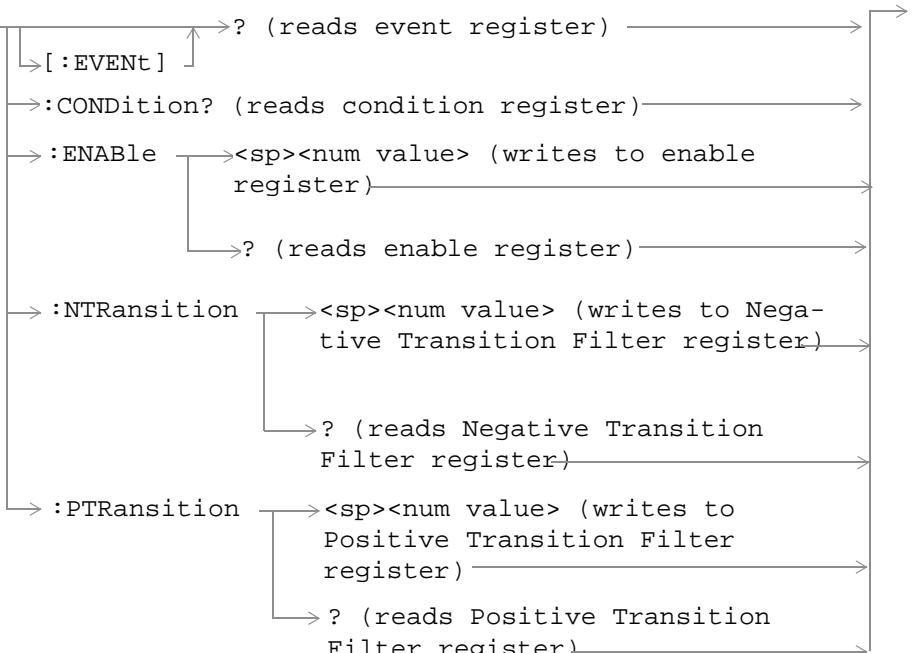
STATUs:OPERation

STATUs—:OPERation



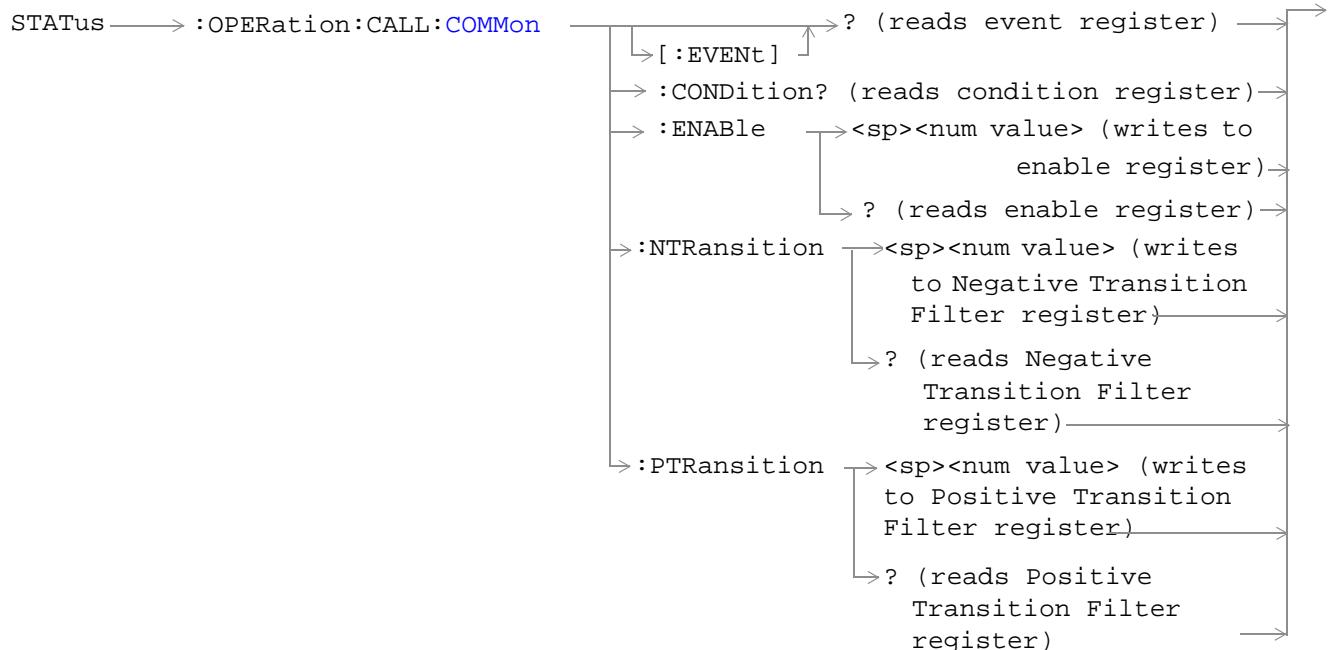
These commands are not applicable to GPRS.

STATUs—:OPERation:CALL

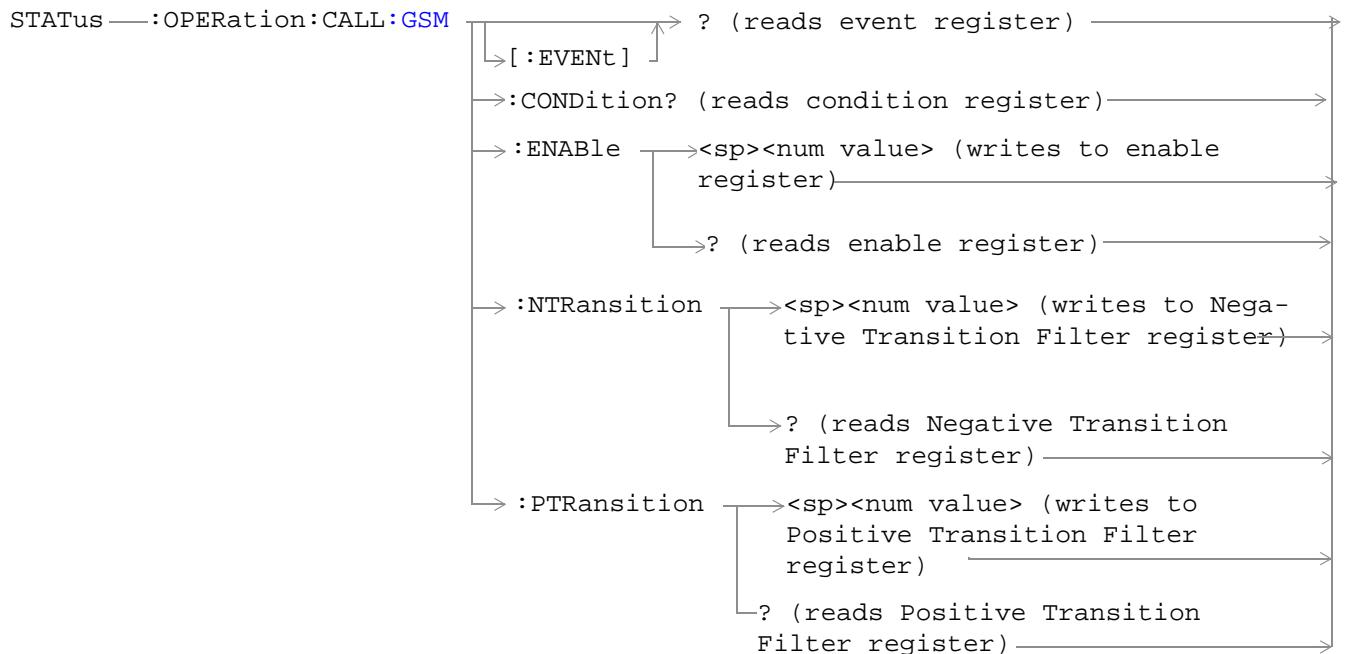


These commands are not applicable to GPRS.

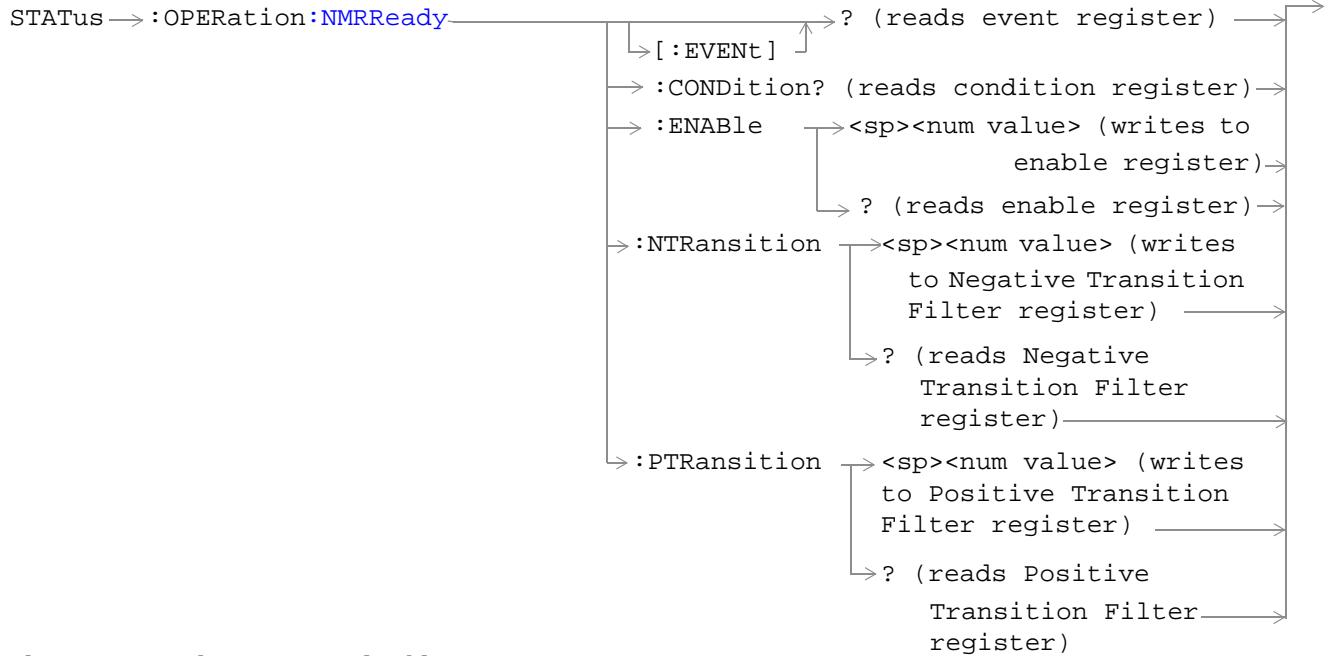
STATUS:OPERation



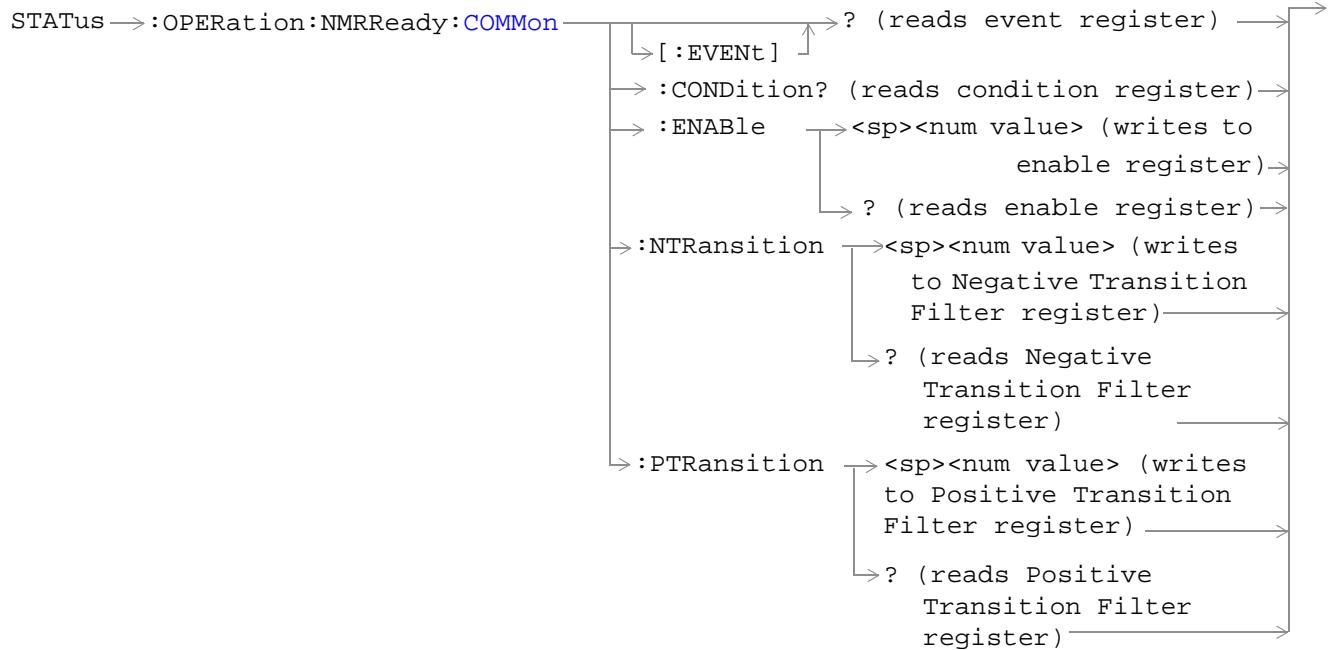
These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

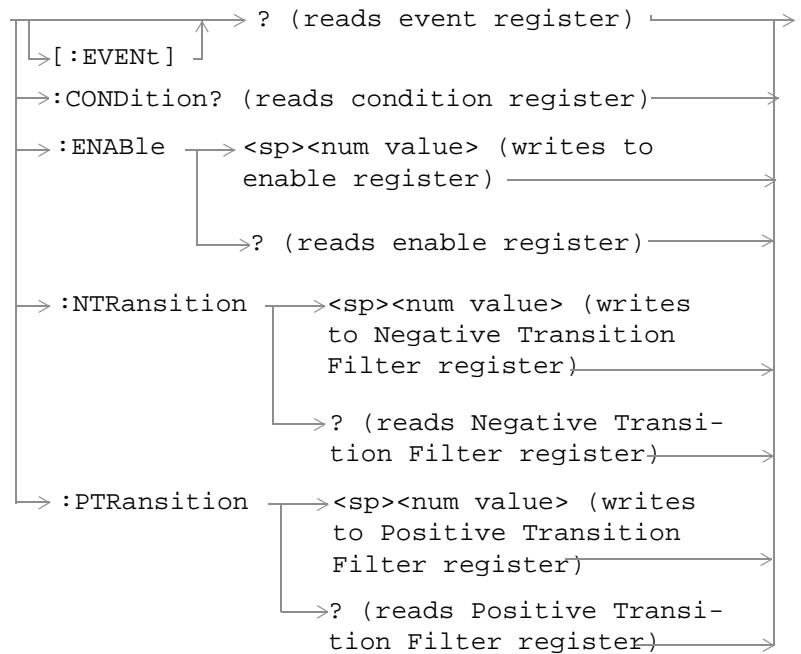


These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

STATus → :OPERation:NMRReady:GSM



These commands are not applicable to GPRS.

[“Diagram Conventions” on page 283](#)

STATus:OPERation Condition Register Bit Assignment

The OPERation status register set contains bits which give an indication of conditions that are part of the test set's normal operation.

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|---|--|
| 15 | 32768 | Not Used. Defined by SCPI. | This bit will always be 0. |
| 14 | 16384 | Reserved for future use. | This bit will always be 0. |
| 13 | 8192 | Reserved for future use. | This bit will always be 0. |
| 12 | 4096 | Processing SYSTem:SYNChronized Command | This condition bit will be "pulsed" by the SYSTem:SYNChronized command. This will allow the status system to indicate that the input buffer is synchronized to the point where this command is parsed and that all prior sequential commands are completed and all prior overlapped commands have started. |
| 11 | 2048 | Reserved for future use | This bit will always be 0. |
| 10 | 1024 | CALL Summary | This bit is the summary message bit for the OPERation:CALL register. |
| 9 | 512 | NMRReady (New Measurement Result Ready) Summary | This bit is the summary message bit for the OPERation:NMRReady register. |
| 8 | 256 | Reserved for future use. | This bit will always be 0. |
| 7 | 128 | Reserved for future use. | This bit will always be 0. |
| 6 | 64 | Reserved for future use. | This bit will always be 0. |
| 5 | 32 | Reserved for future use. | This bit will always be 0. |
| 4 | 16 | Reserved for future use. | This bit will always be 0. |
| 3 | 8 | Reserved for future use. | This bit will always be 0. |
| 2 | 4 | Reserved for future use. | This bit will always be 0. |
| 1 | 2 | Reserved for future use. | This bit will always be 0. |
| 0 | 1 | Extension Bit | This bit will always be 0. |

Program Examples - STATus:OPERation

```
OUTPUT 714;"STATUS:OPERATION:EVENT?" !Queries and clears the Operation
          !Event Register
OUTPUT 714;"STATUS:OPERATION:CONDITION?" !Queries and clears the Operation
          !Condition Register
OUTPUT 714;"STATUS:OPERATION:ENABLE 1024" !Sets the Operation
          !Enable
          !Register for bit 10
OUTPUT 714;"STATUS:OPERATION:NTRANSITION 2" !Sets the Operation
          !Negative Transition
          !Filter Register for bit 1
OUTPUT 714;"STATUS:OPERATION:PTRANSITION 2" !Sets the Operation
          !Positive Transasition
          !Filter Register for bit 1
```

STATus:OPERation:CALL Condition Register Bit Assignment

The STATus:OPERation:CALL register bits will be used to indicate status of processes that occur during normal call processing operations.

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|----------------------------|--|
| 15 | 32768 | Not Used. Defined by SCPI. | This bit will always be 0. |
| 14 | 16384 | Reserved for future use. | This bit will always be 0. |
| 13 | 8192 | Reserved for future use. | This bit will always be 0. |
| 12 | 4096 | Reserved for future use. | This bit will always be 0. |
| 11 | 2048 | Reserved for future use. | This bit will always be 0. |
| 10 | 1024 | Reserved for future use. | This bit will always be 0. |
| 9 | 512 | Reserved for future use. | This bit will always be 0. |
| 8 | 256 | Reserved for future use. | This bit will always be 0. |
| 7 | 128 | Reserved for future use. | This bit will always be 0. |
| 6 | 64 | Reserved for future use. | This bit will always be 0. |
| 5 | 32 | TA136 Summary bit | This bit is the summary bit for the STATus:OPERation:CALL:TA136 register. |
| 4 | 16 | DIGital136 Summary bit | This bit is the summary bit for the STATus:OPERation:CALL:DIGital136 register. |
| 3 | 8 | AMPS Summary bit | This bit is the summary bit for the STATus:OPERation:CALL:AMPS register. |
| 2 | 4 | GSM Summary bit | This bit is the summary bit for the STATus:OPERation:CALL:GSM register. |
| 1 | 2 | COMMON Summary bit | This bit is the summary bit for the STATus:OPERation:CALL:COMMON register. |
| 0 | 1 | Extension Bit | This bit will always be 0. |

Program Examples - STATus:OPERation:CALL

```

OUTPUT 714;"STATUS:OPERATION:CALL:EVENT?" !Queries and clears the Operation Call Event
!Register
OUTPUT 714;"STATUS:OPERATION:CALL:CONDITION?" !Queries and clears the Operation Call
!Condition Register
OUTPUT 714;"STATUS:OPERATION:CALL:ENABLE 4" !Sets the Operation Call Enable
!Register for bit 2
OUTPUT 714;"STATUS:OPERATION:CALL:NTR 4" !Sets the Negative Transition Filter
!Register for bit 2
OUTPUT 714;"STATUS:OPERATION:CALL:PTR 256" !Sets the Positive Transition Filter
!Register for bit 8

```

STATUs:OPERation:CALL:COMMON Condition Register Bit Assignment

The STATus subsystem is not applicable to GPRS.

The STATUs:OPERation:CALL:COMMON register bits will be used to indicate status of processes that occur during normal call processing operations.

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|-------------------------------|---|
| 15 | 32768 | Not Used. Defined by SCPI. | This bit will always be 0. |
| 14 | 16384 | Reserved for future use. | This bit will always be 0. |
| 13 | 8192 | Reserved for future use.) | This bit will always be 0. |
| 12 | 4096 | Reserved for future use. | This bit will always be 0. |
| 11 | 2048 | Reserved for future use. | This bit will always be 0. |
| 10 | 1024 | Registering (MS initiated) | This bit is set to a 1 when the Mobile Station initiates registration. |
| 9 | 512 | Registering (BS initiated) | This bit is set to a 1 when the Base Station initiates registration. |
| 8 | 256 | Reserved for future use. | This bit will always be 0. |
| 7 | 128 | BS Originating | This bit will be a 1 when: <ul style="list-style-type: none"> • Active Cell mode - the call processing state leaves the idle state • Test mode - the test set has noted a base station origination. |
| 6 | 64 | Call Control Status Changing | This bit is set to a 1 when the call control status change detector has been armed. |
| 5 | 32 | Reserved for future use. | This bit will always be 0. |
| 4 | 16 | Reserved for future use. | This bit will always be 0. |
| 3 | 8 | Call Control Status Alerting | This bit will be a 1 when the test set is in the call alerting state (ringing). |
| 2 | 4 | Call Control Status Connected | This bit will be a 1 when the test set is in the call connected state. |
| 1 | 2 | Call Control Status Idle | This bit will be a 1 when the test set is in the call idle state. |
| 0 | 1 | Extension Bit | This bit will always be 0. |

Program Examples STATus:OPERation:CALL:COMMON

```
OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:EVENT?" !Queries and clears the Operation
          !Call
          !Common Event Register
OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:CONDITION?" !Queries and clears the Operation
          !Call
          !Common Condition Register
OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:ENABLE 1024" !Sets the Operation
          !Call
          !Common Enable
          !Register for bit 10
OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:NTRANSITION 2" !Sets the Operation
          !Call
          !Common Negative Transition
          !Filter Register for bit 1
OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:PTRANSITION 2" !Set the Operation
          !Call
          !Common Positive Transasition
          !Filter Register for bit 1
```

STATUs:OPERation:CALL:GSM Condition Register Bit Assignment

The STATus subsystem is not applicable to GPRS.

The STATUs:OPERation:CALL:GSM register bits will be used to indicate status of processes that occur during normal GSM call processing operations.

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|------------------------------|--|
| 15 | 32768 | Not Used. Defined by SCPI. | This bit will always be 0. |
| 14 | 16384 | Reserved for future use. | This bit will always be 0. |
| 13 | 8192 | Reserved for future use. | This bit will always be 0. |
| 12 | 4096 | Reserved for future use. | This bit will always be 0. |
| 11 | 2048 | Reserved for future use. | This bit will always be 0. |
| 10 | 1024 | Reserved for future use. | This bit will always be 0. |
| 9 | 512 | Reserved for future use. | This bit will always be 0. |
| 8 | 256 | BS Disconnecting | <p>This bit will be a 1 when:</p> <ul style="list-style-type: none"> Active Cell mode - the call processing state reaches (or is in) the idle state Test mode - the test set has noted a base station termination. |
| 7 | 128 | BS Originating | <p>This bit will be a 1 when:</p> <ul style="list-style-type: none"> Active Cell mode - the call processing state leaves the idle state Test mode - the test set has noted a base station origination. |
| 6 | 64 | Call Control Status Changing | This bit is set to a 1 when the call control status change detector has been armed. |
| 5 | 32 | TCH Assignment in Progress | <p>This bit will be a 1 when:</p> <ul style="list-style-type: none"> The channel assignment is successfully completed (when a call is established). The test set notes a change in the TCH ARFCN, cell band, TCH timeslot, or mobile station timing advance. An error message is generated. |
| 4 | 16 | BCH Changing | <p>This bit will be a 1 when:</p> <ul style="list-style-type: none"> The downlink signal is transmitting on the new broadcast channel. The test set has noted a change in cell band. |

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|-------------------------------|---|
| 3 | 8 | Call Control Status Alerting | This bit will be a 1 when the test set is in the call alerting state (ringing). |
| 2 | 4 | Call Control Status Connected | This bit will be a 1 when the test set is in the call connected state. |
| 1 | 2 | Call Control Status Idle | This bit will be a 1 when the test set is in the call idle state. |
| 0 | 1 | Extension Bit | This bit will always be 0. |

Program Examples - STATus:OPERation:CALL:GSM

```

OUTPUT 714;"STATUS:OPERATION:CALL:GSM:EVENT?" !Queries and clears the Operation
                                                !Call GSM Event Register
OUTPUT 714;"STATUS:OPERATION:CALL:GSM:CONDITION?" !Queries and clears the Operation
                                                !Call GSM Condition Register
OUTPUT 714;"STATUS:OPERATION:CALL:GSM:ENABLE 1024" !Sets the Operation
                                                !Call GSM Enable
                                                !Register for bit 10
OUTPUT 714;"STATUS:OPERATION:CALL:GSM:NTRANSITION 2" !Sets the Operation
                                                !Call GSM Negative Transition
                                                !Filter Register for bit 1
OUTPUT 714;"STATUS:OPERATION:CALL:GSM:PTRANSITION 2" !Sets the Operation
                                                !Call GSM Positive Transasition
                                                !Filter Register for bit 1

```

STATUs:OPERation:NMRReady Condition Register Bit Assignment

The STATUs:OPERation:NMRReady register bits indicate when a measurement has been completed and new measurement results are available.

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|----------------------------|---|
| 15 | 32768 | Not Used. Defined by SCPI. | This bit will always be 0. |
| 14 | 16384 | Reserved for future use. | This bit will always be 0. |
| 13 | 8192 | Reserved for future use. | This bit will always be 0. |
| 12 | 4096 | Reserved for future use. | This bit will always be 0. |
| 11 | 2048 | Reserved for future use. | This bit will always be 0. |
| 10 | 1024 | Reserved for future use. | This bit will always be 0. |
| 9 | 512 | Reserved for future use. | This bit will always be 0. |
| 8 | 256 | Reserved for future use. | This bit will always be 0. |
| 7 | 128 | Reserved for future use. | This bit will always be 0. |
| 6 | 64 | Reserved for future use. | This bit will always be 0. |
| 5 | 32 | TA136 Summary bit | This bit is the summary bit for the OPERATION:NMRReady:TA136 register. |
| 4 | 16 | DIGItal136 Summary bit | This bit is the summary bit for the OPERATION:NMRReady:DIGItal136 register. |
| 3 | 8 | AMPS Summary bit | This bit is the summary bit for the OPERATION:NMRReady:AMPS register. |
| 2 | 4 | GSM Summary bit | This bit is the summary bit for the OPERATION:NMRReady:GSM register. |
| 1 | 2 | COMMON Summary bit | This bit is the summary bit for the OPERATION:NMRReady:COMMON register. |
| 0 | 1 | Extension Bit | This bit will always be 0. |

Program Examples - STATus:OPERation:NMRReady

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:EVENT?" !Queries and clears the New Measurement
                                                !Results Ready Event Register
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CONDITION?" !Queries and clears the New Measurement
                                                !Results Ready
                                                !Condition Register
OUTPUT 714;"STATUS:OPERATION:NMRREADY:ENABLE 16" !Sets New Measurement Results
                                                !Ready Enable Regigter
                                                !for bit 4
OUTPUT 714;"STATUS:OPERATION:NMRREADY:NTR 2" !Sets the New Measurement Results
                                                !Ready Negative Transition Filter
                                                !Register for bit 1
OUTPUT 714;"STATUS:OPERATION:NMRREADY:PTR 4" !Sets the New Measurement
                                                !Results Ready Positive
                                                !Transition Filter Register
                                                !for bit 2
```

STATUs:OPERation:NMRReady:COMMON Condition Register Bit Assignment

The STATus subsystem is not applicable to GPRS.

The STATus:OPERation:NMRReady:COMMON register bits indicate when a measurement has been completed and new measurement results are available.

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|----------------------------|---|
| 15 | 32768 | Not Used. Defined by SCPI. | This bit will always be 0. |
| 14 | 16384 | Reserved for future use. | This bit will always be 0. |
| 13 | 8192 | Reserved for future use. | This bit will always be 0. |
| 12 | 4096 | Reserved for future use. | This bit will always be 0. |
| 11 | 2048 | Reserved for future use. | This bit will always be 0. |
| 10 | 1024 | Reserved for future use. | This bit will always be 0. |
| 9 | 512 | Reserved for future use. | This bit will always be 0. |
| 8 | 256 | Reserved for future use. | This bit will always be 0. |
| 7 | 128 | Reserved for future use. | This bit will always be 0. |
| 6 | 64 | Reserved for future use. | This bit will always be 0. |
| 5 | 32 | Reserved for future use. | This bit will always be 0. |
| 4 | 16 | Reserved for future use. | This bit will always be 0. |
| 3 | 8 | Reserved for future use. | This bit will always be 0. |
| 2 | 4 | Reserved for future use. | This bit will always be 0. |
| 1 | 2 | Audio Analyzer | This is the summary bit for the STATus:OPERation:NMRReady:COMMON Audio Analyzer register. |
| 0 | 1 | Extension Bit | This bit will always be 0. |

Program Examples - STATus:OPERation:NMRReady:COMMON

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:EVENT?" !Queries and clears the Operation
                                                !New Measurement Results Ready
                                                !Common Event Register
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:CONDITION?" !Queries and clears the Operation
                                                !New Measurement Results Ready
                                                !Common Condition Register
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:ENABLE 1024" !Sets the Operation
                                                !New Measurement Results Ready
                                                !Common Enable
                                                !Register for bit 10
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:NTRANSITION 2" !Sets the Operation
                                                !New Measurement Results Ready
                                                !Common Negative Transition
                                                !Filter Register for bit 1
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:PTRANSITION 2" !Set the Operation
                                                !New Measurement Results Ready
                                                !Common Positive Tranasition
                                                !Filter Register for bit 1
```

STATUs:OPERation:NMRReady:GSM Condition Register Bit Assignment

The STATus subsystem is not applicable to GPRS.

The STATUs:OPERation:NMRReady:GSM register bits indicate when a GSM measurement has been completed and new measurement results are available.

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|---|--|
| 15 | 32768 | Not Used. Defined by SCPI. | This bit will always be 0. |
| 14 | 16384 | Reserved for future use. | This bit will always be 0. |
| 13 | 8192 | Reserved for future use. | This bit will always be 0. |
| 12 | 4096 | Reserved for future use. | This bit will always be 0. |
| 11 | 2048 | Reserved for future use. | This bit will always be 0. |
| 10 | 1024 | DPOWer New Measurement Result Ready | <p>This bit will be a 1 if the measurement has been completed and has produced new results.</p> <p>This bit will be a zero at power on, after a preset and while a measurement is in Measuring States. See "Measurement States" on page 170.</p> |
| 9 | 512 | I/Q Tuning New Measurement Result Ready | <p>This bit will be a 1 if the measurement has been completed and has produced new results.</p> <p>This bit will be a zero at power on, after a preset and while a measurement is in Measuring States. See "Measurement States" on page 170.</p> |
| 8 | 256 | BERRor New Measurement Result Ready | <p>This bit will be a 1 if the measurement has been completed and has produced new results.</p> <p>This bit will be a zero at power on, after a preset and while a measurement is in Measuring States. See "Measurement States" on page 170.</p> |
| 7 | 128 | FBERror New Measurement Result Ready | <p>This bit will be a 1 if the measurement has been completed and has produced new results.</p> <p>This bit will be a zero at power on, after a preset and while a measurement is in Measuring States. See "Measurement States" on page 170.</p> |
| 6 | 64 | DAUDio New Measurement Result Ready | <p>This bit will be a 1 if the measurement has been completed and has produced new results.</p> <p>This bit will be a zero at power on, after a preset and while a measurement is in Measuring States. See "Measurement States" on page 170.</p> |

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|--|--|
| 5 | 32 | AAUDio New Measurement Result Ready | <p>This bit will be a 1 if the measurement has been completed and has produced new results.</p> <p>This bit will be a zero at power on, after a preset and while a measurement is in Measuring States. See "Measurement States" on page 170.</p> |
| 4 | 16 | ORFSpectrum New Measurement Result Ready | <p>This bit will be a 1 if the measurement has been completed and has produced new results.</p> <p>This bit will be a zero at power on, after a preset and while a measurement is in Measuring States. See "Measurement States" on page 170.</p> |
| 3 | 8 | PFERror New Measurement Result Ready | <p>This bit will be a 1 if the measurement has been completed and has produced new results.</p> <p>This bit will be a zero at power on, after a preset and while a measurement is in Measuring States. See "Measurement States" on page 170.</p> |
| 2 | 4 | PVTime New Measurement Result Ready | <p>This bit will be a 1 if the measurement has been completed and has produced new results.</p> <p>This bit will be a zero at power on, after a preset and while a measurement is in Measuring States. See "Measurement States" on page 170.</p> |
| 1 | 2 | TXPower New Measurement Result Ready | <p>This bit will be a 1 if the measurement has been completed and has produced new results.</p> <p>This bit will be a zero at power on, after a preset and while a measurement is in Measuring States. See "Measurement States" on page 170.</p> |
| 0 | 1 | Extension Bit | This bit will always be 0. |

Program Examples - STATus:OPERation:NMRReady:GSM

```
OUTPUT 714;" STATUS:OPERATION:NMRREADY:GSM:EVENT?" !Queries and clears the Operation
                                                !New Measurement Results Ready
                                                !GSM Event Register
OUTPUT 714;" STATUS:OPERATION:NMRREADY:GSM:CONDITION?" !Queries and clears the Operation
                                                !New Measurement Results Ready
                                                !GSM Condition Register
OUTPUT 714;" STATUS:OPERATION:NMRREADY:GSM:ENABLE 1024" !Sets the Operation
                                                !New Measurement Results Ready
                                                !GSM Enable
                                                !Register for bit 10
OUTPUT 714;" STATUS:OPERATION:NMRREADY:GSM:NTRANSITION 2" !Sets the Operation
                                                !New Measurement Results Ready
                                                !GSM Negative Transition
                                                !Filter Register for bit 1
OUTPUT 714;" STATUS:OPERATION:NMRREADY:GSM:PTRANSITION 2" !Sets the Operation
                                                !New Measurement Results Ready
                                                !GSM Positive Transasition
                                                !Filter Register for bit 1
```

Related Topics

["Triggering of Measurements" on page 169](#)

STATus:PRESet

STATus → :PRESet →

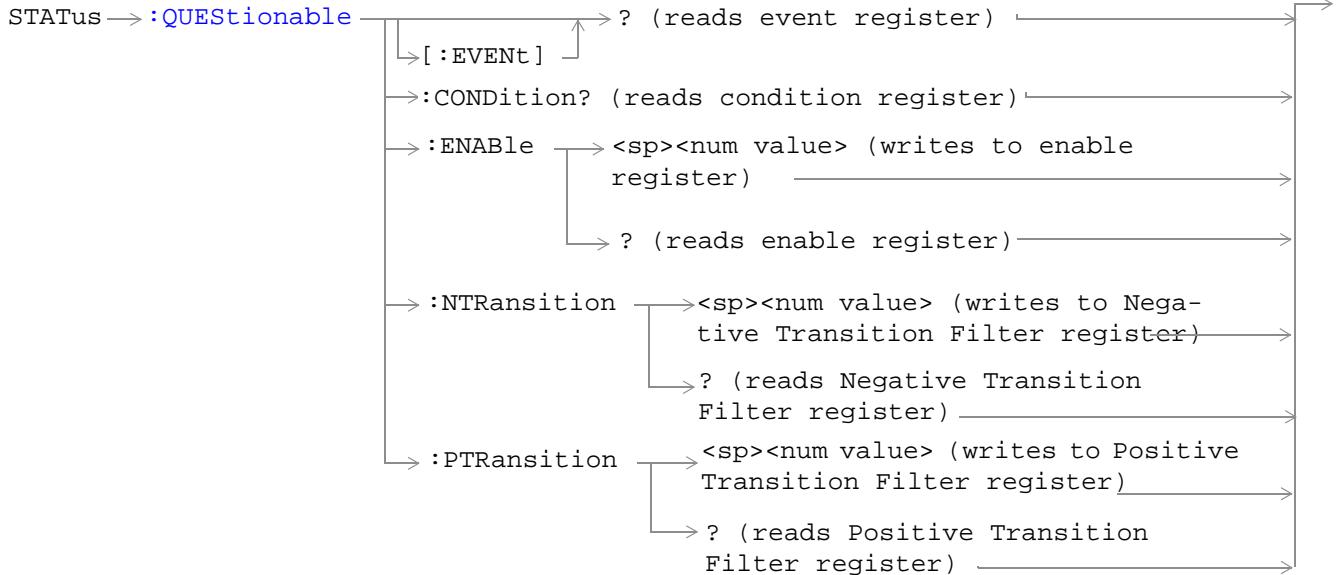
This command is not applicable to GPRS.

[“Diagram Conventions” on page 283](#)

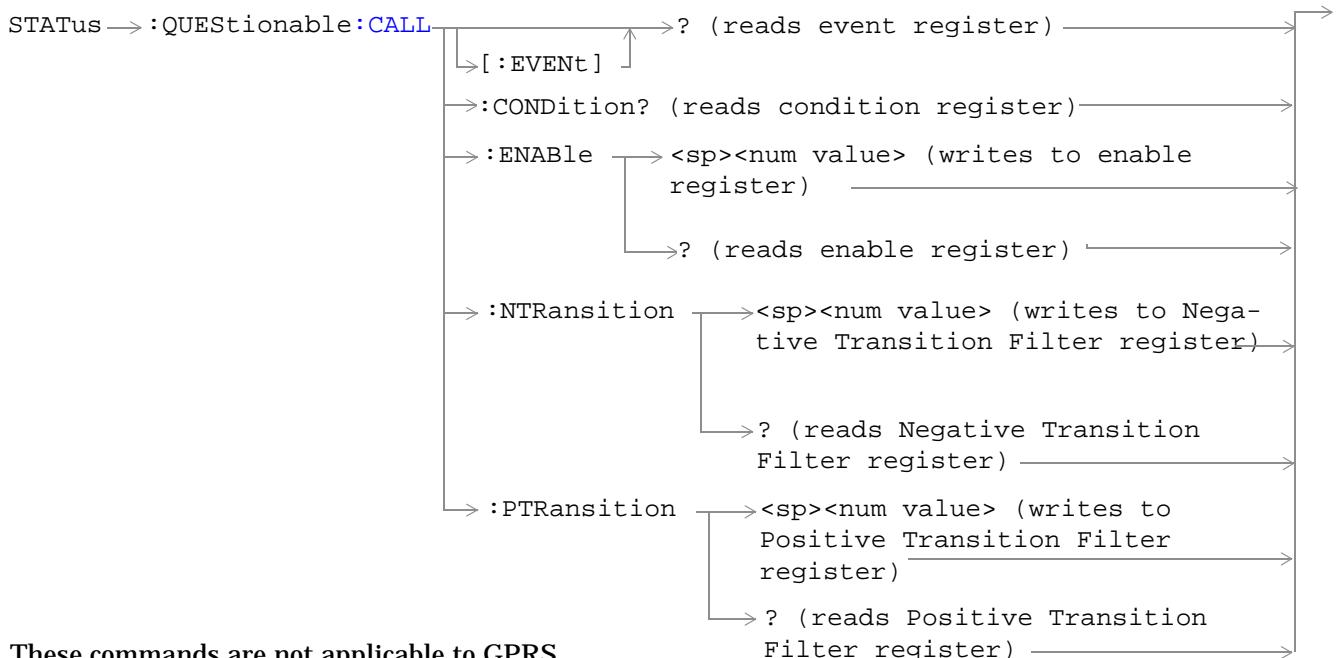
STATus:PRESet

| | | |
|----------|------|--|
| Function | GSM | Presets the Status Subsystem Sets all Enable Registers to 0 (not enabled). Sets all Positive Transition Registers (PTR) to 1 (positive transitions enabled). Sets all Negative Transition Registers (NTR) to 0 (negative transitions disabled). |
| | GPRS | This command is not applicable to GPRS. |

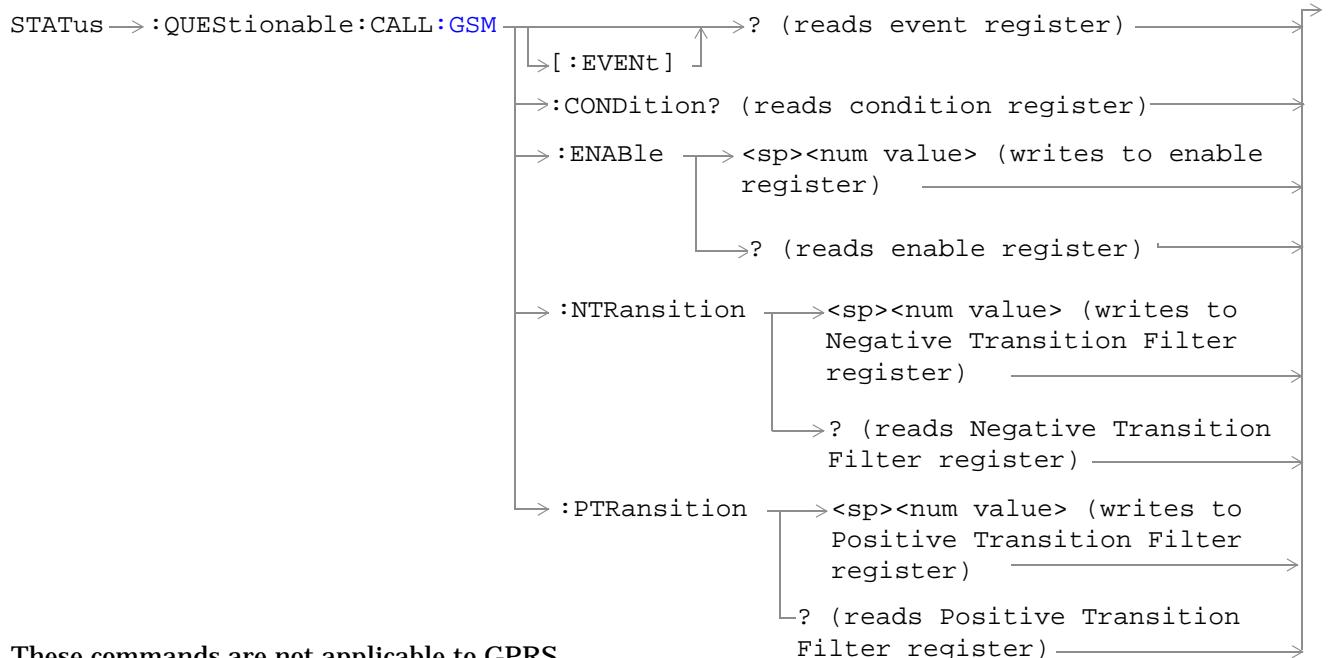
STATUs:QUEStionable



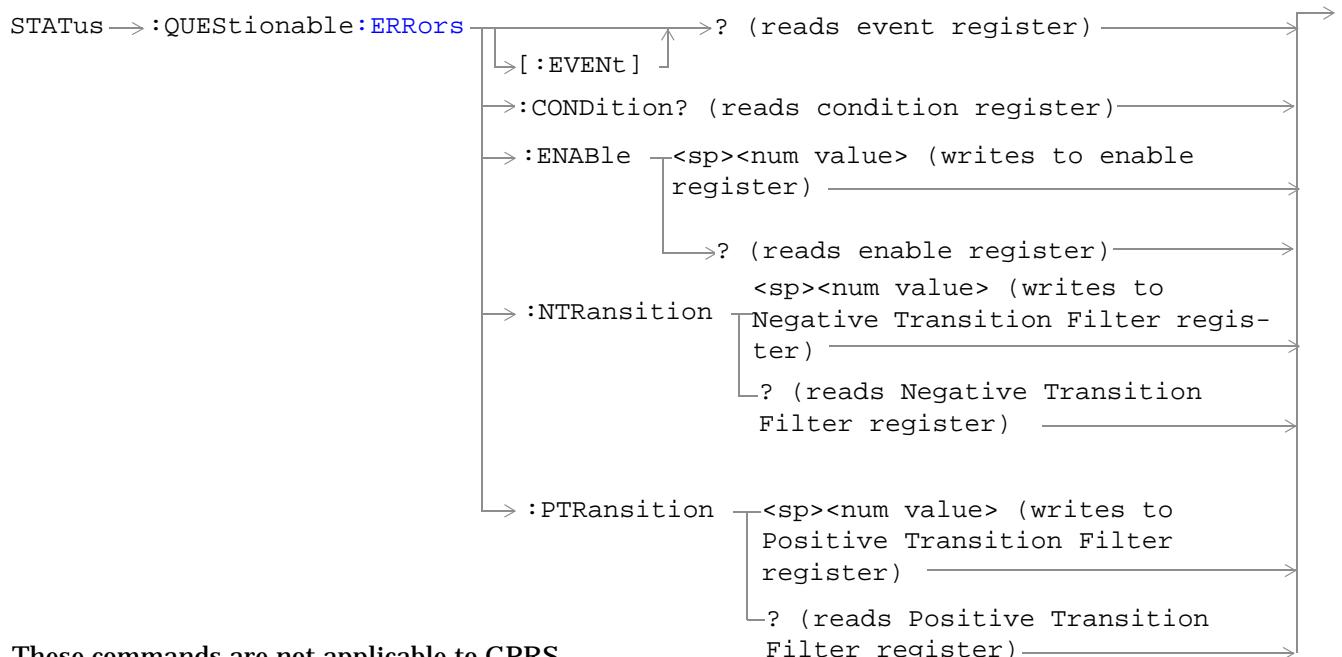
These commands are not applicable to GPRS.



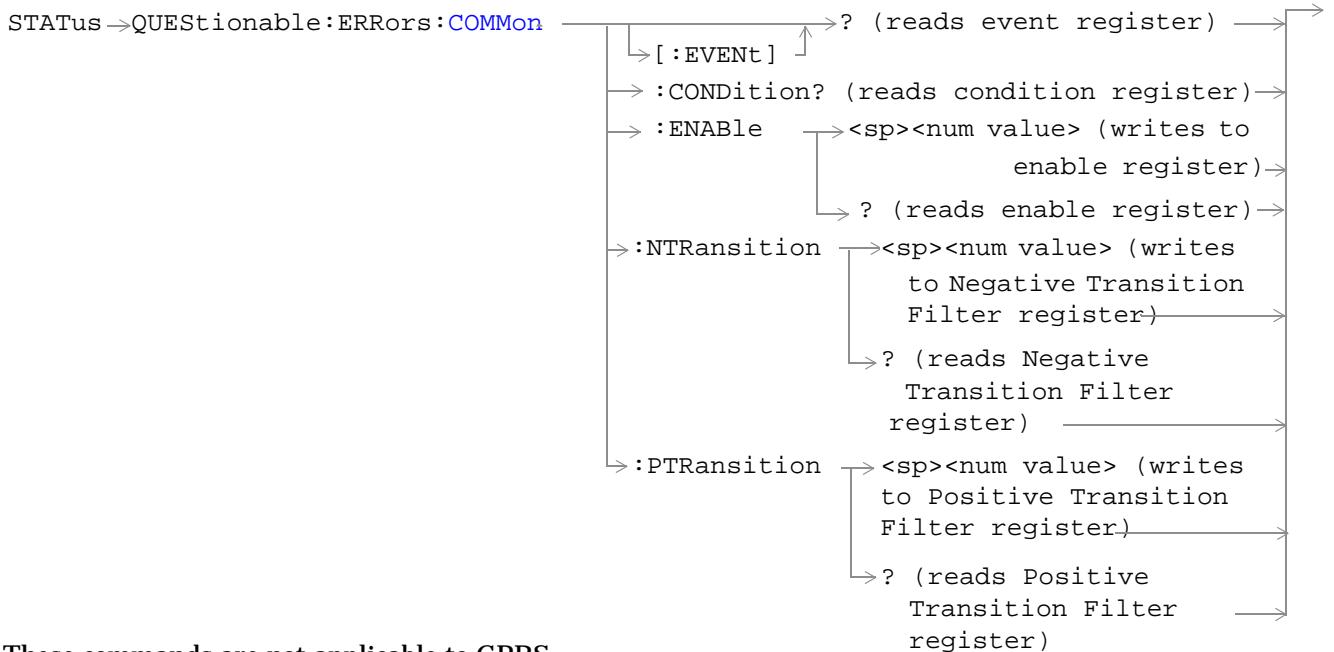
These commands are not applicable to GPRS.



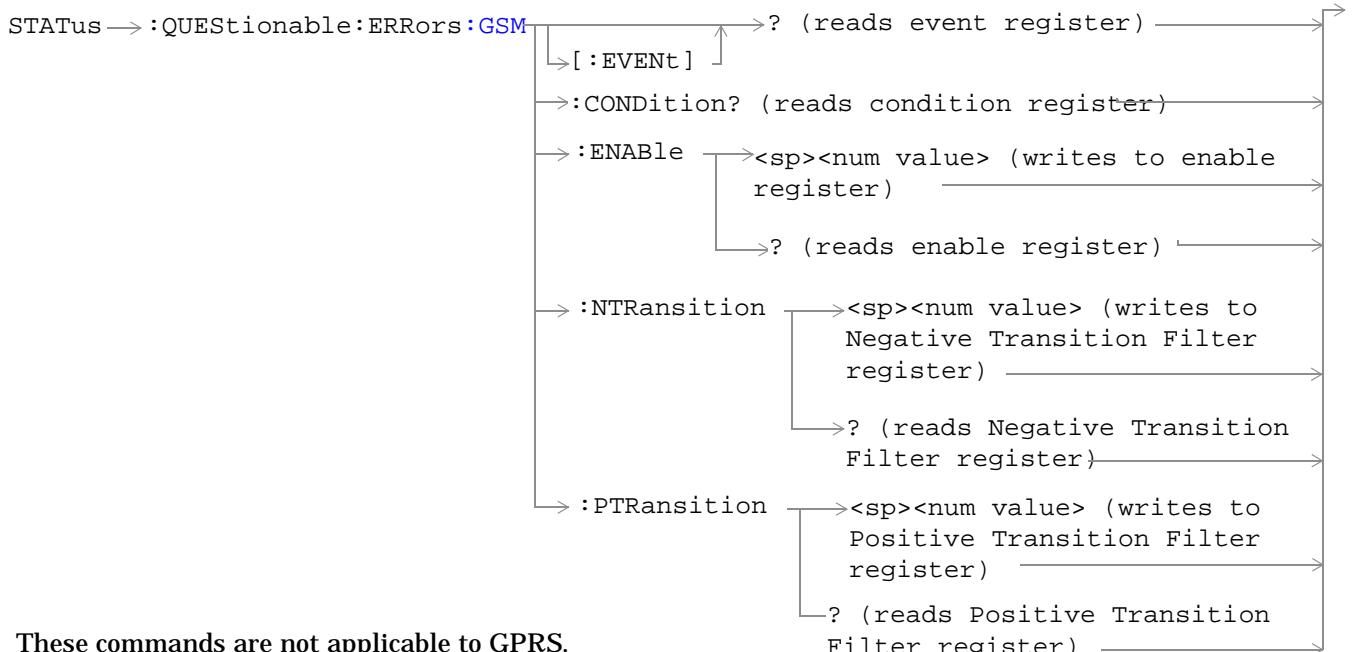
These commands are not applicable to GPRS.



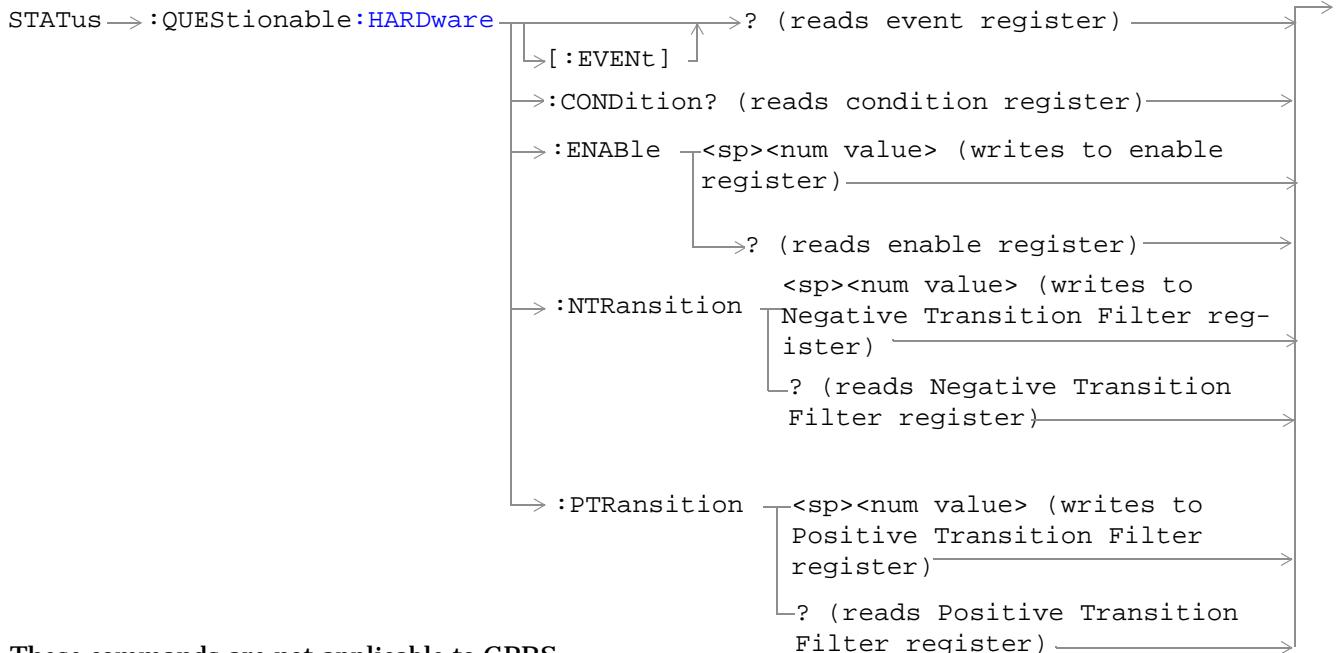
These commands are not applicable to GPRS.



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

[“Diagram Conventions” on page 283](#)

STATUs:QUESTIONable Condition Register Bit Assignment

The STATus subsystem is not applicable to GPRS.

The STATUs:QUESTIONable register contains bits which give an indication that the data currently being acquired or generated is of questionable quality due to some condition affecting the functionality associated with that bit.

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|-------------------------------|--|
| 15 | 32768 | Not Used. Defined by SCPI. | This bit will always be 0. |
| 14 | 16384 | Reserved for future use. | This bit will always be 0. |
| 13 | 8192 | Reserved for future use. | This bit will always be 0. |
| 12 | 4096 | Reserved for future use. | This bit will always be set to 0. |
| 11 | 2048 | QUESTIONable:HARDware summary | This bit is the summary message bit for the STATUs:QUESTIONable:HARDware register. |
| 10 | 1024 | QUESTIONable:CALL summary | This bit is the summary message bit for the STATUs:QUESTIONable:CALL register. |
| 9 | 512 | Reserved for future use. | This bit will always be 0. |
| 8 | 256 | Reserved for future use. | This bit will always be 0. |
| 7 | 128 | Reserved for future use. | This bit will always be 0. |
| 6 | 64 | Reserved for future use. | This bit will always be 0. |
| 5 | 32 | Reserved for future use. | This bit will always be 0. |
| 4 | 16 | Reserved for future use. | This bit will always be 0. |
| 3 | 8 | Reserved for future use. | This bit will always be 0. |
| 2 | 4 | Reserved for future use. | This bit will always be 0. |
| 1 | 2 | QUESTIONable:ERRors summary | This bit is the summary message bit for the STATUs:QUESTIONable:ERRors register. |
| 0 | 1 | Reserved for future use. | This bit will always be 0. |

Program Example - STATUs:QUESTIONable Condition Register Bit Assignment

```

OUTPUT 714;"STATUS:QUESTIONABLE:EVENT?" !Queries and clears the Questionable Event
!Register
OUTPUT 714;"STATUS:QUESTIONABLE:CONDITION?" !Queries and clears the Questionable Condition
!Register
OUTPUT 714;"STATUS:QUESTIONABLE:ENABLE 1024" !Sets the Questionable Enable Register
!for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:NTRANSITION 2" !Sets the Questionable Negative
!Transition Filter Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:PTRANSITION 2" !Sets the Questionable Positive
!Transition Filter Register for bit 1

```

STATus:QUEStionable:CALL Condition Register Bit Assignment

The STATus subsystem is not applicable to GPRS.

The STATus:QUEStionable:CALL registers will contain information about which event(s) occurred during call processing that indicate what call processing procedure failed.

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|----------------------------|---|
| 15 | 32768 | Not Used. Defined by SCPI. | This bit will always be 0. |
| 14 | 16384 | Reserved for future use. | This bit will always be 0. |
| 13 | 8192 | Reserved for future use. | This bit will always be 0. |
| 12 | 4096 | Reserved for future use. | This bit will always be 0. |
| 11 | 2048 | Reserved for future use. | This bit will always be 0. |
| 10 | 1024 | Reserved for future use. | This bit will always be 0. |
| 9 | 512 | Reserved for future use. | This bit will always be 0. |
| 8 | 256 | Reserved for future use. | This bit will always be 0. |
| 7 | 128 | Reserved for future use. | This bit will always be 0. |
| 6 | 64 | Reserved for future use. | This bit will always be 0. |
| 5 | 32 | TA136 Summary bit | This bit is the summary message bit for the STATus:QUEStionable:CALL:TA136 register. |
| 4 | 16 | DIGItal136 Summary bit | This bit is the summary message bit for the STATus:QUEStionable:CALL:DIGItal136 register. |
| 3 | 8 | AMPS Summary bit | This bit is the summary message bit for the STATus:QUEStionable:CALL:AMPS register. |
| 2 | 4 | GSM Summary bit | This bit is the summary message bit for the STATus:QUEStionable:CALL:GSM register. |
| 1 | 2 | COMMON Summary bit | This bit is the summary message bit for the STATus:QUEStionable:CALL:COMMON register. |
| 0 | 1 | Extension Bit | This bit will always be 0. |

Program Example - STATus:QUESTIONable:CALL Condition Register Bit Assignment

```

OUTPUT 714;"STATUS:QUESTIONABLE:CALL:EVENT?" !Queries and clears the Questionable
      !Call Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:CONDITION?" !Queries and clears the Questionable
      !Call Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:ENABLE 1024" !Sets the Questionable
      !Call Enable Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:NTRANSITION 2" !Sets the Questionable Call
      !Negative Transition Filter Register
      !for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:PTRANSITION 2" !Sets the Questionable Call
      !Positive Transition Filter Register
      !for bit 1

```

STATus:QUESTIONable:CALL:GSM Condition Register Bit Assignment

The STATus subsystem is not applicable to GPRS.

The STATus:QUESTIONable:CALL:GSM registers will contain information about which event(s) occurred during GSM call processing that indicate why the call processing procedure failed.

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|--|--|
| 15 | 32768 | Not Used. Defined by SCPI. | This bit will always be 0. |
| 14 | 16384 | Reserved for future use. | This bit will always be 0. |
| 13 | 8192 | Reserved for future use. | This bit will always be 0. |
| 12 | 4096 | Reserved for future use. | This bit will always be 0. |
| 11 | 2048 | Reserved for future use. | This bit will always be 0. |
| 10 | 1024 | Reserved for future use. | This bit will always be 0. |
| 9 | 512 | Call disconnected: Channel Mode not supported | This bit is a 1 if the mobile station is not capable of supporting the selected channel mode. |
| 8 | 256 | Identification failure | This bit is a 1 if the identity request timer (T3270) has expired. The timer expires if the mobile does not respond to identity request message, within 5 seconds. |
| 7 | 128 | Channel Assignment exceeded specified number of frames | This bit is a 1 if the channel assignment exceeded the specified number of frames. |
| 6 | 64 | Call disconnected: No Response to Page | This bit is a 1 if the paging timer (T3113) has expired. The timer expires if the mobile does not respond to a paging request message, within 5 seconds. |

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|---|--|
| 5 | 32 | Call disconnected: Handover Failure | This bit is a 1 if the physical information timer (T3105) has expired. The timer expires if the mobile does not respond to a physical information message, within 50 ms. If the timer has expired and correctly decoded data or a TCH frame has not been received, newly allocated channels are released. |
| 4 | 16 | Call disconnected: Channel Assignment Failure | This bit is a 1 if the channel assignment timer (T3107) has expired. The timer expires if the mobile does not respond to an assignment command message within 3 seconds. |
| 3 | 8 | Call disconnected: Immediate Assignment Failure | This bit is a 1 if the immediate assignment timer (T3101) has expired. The timer expires after 1 second if a signaling link is not established when an immediate assignment or immediate assignment extended message is sent. If the timer expires, newly allocated channels are released. |
| 2 | 4 | Call disconnected: Radio Link Failure | This bit is a 1 if the radio link time out (T100) has expired. The timer expires if a radio link is not detected within four SACCH multiframe (1.92 seconds if no SACCH is present). |
| 1 | 2 | Call disconnected: Data Link Failure | This bit is a 1 if the data link timer (T200) has expired. This timer is used for retransmission on the data link. The expiration period of the timer depends on the message type (for FACCH, 155 ms). |
| 0 | 1 | Extension Bit | This bit will always be 0. |

Program Example - STATus:QUESTIONable:CALL:GSM Condition Register Bit Assignment

```

OUTPUT 714;"STATUS:QUESTIONABLE:CALL:GSM:EVENT?" !Queries and clears the Questionable
                                                !Call GSM Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:GSM:CONDITION?" !Queries and clears the Questionable
                                                !Call GSM Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:GSM:ENABLE 1024" !Sets the Questionable
                                                !Call GSM Enable Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:GSM:NTRANSITION 2" !Sets the Questionable Call
                                                !GSM Negative Transition Filter Register
                                                !for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:GSM:PTRANSITION 2" !Sets the Questionable Call
                                                !GSM Positive Transition Filter Register
                                                !for bit 1

```

STATUs:QUEStionable:ERRors Condition Register Bit Assignment

The STATUs subsystem is not applicable to GPRS.

The STATUs:QUEStionable:ERRors register bits will be used to indicate information about test set device-specific errors (positive error numbers).

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|----------------------------|--|
| 15 | 32768 | Not Used. Defined by SCPI. | This bit will always be 0. |
| 14 | 16384 | Reserved for future use. | This bit will always be 0. |
| 13 | 8192 | Reserved for future use. | This bit will always be 0. |
| 12 | 4096 | Reserved for future use. | This bit will always be 0. |
| 11 | 2048 | Reserved for future use. | This bit will always be 0. |
| 10 | 1024 | Reserved for future use. | This bit will always be 0. |
| 9 | 512 | Reserved for future use. | This bit will always be 0. |
| 8 | 256 | Reserved for future use. | This bit will always be 0. |
| 7 | 128 | Reserved for future use. | This bit will always be 0. |
| 6 | 64 | Reserved for future use. | This bit will always be 0. |
| 5 | 32 | TA136 Summary bit | This bit is the summary message bit for the QUEStionable:ERRors:TA136 register. |
| 4 | 16 | DIGItal136 Summary bit | This bit is the summary message bit for the QUEStionable:ERRors:DIGItal136 register. |
| 3 | 8 | AMPS Summary bit | This bit is the summary message bit for the QUEStionable:ERRors:AMPS register. |
| 2 | 4 | GSM Summary bit | This bit is the summary message bit for the QUEStionable:ERRors:GSM register. |
| 1 | 2 | COMMON Summary bit | This bit is the summary message bit for the QUEStionable:ERRors:COMMON register. |
| 0 | 1 | Extension Bit | This bit will always be 0. |

Program Example - STATus:QUEStionable:ERRors Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:EVENT?" !Queries and clears the Questionable
          !Errors Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:CONDITION?" !Queries and clears the Questionable
          !Errors Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:ENABLE 1024" !Sets the Questionable
          !Errors Enable
          !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:NTRANSITION 2" !Sets the Questionable Errors
          !Negative Transition Filter Register
          !for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:PTRANSITION 2" !Sets the Questionable Errors
          !Positive Transition Filter Register
          !for bit 1
```

STATUs:QUESTIONable:ERRors:COMMON Condition Register Bit Assignment

The STATus subsystem is not applicable to GPRS.

The STATus:QUESTIONable:ERRors:COMMON register bits will be used to indicate information about the COMMON test set device-specific errors (positive error numbers).

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|----------------------------|--|
| 15 | 32768 | Not Used. Defined by SCPI. | This bit will always be 0. |
| 14 | 16384 | Reserved for future use. | This bit will always be 0. |
| 13 | 8192 | Reserved for future use. | This bit will always be 0. |
| 12 | 4096 | Reserved for future use. | This bit will always be 0. |
| 11 | 2048 | Reserved for future use. | This bit will always be 0. |
| 10 | 1024 | Reserved for future use. | This bit will always be 0. |
| 9 | 512 | +900 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |
| 8 | 256 | +800 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |
| 7 | 128 | +700 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |
| 6 | 64 | +600 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |
| 5 | 32 | +500 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|---------------|--|
| 4 | 16 | +400 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |
| 3 | 8 | +300 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |
| 2 | 4 | +200 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |
| 1 | 2 | +100 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |
| 0 | 1 | Extension Bit | This bit will always be 0. |

Program Example - STATUS:QUESTIONable:ERRors:COMMON Condition Register Bit Assignment

```

OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:COMMON:EVENT?" !Queries and clears the Questionable
!Errors Common Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:COMMON:CONDITION?" !Queries the and clears the
!Questionable Errors
!Common Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:COMMON:ENABLE 1024" !Sets the Questionable
!Errors Common Enable
!Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:COMMON:NTRANSITION 2" !Sets the Questionable Errors
!Common Negative Transition
!Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:COMMON:PTRANSITION 2" !Sets the Questionable Errors
!Common Positive Transasition
!Register for bit 1

```

STATUs:QUESTIONable:ERRors:GSM Condition Register Bit Assignment

The STATus subsystem is not applicable to GPRS.

The STATus:QUESTIONable:ERRors:GSM register bits will be used to indicate information about GSM test set device-specific errors (positive error numbers).

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|----------------------------|--|
| 15 | 32768 | Not Used. Defined by SCPI. | This bit will always be 0. |
| 14 | 16384 | Reserved for future use. | This bit will always be 0. |
| 13 | 8192 | Reserved for future use. | This bit will always be 0. |
| 12 | 4096 | Reserved for future use. | This bit will always be 0. |
| 11 | 2048 | Reserved for future use. | This bit will always be 0. |
| 10 | 1024 | Reserved for future use. | This bit will always be 0. |
| 9 | 512 | +900 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |
| 8 | 256 | +800 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |
| 7 | 128 | +700 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |
| 6 | 64 | +600 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |
| 5 | 32 | +500 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|---------------|--|
| 4 | 16 | +400 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |
| 3 | 8 | +300 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |
| 2 | 4 | +200 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |
| 1 | 2 | +100 Errors | The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred. |
| 0 | 1 | Extension Bit | This bit will always be 0. |

Program Example - STATus:QUESTIONable:ERRors:GSM Condition Register Bit Assignment

```

OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:GSM:EVENT?" !Queries and clears the Questionable
                                                !Errors GSM Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:GSM:CONDITION?" !Queries and clears the Questionable
                                                !Errors Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:GSM:ENABLE 1024" !Sets the Questionable
                                                !Errors Enable Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:GSM:NTRANSITION 2" !Sets the Questionable Errors
                                                !GSM Negative Transition Filter Register
                                                !for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:GSM:PTRANSITION 2" !Sets the Questionable Errors
                                                !GSM Positive Transition Filter Register
                                                !for bit 1

```

STATUs:QUESTIONable:HARDware Condition Register Bit Assignment

The STATus subsystem is not applicable to GPRS.

The STATUs:QUESTIONable:HARDware register bits give an indication that the data/signals currently being acquired or generated are of questionable quality.

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|------------------------------|---|
| 15 | 32768 | Not Used. Defined by SCPI. | This bit will always be 0. |
| 14 | 16384 | Reserved for future use. | This bit will always be 0. |
| 13 | 8192 | Reserved for future use. | This bit will always be 0. |
| 12 | 4096 | Reserved for future use. | This bit will always be 0. |
| 11 | 2048 | Reserved for future use. | This bit will always be 0. |
| 10 | 1024 | Reserved for future use. | This bit will always be 0. |
| 9 | 512 | Reserved for future use. | This bit will always be 0. |
| 8 | 256 | Reserved for future use. | This bit will always be 0. |
| 7 | 128 | Reserved for future use. | This bit will always be 0. |
| 6 | 64 | Reserved for future use. | This bit will always be 0. |
| 5 | 32 | Reserved for future use. | This bit will always be 0. |
| 4 | 16 | Power-up Self Test(s) Failed | This bit will be a 1 if the power-up self tests failed. |
| 3 | 8 | Reserved for future use. | This bit will always be 0. |
| 2 | 4 | Reserved for future use. | This bit will always be 0. |
| 1 | 2 | Reserved for future use. | This bit will always be 0. |
| 0 | 1 | Extension Bit. | This bit will always be 0. |

Program Example - STATUs:QUESTIONable:HARDware Condition Register Bit Assignment

```

OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:EVENT?" !Queries and clears the Questionable
                                                !Hardware Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:CONDITION?" !Queries and clears the Questionable
                                                !Hardware Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:ENABLE 1024" !Sets the Questionable
                                                !Hardware Enable
                                                !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:NTRANSITION 2" !Sets the Questionable
                                                !Hardware Negative Transition Filter
                                                !Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:PTRANSITION 2" !Sets the Questionable
                                                !Hardware Positive Transition Filter
                                                !Register for bit 1

```

Status Byte Register

*STB?

*STB? →

NOTE NOTE →

The Status Byte Register can also be read with a serial poll. For example, the command “Status_byte = SPOLL(714)” would perform a serial poll of the Status Byte Register, returning and releasing RQS (bit 6).

Status Byte Register Bit Assignments

Note that only certain bit numbers in the Status Byte Register are applicable to GPRS as indicated in the “Description” column in the table below.

| Bit Number | Binary Weighting | Label | Description |
|------------|------------------|---------------------------------------|--|
| 7 | 128 | STATus: OPERation | This bit number is not applicable to GPRS. Summarizes the STATus: OPERation Status Register, which fans out to the NMReady and CALL Status Registers. |
| 6 | 64 | RQS (SRQ TRUE?)/Master Summary Status | RQS is read by a serial poll (SPOLL). Master Summary Status is read by a *STB? query - defined by IEEE 488.2 |
| 5 | 32 | Standard Event Status Register | Summarizes the Standard Event Status Register |
| 4 | 16 | Message Available | SCPI - Defined |
| 3 | 8 | STATus: QUESTionable Status Register | This bit number is not applicable to GPRS. Summary Message comes from the STATus: QUESTionable Status Register, which fans out to the CALL and HARDware Status Registers. |
| 2 | 4 | Error/ Event Queue | SCPI - Defined |
| 1 | 2 | Reserved | |
| 0 | 1 | Reserved | |

Program Example - Status Byte Register Bit Assignments

OUTPUT 714; “*STB?” !Queries the Status Byte.

Standard Event Status Register

*ESR?

*ESR? → Reads and clears the Std Event Status Register.

*ESE?

*ESE? → Reads the Std Event Status Register Enable Register

*ESE

*ESE → Writes to the Std Event Status Register Enable Register

[“Diagram Conventions” on page 283](#)

Standard Event Status Register Bit Assignment

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|--------------------------|---|
| 15 | 32768 | Reserved by IEEE. | This bit will always be 0. |
| 14 | 16384 | Reserved by IEEE. | This bit will always be 0. |
| 13 | 8192 | Reserved by IEEE. | This bit will always be 0. |
| 12 | 4096 | Reserved by IEEE. | This bit will always be 0. |
| 11 | 2048 | Reserved by IEEE. | This bit will always be 0. |
| 10 | 1024 | Reserved by IEEE. | This bit will always be 0. |
| 9 | 512 | Reserved by IEEE. | This bit will always be 0. |
| 8 | 256 | Reserved by IEEE. | This bit will always be 0. |
| 7 | 128 | Power On | This bit is set to 1 if the power supply has been turned off and on since the last time this register was read or otherwise cleared. Defined in "IEEE Std. 488.2-1992", 11.5.1.1.2 |
| 6 | 64 | Reserved for future use. | This bit will always be 0. |
| 5 | 32 | Command Error | This bit is set to 1 if the test set detects an error while trying to process a command. The following events cause a command error: <ul style="list-style-type: none"> An IEEE 488.2 syntax error. The test set received a message that did not follow the syntax defined by the standard. A semantic error. For example the test set received an incorrectly spelled command. The test set received a group execution trigger (GET) inside a program message |
| 4 | 16 | Execution Error | This bit is set to 1 if the test set detects an error while trying to execute a command. The following events cause a execution error: <ul style="list-style-type: none"> A <PROGRAM DATA> element received in a command is outside the legal range for the test set, or it is inconsistent with the operation of the test set. The test set could not execute a valid command due to some test set hardware/firmware condition. |
| 3 | 8 | Device Dependent Error | This bit is set to 1 if a test set operation does not execute properly due to an internal condition (such as, overrange). This bit indicates that the error was not a command, query, or execution error. |

Standard Event Status Register

| Bit Number | Binary Weighting | Condition | Description |
|------------|------------------|--------------------------|---|
| 2 | 4 | Query Error | <p>This bit is set to 1 if an error has occurred while trying to read the test set's output queue. The following events cause a query error:</p> <ul style="list-style-type: none">• An attempt is made to read data from the output queue when no data is present or is pending.• Data in the output queue has been lost. An example of this would be an output queue overflow. |
| 1 | 2 | Reserved for future use. | This bit will always be 0. |
| 0 | 1 | Operation Complete | This bit is set to 1 when the test set has completed all pending operations and is ready to accept new commands. This bit is only generated in response to the *OPC IEEE 488.2 common command. |

Program Example - Standard Event Status Register

```
OUTPUT 714;"*ESR?" !Queries (reads) the Standard Event Status Register.
```

SYSTem Subsystem

Description

The SYSTem subsystem performs system configuration and non-measurement related functions such as:

- Setting the GPIB and LAN addresses
- Setting Date and Time
- Correcting for RF path loss
- Presetting the test set

Syntax Diagrams and Command Descriptions

[“SYSTem:APPLication” on page 564](#)

[“SYSTem:BEEPer” on page 569](#)

[“SYSTem:COMMUnicate” on page 570](#)

[“SYSTem:CONFigure” on page 574](#)

[“SYSTem:CORRection” on page 575](#)

[“SYSTem:CURRent:TA” on page 582](#)

[“SYSTem:ERRor?” on page 584](#)

[“SYSTem:FTRigger” on page 585](#)

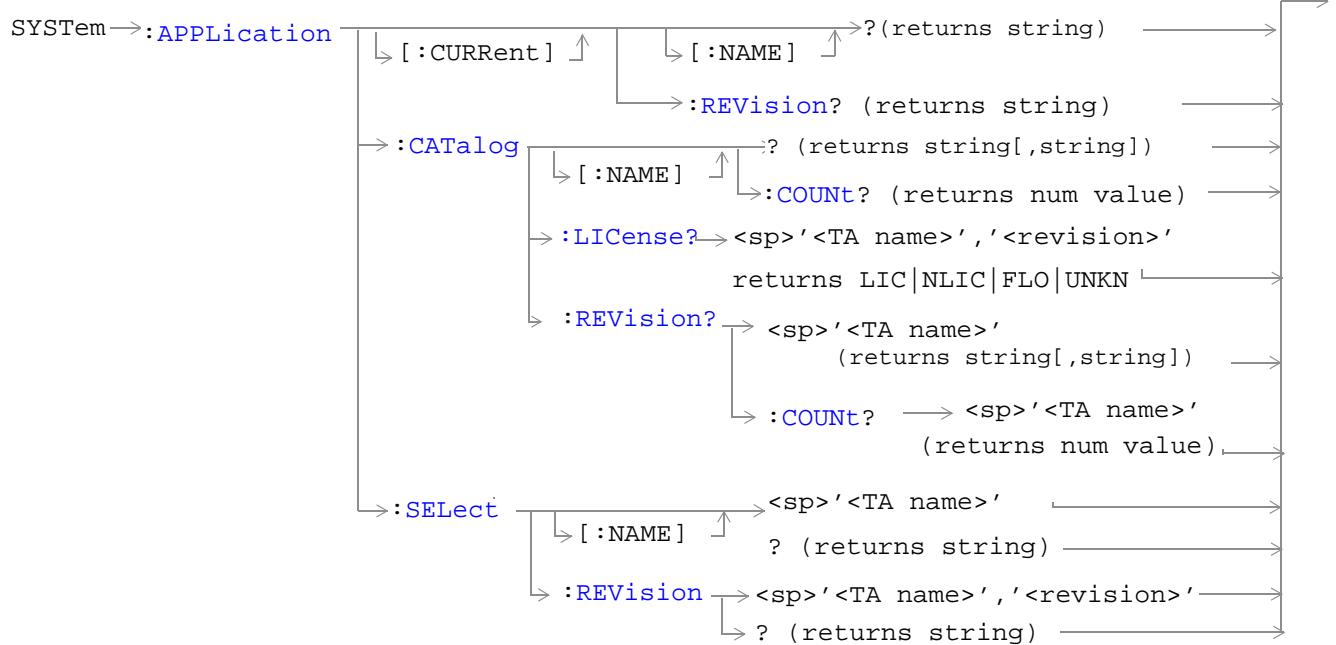
[“SYSTem:MEASurement” on page 587](#)

[“SYSTem:PRESet” on page 588](#)

[“SYSTem:ROSCillator” on page 590](#)

[“SYSTem:SYNChronized” on page 591](#)

SYSTEm:APPlication



[“Diagram Conventions” on page 283](#)

SYSTem:APPlication:CATalog:LICense? '<test application name>','<revision>'

| | | |
|---|------|---|
| Function | GSM | Query the license status for a selected revision. |
| | GPRS | <p>The query must include two strings separated by a comma. The test application name and revision must be entered as they appear in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters.</p> <p>The returned values are:</p> <ul style="list-style-type: none"> • “LIC” indicates this is a licensed test application. • “NLIC” indicates this is not a licensed test application. • “UNKN” indicates that license status is unknown. |
| Query | | Range: LIC NLIC UNKN |
| Programming Example | | |
| OUTPUT 714; "SYSTEM:APPLICATION:CATALOG:LICENSE? 'GSM mobile test','A.04.00'" | | |

SYSTem:APPlication:CATalog:REVision? '<test application name>'

| | | |
|---|------|--|
| Function | GSM | Query the test set for all of the revision numbers stored on the test set's hard drive. You must specify a test application. |
| | GPRS | <p>The test application name must be entered as it appears in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters.</p> |
| Query | | Range: One or more comma separated strings or a null string |
| Programming Example | | |
| OUTPUT 714; "SYSTEM:APPLICATION:CATALOG:REVISION? 'AMPS/136 MOBILE TEST'" | | |

SYSTem:APPlication:CATalog:REVision:COUNT? '<test application name>'

| | | |
|---|------|--|
| Function | GSM | Query the test set for the number of revisions present on the hard disk for a specified test application. Up to 30 revisions can be stored for a test application. |
| | GPRS | <p>The test application name must be entered as it appears in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters.</p> |
| Query | | Range: 0 through 30 |
| Programming Example | | |
| OUTPUT 714; "SYSTEM:APPLICATION:CATALOG:REVISION:COUNT? 'AMPS/136 MOBILE TEST'" | | |

SYSTem:APPLication**SYSTem:APPLication:CATalog[:NAME]?**

| | | |
|---|------|---|
| Function | GSM | Query the test set for all of the names of the test applications stored on the hard drive. |
| | GPRS | This query returns one or more strings, each string is separated by a comma. |
| Query | | Range: AMPS/136 Mobile Test IS-2000 Mobile Test Mode GSM Mobile Test GPRS Mobile Test |
| Programming Example <pre>OUTPUT 714; "SYSTEM:APPLICATION:CATALOG:NAME?"</pre> | | |

SYSTem:APPLication:CATalog[:NAME]:COUNt?

| | | |
|---|------|--|
| Function | GSM | Query the test set for the total number test application names stored on the hard drive. Up to 30 test applications can be stored. |
| | GPRS | |
| Query | | Range: 0 through 30 |
| Programming Example <pre>OUTPUT 714; "SYSTEM:APPLICATION:CATALOG:NAME:COUNT?"</pre> | | |

SYSTem:APPLication[:CURRent][:NAME]?

| | | |
|---|------|---|
| Function | GSM | Query the test set for the name of the currently running test application. |
| | GPRS | |
| Query | | Range: Any string up to 25 characters including null. AMPS/136 Mobile Test IS-2000 Mobile Test Mode GSM Mobile Test GPRS Mobile Test null string |
| Programming Example <pre>OUTPUT 714; "SYSTEM:APPLICATION:CURRENT:NAME?"</pre> | | |

SYSTEm:APPlication[:CURRent]:REVision?

| | | | | |
|--|--|--|--|--|
| Function | GSM | Query the test set for the currently running test application revision number. | | |
| | GPRS | | | |
| Query | Range: Any string up to 20 characters including null. A typical example would be A.01.01 for a licensed version. | | | |
| Programming Example | | | | |
| OUTPUT 714; "SYSTEM:APPLICATION:CURRENT:REVISION?" | | | | |

SYSTEm:APPlication:SElect[:NAME] '<test application name>'

| | | |
|----------|---|---|
| Function | GSM | <p>Selects a test application and reboots the test set. This will switch the test application to the revision already selected. There is no need to re-select the revision before switching. The reboot process takes about 1 minute.</p> <p>Queries the test set for the test application that is selected and will run after the next reboot of the test set.</p> <p>The test application name must be entered as it appears in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters.</p> <hr/> <p>NOTE Selecting the correct name and the desired revision of a test application is important. This information should be reviewed before proceeding. The directions for how to determine test application name and revision are found in this document.</p> |
| | GPRS | |
| Setting | <p>Range:</p> <p>AMPS/136 Mobile Test</p> <p>IS-2000 Mobile Test Mode</p> <p>GSM Mobile Test</p> <p>GPRS Mobile Test</p> | |
| Query | <p>Range:</p> <p>AMPS/136 Mobile Test</p> <p>IS-2000 Mobile Test Mode</p> <p>GSM Mobile Test</p> <p>GPRS Mobile Test</p> <p>null string</p> | |

SYSTem:APPLication

Programming Example

```
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME 'AMPS/136 MOBILE TEST'"  
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME?"
```

SYSTem:APPLication:SElect:REVision '<test application name>','<revision>'

| | | |
|----------|------|---|
| Function | GSM | <p>Selects a test application revision and a test application.</p> <p>The revision does not need to be set in order to switch test applications. The only time you select revisions is to change revisions.</p> <p>Queries the test set for the revision of a specified test application.</p> <p>The test application name and revision must be entered as they appear in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters.</p> <hr/> <p>NOTE GSM Mobile Test; revisions before A.04.00 did not have test application switching and provide no way to return to revisions that have switching. Users will need to reload a revision that has test application switching following the download process for upgrading firmware.</p> |
| | GPRS | |
| Setting | | Range: A valid test application name and revision number for any licensed test application. |
| Query | | Range: A string up to 20 characters, or the null string. |

Programming Example

```
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION 'GSM MOBILE TEST','A.04.00'"  
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION? 'GSM MOBILE TEST'"
```

Related Topics

["Selecting a Radio Personality" on page 679](#)

SYSTEm:BEEPer

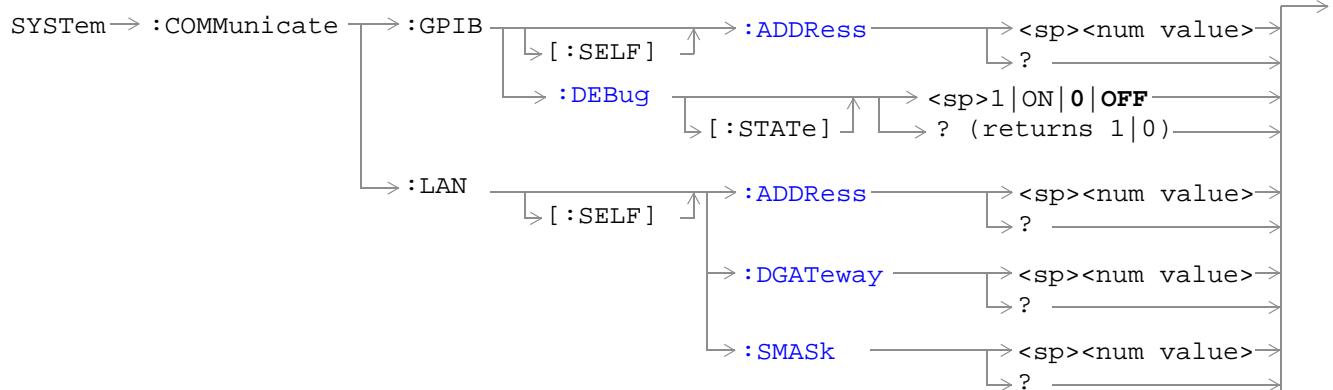


[“Diagram Conventions” on page 283](#)

SYSTEm:BEEPer:STATE

| | | |
|--|------|--|
| Function | GSM | Sets/queries the beeper state of the test set. |
| | GPRS | |
| Setting | | 0 OFF 1 ON |
| Query | | 0 1 |
| *RST Setting | | 1 on |
| Programming Example | | |
| OUTPUT 714; "SYSTEM:BEEPER:STATE OFF" !Sets beeper state to off. | | |

SYSTEm:COMMUnicatE



["Diagram Conventions" on page 283](#)

SYSTem:COMMUnicatE:GPIB[:SELF]:ADDReSS

| | | |
|--|------|--|
| Function | GSM | Sets/queries the test set's GPIB address. |
| | GPRS | |
| Setting | | Range: 0 to 30 Resolution: 1 |
| Query | | Range: 0 to 30 Resolution: 1 |
| Factory setting | | 14 (this parameter is not affected by any reset operation and can only be changed by direct user access) |
| Related Topics | | "Configuring the Test Set's GPIB Address" on page HIDDEN |
| Programming Example | | |
| OUTPUT 714;"SYSTEM:COMMUNICATE:GPIB:SELF:ADDRESS 14" !Sets the GPIB address !to 14. | | |

SYSTem:COMMUnicatE:GPIB:DEBug[:STATe]

| | | |
|---|------|---|
| Function | GSM | Sets/queries the test set's SCPI debugger state. |
| | GPRS | When the state is on, enhanced error messages (generated from GPIB commands with syntax errors) are shown on the test set display. The error message is printed along with the syntax. <ERR> is displayed at the end of the incorrect node. Non-printable characters will be replaced with the \$ symbol. See "Error Messages" on page 684 for a list of the errors. The debugger state should be set to on only during GPIB code development. Test times will increase if the debugger state is left on. |
| Setting | | Range: 0 OFF 1 ON |
| Query | | 0 1 |
| *RST setting | | 0 off |
| Programming Example | | |
| OUTPUT 714;"SYSTEM:COMMUNICATE:GPIB:DEBUG:STATE ON" !Sets debugger to on. | | |

SYSTem:COMMUnicatE:LAN[:SELF]:ADDResS

| | | |
|--|------|---|
| Function | GSM | Sets/queries the test set's LAN IP address. The value of A is used to determine the subnet mask, see " SYSTem:COMMUnicatE:LAN[:SELF]:SMASK " on page 573. |
| | GPRS | If the LAN address is changed the subnet mask should be checked to insure that it is set to the proper class for that LAN address. |
| Setting | | Range: 15 characters formatted as follows: A.B.C.D where A= 0 to 223 B,C,D = 0 to 255 (no embedded spaces) |
| Query | | Range: 15 characters formatted as follows: A.B.C.D where A= 0 to 223 B,C,D = 0 to 255 (no embedded spaces) |
| Factory setting | | 0.0.0.0 (this parameter is not affected by any reset operation and can only be changed by direct user access) |
| Related Topics | | "LAN IP Address" on page 666 |
| Programming Example | | |
| OUTPUT 714;"SYSTEM:COMMUnicatE:LAN:SELF:ADDRESS '130.015.156.255'" !Sets the !LAN IP !address. | | |

SYSTem:COMMUnicatE:LAN[:SELF]:DGATeway

| | | |
|---|------|---|
| Function | GSM | Sets/queries the LAN IP router/gateway address for the test set. |
| | GPRS | |
| Setting | | Range: 15 characters formatted as follows: A.B.C.D where A= 0 to 223 B,C,D = 0 to 255 (no embedded spaces), blank field |
| Query | | Range: 15 characters formatted as follows: A.B.C.D where A,B,C,D = 0 to 255 (no embedded spaces). blank field |
| Factory setting | | blank field, (this parameter is not affected by any reset operation) |
| Programming Example | | |
| OUTPUT 714;"SYSTEM:COMMUnicatE:LAN:SELF:DGATEWAY '130.2.6.200'" | | |

SYSTEm:COMMUnicAtE:LAN[:SELF]:SMASK

| | | |
|--|------|--|
| Function | GSM | Sets/queries the subnet mask of the test set based on the LAN IP address selected. The subnet mask changes according to the value of A used for the LAN IP address. |
| | GPRS | <p>If A is less than or equal to 127, the subnet mask is 255.0.0.0.</p> <p>If A is greater than 127 and less or equal to 191, the subnet mask is 222.255.0.0.</p> <p>If A is greater than 191, the subnet mask is 255.255.255.0.</p> <p>If the LAN address is changed the subnet mask should be checked to insure that it is set to the proper class for that LAN address.</p> |
| Setting | | Range: 15 characters formatted as follows: A.B.C.D where A,B,C,D are between = 0 to 255 (no embedded spaces) |
| Query | | Range: 15 characters formatted as follows: A.B.C.D where A,B,C,D are between = 0 to 255 (no embedded spaces) |
| Factory setting | | 0.0.0.0 (this parameter is not affected by any reset operation and can only be changed by direct user access) |
| Programming Example | | |
| OUTPUT 714;"SYSTEm:COMMUnicAtE:LAN:SELF:SMASK '255.2.6.200' '' | | |

SYSTem:CONFigure

SYSTem → :CONFigure → :INFormation → :HARDware → :VERBose? → (returns model number, serial number, revision number, board ID and Cal file information) →

[“Diagram Conventions” on page 283](#)

SYSTem:CONFigure:INFormation:HARDware:VERBose?

| | | |
|--------------|---|---|
| Function | GSM | Queries the manufacturer, model number, model number of the test application running, serial number, revision, board ID, and cal file information. The information provided by the query represents the configuration that existed when the test set was powered up. For an example of how to use this command, see “Hardware Configuration Report” on page 668 . |
| | GPRS | |
| *RST Setting | Resets have no effect on this information. The information is gathered during the power up cycle. | |

Related Topics

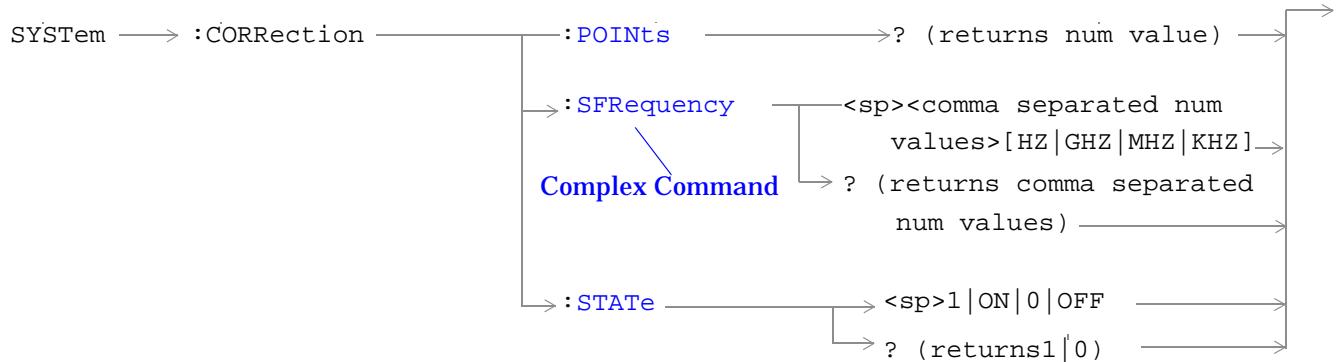
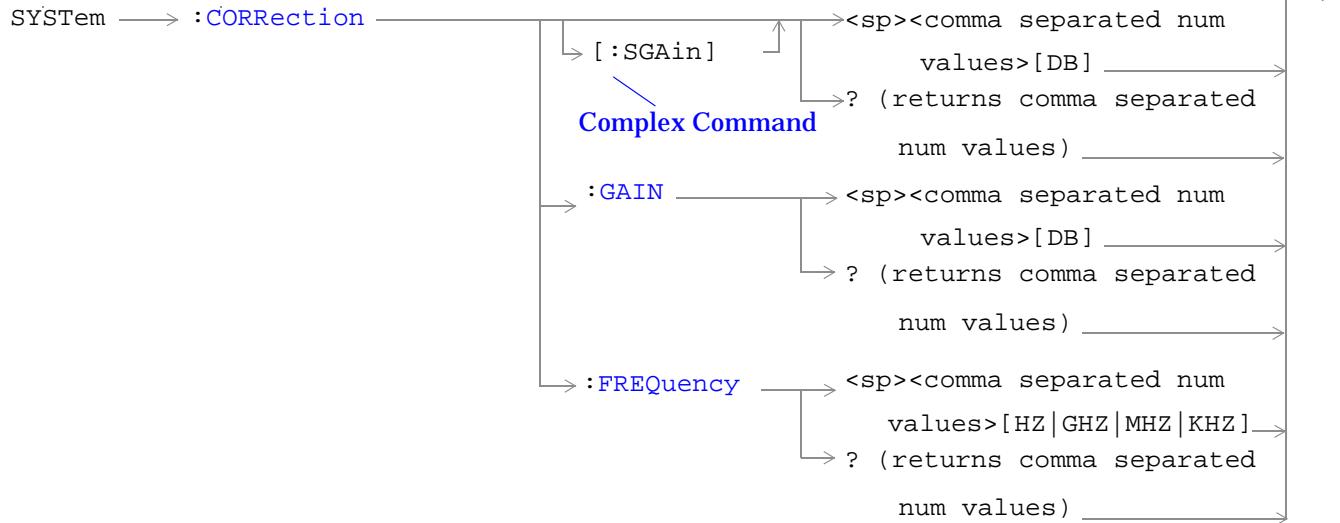
[“Hardware Configuration Report” on page 668](#)

[“SYSTem:CURRent:TA” on page 582](#)

[“Obtaining Test Application Information” on page 677](#)

[“Obtaining Identification Information *IDN?” on page 665](#)

SYSTem:CORRection



[“Diagram Conventions” on page 283](#)

SYSTem:CORRection[:SGAin]

| | | |
|--|------|---|
| Function | GSM | Sets/queries the up to 20 comma separated offset values in dB. This command sets the state to On. See " Measurement Related Configuration " on page 670. |
| | GPRS | The units, dB, are optional. If no units are specified then units default to dB. Sending a null list (no values) sets the state of all offsets to Off. |
| Setting | | Range: 0 to 20 values between -100 to +100 Resolution: 0.01 |
| Query | | Range: 1 to 20 values between -100 to +100, and NAN (9.91E+37) Resolution: 0.01 |
| Factory Setting | | Offsets 1 through 20, are set to 0.00 dB, state is set to Off |
| Programming Example | | |
| <pre>OUTPUT 714;"SYSTEM:CORRECTION:SGAIN -2.55,-3.12,-3.68,-4.23,-4.74,-5.3" !A complex command that sets up to 20 comma separated offsets !and sets the state to On for the frequencies, offsets and !RF IN/OUT Amplitude Offset State OUTPUT 714;"SYSTEM:CORRECTION:SGAIN" !Sets the state for all frequencies and offsets to Off</pre> | | |

SYSTem:CORRection:FREQuency

| | | |
|-----------------|------|---|
| Function | GSM | Sets/queries up to 20 comma separated frequency values in MHz. |
| | GPRS | The units, (GHz, MHz, kHz, Hz) are optional. If no units are specified, units default to Hz. See "Measurement Related Configuration" on page 670 . Sending a null list (no values) sets the state of all frequencies to Off. |
| Setting | | Range: 0 to 20 comma separated values ranging from 292.5 MHz to 2700 MHz Resolution: 1 Hz |
| Query | | Range: 1 to 20 comma separated values ranging from 292.5 MHz to 2700 MHz, and NAN (9.91E+37) Resolution: 1 HZ |
| Factory Setting | | <ol style="list-style-type: none"> 1. 800.00 MHz Off 2. 810.00 MHz Off 3. 820.00 MHz Off 4. 830.00 MHz Off 5. 840.00 MHz Off 6. 850.00 MHz Off 7. 860.00 MHz Off 8. 870.00 MHz Off 9. 880.00 MHz Off 10. 890.00 MHz Off 11. 900.00 MHz Off 12. 910.00 MHz Off 13. 920.00 MHz Off 14. 930.00 MHz Off 15. 940.00 MHz Off 16. 950.00 MHz Off 17. 960.00 MHz Off 18. 970.00 MHz Off 19. 980.00 MHz Off 20. 990.00 MHz Off |

SYSTem:CORRection

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:FREQUENCY 1784.8 MHZ,1879.8 MHZ"  
!Sets up to 20 comma separated frequencies
```

```
OUTPUT 714;"SYSTEM:CORRECTION:FREQUENCY"  
!Sets the state for all frequencies and offsets to Off
```

SYSTem:CORRection:GAIN

| | | |
|-----------------|------|---|
| Function | GSM | Sets/queries the up to 20 comma separated offset values in dB. See " Measurement Related Configuration " on page 670. The units, dB, are optional. If no units are specified, units default to dB. Sending a null list (no values) sets the state of all offsets to Off. |
| | GPRS | |
| Setting | | Range: 0 to 20 values between -100 to +100 Resolution: 0.01 |
| Query | | Range: 1 to 20 values between -100 to +100, and NAN (9.91E+37) Resolution: 0.01 |
| Factory Setting | | Offsets 1 through 20, are set to 0.00 dB, state is set to off |

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:GAIN -3.12,-3.68,-4.23"
```

!Sets up to 20 comma separated offset values

```
OUTPUT 714;"SYSTEM:CORRECTION:GAIN"
```

!Sets the state for all frequencies and offsets to Off

SYSTem:CORRection:POINts

| | | |
|--|------|---|
| Function | GSM | Query returns the number of offsets that are in their On state when the RF IN/OUT Amplitude Offset State is also set to On. See “ Measurement Related Configuration ” on page 670. |
| | GPRS | |
| Query | | Range: 1 to 20, and NAN (9.91E+37) Resolution: 1 |
| Programming Example | | |
| <pre>OUTPUT 714;"SYSTEM:CORRECTION:POINTS?" !Returns the number of frequencies and offsets !with their state set to On</pre> | | |

SYSTem:CORRection:SFRequency

| | | |
|-----------------|------|---|
| Function | GSM | Sets/queries up to 20 comma separated frequency values in MHz. This command sets the state to On. The units (GHz, MHz, kHz, Hz) are optional. If no units are specified, units default to MHz. See “ Measurement Related Configuration ” on page 670. Sending a null list (no values) sets the state of all frequencies to Off. |
| | GPRS | |
| Setting | | Range: 0 to 20 comma separated values from 292.5 MHz to 2700 MHz Resolution: 1 Hz |
| Query | | Range: 1 to 20 comma separated values from 292.5 MHz to 2700 MHz, and NAN (9.91E+37) Resolution: 1 HZ |
| Factory Setting | | <ol style="list-style-type: none"> 1. 800.00 MHz Off 2. 810.00 MHz Off 3. 820.00 MHz Off 4. 830.00 MHz Off 5. 840.00 MHz Off 6. 850.00 MHz Off 7. 860.00 MHz Off 8. 870.00 MHz Off 9. 880.00 MHz Off 10. 890.00 MHz Off 11. 900.00 MHz Off 12. 910.00 MHz Off 13. 920.00 MHz Off 14. 930.00 MHz Off 15. 940.00 MHz Off 16. 950.00 MHz Off 17. 960.00 MHz Off 18. 970.00 MHz Off 19. 980.00 MHz Off 20. 990.00 MHz Off |

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:SFREQUENCY 1710.2 MHZ,1805.2 MHZ,1784.8 MHZ,1879.8 MHZ"
!Sets up to 20 comma separated frequencies and sets the state to On for the frequency,
!offset, and RF IN/OUT Amplitude Offset State
```

```
OUTPUT 714;"SYSTEM:CORRECTION:SFREQUENCY"
!Sets the state for all frequencies and offsets to Off
```

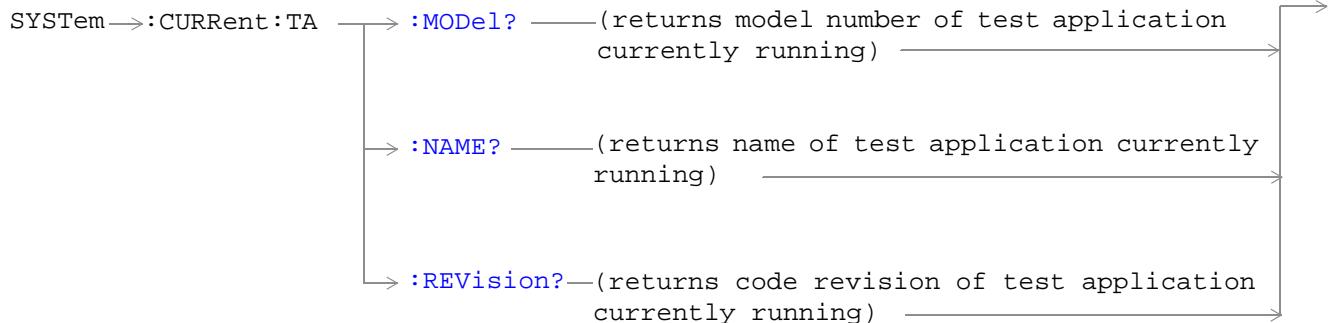
SYSTEm:CORRection:STATE

| | | |
|-----------------|------|---|
| Function | GSM | Sets/queries the RF IN/OUT Amplitude Offset State. The state must be On before any of the offsets are active regardless of the state for any of the frequencies or offsets. |
| | GPRS | When the RF IN/OUT Amplitude Offset State is On, the Instrument Status Area will indicate "Offset" regardless of the state for any of the frequencies or offsets. Setting any of the frequency or offset states to On will set the RF IN/OUT Amplitude Offset State to On. See " Measurement Related Configuration " on page 670. |
| Setting | | 0 OFF 1 ON |
| Query | | 0 1 |
| Factory Setting | | 0 OFF |

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:STATE ON" !Sets the RF IN/OUT
!Amplitude Offset State to On
```

SYSTem:CURREnt:TA



["Diagram Conventions" on page 283](#)

SYSTem:CURREnt:TA:MODel?

| | | |
|--------------|-------------|--|
| Function | GSM GPRS | Query the model number of the test application running. Printable ASCII characters up to a 15 character string. See "Obtaining Test Application Information" on page 677 . |
| Query | | Range: ASCII codes 32 - 126 decimal excluding comma and semicolon |
| *RST Setting | | non volatile, read from the test set's hard disk |

SYSTem:CURREnt:TA:NAME?

| | | |
|--------------|-------------|--|
| Function | GSM GPRS | Query the name of the test application running. Printable ASCII characters up to a 25 character string. This is not the recommended command, see "SYSTem:APPLication" on page 564 for the recommended command. |
| Query | | Range: ASCII codes 32 - 126 decimal excluding comma and semicolon |
| *RST Setting | | non volatile, read from the test set's hard disk |

SYSTem:CURRent:TA:REVision?

| | | |
|--------------|------|--|
| Function | GSM | Query the coordinated codeware revision for the test application running. Printable ASCII characters up to a 20 character string. This is not the recommended command, see "SYSTem:APPLication" on page 564 for the recommended command. |
| | GPRS | |
| Query | | Range: ASCII codes 32 - 126 decimal excluding comma and semicolon |
| *RST Setting | | non volatile, read from the test set's hard disk. |

SYSTem:ERRor?

SYSTem—> :ERRor? ———(returns contents of error/event queue)————→

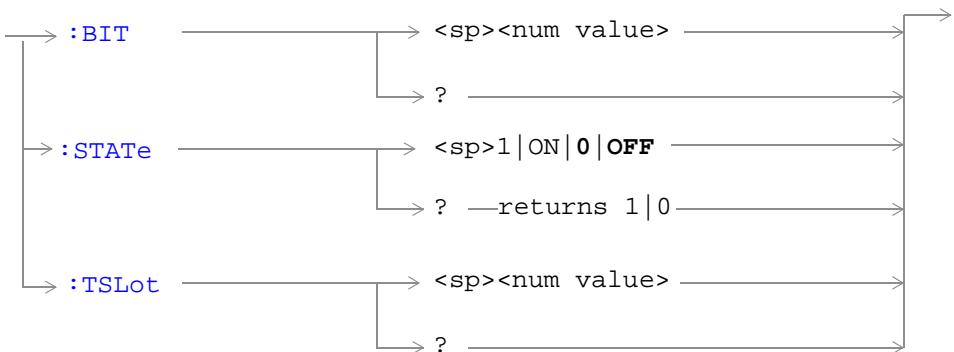
[“Diagram Conventions” on page 283](#)

SYSTem:ERRor?

| | | |
|----------|------|---|
| Function | GSM | Queries the contents of the Error/Event Queue. The Error/Event Queue may contain one or more messages with an error or event description. |
| | GPRS | Manual users may view the Message Log from the SYSTEM CONFIG screen. The contents of the Error/Event Queue and the Message log may not match. Example, manual user errors are not displayed with SYSTem:ERRor? they are viewed from the Message Log. See “Error Messages” on page 684 . |
| Query | | Error/Event Queue <ul style="list-style-type: none"> Range: 0 to 100 messages up to 255 characters in length |

SYSTEm:FTRigger

SYSTEm → :FTRigger



These commands are not applicable to GPRS.

[“Diagram Conventions” on page 283](#)

SYSTEm:FTRigger:BIT

| | | |
|--|------|---|
| Function | GSM | Selects/queries which bit, after zero, will be used for frame trigger pulse positioning. See “Setting Frame Trigger Parameters” on page 611 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 0 to 1250 Resolution: 1 |
| Query | | Range: 0 to 1250 Resolution: 1 |
| *RST Setting | | zero |
| Programming Example | | |
| <pre>OUTPUT 714;"SYSTEM:FRTIGGER:BIT 14" !Would cause external frame trigger pulses !to occur 14 bits after bit 0 of the !selected timeslot.</pre> | | |

SYSTem:FTRigger

SYSTem:FTRigger:STATE

| | | |
|--------------|------|--|
| Function | GSM | Sets/queries the frame trigger state. See “Setting Frame Trigger Parameters” on page 611 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | 0 OFF 1 ON |
| Query | | 0 1 |
| *RST Setting | | 0 off |

Programming Example

```
OUTPUT 714; "SYSTEM:FRTIGGER:STATE ON" !Set frame trigger state to on.
```

SYSTem:FTRigger:TSLOT

| | | |
|--------------|------|--|
| Function | GSM | Selects/queries the timeslot for frame trigger pulse positioning. See “Setting Frame Trigger Parameters” on page 611 |
| | GPRS | This command is not applicable to GPRS. |
| Setting | | Range: 0 to 7 Resolution: 1 |
| Query | | Range: 0 to 7 Resolution: 1 |
| *RST Setting | | zero |

Programming Example

```
OUTPUT 714; "SYSTEM:FRTIGGER:TSLOT 5" !Sets the frame trigger timeslot to 5.
```

SYSTem:MEASurement

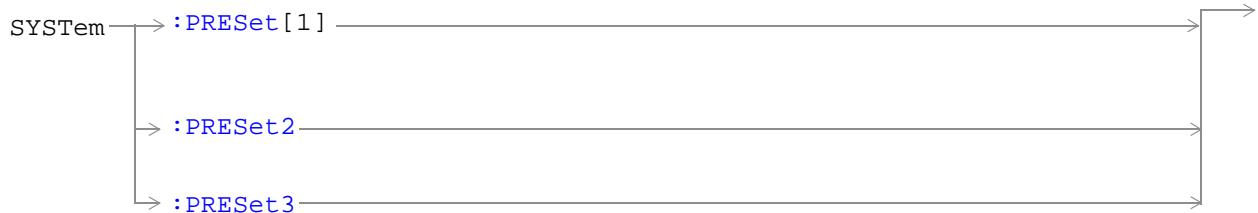
SYSTem → :MEASurement → :RESet →

[“Diagram Conventions” on page 283](#)

SYSTem:MEASurement:RESet

| | | |
|--|------|---|
| Function | GSM | Sets all measurements to abort, if the trigger arm is set to continuous the measurements will begin a new measurement cycle. See “Trigger Arm (Single or Continuous) Description” on page 171 . |
| | GPRS | Any measurement results are cleared and the Integrity Indicator is set to 1 (No_Result_Available). See “Integrity Indicator” on page 146 . |
| Setting | GSM | <p>These results are set to their default values:</p> <ul style="list-style-type: none"> • RACH Count • Page Count • Missing Burst Count • Corrupted Burst Count • Channel Decoder Error Count • MS TX Level Reported • TCH Timing Advance Reported • RX Level • RX Qual |
| | GPRS | <p>These results are set to their default values:</p> <ul style="list-style-type: none"> • Block Error Rate (BLER) • Blocks Tested |
| <p>Programming Example</p> <pre>OUTPUT 714;"SYSTEM:MEASUREMENT:RESET" !Resets current measurements.</pre> | | |

SYSTEm:PRESet



["Diagram Conventions" on page 283](#)

SYSTEm:PRESet[1] (not recommended for use)

| | | | | |
|--|---|--|--|--|
| Function | GSM | <p>Not recommended for use at this time, use the SYSTEM:PRESET3 command for partial preset.</p> <p>Performs a partial preset. This is the recommended command when you want to change from remote operation to manual operation and a partial preset is needed.</p> | | |
| | GPRS | <p>Any call in process is disconnected and all measurements are aborted and inactivated. Measurement parameters are not changed.</p> <p>A partial preset will not modify any measurement settings including trigger arm. See "Trigger Arm (Single or Continuous) Description" on page 171.</p> | | |
| Related Topics | See "Partial Preset" on page 640 for more details | | | |
| Programming Example | | | | |
| OUTPUT 714; "SYSTEM:PRESET" !Partial preset when changing from remote to manual operation. | | | | |

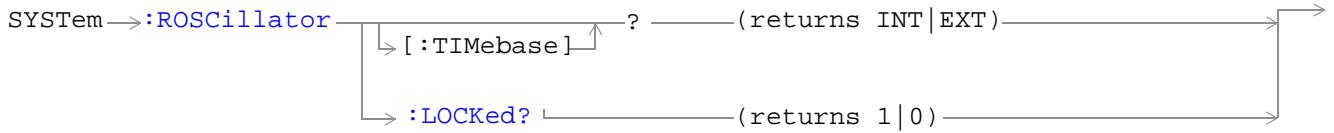
SYSTem:PRESet2

| | | |
|--|---|---|
| Function | GSM | Performs a full preset of the test set. This is the remote equivalent of pressing the SHIFT Preset keys on the front panel of the test set. |
| | GPRS | All parameters are set to their default values. All measurements are aborted the trigger arm is set to continuous. See "Trigger Arm (Single or Continuous) Description" on page 171 . The *RST command will set the trigger arm to single. |
| Related Topics | See "Full Preset" on page 640 for details about the *RST full preset. | |
| Programming Example <pre>OUTPUT 714;"SYSTEM:PRESET2" !Full preset for trigger arm set to continuous.</pre> | | |

SYSTem:PRESet3

| | | |
|--|--|--|
| Function | GSM | Performs a partial preset. This is the recommended command when a partial preset is needed during remote operation of the test set. |
| | GPRS | Any call in process is disconnected and all measurements are aborted and inactivated. Measurement parameters are not changed. A partial preset will not modify any measurement settings including trigger arm. See "Trigger Arm (Single or Continuous) Description" on page 171 . |
| Related Topics | See "Partial Preset" on page 640 for more details. | |
| Programming Example <pre>OUTPUT 714;"SYSTEM:PRESET3" !Partial preset when in remote operation.</pre> | | |

SYSTEm:ROSCillator



["Diagram Conventions" on page 283](#)

SYSTEm:ROSCillator[:TIMEbase]?

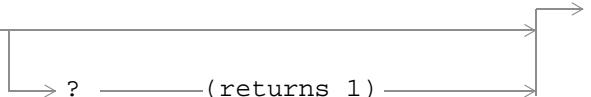
| | | |
|----------|------|--|
| Function | GSM | Query to indicate if the test set's internal source or a suitable external source has been chosen to drive the test set's time base. |
| | GPRS | <p>A suitable external source must have:</p> <ul style="list-style-type: none"> • an output level of 0 to +13DBM • frequency of 10 MHZ |
| Query | | <p>Range:</p> <p>INT = internal source</p> <p>EXT = external source</p> |

SYSTEm:ROSCillator:LOCKed?

| | | |
|----------|------|--|
| Function | GSM | Query the status of the reference oscillator and indicate if it is locked or unlocked. |
| | GPRS | |
| Query | | <p>Range:</p> <p>0 = unlocked</p> <p>1 = locked</p> |

SYSTEm:SYNChronized

SYSTEm → :SYNChronized



["Diagram Conventions" on page 283](#)

SYSTEm:SYNChronized

| | | |
|--|-----|--|
| Function | GSM | Sets/queries the test set that all prior sequential commands have completed and all prior overlapped commands have started indicating that the input buffer is synchronized. (See "Call Processing Event Synchronization" on page 32 or "Data Connection Processing Event Synchronization" on page 50 .) |
| Setting | | Bit 12 of the status operation condition register is pulsed. See "STATUs:OPERation:CALL Condition Register Bit Assignment" on page 531 . |
| Query | | 1 |
| Related Topics | | See "Status Subsystem Overview" on page 159 . See "Call Processing Event Synchronization" on page 32 or "Data Connection Processing Event Synchronization" on page 50 . |
| Programming Example | | |
| <pre> OUTPUT 714;"SYSTEM:SYNCHRONIZED" !Pulses bit 12 of the status operation !condition register. OUTPUT 714;"SYSTEM:SYNCHRONIZED?" !Returns a 1 indicating all prior sequential !commands have completed and all overlapped !commands have started. </pre> | | |

IEEE 488.2 Common Commands

Description

*CLS

The *CLS, clear status command, is defined in “IEEE Std 488.2-1992”, 10.3. This command will also clear and close the error message screen on the test set’s display.

*ESE

The *ESE, standard event status enable command, is defined in “IEEE Std 488.2-1992”, 10.10.

*ESE?

The *ESE?, standard event status enable query, is defined in “IEEE Std 488.2-1992”, 10.11.

*ESR?

The *ESR?, standard event status register query, is defined in “IEEE Std 488.2-1992”, 10.12.

*IDN?

The *IDN?, identification query, is defined in “IEEE Std 488.2-1992”, 10.14.*IDN? is used to retrieve information about the test set in ASCII format.

*IDN?, returns ASCII codes 32 through 126 excluding comma and semicolon in four comma separated fields. Field 1 returns the manufacturer, field 2 returns the instrument model number, field 3 returns the serial number, field 4 returns 0.

*OPC

The *OPC, operation complete command, is defined in “IEEE 488.2-1992”, 10.18. *OPC causes the test set to continuously sense the No Operation Pending flag. When the No Operation Pending flag becomes TRUE, the OPC event bit in the standard event status register (ESR) is set to indicate that the state of all pending operations is completed. The *OPC common command is not recommended for use as an overlapped command.

*OPC?

The *OPC?, operation complete query, is defined in “IEEE Std 488.2-1992”, 10.19. The *OPC? query allows synchronization between the controller and the test set using either the message available (MAV) bit in the status byte, or a read of the output OPC?. The *OPC? query does not effect the OPC event bit in the Standard Event Status Register (ESR). The *OPC? common command is not recommended for use as an overlapped command.

*OPT

The *OPT?, option identification query, is defined in “IEEE Std 488.2-1992”, 10.20. Each option will have a unique name, that name will be retuned with the query.

*RST

The *RST, full preset command, is defined in “IEEE Std 488.2-1992”, 10.32. A full preset is also accomplished

using the SYStem:PRESet2 command. A full preset restores the majority of settings to their default values and sets measurement trigger arm to single.

***SRE**

The *SRE, service request enable command, is defined in “IEEE Std 488.2-1992”, 10.34. The parameter range for this command is 0 through 255.

***SRE?**

The *SRE?, service request enable query, is defined in “IEEE Std 488.2-1992”, 10.35. Values returned by this query range from 0 through 255.

***STB?**

The *STB?, read status byte query, is defined in “IEEE Std 488.2-1992”, 10.36. Values returned by this query range from 0 through 255.

***WAI**

The *WAI, wait-to-continue command, is defined in “IEEE Std 488.2-1992”, 10.39. The *WAI command prevents the test set from executing any further commands or queries until all pending operation flags are false. The *WAI common command is not recommended for use as an overlapped command.

Related Topics

[“Call Processing Event Synchronization” on page 32](#)

[“Preset Descriptions” on page 640](#)

[“Obtaining Identification Information *IDN?” on page 665](#)

8 General Usage

Frequency Banded Parameters

The majority of the test set's parameters are active regardless of the frequency band selected. There are a number of parameters for GSM and GPRS that allow you to specify a band; PGSM, EGSM, DCS, or PCS (GSM only). These exceptions are called frequency banded parameters.

Frequency banded parameters are activated upon selection of a band. Parameters that select frequency bands include cell band and traffic band (see ["Band Selection Parameters" on page 599](#)).

You can set parameter values for a band that is not currently selected, and the test set stores the settings for future use. For example, during a call on the PGSM band, the MS TX level can be set to 10 for the DCS frequency band. When a handover (see ["How the Test Set Performs a Dualband Handover" on page 140](#)) to the DCS band is made, the MS TX level of 10 for DCS will already be set.

If you do not specify a frequency band when setting frequency banded parameters, settings to the parameter are made in the currently selected band.

- ["GSM Frequency Banded Parameters" on page 597](#)
- ["GPRS Frequency Banded Parameters" on page 598](#)

GSM Frequency Banded Parameters

There are eight frequency banded parameters for GSM. To set or query:

- the broadcast channel (ARFCN), see ["CALL\[:CELL\]:BCHannel\[:ARFCn\]\[:SElected\]" on page 306](#).
- the BA (broadcast allocation) table, see ["CALL\[:CELL\]:BA:TABLE\[:SElected\]" on page 299](#).
- the BA table points, see ["CALL\[:CELL\]:BA:TABLE:POINts\[:SElected\]?" on page 302](#).
- the traffic channel number, see ["CALL:TCHannel\[:ARFCn\]\[:SElected\]" on page 371](#).
- the mobile station uplink power control level, see ["CALL:MS:TXLevel\[:SElected\]" on page 336](#).
- the manual channel number for the test set's receiver, see ["RFAnalyzer:MANual:CHANnel\[:SElected\]" on page 458](#).
- the expected power of the mobile station, see ["RFAnalyzer:EXPected:POWer\[:SElected\]" on page 455](#).
- the RF Generator channel number, see ["CALL\[:CELL\]:RFGenerator:CHANnel\[:SElected\]" on page 359](#).

Programming Example

```
OUTPUT 714;"CALL:CELL:BCHANNEL:ARFCN:DCS 512" !Sets broadcast channel to 512
                                                !for DCS.
OUTPUT 714;"CALL:CELL:BA:TABLE:EGSM 20,37,124,975,986,1008,1019" !Sets BA table
                                                !to 7 of 16
                                                !possible channels.
OUTPUT 714;"CALL:TCHANNEL:ARFCN:PGSM 124" !Sets traffic channel to 124 for PGSM band.
OUTPUT 714;"CALL:MS:TXLEVEL:PGSM 7" !Sets the mobile station uplink power control
                                                !level to 7 for PGSM band.
OUTPUT 714;"RFANALYZER:MANUAL:CHANNEL:EGSM 24" !Manually sets the RF analyzer to
                                                !EGSM channel 24.
OUTPUT 714;"RFANALYZER:EXPECTED:POWER:PGSM -15DBM" !Sets the RF analyzer's input
                                                !power to -15 dbm for PGSM band.
OUTPUT 714;"CALL:CELL:RFGENERATOR:CHANNEL:PCS 512" !Sets the RF generator's channel to
                                                !512 for the PCS band.
```

GPRS Frequency Banded Parameters

There are two frequency banded parameters for GPRS. To set or query:

- the packet data traffic channel (ARFCN), see “[CALL:PDTCH | PDTChannel\[:ARFCn\]\[:SElected\]](#)” on page [346](#).
- the uplink burst transmit level, see “[CALL:PDTCH | PDTChannel:MS:TXLevel\[:SElected\]:BURSt](#)” on page [350](#).

Note that the PCS band is not currently supported for GPRS.

Programming Example

```
OUTPUT 714;"CALL:CELL:BCHANNEL:ARFCN:SELECTED 512" !Sets the BCH ARFCN for the
                                                !selected broadcast band to 512.
OUTPUT 714;"CALL:PDTCH:ARFCN:EGSM 1010" !Sets the packet data traffic channel to
                                                !1010 for the EGSM band.
OUTPUT 714;"CALL:PDTCHANNEL:MS:TXLEVEL:DCS:BURST1 10" !Sets the uplink power level of burst
                                                !one in the DCS band to 10.
```

Related Topics

[“Band Selection Parameters” on page 599](#)

[“How the Test Set Performs a Dualband Handover” on page 140](#)

[“Configuring the Broadcast Channel \(BCH\)” on page 609](#)

[“Configuring the Traffic Channel \(TCH\)” on page 619](#)

[“Configuring the Packet Data Traffic Channel \(PDTCH\)” on page 615](#)

[“Receiver Control” on page 616](#)

Band Selection Parameters

Band selection parameters allow you to choose the frequency band for different channel types in GSM or GPRS:

- [“GSM Band Selection Parameters” on page 599](#)
- [“GPRS Band Selection Parameters” on page 600](#)

GSM Band Selection Parameters

There are four band selection parameters for GSM:

- [“Cell Band Parameter” on page 599](#)
- [“Traffic Band Parameter” on page 599](#)
- [“Manual Band Parameter” on page 599](#)
- [“Signal Generator Band Parameter” on page 600](#)

Cell Band Parameter

This parameter allows you to set or query the band used to broadcast the BCH (see [“CALL\[:CELL\]:BAND” on page 304](#)).

- When the operating mode is active cell and the call connected state is idle, changes to the cell band parameter will be reflected in the traffic band and manual band parameters as well.
- When the operating mode is active cell and the call connected state is connected, changes to the cell band parameter will disconnect any call in progress.
- When the operating mode is test mode and the test function is set to BCH, the cell band parameter should be used. See [“CALL:FUNCTION:DOWNlink” on page 322](#).
- When the operating mode is test mode and the test function is set to CW, the cell band parameter should be used.

Traffic Band Parameter

This parameter allows you to set or query the traffic channel band (see [“CALL:TCHannel:BAND” on page 374](#)).

- When the operating mode is active cell and the call connected state is connected, changes to the traffic band parameter cause an inter-band channel assignment. See [“How the Test Set Performs a Dualband Handover” on page 140](#).
- When the operating mode is active cell and the call connected state is connected, changes to the traffic band parameter are not reflected in the cell band or the manual band parameters.
- When the operating mode is test mode and the test function is set to BCH + TCH, the traffic band parameter should be used. See [“CALL:FUNCTION:DOWNlink” on page 322](#).

Manual Band Parameter

This parameter allows you to set or query the manual channel band (see [“RFAnalyzer:MANual:BAND” on page 458](#)).

Band Selection Parameters

- When the receiver control parameter is set to manual, changes to the manual band parameter are not reflected in the traffic band or cell band parameters.
- Setting the manual band parameter changes the receiver control parameter to manual.
- When the receiver control parameter is set to manual, changes to the cell band parameter set the receiver control parameter to auto; however, the manual band parameter changes to match the cell band setting. You do not need to set receiver control back to manual.

Signal Generator Band Parameter

This parameter allows you to set or query the channel band for the test set's RF generator (see [“CALL\[:CELL\]:RFGenerator:BAND” on page 358](#)).

- When the operating mode is test mode and the downlink function is set to CW, the test set operates like a signal generator with level and frequency controls. See [“CW Test Function Behavior” on page 628](#).

GPRS Band Selection Parameters

There are two band selection parameters for GPRS:

- [“Cell Band Parameter” on page 600](#)
- [“Packet Data Traffic Channel Band Parameter” on page 600](#)

Note that the PCS band is not currently supported for GPRS.

Cell Band Parameter

This parameter allows you to set or query the band used to broadcast the BCH (see [“CALL\[:CELL\]:BAND” on page 304](#)).

- When the data connection status is *not* transferring (see [“Data Connection Processing State Synchronization” on page 53](#)), changing the cell band parameter to a new band changes the packet data traffic channel band to the new band as well.
- When the data connection status is transferring (see [“Data Connection Processing State Synchronization” on page 53](#)), changing the cell band parameter will disconnect any data connection in progress.

Packet Data Traffic Channel Band Parameter

This parameter allows you to set or query the band used to transmit the packet data traffic channel (see [“CALL:PDTCH | PDTChannel:BAND” on page 349](#)).

- When the data connection status is transferring (see [“Data Connection Processing State Synchronization” on page 53](#)), changing the packet data traffic band parameter selects the PDTCH ARFCN and uplink burst TX level parameters. However, the setting will not be applied until you re-start ETSI test mode using [“CALL:FUNCTION:DATA:STARt” on page 321](#).

Related Topics

For GSM:

[“Configuring the Broadcast Channel \(BCH\)” on page 609](#)

[“Configuring the Traffic Channel \(TCH\)” on page 619](#)

[“Receiver Control” on page 616](#)

[“CALL:CONNected\[:STATe\]?” on page 310](#)

[“Programming the Agilent Technologies 8960 Series 10 for GSM Mobile Testing in Active Cell Operating Mode” on page 175](#)

For GPRS:

[“Configuring the Broadcast Channel \(BCH\)” on page 609](#)

[“Configuring the Packet Data Traffic Channel \(PDTCH\)” on page 615](#)

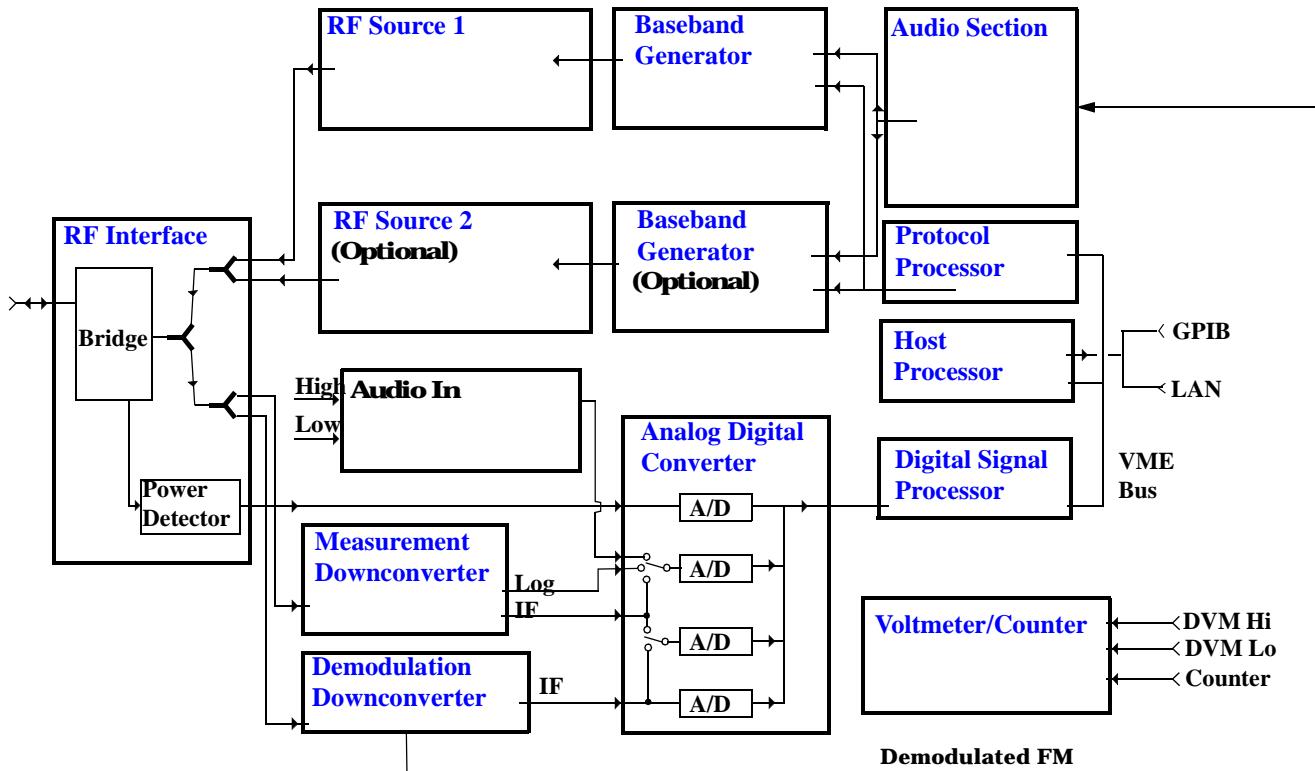
[“CALL:STATUS\[:STATe\]:DATA?” on page 366](#)

[“Programming the Agilent Technologies 8960 Series 10 for GPRS Mobile Testing in Active Cell Operating Mode” on page 235](#)

Block Diagram

The hardware architecture of the test set provides a number of parallel signal paths through the instrument. This parallel architecture allows the measurement hardware to run some measurements concurrently. See “Concurrent Measurements” on page 143.

Description



RF Interface Module

Input and output signals are routed through the RF Interface module. The RF Interface module consists of a directional bridge for sampling incoming power and hybrid power splitters which create 4 bidirectional ports, (two receiver ports and two source ports), RF amplifiers, video gain circuits, and fast and slow power detectors.

The sampled input power from the directional bridge is routed to a fast power detector or a slow detector. The fast power detector has a response time of several microseconds and can measure power during the bursts of TDMA systems.

The RF Interface module provides two identical RF Source path connections to the In/Out port of the instrument. There is about 25 dB of isolation between the two source paths. There is about 35 dB of isolation between the source paths and either receiver path. The RFIO module has nominally 23 dB of insertion loss in the source path. A temperature sensing circuit facilitates compensation for path loss variation with

temperature.

The sampled input power from the directional bridge can be amplified by as many as two 18 dB range amplifiers and then can be directed to the fast detector, or the slow detector. The input power to the fast detector is detected by a diode detector that is part of a feedback loop. The input to the slow detector is measured in a bridge using a pair of RMS thermal detectors in a feedback loop. Signals from the fast and slow power detectors are calibrated with Gain DAC's. Video gain can be applied in 6 dB and 1.5 dB steps.

Signal Downconversion

The test set's downconversion receiver section has two downconversion modules; a high performance Measurement Downconversion Module for making measurements, and a Demodulation Downconversion Module for maintaining the radio link.

Measurement Downconverter Module The Measurement Downconverter module is a part of the receiver, it provides high quality (wide dynamic range, spurious free) signals to the Analog To Digital Converter module's measurement sampler input. These signals are:

- 10 KHz - 6 MHz Intermediate Frequency signal
- detected envelope of the Intermediate Frequency signal

The Measurement Downconverter module is designed for very high performance operation to ensure accurate and repeatable measurement results. The Measurement Downconverter module contains two downconversion stages, two local oscillators, and a logarithmic IF envelope detector. Both first and second LO synthesizers are tunable. The first LO is used when tuning to the RF input frequency, and the second LO is used when setting second IF frequency, which is fed to the measurement sampler on the Analog To Digital Converter module.

Demodulation Downconverter Module The Demodulation Downconverter module is used as part of the demodulation receiver to maintain the radio link of a given TA. The IF signal from the Demodulation Downconverter is sent to the Analog to Digital Converter, the digital data then goes to the protocol subsystem. That data allows the Protocol Processor module to set up a call with the DUT so that testing can be performed on the radio.

The Demodulation Downconverter module is also used as part of the BER testing path. For bit error ratio measurements the bits tested by the Protocol Processor module are taken from this path. The demodulated bits provided to the Protocol Processor contain the data that will be checked for errors.

Analog To Digital Converter Module

Following the Measurement Downconverter and Demodulation Downconverter modules is the Analog to Digital Converter module. The purpose of the Analog to Digital Converter module is to convert the downconverted analog signals into digital data streams which can be processed by the Digital Signal Processing module.

In order to maintain the radio link of a given TA, the downconversion path through the Demodulation Downconverter module has a dedicated A/D conversion path.

In order to optimize measurement throughput, the fast RF power detector also has a single dedicated A/D path. This allows power measurements, in many cases, to be made concurrently with other measurements. The two outputs from the Measurement Downconverter module, and the Audio In signal share a single multiplexed A/D path.

The outputs of the various analog to digital converters on the Analog to Digital Converter module share a common data bus to the Digital Signal Processing module.

Block Diagram

Digital Signal Processing Module

The Digital Signal Processing (DSP) module is responsible for a variety of tasks within the overall test set architecture. These tasks are:

- demodulating data from the radio under test (data received from the Demodulation Downconverter module) and sending the demodulated data bits to the Protocol Processor module
- for some systems, perform audio measurements using audio information sent to the DSP module from the Protocol Processor module
- execute a variety of signal processing algorithms to perform measurements on the radio system of the currently loaded TA (data received from the power detector ADC, the measurement ADC and, in some cases, data received from the Demodulation Downconverter ADC)

The DSP processor communicates with the Host Processor and the Protocol Processor, as well as controlling the configuration and synchronization of the Analog To Digital Converter module.

Protocol Processor Module

The Protocol Processor module is responsible for maintaining the radio link between the test set and the mobile station under test. The primary tasks of the Protocol Processor module are:

- generating the protocol messaging necessary for the forward channel and sending that protocol stream to the test set's RF source for transmission to the mobile station
- decoding the protocol messaging received from the mobile station under test on the reverse channel
- computing measurement results which are associated with data bits contained within the mobile stations messaging, such as bit error ratio

Host Processor Module

The Host Processor module is responsible for a variety of tasks within the overall test set architecture. These tasks include:

- control of the manual user interface (MUI)
- executing commands and processing data received from the LAN interface
- executing commands and processing data received from the GPIB interface
- controlling disk access
- control of all RF and audio hardware modules
- routing measurement results received from the Digital Signal Processing and Protocol Processor modules to the appropriate output device (display, GPIB, LAN, serial, etc.)

Voltmeter/Counter

Voltmeter The voltmeter is primarily used to measure external DC & AC voltages. A secondary purpose is to measure internal voltages for instrument self-diagnostics.

The external voltmeter is capable of measuring DC voltages up to + 50 VDC and AC voltages up to 50 Vpk. A true RMS detector is used for measuring AC voltages. For internal measurements, a switch routes the diagnostic MUX output to the Voltmeter 1 path.

Frequency Counter The Frequency Counter is used to measure external frequencies from the front panel Audio IN, High or Low BNC connectors, and to measure internal signals for diagnostics. The external input can receive a signal between 20 Hz and 50 MHz, with a level from 25 mV to 8 V rms.

The counter circuit is based on the METRON IC. This IC contains a reciprocal counter. A reciprocal counter functions by counting the input signal and a reference signal simultaneously during a selected gate period. At the end of this period, the counting is stopped and the values of the signal and reference counters are read. The ratio of these values is used to calculate the input signal frequency.

Audio Section

Audio Analysis Path Externally applied audio signals can be analyzed through the test set's DSP module for such characteristics as AC level, SINAD, or distortion.

The audio signal to be analyzed is input to the test set using the front panel Audio IN High and Low connectors. The signal is then routed to the Analog To Digital Converter module's measurement sampler for analysis by the DSP module.

The Audio In connector accepts signals from 20 Hz to 15 KHz, at input levels from 10 mV to 20 Vpk.

Audio 1 Path The Audio 1 path provides analog baseband signals used for frequency modulation of the test set's RF sources. Up to four separate audio sources may be summed together in any combination to provide the composite Audio 1 output. These include the external FM input, internal direct digital synthesis (DDS,) regenerated SAT, and audio echo input.

The external FM input accepts an externally supplied audio signal with a peak voltage between 0.25 and 2 Vpk.

The internal DDS generates low distortion audio signals from DC to 20 KHz with 0.1 Hz resolution. One to four signals may be generated and internally summed, with independent level control of each waveform.

The SAT regeneration circuit outputs a signal which is phase-locked to a received SAT signal. This is useful for testing situations where the test set needs to emulate a mobile station.

The audio echo input is used for retransmitting the received audio after a selectable time delay, to check both radio transmit and receive paths simultaneously.

For most applications, only one or two of these Audio 1 path sources are enabled at any given time.

Audio 2 Path The Audio 2 path provides a secondary means for sending analog baseband signals to the FM modulator. Audio 2 contains only one source, a DDS similar to that used for Audio 1.

Typically, the Audio 2 path DDS is used for cases where multiple signals must be summed together with the lowest possible distortion. Another potential use of Audio 2 would be to obtain higher output levels than Audio 1 is capable of (up to twice as much), assuming the two outputs are set to the same frequency and phase, and then summed together at the Baseband Generator module.

Audio 2 is rarely used in practice because the DDS used for Audio 2 is the same DDS that is used for the front panel audio output.

Audio Out Path Any one of four inputs may be coupled to the front panel audio output connector. These include a 4 channel DDS (shared with Audio 2), receiver discriminator audio from the Demodulation Downconverter module, audio echo from the Analog To Digital Converter module, and audio vocoder.

The front panel output is capable of providing signal levels up to 9 Vpk into > 600 ohm loads, and up to 0.8 Vpk into an 8 ohm load (e.g. speaker). The output level is calibrated for all modes except discriminator audio,

Block Diagram

The discriminator audio has an uncalibrated volume control provided due to the high tolerances involved.

Typically the DDS mode is used to feed the MIC input of a radio, or it may simply be used as a general purpose low distortion function generator.

Demodulated audio can be selected from either of two Demodulation Downconverters. 300 - 3000 Hz BPF, 750 usec de-emphasis, and expandor circuits can be individually applied to the receiver audio, or bypassed.

Audio echo can be selected to route the received audio to the front panel audio output connector.

RF Sources

The test set can contain two identical RF sources. The RF sources are used to provide analog or digitally modulated RF carriers for use in parametric testing of mobile stations encompassing a variety of cellular radio formats. In general, the sources have a frequency range of 45 MHz to 2.7 GHz and an amplitude range of -13 dBm to -135 dBm.

The RF sources consist of a Synthesized Signal Generator module followed by a Vector Output module and an RF Attenuator module. Baseband modulation information is supplied to the RF sources from a Baseband Generator module preceded by an Audio Section module. The various components which make up the test set source system are described in the following sections.

Baseband Generators

The purpose of the Baseband Generator module is to provide, for the modulation type currently in effect, properly formatted baseband signals to the modulation circuits on the RF Source modules.

The Baseband Generator performs several functions related to the generation and processing of these base-band modulation signals. These are:

- Transform data and clock signals from the Protocol Processor module into base-band analog I-Q modulation signals for the I-Q modulator in the Vector Output module
- Transform data from the Protocol Processor module into baseband FSK modulation for the FM modulator in the Signal Generator module
- Provide baseband FM path source selection, gain adjustment and summing node for analog FM signals from the Audio module and internally generated baseband FSK signals which are output to the FM modulator in the Signal Generator module
- Transform burst and adjacent timeslot signals from the Protocol Processor module into baseband burst modulation signals for the burst modulator in the Vector Output module

Active Cell Operating Mode

The operating mode changes the way in which the test set interacts with the mobile station.

For GSM, the test set can operate in two different operating modes, active cell mode or test mode (see ["Test Mode Operating Mode" on page 621](#)).

For GPRS, active cell is the only operating mode currently available.

Active cell operating mode provides active signaling between the mobile station and the test set's base station emulator:

- ["Active Cell For GSM" on page 607](#)
- ["Active Cell For GPRS" on page 608](#)

Active Cell For GSM

Active cell mode is the default operating mode for GSM, and is used when emulating a normal GSM cell. Test mode is used when it is not possible, or not desired, to communicate via over-the-air signaling with the mobile station, but downlink stimulus and uplink measurements are still needed. For more details on test mode, see ["Test Mode Operating Mode" on page 621](#).

Associated with the active cell operating mode is the cell activated state parameter. This parameter turns on and off the test set's control of the uplink and downlink (including all signalling operations, uplink demodulation and downlink (BCH and TCH) generation).

Trying to set any of the network configuration parameters while the cell is in the active state will generate the following error:

GSM operation rejected; Attempting to set <MCC|MNC|LAC|NCC|BCC> while generating a BCH

For a list of basic features provided by active cell operating mode for GSM, see ["Active Cell Features" on page 179](#).

Setting the Test Set's Operating Mode to Active Cell Mode

The test set's operating mode is set using the command, ["CALL:OPERating:MODE" on page 340](#).

Setting the Cell Activated State Parameter

The cell activated state parameter is set using ["CALL\[:CELL\]:ACTivated\[:STATE\]" on page 297](#).

Active Cell For GPRS

Active cell mode is used when emulating a normal GSM/GPRS cell.

In active cell operating mode the base station emulator, using the test set's GMSK modulated source, generates a downlink (base station to mobile station direction) broadcast channel (BCH) which represents a cell. The GPRS mobile station can "camp" to this signal, just as it would camp to a cell on a real network, and perform an attach procedure to register the mobile station with the network. A Packet Data Traffic Channel (PDTCH) can then be established using an Agilent proprietary data connection which allows receiver block error rate (BLER) reports to be retrieved from the mobile station (see ["BLER Reports Measurement Description" on page 73](#)). You can also make transmitter measurements using this data connection.

For GPRS mobile stations which support a single uplink timeslot, the following measurements can be made under essentially identical conditions to that which the mobile station would experience on a real network:

- Output RF Spectrum (ORFS) - see ["Output RF Spectrum Measurement Description" on page 96](#).
- Transmit Power (TXP) - see ["Transmit Power Measurement Description" on page 127](#)
- Phase and Frequency (PFER) - see ["Phase and Frequency Error Measurement Description" on page 103](#)
- Power versus Time (PVT) - see ["Power versus Time Measurement Description" on page 109](#)

For a typical scenario detailing the steps you might take to test a GPRS mobile station, see ["Testing a GPRS Mobile Station" on page 635](#).

For a list of basic features provided by active cell operating mode for GPRS, see ["Active Cell Features" on page 239](#).

Related Topics

GSM:

["Configuring the Broadcast Channel \(BCH\)" on page 609](#)

["CALL:OPERating" on page 340](#)

["Configuring the Traffic Channel \(TCH\)" on page 619](#)

GPRS:

["Configuring the Broadcast Channel \(BCH\)" on page 609](#)

["Configuring the Packet Data Traffic Channel \(PDTCH\)" on page 615](#)

["Testing a GPRS Mobile Station" on page 635](#)

["Programming the Agilent Technologies 8960 Series 10 for GPRS Mobile Testing in Active Cell Operating Mode" on page 235](#)

Configuring the Broadcast Channel (BCH)

The broadcast channel parameters are configured using the following call processing subsystem commands. You should note that many of these parameters are *not* applicable to GPRS.

For a complete list of GPIB commands in the call processing subsystem, refer to “[CALL Subsystem](#)” on page [296](#).

GSM Broadcast Channel Parameters

- Cell Band (see “[CALL\[:CELL\]:BAND](#)” on page [304](#))
- Cell Power (see “[CALL\[:CELL\]:POWer\[:SAMPlitude\]](#)” on page [355](#))
- Cell Power State (see “[CALL\[:CELL\]:POWer:STATe](#)” on page [356](#))
- Broadcast Channel (ARFCN) (see “[CALL\[:CELL\]:BCHannel\[:ARFCn\]\[:SELected\]](#)” on page [306](#))
- Mobile Country Code (see “[CALL:MCCode](#)” on page [325](#))
- Mobile Network Code (see “[CALL:MNCCode](#)” on page [326](#))
- Location Area Code (see “[CALL:LACode](#)” on page [324](#))
- Network Color Code (see “[CALL:NCCode](#)” on page [339](#))
- Base Station Color Code (see “[CALL:BCCode](#)” on page [305](#))
- Paging IMSI (see “[CALL:PAGing:IMSI](#)” on page [342](#))
- Repeat Paging (see “[CALL:PAGing:REPeat\[:STATe\]](#)” on page [343](#))
- Paging Mode (see “[CALL:PAGing:MODE](#)” on page [343](#))
- Paging Multiframes (see “[CALL:PAGing:MFRames](#)” on page [344](#))
- Get IMEI at Call Setup (see “[CALL:IMEI](#)” on page [323](#))
- TX Level FACCH Signaling (see “[CALL:SIGNaling](#)” on page [364](#))
- BA Table (see “[CALL\[:CELL\]:BA:TABLE\[:SELected\]](#)” on page [299](#))
- 3 Digit MNC for PCS (see “[CALL:PMNCode](#)” on page [353](#))

GPRS Broadcast Channel Parameters

- Cell Band (see “[CALL\[:CELL\]:BAND](#)” on page [304](#))
- Cell Power (see “[CALL\[:CELL\]:POWer:AMPLitude](#)” on page [356](#))

Operating Considerations

GSM

There are a number of parameters for the broadcast channel and the traffic channel (see “[Configuring the Traffic Channel \(TCH\)](#)” on page 619) that can be configured, however the test set’s default parameters should allow a properly functioning mobile station to successfully camp on the cell and make a call under most circumstances.

Parameters can be queried from the test set regardless of the state of the test set.

If the test set is in active cell operating mode, parameters MCC, MNC, LAC, NCC, and BCC can not be set unless the Cell Activated State is OFF. See “[CALL:ACTivated](#)” on page 297.

If the test set is in test mode (see “[Test Mode Operating Mode](#)” on page 621) operating mode, any BCH parameter can be set at any time.

The 3 Digit MNC for PCS parameter defines if the PCS BCCH should be configured using the standard 2-digit MNC (J-STD-007 coding), or the PCS 3-digit MNC (J-STD-007A coding, section 2.10.5.1.3). The PCS 3-digit MNC is used on the PCS BCCH instead of the 2-digit MNC only when the current cell band is PCS and the 3 Digit MNC for PCS parameter is set to on.

When TX Level FACCH Signaling is set to on, measurements are aborted and restarted as a result of mobile TX power level changes. However, when TX Level FACCH Signaling is set to off, measurements are not aborted and restarted. This may cause the integrity result for some measurements to indicate an under range or over range condition until the mobile’s TX power level is within the specified measurement range. For more information about measurement integrity, see “[Integrity Indicator](#)” on page 146.

GPRS

For GPRS, there are a number of BCH parameters which are currently set to fixed values. See “[Fixed Parameters](#)” on page 639.

Related Topics

“[Frequency Banded Parameters](#)” on page 597

“[Band Selection Parameters](#)” on page 599

Setting Frame Trigger Parameters

Frame Trigger Parameters

The frame trigger is a positive-going TTL compatible pulse that is one GSM bit wide, it is aligned to the downlink TDMA frame timing. The test set provides a frame trigger for synchronizing other test equipment to a measurement it is available at the rear-panel TRIG OUT connector.

The frame trigger has 3 parameters that the user must set. See [“SYSTEm:FTRigger” on page 585](#).

- [“External Trigger State \(on or off\)” on page 611](#)
- [“External Trigger Timeslot \(0 to 7\)” on page 611](#)
- [“External Trigger Bit \(0 to 1250\)” on page 611](#)

Programming Examples

External Trigger State (on or off)

```
OUTPUT 714;"SYSTEM:FTRIGGER:STATE ON"
```

would set the external frame trigger ON.

External Trigger Timeslot (0 to 7)

```
OUTPUT 714;"SYSTEM:FTRIGGER:TSLOT 3"
```

would cause external frame trigger pulses to align with timeslot three.

External Trigger Bit (0 to 1250)

```
OUTPUT 714;"SYSTEM:FTRIGGER:BIT 100"
```

would cause external frame trigger pulses to occur 100 bits after bit 0 of the selected timeslot.

Operating Considerations

Each frame is made up of 8 time slots. Time slots are defined in “ETSI GSM 05.10 Ver. 4.9.0 Section 5. Time slots 0 and 4 are 157 bit periods long, time slots 1, 2, 3, 5, 6, 7 are 156 bit periods long, the average time slot is 156.25 bits in duration. The external trigger timeslot can be set to any time slot 0 through 7, the external trigger bit position can be set from 0 through 1250. If the trigger bit position is set to 1250, that is one full frame beyond the setting of the external trigger timeslot, (156.25 * 8 = 1250).

When the cell activated state is OFF, the frame trigger output is disabled (set to 0 volts) since there is no reference downlink TDMA frame structure available. However, the frame trigger state is not affected when there are changes to cell activated state.

The frame trigger can be set manually from the system configuration screen by pressing the External Trigger Setup soft key.

Related Topics

“SYSTem:FTTrigger” on page 585

Configuring Mobile Station Operating Parameters

The mobile station operating parameters are configured using the following call processing subsystem commands.

For a complete list of GPIB commands in the call processing subsystem, refer to “[CALL Subsystem](#)” on page [296](#).

GSM Mobile Station Operating Parameters

- MS TX Level (see “[CALL:MS:TXLevel\[:SELected\]](#)” on page [336](#))
- Timing Advance (see “[CALL:MS:TADVance](#)” on page [335](#))
- Mobile DTX State (see “[CALL:MS:DTX\[:STATe\]](#)” on page [329](#))

GPRS Mobile Station Operating Parameters

- Uplink Burst TX Level (see “[CALL:PDTCH | PDTChannel:MS:TXLevel\[:SELected\]:BURSt](#)” on page [350](#))

Operating Considerations

GSM

There are a number of parameters for the broadcast channel (see “[Configuring the Broadcast Channel \(BCH\)](#)” on page [609](#)) and the traffic channel (see “[Configuring the Traffic Channel \(TCH\)](#)” on page [619](#)) that can be configured, however the test set’s default parameters should allow a properly functioning mobile station to successfully camp on the cell and make a call under most circumstances.

When Operating Mode = Active Cell, if a call is connected, changes to these parameters, **including a change to the value of the parameter’s current setting**, causes signaling on the downlink to automatically initiate the change. No separate command is necessary to initiate the change. If a call is not connected, changes to the parameter are stored for when the next call is established.

The MS TX Level parameter, besides informing the mobile station what uplink power to transmit to the test set, also updates the Expected Power parameter. See “[RFAnalyzer:EXPected:POWer\[:SELected\]](#)” on page [455](#).

GPRS

For details on the parameters you can use to configure the PDTCH, see “[Configuring the Packet Data Traffic Channel \(PDTCH\)](#)” on page [615](#).

Configuring the Packet Data Traffic Channel (PDTCH)

This section is *not* applicable to GSM.

The packet data traffic channel parameters are configured using the following call processing subsystem commands.

For a complete list of GPIB commands in the call processing subsystem, refer to “[CALL Subsystem](#)” on page 296.

Packet Data Traffic Channel Parameters

- Packet Data Traffic Channel Band (see “[CALL:PDTCH | PDTChannel:BAND](#)” on page 349)
- Packet Data Traffic Channel (ARFCN) (see “[CALL:PDTCH | PDTChannel\[:ARFCn\]\[:SELected\]](#)” on page 346)
- Downlink Burst Power Reduction Selection (see “[CALL:PDTCH | PDTChannel:PREduction:BURSt\[1 | 2\]](#)” on page 352)
- Downlink Power Reduction Level (dB) (see “[CALL:PDTCH | PDTChannel:PREduction:LEVel\[1 | 2\]](#)” on page 352)
- Data Connection Type (see “[CALL:FUNCTION:DATA:TYPE](#)” on page 321)

Operating Considerations

When configuring the base station emulator you must configure the broadcast channel (see “[CALL:BCHannel](#)” on page 306) and the packet data traffic channel (PDTCH). There are a number of parameters for the BCH and the PDTCH that can be configured; however, the test set’s default parameters should allow a properly functioning GPRS mobile station to successfully establish a data connection under most circumstances.

Changing the PDTCH band parameter selects the band for the range of PDTCH ARFCN. However, the setting will not be applied until you re-start the data connection using “[CALL:FUNCTION:DATA:START](#)” on page 321.

PDTCH (ARFCN) is a frequency banded parameter (see “[Frequency Banded Parameters](#)” on page 597).

Related Topics

“[Configuring the Broadcast Channel \(BCH\)](#)” on page 609

“[Configuring Mobile Station Operating Parameters](#)” on page 613

“[Packet Data Traffic Channel Band Parameter](#)” on page 600

“[CALL:PDTCH | PDTChannel](#)” on page 345

Receiver Control

This section is *not* applicable to GPRS.

You may want to control the internal receiver parameters rather than allow the test set to control them. You can do this by using the receiver control parameters.

Selecting Manual or Automatic Receiver Control

Receiver control defines whether the test set (auto) or you (manual) are in control of the receiver's band, channel, frequency and power.

- Setting a manual band, manual frequency, or manual channel causes receiver control to be set to manual control mode.
- Setting the broadcast band, or any reset operation causes the receiver control to be set to auto control mode.
- Setting the RFANALYZER:CONTROL:AUTO to ON or OFF.

Example

```
OUTPUT 714;"RFANALYZER:CONTROL:AUTO OFF" !Allows manual control of
!receiver parameters.
```

Operating Mode and Receiver Control

The test set's receiver control parameter is set using, ["RFANALYZER:CONTROL:AUTO" on page 455](#).

Manual Receiver Control Parameters

When receiver control is set to auto, the test set's protocol controls the parameters. When receiver control is set to manual, the following three parameters are under user control.

- Manual Band
- Manual Freq
- Manual Channel

Manual Band The frequency bands available for the test set are PGSM, EGSM, DCS and PCS. Only one band can be active at a time. The frequency band must be selected in order to define the frequencies where measurements are to be made. See ["Frequency Banded Parameters" on page 597](#) for details on these parameters.

```
OUTPUT 714;"RFANALYZER:MANUAL:BAND PCS" !Sets the frequency band to PCS.
```

Manual Freq Manual frequency is used to tune the test set's measuring receiver. None of the ["Manual Channel" on page 616](#) parameters are affected by changes to manual frequency.

```
OUTPUT 714;"RFANALYZER:MANUAL:FREQUENCY 942.6MHZ" !Sets the input frequency to 942.6 MHz.
```

Manual Channel Manual channel is used to tune the test set's measuring receiver. ["Manual Freq" on page 616](#) is affected by changes to manual channel.

```
OUTPUT 714;"RFANALYZER:MANUAL:CHANNEL:EGSM 24" !Sets the EGSM channel to 24.
```

Manual Receiver Control

If the receiver control parameter is set to manual, the test set's receiver frequency is set using the parameters in the following table. See “[RFAnalyzer:MANual:BAND](#)” on page 458 for manual band or manual frequency details.

Table 4. Test Set Receiver Frequencies (Manual)

| Operating Mode | Cell Activated State | Measurement Band | Measurement Frequency | Measurement Channel |
|----------------|----------------------|------------------|-----------------------|---------------------|
| Active Cell | ON or OFF | Manual Band | Manual Frequency | Manual Channel |
| Test Mode | ON or OFF | Manual Band | Manual Frequency | Manual Channel |

Auto Receiver Control

If the receiver control parameter is set to auto, the test set's receiver frequency is set using the parameters in the following table. See “[CALL:TCHannel\[:ARFCn\]\[:SElected\]](#)” on page 371 traffic channel details and “[CALL:TCHannel:BAND](#)” on page 374 for traffic band details. See “[CALL\[:CELL\]:BAND](#)” on page 304 for cell band details. See “[CALL:BCHannel](#)” on page 306 for broadcast channel details.

Table 5. Test Set Receiver Frequencies (Auto)

| Operating Mode | Cell Activated State | Measurement Band | Measurement Frequency |
|----------------|----------------------|------------------|-----------------------|
| Active Cell | ON | Traffic Band | Traffic Channel |
| Active Cell | OFF | Cell Band | Broadcast Channel |

Table 6. Test Set Receiver Frequencies (Auto)

| Operating Mode | Test Function | Measurement Band | Measurement Frequency |
|----------------|---------------|------------------|-----------------------|
| Test Mode | BCH (1) | Cell Band | Broadcast Channel |
| Test Mode | BCH +TCH (2) | Traffic Band | Traffic Channel |
| Test Mode | CW | Cell Band | Broadcast Channel |

Table Footnotes

- 1 Actual frequency depends on current broadcast band (PGSM, EGSM, PCS, or DCS) and is defined in GSM as the uplink frequency.
- 2 Actual frequency depends on current traffic channel band (PGSM, EGSM, PCS, or DCS) and is defined in GSM as the uplink frequency.

Expected Power

You can use the expected power parameter regardless of the receiver control setting. The MS TX level parameter sets the mobile station uplink power control level ranges while expected power sets the mobile station uplink power in dBm.

Expected power defines the expected input power at the RF IN /OUT connector on the front panel of the test set. The range of expected power is beyond the capability of the test set's hardware. This is because expected power is intended to reflect the potential range of RF power at the DUT. This range of RF power is meant to accommodate the use of a gain or loss network between the DUT and the test set. See ["Measurement Related Configuration" on page 670](#) for details about amplitude offset.

The upper and lower limits of expected power provide boundaries for the combination of amplitude offset and expected power. If the user sets expected power to +52 dBm and the amplitude offset to -3 dB, the calculated receiver power will be 49 dBm, but the test set shall be set to +43 dBm, the upper limit of the hardware. If the calculated value of receiver power goes below -25 dB, the lower limit of the hardware, the test set shall be set to -25 dB.

Expected power is always overwritten by settings made to the MS TX Level parameter.

Setting the expected power will not set receiver control to manual.

```
OUTPUT 714;"RFANALYZER:EXPECTED:POWER:PGSM -15DBM" !Set input power to -15 dbm.
```

See ["RFANalyzer:EXPected:POWer:PGSM" on page 457](#) or ["CALL:MS:TXLevel\[:SElected\]" on page 336](#).

Related Topics

["Active Cell Operating Mode" on page 607](#)

["Test Mode Operating Mode" on page 621](#)

["Frequency Banded Parameters" on page 597](#)

Configuring the Traffic Channel (TCH)

This section is *not* applicable to GPRS.

The traffic channel parameters are configured using the following call processing subsystem commands.

For complete GPIB command syntax, see “[CALL:TCHannel](#)” on page 370.

TCH Parameters

- Traffic Channel Band (see “[CALL:TCHannel:BAND](#)” on page 374)
- Traffic Channel (ARFCN) (see “[CALL:TCHannel\[:ARFCn\]\[:SELected\]](#)” on page 371)
- Timeslot (see “[CALL:TCHannel:TSLot](#)” on page 376)
- Mobile Loopback (see “[CALL:TCHannel:LOOPback](#)” on page 375)
- Speech (see “[CALL:TCHannel:DOWNlink:SPEech](#)” on page 375)
- Max Frames Allowed for Assignment (see “[CALL:COUNT:TDMA:FRAMES](#)” on page 316)
- Channel Mode (see “[CALL:TCHannel:CMODE](#)” on page 374)

Operating Considerations

When configuring the base station emulator you must configure the broadcast channel (see “[CALL:BCHannel](#)” on page 306) and the traffic channel (TCH). There are a number of parameters for the BCH and the TCH that can be configured; however, the test set’s default parameters should allow a properly functioning mobile station to successfully camp on the cell and make a call under most circumstances.

When Operating Mode = Active Cell, if a call is connected, changes to the traffic channel number (ARFCN) or traffic channel timeslot, **including a change to the value of the parameter’s current setting**, causes signaling on the downlink FACCH to initiate a channel reassignment, see “[How the Test Set Performs a Dualband Handover](#)” on page 140. This configures the TCH to use the new parameter. If a call is not connected, changes to the parameter are stored for when the next call is established.

When Operating Mode = Test Mode, if Test Mode Downlink Function (see “[CALL:FUNCTION:DOWNlink](#)” on page 322) = BCH+TCH, changes to the traffic channel number (ARFCN) or traffic channel timeslot will reconfigure the downlink TCH accordingly, but there will be no signaling initiated. The change will be immediate. If a TCH is not being generated, changes to the parameter are stored for when the next call is established.

Downlink speech controls what kind of speech data is transmitted on the downlink TCH. A TCH with speech data is generated when call control status is connected (see “[Call Processing State Synchronization](#)” on page 37), or when in test mode with downlink function set to BCH+TCH.

When an FBER measurement is activated PRBS15 is transmitted on the downlink TCH, over riding the user setting of downlink speech source. Any changes to downlink speech source will be accepted and saved but not applied until FBER become inactive.

There are 5 different settings for the downlink speech source. See “[CALL:TCHannel:DOWNlink:SPeech](#)” on page 375.

- Echo retransmits the uplink speech frames back to the downlink with a non-selectable delay of about 1 second.
- PRBS15 the 260 speech frame bits (prior to channel coding) are generated using a pseudo random bit sequence.
- SIN300 the sequence of 260 speech bit frames represent a sine wave at 300 Hz.
- SIN1000 the sequence of 260 speech bit frames represent a sine wave at 1000 Hz.

Traffic channel loopback type cannot be set to type C if the traffic channel band is PGSM.

The Max Frames Allowed for Assignment parameter, is used to specify the maximum number of TDMA frames the mobile station is allowed to take for a channel assignment. This is only applicable to changes in TCH band, traffic channel, or TCH timeslot. Changes to any other TCH parameter will not cause an error to be generated if, the number of frames taken to perform the change exceeds the setting of the maximum frames allowed for assignment. If the mobile station does not complete the channel assignment within the specified number of frames, the test set will generate an error message, but this will not cause a call to drop. If the mobile DTX state (discontinuous transmission) parameter is on (see “[CALL:MS:DTX\[:STATe\]](#)” on page 329), the error is not generated, because when a mobile station is in discontinuous transmission mode, it is not required to transmit on the new channel, at least not until a SACCH, FACCH, or SID frame is ready. In this case, the mobile station may actually have changed channels in the correct time, but had nothing to transmit.

Related Topics

“[Configuring the Broadcast Channel \(BCH\)](#)” on page 609

“[Configuring Mobile Station Operating Parameters](#)” on page 613

“[Receiver Control](#)” on page 616

“[Traffic Band Parameter](#)” on page 599

“[CALL:TCHannel](#)” on page 370

“[Fast Bit Error Measurement Description](#)” on page 90

Test Mode Operating Mode

This operating mode is *not* applicable to GPRS.

The test set can operate in two different GSM operating modes (active cell mode or a test mode). Active cell mode is the default operating mode and is used when emulating a normal GSM cell. You use Test mode (see ["CALL:OPERating" on page 340](#) for GPIB syntax) when it is not possible, or not desired, to communicate via over-the-air signalling with the mobile station, but downlink stimulus and uplink measurements are still needed. When test mode is selected, the choices of downlink stimulus (Test Function) are:

- BCH (broadcast channel) (see ["BCH Test Function Behavior" on page 623](#))
- BCH + TCH (broadcast channel + traffic channel) (see ["BCH + TCH Test Function Behavior" on page 626](#))
- CW (continuous wave) (see ["CW Test Function Behavior" on page 628](#))

See ["CALL:FUNCTION" on page 320](#) for test function GPIB syntax.

Test Mode Operation

When the test set's operating mode is test mode:

- No over-the-air signaling is available.
- No capability to demodulate and decode uplink RACH bursts is available.
- Test mode features are determined by the test function: BCH, BCH + TCH, or CW.
- When the operating mode is set to test mode, auto triggering sets the trigger source to RF Rise. See ["RF Rise Trigger Source:" on page 169](#).

The test set's receiver remains on the uplink frequency determined by the broadcast channel see ["CALL\[:CELL\]:BCHannel\[:ARFCn\]\[:SELECTed\]" on page 306](#) as long as receiver control is set to auto. If you require manual control of the receiver parameters, receiver control should be set to manual. This gives access to the receiver parameters of manual band, manual channel and manual frequency. See ["Receiver Control" on page 616](#).

NOTE ["Setting the Cell Activated State Parameter" on page 607](#) has no effect while the test set is in test mode.

Receiver Control - Auto

If the receiver control field is set to auto (see “[RFANalyzer:CONTrol:AUTo](#)” on page 455), the test set’s receiver frequency is set according to the fields or GPIB commands in the following table.

Table 1. Test Set Receiver Frequencies (Receiver Control = Auto)

| Test Function | Receiver Frequency Fields | GPIB Command |
|---------------|---------------------------|---|
| BCH | Broadcast Chan (1) | “CALL[:CELL]:BCHannel[:ARFCn][:SElected]” on page 306 |
| BCH + TCH | Traffic Channel (2) | “CALL:TCHannel[:ARFCn][:SElected]” on page 371 |
| CW | RF Gen Channel | “CALL[:CELL]:BCHannel[:ARFCn][:SElected]” on page 306 |

Table Footnotes

- 1 Actual frequency depends on current broadcast band (PGSM, EGSM, PCS, or DCS), and is defined in GSM as the uplink frequency.
- 2 Actual frequency depends on current traffic channel band (PGSM, EGSM, PCS, or DCS), and is defined in GSM as the uplink frequency.

Receiver Control - Manual

If the Receiver Control field is set to Manual (see “[RFANalyzer:CONTrol:AUTo](#)” on page 455), the test set’s receiver frequency is set according to the fields or GPIB commands in the following table.

Table 2. Test Set Receiver Frequencies (Receiver Control = Manual)

| Test Function | Receiver Frequency Fields | GPIB Command |
|---------------|---------------------------|--|
| Don’t Care | Manual Channel (1) | “RFANalyzer:MANual:CHANnel[:SElected]” on page 458 |
| | Manual Frequency | “RFANalyzer:MANual:FREQuency” on page 461 |

Table Footnotes

- 1 Actual frequency is defined in GSM as the uplink frequency.

Expected Burst

This parameter is only used when the test set's operating mode is set to Test Mode or when the Cell Activated state is set to Off. (If it is not set, the test set may not synchronize to the input signal's midamble.) When operating mode is set to Active Cell and the Cell Activated state is set to On, the test set automatically selects the correct burst type.

A TCH can have one of eight midamble patterns. These patterns are called Training Sequence Codes (TSC). The Expected Burst parameter allows you to set the test set to expect a certain midamble pattern (TSC0 through TSC7) from the mobile. Alternatively, selecting RACH for this parameter allows you to set the test set to expect the special midamble pattern used by a RACH burst.

For details on the GPIB command, see [“CALL:BURSt” on page 309](#). (If you are using the test set manually, the Expected Burst field is in the CallParms window, screen 3 of 3, F12.)

```
OUTPUT 714;"CALL:BURST:TYPE TSC5" !Sets the test set to expect a TCH with midamble
!pattern TSC5.
```

BCH Test Function Behavior

- The test set generates a BCH without a TCH. BCH configuration and timeslot configuration are the same as when the operating mode is set to active cell.
- Cell power is set using the [“CALL:POWer” on page 355](#) command.
- By default, the test set expects the mobile station to transmit on the uplink BCH. The test set's receiver frequency can be set manually, which de-couples the automatic setting.
- Changes to the MS TX level will couple to the expected power, and the MS TX Level parameter will be transmitted on the downlink BCCH.
- All measurements are available to you as if the operating mode was set to active mode.

Example 1. BCH Test Function Using Auto Receiver Control

The following example shows how to set up a test mode measurement using the BCH test function. In this example the test set is configured to transmit a BCH on PGSM channel 21, and receive the mobile station on PGSM channel 21 at a power level of 12.

1. Select test mode.

```
OUTPUT 714;"CALL:OPERATING:MODE TEST"
```

2. Select PGSM as the broadcast band.

```
OUTPUT 714;"CALL:CELL:BAND PGSM"
```

3. Select BCH as the test function.

```
OUTPUT 714;"CALL:FUNCTION:DOWLINK BCH"
```

4. Configure the receiver control to auto.

```
OUTPUT 714;"RFANALYZER:CONTROL: AUTO ON"
```

5. Set the BCH to channel 21.

```
OUTPUT 714;"CALL:BCH:PGSM 21"
```

6. Set the MS TX level to 12.

```
OUTPUT 714;"CALL:MS:TXLEVEL 12"
```

7. To make the measurement, set up the mobile station to transmit on PGSM channel 21 at a power level of 12.

Example 2. BCH Test Function Using Manual Receiver Control

The following example shows how to set up a test mode measurement using the BCH test function. In this example the test set is configured to transmit a BCH on PGSM channel 21. Manual receiver control is used to configure the test set to measure a signal from the mobile station at 895 MHz and 14 dBm. Note that the frequency can also be tuned by channel number.

1. Select test mode.

```
OUTPUT 714;"CALL:OPERATING:MODE TEST"
```

2. Select PGSM as the broadcast band.

```
OUTPUT 714;"CALL:CELL:BAND PGSM"
```

3. Select BCH as the test function.

```
OUTPUT 714;"CALL:FUNCTION:DOWLINK BCH"
```

4. Set the BCH to channel 21.

```
OUTPUT 714;"CALL:BCH:PGSM 21"
```

5. Configure the receiver control to manual.

```
OUTPUT 714;"RFANALYZER:CONTROL:AUTo OFF"
```

6. Configure the test set's receiver frequency to 895 MHz.

```
OUTPUT 714;"RFANALYZER:MANUAL:FREQUENCY 895 MHZ"
```

If tuning by channel number, see ["RFANalyzer:MANual:CHANnel\[:SELected\]" on page 458](#)

7. Set the receiver's expected power level to 14 dBm.

```
OUTPUT 714;"RFANALYZER:EXPECTED:POWER 14 DBM"
```

8. To make the measurement, set up the mobile station to transmit at 895 MHz and at a power level of 14 dBm.

BCH + TCH Test Function Behavior

- The test set generates BCH + TCH on the downlink path. The BCH + TCH burst modulation is the same as when the operating mode is set to active cell.
- Cell power is set using the “[CALL:POWer](#)” on page 355 command.
- Manually synchronizing the mobile station to the BCCH is not under direct control of the test set. You are responsible for this synchronization.
- Changes to the TCH timeslot and TCH ARFCN will reconfigure the downlink (although no channel assignment signaling will take place).
- By default, the test set’s receiver is configured to receive the mobile station’s signal at the TCH uplink frequency. The test set’s receiver frequency can be set manually, which decouples the automatic setting.
- Changes to the MS TX level will couple to the expected power, and the MS TX Level parameter will be transmitted on the downlink BCCH and SACCH.
- Changes to TCH timing advance will also appear on the downlink SACCH. Whether the mobile station makes use of these parameters is a function of the mobile station.
- All measurements are available to you, the same as if the operating mode was active mode.

Example 3. BCH + TCH Test Function Using Auto Receiver Control

The following example shows how to set up a test mode measurement using the test function BCH + TCH. In this example the test set is configured to transmit a BCH on PGSM channel 21, a TCH on PGSM channel 31, and receive the mobile station on PGSM channel 31 at power level 12.

1. Select test mode.

```
OUTPUT 714;"CALL:OPERATING:MODE TEST"
```

2. Select PGSM as the broadcast band (traffic channel band will automatically be set to this band).

```
OUTPUT 714;"CALL:CELL:BAND PGSM"
```

3. Select BCH as the test function.

```
OUTPUT 714;"CALL:FUNCTION:DOWLINK BCHTCH"
```

4. Configure the receiver control to auto.

```
OUTPUT 714;"RFANALYZER:CONTROL:AUTO ON"
```

5. Set the BCH to channel 21.

```
OUTPUT 714;"CALL:BCH:PGSM 21"
```

6. Set the TCH to channel 31.

```
OUTPUT 714;"CALL:TCH:PGSM 31"
```

7. Set the MS TX Level to 12.

```
OUTPUT 714;"CALL:MS:TXLEVEL 12"
```

8. To make the measurement, set the mobile station to transmit on PGSM channel 31 at a power level of 12.

Example 4. BCH + TCH Test Function Using Manual Receiver Control

The following example shows how to set up a test mode measurement using the test function BCH + TCH. In this example the test set transmits a BCH on PGSM channel 21 and a TCH on PGSM channel 31. Manual receiver control is used to configure the test set to measure a signal from the mobile station at 895 MHz, the frequency can also be tuned by channel number with the manual channel parameter. Expected power is set at +14 dBm.

1. Select test mode.

```
OUTPUT 714;"CALL:OPERATING:MODE TEST"
```

2. Select PGSM as the broadcast band (the TCH will automatically be set to this band).

```
OUTPUT 714;"CALL:CELL:BAND PGSM"
```

3. Select BCH + TCH as the test function.

```
OUTPUT 714;"CALL:FUNCTION:DOWLINK BCHTCH"
```

4. Set the BCH to channel 21.

```
OUTPUT 714;"CALL:BCH:PGSM 21"
```

5. Set the TCH to channel 31.

```
OUTPUT 714;"CALL:TCH:PGSM 31"
```

6. Configure the receiver control to manual.

```
OUTPUT 714;"RFANALYZER:CONTROL:AUTo OFF"
```

7. Configure the test set's receiver frequency to 895 MHz.

```
OUTPUT 714;"RFANALYZER:MANUAL:FREQUENCY 895 MHZ"
```

If tuning by channel number, see "[RFAnalyzer:MANual:CHANnel\[:SElected\]](#)" on page 458

8. Set the receivers expected power level to 14 dBm.

```
OUTPUT 714;"RFANALYZER:EXPECTED:POWER 14 DBM"
```

9. To make the measurement, set up the mobile station to transmit at 895 MHz and at a power level of 14 dBm.

CW Test Function Behavior

When the test set's downlink function is set to CW the test set operates like a signal generator with level and frequency controls. The CallParms selections change from Cell Power to RF Gen Power, from Cell Band to RF Gen Band, from Broadcast Chan to RF Gen Channel. The CW setting also gives you the opportunity to set output frequency using the RF Gen Freq parameter.

- The test set generates an unmodulated CW downlink signal.
- The RF generator's power is set using the “[CALL\[:CELL\]:RFGenerator:POWER\[:SAMPLitude\]](#)” on page 362 command.
- The RF generator's band is set using the “[CALL\[:CELL\]:RFGenerator:BAND](#)” on page 358 command.
- The downlink frequency is controlled by the RF Gen Channel and RF Gen Freq fields. The RF Gen Channel field sets the generator to the frequency corresponding to the channel number in the current RF Gen Band field using the “[CALL\[:CELL\]:RFGenerator:CHANnel\[:SElected\]](#)” on page 359 command.
- The RF generator's frequency is set using the “[CALL\[:CELL\]:RFGenerator:FREQuency](#)” on page 362 command, in this mode the user has direct control of the output frequency without making a channel selection.
- By default, the test set's receiver is configured to receive the mobile station's signal at the current RF generator channel setting. The test set's receiver frequency can be set manually, which decouples the automatic setting.
- No uplink demodulation or channel decoding is available. BER and uplink audio measurements will not return any results.

When you update the RF Gen Channel parameter the RF Gen Freq parameter changes to indicate the frequency for that channel. When RF Gen Freq is changed the RF Channel parameter does not change. This is because you may select a frequency that is not a channel.

Example 5. CW Test Function Using RF Generator Frequency

The following example shows how to set up a test mode using the CW test function. In this example the test set transmits a CW signal on DCS frequency 1805.4 mHz at an output power level of -80 dBm.

1. Set the RF generator output power to -80 dBm.

```
OUTPUT 714;"CALL:CELL:RFGENERATOR:POWER -80"
```

2. Select test mode.

```
OUTPUT 714;"CALL:OPERATING:MODE TEST"
```

3. Select PGSM as the RF generator band.

```
OUTPUT 714;"CALL:CELL:RFGENERATOR:BAND DCS"
```

4. Select CW as the test function.

```
OUTPUT 714;"CALL:FUNCTION:DOWLINK CW"
```

5. Configure the test set's output frequency to 1805.4 MHz.

```
OUTPUT 714;"CALL:CELL:RFGENERATOR:FREQUENCY 1805.4MHZ"
```

Related Topics

[“Configuring the Broadcast Channel \(BCH\)” on page 609](#)

[“Configuring the Traffic Channel \(TCH\)” on page 619](#)

[“CALL:OPERating” on page 340](#)

[“Receiver Control” on page 616](#)

Bursted Parameters

This section is *not* applicable to GSM.

The majority of the test set's base station emulator parameters allow you to set or query a single value which is applied to all allowed burst (or timeslot) locations. However, there are a number of parameters for GPRS that have a :BURSt suffix. The :BURSt suffix indicates that the parameter name refers to a set of parameters, one for each of the possible bursts. These are called bursted parameters.

Bursted parameters use the concept of an active burst. An active burst is a timeslot that is expected to contain RF power relating to a traffic channel based on the multislot configuration. Bursted parameters are activated when the burst you have set a value for becomes active.

Bursted parameters are useful when changing the multislot configuration. For example, they allow you to specify the uplink burst TX level for a burst that is not currently active.

The GPIB command for each bursted parameter lets you specify one of the allowable bursts. If you do not specify a burst number, then burst one is assumed. The burst numbers you specify are relative from the first active uplink or downlink burst.

There are currently two bursted parameters for GPRS. To set or query:

- the Downlink Burst Power Reduction Selection, see [“CALL:PDTCH | PDTChannel:PREduction:BURSt\[1 | 2\]” on page 352](#).
- the Uplink Burst TX Level, see [“CALL:PDTCH | PDTChannel:MS:TXLevel\[:SElected\]:BURSt” on page 350](#).

Operating Considerations

The test set currently allows you to test a GPRS mobile station which supports a single uplink timeslot. For this reason, the Uplink Burst TX Level parameter only allows you to set or query a value for a single uplink burst (or timeslot).

The Uplink Burst TX Level parameter is also a frequency banded parameter (see [“Frequency Banded Parameters” on page 597](#)).

Related Topics

[“Configuring the Packet Data Traffic Channel \(PDTCH\)” on page 615](#)

[“CALL:PDTCH|PDTChannel” on page 345](#)

Testing a Mobile for Enhanced Full Rate Speech Channel Mode

This test is *not* applicable to GPRS.

The channel mode function allows you to command a mobile to switch between full rate speech and enhanced full rate speech either before a call is originated, or during a call connected state with any or all of the supported measurements running.

The following measurements are supported in enhanced full rate speech mode:

- Analog Audio (AAUDio)
- Bit Error Rate (BERRor)
- Fast Bit Error Rate (FBERror)
- Dynamic Power (DPOWer)
- I/Q Tuning (IQTuning)
- Output RF Spectrum (ORFSpectrum)
- Phase and Frequency Error (PFERror)
- Power versus Time (PVTime)
- Transmitter Power (TXPower)

You can initiate a Decoded Audio (DAUDio) measurement in enhanced full rate speech mode. However, this measurement is not supported in this channel mode and the integrity indicator will report that the results are questionable (see “[Decoded Audio \(DAUDio\) Troubleshooting](#)” on page 80).

If you change the channel mode when no call is connected, the mobile is requested to go into the selected channel mode the next time a mobile originated or mobile terminated call is initiated.

If you change the channel mode when a call is connected, the mobile is requested to go into the selected channel mode immediately.

The channel mode should only be changed when the test set is in active cell operating mode, not test operating mode.

NOTE GSM Phase 1 mobiles are not required to support enhanced full rate speech vocoder. Therefore, the behavior of a GSM Phase 1 mobile which does support enhanced full rate speech vocoder may be manufacturer dependent when used with the channel mode function.

If you switch the channel mode between enhanced full rate speech and full rate speech when the downlink speech source is set to Echo (see “[CALL:TChannel:DOWNlink:SPEech](#)” on page 375), you may hear momentary unpleasant audio bursts from the mobile.

Related Topics

[“Programming a Channel Mode Change” on page 138](#)

Testing a GPRS Mobile Station

This section is *not* applicable to GSM.

This section provides a description of how you may want to use the test set to test a GPRS mobile station which supports a single uplink timeslot. The section contains:

- “[Test Overview](#)” on page 635
- “[Procedure](#)” on page 636
- “[Operating Considerations](#)” on page 637

If you want a detailed description of how to write a basic control program that performs fundamental manufacturing tests on a GPRS mobile station, see “[Programming the Agilent Technologies 8960 Series 10 for GPRS Mobile Testing in Active Cell Operating Mode](#)” on page 235.

Test Overview

To test a GPRS mobile station, you need to perform the following steps:

- “[Configure the base station emulator, mobile station, and measurement execution parameters](#)” on page 636
- “[Switch on the GPRS mobile station, perform an attach and establish a data connection](#)” on page 636
- “[Make measurements and obtain results](#)” on page 637
- “[Reconfigure the data connection and make more measurements \(if required\)](#)” on page 637
- “[Disconnect the Mobile Station from the base station emulator](#)” on page 637

These steps are described in more detail in the next section.

Procedure

1. Configure the base station emulator, mobile station, and measurement execution parameters

Before starting to transfer data and make measurements on a GPRS mobile station, you may need to configure some, or all of the following parameters:

- Broadcast channel (BCH) parameters:
 - Cell Band (see “[CALL\[:CELL\]:BAND](#)” on page 304)
Note that the PCS band is not currently supported for GPRS mobile station testing.
 - Cell Power (see “[CALL\[:CELL\]:POWer:AMPLitude](#)” on page 356)
- Packet data traffic channel (PDTCH) parameters:
 - Packet Data Traffic Channel Band (see “[CALL:PDTCH | PDTChannel:BAND](#)” on page 349)
 - Packet Data Traffic Channel (ARFCN) (see “[CALL:PDTCH | PDTChannel\[:ARFCn\]:\[SELected\]](#)” on page 346)
 - Downlink Packet Data Traffic Channel Power Control:
 - Downlink Power Reduction Level (dB) (see “[CALL:PDTCH | PDTChannel:PREduction:LEVel\[1 | 2\]](#)” on page 352)
 - Downlink Burst Power Reduction Selection (see “[CALL:PDTCH | PDTChannel:PREduction:BURSt\[1 | 2\]](#)” on page 352)
 - Data Connection Type (see “[CALL:FUNCTION:DATA:TYPE](#)” on page 321)

Note that some BCH and PDTCH parameters are fixed parameters. This means that their values cannot be changed (see “[Fixed Parameters](#)” on page 639).

- Mobile station operating parameters:
 - PDTCH MS TX Level (see “[CALL:PDTCH | PDTChannel:MS:TXLevel\[:SELected\]:BURSt](#)” on page 350)
- Measurement execution parameters:
 - The SETup subsystem is used to configure measurement parameters. For a brief description of this subsystem and links to the GPIB commands, see “[SETup Subsystem](#)” on page 462. For a more detailed description of measurement execution parameters along with programming examples, see “[Step 4: Configure the Measurement Execution Parameters](#)” on page 247.

2. Switch on the GPRS mobile station, perform an attach and establish a data connection

When you connect your mobile station to the test set and switch the mobile station on, it should automatically perform a GPRS attach. (For those mobile station’s which do not automatically perform a GPRS attach, you may have to instruct the mobile station to go into a data mode. The method for doing this will vary from one mobile station to another. For example, you may have to press a key on the mobile station’s keypad, or make a selection from the mobile station’s on-screen menu system.)

The mobile station must be GPRS attached before you can use the command “[CALL:FUNCTION:DATA:START](#)” on page 321 to start the data connection. You can verify that a data connection has been successfully established, by checking that the connection status is “transferring”. (If you require more details on connection states see “[Data Connection Processing State Synchronization](#)” on page 53).

3. Make measurements and obtain results

Now that the data connection is successfully established, you can start making concurrent transmitter measurements and gathering results. Output RF Spectrum, Transmitter Power, Phase and Frequency Error, and Power versus Time are all available for GPRS. In addition, a receiver BLock Error Rate (BLER) result is available. If you plan to control your mobile station directly through its serial connection to measure received signal level, you should perform this measurement at this time.

The FETch subsystem is used to obtain transmitter measurement results. For a description of this subsystem along with links to the GPIB commands, see “[FETCh? Subsystem](#)” on page 380.

The “[CALL:STATus:PDTCH | PDTChannel:BLERror?](#)” on page 367 is used to obtain BLER results. You may want to vary the downlink power to stress the mobile’s receiver during your testing (see “[Downlink PDTCH Power Control](#)” on page 637). If you require more details on BLER, see “[BLER Reports Measurement Description](#)” on page 73.

For more details on the process of making measurements and gathering results, see “[Step 6: Make Measurements](#)” on page 257.

4. Reconfigure the data connection and make more measurements (if required)

In order to test the mobile station using different parameters, such as channel number, channel band, or mobile station transmit level, you must reconfigure the data connection. To reconfigure the data connection, you must:

- end the data connection (using “[CALL:FUNCTION:DATA:STOP](#)” on page 321)
- use the PDTCH commands to set up the new channel (“[CALL:PDTCH | PDTChannel](#)” on page 345), and
- restart the data connection (using “[CALL:FUNCTION:DATA:START](#)” on page 321)

If you require more details, see “[Step 7: Reconfigure the Data Connection](#)” on page 267.

5. Disconnect the Mobile Station from the base station emulator

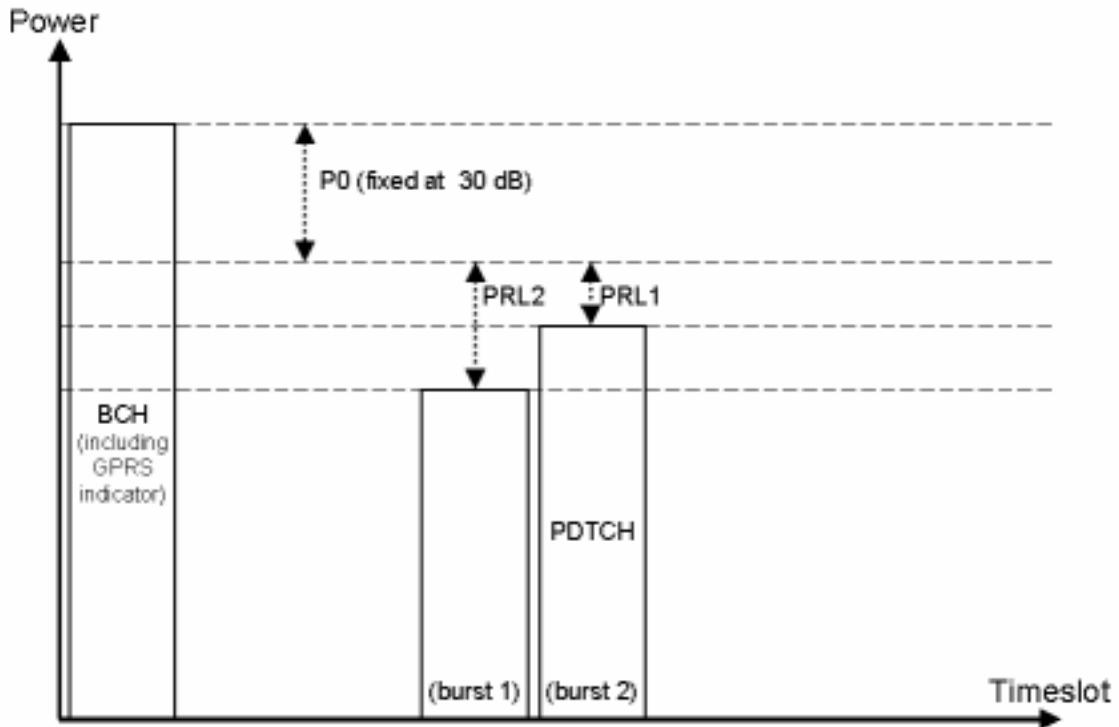
When your testing is complete, you need to end the data connection (using “[CALL:FUNCTION:DATA:STOP](#)” on page 321) and then initiate the GPRS detach procedure from the mobile station. If you require more details, see “[Step 8: Disconnect the Mobile Station from the Base Station Emulator](#)” on page 271.

Operating Considerations

Downlink PDTCH Power Control

For GPRS-specific testing of mobile stations, you must take into consideration the multislot mode of operation (where a single packet data connection uses multiple timeslots on the same ARFCN possibly at different power levels). In GPRS, downlink power levels are generally specified as a power reduction level (for each burst) from the reference level for the current connection. ETSI refers to these power reduction levels as PR values, and the reference level is known as P0. In the test set, the power reduction levels are implemented as 2 values (PRL1 and PRL2) which can be mapped to any downlink burst.

P0, PRL1, and PRL2 are shown in the figure below.

Figure 1. **GPRS Power Reduction Levels**

The P_0 reference level is fixed at 30 dB (see “[Fixed Parameters](#)” on page 639). Use the following commands to set the **BCH** power, and **PDTCH** power reduction levels:

- To set the Cell Power (**BCH** power level), use “[CALL\[:CELL\]:POWER:AMPLitude](#)” on page 356.
- To set the Downlink Power Reduction Level (dB) for **PRL1** and **PRL2**, use “[CALL:PDTCH | PDTChannel:PREduction:LEVel\[1 | 2\]](#)” on page 352.
- To make the Downlink Burst Power Reduction Selection (either **PRL1** or **PRL2**) for each **PDTCH** burst, use “[CALL:PDTCH | PDTChannel:PREduction:BURSt\[1 | 2\]](#)” on page 352.

Fixed Parameters

A number of GPRS parameters currently have fixed values. These fixed parameters are shown in the following table.

Table 9. GPRS Fixed Parameters

| Fixed Parameter | Value |
|---------------------------------|--|
| Broadcast Channel (ARFCN) | DCS: 512 EGSM: 20 PCS: 512 PGSM: 20 |
| Broadcast Allocation (BA) Table | DCS: 512 EGSM: 20 PCS: 512 PGSM: 20 |
| Base Station Colour Code (BCC) | 5 |
| Location Area Code (LAC) | 1 |
| Mobile Country Code (MCC) | 1 |
| Mobile Network Code (MNC) | 1 |
| Network Colour Code (NCC) | 1 |
| Routing Area Code (RAC) | 1 |
| Downlink PDTCH P ₀ | 30 dB |
| Multislot Configuration | 2 (downlink) x 1 (uplink) |
| Coding Scheme | CS-4 |

Related Topics

[“Programming the Agilent Technologies 8960 Series 10 for GPRS Mobile Testing in Active Cell Operating Mode” on page 235](#)

[“Active Cell Operating Mode” on page 607](#)

[“Configuring the Broadcast Channel \(BCH\)” on page 609](#)

[“Configuring the Packet Data Traffic Channel \(PDTCH\)” on page 615](#)

Preset Descriptions

Description

The test set is capable of accepting several different preset commands.

At no time during a preset operation, will transmit power exceed the last user setting of the transmit power. The input power will not be set to any value lower than the last user setting of the input power. This is to avoid power spikes on the output and possible receiver damage on the input during transitions associated with preset operations.

Partial Preset

```
OUTPUT 714;"SYSTEM:PRESET3" !Command for a partial preset when user in
!remote operation.
```

SYSTEM:PRESET3 is the recommended command for a partial preset operation. The SYSTEM:PRESET[1] command is not recommended for use at this time.

Full Preset

A full preset requires you to setup new measurements and their parameters. If new setup parameters are not needed, use a partial preset to save time.

Example

```
OUTPUT 714;"*RST" !Recommended command for a full preset, sets trigger arm to single.
```

```
OUTPUT 714;"SYSTEM:PRESET2" !Command for a full preset, sets trigger arm to continuous.
```

The *RST common command is the recommended command for a full preset operation.

| | |
|-------------|---|
| NOTE | Transmit power is not set to OFF during a full preset, transmit power will be set to the default value. |
|-------------|---|

*RST gives the same results as partial preset with the exception of Trigger Arm and the measurement parameters.

Table 10. Full Preset Behavior

| Function | Result |
|------------------------|---|
| Trigger Arm | Continuous (manual operation full preset or SYSTEM:PRESET2 command) |
| Trigger Arm | Single (remote operation full preset, *RST command) |
| Measurement Parameters | all set to defaults |

Table 10. Full Preset Behavior

| Function | Result |
|--------------------------------|------------------------------------|
| Maskable Message Display State | On (manual operation full preset) |
| Maskable Message Display State | Off (remote operation full preset) |

Status Preset

The STATUS:PRESET command will set the status system as defined in “SCPI 1995 Volume 2: Command Reference” section 20.7. All of the enable registers will be set to 0, all PTR registers will be set to 1, and all NTR registers will be set to 0.

Example

```
OUTPUT 714;"STATUS:PRESET" !Presets the STATus subsystem.
```

Related Topics

[“SYSTem:PRESet” on page 588](#)

[“*RST” on page 592](#)

Instrument Status Area

Description

The Instrument status area is found on the bottom center of the test set's display.

Figure 2. Status Area of the Test Set Display



Background

Users are able to initiate more than one measurement at a time with the test set. The test set's display will show a maximum of 2 measurements. When 3 or more measurements are initiated, or the MEASUREMENT screen is not displayed, the Background annunciator reminds you that measurements are active but not displayed.

<Operating Mode> Status

The call processing status and the operating modes are displayed in this area. This area may change (depending on the TA that is active) in order to provide TA specific information.

Shift

This annunciator indicates that the blue SHIFT key has been pressed, and that the next key you press will perform the shifted function indicated, also in blue.

Ext Ref

When a suitable external time base is connected to the rear panel 10MHz REF IN connector, this annunciator will turn on.

Int Ref

When a suitable external time base is not connected to the rear panel 10MHz REF IN connector, this annunciator will turn on.

Offset

Indicates that the Amplitude Offset state is set to On.

RLTS

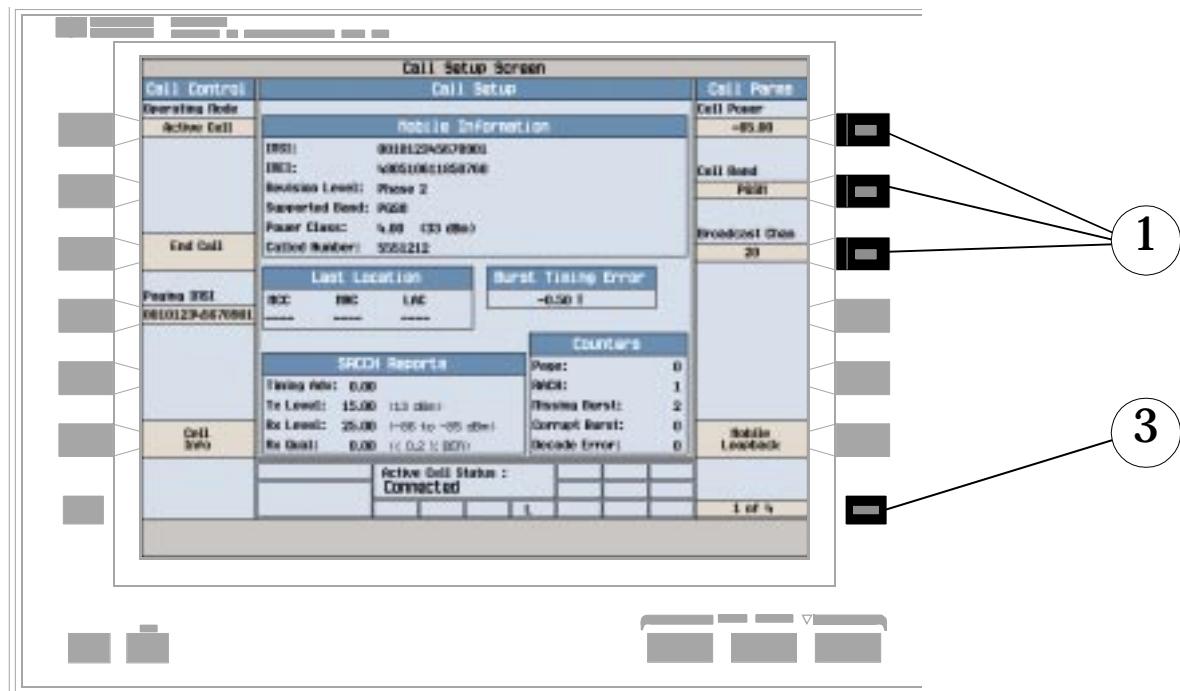
This annunciator indicates the state of four different conditions of the test set:

- Remote annunciator. 'R' turns on when the test set is operated remotely.
- Listen annunciator. 'L' turns on when the test set is listening to a command.

- Talk annunciator. 'T' turns on when the test set is providing information over GPIB.
- SRQ annunciator. 'S' turns on when an SRQ is active.

How Do I Change Call Parameters?

This section is *not* applicable to GPRS.

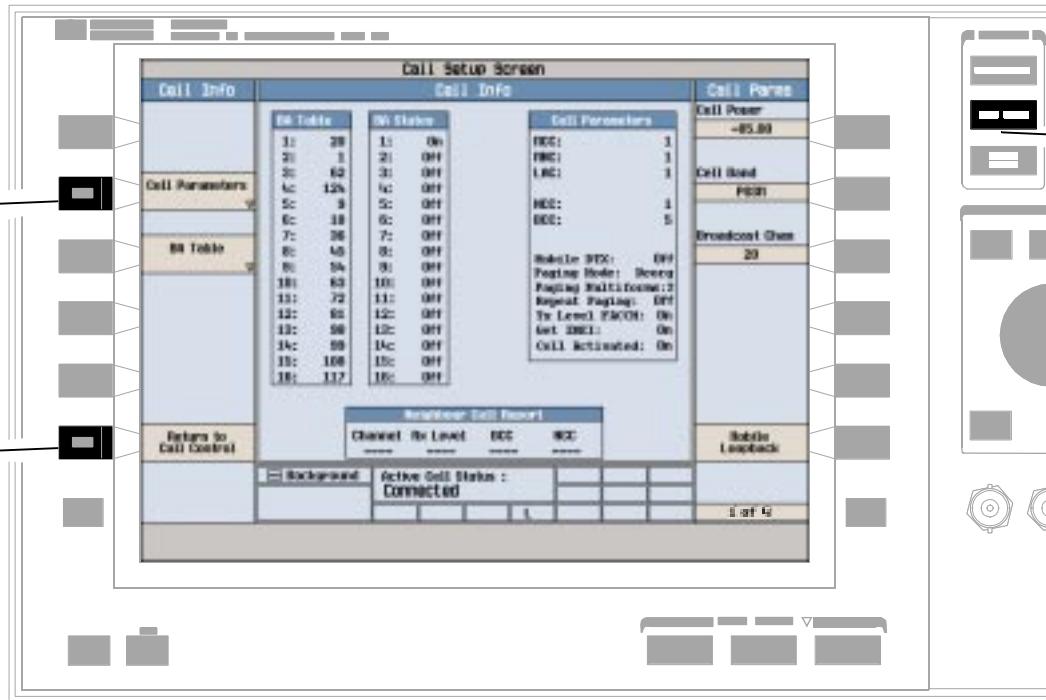


1. Press **F7**, **F8**, or **F9**.
2. Enter a value or highlight a selection and press the knob.
3. Press the **MORE** key for additional call parameters (**Call Params**). Note: For a dual-band handover, change **Traffic Band** selection (**F7, Call Params menu 2 of 4**).

How Do I Change Cell Parameters?

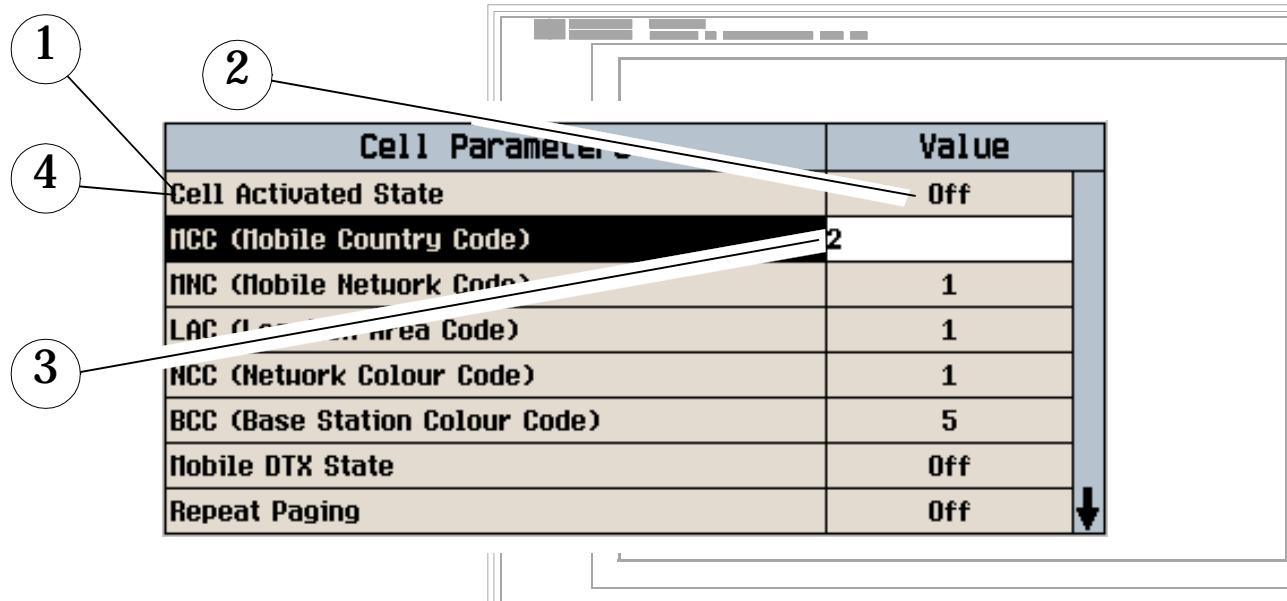
This section is *not* applicable to GPRS.

A. Select the cell parameters menu.



1. Press the **CALL SETUP** key.
2. Press **Cell Info (F6)**.
3. Press **Cell Parameters (F2)**.

B. Set a cell parameter.



To Change “Network” cell parameters follow the instructions below. For all other cell parameters:

Highlight the parameter, press the knob, enter a value, and press the knob.

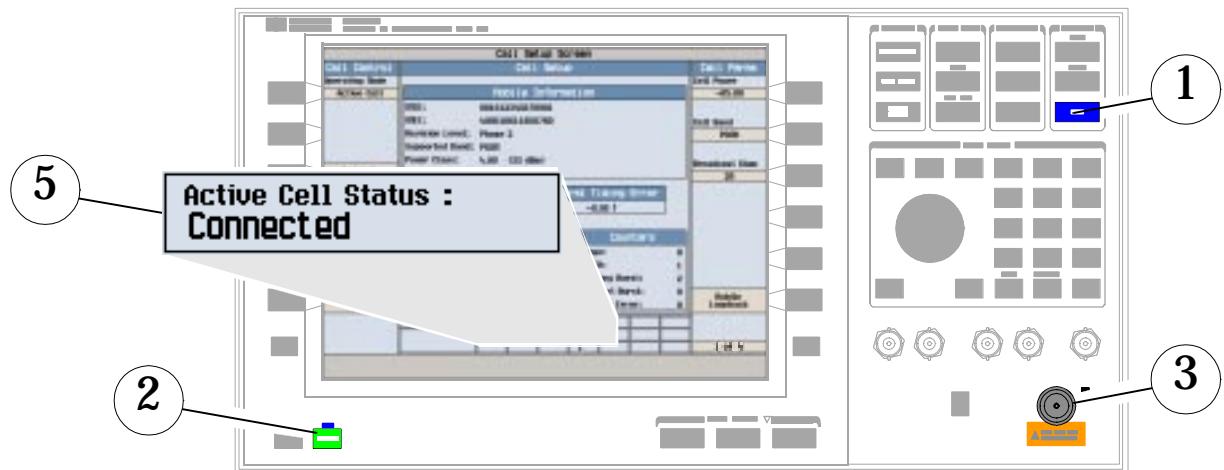
To Change “Network” cell parameters:

1. Highlight **Cell Activated State** and press the knob.
2. Set **Cell Activated State** to **Off**. (Highlight **Off** and press the knob.)
3. Set “Network” cell parameter to the desired value. (Highlight the parameter, press the knob, enter a value, and press the knob.)
4. Set **Cell Activated State** to **On**.

How Do I Make Measurements on a Mobile?

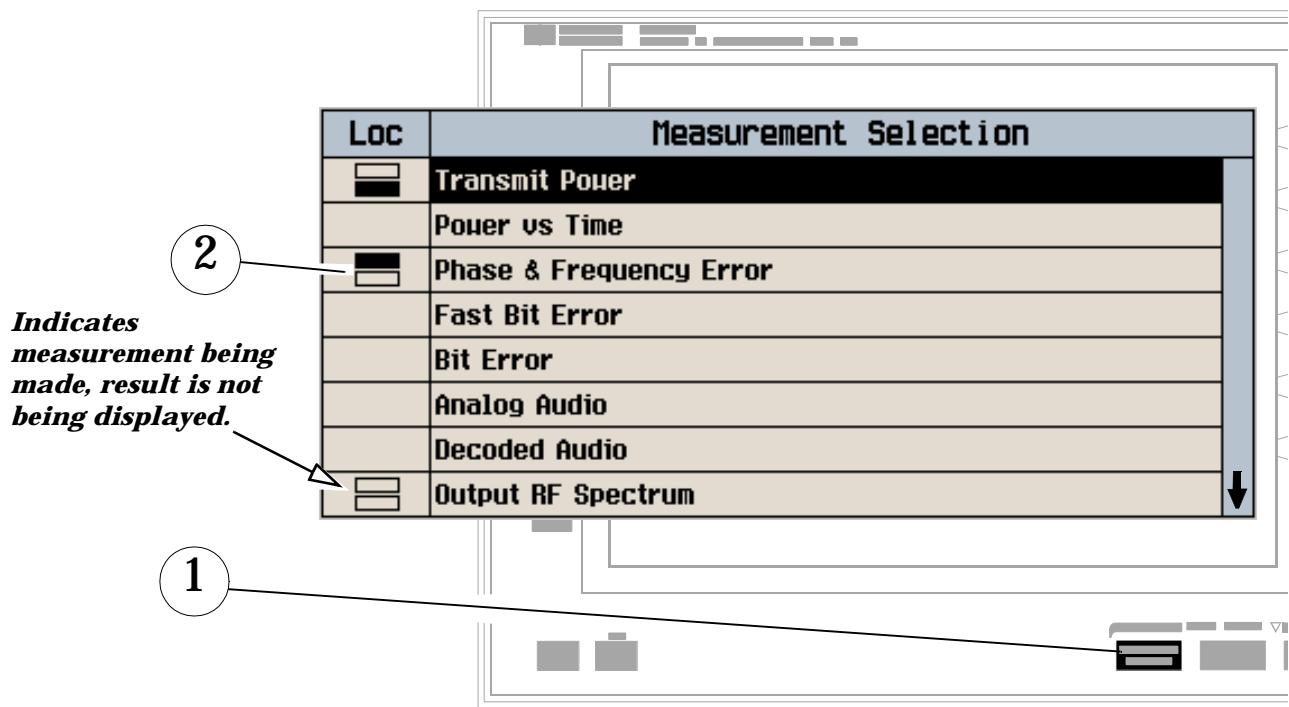
This section is *not* applicable to GPRS.

A. Establish a call.



1. Press the blue **SHIFT** key.
2. Press the green **Preset** key.
3. Connect the mobile. Note: Is the mobile camped? PGSM is default Cell Band setting.
4. On the mobile press 1, 2, 3, and then press send.
5. Check for **Connected** in the **Active Cell Status:** field.

B. Select measurements.

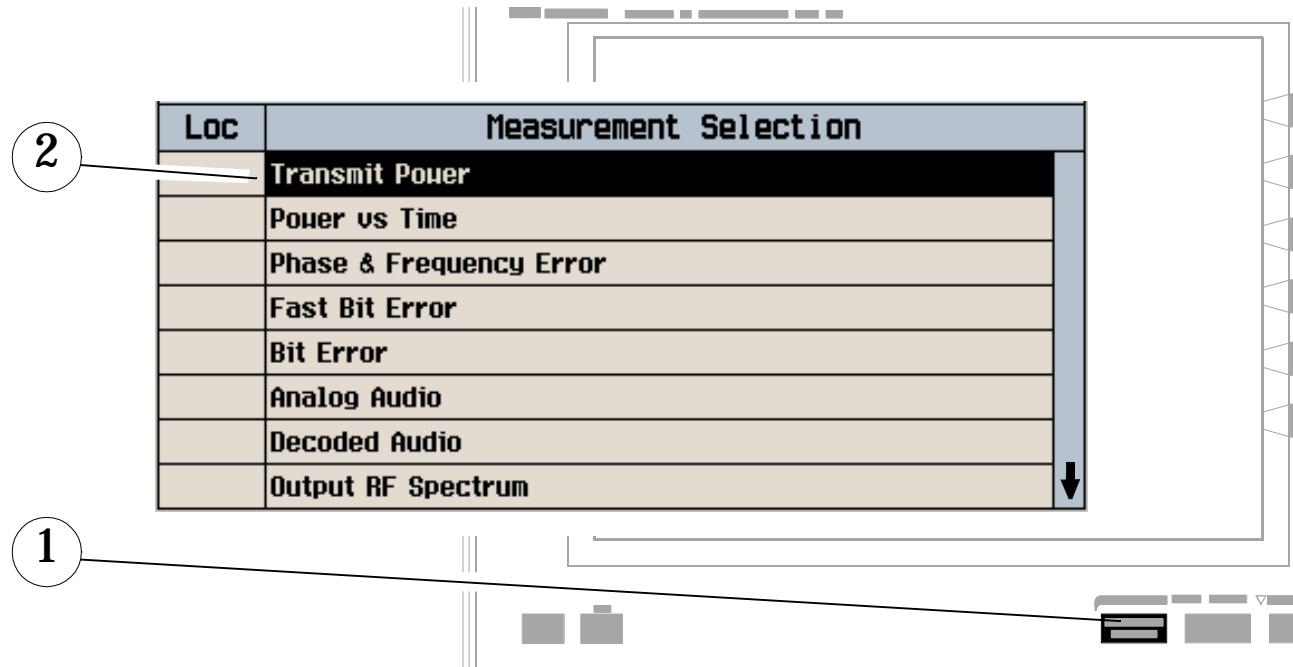


1. Press the Measurement selection key.
2. Highlight a measurement and press the knob.
3. Repeat steps 1 and 2 to add measurements.

How Do I Change Measurement Setup?

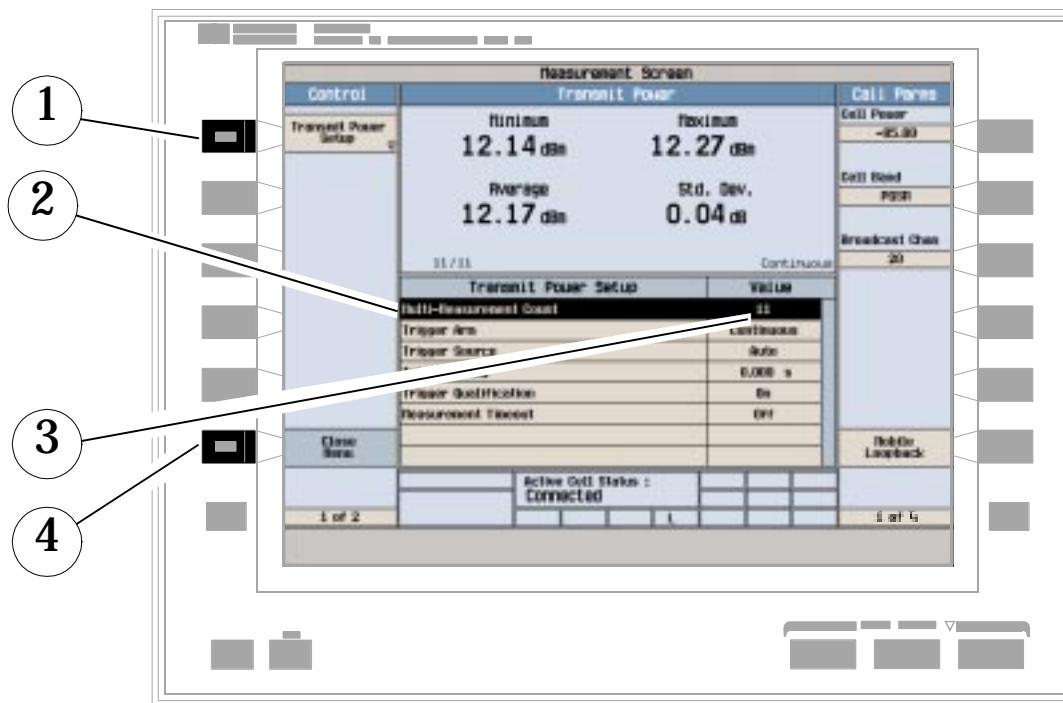
This section is *not* applicable to GPRS.

A. Select a measurement.



1. Press the **Measurement selection** key.
2. Highlight a measurement to setup and press the knob.

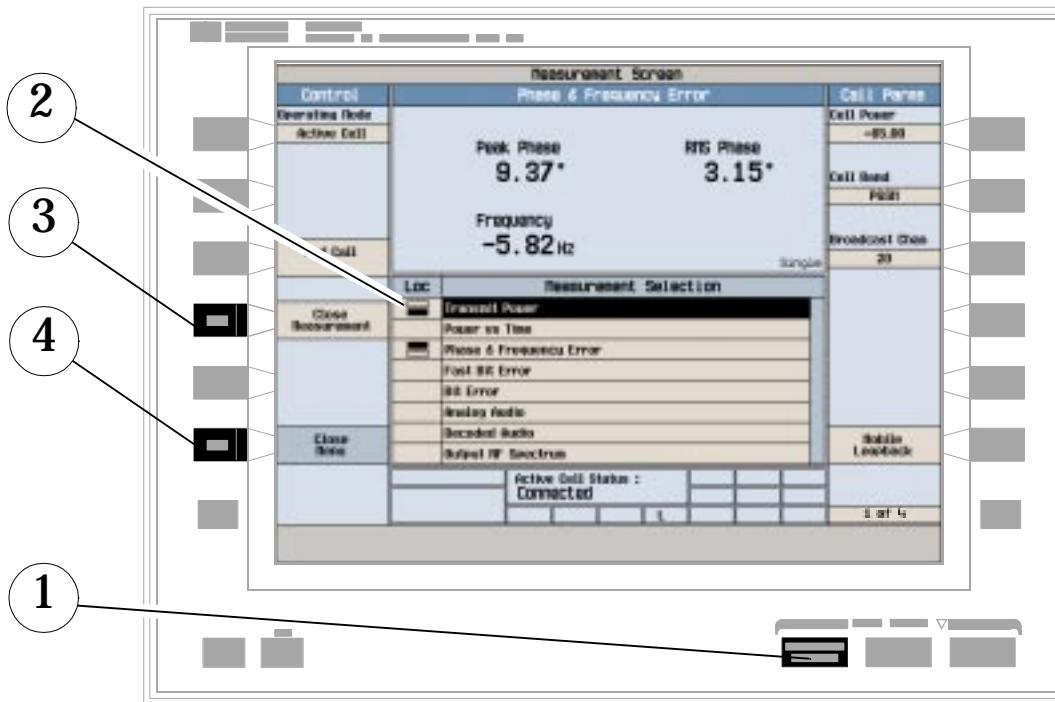
B. Set up the measurement.



1. Press the measurement's **Setup (F1)** key.
2. Highlight a parameter and press the knob.
3. Enter a value or make a selection and press the knob. Note: For statistical measurement results, change the **Multi-Measurement Count** parameter from **Off** to a number >1.
4. Press **Close Menu (F6)**.

How Do I Turn Off a Measurement?

This section is *not* applicable to GPRS.

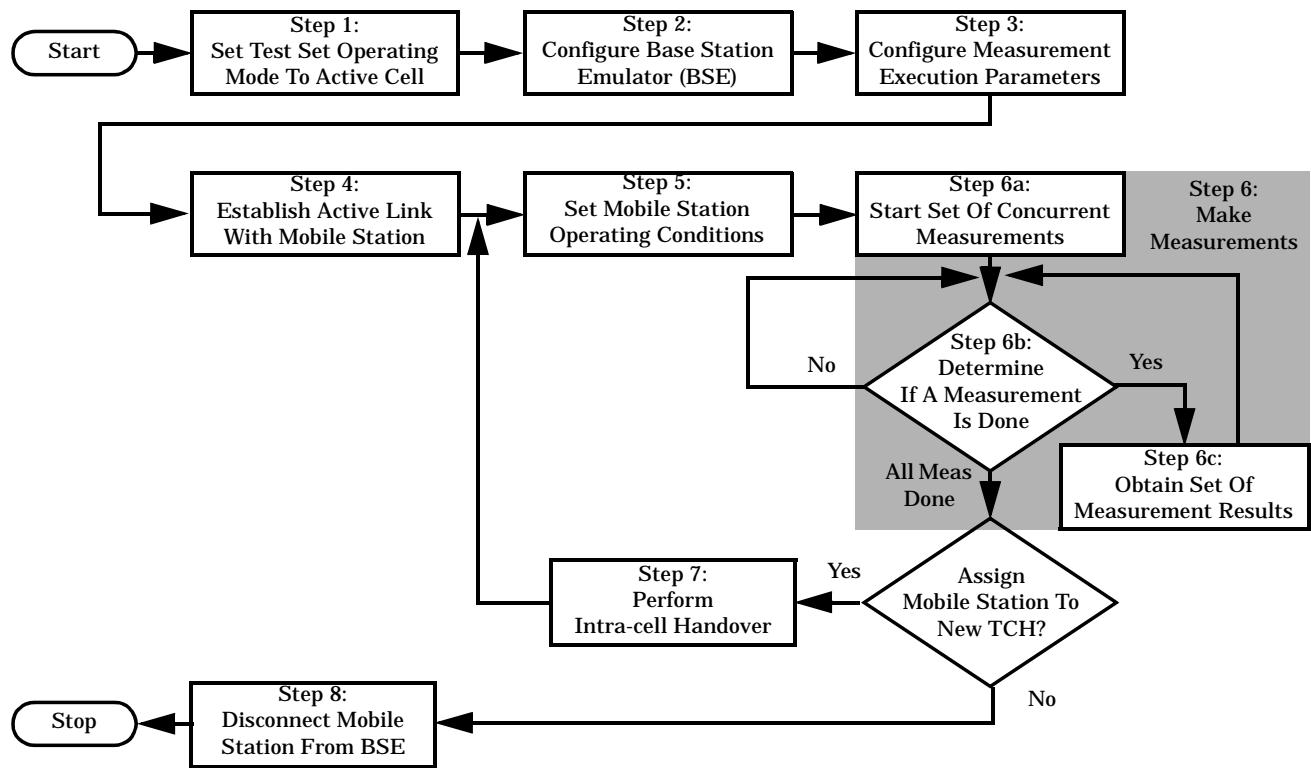


1. Press the **Measurement selection** key.
2. Highlight the measurement you want to turn off.
3. Press **Close Measurement (F4)**.
4. Press **Close Menu (F6)**.

Programming Overview

Figure 3.

Typical Flow Of Tasks Performed By Control Program



Related Topics

[“Programming a Phase and Frequency Error Measurement” on page 106](#)

[“Programming a Transmit Power Measurement” on page 129](#)

[“Programming an Output RF Spectrum Measurement” on page 99](#)

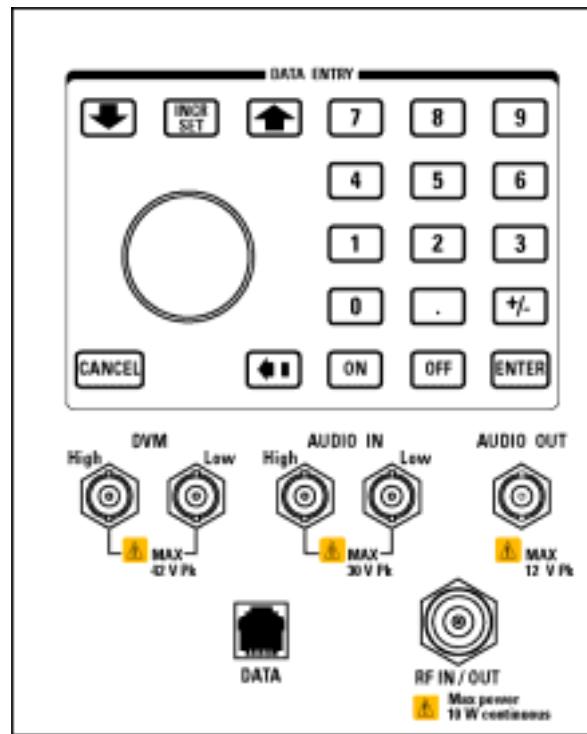
[“Programming a Power versus Time Measurement” on page 114](#)

[“Programming a Fast Bit Error Measurement” on page 93](#)

[“Establishing an Active GSM Link with the Mobile Station” on page 30](#)

Front Panel Connectors

Description



AUDIO IN

The input to the audio analyzer is a floating input differential amplifier. Both the AUDIO IN High and AUDIO IN Low BNC connectors should be connected to provide noise immunity. Refer to the technical specifications for more information.

AUDIO OUT

This BNC connector accesses to the test set's audio generator. Refer to the technical specifications for more information.

DATA

This RJ-45 connector provides front panel access to the rear panel LAN connection. This connector is used for downloading firmware upgrades, or new test applications into the test set. No other types of communication are possible with the LAN port.

Front Panel Connectors

The the DATA connector on the front panel is connected internally to the ETHERNET TO FRONT PANEL connector on the rear panel. In order to use the front panel DATA connector, connect the rear panel LAN PORT, to the rear panel ETHERNET TO FRONT PANEL connector with the LAN jumper cable.

The LAN jumper cable, part number E5515-61160, is supplied with the test set.

DVM

Not functional for this release.

RF IN/OUT

This Type-N connector is the path for all RF signals in or out of the test set. Refer to the technical specifications for more information.

Related Topics

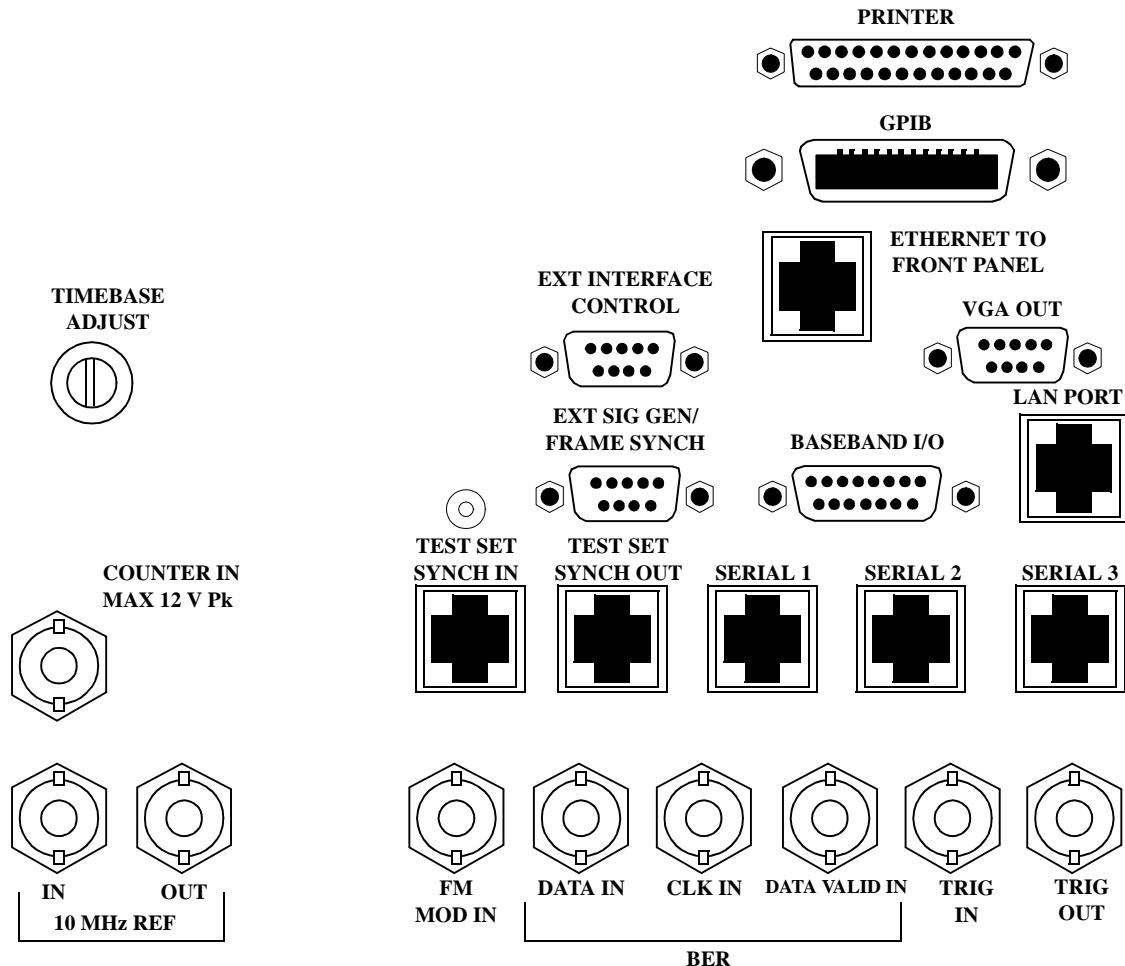
[“Analog Audio Measurement Description” on page 62](#)

[“AFGenerator” on page 290](#)

[“Configuring the Test Set’s LAN” on page 666](#)

Rear Panel Connectors

Description



BASEBAND I/O

Not functional for this release.

CLK IN

Not functional for this release.

COUNTER IN

Not functional for this release.

DATA IN

Not functional for this release.

DATA VALID IN

Not functional for this release.

ETHERNET TO FRONT PANEL

This RJ-45 connector is used with a separate LAN jumper cable to connect the front panel DATA connector to the rear panel LAN PORT.

The the DATA connector on the front panel is connected internally to the ETHERNET TO FRONT PANEL connector on the rear panel. In order to use the front panel DATA connector the user must connect the rear panel LAN PORT, to the rear panel ETHERNET TO FRONT PANEL connector with the LAN jumper cable.

The LAN jumper cable, part number E5515-61160, is supplied with the test set.

EXT INTERFACE CONTROL

Not functional for this release.

EXT SIG GEN/FRAME SYNCH

Not functional for this release.

FM MOD IN

This BNC connector let's you use an external signal to frequency modulate the test set's RF generator. It has a fixed sensitivity of 20 KHz/volt, and a frequency range of 100Hz to 20 KHz.

GPIB

The GPIB connector allows test set control with compatible devices.

LAN PORT

This RJ-45 connector provides connection for down loading firmware upgrades, or new test applications into the test set. No other types of communication are possible with the LAN port.

PRINTER

Not functional for this release.

SERIAL 1

Not functional for this release.

SERIAL 2

Not functional for this release.

SERIAL 3

Not functional for this release.

TEST SET SYNCH IN

Not functional for this release.

TEST SET SYNCH OUT

Not functional for this release.

TIMEBASE ADJUST

This is the timebase adjust cover, removing this screw allows access for timebase adjustment.

TRIG IN

Not functional for this release.

TRIG OUT

This BNC connector allows for synchronization of the test set to other equipment and is configured by setting Frame Trigger Parameters.

VGA OUT

This DB-15 connector allows the user to simultaneously route the test set's display to another monitor.

10 MHZ REF IN

This BNC connector accepts an external 10 MHz timebase signal. The nominal input impedance is 50 ohm. This version of test set can only accept a 10 MHz timebase signal.

10 MHZ REF OUT

This BNC connector provides a 10 MHz timebase signal to external test equipment. The accuracy of this signal

is determined by the timebase used. The nominal output impedance is 50 ohm with a typical level of 0.5 V rms.

Related Topics

[“Setting Frame Trigger Parameters” on page 611](#)

[“Timebase Description/Configuration” on page 678](#)

[“SYSTem:ROSCillator” on page 590](#)

[“Configuring the Test Set’s GPIB Address” on page HIDDEN](#)

[“Configuring the Test Set’s LAN” on page 666](#)

Remote/Local Mode

Description

Remote Mode

When the test set is operated remotely, all of the keys on the front panel of the test set are disabled (except the LOCAL key and the power switch). During remote operation the test set is controlled by the Remote User Interface, (RUI).

Any open menus are be closed, and any manual entries are be aborted when the test set transitions from local mode to remote mode.

The remote annunciator (R) will appear in the Instrument Status Area of the test set's display indicating that the test set is in remote mode.

When the test set is in remote mode press the LOCAL key on the front panel in order to gain manual control.

Local Mode

During local mode all front panel keys and the knob are enabled. During local operation the test set is controlled by the Manual User Interface, (MUI).

The remote annunciator (R) is turned off when the test set is operated in local mode.

9 Installation/Configuration

Display Brightness

Description

This parameter allows you to adjust the brightness of the test set's display. The test set's display screen has two brightness settings:

- medium brightness
- high brightness

Example

```
OUTPUT 714;"DISPLAY:BRIGHTNESS MEDIUM" ! sets screen brightness to medium.
```

Related Topics

["DISPLAY:BRIGHTNESS" on page 379](#)

Test Set Beeper

Description

This parameter allows you to change the beeper state to on or off. A beep will indicate error conditions caused during manual or remote operation of the test set.

A 100 ms, 1.24 kHz audible tone (beep) is generated when an error message is logged and the beeper state is set to on. If two errors are generated in quick succession, two beeps are generated to indicate that more than one error has been logged.

The beeper state can be manually set in the Instrument Setup window found in the SYSTEM CONFIG screen.

Example

```
OUTPUT 714;"SYSTEM:BEEPER:STATE OFF"
```

Related Topics

[“SYSTem:BEEPer” on page 569](#)

[“Error Messages” on page 684](#)

Description

The GPIB address is an integer between 0 and 30. The test set comes with a default address of 14 and may be set/queried using the SYSTem subsystem or manually through the system configuration screen by selecting the parameter and changing the number with the knob or the keypad.

The GPIB address is a non-volatile parameter. The GPIB address is not affected by any reset operation and can only be changed by direct access to the parameter itself.

Related Topics

["SYSTem:COMMUnicatE:GPIB:\[;SELF\]:ADDReSS" on page 571](#)

Obtaining Identification Information *IDN?

Description

Test set information is returned from a *IDN? query. The *IDN? query provides information about the Manufacturer, Model Number, Serial Number, and Firmware Revision. *IDN? is defined in IEEE Std. 488.2-1992, 10.14.

Test Set Information

*IDN? query returns identification information as a comma separated string.

```
DIM A$[100]
OUTPUT 714;"*IDN?" !returns manufacturer,model number, serial number and "0"
!separated by commas
ENTER 714;A$
PRINT A$ !prints, for example "Agilent Technologies, 8960 Series 10 E5515B,
!US38020105,0
```

- Agilent Technologies is the manufacturer.
- Printable ASCII characters excluding comma and semicolon up to a 25-character string.
Model number example: 8960 Series 10 E5515B
- Printable ASCII characters excluding comma and semicolon up to a 10-character string.
Serial number example: US00000123
- Printable ASCII characters excluding comma and semicolon up to a 20-character string.
Firmware revision example: 0

NOTE The *IDN? query will always indicate that the firmware revision is zero.
SYSTem:APPLication[:CURRent]:REVision? is the recommended way to query the firmware revision.

Related Topics

“*IDN?” on page 592

“CALibration:DATE” on page 295

“Obtaining Test Application Information” on page 677

“SYSTem:COMMUnicatE” on page 570

Configuring the Test Set's LAN

Description

LAN IP Address

The LAN address is a character string with a maximum of 15 characters and a format of A, B, C, D, where A is between 0 and 223, and B, C, and D are between 0 and 255. No embedded spaces are allowed. The address may be manually set/viewed in the system configuration screen. The LAN address can be set/queried using the SYSTem subsystem.

The LAN address is a non-volatile parameter. The LAN address is not affected by any reset operation and can only be changed by direct access to the parameter itself.

NOTE If the LAN address is set to a different network class, the subnet mask will change to the default net mask for the new network class.

For convenience the DATA port on the front panel may be configured as a LAN port. When a RJ45 jumper cable, (part number E5515-61160) is connected from the LAN PORT on the rear panel, to the ETHERNET TO FRONT PANEL port also on the rear panel, the user has LAN access from the front panel of the test set. Without the RJ45 jumper cable, the test set connection to a LAN is the rear-panel, LAN PORT connector.

LAN Default Gateway

The LAN router, (default gateway), is a character string with a maximum of 15 characters and a format of A, B, C, D, where A is between 0 and 223, and B, C, and D are between 0 and 255, no embedded spaces are allowed. If the default gateway is set to a format not allowed with the LAN address or the subnet mask that have been selected, the default gateway will be set to a null string, indicated by a blank field on the test set display. The address may be manually set/viewed in the system configuration screen. The LAN default gateway can be set/queried using the SYSTem subsystem.

The LAN default gateway is the address of a router that routes messages between networks and or subnets. If this value is not specified, LAN communications will be limited to the network and subnet specified by the LAN IP address and the subnet mask. Your network administrator will know if a default gateway is needed and if so, the address of the router. If the default gateway address is not needed by your network, it may be disabled by entering any of the following values: "0" (zero), "" (null string), "0.0.0.0"

The LAN default gateway is a non-volatile parameter. The LAN default gateway is not affected by any reset operation and can only be changed by direct access to the parameter itself.

LAN Subnet Mask

The LAN subnet mask address is a character string with a maximum of 15 characters and a format of A, B, C, D, where A, B, C, and D are between 0 and 255. No embedded spaces are allowed. The address may be manually set/viewed in the system configuration screen. The LAN subnet mask address can be set/queried using the SYSTem subsystem.

The subnet mask number combined with the IP address identifies which network and subnet your computer is on. Contact your system administrator for the correct subnet mask for your network.

The subnet mask determines the boundaries between the subnet ID and the host ID.

The LAN subnet mask is a non-volatile parameter. The LAN subnet mask is not affected by any reset operation and can only be changed by direct access to the parameter itself.

NOTE If the LAN address is set to a different network class, the subnet mask will change to the default net mask for the new network class.

The subnet mask number is obtained from your network administrator.

Related Topics

[“SYSTem:COMMUnicatE:LAN\[:SELF\]:ADDReSS” on page 572](#)

[“SYSTem:COMMUnicatE:LAN\[:SELF\]:DGATeway” on page 572](#)

[“SYSTem:COMMUnicatE:LAN\[:SELF\]:SMASK” on page 573](#)

Hardware Configuration Report

Description

You can generate a list of the test set's hardware configuration over the LAN or GPIB.

The LAN query is the easiest and most direct way to query the test set's hardware configuration. This method uses your web browser to display a formatted report.

The GPIB query returns an unformatted character string that must be buffered and saved to an HTML file to provide formatted text.

LAN Query

1. Refer to the SYSTEM CONFIG screen to determine the LAN address.
2. Open a web browser and enter <LAN address>/iconfig. For example, if your LAN address is 130.2.2.147, you would enter:
130.2.2.147/iconfig
3. The web browser will then display formatted text. A partial list of the hardware configuration information is shown below:

Agilent Technologies 8960 Series 10 E5515A

Serial Number: US00000097

Current Test Application: E1960A, GSM Mobile Test, A.04.01

Instrument Options Installed: RF Source 2

HOST BOOT ROM REV: A.02.03_BOOT

PROTOCOL BOOT ROM REV: MOM_PROTOCOL_BSP_1.7

DSP BOOT ROM REV: A.00.01

GPIB Query

Use the following Basic example as a model to store the test set's configuration as an HTML file.

GPIB Example:

```
10  DIM Buf1$[20000],Buf2$[20000] ! This is the minimum space for the arrays
20  OUTPUT 714;"SYSTEM:CONFIGURE:INFORMATION:HARDWARE:VERBOSE?"
30  ENTER 714,Buf1$,Buf2$
40  CREATE "HW.htm",1           ! Create an HTML file
50  ASSIGN @File TO "HW.htm"
60  OUTPUT @File;Buf1$,Buf2$
70  END
```

In the future, the hardware configuration report may increase in length. More space would then need to be allocated for the arrays.

Display the HTML file using a web browser or HTML text editor.

Related Topics

[“SYSTem:CONFigure” on page 574](#)

[“SYSTem:CURRent:TA” on page 582](#)

[“Obtaining Test Application Information” on page 677](#)

[“Obtaining Identification Information *IDN?” on page 665](#)

[“Rear Panel Connectors” on page 655](#)

Measurement Related Configuration

GSM Configuration

Description

Amplitude offset is provided in order to compensate for loss or gain of the external network between the test set and the DUT, (device under test). The offset value allows the test set to represent the RF level at the DUT at one frequency. The amplitude offset value can be viewed from the SYSTEM CONFIG screen, Port Configuration, F5 key.

GPIB Commands Available For The E1960 GSM Mobile Test Application These are the commands available to set an amplitude offset for the E1960 GSM Mobile Test Application.

When SYSTEM:CORRECTION:STATE is on; the annunciator "Offset" will be shown on the display.

OUTPUT 714;"SYSTEM:CORRECTION:STATE ON" !Set amplitude offset state to ON.

OUTPUT 714;"SYSTEM:CORRECTION:GAIN -3DB" !Set amplitude offset to 3 dB loss in network.

OUTPUT 714;"SYSTEM:CORRECTION:GAIN 6DB" !Set amplitude offset to 6 dB gain in network.

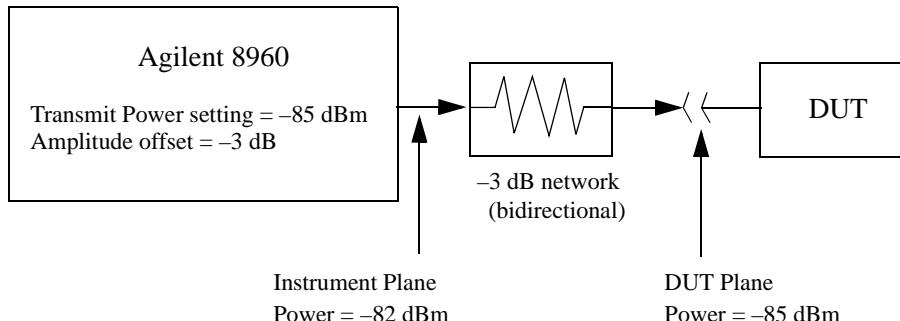
OUTPUT 714;"SYSTEM:CORRECTION:SGAIN -9DB" !Set amplitude offset state to ON and a 9 dB loss in the network.

Transmitter Example Cell power reflects the actual power at the DUT, including any gain or loss entered as an amplitude offset.

If an amplitude offset of -3 dB is set, and the cell power is set to -85 dBm, the cell power setting will indicate -85 dBm. The actual power at the output of the test set's RF IN/OUT connector is -82 dBm, the level shown for cell power is the level present at the DUT plane.

The following figure shows a transmitter example. Transmit power is the combination of the cell power and the amplitude offset values.

Figure 4. Amplitude Offset Transmitter Example



The transmit power setting reflects the power at the DUT plane.

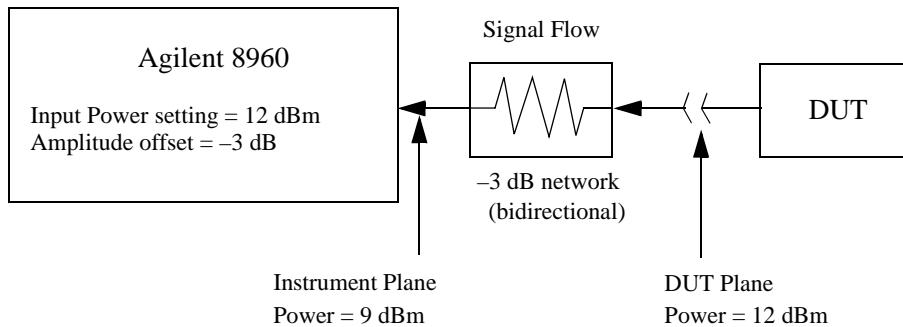
Receiver Example The expected power setting reflects the actual power at the DUT, the test set's hardware

changes internally to expect a level that includes the offset.

If an amplitude offset of -3 dB is set, and the expected power setting is set to 12 dBm. The displayed value of expected power indicates 12 dBm in order to reflect the level at the DUT, but the test set's internal hardware changes to receive 9 dBm the actual power received at the test set's RF IN/OUT connector after a -3dB amplitude offset in the network.

The following figure shows a receiver example. Input power is the combination of the expected power and amplitude offset values.

Figure 5. Amplitude Offset Receiver Example



The input power setting reflects
the power at the DUT plane.

GPRS Configuration

Description

Amplitude offset is provided in order to compensate for loss or gain of the external network between the test set and the DUT, (device under test).

The test set allows you to select up to 20 different offsets at 20 different frequencies.

There are 5 non-volatile amplitude offset parameters that require your attention:

- RF IN/OUT Amplitude Offset State
- Frequency state 1 - 20
- Frequency 1 - 20
- Offset state 1-20
- Offset 1 - 20

NOTE Frequency and offset values must be set independently.

It is not necessary to use all 20 offsets or frequencies.

RF IN/OUT Amplitude Offset State The RF IN/OUT Amplitude Offset State can be changed to On by setting any of the 20 offsets or frequencies to the On state. The RF IN/OUT Amplitude Offset State can also be turned On or Off independently of the frequency or offset state. When the RF IN/OUT Amplitude Offset State is On, the Offset indicator will appear in the Instrument Status Area of the test set display.

If the RF IN/OUT Amplitude Offset State is Off none of the amplitude offsets are active even if the states of the individual offsets are set to On.

Remote User To set the RF IN/OUT Amplitude Offset State to On:

```
OUTPUT 714;"SYSTEM:CORRECTION:STATE ON" !Sets the RF IN/OUT
!Amplitude Offset State to On
```

Manual User In order to manually set the RF IN/OUT Amplitude Offset State, go to the SYSTEM CONFIG screen, and press the RF IN/OUT Amptd Offset key, F5. Amplitude offset loss, gain and state settings are found by pressing the RF IN/OUT Amptd Offset Setup key, F2. RF IN/OUT Amplitude Offset State is the first parameter in the RF IN/OUT Amplitude Offset Setup menu.

When any of the 20 frequencies or offsets are manually set to On, the RF IN/OUT Amplitude Offset State is also set to On.

Frequency 1 - 20 Up to 20 different RF offset frequencies can be defined by you to correct network loss or gain.

When operating at frequencies not specified in the RF IN/OUT Amplitude Offset frequency list, but between the lowest and highest frequencies in the list, the test set will use linear interpolation to define offset values.

When operating at frequencies above the highest frequency specified, or below the lowest frequency specified in the RF IN/OUT Amplitude Offset frequency list, the test set will use the offset of the closest associated frequency.

If you repeat a frequency entry, only the first entry along with its offset will be used by the test set, even though both of the repeated frequencies may be shown. If a frequency is repeated a warning will appear:

NOTE Duplicate RF IN/OUT Amplitude Offset Frequency. The first occurrence of duplicate is used.

Remote User If less than 20 frequencies are sent, the first positions of the RF IN/OUT Amplitude Offset Setup menu will fill in according to the number of frequencies sent. This means that if 6 frequencies are sent, Frequency 1 through Frequency 6 will reflect the values sent by you, and Frequency 7 through Frequency 20 will remain off.

Sending any new frequency values in subsequent commands will write over the original values and set the state to Off for any frequencies not set with the new command.

Sending a null list (no values) with the frequency command results in setting the state for Frequency 1 - 20 to Off .

There are two different commands that can be used to set the RF offset frequency.

- Frequency is set, and the frequency state is set to On with this complex command:

```
OUTPUT 714;"SYSTEM:CORRECTION:SFREQUENCY 1710.2 MHZ,1805.2 MHZ,1784.8 MHZ,1879.8 MHZ"
!A complex command that sets the up to 20 comma separated frequencies and sets the state to On !for the
frequencies, offsets, and RF IN/OUT Amplitude Offset State
```

- Frequencies are set with this command:

```
OUTPUT 714;"SYSTEM:CORRECTION:FREQUENCY 1784.8 MHZ,1879.8 MHZ" !Sets up to 20 comma
!separated frequencies
```

Manual User Manual users may set the state or the value for any of the 20 frequencies from the RF IN/OUT Amplitude Offset Setup menu. Frequency values may be set in any order, i.e. set Frequency 1 and then skip to Frequency 20. The frequency state and value is individually controlled for manual users.

In order to manually set the RF offset frequencies go to the SYSTEM CONFIG screen, and press the RF IN/OUT Amptd Offset key, F5. Amplitude offset loss, gain and state settings are found by pressing the RF IN/OUT Amptd Offset Setup key, F2. RF offset frequencies 1 through 20 are listed in the RF IN/OUT Amplitude Offset Setup menu.

When any of the 20 frequencies are manually set to On, the RF IN/OUT Amplitude Offset State and the associated offset state are also set to On.

Offset 1 - 20 Up to 20 different offset values can be defined by you to correct network loss or gain.

Duplicate offsets are allowed as long as they are associated with different frequencies.

Remote User Sending any new offset values in subsequent commands will write over the original values and set the state to Off for any offsets not set with the new command.

There are two different commands to set offsets.

- Offsets are set, and the offset state is set to On with this complex command:

```
OUTPUT 714;"SYSTEM:CORRECTION:SGAIN -2.55,-3.12,-3.68,-4.23,-4.74,-5.3"
!A complex command that sets up to 20 comma separated offsets and sets the state to On for !the
frequencies, offsets and RFIN/OUT Amplitude Offset State
```

- Offsets are set with this command:

```
OUTPUT 714;"SYSTEM:CORRECTION:GAIN -3.12,-3.68,-4.23" !Sets up to 20 separated offset values
```

Manual User Manual users may set the state or the value for any of the 20 offsets from the RF IN/OUT Amplitude

Offset Setup menu. Offset values may be set in any order, i.e. set Offset 1 and then skip to Offset 20. The offset state and value is individually controlled for manual users.

In order to manually set the RF offsets go to the SYSTEM CONFIG screen, and press the RF IN/OUT Amptd Offset key, F5. Amplitude offset gain, loss and state settings are found by pressing the RF IN/OUT Amptd Offset Setup key, F2. RF offsets 1 through 20 are listed in the RF IN/OUT Amplitude Offset Setup menu.

When any of the 20 offsets are manually set to On, the RF IN/OUT Amplitude Offset State and the associated frequency state are also set to On.

Points Remote users can query the test set to determine the number of offsets that are in the On state.

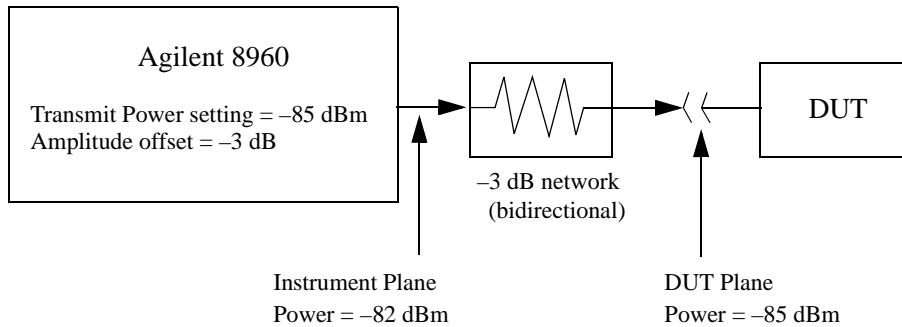
```
OUTPUT 714;"SYSTEM:CORRECTION:POINTS?" !Query returns the number of
!frequencies that have their
!offset states set to On
```

RF IN/OUT Amplitude Offset The offset values allow the test set to represent the RF level at the DUT.

Transmitter Example When you set transmit power level, the test set uses the amplitude offset value to adjust the power so that the power at the DUT will match the transmit power setting.

With the test set's transmit power set to -85 dBm, the RFIN/OUT Amplitude Offset State set to On, and a -3 dB offset at some frequency. The power transmitted from the test set will be -82 dBm, the 3 dB loss in the network means that the DUT will see -85 dBm.

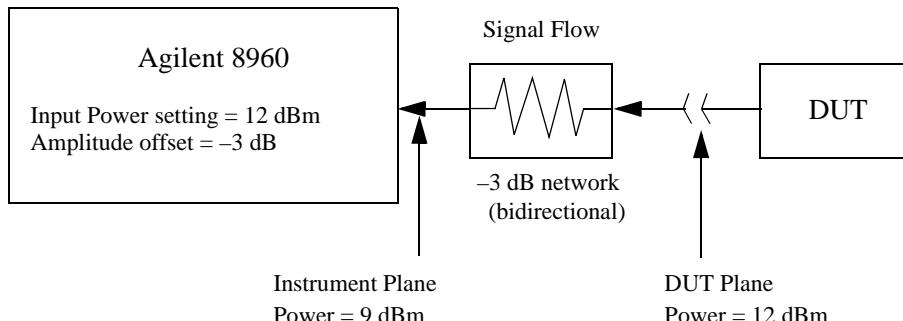
Figure 6. Amplitude Offset Transmitter Example



The transmit power setting reflects the power at the DUT plane.

Receiver Example The received power setting reflects the power at the DUT. This means the value displayed for received power does not change; however, the test set's hardware changes internally to expect a level that includes the offset.

With the test set's received power set to 12 dBm, the RF IN/OUT Amplitude Offset State set to On, and a -3 dB offset at some frequency. The received power displays 12 dBm to reflect the level at the DUT. The test set's internal hardware changes to receive 9 dBm, the power received at the test set's RF IN/OUT connector after the 3 dB loss in the network.

Figure 7. Amplitude Offset Receiver Example

The input power setting reflects the power at the DUT plane.

Related Topics

[“SYSTem:CORRection” on page 575](#)

Display Mode (Track/Fast)

Description

There are two display modes to select from when operating the test set remotely.

- Display mode fast
- Display mode track

Fast Mode

When operating remotely, there is often no need for the display to be updated as measurements are made. Using the fast display mode will increase the speed of the test set when it is operated remotely.

Fast mode is designed for remote use only. The test set returns to track mode if you change to manual operation.

- No screen or menu items are visible (except error messages).
- Error messages will be displayed in their normal location.
- “This instrument is being operated remotely” will be displayed at the bottom of the screen.

Example

```
OUTPUT 714;"DISPLAY:MODE FAST" !Selects fast mode
```

Track Mode

The track display mode is used to allow users to see what the test set is doing while it is being controlled remotely. Track mode is the default mode of the test set.

- Any changes made remotely will be updated on the screen if that screen is displayed.
- The error message window will be displayed as required when an error occurs.

Example

```
OUTPUT 714;"DISPLAY:MODE TRACK"!Selects track mode
```

Related Topics

[“DISPlay:MODE” on page 379](#)

Obtaining Test Application Information

Description

Test application information may be viewed from the SYSTEM CONFIG screen. Test application information may be queried using SYSTem:APPLication or SYSTem:CURRent GPIB queries. Queries for information about the current test application, selected test application, or any of the test applications loaded on your test set are available.

Test Application Information

Each test application has a name, model number, at least one revision, and a license status. This is a sample of the queries available to you.

1. Test application name query:

```
OUTPUT 714; "SYSTEM:APPLICATION:CURRENT:NAME?"
```

This query will return GSM Mobile Test, if that test application is currently running.

2. Model number query:

```
OUTPUT 714; "SYSTem:CURRent:TA:MODEl?"
```

This query will return E1960A, if that test application is currently running.

3. Revision query:

```
OUTPUT 714; "SYSTEM:APPLICATION:CURRENT:REVISION?"
```

This query will return A.04.01, if that revision is currently running.

4. License status query:

```
OUTPUT 714; "SYSTEM:APPLICATION:CATALOG:LICENSE? 'GSM mobile test', 'A.04.01'"
```

This query will return LIC, if the test application is licensed for use.

Related Topics

["SYSTem:APPLication" on page 564](#)

["Obtaining Identification Information *IDN?" on page 665](#)

["Hardware Configuration Report" on page 668](#)

["SYSTem:COMMunicate" on page 570](#)

["CALibration:DATE" on page 295](#)

["SYSTem:CURRent:TA" on page 582](#)

Timebase Description/Configuration

Description

The time base source is selected by the test set, either an internal time base or an external source (if a suitable signal is detected) is used as the reference oscillator. If a 10 MHz +/- 100 ppm signal, that has an input level from 0 to +13 dBm is connected to the 10 MHz REF IN connector on the rear panel, the test set will automatically select the external timebase.

You can read the status window at the bottom of the test set display for the EXT REF indicator, or query the test set to verify if it is using an external time base or an internal time base. You may also query the test set to verify if the time base is locked. The reference oscillator functionality is controlled through the SYSTEM subsystem.

Example:

```
OUTPUT 714;"SYSTEM:ROSCILLATOR[:TIMEBASE]?" !returns INT or EXT
                                         !(internal or external) timebase.
OUTPUT 714;"SYSTEM:ROSCILLATOR:LOCKED?" !returns 1 or 0 (locked or unlocked)
                                         !condition for timebase
```

Related Topics

[“SYSTem:ROSCillator” on page 590](#)

[“Rear Panel Connectors” on page 655](#)

Selecting a Radio Personality

Description

Different radio personalities or radio standards, (such as GSM, AMPS or TIA/EIA 136) can be tested when the optional test applications are purchased from Agilent Technologies. Some test applications will have the ability to test more than one radio standard.

When the operations described in this section are queried, several seconds may pass before the information is ready to be displayed.

You can query the current revision, the selected revision, all the revisions, and the total count of revisions for a selected test application. These queries are helpful when changing revisions or loading new revisions. They are not usually necessary when switching test applications.

The Test Application Setup menu will display all of the test applications available along with the selected revision. The selected revision is the revision that would run if the test set was switched to that test application. There is no need to select a revision every time you want to switch test applications.

NOTE Selecting the correct name and the desired revision of a test application is important. This information should be reviewed before proceeding.

Test Applications Switching

Selecting of a different test application is accomplished manually using the front panel keys, or remotely over GPIB. The test set must be rebooted in order for the test application to become functional. The reboot will happen automatically when you tell the test set to switch test applications. Rebooting to another test application takes about one minute.

Remote User In order to switch to another test application use this GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME 'GSM MOBILE TEST'"
```

Sending this command will cause the test set to reboot.

Manual User Test application switching is found on the SYSTEM CONFIG screen.

To switch to the test application you have selected.

1. Press the Test Application key.
2. Use the knob or arrows to scroll to the test application you want.
3. Press the knob or enter key.
4. A menu will appear asking "Switch Now?" If you answer "No" nothing will change, if you answer "Yes" the test set will reboot in the new test application.

Revision Selection

Different revisions of the test applications in your test set will provide different functionality. Switching

Selecting a Radio Personality

revisions does not reboot the test set in a new test application. It merely selects a revision for the next switch. A revision will remain the selected revision until a different revision is selected by you.

NOTE If you switch test applications to an older version that does not support test application switching you will not have a path to get back. Using the firmware upgrade process to load firmware with the correct version will fix this problem.

Test application switching is available on revisions greater than A.04.00 of GSM Mobile Test, and all other test applications that are developed thereafter.

Remote User These are commands to query revision information or select a revision. Selecting a new revision does not switch test applications.

- In order to query a **selected** test application revision (running or not) use this GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION? 'AMPS/136 MOBILE TEST'"
```

- In order to query the revision of the test application **currently running** use this GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:REVISION?"
```

- In order to query **all** of the revisions available for a test application use this GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION? 'AMPS/136 MOBILE TEST'"
```

- In order to **select** a revision of a test application use this GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION 'GSM mobile test', 'A.04.01'"
```

- Query that returns the number of revisions for a specified test application:

```
OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION:COUNT? 'GSM MOBILE TEST'"
```

License Status of Test Applications The test application license status can be queried for a particular test application and revision using the following GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:LICENSE? 'GSM mobile test', 'A.04.01'"
```

This query returns one of the following:

- "LIC" The test application license status is, licensed
- "NLIC" The test application license status is, not licensed
- "UNKN" The test application license status is, unknown

CAUTION If you switch to an unlicensed state the test set will reboot to SYSTEM CONFIG screen, unable to switch to any other screen or make any measurements. View the Test Application Setup menu to determine the licensed versions of test applications available. Use the Test Application key to switch to a licensed version of the test application.

Manual User Revision selection is found in the SYSTEM CONFIG screen, Test Application Setup menu. Revisions are shown with their license status. This is where you select the revision and test application that you want, it does not switch test applications. After the revision number is a letter, this letter indicates the

revision license status; Licensed “L”, Not Licensed “N”, or Unknown “U”.

- “L” This revision of test application appears to have a license. The test application may have been developed before licensing and therefore needs no license.
- “N” This test application does not appear to have a license. Selecting a not licensed revision will result in an error +130.
- “U” This test application has unknown license status.

1. Press the Test Application Setup key.
2. Use the knob or arrows and scroll to the test application you want.
3. Press the knob or enter key to display the revision menu.
4. Use the knob or enter key to scroll to the revision you want.
5. Press the knob or enter key to select the revision.

Test Application Names

Each test application has a name associated with it.

- “AMPS/136 Mobile Test” for the E1961A test application.
- “IS-2000 Mobile Test Mode” for the E1962A test application.
- “GSM Mobile Test” for the E1960A test application.
- “GPRS Mobile Test” for the E1964A test application.

Remote User In order to query or switch test applications remotely you must use the test application name exactly as it appears (without regard to case) in the Test Application Setup menu of the test set display.

- Query the name of the all test applications installed in the test set.

OUTPUT 714; “SYSTEM:APPLICATION:CATALOG:NAME?”

- Query the name of the selected test application (running or not):

OUTPUT 714; “SYSTEM:APPLICATION:SELECT:NAME?”

- Query the name of the currently running test application:

OUTPUT 714; “SYSTEM:APPLICATION:CURRENT:NAME?”

- In order to know the number of test applications installed in the test set, use the following GPIB command:

OUTPUT 714; “SYSTEM:APPLICATION:CATALOG:NAME:COUNT?”

Manual User The names of test applications installed in the test set can be viewed from the Test Application Setup menu found in the SYSTEM CONFIG screen. This menu shows you how each test application is spelled and should be used as a reference for GPIB commands.

Test Application Model Number

Each test application has a model number associated with it.

Remote User This query will return E1960A, if that test application is currently running.

Selecting a Radio Personality

```
OUTPUT 714;"SYSTem:CURRent:TA:MODEl?"
```

Manual User The test application model number is found in the SYSTEM COFIG screen in the Instrument Information window.

Programming Example

This program example assumes that the you want to switch to the GSM test application.

1. Query the list of test application names to get exact spelling of the GSM test application. This is not necessary if you already know the exact name.
2. Query the test set to get a list of all revisions for “GSM Mobile Test.” This is not necessary if you are not changing revisions.
3. Select a revision of “GSM Mobile Test.” This is not necessary if you are not changing revisions.
4. Select the GSM test application. This will switch test applications and cause the test set to reboot.

```
10  OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:NAME?"  
20  !Queries all of the test application names  
30  ENTER 714;N$  
40  PRINT "The CATALOG names that are loaded are ";N$  
50  OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION? 'GSM MOBILE TEST'"  
60  !Queries all revisions of GSM MOBILE TEST  
70  ENTER 714;Cat_rev$  
80  PRINT "The revisions for the GSM Mobile Test Application are ";Cat_rev$  
90  OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION 'GSM MOBILE TEST','A.04.01'"  
100 !Selects a revision  
110 OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME 'GSM MOBILE TEST'"  
120 !Switches the test application to GSM MOBILE TEST  
130 END
```

Related Topics

[“SYSTem:APPLication” on page 564](#)

10 Error Messages

Error Messages

Error Message Descriptions

[“Fixed Timer Messages” on page 687](#)

[“Manual User Error Messages” on page 690](#)

[“-400 to -499 Query Errors” on page 701](#)

[“-300 to -399 SCPI Specified Device-Specific Errors” on page 699](#)

[“-200 to -299 Execution Errors” on page 696](#)

[“-100 to -199 Command Errors” on page 692](#)

[“+100 to +199 Core Device-Specific Error” on page 702](#)

[“+200 to +299 Call Processing Device-Specific Error” on page 704](#)

[“+300 to +399 Link Control Device-Specific Error” on page 707](#)

[“+400 to +499 Core Hardware Device-Specific Error” on page 708](#)

[“+500 to +599 Test Application Hardware Device-Specific Error” on page 711](#)

[“+600 to +699 Instrument Device-Specific Error” on page 712](#)

[“+700 to +799 Test Application Measurement Device-Specific Error” on page 713](#)

[“+800 to +899 Core Measurement Device-Specific Error” on page 714](#)

Description

Reading Error Messages

Each error message that is generated is recorded in either the error/event queue or the message log or both. Error messages are shown in a message window at the center of the test set's display.

When an error message is displayed an audio beep occurs, the beeper state of the test set can be set to on or off. The error/event queue is read remotely using the SYSTem:ERRor? query. The error/event queue is able to hold 100 messages. To read the entire error/event queue use the following program.

```

10 DIM Err_msg$[255]
20 REPEAT
30 OUTPUT 714;"SYSTEM:ERROR?"
40 ENTER 714; Err_num,Err_msg$
50 PRINT Err_num,Err_msg$
60 UNTIL Err_num = 0

```

The message log may be viewed on the test set's display by pressing the SYSTEM CONFIG screen's Message Log key. The message log can display up to 24 entries over two pages.

Error messages can be cleared from the test set's display using the DISPlay:WINDOW:ERRor:CLEar command. Pressing any functional front panel key, i.e. the LOCAL key, will clear an error message for the test set's display.

Classes of Errors

Error messages are divided into classes, each class of error is handled differently by the test set. The message log is cleared when the test set is power cycled.

Measurement Integrity Indicators These messages occur as a result of a measurement, they indicate the validity of the measurement. Measurement integrity indicators are read with the FETCh command.

Non-Persistent Errors These messages are generated when a condition occurs that is incorrect, but has no serious or long lasting effect on the test set's operation. Examples could include an out of range value to a parameter, or an invalid GPIB mnemonic. The message window is cleared when any front panel key is pressed.

Persistent Errors These errors are generated when a non-transitory error condition exists. Persistent errors occur when a hardware failure is found, or when damage or injury to a person or the test set may occur.

The test set displays these errors in the error message window and as a prompt at the bottom of the display screen where it remains until the error condition no longer exists.

Fatal Errors When these errors occur no further operation of the test set is possible without cycling the power switch. Fatal errors are not saved in the error message log. The test set display will provide the user with information about what to do next and some details about what the test set was doing when the fatal error occurred.

Maskable Messages These messages are intended to inform the user of a condition within the test set. They are generally meant to provide information to the user. The user will need to decide if this condition is undesirable and if they want the message to appear.

Maskable Message Display State The Maskable Messages Display State found in the Instrument Setup menu gives

Error Messages

users a way to block these messages and the associated beep from ever happening. When the state is Off these messages and their associated beep will be blocked. The Maskable Message Display State can be set manually or with the following GPIB command:

```
OUTPUT 714;"DISPLAY:MESSAGE:MASKABLE:STATE OFF" !Prevents certain messages from appearing on the display.
```

Instrument Maskable Messages

- Instrument warning: Audio Generator instrument has been closed.
- Instrument warning: Audio Analyzer instrument has been closed.
- Instrument warning: Analog Audio instrument has been closed.

GSM Mobile Test Maskable Messages

- GSM measurement warning: TX Power measurement has been closed.
- GSM measurement warning: Power vs Time measurement has been closed.
- GSM measurement warning: Phase Frequency Error measurement has been closed.
- GSM measurement warning: Output RF Spectrum measurement has been closed.
- GSM measurement warning: Fast Bit Error measurement has been closed.
- GSM measurement warning: Decoded Audio measurement has been closed.
- GSM measurement warning: IQ Tuning measurement has been closed.

Related Topics

[“SYSTem:COMMUnicatE:GPIB:DEBug\[:STATe\]” on page 571](#)

[“Test Set Beeper” on page 663](#)

[“SYSTem:ERRor?” on page 584](#)

[“DISPlay:WINDOW:ERRor:CLEar”](#)

[“DISPlay:MESSAge:MASKable:STATe” on page 379](#)

[“Integrity Indicator” on page 146](#)

[“FETCH? Subsystem” on page 380](#)

Fixed Timer Messages

Description

This is the list of fixed timers with a brief explanation and their values. A timer expiry message appears in its own window, on the test set display. The user has no access to these values and can not change them. None of the fixed timers are active when operating mode is Test Mode.

| Timer Name | Description | Value |
|---|--|---|
| T100 RADIO-LINK-TIMEOUT | Detects the presence of the radio link by detecting SACCH frames every 480 ms. | 4 SACCH multiframe. That is 1.92 seconds if the SACCH is completely absent. |
| T200 Data link timer | Used for re-transmission on the data link. The value varies depending on the message type. | 155 ms for FACCH |
| T301 Alerting (ringing) timer | Timer used to limit the amount of time a user has to answer a call. | 20 seconds |
| T303 Mobility Management connection timer | Time the network waits after sending a CM SERVICE REQUEST until receiving a response. This occurs before initiating call clearing procedures towards the MS. | 10 seconds |
| T305 Release timer | Time the network waits after transmitting a DISCONNECT message until receiving a RELEASE message. | 10 seconds |
| T306 In-band tones release timer | Time the network waits after transmitting a DISCONNECT message while in-band tones/announcements are provided, until receiving a RELEASE message. | 10 seconds |
| T308 Release timer | Time the network waits after sending a RELEASE message until receiving a RELEASE COMPLETE message. This occurs before re-transmitting the RELEASE or releasing the Mobility Management connection. | 10 seconds |
| T310 Call proceeding timer | Time the network waits after receiving a CALL CONFIRMED message until receiving a ALERTING, CONNECT, or DISCONNECT message before initiating clearing procedures towards the MS. | 10 seconds |

| Timer Name | Description | Value |
|--|---|------------|
| T313 Connect acknowledge timer | Time the network waits after transmitting a CONNECT message until receiving the CONNECT ACKNOWLEDGE message before performing clearing procedures with the MS. | 10 seconds |
| T323 Modify complete timer | Time the network waits after sending a MODIFY message during call mode changes, until receiving a MODIFY COMPLETE or MODIFY REJECT message before initiating call clearing procedures. | 10 seconds |
| T3101 Immediate assignment timer | Time the network waits after sending the IMMEDIATE ASSIGNMENT or IMMEDIATE ASSIGNMENT EXTENDED message until the main signalling link is established before releasing the newly allocated channels. | 1 second |
| T3103 Handover timer | Time the network waits after transmitting a HANDOVER COMMAND message until receiving HANDOVER COMPLETE or HANDOVER FAILURE or the MS re-establishes the call before the old channels are released. If the timer expires and the network has not received a correctly decoded L2 (format A or B) or TCH frame, then the newly allocated channels are released. | 2 seconds |
| T3105 Physical information repetition timer | Time the network waits after sending the PHYSICAL INFORMATION message until receiving a correctly decoded L2 (format A or B) or TCH frame. This occurs before re-transmitting the PHYSICAL INFORMATION message or releasing the newly allocated channels. | 50 ms |
| T3107 Channel assignment timer | Time the network waits after transmitting an ASSIGNMENT COMMAND message until receiving the ASSESSMENT FAILURE message or the MS re-establishes the call before releasing the old and the new channels. | 3 seconds |
| T3109 Signalling disconnection timer | Time the network waits after sending the CHANNEL RELEASE message before disconnecting the signalling link. | 5 seconds |
| T3111 Channel deactivation after disconnection timer | Time the network waits after disconnecting the signalling link before deactivating the channel. | 500 ms |

| Timer Name | Description | Value |
|-------------------------------------|---|----------------------|
| T3113 Paging timer | Time the network waits after transmitting the PAGING REQUEST message until receiving the PAGING RESPONSE message. This occurs before re-transmitting the PAGING REQUEST (if the maximum number of re-transmissions have not been exceeded). | 5 seconds |
| T3212 Location update timer | The location update timer is set to zero, periodic location update by the MS are disabled. If the MS camps to the BCH and decodes a new MCC or MNC from the one it last camped on, it should perform a location update. | zero = infinite time |
| T3250 TMSI reallocation timer | Time the network waits after sending the TMSI REALLOCATION COMMAND until receiving TMSI REALLOCATION COMPLETE. This occurs before aborting the procedure and releasing the Radio Resource connection. | 5 seconds |
| T3260 Authentication response timer | Time the network waits after an AUTHENTICATION REQUEST until receiving AUTHENTICATION RESPONSE. This occurs before aborting the procedure and releasing the Radio Resource connection. | 5 seconds |

Manual User Error Messages

Description

These messages are intended to be displayed on the manual user interface only, and are not entered into the Error/Event Queue.

| Error Message | Description |
|---|---|
| The function you requested is not yet available. | The test set does not have this capability. |
| IQ Calibration completed successfully for modulator <N>. Cycle power to continue. | <N> is the IQ modulator number that you are attempting to calibrate, <N> is 1 or 2. |
| IQ Calibration failed for modulator <N>. Cycle power to continue. | <N> is the IQ modulator number that you are attempting to calibrate, <N> is 1 or 2. |
| The function you requested is not available in this TA. | This function is used in another Test Application. |
| IQ Calibration for modulator <N> in progress. Call processing disabled | <N> is the IQ modulator number that you are attempting to calibrate, <N> is 1 or 2. |
| Instrument warning: Audio generator instrument has been closed. | The audio generator instrument was closed automatically by the test set. |
| Instrument warning: Audio Analyzer instrument has been closed. | The audio analyzer instrument was closed automatically by the test set. |
| Measurement warning: Analog audio measurement has been closed. | Analog audio measurements have been closed by the test set. |
| Warning: Call processing disabled | The call processing functions are not active because the test set is performing calibration operations. |

GSM and GPRS Mobile Test Manual User Messages

These messages are maskable so that they can be blocked from appearing on the display. See “[Error Messages](#)” on page 684.

Table 11.

| Message | Description |
|---|---|
| GSM measurement warning; TX power measurement has been closed GPRS measurement warning; TX power measurement has been closed | Indicates that a measurement has been inactivated because of a resource conflict. |
| GSM measurement warning; Power vs time measurement has been closed GPRS measurement warning; Power vs time measurement has been closed | Indicates that a measurement has been inactivated because of a resource conflict. |
| GSM measurement warning; Phase frequency error measurement has been closed GPRS measurement warning; Phase frequency error measurement has been closed | Indicates that a measurement has been inactivated because of a resource conflict. |
| GSM measurement warning; Output RF spectrum measurement has been closed GPRS measurement warning; Output RF spectrum measurement has been closed | Indicates that a measurement has been inactivated because of a resource conflict. |
| GSM measurement warning; Fast bit error measurement has been closed | Indicates that a measurement has been inactivated because of a resource conflict. |
| GSM measurement warning; Bit error measurement has been closed | Indicates that a measurement has been inactivated because of a resource conflict. |
| GSM measurement warning; Decoded audio measurement has been closed | Indicates that a measurement has been inactivated because of a resource conflict. |
| GSM measurement warning; IQ tuning measurement has been closed | Indicates that a measurement has been inactivated because of a resource conflict. |
| Protocol warning; Setting change has terminated the link with the DUT | Indicates that a user setting has caused the link with the device under test (DUT) to be dropped. (For example, this may occur if you change the ETSI Test Mode Type parameter while the the data connection status is Transferring.) |

-100 to -199 Command Errors

Description

A command error indicates that the test set's GPIB parser has detected an IEEE 488.2 syntax error.

When one of these errors is generated, the command error bit in the event status register is set.

| Error Message | Description |
|--------------------------------|---|
| -100 Command error | This event bit (Bit 5) indicates a syntax error, or a semantic error, or a GET command was entered, see IEEE 488.2, 11.5.1.1.4. |
| -101 Invalid character | Indicates a syntactic elements contains a character which is invalid for that type. |
| -102 Syntax error | Indicates that an unrecognized command or data type was encountered. For example, a string was received when the device does not accept strings. |
| -103 Invalid separator | The parser was expecting a separator and encountered an illegal character. For example, the semicolon was omitted after a program message unit. |
| -104 Data type error | The parser recognized a data element different than one allowed. For example, numeric or string data was expected but block data was encountered. |
| -105 Get not allowed | Indicates a Group Execute Trigger was received within a program message. Correct the program so that the GET does not occur within the program code. |
| -108 Parameter not allowed | Indicates that more parameters were received than expected for the header. For example, *ESE common command only accepts one parameter, so *ESE 0,1 is not allowed. |
| -109 Missing parameter | Indicates that less parameters were received than required for the header. For example, *ESE requires one parameter, *ESE is not allowed. |
| -110 Command header error | Indicates an error was detected in the header. This error is used when the device cannot detect the more specific errors -111 through -119. |
| -111 Header separator error | Indicates that a character that is not a legal header separator was encountered while parsing the header. |
| -112 Program mnemonic too long | Indicates that the header contains more than twelve characters, see IEEE 488.2, 7.6.1.4.1. |

| Error Message | Description |
|----------------------------------|---|
| -113 Undefined header | Indicates the header is syntactically correct, but it is undefined for this specific device. For example, *XYZ is not defined for any device. |
| -114 Header suffix out of range | Indicates the value of a header suffix attached to a program mnemonic makes the header invalid. |
| -120 Numeric data error | This error, as well as errors -121 through -129, are generated when parsing a data element which appears to be numeric, including non-decimal numeric types. This particular error is used if the device cannot detect a more specific error. |
| -121 Invalid character in number | Indicates an invalid character for the data type being parsed was encountered. For example, an alpha in a decimal numeric or a "9" in octal data. |
| -123 Exponent too large | Indicates the magnitude of an exponent was greater than 32000, see IEEE 488.2, 7.7.2.4.1. |
| -124 Too many digits | Indicates the mantissa of a decimal numeric data element contained more than 255 digits excluding leading zeros, see IEEE 488.2, 7.7.2.4.1. |
| -128 Numeric data not allowed | Indicates that a legal numeric data element was received, but the device does not accept one in this position for the header. |
| -130 Suffix error | This error, as well as errors -131 through -139, are generated when parsing a suffix. This particular error message is used if the device cannot detect a more specific error. |
| -131 Invalid suffix | Indicates the suffix does not follow the syntax described in IEEE 488.2, 7.7.3.2, or the suffix is inappropriate for this device. |
| -134 Suffix too long | Indicates the suffix contain more than 12 characters, see IEEE 488.2, 7.7.3.4. |
| -138 Suffix not allowed | Indicates that a suffix was encountered after a numeric element that does not allow suffixes. |
| -140 Character data error | This error, as well as errors -141 through -149, are generated when parsing a character data element. This particular error message is used if the device cannot detect a more specific error. |
| -141 Invalid character data | Indicates that the character data element contains an invalid character or the particular element received is not valid for the header. |
| -144 Character data too long | Indicates the character data element contains more than twelve characters, see IEEE 488.2, 7.7.1.4. |

| Error Message | Description |
|--------------------------------------|--|
| -148 Character not allowed | Indicates a legal character data element was encountered where prohibited by the device. |
| -150 String data error | This error, as well as errors -151 through -159, are generated when parsing a string data element. This particular error message is used if the device cannot detect a more specific error. |
| -151 Invalid string data | Indicates that a string data element was expected, but was invalid, see IEEE 488.2, 7.7.5.2. For example, an END message was received before the terminal quote character. |
| -158 String data not allowed | Indicates that a string data element was encountered but was not allowed by the device at this point in parsing. |
| -160 Block data error | This error, as well as errors -161 through -169, are generated when parsing a block data element. This particular error message is used if the device cannot detect a more specific error. |
| -161 Invalid block data | Indicates a block data element was expected, but was invalid, see IEEE 488.2, 7.7.6.2. For example, and END message was received before the end length was satisfied. |
| -168 Block data not allowed | Indicates a legal block data element was encountered, but not allowed by the device at this point in parsing. |
| -170 Expression error | This error, as well as errors -171 through -179, are generated when parsing an expression data element. This particular error message is used if the device cannot detect a more specific error. |
| -171 Invalid expression | Indicates the expression data element was invalid, see IEEE 488.2, 7.7.7.2. For example, unmatched parentheses or an illegal character. |
| -178 Expression data not allowed | Indicates a legal expression data was encountered, but was not allowed by the device at this point in parsing. |
| -180 Macro error | This error, as well as error -181 through -189, are generated when defining a macro or execution a macro. This particular error message is used if the device cannot detect a more specific error. |
| -181 Invalid output macro definition | Indicates that a macro parameter place holder was encountered outside of a macro definition. |
| -183 Invalid inside macro definition | Indicates that the program message unit sequence, sent with a *DDT or a *DMC command, is syntactically invalid, see IEEE 488.2, 10.7.6.3. |

| Error Message | Description |
|----------------------------|--|
| -184 Macro parameter error | Indicates that a command inside the macro definition had the wrong number or type of parameters. |

Related Topics

[“Standard Event Status Register” on page 560](#)

-200 to -299 Execution Errors

Description

These errors are generated when something occurs that is incorrect in the current state of the instrument. These errors may be generated by a user action from either the remote or the manual user interface.

| Error Message | Description |
|--------------------------------|---|
| -200 Execution error | This event bit (Bit 4) indicates a PROGRAM DATA element following a header was outside the legal input range or otherwise inconsistent with the device's capabilities, see IEEE 488.2, 11.5.1.1.5. |
| -203 Command protected | Indicates that a legal password-protected program command or query could not be executed because the command was disabled. |
| -220 Parameter error | Indicates that a program data element related error occurred. |
| -221 Setting conflict | Indicates that a legal program data element was parsed but could not be executed due to the current device state. |
| -222 Data out of range | Indicates that a legal program data element was parsed but could not be executed because the interpreted value was outside the legal range defined by the devices |
| -223 Too much data | Indicates that a legal program data element of block, expression, or string type was received that contained more data than the device could handle due to memory or related device-specific requirements. |
| -224 Illegal parameter value | Indicates that the value selected was not part of the list of values given. |
| -225 Out of memory | The device has insufficient memory to perform the requested operation. |
| -226 Lists not the same length | Attempted to use LIST structure having individual LIST's of unequal lengths. |
| -230 Data corrupt or stale | Indicates invalid data, a new reading started but not completed since the last access. |
| -231 Data questionable | Indicates that measurement accuracy is suspect. |
| -233 Invalid version | Indicates that a legal program data element was parsed but could not be executed because the version of the data is incorrect to the device. For example, a not supported file version, a not supported instrument version. |

| Error Message | Description |
|----------------------------|--|
| -240 Hardware error | Indicates that a legal program command or query could not be executed because of a hardware problem in the device. |
| -241 Hardware missing | Indicates that a legal program command or query could not be executed because of missing device hardware. For example, an option was not installed. |
| -250 Mass storage error | Indicates that a mass storage error occurred. The device cannot detect the more specific errors described for errors -251 through -259. |
| -251 Missing mass storage | Indicates that a legal program command or query could not be executed because of missing mass storage. |
| -252 Missing media | Indicates that a legal program command or query could not be executed because of missing media. For example, no disk. |
| -253 Corrupt media | Indicates that a legal program command or query could not be executed because of corrupt media. For example, bad disk or wrong format. |
| -254 Media full | Indicates that a legal program command or query could not be executed because the media is full. For example, there is no room left on the disk. |
| -255 Directory full | Indicates that a legal program command or query could not be executed because the media directory was full. |
| -256 File name not found | Indicates that a legal program command or query could not be executed because the file name was not found on the media. |
| -257 File name error | Indicates that a legal program command or query could not be executed because the file name on the device media was in error. For example, an attempt was made to read or copy a nonexistent file. |
| -258 Media protected | Indicates that a legal program command or query could not be executed because the media was protected. For example, the write-protect switch on a memory card was set. |
| -270 Macro error | Indicates that a macro related execution error occurred. |
| -271 Macro syntax error | Indicates that a syntactically legal macro program data sequence, according to IEEE 488.2, 10.7.2, could not be executed due to a syntax error within the macro definition. |
| -272 Macro execution error | Indicates that a syntactically legal macro program data sequence could not be executed due to some error in the macro definition, see IEEE 488.2, 10.7.6.3. |

| Error Message | Description |
|-------------------------------------|---|
| -273 Illegal macro label | Indicates that the macro label was not accepted, it did not agree with the definition in IEEE 488.2, 10.7.3 |
| -274 Macro parameter error | Indicates that the macro definition improperly used a macro parameter placeholder, see IEEE 488.2, 10.7.3. |
| -275 Macro definition too long | Indicates that a syntactically legal macro program data sequence could not be executed because the string of block contents were too long for the device to handle, IEEE 488.2, 10.7.6.1. |
| -276 Macro recursion error | Indicates that a syntactically legal macro program data sequence count not be executed because it would be recursive, see IEEE 488.2, 10.7.6.6. |
| -277 Macro redefinition not allowed | Indicates that redefining an existing macro label, see IEEE 488.2, 10.7.6.4. |
| -278 Macro header not found | Indicates that a legal macro label in the *GMS?, see IEEE 488.2, 10.13, could not be executed because the header was not previously defined. |

-300 to -399 SCPI Specified Device-Specific Errors

Description

A device-specific error indicates that the instrument has detected an error that occurred because some operations did not properly complete, possibly due to an abnormal hardware or firmware condition. For example, an attempt by the user to set an out of range value will generate a device specific error. When one of these errors is generated, the device specific error bit in the event status register is set.

| Error Message | Description |
|--------------------------------|---|
| -300 Device specific error | This event bit (Bit 3) indicates that a device operation did not properly complete due to some condition, such as overrange see IEEE 488.2, 11.5.1.1.6. |
| -311 Memory error | Indicates some physical fault in the devices memory, such as a parity error. |
| -312 PUD memory lost | Indicates protected user data saved by the *PUD command has been lost, see IEEE 488.2, 10.27. |
| -313 Calibration memory lost | Indicates that nonvolatile calibration data used by the *CAL? command has been lost, see IEEE 488.2, 10.2. |
| -314 Save/recall memory lost | Indicates that the nonvolatile data saved by the *SAV command has been lost, see IEEE 488.2, 10.33. |
| -315 Configuration memory lost | Indicates that nonvolatile configuration data saved by the device has been lost. |
| -320 Storage fault | Indicates that the firmware detected a fault when using data storage. This is not an indication of physical damage or failure of any mass storage element. |
| -321 Out of memory | An internal operation needed more memory than was available |
| -330 Self test failed | Indicates a problem with the device that is not covered by a specific error message. The device may require service. |
| -340 Calibration failed | Indicates a problem during calibration of the device that is not covered by a specific error. |
| -350 Queue overflow | Indicates that there is no room in the queue and an error occurred but was not recorded. This code is entered into the queue in lieu of the code that caused the error. |
| -360 Communication error | This is the generic communication error for devices that cannot detect the more specific errors described for error -361 through -363. |

| Error Message | Description |
|---------------------------------------|---|
| -361 Parity error in program message | Parity bit not correct when data received for example, on a serial port. |
| -362 Framing error in program message | A stop bit was not detected when data was received for example, on a serial port (for example, a baud rate mismatch). |
| -363 Input buffer overrun | Software or hardware input buffer on serial port overflows with data caused by improper or nonexistent pacing. |

Related Topics

[“Standard Event Status Register” on page 560](#)

-400 to -499 Query Errors

Description

A Query error is generated either when data in the instrument's GPIB output queue has been lost, or when an attempt is being made to read data from the output queue when no output is present or pending.

| Error Message | Description |
|---|---|
| -400 Query error | This event bit (Bit 2) indicates that an attempt to read data from the Output Queues when no output is present or pending, to data in the Output Queue has been lost see IEEE488.2, 11.5.1.1.7. |
| -410 Query INTERRUPTED | Indicates the test set has been interrupted by a new program message before it finishes sending a RESPONSE MESSAGE see IEEE 488.2, 6.3.2.3. |
| -420 Query UNTERMINATED | Indicates an incomplete Query in the program see IEEE 488.2, 6.3.2.2. |
| -430 Query DEADLOCKED | Indicates that the Input Buffer and Output Queue are full see IEEE 488.2, 6.3.1.7. |
| -440 Query UNTERMINATED after indefinite response | Indicates that a query was received in the same program message after a query requesting an indefinite response was executed see IEEE 488.2, 6.5.7.5. |

+100 to +199 Core Device-Specific Error

Description

A device-specific error indicates that the instrument has detected an error that occurred because some operations did not properly complete, possibly due to an abnormal hardware or firmware condition. For example, an attempt by the user to set an out of range value will generate a device specific error.

These are general errors generated by the core instrument. When one of these errors is generated, the '+100 errors' bit in the questionable error status register is set.

| Error Message | Description |
|---|--|
| +101 Assert; Cycle power. Assert message<message1> | <p><message1> will appear as:</p> <p>If the DSP generated the assert:</p> $;P:DSP T:<task ID> E:<error code> C:<error classif.> F1:<flag 1> F2:<flag 2>$ <p>If the Protocol processor generated the assert:</p> $;P:Protocol T:<task ID> L:<line number> F:<file name>$ <p>If the Host processor generated the assert:</p> $;P:Host T:<task ID> L:<line number> F:<file name>$ |
| +102 Exception; Cycle power. Exception message<message2> | <p><message2> will appear as: T:<task ID> or V:<vector number> or PC:<program counter> or DA:<data adr reg value>.</p> <p>Vector number, program counter and data address register values are hexadecimal format.</p> |
| +103 Failure; No measurements or settings can be made | Indicates none of the VI's are operational because a serious problem exists. |
| +104 Failure; No settling operations will take place | Indicates none of the VI's are operational because a serious problem exists. |
| +105 Failure; No measurements or setting can be made for the function selected | Indicates none of the VI's are operational because a serious problem exists. |
| +110 Input pacing; Internal communication queue overflow likely | Indicates that GPIB commands are too fast for the device input queue and should be slowed. |
| +111 Input pacing; Internal communication queue overflow imminent. Pacing increased | Indicates that GPIB commands were too fast and the device input queue has not kept pace. |
| +112 Internal error; Protocol error <message3> | <message3> is an eight digit hexadecimal number that is the error code reported by protocol. |

| Error Message | Description |
|---|---|
| +113 Internal error; <VI NAME> forced inactive | Indicates that a VI is inactivated when not executed. <VI NAME> includes : "IntVmVI", "GSMFixedVI", "MiscVI", "GSMSacchMriVI", "IQSelfCalVI1", "IQSelfCalVI2", "TA RevisionVI". |
| +114 Internal error; <VI NAME> not responding | Indicates that a VI has not been instantiated or the state is not available. <VI NAME> includes : "IntVmVI", "GSMFixedVI", "MiscVI", "GSMSacchMriVI", "IQSelfCalVI1", "IQSelfCalVI2", "TA RevisionVI". |
| +115 Internal error; <VI NAME> inactive | Indicates that a VI has been made inactive. <VI NAME> includes : "IntVmVI", "GSMFixedVI", "MiscVI", "GSMSacchMriVI", "IQSelfCalVI1", "IQSelfCalVI2", "TA RevisionVI". |
| +120 Warning; Receiver over range due to requested settings | Indicates the total received power (a combination of received power and amplitude offset) is above the range of the test set. |
| +121 Warning; Receiver under range due to requested settings | Indicates the total received power (a combination of received power and amplitude offset) is below the range of the test set. |
| +122 Warning; Reference out of lock | Indicates the test set's internal reference is out of lock. |
| +123 Warning; Duplicate RF IN/OUT Amplitude Offset Frequency entry. First frequency entry in RF IN/OUT Amplitude Offset table will be used. | Indicates that an amplitude offset value for that frequency has already been entered. The test set will use the amplitude offset value entered first. |
| +124 Warning; Source over range due to requested settings | The setting selected for total transmit power (a combination of cell power, awgn power, amplitude offset) is above the test set's range. |
| +125 Warning; Source under range due to requested settings | The setting selected for total transmit power (a combination of cell power, awgn power, amplitude offset) is below the test set's range. |
| +130 Configuration error; Unable to switch to indicated Test Application | The test application selected is not available for this test set. |
| +131 Configuration error; Current Test Application is not licensed (License = N). Select another Test Application | The test application selected is not licensed. Select another version or test application that is licensed (License = L). |

+200 to +299 Call Processing Device-Specific Error

These errors are generated when a problem occurs maintaining the link between the test set and the DUT. These errors generally occur as a result of a problem on the link such as if the DUT did not respond to a message, or the user attempted to perform an invalid operation in the current instrument state.

Errors with a description beginning with “GSM call disconnected” mean that the call is dropped when the error occurs. Errors beginning with “GSM protocol failure” mean that the call is not necessarily dropped, these are informational messages.

| Error Message | Description |
|--|--|
| +201 GSM call disconnected; Radio link failure (Timer T100 expiry) | “Fixed Timer Messages” on page 687 |
| +202 GSM call disconnected; Immediate assignment failure (Timer T3101 expiry) | “Fixed Timer Messages” on page 687 |
| +203 GSM call disconnected; Handover failure (Timer T3103 expiry) | “Fixed Timer Messages” on page 687 |
| +204 GSM call disconnected; Channel assignment failure (Timer T3107 expiry) | “Fixed Timer Messages” on page 687 |
| +205 GSM call disconnected; No response to page (Timer T3113 expiry) | “Fixed Timer Messages” on page 687 |
| +206 GSM call disconnected; No answer (Timer T301 expiry) | “Fixed Timer Messages” on page 687 |
| +207 GSM call disconnected; No response to setup (Timer T303 expiry) | “Fixed Timer Messages” on page 687 |
| +210 GSM call disconnected; No response to release 2 times (Timer T308 expiry) | “Fixed Timer Messages” on page 687 |
| +211 GSM call disconnected; No alert from mobile (Timer T310 expiry) | “Fixed Timer Messages” on page 687 |
| +212 GSM call disconnected; No response to connect (Timer T313 expiry) | “Fixed Timer Messages” on page 687 |
| +213 GSM call disconnected; Data link failure (Timer T200 expiry) | “Fixed Timer Messages” on page 687 |
| +214 GSM call disconnected; Physical information repetition failed (Timer T3105 expiry) | “Fixed Timer Messages” on page 687 |
| +217 GSM call disconnected; TMSI (Temporary Mobile Subscriber Identity) reallocation failed (Timer T3250 expiry) | “Fixed Timer Messages” on page 687 |
| +218 GSM call disconnected; Authentication failed (Timer T3260 expiry) | “Fixed Timer Messages” on page 687 |

| Error Message | Description |
|--|---|
| +219 GSM Call disconnected; Mobile not capable of supporting the selected Channel Mode | Indicates that the mobile station cannot support the requested channel mode. |
| +220 GSM call processing failure; (Call processing not available | Indicates the BS Emulator VI cannot be instantiated. |
| +230 GSM operation rejected; Call processing disabled | Indicates an attempt to perform a BS Emulator action when the BS emulator VI is inactive. |
| +231 GSM operation rejected; Attempting to set MCC while generating a BCH | Indicates that the Cell Activated State is still On. The Cell Activated State must be turned Off before setting the BCC. |
| +232 GSM operation rejected; Attempting to set LAC while generating a BCH | Indicates that the Cell Activated State is still On. The Cell Activated State must be turned Off before setting the BCC. |
| +233 GSM operation rejected; Attempting to set BCC while generating a BCH | Indicates that the Cell Activated State is still On. The Cell Activated State must be turned Off before setting the BCC. |
| +234 GSM operation rejected; Attempting to set NCC while generating a BCH | Indicates that the Cell Activated State is still On. The Cell Activated State must be turned Off before setting the BCC. |
| +235 GSM operation rejected; Attempting to set MNC while generating a BCH | Indicates that the Cell Activated State is still On. The Cell Activated State must be turned Off before setting the BCC. |
| +236 GSM operation rejected; Only one call can be supported at a time | Indicates an attempt at a second call being activated. |
| +237 GSM operation rejected; Requested TCH Band is invalid in current state | Indicates that there is not an active link between the MS and the test set. |
| +250 GSM protocol failure; No response to disconnect (Timer T305 expiry) | "Fixed Timer Messages" on page 687 |
| +251 GSM protocol failure; No response to release (Timer T308 expiry) | "Fixed Timer Messages" on page 687 |
| +252 GSM protocol failure; Channel release failed (Timer T3109 expiry) | "Fixed Timer Messages" on page 687 |
| +253 GSM protocol failure; (Timer T3270 expiry) | "Fixed Timer Messages" on page 687 |
| +254 GSM protocol failure; Unknown identity type received from mobile | Indicates that an identity type other than 1, 2, 3 or 4 was received from the MS. |
| +255 GSM protocol failure; Unexpected identity type received from mobile | Indicates that the MS has responded with an unexpected identity type. Example MS returned IMSI when IMEI was queried. See "CALL:MS:REPorted:IMEI?" on page 329 . |
| +256 GSM protocol failure; Channel assignment exceeded specified number of frames | Indicates that the max frames allowed for assignment parameter should be increased. |

| Error Message | Description |
|--|---|
| +257 GSM call disconnected; Invalid TMSI received from MS | Indicates that some of the bits received were not set to their normal or expected value for a TMSI (Temporary Mobile Subscriber Identity). |
| +260 GSM RR Cause; <cause identifier> | The <cause identifier> is a 4 digit hexadecimal number |
| +261 GSM MM Cause; <cause identifier> | The <cause identifier> is a 4 digit hexadecimal number |
| +262 GSM CC Cause; <cause identifier> | The <cause identifier> is a 4 digit hexadecimal number |
| +270 GSM protocol failure; Cell Change procedure failed | Indicates that the BCH ARFCN or Cell Band was changed while the mobile station was attached (thus initiating a cell change. The mobile station had not completed the cell change procedure after 5 seconds. |
| +271 GSM data connection terminated; Data connection failed to start | Indicates that the GPRS test application was unable to start the data connection with the DUT (Device Under Test). |
| +272 GSM data connection terminated; Detach failure (Timer T3322 expired 5 times) | Indicates that the Detach procedure failed after five attempts. The Data Connection Status will be set to Idle. |
| +273 GSM data connection terminated; Attach failure (Timer T3350 expired 5 times) | Indicates that the Attach procedure failed after five attempts. The Data Connection Status will be set to Idle. |
| +274 GSM data connection terminated; Routing Area Update failure (Timer T3350 expired 5 times) | Indicates that the Routing Area Update procedure failed after five attempts. The Data Connection Status will not be changed. |
| +275 GSM data connection terminated; MS unexpectedly ended TBF | Indicates that the mobile station unexpectedly ended the TBF (temporary block flow). |
| +276 GSM data connection terminated; No data received from MS in last 10 seconds | Indicates that no data was received from the mobile station in the allowed time. |
| +277 GSM data connection terminated; MS timed out ACK/NACK exchanges and released the TBF | Indicates that the mobile station timed out ACK (Acknowledged) or NACK (Not Acknowledged) exchanges and released the TBF (temporary block flow). |
| +278 GSM data connection terminated; MS did not respond to uplink immediate assignment | Indicates that the mobile station did not respond to the uplink immediate assignment. |
| +279 GSM data connection terminated; MS did not respond to downlink immediate assignment | Indicates that the mobile station did not respond to the downlink immediate assignment. |

+300 to +399 Link Control Device-Specific Error

These errors are generated when a problem occurs in maintaining the link between the test set and a DUT. These errors generally occur when a message is received from the DUT that is unexpected.

When one of these errors is generated, the ‘+300 errors’ bit in the questionable error status register is set. Refer to “[Standard Event Status Register](#)” on page 560 for information on this register.

| Error Message |
|---|
| +303 GSM data link failure; Unsolicited DM response, multiple frame established state |
| +309 GSM data link failure; N(R) sequence error |

+400 to +499 Core Hardware Device-Specific Error

Description

These errors are generated when a problem occurs in one of the test set's hardware modules that is part of the test set's core instrument.

When one of these errors is generated, the '+400 errors' bit in the questionable error status register is set.

| Error Message | Description |
|--|-------------|
| +400 Hardware failure; Hardware is not available | |
| +401 Hardware failure; Protocol processor hardware is not responding | |
| +402 Hardware failure; Demod receiver hardware is not responding | |
| +403 Hardware failure; Measurement receiver hardware is not responding | |
| +404 Hardware failure; RF source 1 hardware is not responding | |
| +405 Hardware failure; RF source 1 digital modulation hardware is not responding | |
| +406 Hardware failure; RF source 1 level hardware is not responding | |
| +407 Hardware failure; DSP demod control hardware is not responding | |
| +408 Hardware failure; 2nd demod receiver hardware is not responding | |
| +409 Hardware failure; Base station emulator trigger hardware is not responding | |
| +410 Hardware failure; Audio source hardware is not responding | |
| +411 Hardware failure; RF source 2 hardware is not responding | |
| +412 Hardware failure; Internal voltmeter hardware is not responding | |
| +413 Hardware failure; Fixed timebase input is not responding | |
| +414 Hardware failure; Fixed external reference output is not responding | |

| Error Message | Description |
|--|--|
| +415 Hardware failure; Instrument reference is not responding | |
| +416 Hardware failure; Bit clock A is not responding | |
| +417 Hardware failure; RF source 2 frequency hardware is not responding | |
| +418 Hardware failure; RF source 2 digital modulation hardware is not responding | |
| +419 Hardware failure; RF source 2 level hardware is not responding | |
| +420 Hardware failure; RF source hopping hardware is not responding | |
| +421 Hardware failure; Digital demod hopping hardware is not responding | |
| +422 Hardware failure; Misc VI hardware is not responding | |
| +423 Hardware failure; Unable to access networking information | |
| +424 Hardware failure; Bit clock B is not responding | |
| +425 Hardware failure; Invalid EEPROM checksum <EEPROM board ID> | See the list of EEPROM board ID names below. |
| +426 Hardware failure; Unable to write to EEPROM <EEPROM board ID> | See the list of EEPROM board ID names below. |
| +427 Hardware failure; Unable to read from EEPROM <EEPROM board ID> | See the list of EEPROM board ID names below. |
| +428 Hardware failure; Board not identified <board ID> | See the list of board ID names below. |
| +429 Hardware failure; Could not create board identification <board ID> | See the list of board ID names below. |
| +430 Hardware failure; Control version not compatible with FW <board ID> | See the list of board ID names below. |
| +431 Hardware failure; RF IO DAC cannot be calibrated due to present temperature | |
| +432 Hardware failure; RF hardware is not responding | |
| +433 Hardware failure; RF source FM hardware is not responding | |
| +434 Hardware failure; Audio source FM hardware is not responding | |

| Error Message | Description |
|---|--|
| +460 Hardware failure; Hardware doesn't support requested operation | This error occurs when a setting is attempted that is not possible with the test set's hardware. The current firmware needs new hardware in order to work. |

<board ID> names

3 GHZ ATTENUATOR 1 | ;3GHZ ATTENUATOR 2 | ;AUDIO BD | ;ROM BASEBAND GENERATOR 1 | ;ROM BASEBAND GENERATOR 2 | ;DEMOD DOWNCONVERTER | ;VECTOR OUTPUT BOARD 1 | ;VECTOR OUTPUT BOARD 2 | ;IVF MEASUREMENT | ;MEASUREMENT DOWCONVERTER | ;RF POWER DETECTORS | ;REFERENCE MODULE | ;SYNTH DOUBLER 1 | ;SYNTH DOUBLER 2 | ;TIMING REF | ;MOMENTUM INSTRUMENT | ;RF MOTHER BOARD | ;JUMPER BOARD | ;DIGITAL MOTHER BOARD | ;FLAT PANEL ADAPTER | ;REAR PANEL BOARD

<EEPROM board ID> names

Instrument Eeprom ID State | ;Atten 1 Eeprom ID State | ;Atten 2 Eeprom ID State | ;Audio Eeprom ID State | ;BaseBandGen 1 Eeprom ID State | ;BaseBandGen 2 Eeprom ID State | ;Demod DC Eeprom ID State | ;Digital Mother Board Eeprom ID State | ;IQ Output 1 Eeprom ID State | ;IQ Output 2 Eeprom ID State | ;IVF Meas Eeprom ID State | ; Jumper Board Eeprom ID State | ; Meas DC Eeprom ID State | ;RF Mother Board Eeprom ID State | ;RF Interface Eeprom ID State | ; Ref Mod Eeprom ID State | ;Sig Gen 1 Eeprom ID State | ; Sig Gen 2 Eeprom ID State | ;Time Ref Eeprom ID State | ;Display Interface Eeprom ID State | ;Rear Panel Eeprom ID State

Related Topics

["Standard Event Status Register" on page 560](#)

+500 to +599 Test Application Hardware Device-Specific Error

Description

These errors are generated when a problem occurs with a hardware module that is required for a particular test application.

When one of these errors is generated, the ‘+500 errors’ bit in the questionable error status register is set.

Table 12. Test Application Hardware Device Specific Errors

| Error Message |
|--|
| +500 to +599 No errors currently defined |

Related Topics

[“Standard Event Status Register” on page 560](#)

+600 to +699 Instrument Device-Specific Error

Description

These errors are generated when a problem occurs that is specific to one of the test set's instruments. These errors are part of the test set's core. Note that these measurements may not be present in every test application and therefore, these errors may not be present in every test application. There is no plan at present to support test application specific instruments.

An instrument in this context refers to the measurement-like functionality such as the audio generator and not to the test set as a whole.

When one of these errors is generated, the '+600 errors' bit in the questionable error status register is set.

| Error Message | Description |
|---|---|
| +601 Instrument failure; Audio generator hardware is not responding | Indicates a problem occurs when attempting to control the test set's audio generator. |

Related Topics

["Standard Event Status Register" on page 560](#)

+700 to +799 Test Application Measurement Device-Specific Error

These errors are generated when a problem occurs that is specific to one of the test set's measurements (such as BERR, or TX power). These are test application specific.

When one of these errors is generated, the '+700 errors' bit in the questionable error status register is set. Refer to ["Standard Event Status Register" on page 560](#) for information on this register.

| Error Message | Description |
|--|--|
| +701 GSM measurement failure; TX power hardware is not responding | This indicates a problem with your test set's hardware. Please call your local Agilent Service Center. |
| +702 GSM measurement failure; Power vs time hardware is not responding | This indicates a problem with your test set's hardware. Please call your local Agilent Service Center. |
| +703 GSM measurement failure; Phase frequency error hardware is not responding | This indicates a problem with your test set's hardware. Please call your local Agilent Service Center. |
| +704 GSM measurement failure; Output RF spectrum hardware is not responding | This indicates a problem with your test set's hardware. Please call your local Agilent Service Center. |
| +705 GSM measurement failure; Fast bit error hardware is not responding | This indicates a problem with your test set's hardware. Please call your local Agilent Service Center. |
| +706 GSM measurement failure; Bit error hardware is not responding | This indicates a problem with your test set's hardware. Please call your local Agilent Service Center. |
| +707 GSM measurement failure; Decoded audio hardware is not responding | This indicates a problem with your test set's hardware. Please call your local Agilent Service Center. |
| +708 GSM measurement failure; IQ tuning hardware is not responding | This indicates a problem with your test set's hardware. Please call your local Agilent Service Center. |
| +709 GSM measurement failure; Dynamic power hardware is not responding | This indicates a problem with your test set's hardware. Please call your local Agilent Service Center. |
| +729 GSM measurement warning; Dynamic Power measurement has been closed | Indicates that a measurement has been inactivated because of a resource conflict. |

+800 to +899 Core Measurement Device-Specific Error

Description

These errors are generated when a problem occurs that is specific to one of the test set's core measurements (such as analog audio).

When one of these errors is generated, the '+800 errors' bit in the questionable error status register is set.

| Error Message | Description |
|---|--|
| +801 Measurement failure; Analog audio hardware is not responding | Indicates that a problem occurs when attempting to control the measurement's hardware. |
| +802 Measurement failure; Audio analyzer hardware is not responding | Indicates that a problem occurs when attempting to control the measurement's hardware. |

Related Topics

["Standard Event Status Register" on page 560](#)

Error Message Log

Description

When an error message is displayed, it is also logged in the error message log. This log is only accessible manually; it is not available through GPIB. The error message log can have two pages it can be displayed by pressing the F7 menu key from the SYSTEM CONFIG screen, Next Page and Previous Page controls are provided.

All errors and events that are generated are displayed in the error message log. When the log is full a new message is sent to the log and the oldest message is removed from the log. The log is cleared when the test set powers up or when the user presses F10 (Clear Error Message Log).

Related Topics

[“Error Messages” on page 684](#)

GSM Revision Information

This document describes features and functionality that are part of the E1960A GSM Mobile Test Application releases. This document contains the original features, as well as enhancements that have been added over time.

Select the appropriate link below to view the required release.

- [“A.05 Release May 2000” on page 716](#)
- [“A.04 Release - March 2000” on page 717](#)
- [“A.03 Release - December 1999” on page 718](#)
- [“A.02 Release - July 1999” on page 719](#)
- [“A.01 Release - March 1999” on page 719](#)
- [“A.00 Initial Release - January 1999” on page 720](#)

A.05 Release May 2000

Call Processing

No new features in this release.

Measurements

No new measurements in this release.

Other

- RF Source Analyzer Level Compensation

Amplitude offset is provided in order to compensate for loss or gain of the external network between the test set and the DUT, (device under test) over a range of frequencies.

- Test Application Security

A licensed version of each test application is required in order for the test application to operate. If you switch test applications to an unlicensed test application, the test set will reboot to the SYSTEM CONFIG screen. You will be unable to switch to any other screen, or make any measurements.

A.04 Release - March 2000

Call Processing

No new features in this release.

Measurements

No new measurements in this release.

Other

- Test Application selection for multi-format operation

Menus have been added to the System Configuration screen which allow you to select between different Test Applications that are installed in the test set. This feature can also be accessed remotely within the SYSTem subsystem using the command “[SYSTem:APPLication:SElect\[:NAME\] <test application name>](#)” [on page 567](#).

NOTE It is not recommended that you switch to a GSM Test Application that has a revision earlier than A.04. Earlier revisions did not have the capability to select Test Applications.

There may be up to a three second delay between the time the Test Application is selected and it being implemented in the test set.

- Options installed display is now active

The Options Installed display on the System Configuration screen has been activated to allow for the optional second source. Although the second source has been optional since the A.03 release, the Options Installed display has remained blank until this current release.

- Usability enhanced through gray fields

Non-enabled menu items are now denoted as gray text, versus enabled menu items that are a standard black text. Currently there are no GSM Test Application menu items that use this feature.

- Measurement time-out resolution increased

The measurement time-out resolution has been increased from 1 second to 0.1 seconds. The minimum time-out has also been reduced from 1 second to 0.1 seconds.

- Warning messages can be masked from the display

A new command is available in the DISPlay subsystem which allows you to set whether or not the test set displays and beeps warning messages. For further information on this command refer to “[DISPlay:MESSage:MASKable:STATE](#)” [on page 379](#). This feature is also available over the manual interface (the Maskable Messages Display State field is available in the Instrument Setup menu in the System Configuration screen).

A.03 Release - December 1999

Call Processing

- EFS

The Enhanced Full-rate Speech (EFS) feature provides the ability to set up a call in EFS mode.

- SACCH Tx Level Signalling

The mobile can now be commanded to use a different Tx level by signalling using the SACCH header alone. In previous releases a FACCH assignment as well as the updated SACCH header was used.

Measurements

- I/Q Tuning

A new measurement that can be used to determine the quality of an I/Q modulator by measuring the power of spurious signals at harmonics of 67.7 kHz.

- Simultaneous BER results

An enhancement to the BER measurement now allows all types of BER measurement results to be returned at the same time if required.

- Dynamic Power

A new feature that performs a series of rapid power measurements on a mobile station. This is only available via the test set's remote user interface.

Other

- Remote clear of error messages on screen

A new command can be sent over the GPIB to clear error messages from the screen to enhance use of the test set in a remote situation. Previously, error messages on the screen could only be cleared through manual intervention, by pressing a key on the front panel. For further information on this command refer to ["DISPlay:WINDow:ERRor:CLEar" on page 379](#).

- Status field indication of external or internal reference

A status field has been implemented on the screen to indicate whether the test set has locked to an external or an internal reference.

- Beeper ON/OFF setting is non-volatile

The ON/OFF setting of the beeper is now maintained through power-off. Previously, a power cycle would reset the beeper to its default state of OFF.

- Enhanced status subsystem for multi-format capability

The status subsystem has been enhanced with radio system nodes where necessary for future multi-format capability. This will cause some status subsystem commands to be in error condition, unless they are replaced with the modified commands. The commands are:

— STATus:QUEStionable:ERRors is now STATus:QUEStionable:ERRors:GSM

— STATus:QUEStionable:CALL is now STATus:QUEStionable:CALL:GSM

— STATus:OPERation:CALL is now STATus:OPERation:CALL:GSM

— STATus:OPERation:NMRReady is now STATus:OPERation:NMRReady:GSM

- Instrument configuration information available remotely
Information on the instrument hardware can be obtained through a remote command over the GPIB, and through a remote command via the LAN and a web browser. For further information on the commands refer to ["Hardware Configuration Report" on page 668](#).
- Enhanced instrument information on the Configuration Screen
The Instrument Information display on the Configuration Screen, now includes Subnet Mask and Gateway Default information in a new, improved information display.
- *IDN? returns "Agilent Technologies" in the manufacturer's field where previously it returned "Hewlett-Packard".
- RF Generator frequency range is now matched to the RF Receiver frequency range
Previously the RF Generator had a low end limit of 45 MHz, while the RF Receiver has always had a low end limit of 292.5 MHz. The RF Generator is now limited to 292.5 MHz to enhance testability and supportability of the test set.

A.02 Release - July 1999

Call Processing

- Paging Mode selectable between "Reorganisation" or "Normal"

Measurements

- Automatic closed loop settings as part of Normal BER and Fast BER measurements
- 3 kHz speech selection for Downlink Speech Source

Other

- LAN subnet mask and LAN Default Gateway settable
- Status Subsystem for GPIB queries of instrument status
- Display Brightness
- Display Automatic Backlight Dimming

A.01 Release - March 1999

Call Processing

No new features in this release.

Measurements

- Normal BER
- Pulsed Audio Source (For uplink speech measurement)

Other

Measurement Integrity on Manual User Interface

A.00 Initial Release - January 1999

Call Processing

- GSM 900 (Includes PGSM/EGSM), DCS1800, PCS1900
- MS and BS Originated Calls
- TCH, Timeslot, Timing Advance, MS Tx Level Assignments
- Dual-Band Handover
- Downlink Speech Source
- Test Mode - CW, BCH Only, BCH + TCH

Measurements

- Tx Power
- Output RF Spectrum
- Power versus Time
- Phase / Frequency Error
- Burst Timing
- Analog Audio
- Uplink Speech Measurement (requires pulsed audio source)
- Burst by Burst BER (Fast BER)

Other

- Audio Source
- User settable amplitude offset

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