User Manual

Tektronix

WCA230A & WCA280A Option 22
W-CDMA Downlink Analysis Software

071-1475-00

This document applies to firmware version 2.0
and above.

www.tektronix.com

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Preface

This manual describes how to use the WCA230A and WCA280A Option 22 W-CDMA Downlink Analysis Software. For details on the standard functions of the analyzer, refer to the *WCA230A and WCA280A Wireless Communication Analyzers User Manual*.

About This Manual

The manual consists of the following sections:

- *Getting Started* describes the overview of the W-CDMA downlink analysis.
- *Operating Basics* explains the menu functions and measurement procedures.
- *Syntax and Commands* presents descriptions of the GPIB commands provided in Option 22.
- *Appendices* provide additional information including factory initialization settings, scale setting ranges, and SCPI conformance informatin.

Related Documents

The following documents are also available for the analyzer.

- *WCA230A and WCA280A User Manual*
  (Standard accessory; Tektronix part number 071-1253-XX)
  Describes how to install the analyzer and how to work with the menus, and details the standard functions. Also shows the specifications.
- *WCA230A and WCA280A Programmer Manual*
  (Standard accessory; Tektronix part number 071-1255-XX)
  Contains an alphabetical listing of the programming commands and other information related to controlling the analyzer over the GPIB interface.

Conventions

This manual uses the following conventions:

- Front-panel button and control labels are printed in the manual in upper case text. For example, SPAN, PEAK, PRINT. If it is part of a procedure, the button or control label is printed in boldface. For example:

  Press **SPAN**.

- To easily find buttons on the front panel, the area name label is printed together with the button by concatenating with a colon (:), as in MODE: **DEMOD**, VIEW: **SCALE**, MARKERS: **SELECT**, etc. For example:

  Press the MODE: **DEMOD** key.

- Menu and on-screen form titles are printed in the manual in the same case (initial capitals) as they appear on the analyzer screen, such as Span, Source, and Channel Power. If it is part of a procedure, the menu title is shown in boldface. For example:

  Press the **Source** side key.

- A list of keys, controls, and/or menu items separated by an arrow symbol (→) indicates the order in which to perform the listed tasks. For example:

  Select **RBW/FFT → Filter Shape...→ Gaussian**.

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* **This phone number is toll free in North America. After office hours, please leave a voice mail message.**
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Getting Started

Getting Started

This section outlines the downlink analysis according to the W-CDMA standard using Option 22. Table 1–1 summarizes the additional functions in Option 22 by the measurement mode.

Table 1–1: Additional functions in Option 22

Measurement mode	Additional functions
S/A (spectrum analysis)	W-CDMA ACLR measurement
Demod (modulation analysis)	Nine measurement functions, including code domain power
Time (time analysis)	None

Figure 1–1 shows an example of the downlink analysis in the Demod mode.

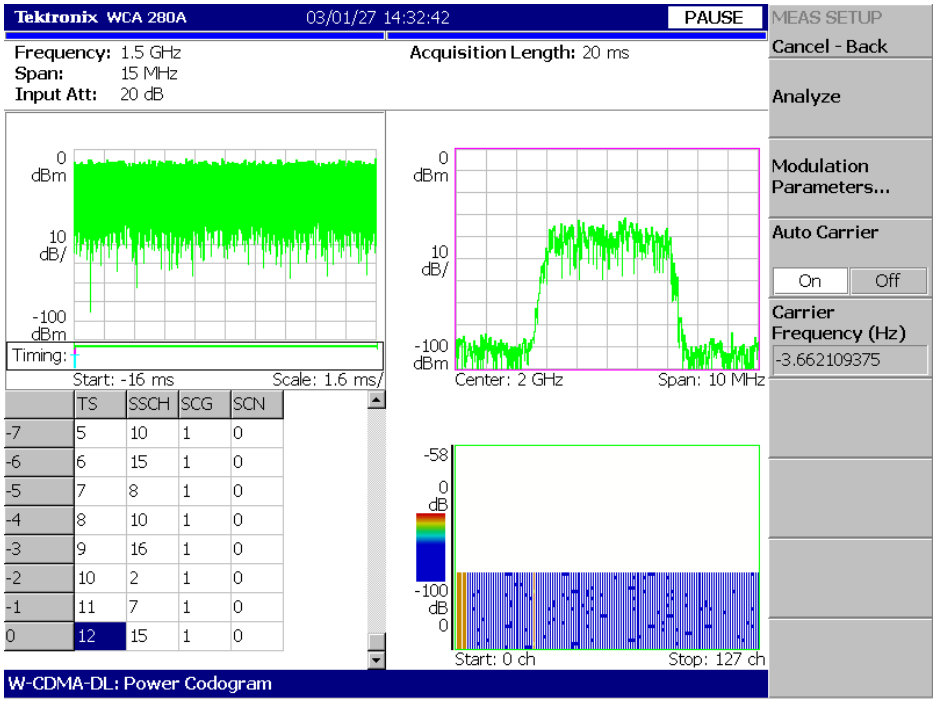


Figure 1–1: W-CDMA downlink analysis display

Definition of Analysis

This instrument performs measurements according to the W-CDMA downlink signal parameters shown in Table 1–2.

Table 1–2: W-CDMA downlink signal parameters

Item	Description
Chip rate	3.84 Mcps
Symbol rate	7.5, 15, 30, 60, 120, 240, 480, 960, and 1920 ksps
Maximum number of channels	512
Frame structure	Time slot: 666.7 μs
Scrambling code	Gold code using M series by generator polynomial 18 bits
Channelization code	Hierarchical orthogonal code series based on the combination of chip rate and symbol rate
Modulation method of each channel	QPSK
Baseband filter	Root cosine of α = 0.22 (default) Can be set in the range of $0.0001 \leq \alpha \leq 1$

Measurement Functions

The analyzer has the following measurement functions:

- *Code domain power*
  Measures the power relative to the total power for each channel.
  Multi-rate is supported and up to 512 channels can be measured.
- *Code domain power vs. Time*
  Measures the relative power at symbol points for each channel in time series.
- *Code domain power spectrogram*
  Measures the code domain power continuously for up to 150 slots (0.1 sec) and displays spectrogram for each slot.
- *Vector/Constellation*
  Measures the vector loci and chip points for all signals as well as constellation at symbol points for each channel.
- *Modulation accuracy*
  Measures EVM (Error Vector Magnitude), amplitude and phase errors, waveform quality, and origin offset for each channel.
  Measures PCDE (Peak Code Domain Error), amplitude, frequency, and phase errors; waveform quality; and origin offset for each time slot.

Measurement Process

The internal process for the W-CDMA downlink analysis is as follows:

1. Perform the flatness correction and filtering.
2. Establish the synchronization with P-SCH.
3. Determine the range of scrambling code numbers with S-SCH.
4. Fix the scrambling code number and the phase.
5. Correct the frequency and the phase.
6. Perform high-speed Hadamard transformation.
7. Calculate the power for each symbol on all channels.

Modulation Analysis Measurement Items

Use the Measure menu to select the measurement items provided in the Demod (modulation analysis) mode:

- **Code Domain Power.** Displays code domain power for each short code.
- **Power Codogram.** Displays code domain power with a spectrogram.
- **Code Power versus Time Slot.** Displays code domain power for each time slot.
- **Code Power versus Symbol.** Displays code domain power for each symbol.
- **Symbol Constellation.** Displays a symbol constellation.
- **Symbol EVM.** Displays EVM for each symbol.
- **Symbol Eye Diagram.** Displays a symbol eye diagram.
- **Symbol Table.** Displays a symbol table.
- **Modulation Accuracy.** Displays constellation and measurement results for each time slot. The results were obtained before de-spread occurred.

Measurement Menu

Figure 1–2 shows the measurement menus added in Option 22.

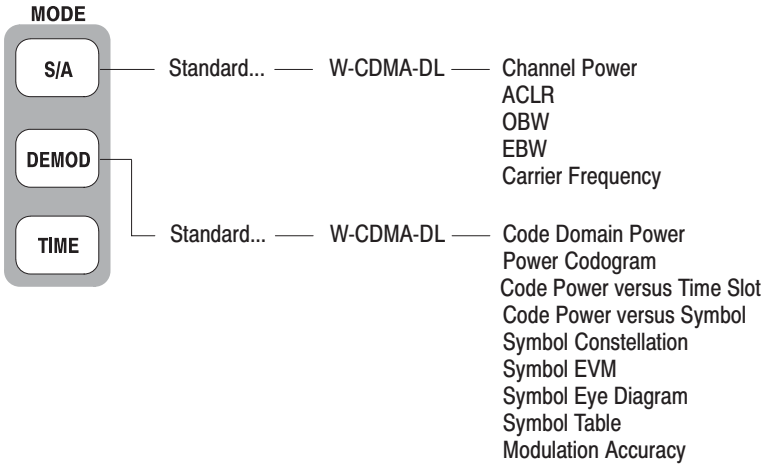


Figure 1–2: W-CDMA downlink measurement menus

The following sections provide the measurement procedures.

Operating Basics

Basic Operation in the S/A Mode

This section describes the basic operation in the S/A (Spectrum Analysis) mode.

Measurement Procedure

Use the following procedure for a spectrum measurement in the S/A mode.

1. Press the **S/A** key on the front panel.
2. Press the side key **Standard...→ W-CDMA-DL**.
3. Press the **FREQUENCY/CHANNEL** key on the front panel and set frequency.

NOTE. *For details on setting frequency, span, and amplitude, refer to the WCA230A and WCA280A User Manual.*

If you use the channel table, do these steps:

   a. Press the **Channel Table...** side key and select **W-CDMA-DL**.

   b. Press the **Channel** side key and select a channel by turning the general purpose knob.

      The center frequency is set to the value corresponding to the channel.

4. Set span and amplitude appropriately.

NOTE. *If the input level is too high, A/D OVERFLOW displays in the red box at the center top of the screen. If this occurs, raise the reference level.*

---

5. Press the **MEASURE** key on the front panel and select a measurement item:
   - Channel Power
   - ACLR (Adjacent Channel Leakage Power Ratio)
   - OBW (Occupied Bandwidth)
   - EBW (Emission Bandwidth)
   - Carrier Frequency

NOTE. *All the measurement items except ACLR are the same as in normal spectrum analysis. For details on these items, refer to the WCA230A and WCA280A User Manual. For the ACLR measurement procedure, refer to page 2–3.*

ACLR Measurement

The ACLR (Adjacent Channel Leakage Power Ratio) measurement according to the W-CDMA standard is based on the ACPR measurement function in the normal spectrum analysis. For the basics, refer to *ACPR Measurement* in the *WCA230A and WCA280A User Manual*.

The following settings are fixed according to the W-CDMA standard:

Span . . . . . 25 MHz
Main channel measurement bandwidth (Main Chan BW) . . . . . 3.84 MHz
Adjacent channel measurement bandwidth (Adj Chan BW) . . . 3.84 MHz
Channel spacing (Chan Spacing) . . . . . 5 MHz

After selecting ACLR in the procedure on page 2–2, set the parameters in the Measurement Setup menu as follows:

Measurement Setup Menu

The Measurement Setup menu for the ACLR measurement contains the following parameters:

Measurement Filter Shape... Selects a filter shape:

- Rect (rectangle)
- RootNyquist (Root Nyquist, default)

Rolloff Ratio. Sets the roll-off value when the filter is root Nyquist.
Range: 0.0001 to 1 (default: 0.22)

2nd Adj Channel Gain. Because the power of the second adjacent channel is normally much smaller than the main channel, measurement with the same gain causes a larger error. To enhance accuracy, raise the gain of the second adjacent channel inside the analyzer. Set the gain value here.

Range: 3 to 15 dB (default: 5dB)

The upper limit of the range may be smaller than 15 dB, depending on the amplitude setting. This setting does not affect the waveform display.

Figure 2–1 shows an example of the ACLR measurement. Measured values are displayed in the lower part of the screen.

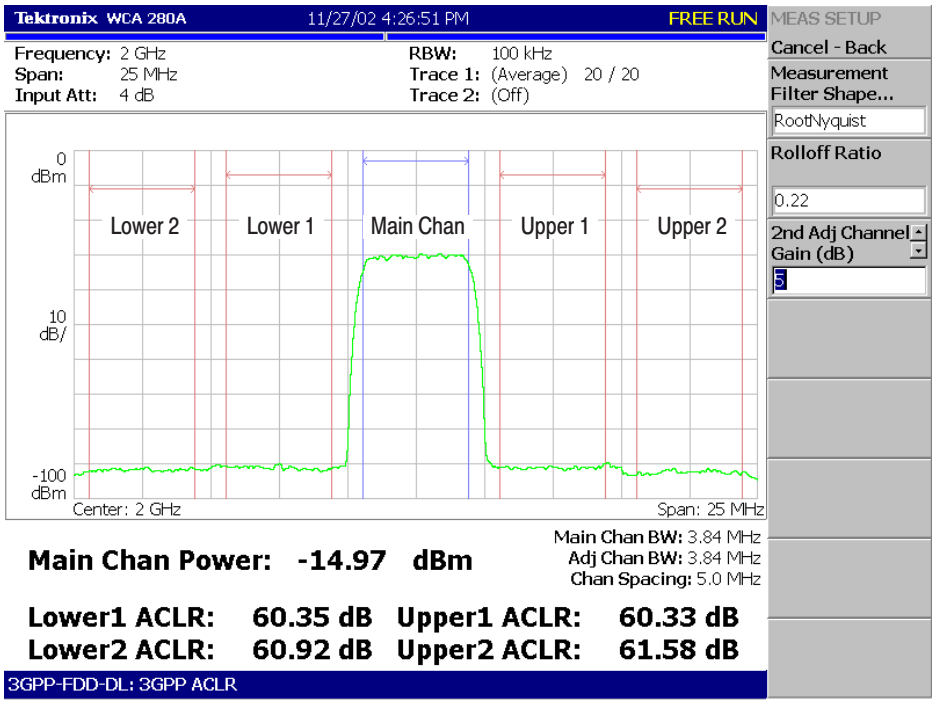


Figure 2–1: W-CDMA ACLR measurement

Basic Operation in the Demod Mode

This section describes the basic operation in the Demod (Modulation Analysis) mode. The W-CDMA downlink analysis in the Demod mode is based on the digital modulation analysis function. For the digital modulation analysis, refer to the *WCA230A and WCA280A User Manual.*

Measurement Procedure

The following procedure shows you how to acquire data of multiple slots in advance, measure continuous data, and obtain continuous code domain power:

1. Press the **DEMOD** key on the front panel.
2. Press the side key **Standard...→ W-CDMA-DL**.
3. Press the **FREQUENCY/CHANNEL** key on the front panel to set frequency.

***NOTE**. For details on setting frequency, span, and amplitude, refer to the WCA230A and WCA280A User Manual.*

If you use the channel table, do these steps:

   a. Press the **Channel Table...** side key and select **W-CDMA-DL**.

   b. Press the **Channel** side key and select a channel by rotating the general purpose knob.

      The center frequency is set to the value corresponding to the channel.

4. Set span and amplitude appropriately.

***NOTE**. If the input level is too high, A/D OVERFLOW displays in the red box at the center top of the screen. At this time, raise the reference level.*

---

5. Press the **TIMING** key on the front panel and then the **Acquisition Length** side key to set the time length to acquire one block.

   Suppose that one block contains M frames; the acquisition length is calculated with this equation:

   (One block acquisition length) = M × (One frame acquisition length)

   One frame acquisition length is determined by span and indicated on the **Spectrum Length** side key.

   The number of frames M required for measuring N slots must meet the following condition:

   $M > K \times (N + 1.2) + 1$

   where
   K = 16.7 (for the span of 20 MHz and 15 MHz)
   8.34 (for the span of 10 MHz)
   4.17 (for the span of 5 MHz)

6. After acquiring measurement data, stop the data acquisition.
   If you are acquiring data in the continuous mode, press the **RUN/STOP** key.

7. Press the **MEASURE** key on the front panel and select measurement items. For example, press the **Power Codogram** side key to observe the code domain power spectrogram.

8. Press the **MEAS SETUP** key on the front panel and set the measurement parameters. Refer to page 2–8 for details of the Meas Setup menu.

9. Set the analysis range in the overview.
   Refer to the *WCA230A and WCA280A User Manual* for the details.

10. Press the **Analyze** side key to perform measurement for the frames in the analysis range. The measurement result and waveform are displayed in the main view.

    Change the scale and format of the view as needed. Refer to page 2–11 for setting views specific to the W-CDMA downlink analysis.

11. If the level of input signals is low, the waveform may not be displayed correctly. In this case, perform the following procedure:

***NOTE**. Correct W-CDMA downlink signal analysis cannot be performed if the P-SCH, S-SCH, and PCPICH channels are too low to be detected. An error occurs when one of these channel levels is lower than about 1/10th the sum of other channel levels. In this case, set Scrambling Code Search to Off and specify the scrambling code with Scrambling Code.*

---

a. Press the **MEAS SETUP** key on the front panel.

b. Press the **Modulation Parameters...** side key.

c. Press the **Scrambling Code Search** side key to select **Off**.

d. Press the **Scrambling Code** side key and enter the scrambling code.

The analyzer performs measurement with the value set here in place of detecting the scrambling code.

e. Press the **MEAS SETUP** key on the front panel.

f. Press the **Analyze** side key to perform measurement for the frames in the analysis range.

Figure 2–2 shows an example of the code domain power measurement.

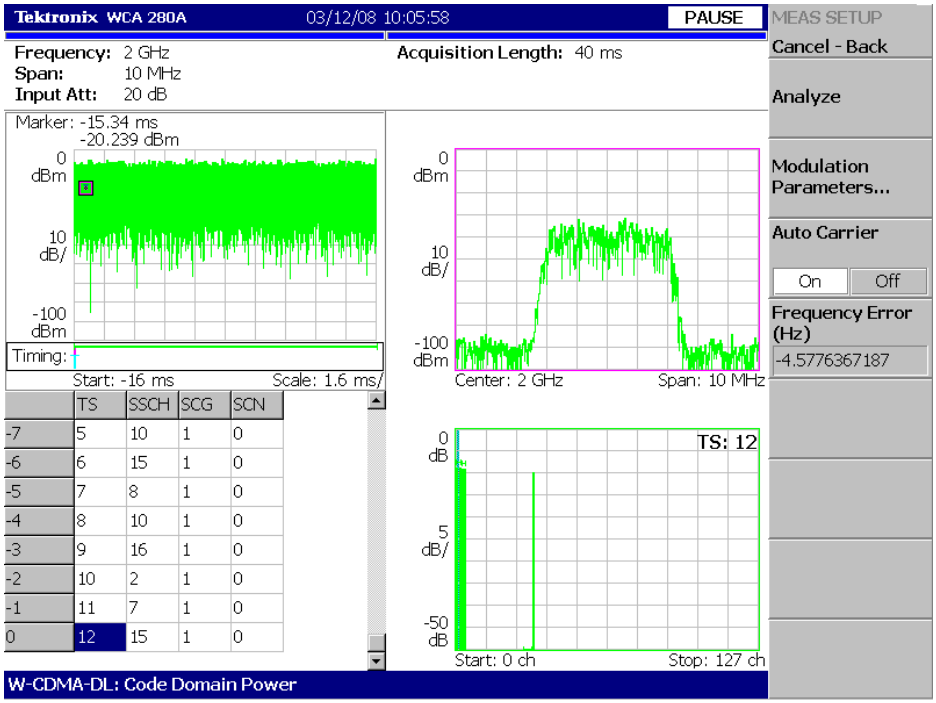


Figure 2–2: Code domain power measurement example

Meas Setup Menu

The Meas Setup menu for the W-CDMA downlink analysis contains the following items:

Analyze Performs analysis for time slots in the analysis range.

Modulation Parameters... Sets a measurement parameter to a non-standard value.
The following controls are provided:

Scrambling Code Search. Selects whether to perform analysis by detecting a scrambling code from input signals.

- **On.** Detects a scrambling code from the input signal to perform the measurement.
- **Off.** Performs measurement using the scrambling code that has been set with **Scrambling Code** described below.

  Refer to *Note* on page 2–6.

Scrambling Code. Sets the scrambling code number when you select **Off** in **Scrambling Code Search**. Range: 0 to 24575.

The analyzer performs measurement using the set scrambling code.

Use SCH Part. Selects whether to include or exclude the SCH portion when calculating the code domain power.

- **On.** Calculates the code domain power by including the SCH portion.
- **Off.** *Default.* Calculates the code domain power by excluding the SCH portion.

Composite. Determines whether to perform the composite analysis (automatic detection of symbol rate).

- **On.** Specifies that the composite analysis is performed.
- **Off.** Specifies that the composite analysis is not performed.

NOTE*. You should usually specify that composite analysis is performed. If a normal analysis does not result, select Off in this command and select a specific symbol rate with Symbol Rate in the View: Define menu.*

Measurement Filter... Selects a filter for demodulating digitally-modulated signals:

- None (no filter)
- RootRaisedCosine

Reference Filter... Selects a filter for creating reference data:

- None (no filter)
- RaisedCosine
- Gaussian

For the filters, refer to *Process Flow of Digitally-Modulated Signal* in the *WCA230A and WCA280A User Manual*.

Filter Parameter. Sets the α/BT value for Measurement Filter and Reference Filter described above. Range: 0.0001 to 1.

Auto Carrier Selects whether to detect the carrier automatically.

- **On.** *Default*. Automatically detects the carrier for every frame. The error from the center frequency is shown on the **Freq Error** side key.
- **Off.** Sets the carrier frequency using **Frequency Offset** described below.

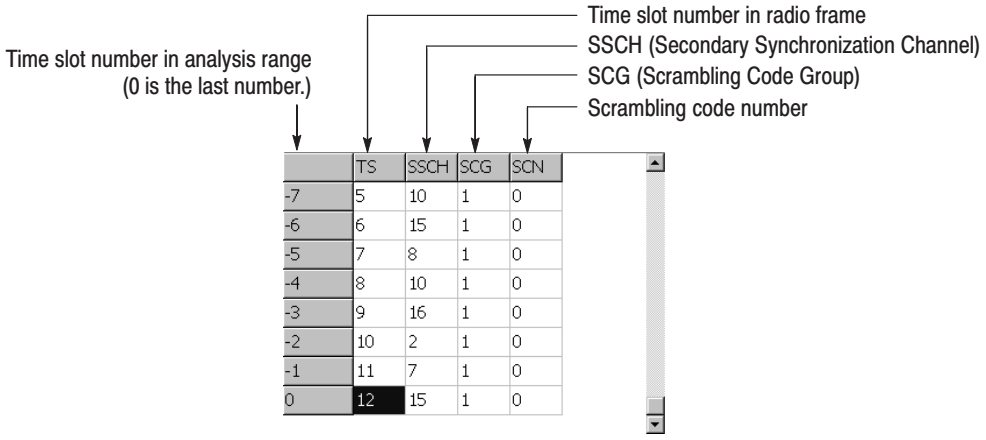
Frequency Offset Sets the carrier frequency when Off is selected in Auto Carrier. Input the carrier offset from the center frequency.

Scale and Format of View

The following main views are specific for the measurement items of the W-CDMA downlink analysis in Demod mode:

- Code domain power
- Power codogram
- Code power vs. Time slot
- Code power vs. Symbol
- Symbol constellation
- Symbol EVM
- Symbol eye diagram
- Symbol table
- Modulation accuracy

Each view and its specific menu are described on the following pages. In the main view, the time slot table shown in Figure 2–3 is displayed in addition to waveform and measurement results.



	TS	SSCH	SCG	SCN
-7	5	10	1	0
-6	6	15	1	0
-5	7	8	1	0
-4	8	10	1	0
-3	9	16	1	0
-2	10	2	1	0
-1	11	7	1	0
0	12	15	1	0

Figure 2–3: Time slot table

View: Define Menu

The View: Define menu is common to all main views of the W-CDMA downlink measurement items. It contains the following controls:

Show Views. Selects the view style:

- **Single.** Displays only the view selected by the VIEW: **SELECT** key.
- **Multi.** *Default*. Displays the overview, subview, and main view.

Overview Content... Selects a view to display in the overview:

- Waveform (power versus time)
- Spectrogram

Subview Content... Selects a view to display in the subview:

- Spectrum
- Code Domain Power
- Power Codogram
- Code Power versus Time Slot
- Code Power versus Symbol
- Symbol Constellation
- Symbol EVM
- Symbol Eye Diagram
- Symbol Table
- Modulation Accuracy

Time Slot. Sets a time slot number to position the marker.
Range: 0 to number of slots – 1

Symbol Rate. Sets the symbol rate for displaying symbol constellation:

- Composite
- 7.5 k
- 15 k
- 30 k
- 60 k
- 120 k
- 240 k
- 480 k
- 960 k

The default is Composite for multi-rate.

Short Code. Sets a short code number to position the marker.
Range: 0 to 511 channels

Show SCH Part. Determines whether to display SCH at the beginning of data. If it is On, SCH is displayed.

Code Domain Power

When you select **Code Domain Power** in the Measure menu, the code domain power is displayed for each short code, as shown in Figure 2–4.

View: Scale Menu

Use the following controls to set the scale:

Auto Scale. Sets the start value and the scale of the vertical axis automatically to display the entire waveform.

Horizontal Scale. Sets the scale of the horizontal axis. Range: 16 to 512 channels.

Horizontal Start. Sets the start channel number of the horizontal axis.

Vertical Scale. Sets the scale of the vertical axis. Range: 1 to 100 dB.

Vertical Stop. Sets the maximum value (top edge) of the vertical axis. Range: –100 to 100 dB.

Full Scale. Sets the scale of the vertical axis to default full-scale value.

Y Axis. Selects whether to represent the vertical axis (amplitude) with relative or absolute values.

- **Relative.** The vertical axis represents the power relative to the total power of all channels.
- **Absolute.** The vertical axis represents the absolute power of each channel.

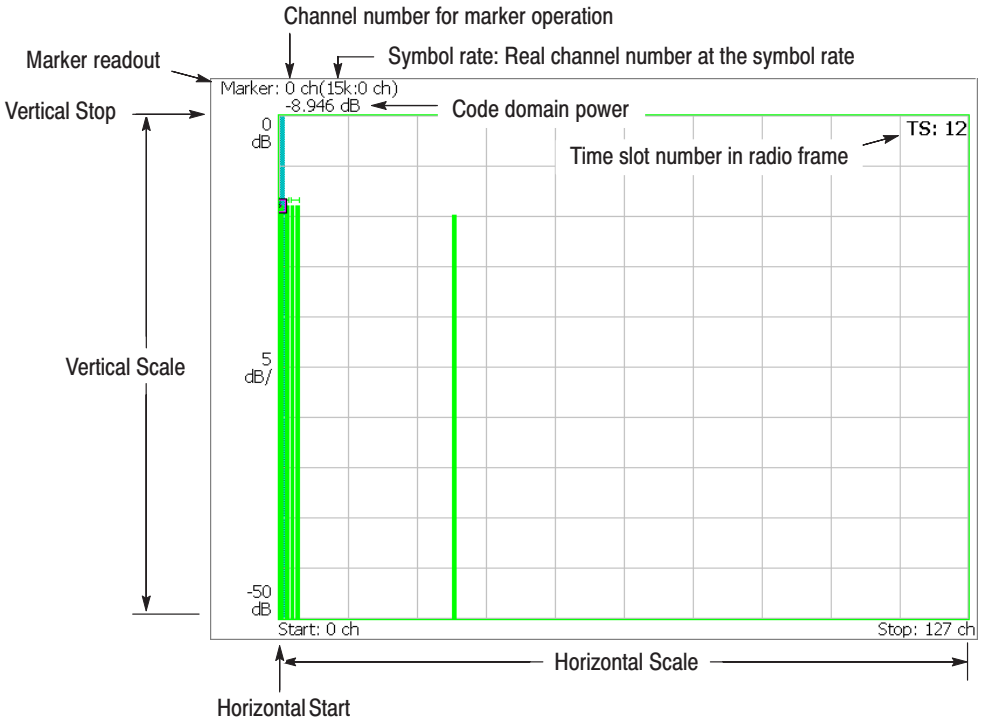


Figure 2–4: Code domain power versus Short code

Power Codogram

When you select **Power Codogram** in the Measure menu, the code domain power is displayed in spectrogram, as shown in Figure 2–5.

View: Scale Menu

Use the following controls to set the scale:

Auto Scale. Sets the start value and the scale of the vertical axis automatically to display the entire waveform.

Horizontal Scale. Sets the scale of the horizontal axis. Range: 16 to 512 channels.

Horizontal Start. Sets the start channel number of the horizontal axis.

Vertical Size. Sets the full-scale of the vertical axis in frames.
Range: 58 to 59392.

Vertical Start. Sets the start frame number of the vertical axis.

Color Scale. Sets the scale (the value subtracting the minimum power value from the maximum power value) of the color axis:

- 10 dB
- 20 dB
- 50 dB
- 100 dB

The spectrogram is displayed in 100 steps (100 colors) from the minimum value (blue) to the maximum value (red) in the default state.

Color Stop. Sets the maximum value (top edge) of the color axis.
Range: –50 to 50 dB.

Full Scale. Sets the maximum value of the color axis to the reference level and sets the height to 100 dB.

Y Axis. Selects whether to represent the Y (color) axis with relative or absolute values.

- **Relative.** Y axis shows the power relative to the total power of all channels.
- **Absolute.** Y axis shows the absolute power of each channel.

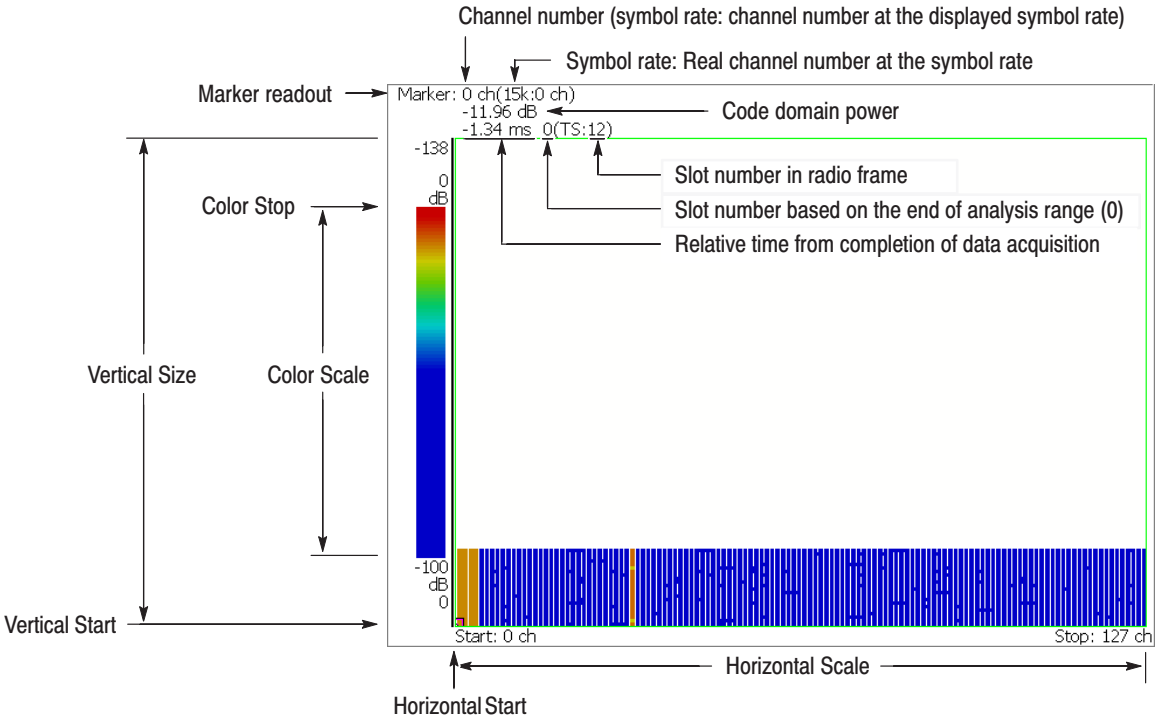


Figure 2–5: Power codogram

Code Power vs. Time Slot

When you select **Code Power versus Time Slot** in the Measure menu, the code domain power is displayed for each slot, as shown in Figure 2–6.

View: Scale Menu

Use the following controls to set the scale:

Auto Scale. Sets the start value and the scale of the vertical axis automatically to display the entire waveform.

Horizontal Scale. Sets the scale of the horizontal axis (number of slots).

Horizontal Start. Sets the start slot number of the horizontal axis.

Vertical Scale. Sets the scale of the vertical axis. Range: 1 to 100 dB

Vertical Stop. Sets the maximum value (top edge) of the vertical axis. Range: –100 to 100 dB.

Full Scale. Sets the scale of the vertical axis to default full-scale value.

Y Axis. Selects whether to represent the vertical (amplitude) axis with relative or absolute values.

- **Relative.** The vertical axis represents the power relative to the total power of all channels.
- **Absolute.** The vertical axis represents the absolute power of each channel.

Total Power. Determines whether to display total power of time slots.

- **On.** Displays the total power of time slots.
- **Off.** Displays power of the short code specified with Short Code (refer to page 2–13) for each time slot.

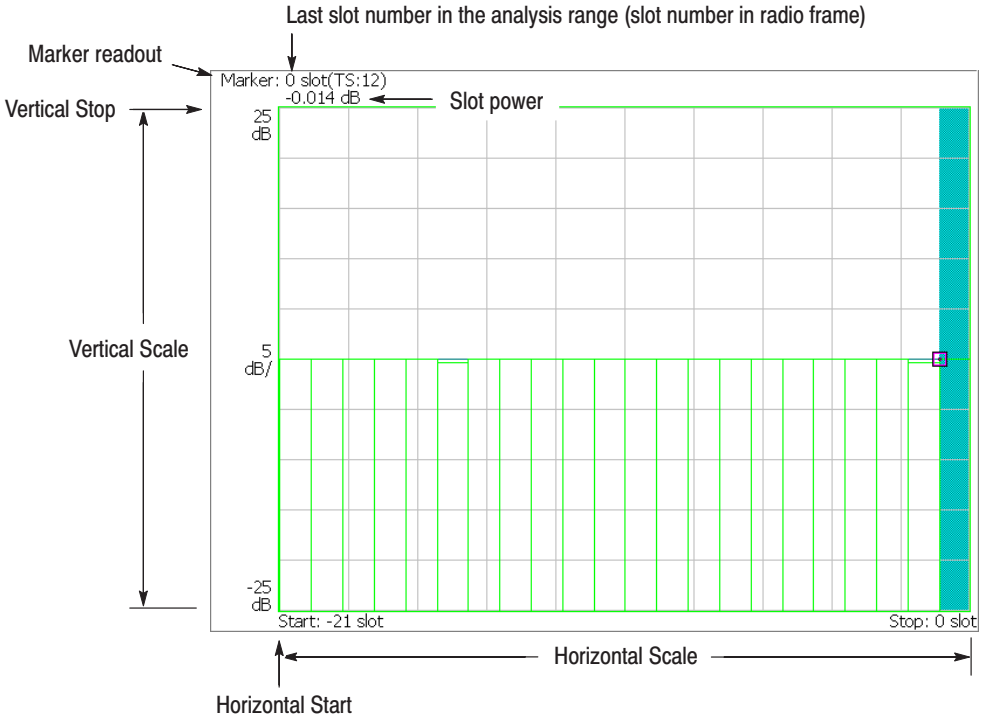


Figure 2–6: Code domain power versus Time slot

Code Power vs. Symbol

When you select **Code Power versus Symbol** in the Measure menu, the code domain power is displayed for each symbol, as shown in Figure 2–7.

View: Scale Menu

Use the following controls to set the scale:

Auto Scale. Sets the start value and the scale of the vertical axis automatically to display the entire waveform.

Horizontal Scale. Sets the scale of the horizontal axis (number of symbols).

Horizontal Start. Sets the start symbol number of the horizontal axis.

Vertical Scale. Sets the scale of the vertical axis. Range: 1 to 100 dB

Vertical Stop. Sets the maximum value (top edge) of the vertical axis. Range: –100 to 100 dB.

Full Scale. Sets the scale of the vertical axis to default full-scale value.

Y Axis. Selects whether to represent the vertical (amplitude) axis with relative or absolute values.

- **Relative.** The vertical axis represents the power relative to the total power of all channels.
- **Absolute.** The vertical axis represents the absolute power of each channel.

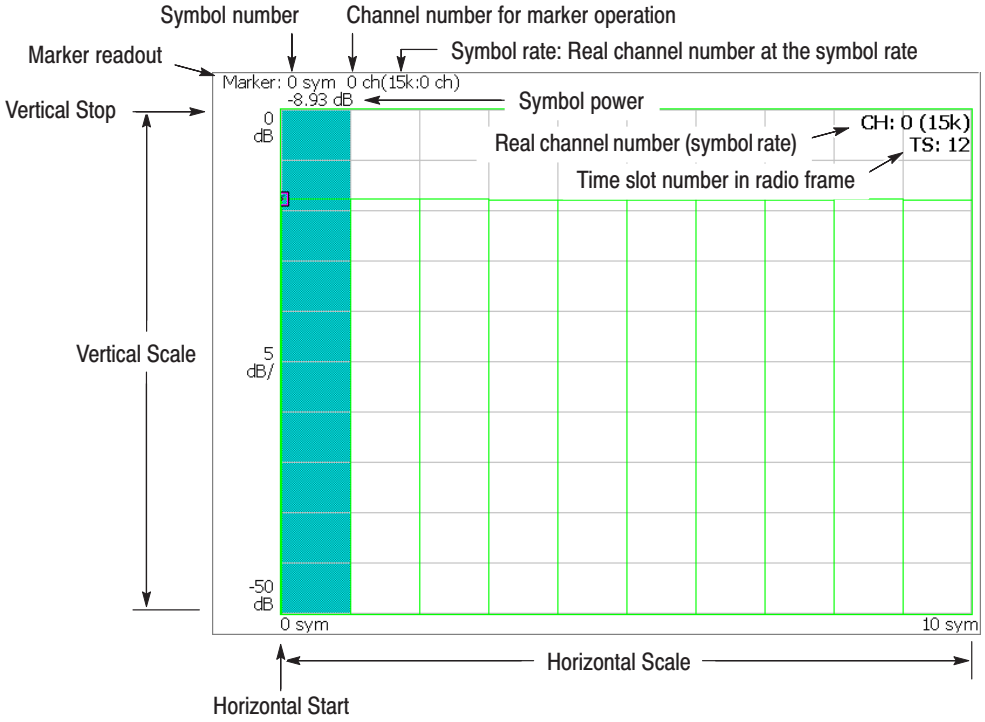


Figure 2–7: Code domain power versus Symbol

Symbol Constellation

The symbol constellation is displayed when you select **Symbol Constellation** in the Measure menu, as shown in Figure 2–8.

View: Scale Menu

Use the following controls to set the scale:

Measurement Content... Selects vector or constellation display.

- **Vector.** Selects vector display. A signal represented with phase and amplitude is displayed in polar coordinate or IQ diagram. The red point indicates the symbol position of measured signal, and the yellow trace indicates locus of signal between symbols.
- **Constellation.** Selects constellation display. It is the same as the vector display, except that only symbols of measured signal are indicated in red, and the locus between symbols is not shown. The cross marks indicate symbol positions of ideal signal.

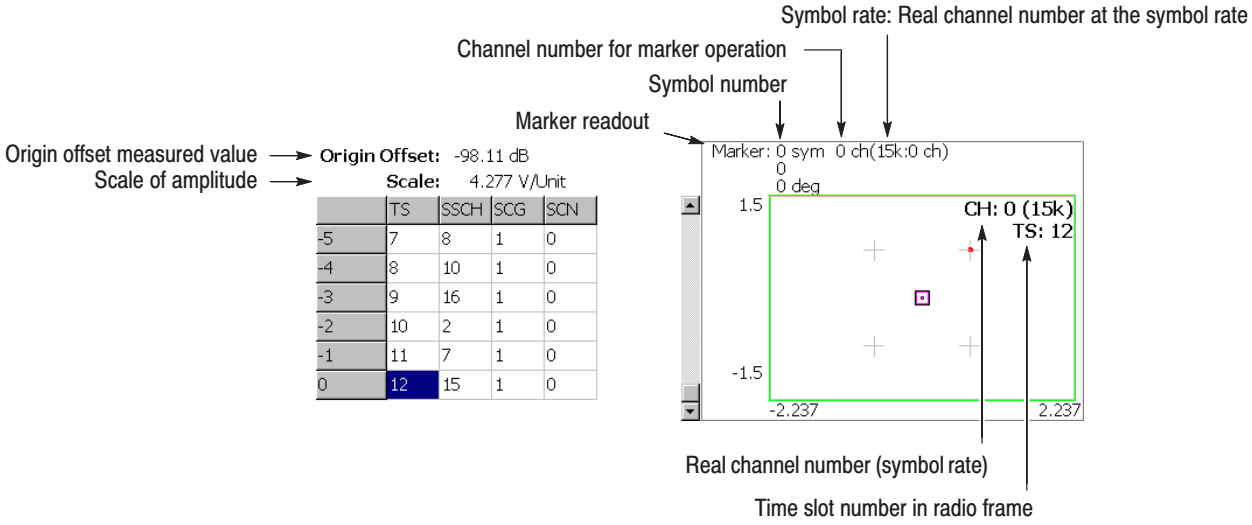


Figure 2–8: Symbol constellation

Symbol EVM

When you select **Symbol EVM** in the Measure menu, EVM is displayed for each symbol, as shown in Figure 2–9.

View: Scale Menu

Use the following controls to set the scale:

Auto Scale. Sets the start value and the scale of the vertical axis automatically to display the entire waveform.

Horizontal Scale. Sets the scale of the horizontal axis (number of symbols).

Horizontal Start. Sets the start symbol number of the horizontal axis.

Vertical Scale. Sets the scale of the vertical axis. Range: 100µ to 100% (EVM), 200µ to 200% (Mag Error), 450µ to 450° (Phase Error)

Vertical Start. When the measurement content is EVM, sets the minimum value (bottom edge) of the vertical axis. Range: –100 to 100% (EVM)

Vertical Offset. When the measurement content is Mag Error or Phase Error, sets the center value ((maximum + minimum) / 2) of the vertical axis.
Range: –200 to 200% (Mag Error), –450 to 450° (Phase Error)

Full Scale. Sets the scale of vertical axis to default full-scale value.

Measurement Content... Selects how to display the vertical axis:

- **EVM.** Displays the vertical axis with EVM (Error Vector Magnitude).
- **Mag Error.** Displays the vertical axis with magnitude error.
- **Phase Error.** Displays the vertical axis with phase error.

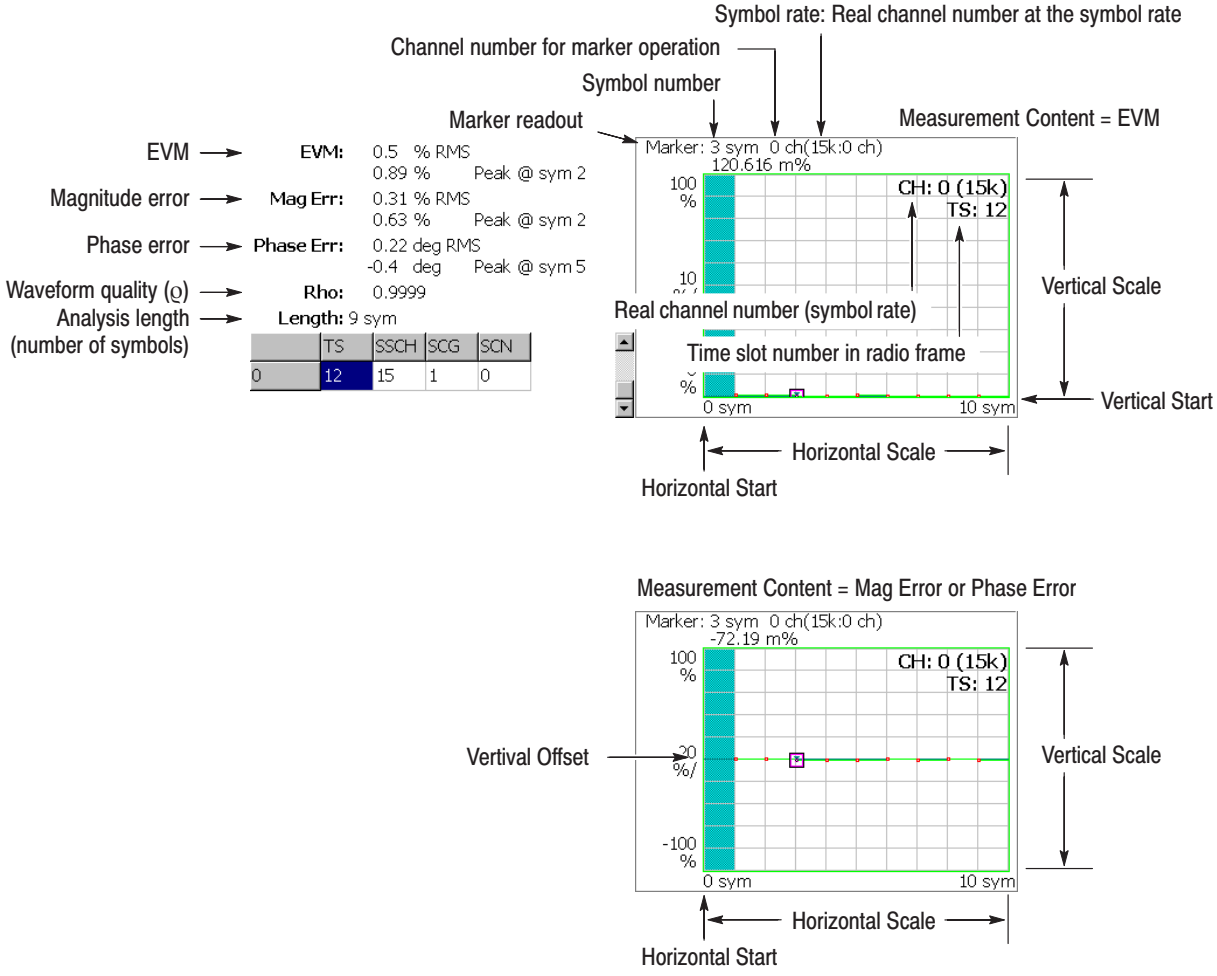


Figure 2–9: Symbol EVM

Symbol Eye Diagram

The symbol eye diagram is displayed when you select **Symbol Eye Diagram** in the Measure menu, as shown in Figure 2–10.

View: Scale Menu

Use the following controls to set the scale.

Measurement Content... Selects the vertical axis of eye diagram.

- **I.** *Default.* Displays I data on the vertical axis.
- **Q.** Displays Q data on the vertical axis.
- **Trellis.** Displays phase on the vertical axis.

Eye Length. Enters the number of display symbols on the horizontal axis. Range: 1 to 16. Default value: 2.

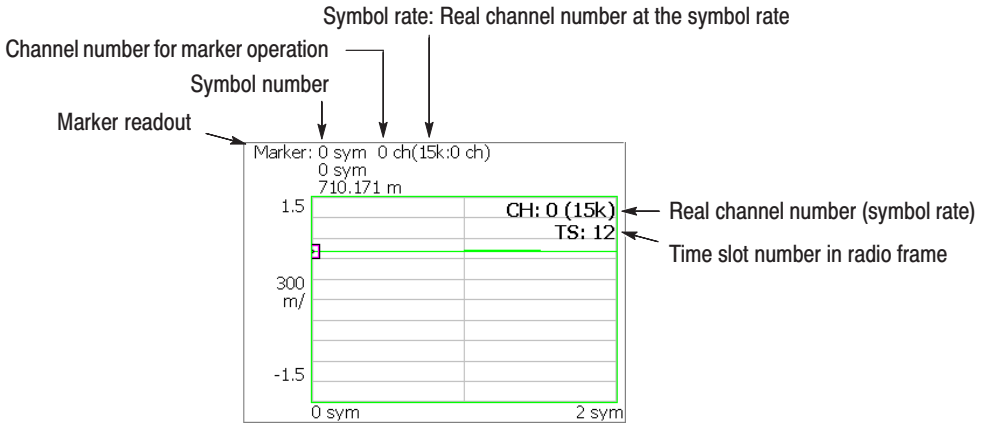


Figure 2–10: Symbol eye diagram

Symbol Table

The symbol table is displayed when you select **Symbol Table** in the Measure menu, as shown in Figure 2–11.

View: Scale Menu

Use the following controls to set the scale:

Radix. Selects the radix for displaying the table:

- **Hex.** Hexadecimal digit
- **Oct.** Octal digit
- **Bin.** Binary digit (default)

Rotate. Sets the start position. Range: 0 to 3.

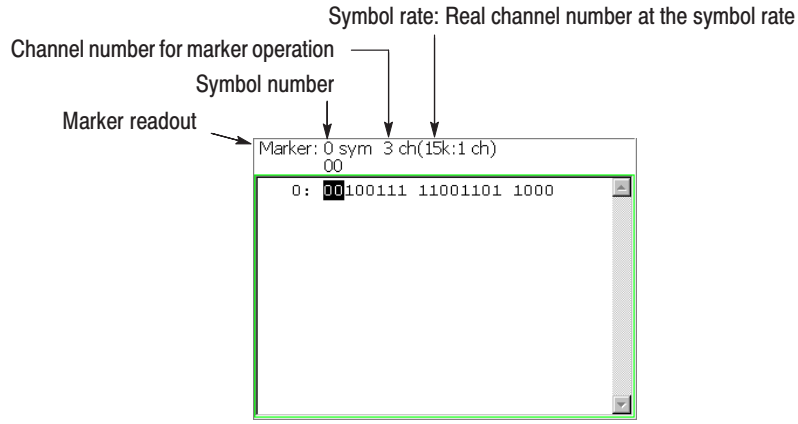


Figure 2–11: Symbol table

Modulation Accuracy

The constellation of all channels before the de-spread is displayed when you select **Modulation Accuracy** in the Measure menu.

When you press the VIEW: **SELECT** key on the front panel to select the constellation view, the measurement results for the time slot are displayed instead of the overview, as shown in Figure 2–12.

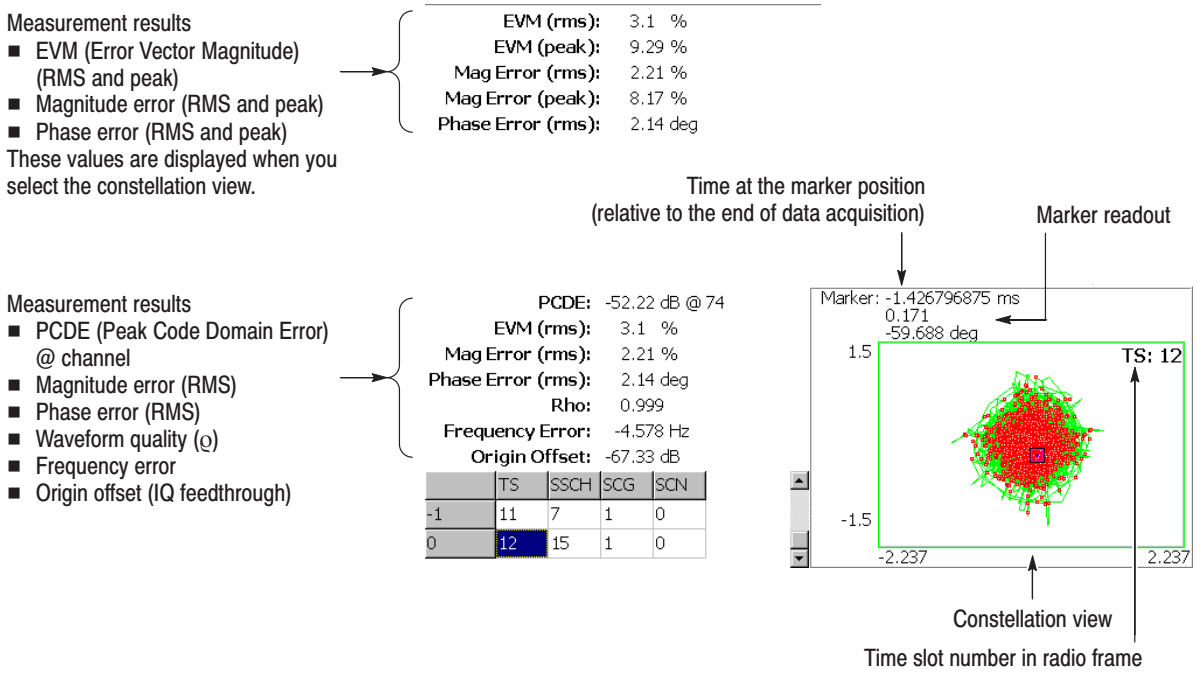


Figure 2–12: Modulation accuracy

The view settings are the same as for Symbol Constellation. Refer to *Symbol Constellation* on page 2–22.

Syntax and Commands

Command Groups

This section lists the commands added in Option 23 in two ways. It first presents them by functional groups. It then lists them alphabetically. The functional group list starts below. The alphabetical list provides more detail on each command and starts on page 3–7.

For details on the standard analyzer commands, refer to the *WCA230A and WCA280A Programmer Manual.*

Items followed by question marks are queries; items without question marks are commands. Some items in this section have a question mark in parentheses (?) in the command header section; this indicates that the item can be both a command and a query.

Each command may be available or unavailable, depending on the current measurement mode. The “Measurement Modes” in each command description shows the measurement mode in which the command is available. To set the measurement mode, use the :INSTrument[:SELect] command (refer to the *WCA230A and WCA280A Programmer Manual*) using one of the mnemonics listed below:

Table 3–1: Measurement modes added in Option 22

Mnemonic	Meaning
SADL3G	W-CDMA downlink spectrum analysis
DEMDL3G	W-CDMA downlink modulation analysis

The WCA200A Series analyzers conform to the Standard Commands for Programmable Instruments (SCPI) 1999.0 and IEEE Std 488.2-1987 except where noted.

Functional Groups

The commands added in Option 22 are divided into the groups listed below.

Table 3–2: List of command groups

Command group	Function
:CONFigure	Configure the analyzer for each measurement session.
:DISPlay	Control how to show waveform and measurement result on the screen.
:FETCh	Retrieve the measurements from the data last acquired.
:READ	Obtain the measurement results with acquiring data.
:SENSe	Set up detailed conditions for each measurement.

The following sections list the commands by group.

:CONFigure Commands

Set up the analyzer in order to perform the specified measurement.

Table 3–3: :CONFigure commands

Header	Description
:CONFigure:AC3Gpp	Sets up the analyzer to the W-CDMA ACLR measurement default settings.
:CONFigure:DL3Gpp	Sets up the analyzer to the W-CDMA downlink analysis default settings.

:DISPlay Commands

Control how to show measurement data on the screen.

Table 3–4: :DISPlay commands

Header	Description
:DISPlay:AC3Gpp subgroup	W-CDMA ACLR measurement related.
:DISPlay:AC3Gpp:X[:SCALe]:OFFSet (?)	Sets the minimum horizontal value (i.e., left end).
:DISPlay:AC3Gpp:X[:SCALe]:RANGe (?)	Defines the display area along the horizontal axis.
:DISPlay:AC3Gpp:Y[:SCALe]:FIT	Runs auto-scale.
:DISPlay:AC3Gpp:Y[:SCALe]:FULL	Sets the vertical axis to the default full-scale.
:DISPlay:AC3Gpp:Y[:SCALe]:OFFSet (?)	Sets the minimum vertical value (i.e., bottom end).
:DISPlay:AC3Gpp:Y[:SCALe]:RANGe (?)	Sets the vertical full-scale.
:DISPlay:DL3Gpp subgroup	W-CDMA downlink analysis related.
:DISPlay:DL3Gpp:AVIew:SHORtcode (?)	Selects the short code to display.
:DISPlay:DL3Gpp:AVIew:SRATe (?)	Selects the symbol rate for analysis.
:DISPlay:DL3Gpp:AVIew:SSCHpart (?)	Determines whether to show SCH.
:DISPlay:DL3Gpp:AVIew:TSLot (?)	Selects the time slot to display.
:DISPlay:DL3Gpp:MVIew:COLor[:SCALe]:OFFSet (?)	Sets the minimum color-axis value (i.e., bottom end) in the main view.
:DISPlay:DL3Gpp:MVIew:COLor[:SCALe]:RANGe (?)	Sets the color-axis full-scale in the main view.
:DISPlay:DL3Gpp:MVIew:FORMat (?)	Selects the main view display format.
:DISPlay:DL3Gpp:MVIew:RADix (?)	Selects the base of symbols in the main view.
:DISPlay:DL3Gpp:MVIew:X[:SCALe]:OFFSet (?)	Sets the minimum horizontal value (i.e., left end) in the main view.
:DISPlay:DL3Gpp:MVIew:X[:SCALe]:RANGe (?)	Sets the horizontal full-scale in the main view.
:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:FIT	Runs auto-scale on the main view.
:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:FULL	Sets the main view's vertical axis to the default full-scale.
:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:OFFSet (?)	Sets the minimum vertical value (i.e., bottom end) in the main view.
:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:PUNit (?)	Selects the unit for the main view's vertical axis.
:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:RANGe (?)	Sets the vertical full-scale in the main view.
:DISPlay:DL3Gpp:SVIew:COLor[:SCALe]:OFFSet (?)	Sets the minimum color-axis value (i.e., bottom end) in the subview.
:DISPlay:DL3Gpp:SVIew:COLor[:SCALe]:RANGe (?)	Sets the color-axis full-scale in the subview.
:DISPlay:DL3Gpp:SVIew:FORMat (?)	Selects the subview display format.
:DISPlay:DL3Gpp:SVIew:RADix (?)	Selects the base of symbols in the subview.

Table 3–4: :DISPlay commands (Cont.)

Header	Description
:DISPlay:DL3Gpp:SVIew:X[:SCALe]:OFFSet (?)	Sets the minimum horizontal value (i.e., left end) in the subview.
:DISPlay:DL3Gpp:SVIew:X[:SCALe]:RANGe (?)	Sets the horizontal full-scale in the subview.
:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:FIT	Runs auto-scale on the subview.
:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:FULL	Sets the subview's vertical axis to the default full-scale.
:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:OFFSet (?)	Sets the minimum vertical value (i.e., bottom end) in the subview.
:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:PUNit (?)	Selects the unit for the subview's vertical axis.
:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:RANGe (?)	Sets the vertical full-scale in the subview.

:FETCh Commands

The :FETCh commands retrieve the measurements from the data taken by the latest INITiate command.

If you want to perform a FETCh operation on fresh data, use the :READ commands, which acquire a new input signal and fetch the measurement results from that data.

Table 3–5: :FETCh commands

Header	Description
:FETCh:AC3Gpp:ACLR?	Returns the W-CDMA ACLR measurement results.
:FETCh:DL3Gpp?	Returns the W-CDMA downlink analysis measurement results.

:READ Commands

The :READ commands acquire an input signal once in the single mode and obtain the measurement results from that data.

If you want to fetch the measurement results from the data currently residing in the memory without acquiring the input signal, use the :FETCh commands.

Table 3–6: :READ commands

Header	Description
:READ:AC3Gpp:ACLR?	Returns the W-CDMA ACLR measurement results.

:SENSe Commands

Set the detailed measurement conditions.

Table 3–7: :SENSe commands

Header	Description
[:SENSe]:AC3Gpp subgroup	W-CDMA ACLR measurement related.
[:SENSe]:AC3Gpp:FILTer:ALPHa (?)	Sets the filter factor (α/BT).
[:SENSe]:AC3Gpp:FILTer:TYPE (?)	Selects a filter.
[:SENSe]:AC3Gpp:SGAin (?)	Sets the gain offset of the next adjacent channel.
[:SENSe]:DL3Gpp subgroup	Related to W-CDMA downlink analysis.
[:SENSe]:DL3Gpp:BLOCk (?)	Sets the number of the block to be measured.
[:SENSe]:DL3Gpp:CARRier:OFFSet (?)	Sets the carrier frequency offset.
[:SENSe]:DL3Gpp:CARRier:SEARch (?)	Determines whether to detect the carrier automatically.
[:SENSe]:DL3Gpp:COMPosite (?)	Determines whether to decide the symbol rate automatically.
[:SENSe]:DL3Gpp:FILTer:ALPHa (?)	Sets the filter factor (α/BT).
[:SENSe]:DL3Gpp:FILTer:MEASurement (?)	Sets the measurement filter.
[:SENSe]:DL3Gpp:FILTer:REFerence (?)	Sets the reference filter.
[:SENSe]:DL3Gpp[:IMMediate]	Starts W-CDMA downlink analysis calculation.
[:SENSe]:DL3Gpp:LENGth (?)	Sets the measurement range.
[:SENSe]:DL3Gpp:OFFSet (?)	Sets the measurement start position.
[:SENSe]:DL3Gpp:SCHPart (?)	Determines whether to include SCH in the analysis.
[:SENSe]:DL3Gpp:SCODe:NUMBer (?)	Sets the scrambling code number.
[:SENSe]:DL3Gpp:SCODe:SEARch (?)	Determines whether to detect the scrambling code automatically.

:CONFigure Commands

The :CONFigure commands set up the analyzer to the default settings for the specified measurement.

Command Tree

Header	Parameter
:CONFigure	
:AC3Gpp	
:DL3Gpp	

***NOTE**. Data acquisition stops on completion of a :CONFigure command. The following each command description shows the front-panel key operation equivalent to running the command except data acquisition control.*

:CONFigure:AC3Gpp (No Query Form)

Sets up the analyzer to the default settings for the W-CDMA ACLR (Adjacent Channel Leakage Power Ratio) measurement. Running this command is equivalent to pressing the following front panel keys:

DEMOD key → **Standard...** side key → **W-CDMA-DL** side key → **PRESET** key → **ACLR** side key

Syntax `:CONFigure:AC3Gpp`

Arguments None

Measurement Modes `SADL3G`, `SAUL3G`

Examples `:CONFigure:AC3Gpp`
sets up the analyzer to the default settings for W-CDMA ACLR measurement.

Related Commands `:INSTrument[:SELect]`

:CONFigure:DL3Gpp (No Query Form)

Sets up the analyzer to the default settings for W-CDMA downlink analysis. Running this command is equivalent to pressing the following front panel keys:

DEMOD key → **Standard...** side key → **W-CDMA-DL** side key → **PRESET** key

Syntax `:CONFigure:DL3Gpp`

Arguments None

Measurement Modes `DEMDL3G`

Examples `:CONFigure:DL3Gpp`
sets up the analyzer to the default settings for W-CDMA downlink analysis.

Related Commands `:INSTrument[:SELect]`

:DISPlay Commands

The :DISPlay commands control how to show measurement data on the screen. These commands are divided into the following subgroups:

Table 3–8: :DISPlay command subgroups

Command header	Function	Refer to:
:DISPlay:AC3Gpp	Control display of the W-CDMA ACLR analysis.	p. 3–10
:DISPlay:DL3Gpp	Control display of the W-CDMA downlink analysis	p. 3–14

***NOTE**. The :DISPlay commands concern the measurement display only, and do not affect the hardware settings.*

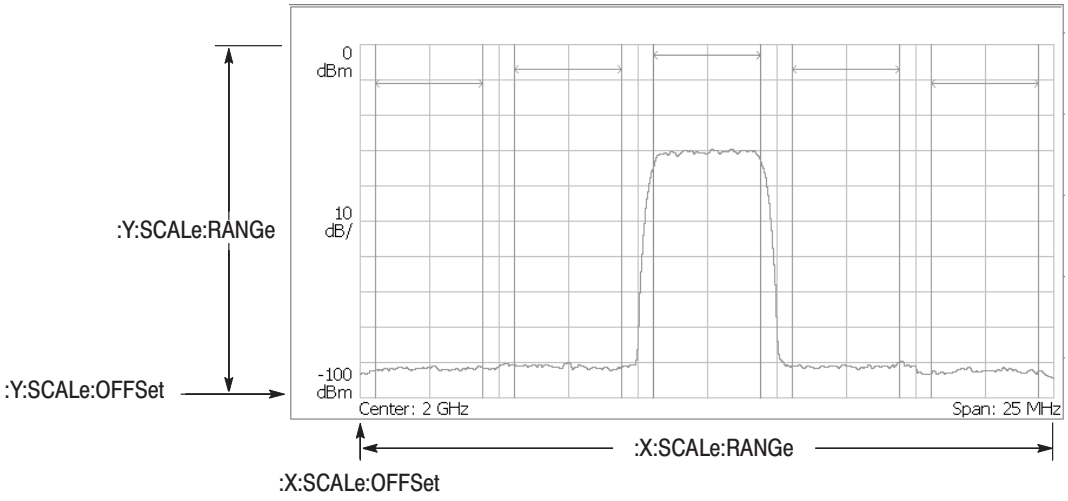
:DISPlay:AC3Gpp Subgroup

The :DISPlay:AC3Gpp commands control display of the W-CDMA ACLR (Adjacent Channel Leakage Power Ratio) measurement.

***NOTE**. To use a command in this group, you must have selected SADL3G (W-CDMA downlink spectrum analysis) in the :INSTrument[:SELect] command.*

Command Tree

Header	Parameter
:DISPlay	
:AC3Gpp	
:X	
[:SCALe]	
:OFFSet	
:RANGe	<frequency>
:Y	
[:SCALe]	
:FIT	
:FULL	
:OFFSet	<amplitude>
:RANGe	<relative_amplitude>



NOTE. Command header :DISPlay:AC3Gpp is omitted here.

Figure 3–1: :DISPlay:AC3Gpp command setting

:DISPlay:AC3Gpp:X[:SCALe]:OFFSet (?)

Sets or queries the minimum horizontal value (left end) in the W-CDMA ACLR analysis.

Syntax

```
:DISPlay:AC3Gpp:X[:SCALe]:OFFSet <value>
:DISPlay:AC3Gpp:X[:SCALe]:OFFSet?
```

Arguments

<value>::=<NRf> specifies the minimum value of the horizontal axis. Range: Center frequency ±25 MHz.

Measurement Modes

SADL3G

Examples

```
:DISPlay:AC3Gpp:X:SCALe:OFFSet 1GHz
```

sets the minimum value of the horizontal axis to 1 GHz.

:DISPlay:AC3Gpp:X[:SCALe]:RANGe (?)

Sets or queries the full-scale of the horizontal, or frequency, axis in the W-CDMA ACLR analysis.

Syntax

```
:DISPlay:AC3Gpp:X[:SCALe]:RANGe <value>
:DISPlay:AC3Gpp:X[:SCALe]:RANGe?
```

Arguments

<value>::=<NRf> specifies the full-scale of the horizontal axis. Range: 0 to 25 MHz.

Measurement Modes

SADL3G

Examples

```
:DISPlay:AC3Gpp:X:SCALe:RANGe 25MHz
```

sets the full-scale of the horizontal axis to 25 MHz.

:DISPlay:AC3Gpp:Y[:SCALe]:FIT (No Query Form)

Runs auto-scale in the W-CDMA ACLR analysis. The auto-scale automatically sets the start value and scale of the vertical axis to display the whole waveform.

Syntax `:DISPlay:AC3Gpp:Y[:SCALe]:FIT`

Arguments None

Measurement Modes `SADL3G`

Examples `:DISPlay:AC3Gpp:Y:SCALe:FIT`
runs auto-scale on the main view.

:DISPlay:AC3Gpp:Y[:SCALe]:FULL (No Query Form)

Sets the vertical axis to the default full-scale in the W-CDMA ACLR analysis.

Syntax `:DISPlay:AC3Gpp:Y[:SCALe]:FULL`

Arguments None

Measurement Modes `SADL3G`

Examples `:DISPlay:AC3Gpp:Y:SCALe:FULL`
sets the vertical axis to the default full-scale.

:DISPlay:AC3Gpp:Y[:SCALe]:OFFSet (?)

Queries the minimum vertical value (bottom end) in the W-CDMA ACLR analysis.

Syntax `:DISPlay:AC3Gpp:Y[:SCALe]:OFFSet <value>`

Arguments `<value>::=<NRf>` sets the minimum vertical value. Range: –200 to +100 dBm.

Measurement Modes `SADL3G`

Examples `:DISPlay:AC3Gpp:Y:SCALe:OFFSet -100`
sets the minimum vertical value to –100 dBm.

:DISPlay:AC3Gpp:Y[:SCALe]:RANGe (?)

Sets or queries the full-scale of the vertical, or amplitude, axis in the W-CDMA ACLR analysis.

Syntax `:DISPlay:AC3Gpp:Y[:SCALe]:RANGe <value>`

`:DISPlay:AC3Gpp:Y[:SCALe]:RANGe?`

Arguments `<value>::=<NRf>` sets the full-scale of the vertical axis. Range: 0 to 100 dBm

Measurement Modes `SADL3G`

Examples `:DISPlay:AC3Gpp:Y:SCALe:RANGe 100`
sets the full-scale of the vertical axis to 100 dBm.

:DISPlay:DL3Gpp Subgroup

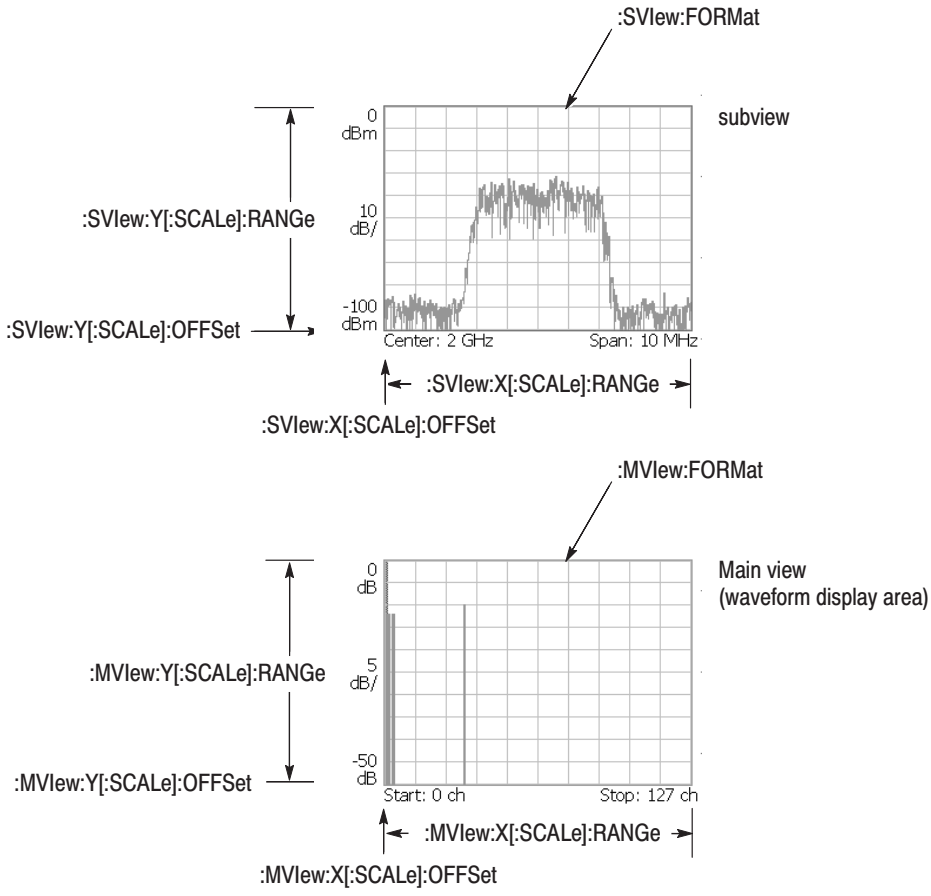
The :DISPlay:DL3Gpp commands control display of the W-CDMA downlink analysis.

***NOTE**. To use a command of this group, you must have selected DEMDL3G (W-CDMA downlink modulation analysis) in the :INSTrument[:SELect] command.*

Command Tree

Header	Parameter
:DISPlay	
:DL3Gpp	
:AVIew	
:SHORtcode	<number>
:SRATe	COMPosite | R960S | R480S | R240S | R120S | R60S | R30S | R15S | R7P5S
:SSCHpart	<boolean>
:TSLot	<number>
:MVIew	
:COLor	
[:SCALe]	
:OFFSet	<amplitude>
:RANge	<relative_amplitude>
:FORMat	OFF | CSGRam | CPSHortcode | CPSYmbol | CPTSlot | SCONste | SVECtor | SEVM | SMERror | SPERror | SIEYe | SQEYe | STEYe | STABle | CONSte | VECTor
:RADix	BINary | OCTal | HEXadecimal
:X	
[:SCALe]	
:OFFSet	<numeric_value>
:RANGe	<numeric_value>
:Y	
[:SCALe]	
:FIT	
:FULL	
:OFFSet	<numeric_value>
:PUNit	RELative | ABSolute
:RANGe	<numeric_value>
:SVIew	
:COLor	
[:SCALe]	
:OFFSet	<amplitude>
:RANge	<relative_amplitude>

```
:FORMat          CSGRam | CPSHortcode | CPSYmbol
                 | CPTSlot | SCONste | SVECtor | SEVM
                 | SMERror | SPERror | SIEYe | SQEYe
                 | STEYe | STABle | CONSTe | VECTor
                 | SPECtrum
:RADix           BINary | OCTal | HEXadecimal
:X
   [:SCALe]
      :OFFSet    <numeric_value>
      :RANGe     <numeric_value>
```



NOTE: Command header :DISPlay:DL3Gpp is omitted here.

Figure 3–2: :DISPlay:DL3Gpp command setting

:DISPlay:DL3Gpp:AVIew:SHORtcode (?)

Sets or queries the short code to be displayed in the W-CDMA downlink analysis.

Syntax

```
:DISPlay:DL3Gpp:AVIew:SHORtcode <number>
:DISPlay:DL3Gpp:AVIew:SHORtcode?
```

Arguments

<number>::=<NR1> specifies the short code to be displayed.
Range: channel 0 to 511.

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:AVIew:SHORtcode 100
```
sets the short code to channel 100.

:DISPlay:DL3Gpp:AVIew:SRATe (?)

Sets or queries the symbol rate for the measurement in the W-CDMA downlink analysis.

Syntax

```
:DISPlay:DL3Gpp:AVIew:SRATe { COMPosite | R960S | R480S | R240S | R120S | R60S | R30S | R15S | R7P5S }
```

```
:DISPlay:DL3Gpp:AVIew:SRATe?
```

Arguments

The arguments specify the symbol rates as listed below:

Table 3–9: Symbol rate settings

Argument	Symbol rate
COMPosite (default)	Corresponds to multi-rate
R960S	960k
R480S	480k
R240S	240k
R120S	120k
R60S	60k
R30S	30k
R15S	15k
R7P5S	7.5k

***NOTE**. Usually use COMPosite. If a normal analysis does not result, select OFF in the [:SENSe]:DL3Gpp:COMPosite command and then select one of the symbol rates (other than COMPosite) listed in Table 3–9.*

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:AVIew:SRATe R960S
```

sets the symbol rate to 960 k.

Related Commands

[:SENSe]:DL3Gpp:COMPosite

:DISPlay:DL3Gpp:AVIew:SSCHpart (?)

Determines whether to show SCH at the head of data in the W-CDMA downlink analysis.

Syntax

```
:DISPlay:DL3Gpp:AVIew:SSCHpart { OFF | ON | 0 | 1 }
:DISPlay:DL3Gpp:AVIew:SSCHpart?
```

Arguments

OFF or 0 hides SCH.

ON or 1 shows SCH.

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:AVIew:SSCHpart ON
```
shows SCH.

:DISPlay:DL3Gpp:AVIew:TSLot (?)

Sets or queries the number of the time slot to be displayed in the W-CDMA downlink analysis.

Syntax

```
:DISPlay:DL3Gpp:AVIew:TSLot <number>
:DISPlay:DL3Gpp:AVIew:TSLot?
```

Arguments

<number>::=<NR1> specifies the number of the time slot to be displayed. Range: Slot –15999 to 0.

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:AVIew:TSLot -100
```
sets the time slot number to –100.

:DISPlay:DL3Gpp:MVIew:COLor[:SCALe]:OFFSet (?)

Sets or queries the minimum value on the color, or amplitude, axis when the main view displays a spectrogram in the W-CDMA downlink analysis.

Syntax

```
:DISPlay:DL3Gpp:MVIew:COLor[:SCALe]:OFFSet <value>
:DISPlay:DL3Gpp:MVIew:COLor[:SCALe]:OFFSet?
```

Arguments

<value>::=<NRf> specifies the minimum value on the color axis. Range: –200 to +100 dBm.

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:MVIew:COLor:SCALe:OFFSet -100
```

sets the minimum value on the color axis in the main view to –100 dBm.

Related Commands

:DISPlay:DL3Gpp:MVIew:FORMat

:DISPlay:DL3Gpp:MVIew:COLor[:SCALe]:RANGe (?)

Sets or queries full-scale of the color, or amplitude, axis when the main view displays a spectrogram in the W-CDMA downlink analysis.

Syntax

```
:DISPlay:DL3Gpp:MVIew:COLor[:SCALe]:RANGe <value>
:DISPlay:DL3Gpp:MVIew:COLor[:SCALe]:RANGe?
```

Arguments

<value>::={ 10 | 20 | 50 | 100 } (dB) specifies full-scale of the color axis in the spectrogram view.

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:MVIew:COLor:SCALe:RANGe 100
```

sets full-scale of the color axis to 100 dB.

Related Commands

:DISPlay:DL3Gpp:MVIew:FORMat

:DISPlay:DL3Gpp:MVIew:FORMat (?)

Selects or queries the main view display format in the W-CDMA downlink analysis.

Syntax

```
:DISPlay:DL3Gpp:MVIew:FORMat { OFF | CSGRam | CPSHortcode
| CPSYmbol | CPTSlot | SCONste | SVECtor | SEVM | SMERror
| SPERror | SIEYe | SQEYe | STEYe | STABle | CONSte | VECTor }

:DISPlay:DL3Gpp:MVIew:FORMat?
```

Arguments The arguments and display formats are listed below:

Table 3–10: Main view display formats

Argument	Display format
OFF	Hides all measurement results.
CSGRam	Code domain power spectrogram
CPSHortcode	Code domain power vs. short code
CPSYmbol	Code domain power vs. symbol
CPTSlot	Code domain power vs. time slot
SCONste	Symbol constellation
SVECtor	Symbol vector
SEVM	Symbol EVM
SMERror	Symbol amplitude error
SPERror	Symbol phase error
SIEYe	Symbol eye diagram (vertical axis: I)
SQEYe	Symbol eye diagram (vertical axis: Q)
STEYe	Symbol trellis diagram (vertical axis: Phase)
STABle	Symbol table
CONSte	Constellation and modulation accuracy measurement results
VECTor	Vector locus

Measurement Modes DEMDL3G

Examples

```
:DISPlay:DL3Gpp:MVIew:FORMat CSGRam
```

displays the code domain power spectrogram in the main view.

:DISPlay:DL3Gpp:MVIew:RADix (?)

Selects or queries the base of symbols on the main view in the W-CDMA downlink analysis.

***NOTE**. This command is valid when :DISPlay:DL3Gpp:MVIew:FORMat is set to STABle (symbol table).*

Syntax

```
:DISPlay:DL3Gpp:MVIew:RADix { BINary | OCTal | HEXadecimal }
:DISPlay:DL3Gpp:MVIew:RADix?
```

Arguments

`BINary` selects binary notation.

`OCTal` selects octal notation.

`HEXadecimal` selects hexadecimal notation.

Measurement Modes

`DEMDL3G`

Examples

```
:DISPlay:DL3Gpp:MVIew:RADix BINary
```

selects binary notation for the base of symbols in the main view.

Related Commands

`:DISPlay:DL3Gpp:MVIew:FORMat`

:DISPlay:DL3Gpp:MVIew:X[:SCALe]:OFFSet (?)

Sets or queries the minimum horizontal value (left end) on the main view in the W-CDMA downlink analysis.

Syntax

```
:DISPlay:DL3Gpp:MVIew:X[:SCALe]:OFFSet <value>
```

```
:DISPlay:DL3Gpp:MVIew:X[:SCALe]:OFFSet?
```

Arguments

<value>::=<NRf> specifies the minimum horizontal value in the main view. The valid range depends on the display format. Refer to Table B–1 in *Appendix B*.

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:MVIew:X:SCALe:OFFSet 0
```

sets the minimum horizontal value to channel 0 when the main view displays a code domain power spectrogram.

Related Commands

:DISPlay:DL3Gpp:MVIew:FORMat

:DISPlay:DL3Gpp:MVIew:X[:SCALe]:RANGe (?)

Sets or queries full-scale of the horizontal axis on the main view in the W-CDMA downlink analysis.

Syntax

```
:DISPlay:DL3Gpp:MVIew:X[:SCALe]:RANGe <value>
:DISPlay:DL3Gpp:MVIew:X[:SCALe]:RANGe?
```

Arguments

<value>::=<NRf> specifies full-scale of the horizontal axis in the main view. The valid range depends on the display format. Refer to Table B–1 in *Appendix B*.

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:MVIew:X:SCALe:RANGe 512
```

sets the horizontal full-scale to 512 channels when the main view displays a code domain power spectrogram.

Related Commands

:DISPlay:DL3Gpp:MVIew:FORMat

:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:FIT (No Query Form)

Runs the auto-scale on the main view in the W-CDMA downlink analysis. The auto-scale automatically sets the start value and scale of the vertical axis to display the whole waveform.

***NOTE**. This command is valid when :DISPlay:DL3Gpp:MVIew:FORMat is set to CPSHortcode, CPSYmbol, CPTSlot, SEVM, SMERror, or SPERror.*

Syntax

```
:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:FIT
```

Arguments

None

Measurement Modes

```
DEMDL3G
```

Examples

```
:DISPlay:DL3Gpp:MVIew:Y:SCALe:FIT
```

runs the auto-scale on the main view.

Related Commands

```
:DISPlay:DL3Gpp:MVIew:FORMat
```

:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:FULL (No Query Form)

Sets the main view's vertical axis to the default full-scale in the W-CDMA downlink analysis.

***NOTE**. This command is valid when :DISPlay:DL3Gpp:MVIew:FORMat is set to CPSHortcode, CPSYmbol, CPTSlot, SEVM, SMERror, or SPERror.*

Syntax `:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:FULL`

Arguments None

Measurement Modes `DEMDL3G`

Examples `:DISPlay:DL3Gpp:MVIew:Y:SCALe:FULL`
sets the main view's vertical axis to the default full-scale.

Related Commands `:DISPlay:DL3Gpp:MVIew:FORMat`

:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:OFFSet (?)

Sets or queries the minimum vertical value (bottom end) in the main view in the W-CDMA downlink analysis.

***NOTE**. This command is valid when :DISPlay:DL3Gpp:MVIew:FORMat is set to CPSHortcode, CPSYmbol, CPTSlot, SEVM, SMERror, or SPERror.*

Syntax

```
:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:OFFSet <value>
:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:OFFSet?
```

Arguments

<value>::=<NRf> specifies the minimum vertical value in the main view. The valid range depends on the display format. Refer to Table B–1 in *Appendix B*.

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:MVIew:Y:SCALe:OFFSet 0
```

sets the bottom end of the vertical axis to channel 0 when the main view displays a code domain power spectrogram.

Related Commands

```
:DISPlay:DL3Gpp:MVIew:FORMat
```

:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:PUNit (?)

Selects or queries the unit on the Y (power) axis in the main view during the W-CDMA downlink analysis.

***NOTE**. This command is valid when :DISPlay:DL3Gpp:MVIew:FORMat is set to CSGRam, CPSHortcode, CPSYmbol, or CPTSlot.*

Syntax

```
:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:PUNit { RELative | ABSolute }
:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:PUNit?
```

Arguments

`RELative` represents the relative channel power to the total power of all the channels along the Y axis in dB.

`ABSolute` represents the absolute power of each channel along the Y axis in dBm.

Measurement Modes

`DEMDL3G`

Examples

```
:DISPlay:DL3Gpp:MVIew:Y:SCALe:PUNit RELative
```
represents the relative power along the Y axis in the main view.

Related Commands

`:DISPlay:DL3Gpp:MVIew:FORMat`

:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:RANGe (?)

Sets or queries full-scale of the vertical axis on the main view in the W-CDMA downlink analysis.

***NOTE**. This command is valid when :DISPlay:DL3Gpp:MVIew:FORMat is set to CSGRam, CPSHortcode, CPSYmbol, CPTSlot, SEVM, SMERror, or SPERror.*

Syntax

```
:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:RANGe <value>
:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:RANGe?
```

Arguments

<value>::=<NRf> specifies full-scale of the vertical axis in the main view. The valid range depends on the display format. Refer to Table B–1 in *Appendix B*.

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:MVIew:Y:SCALe:RANGe 50
```

sets the vertical full-scale to 50 slots when the main view displays a code domain power spectrogram.

Related Commands

:DISPlay:DL3Gpp:MVIew:FORMat

:DISPlay:DL3Gpp:SVIew:COLor[:SCALe]:OFFSet (?)

Sets or queries the minimum value of the color, or amplitude, axis when the subview displays a spectrogram in the W-CDMA downlink analysis.

Syntax

```
:DISPlay:DL3Gpp:SVIew:COLor[:SCALe]:OFFSet <value>
:DISPlay:DL3Gpp:SVIew:COLor[:SCALe]:OFFSet?
```

Arguments

<value>::=<NRf> specifies the minimum color-axis value.
Range: –200 to +100 dBm.

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:SVIew:COLor:SCALe:OFFSet -100
```
sets the minimum color-axis value in the subview to –100 dBm.

Related Commands

:DISPlay:DL3Gpp:SVIew:FORMat

:DISPlay:DL3Gpp:SVIew:COLor[:SCALe]:RANGe (?)

Sets or queries full-scale of the color, or amplitude, axis when the subview displays a spectrogram in the W-CDMA downlink analysis.

Syntax

```
:DISPlay:DL3Gpp:SVIew:COLor[:SCALe]:RANGe <value>
:DISPlay:DL3Gpp:SVIew:COLor[:SCALe]:RANGe?
```

Arguments

<value>::={ 10 | 20 | 50 | 100 } [dB] specifies full-scale of the color axis.

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:SVIew:COLor:SCALe:RANGe 100
```
sets full-scale of the subview's color axis to 100 dB.

Related Commands

:DISPlay:DL3Gpp:SVIew:FORMat

:DISPlay:DL3Gpp:SVIew:FORMat (?)

Sets or queries the subview display format in the W-CDMA downlink analysis.

Syntax

```
:DISPlay:DL3Gpp:SVIew:FORMat { CSGRam | CPSHortcode | CPSYmbol
| CPTSlot | SCONste | SVECtor | SEVM | SMERror | SPERror | SIEYe
| SQEYe | STEYe | STABle | CONSTe | VECTor | SPECtrum }

:DISPlay:DL3Gpp:SVIew:FORMat?
```

Arguments

The arguments and display formats are listed below:

Table 3–11: Subview display formats

Argument	Display format
CSGRam	Code domain power spectrogram
CPSHortcode	Code domain power vs. short code
CPSYmbol	Code domain power vs. symbol
CPTSlot	Code domain power vs. time slot
SCONste	Symbol constellation
SVECtor	Symbol vector
SEVM	Symbol EVM
SMERror	Symbol amplitude error
SPERror	Symbol phase error
SIEYe	Symbol eye diagram (vertical axis: I)
SQEYe	Symbol eye diagram (vertical axis: Q)
STEYe	Symbol trellis diagram (vertical axis: Phase)
STABle	Symbol table
CONSte	Constellation
VECTor	Vector locus
SPECtrum	Spectrum

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:SVIew:FORMat CSGRam
```

displays the code domain power spectrogram in the subview.

Related Commands

:DISPlay:DL3Gpp:MVIew:FORMat

:DISPlay:DL3Gpp:SVIew:RADix (?)

Selects or queries the base of symbols on the subview in the W-CDMA downlink analysis.

***NOTE**. This command is valid when :DISPlay:DL3Gpp:SVIew:FORMat is set to STABle (symbol table).*

Syntax

```
:DISPlay:DL3Gpp:SVIew:RADix { BINary | OCTal | HEXadecimal }
:DISPlay:DL3Gpp:SVIew:RADix?
```

Arguments

`BINary` selects binary notation.

`OCTal` selects octal notation.

`HEXadecimal` selects hexadecimal notation.

Measurement Modes

`DEMDL3G`

Examples

```
:DISPlay:DL3Gpp:SVIew:RADix BINary
```
selects binary notation for the base of symbols in the subview.

Related Commands

`:DISPlay:DL3Gpp:SVIew:FORMat`

:DISPlay:DL3Gpp:SVIew:X[:SCALe]:OFFSet (?)

Sets or queries the minimum horizontal value (left end) on the subview in the W-CDMA downlink analysis.

Syntax

```
:DISPlay:DL3Gpp:SVIew:X[:SCALe]:OFFSet <value>
:DISPlay:DL3Gpp:SVIew:X[:SCALe]:OFFSet?
```

Arguments

<value>::=<NRf> specifies the minimum horizontal value in the subview. The valid range depends on the display format. Refer to Table B–1 in *Appendix B*.

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:SVIew:X:SCALe:OFFSet 0
```

sets the minimum horizontal value to channel 0 when the subview displays a code domain power spectrogram.

Related Commands

:DISPlay:DL3Gpp:SVIew:FORMat

:DISPlay:DL3Gpp:SVIew:X[:SCALe]:RANGe (?)

Sets or queries full-scale of the horizontal axis on the subview in the W-CDMA downlink analysis.

Syntax

```
:DISPlay:DL3Gpp:SVIew:X[:SCALe]:RANGe <value>
:DISPlay:DL3Gpp:SVIew:X[:SCALe]:RANGe?
```

Arguments

<value>::=<NRf> specifies full-scale of the horizontal axis in the subview. The valid range depends on the display format. Refer to Table B–1 in *Appendix B*.

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:SVIew:X:SCALe:RANGe 512
```

sets the horizontal full-scale to 512 channels when the subview displays a code domain power spectrogram.

Related Commands

:DISPlay:DL3Gpp:SVIew:FORMat

:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:FIT (No Query Form)

Runs the auto-scale on the subview in the W-CDMA downlink analysis. The auto-scale automatically sets the start value and scale of the vertical axis to display the whole waveform.

***NOTE**. This command is valid when :DISPlay:DL3Gpp:SVIew:FORMat is set to CPSHortcode, CPSYmbol, CPTSlot, SEVM, SMERror, or SPERror.*

Syntax `:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:FIT`

Arguments None

Measurement Modes `DEMDL3G`

Examples `:DISPlay:DL3Gpp:SVIew:Y:SCALe:FIT`
runs the auto-scale on the subview.

Related Commands `:DISPlay:DL3Gpp:SVIew:FORMat`

:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:FULL (No Query Form)

Sets the vertical axis in the subview to the default full-scale during the W-CDMA downlink analysis.

***NOTE**. This command is valid when :DISPlay:DL3Gpp:SVIew:FORMat is set to CPSHortcode, CPSYmbol, CPTSlot, SEVM, SMERror, or SPERror.*

Syntax `:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:FULL`

Arguments None

Measurement Modes `DEMDL3G`

Examples `:DISPlay:DL3Gpp:SVIew:Y:SCALe:FULL`
sets the subview's vertical axis to the default full-scale.

Related Commands `:DISPlay:DL3Gpp:SVIew:FORMat`

:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:OFFSet (?)

Sets or queries the minimum vertical value (bottom end) on the subview in the W-CDMA downlink analysis.

***NOTE**. This command is valid when :DISPlay:DL3Gpp:SVIew:FORMat is set to CSGRam, CPSHortcode, CPSYmbol, CPTSlot, SEVM, SMERror, or SPERror.*

Syntax

```
:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:OFFSet <value>
:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:OFFSet?
```

Arguments

<value>::=<NRf> specifies the minimum vertical value in the subview. The valid range depends on the display format. Refer to Table B–1 in *Appendix B*.

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:SVIew:Y:SCALe:OFFSet 0
```

sets the bottom end of the vertical axis to channel 0 when the subview displays a code domain power spectrogram.

Related Commands

:DISPlay:DL3Gpp:SVIew:FORMat

:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:PUNit (?)

Selects or queries the unit on the Y (power) axis on the subview in the W-CDMA downlink analysis.

***NOTE**. This command is valid when :DISPlay:DL3Gpp:SVIew:FORMat is set to CSGRam, CPSHortcode, CPSYmbol, or CPTSlot.*

Syntax

```
:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:PUNit { RELative | ABSolute }
:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:PUNit?
```

Arguments

`RELative` represents the relative channel power to the total power of all the channels along the Y axis in dB.

`ABSolute` represents the absolute power of each channel along the Y axis in dBm.

Measurement Modes

`DEMDL3G`

Examples

```
:DISPlay:DL3Gpp:SVIew:Y:SCALe:PUNit RELative
```
represents the relative power along the Y axis in the subview.

Related Commands

`:DISPlay:DL3Gpp:SVIew:FORMat`

:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:RANGe (?)

Sets or queries full-scale of the vertical axis on the subview in the W-CDMA downlink analysis.

***NOTE**. This command is valid when :DISPlay:DL3Gpp:SVIew:FORMat is set to CSGRam, CPSHortcode, CPSYmbol, CPTSlot, SEVM, SMERror, or SPERror.*

Syntax

```
:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:RANGe <value>
```

Arguments

<value>::=<NRf> specifies full-scale of the vertical axis in the subview. The valid range depends on the display format. Refer to Table B–1 in *Appendix B*.

Measurement Modes

DEMDL3G

Examples

```
:DISPlay:DL3Gpp:SVIew:Y:SCALe:RANGe 50
```

sets the vertical axis full-scale to 50 slots when the subview displays a code domain power spectrogram.

Related Commands

```
:DISPlay:DL3Gpp:SVIew:FORMat
```

:FETCh Commands

The :FETCh commands retrieve the measurements from the data taken by the latest INITiate command.

If you want to perform a FETCh operation on fresh data, use the :READ commands on page 3–47. The :READ commands acquire a new input signal and fetch the measurement results from that data.

***NOTE**. To use a :FETCh command, you must have set a measurement mode for the FETCh operation using the :INSTrument[:SELect] command (refer to the* WCA230A and WCA280A Programmer Manual*).*

Command Tree

Header	Parameter
:FETCh	
:AC3Gpp	
:ACLR?	
:DL3Gpp?	CSHortcode | CSYMbol | CTSLot | SCONste | EVM | AEVM | PEVM | MERRor | AMERror | PMERror | PERRor | APERror | PPERror | RHO | FERRor | OOFFset | STABle | TSNumber | SSCHannel | SCGRoup | SCNumber | TLENgth | PCDE | PCDE | CEVM | CMERror | CPERror | CHRO | COOF

:FETCh:AC3Gpp:ACLR? (Query Only)

Fetches the measurement results of the W-CDMA ACLR (Adjacent Channel Leakage Power Ratio) analysis.

Syntax `:FETCh:AC3Gpp:ACLR?`

Arguments None

Returns `<chpower>,<aclrm1>,<aclrp1>,<aclrm2>,<aclrp2>`

Where
`<chpower>::=<NRf>` is the channel power measured value in dBm.
`<aclrm1>::=<NRf>` is the first lower adjacent channel ACLR in dB.
`<aclrp1>::=<NRf>` is the first upper adjacent channel ACLR in dB.
`<aclrm2>::=<NRf>` is the second lower adjacent channel ACLR in dB.
`<aclrp2>::=<NRf>` is the second upper adjacent channel ACLR in dB.

Measurement Modes `SADL3G`

Examples `:FETCh:AC3Gpp:ACLR?`
might return `-1.081,-68.420,-68.229,-74.506,-74.462` for the W-CDMA ACLR measurement results.

Related Commands `:INSTrument[:SELect]`

:FETCh:DL3Gpp? (Query Only)

Fetches measurement results of the W-CDMA downlink analysis.

Syntax
```
:FETCh:DL3Gpp? { CSHortcode | CSYMbol | CTSLot | SCONste | EVM
| AEVM | PEVM | MERRor | AMERror | PMERror | PERRor | APERror
| PPERror | RHO | FERRor | OOFFset | STABle | TSNumber
| SSCHannel | SCGRoup | SCNumber | TLENgth | PCDE | CEVM
| CMERror | CPERror | CHRO | COOF }
```

Arguments Information queried is listed below for each of the arguments:

Table 3–12: Queried information on the W-CDMA downlink analysis results

Argument	Information queried
CSHortcode	Power of each short code for the specified TS
CSYMbol	Each symbol power of the specified TS/SC
CTSLot	Power of each time slot for the specified SC
SCONste	Symbol position data for the specified TS/SC
EVM	Measurement results of Error Vector Magnitude for the specified TS/SC
AEVM	RMS value of EVM for the specified TS/SC
PEVM	Peak value of EVM for the specified TS/SC and its symbol number
MERRor	Amplitude error for the specified TS/SC
AMERror	RMS value of amplitude error for the specified TS/SC
PMERror	Peak amplitude error for the specified TS/SC and its symbol number
PERRor	Phase error for the specified TS/SC
APERror	RMS value of phase error for the specified TS/SC
PPERror	Peak phase error for the specified TS/SC and its symbol number
RHO	Value of waveform quality (ρ) for the specified TS/SC
FERRor	Frequency error for the specified TS
OOFFset	Value of origin offset for the specified TS/SC
STABle	Data from symbol table for the specified TS/SC
TSNumber	Slot number in radio frame for the specified TS
SSCHannel	Secondary Synchronization Channel (SCH) number for the specified TS
SCGRoup	Scrambling code group for the specified TS
SCNumber	Scrambling code number for the specified TS
TLENgth	Number of analyzed TSs
PCDE	PCDE (Peak Code Domain Error) for the specified TS, and the SC number
CEVM	RMS and peak values of chip EVM for the specified TS
CMERror	RMS and peak values of chip amplitude error for the specified TS
CPERror	RMS and peak values of chip phase error for the specified TS
CRHO	Chip waveform quality (ρ) for the specified TS
COOF	Chip origin offset for the specified TS

*** TS: Time slot; SC: Short code**

To specify the time slot, use the :DISPlay:DL3Gpp:AVIew:TSLot command.

To specify the short code, use the :DISPlay:DL3Gpp:AVIew:SHORtcode command.

Returns

Returns are listed below for each of the arguments:

CSHortcode. `#<Num_digit><Num_byte><Cpwr(1)><Cpwr(2)>...<Cpwr(n)>`

Where
`<Num_digit>` is the number of digits in <Num_byte>.
`<Num_byte>` is the number of bytes of the data that follow.
`<Cpwr(n)>` is the relative or absolute power value for each short code in dB or dBm. 4-byte little endian floating-point format specified in IEEE 488.2.
n: Max 512

CSYMbol. `#<Num_digit><Num_byte><Cpwr(1)><Cpwr(2)>...<Cpwr(n)>`

Where
`<Num_digit>` is the number of digits in <Num_byte>.
`<Num_byte>` is the number of bytes of the data that follow.
`<Cpwr(n)>` is the relative or absolute power value for each symbol in dB or dBm. 4-byte little endian floating-point format specified in IEEE 488.2.
n: Max 640

CTSLot. `#<Num_digit><Num_byte><Cpwr(1)><Cpwr(2)>...<Cpwr(n)>`

Where
`<Num_digit>` is the number of digits in <Num_byte>
`<Num_byte>` is the number of bytes of the data that follow
`<Cpwr(n)>` is the relative or absolute power value for each time slot in dB or dBm. 4-byte little endian floating-point format specified in IEEE 488.2.
n: Max 16000

SCONste. `#<Num_digit><Num_byte><Ip(1)><Qp(1)>...<Ip(n)><Qp(n)>`

Where
`<Num_digit>` is the number of digits in <Num_byte>.
`<Num_byte>` is the number of bytes of the data that follow.
`<Ip(n)>` is the symbol position on the I axis in volt.
`<Qp(n)>` is the symbol position on the Q axis in volt.
Both `<Ip(1)>` and `<Qp(1)>` are in the 4-byte little endian floating-point format specified in IEEE 488.2. n: Max 640.

EVM. #<Num_digit><Num_byte><Evm(1)><Evm(2)>...<Evm(n)>

Where
<Num_digit> is the number of digits in <Num_byte>.
<Num_byte> is the number of bytes of the data that follow.
<Evm(n)> is the value of EVM of symbol in percent (%).
4-byte little endian floating-point format specified in IEEE 488.2
n: Max 640

AEVM. <aevm>::=<NRf> is the EVM RMS value in percent (%).

PEVM. <pevm>,<symb>

Where
<pevm>::=<NRf> is the EVM peak value in percent (%).
<symb>::=<NR1> is the symbol number for the EVM peak value.

MERRor. #<Num_digit><Num_byte><Merr(1)><Merr(2)>...<Merr(n)>

Where
<Num_digit> is the number of digits in <Num_byte>.
<Num_byte> is the number of bytes of the data that follow.
<Merr(n)> is the value of amplitude error of symbol in percent (%).
4-byte little endian floating-point format specified in IEEE 488.2
n: Max 640

AMERror. <amer>::=<NRf> is the amplitude error RMS value in percent (%).

PMERror. <pmer>,<symb>

Where
<pmer>::=<NRf> is the amplitude error peak value in percent (%).
<symb>::=<NR1> is the symbol number for the amplitude error peak value.

PERRor. #<Num_digit><Num_byte><Perr(1)><Perr(2)>...<Perr(n)>

Where
<Num_digit> is the number of digits in <Num_byte>.
<Num_byte> is the number of bytes of the data that follow.
<Perr(n)> is the value of phase error of symbol in degree.
4-byte little endian floating-point format specified in IEEE 488.2
n: Max 640

APERror. <pmer>::=<NRf> is the phase error RMS value in degree.

PPERror. <pmer>,<symb>

Where
<pmer>::=<NRf> is the phase error peak value in degree.
<symb>::=<NRf> is the symbol number of phase error peak value.

RHO. <rho>::=<NRf> is the measured value of waveform quality.

FERRor. <ferr>::=<NRf> is the measured value of frequency error in Hz.

OOFFset. <ooff>::=<NRf> is the measured value of origin offset in dB.

STABLe. #<Num_digit><Num_byte><Sym(1)><Sym(2)>...<Sym(n)>

Where
<Num_digit> is the number of digits in <Num_byte>.
<Num_byte> is the number of bytes of the data that follow.
<Sym(n)>::=<NR1> is the symbol data. n: Max 640.

TSNumber. <tsnum>::=<NR1> is the slot number in radio frame.

SSCHannel. <ssch>::=<NR1> is the Secondary Synchronization Code (SSCH) number.

SCGRoup. <scgr>::=<NR1> is the scrambling code group.

SCNumber. <scnum>::=<NR1> is the scrambling code number.

TLENgth. <tlen>::=<NR1> is the number of analyzed time slots.

PCDE. <pcde>,<scod>

Where
<pcde>::=<NRf> is the PCDE (Peak Code Domain Error) value in dB
<scod>::=<NRf> is the short code number for the PCDE

CEVM. <cevma>,<cevmp>

Where
<cevma>::=<NRf> is the RMS value of chip EVM in percent (%)
<cevmp>::=<NRf> is the peak value of chip EVM in percent (%)

CMERror. <cmera>,<cmerp>

Where
<cmera>::=<NRf> is the RMS value of chip amplitude error in percent (%)
<cmerp>::=<NRf> is the peak value of chip amplitude error in percent (%)

CPERror. <cpera>,<cperp>

Where
<cpera>::=<NRf> is the RMS value of chip EVM in percent (%)
<cperp>::=<NRf> is the peak value of chip EVM in percent (%)

CRHO. <crho>::=<NRf> is the chip waveform quality (ϱ)

COOF. <coof>::=<NRf> is the chip origin offset in dB

Measurement Modes

DEMDL3G

Examples

```
:FETCh:DL3Gpp? CSHortcode
```

might return #3512xxxx... (512-byte data) for the power measurement results for each short code.

Related Commands

:DISPlay:DL3Gpp:AVIew:SHORtcode, :DISPlay:DL3Gpp:AVIew:TSLot, :INSTrument[:SELect]

:READ Commands

The :READ commands acquire an input signal once in the single mode and obtain the measurement results from that data.

If you want to fetch the measurement results from the data currently residing in the memory without acquiring the input signal, use the :FETCh commands.

Prerequisites for Use

To use a command of this group, you must have run at least the following two commands:

1. Select a measurement mode with the :INSTrument[:SELect] command. For example, use the following command to select SADL3G (W-CDMA downlink spectrum analysis mode).

```
:INSTrument[:SELect] "SADL3G"
```

2. Set the acquisition mode to single with the following command:

```
:INITiate:CONTinuous OFF
```

***NOTE**. If a :READ command is run in the continuous mode, the acquisition mode is changed to single.*

Command Tree

Header	Parameter
:READ	
:AC3Gpp	
:ACLR?	

:READ:AC3Gpp:ACLR? (Query Only)

Obtains the measurement results of the W-CDMA ACLR (Adjacent Channel Leakage Power Ratio) analysis.

Syntax `:READ:AC3Gpp:ACLR?`

Arguments None

Returns `<chpower>,<aclrm1>,<aclrp1>,<aclrm2>,<aclrp2>`

Where
`<chpower>::=<NRf>` is the channel power measured value in dBm.
`<aclrm1>::=<NRf>` is the first lower adjacent channel ACLR in dB.
`<aclrp1>::=<NRf>` is the first upper adjacent channel ACLR in dB.
`<aclrm2>::=<NRf>` is the second lower adjacent channel ACLR in dB.
`<aclrp2>::=<NRf>` is the second upper adjacent channel ACLR in dB.

Measurement Modes `SADL3G`

Examples `:READ:AC3Gpp:ACLR?`
might return `-1.081,-68.420,-68.229,-74.506,-74.462` for the W-CDMA ACLR measurement results.

Related Commands `:INSTrument[:SELect]`

:SENSe Commands

The :SENSe commands set the details for each of the measurement sessions. They are divided into the following subgroups:

Table 3–13: :SENSe command subgroups

Command header	Function	Refer to:
[:SENSE]:AC3Gpp	Set up W-CDMA ACLR measurement	p. 3–50
[:SENSE]:DL3Gpp	Set up W-CDMA downlink analysis	p. 3–53

[:SENSe]:AC3Gpp Subgroup

The [:SENSe]:AC3Gpp commands set up the conditions related to the W-CDMA ACLR (Adjacent Channel Leakage Power Ratio) measurement.

***NOTE**. To use a command of this group, you must have selected SADL3G (W-CDMA downlink analysis in the S/A mode for Option 22) with the :INSTrument[:SELect] command.*

Command Tree

Header	Parameter
[:SENSe]	
:AC3Gpp	
:FILTer	
:ALPHa	<numeric_value>
:TYPE	RECTangle | RNYQuist
:SGAin	<gain_offset>

[:SENSe]:AC3Gpp:FILTer:ALPHa (?)

Sets or queries the filter factor (α/BT) when you have selected RNYQuist (Root Nyquist filter) in the [:SENSe]:AC3Gpp:FILTer:TYPE command for the W-CDMA ACLR measurement.

Syntax

```
[:SENSe]:AC3Gpp:FILTer:ALPHa <value>
[:SENSe]:AC3Gpp:FILTer:ALPHa?
```

Arguments

`<value>::=<NRf>` specifies the filter factor. Range: 0 to 1.

Measurement Modes

SADL3G

Examples

```
:SENSe:AC3Gpp:FILTer:ALPHa 0.5
```

sets the filter factor to 0.5.

Related Commands

`[:SENSe]:AC3Gpp:FILTer:TYPE`

[:SENSe]:AC3Gpp:FILTer:TYPE (?)

Selects or queries the filter for the W-CDMA ACLR measurement.

Syntax

```
[:SENSe]:AC3Gpp:FILTer:TYPE { RECTangle | RNYQuist }
[:SENSe]:AC3Gpp:FILTer:TYPE?
```

Arguments

`RECTangle` selects the rectangular filter.

`RNYQuist` selects the Root Nyquist filter.

Measurement Modes

SADL3G

Examples

```
:SENSe:AC3Gpp:FILTer:TYPE RNYQuist
```

selects the Root Nyquist filter.

[:SENSe]:AC3Gpp:SGAin (?)

Selects or queries the gain offset for the second adjacent channel in the W-CDMA ACLR measurement.

Syntax

```
[:SENSe]:AC3Gpp:SGAin <value>
[:SENSe]:AC3Gpp:SGAin?
```

Arguments

<value>::=<NRf> specifies the gain offset for the second adjacent channel. Range: 3 to 15 dB.

The upper limit of the range may be limited, depending on amplitude settings and/or calibration results. You can check the value of the upper limit with the **2nd Adj Channel Gain** side key in the **MEAS SETUP** menu; Turn the general purpose knob clockwise to obtain the maximum value.

Measurement Modes

SADL3G

Examples

```
:SENSe:AC3Gpp:SGAin 10
```

sets the gain offset to 10 dB.

[:SENSe]:DL3Gpp Subgroup

The [:SENSe]:DL3Gpp commands set up the conditions related to the W-CDMA downlink analysis.

***NOTE**. To use a command of this group, you must have selected DEMDL3G (W-CDMA downlink analysis in the Demod mode for Option 22) with the :INSTrument[:SELect] command.*

Command Tree

Header	Parameter
[:SENSe]	
:DL3Gpp	
:BLOCk	<numeric_value>
:CARRier	
:OFFSet	<frequency>
:SEARch	<boolean>
:COMPosite	<boolean>
:FILTer	
:ALPHa	<ratio>
:MEASurement	OFF | RRCosine
:REFerence	OFF | RCOSine | GAUSsian
[:IMMediate]	
:LENGth	<numeric_value>
:OFFSet	<numeric_value>
:SCHPart	<boolean>
:SCODe	
:NUMBer	<code_number>
:SEARch	<boolean>

[:SENSe]:DL3Gpp:BLOCk (?)

Sets or queries the number of the block to measure in the W-CDMA downlink analysis.

Syntax

```
[:SENSe]:DL3Gpp:BLOCk <number>
[:SENSe]:DL3Gpp:BLOCk?
```

Arguments

<number>::=<NR1> specifies the block number. Zero represents the latest block. Range: –M to 0 (M: Number of acquired blocks).

Measurement Modes

DEMDL3G

Examples

```
:SENSe:DL3Gpp:BLOCk -5
```

sets the block number to –5.

[:SENSe]:DL3Gpp:CARRier:OFFSet (?)

Sets or queries the carrier frequency offset in the W-CDMA downlink analysis.

Syntax

```
[:SENSe]:DL3Gpp:CARRier:OFFSet <freq>
[:SENSe]:DL3Gpp:CARRier:OFFSet?
```

Arguments

<frequency>::=<NRf> specifies the carrier frequency offset. Range: –Fs to Fs (Fs: Span)

Measurement Modes

DEMDL3G

Examples

```
:SENSe:DL3Gpp:CARRier:OFFSet 10MHz
```

sets the carrier frequency offset to 10 MHz.

[:SENSe]:DL3Gpp:CARRier:SEARch (?)

Determines whether to detect the carrier automatically in the W-CDMA downlink analysis.

Syntax

```
[:SENSe]:DL3Gpp:CARRier:SEARch { OFF | ON | 0 | 1 }
[:SENSe]:DL3Gpp:CARRier:SEARch?
```

Arguments

OFF or 0 specifies that the carrier is not detected automatically. Set the carrier frequency offset using the [:SENSe]:DL3Gpp:CARRier:OFFSet command.

ON or 1 specifies that the carrier is detected automatically.

Measurement Modes

DEMDL3G

Examples

```
:SENSe:DL3Gpp:CARRier:SEARch ON
```

specifies that the carrier is detected automatically.

[:SENSe]:DL3Gpp:COMPosite (?)

Determines whether to perform the composite analysis (automatic detection of symbol rate) in the W-CDMA downlink analysis.

Syntax

```
[:SENSe]:DL3Gpp:COMPosite { OFF | ON | 0 | 1 }
[:SENSe]:DL3Gpp:COMPosite?
```

Arguments

OFF or 0 specifies that composite analysis is not performed.

ON or 1 specifies that composite analysis is performed.

***NOTE**. You should usually specify that composite analysis is performed. If a normal analysis does not result, select OFF in this command and select a specific symbol rate in :DISPlay:DL3Gpp:AVIew:SRATe.*

Measurement Modes

DEMDL3G

Examples

```
:SENSe:DL3Gpp:COMPosite ON
```

specifies that the composite analysis is performed.

Related Commands

:DISPlay:DL3Gpp:AVIew:SRATe

[:SENSe]:DL3Gpp:FILTer:ALPHa (?)

Sets or queries the filter factor (α/BT) in the W-CDMA downlink analysis.

Syntax

```
[:SENSe]:DL3Gpp:FILTer:ALPHa <value>
[:SENSe]:DL3Gpp:FILTer:ALPHa?
```

Arguments

<value>::=<NRf> specifies the filter factor (α/BT). Range: 0 to 1.

Measurement Modes

DEMDL3G

Examples

```
:SENSe:DL3Gpp:FILTer:ALPHa 0.5
```

sets the filter factor to 0.5.

[:SENSe]:DL3Gpp:FILTer:MEASurement (?)

Selects or queries the measurement filter in the W-CDMA downlink analysis.

Syntax

```
[:SENSe]:DL3Gpp:FILTer:MEASurement { OFF | RRCosine }
[:SENSe]:DL3Gpp:FILTer:MEASurement?
```

Arguments

`OFF` specifies that no measurement filter is used.

`RRCosine` selects the Root Raised Cosine filter.

Measurement Modes

`DEMDL3G`

Examples

```
:SENSe:DL3Gpp:FILTer:MEASurement RRCosine
```

selects the Root Raised Cosine filter as the measurement filter.

[:SENSe]:DL3Gpp:FILTer:REFerence (?)

Selects or queries the reference filter in the W-CDMA downlink analysis.

Syntax

```
[:SENSe]:DL3Gpp:FILTer:REFerence { OFF | RCOSine | GAUSsian }
[:SENSe]:DL3Gpp:FILTer:REFerence?
```

Arguments

`OFF` specifies that no measurement filter is used.

`RCOSine` selects the Raised Cosine filter.

`GAUSsian` selects the Gaussian filter.

Measurement Modes

`DEMDL3G`

Examples

```
:SENSe:DL3Gpp:FILTer:REFerence RCOSine
```

selects the Raised Cosine filter as the reference filter.

[:SENSe]:DL3Gpp[:IMMediate] (No Query Form)

Runs the W-CDMA downlink analysis calculation on the acquired data. To acquire data, use the :INITiate command.

Syntax `[:SENSe]:DL3Gpp[:IMMediate]`

Arguments None

Measurement Modes `DEMDL3G`

Examples `:SENSe:DL3Gpp:IMMediate`
runs the W-CDMA downlink analysis calculation.

Related Commands `:INITiate`

[:SENSe]:DL3Gpp:LENGth (?)

Defines or queries the range for the W-CDMA downlink analysis.

Syntax `[:SENSe]:DL3Gpp:LENGth <value>`

`[:SENSe]:DL3Gpp:LENGth?`

Arguments `<value>::=<NRf>` specifies the analysis range by the number of data points. Range: 1 to 1024 × (Block size). To set the block size, use the [:SENSe]:BSIZe command.

Measurement Modes `DEMDL3G`

Examples `:SENSe:DL3Gpp:LENGth 1000`
sets the length of the analysis range to 1000 points.

Related Commands `[:SENSe]:BSIZe`

[:SENSe]:DL3Gpp:OFFSet (?)

Sets or queries the analysis start position in the W-CDMA downlink analysis.

Syntax

```
[:SENSe]:DL3Gpp:OFFSet <value>
[:SENSe]:DL3Gpp:OFFSet?
```

Arguments

<value>::=<NRf> specifies the analysis start position by the number of data points. Range: 0 to 1024 × (Block size). To set the block size, use the [:SENSe]:BSIZe command.

Measurement Modes

DEMDL3G

Examples

```
:SENSe:DL3Gpp:OFFSet 100
```

sets the analysis start position to point 100.

[:SENSe]:DL3Gpp:SCHPart (?)

Determines whether to include the SCH part in the analysis.

Syntax

```
[:SENSe]:DL3Gpp:SCHPart { OFF | ON | 0 | 1 }
[:SENSe]:DL3Gpp:SCHPart?
```

Arguments

OFF or 0 specifies that the SCH part is not included in the analysis.

ON or 1 specifies that the SCH part is included in the analysis.

Measurement Modes

DEMDL3G

Examples

```
:SENSe:DL3Gpp:SCHPart ON
```

specifies that the SCH part is included in the analysis.

[:SENSe]:DL3Gpp:SCODe:NUMBer (?)

Sets or queries the scrambling code in the W-CDMA downlink analysis.

Syntax

```
[:SENSe]:DL3Gpp:SCODe:NUMBer <value>
[:SENSe]:DL3Gpp:SCODe:NUMBer?
```

Arguments

<value>::=<NR1> specifies the scrambling code. Range: 0 to 24575.

Measurement Modes

DEMDL3G

Examples

```
:SENSe:DL3Gpp:SCODe:NUMBer 3
```

sets the scrambling code to 3.

Related Commands

[:SENSe]:DL3Gpp:SCODe:SEARch

[:SENSe]:DL3Gpp:SCODe:SEARch (?)

Determines whether automatic detection of the scrambling code is on or off in the W-CDMA downlink analysis.

Syntax

```
[:SENSe]:DL3Gpp:SCODe:SEARch { OFF | ON | 0 | 1 }
[:SENSe]:DL3Gpp:SCODe:SEARch?
```

Arguments

OFF or 0 specifies that the scrambling code is not detected automatically. To set it, use the [:SENSe]:DL3Gpp:SCODe:NUMBer command above.

ON or 1 specifies that the scrambling code is detected automatically.

Measurement Modes

DEMDL3G

Examples

```
:SENSe:DL3Gpp:SCODe:SEARch ON
```

specifies that the scrambling code is detected automatically.

Related Commands

[:SENSe]:DL3Gpp:SCODe:NUMBer

Appendices

Appendix A: Factory Initialization Settings

The factory initialization settings provide you a known state for the analyzer. The *RST command returns the instrument settings to the factory defaults for the measurement mode specified with :INSTrument[:SELect]. Factory initialization sets values as shown in the following tables. The column to the far right shows the measurement modes in which the command is available.

Table A–1: Factory initialization settiings — :DISPlay commands

Header	Default value	Meas. mode
:DISPlay:AC3Gpp subgroup		
:DISPlay:AC3Gpp:X[:SCALe]:OFFSet	2.0977 GHz	SADL3G
:DISPlay:AC3Gpp:X[:SCALe]:RANGe	25 MHz	
:DISPlay:AC3Gpp:Y[:SCALe]:OFFSet	–100 dBm	
:DISPlay:AC3Gpp:Y[:SCALe]:RANGe	100 dB	
:DISPlay:DL3Gpp subgroup		
:DISPlay:DL3Gpp:AVIew:SRATe	COMPosite	DEMDL3G
:DISPlay:DL3Gpp:AVIew:SHORtcode	0	
:DISPlay:DL3Gpp:AVIew:SSCHpart	OFF	
:DISPlay:DL3Gpp:AVIew:TSLot	0	
:DISPlay:DL3Gpp:MVIew:COLor[:SCALe]:OFFSet	0	
:DISPlay:DL3Gpp:MVIew:COLor[:SCALe]:RANGe	0	
:DISPlay:DL3Gpp:MVIew:FORMat	OFF	
:DISPlay:DL3Gpp:MVIew:RADIx	BINary	
:DISPlay:DL3Gpp:MVIew:X[:SCALe]:OFFSet	0	
:DISPlay:DL3Gpp:MVIew:X[:SCALe]:RANGe	0	
:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:OFFSet	0	
:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:PUNit	RELative	
:DISPlay:DL3Gpp:MVIew:Y[:SCALe]:RANGe	0	
:DISPlay:DL3Gpp:SVIew:COLor[:SCALe]:OFFSet	0	
:DISPlay:DL3Gpp:SVIew:COLor[:SCALe]:RANGe	0	
:DISPlay:DL3Gpp:SVIew:FORMat	SPECtrum	
:DISPlay:DL3Gpp:SVIew:RADIx	BINary	
:DISPlay:DL3Gpp:SVIew:X[:SCALe]:OFFSet	0	
:DISPlay:DL3Gpp:SVIew:X[:SCALe]:RANGe	0	

Table A–1: Factory initialization settiings — :DISPlay commands (Cont.)

Header	Default value	Meas. mode
:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:OFFSet	0	
:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:PUNit	RELative	
:DISPlay:DL3Gpp:SVIew:Y[:SCALe]:RANGe	0	

Table A–2: Factory initialization settiings — :SENSe commands

Header	Default value	Meas. mode
[:SENSe]:AC3Gpp subgroup		
[:SENSe]:AC3Gpp:FILTer:ALPHa	0.22	SADL3G
[:SENSe]:AC3Gpp:FILTer:TYPE	RNYQuist	
[:SENSe]:AC3Gpp:SGAIn	5 dB	
[:SENSe]:DL3Gpp subgroup		
[:SENSe]:DL3Gpp:BLOCk	0	DEMDL3G
[:SENSe]:DL3Gpp:CARRier:OFFSet	0	
[:SENSe]:DL3Gpp:CARRier:SEARch	ON	
[:SENSe]:DL3Gpp:FILTer:ALPHa	0.22	
[:SENSe]:DL3Gpp:FILTer:MEASurement	RRCosine	
[:SENSe]:DL3Gpp:FILTer:REFerence	RCOSine	
[:SENSe]:DL3Gpp:LENGth	512000	
[:SENSe]:DL3Gpp:OFFSet	0	
[:SENSe]:DL3Gpp:SCHPart	OFF	
[:SENSe]:DL3Gpp:SCODe:NUMBer	0	
[:SENSe]:DL3Gpp:SCODe:SEARch	ON	

Appendix B: Scale Setting Range

This section lists the setting ranges of the horizontal and the vertical scales for the views used in the W-CDMA downlink analysis.

Table B–1: Display format and scale

Display format	Horizontal range	Vertical range
Spectrum	0 Hz to 3 GHz (WCA230A) 0 Hz to 8 GHz (WCA280A)	–200 to +100 dBm
Spectrogram	0 Hz to 3 GHz (WCA230A) 0 Hz to 8 GHz (WCA280A)	Frame –15999 to 0 Frame –63999 to 0 (Option 02)
Time domain view	– ($T_f \times N_f$) to 0 s *	–200 to +100 dBm (Amplitude) –30 to +30 V (I/Q level) –300 to +300% (AM) –38.4 to +38.4 MHz (FM/FVT) –675 to +675 deg. (PM)
Constellation	– ($T_f \times N_f$) to 0 s *	fixed
EVM	– ($T_f \times N_f$) to 0 s *	–100 to +200% (EVM) –300 to +300% (amplitude error) –675 to +675 deg. (phase error)
Eye diagram	– ($T_f \times N_f$) to 0 s *	fixed
Symbol table	0 to (1024 × N_f) symbols	NA
CDP spectrogram *	0 to 511 channels	Slot –3999 to 0 Slot –15999 to 0 (Option 02)
CDP vs. Short code *	0 to 511 channels	–200 to +100 dB/dBm
CDP vs. Symbol *	0 to 639 symbols	–200 to +100 dB/dBm
CDP vs. Time slot *	–3999 to 0 slot –15999 to 0 slot (Option 02)	–200 to +100 dB/dBm
Symbol constellation	0 to 639 symbols	fixed
Symbol EVM	0 to 639 symbols	–100 to +200% (EVM) –300 to +300% (amplitude error) –675 to +675 deg. (phase error)
Symbol eye diagram	0 to 639 symbols	fixed

* **T_f: Frame time; N_f: Frame number; CDP: Code Domain Power**

Appendix C: SCPI Conformance Information

All commands in the WCA200A Series analyzers are based on SCPI Version 1999.0. The following tables list all commands supported by the analyzer. The columns to the right show whether a command is defined in the SCPI 1999.0 Standard or not.

Table C–1: SCPI conformance information — :CONFigure commands

Command		Defined in SCPI 1999.0	Not Defined in SCPI 1999.0
:CONFigure	:AC3Gpp		✓
	:DL3Gpp		✓

Table C–2: SCPI conformance information — :DISPlay commands

Command						Defined in SCPI 1999.0	Not Defined in SCPI 1999.0
:DISPlay	:AC3Gpp	:X	[:SCALe]	:OFFSet			✓
				:RANGe			✓
		:Y	[:SCALe]	:FIT			✓
				:FULL			✓
				:OFFSet			✓
				:RANGe			✓
	:DL3Gpp	:AVIew	:SHORtcode				✓
			:SRATe				✓
			:SSCHpart				✓
			:TSLot				✓
		:MVIew	:FORMat				✓
			:X	[:SCALe]	:OFFSet		✓
					:RANGe		✓
			:Y	[:SCALe]	:FIT		✓
					:FULL		✓
					:OFFSet		✓
					:PUNit		✓
					:RANGe		✓
			:COLor	[:SCALe]	:OFFSet		✓
					:RANGe		✓
			:RADix				✓
		:SVIew	:FORMat				✓
			:X	[:SCALe]	:OFFSet		✓
					:RANGe		✓

Table C–2: SCPI conformance information — :DISPlay commands (Cont.)

Command				Defined in SCPI 1999.0	Not Defined in SCPI 1999.0
	:Y	[:SCALe]	:FIT		✓
			:FULL		✓
			:OFFSet		✓
			:PUNit		✓
			:RANGe		✓
	:COLor	[:SCALe]	:OFFSet		✓
			:RANGe		✓
	:RADix				✓

Table C–3: SCPI conformance information — :FETCh commands

Command		Defined in SCPI 1999.0	Not Defined in SCPI 1999.0
:FETCh	:AC3Gpp?		✓
	:DL3Gpp?		✓

Table C–4: SCPI conformance information — :READ commands

Command		Defined in SCPI 1999.0	Not Defined in SCPI 1999.0
:READ	:AC3Gpp?		✓

Table C–5: SCPI conformance information — :SENSe commands

Command				Defined in SCPI 1999.0	Not Defined in SCPI 1999.0
[:SENSe]	:AC3Gpp	:FILTer	:ALPHa		✓
			:TYPE		✓
		:SGAin			✓
	:DL3Gpp	:BLOCk			✓
		[:IMMediate]			✓
		:LENGth			✓
		:OFFSet			✓
		:CARRier	:OFFSet		✓
			:SEARch		✓
		:FILTer	:ALPHa		✓
			:MEASurement		✓
			:REFerence		✓
		:SCODe	:NUMBer		✓
			:SEARch		✓
		:SCHPart			✓

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