W-CDMA Programming Commands

Agilent Technologies E4406A VSA Series Transmitter Tester

Agilent Technologies

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1 W-CDMA (3GPP) Programming Commands

These commands are only available when the W-CDMA (3GPP) mode has been selected using **`INSTrument:SELect WCDMA`**. If this mode is selected, commands that are unique to another mode are not available.

SCPI Command Subsystems

CALCulate Subsystem

This subsystem is used to perform post-acquisition data processing. In effect, the collection of new data triggers the CALCulate subsystem. In this instrument, the primary functions in this subsystem are markers and limits.

Code Domain—Decode Axis

:CALCulate:CDPower:AXIS[:MS] IPH|QPH

:CALCulate:CDPower:AXIS[:MS]?

Select the I phase or Q phase for the demodulation axis. (For MS only)

IPH – I phase

QPH – Q phase

Factory Preset and *RST:	QPH for W-CDMA (3GPP)
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Spread Code

:CALCulate:CDPower:SPRead <integer>

:CALCulate:CDPower:SPRead?

Set a spread code.

Factory Preset and *RST: 0

Range:
- For W-CDMA (3GPP)

  0 to 511, when **CALCulate:CDPower:SRATe** = 7500

  0 to 255, when **CALCulate:CDPower:SRATe** = 15000

  0 to 127, when **CALCulate:CDPower:SRATe** = 30000

  0 to 63, when **CALCulate:CDPower:SRATe** = 60000

  0 to 31, when **CALCulate:CDPower:SRATe** = 120000

  0 to 15, when **CALCulate:CDPower:SRATe** = 240000

  0 to 7, when **CALCulate:CDPower:SRATe** = 480000

  0 to 3, when **CALCulate:CDPower:SRATe** = 960000

Remarks: You must be in the W-CDMA (3GPP) or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Symbol Rate

:CALCulate:CDPower:SRATe <integer>

:CALCulate:CDPower:SRATe?

Set a symbol rate.

Factory Preset and *RST: 15000 for W-CDMA (3GPP)

Range: 7500, 15000, 30000, 60000, 120000, 240000, 48000, 960000 for BTS of W-CDMA (3GPP)

15000, 30000, 60000, 120000, 240000, 48000, 960000 for MS of W-CDMA (3GPP)

Remarks: You must be in the W-CDMA (3GPP) or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Sweep Offset (Measurement Offset)

:CALCulate:CDPower:SWEep:OFFSet <integer>

:CALCulate:CDPower:SWEep:OFFSet?

Set the timing offset of measurement interval in Power Control Groups (PCG; 1 PCG = 1.25 ms) for cdma2000 or in slots (1 slot = 625 μs) for W-CDMA (3GPP) and W-CDMA (Trial & Arib).

The sum of **CALCulate:CDPower:SWEep:TIME** and **CALCulate:CDPower:SWEep:OFFSet** must be equal to or less than**CALCulate:CDPower:CAPTure:TIME** for cdma2000, **CALCulate:CDPower:CAPTure:TIME** × 15 for W-CDMA (3GPP), or 32 for W-CDMA (Trial & Arib). If the sum becomes more than the value, **CALCulate:CDPower:SWEep:OFFSet** is adjusted automatically.

Factory Preset and *RST: 0

Range: 0 to **CALCulate:CDPower:CAPTure:TIME** × 15 – 1 for W-CDMA (3GPP)

Remarks: You must be in the cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Sweep Time (Measurement Interval)

:CALCulate:CDPower:SWEep:TIME <integer>

:CALCulate:CDPower:SWEep:TIME?

Set the length of measurement interval in Power Control Groups (PCG; 1 PCG = 1.25 ms) for cdma2000 or in slots (1 slot = 625 μs) for W-CDMA (3GPP) and W-CDMA (Trial & Arib).

The sum of **CALCulate:CDPower:SWEep:TIME** and **CALCulate:CDPower:SWEep:OFFSet** must be equal to or less than**CALCulate:CDPower:CAPTure:TIME** for cdma2000, **CALCulate:CDPower:CAPTure:TIME** × 15 for W-CDMA (3GPP), or 32 for W-CDMA (Trial & Arib). If the sum becomes more than the value, **CALCulate:CDPower:SWEep:OFFSet** is adjusted automatically.

Factory Preset and *RST: 1

Range: 1 to **CALCulate:CDPower:CAPTure:TIME** × 15 for W-CDMA (3GPP)

Remarks: You must be in the cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Computation Type

:CALCulate:CDPower:TYPE ABSolute|RELative

:CALCulate:CDPower:TYPE?

Select the code domain power computation type either the absolute power or the relative to mean power mode.

Absolute – code domain power is computed as the absolute power.

Relative – code domain power is computed as the relative to the mean power.

Factory Preset and *RST:	Relative
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Test Current Results Against all Limits

:CALCulate:CLIMits:FAIL?

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

Data Query

:CALCulate:DATA[n]?

Returns the designated measurement data for the currently selected measurement and sub-opcode.

n = any valid sub-opcode for the current measurement. See the “MEASure Group of Commands” on page 66 for information on the data that can be returned for each measurement.

Calculate/Compress Trace Data Query

:CALCulate:DATA[n]:COMPress? MAXimum|MEAN|MINimum|RMS|SAMPle|SDEViation|CFIT {,<soffset>}{,<length>}{,<roffset>}

Returns the designated trace data for the currently selected measurement. The command can be used with sub-opcodes (*n*) for measurement results that are trace data. See the following table.

This command is used to compress/decimate a long trace to extract the desired data and only return to the computer the necessary data. A typical example would be to acquire N bursts of GSM data and return the mean power of each burst.

The command can also be used to identify the best curve fit for the data.

Curve Fit - applies curve fitting routines to the data. Where <soffset> and <length> are required, and <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in points) and the curve coefficients ((order + 1) values).

<Start offset> - is an optional integer. It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is an integer index (that starts counting at zero) for all the elements in the trace. The default value is zero.

<Length> - is an optional integer that defines how many trace elements will be compressed into one value. This parameter has a default value equal to the current trace length.

<Repeat offset> - is an optional real number. It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Select a number such that repeated additions will round to the correct starting index.

Example: To query the mean power of a set of GSM bursts:

1. Set the waveform measurement sweep time to acquire the required number of bursts.
2. Set the triggers such that acquisition happens at a known position relative to a burst.
3. Then query the mean burst levels using, **CALC:DATA2:COMP? MEAN,62,1315,1442.3** (These parameter values correspond to GSM signals.)

Remarks: The optional parameters must be entered in the specified order. If you want to specify <length>, you must also specify <soffset> or its default. For example:

CALC:DATA2:COMP? MEAN,62,1315

CALC:DATA2:COMP? MEAN,DEFault,1315

This command uses the data setting specified by the FORMat:DATA command and can return binary or ascii data.

History: Added in revision A.03.00 and later

Measurement	Available Traces	Markers Available?
ACP - adjacent channel power (Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), iDEN, NADC, PDC modes)	no traces	no markers
CDPower - code domain power (cdma2000, W-CDMA (3GPP) modes)	CDPower (*n*=2)[a] EVM (*n*=5)[a] MERRor (*n*=6)[a] PERRor (*n*=7)[a] SPOWer (*n*=9)[a] CPOWer (*n*=10)[a]	yes
CHPower - channel power (Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib) modes)	SPECtrum (*n*=2)[a]	no markers
EVMQpsk - QPSK error vector magnitude (cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib) modes)	EVM (*n*=2)[a] MERRor (*n*=3)[a] PERRor (*n*=4)[a]	yes
IM - intermodulation (cdma2000, W-CDMA (3GPP) modes)	SPECtrum (*n*=2)[a]	yes
MCPower - multi-carrier power (W-CDMA (3GPP) mode)	no traces	no markers
OBW - occupied bandwidth (cdmaOne, cdma2000, iDEN, PDC, W-CDMA (3GPP) modes)	no traces	no markers

Measurement	Available Traces	Markers Available?
PSTatistic - power statistics CCDF (Basic, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib) modes)	MEASured (*n*=2)[a] GAUSian (*n*=3)[a] REFerence (*n*=4)[a]	yes
RHO - modulation quality (cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib) modes)	EVM (*n*=2)[a] MERRor (*n*=3)[a] PERRor (*n*=4)[a]	yes
SEMask - spectrum emissions mask (cdma2000, W-CDMA (3GPP) modes)	SPECtrum (*n*=2)[a]	yes
SPECtrum - (frequency domain) (all modes)	RFENvelope (*n*=2)[a] for Service mode IQ (*n*=3)[a] SPECtrum (*n*=4)[a] ASPectrum (*n*=7)[a]	yes
WAVEform - (time domain) (all modes)	RFENvelope (*n*=2)[a] IQ (*n*=8)[a]	yes

a. The *n* number indicates the sub-opcode that corresponds to this trace. Detailed descriptions of the trace data can be found in the MEASure subsystem documentation by looking up the sub-opcode for the appropriate measurement.

Calculate Peaks of Trace Data

**:CALCulate:DATA[n]:PEAKs?
<threshold>,<excursion>[,AMPLitude|FREQuency|TIME]**

Returns a list of peaks for the designated trace data *n* for the currently selected measurement. The peaks must meet the requirements of the peak threshold and excursion values.

The command can be used with sub-opcodes (*n*) for any measurement results that are trace data. See the table above. Subopcode *n*=0, raw trace data cannot be searched for peaks. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm.

Threshold - is the level below which trace data peaks are ignored

Excursion - To be defined as a peak, the signal must rise above the threshold by a minimum amplitude change. Excursion is measured from the lowest point above the threshold (of the rising edge of the peak), to the highest signal point that begins the falling edge.

Amplitude - lists the peaks in order of descending amplitude, so the highest peak is listed first. This is the default peak order listing if the optional parameter is not specified.

Frequency - lists the peaks in order of occurrence, left to right across the x-axis

Time - lists the peaks in order of occurrence, left to right across the x-axis

Example: Select the spectrum measurement.

Use **CALC:DATA4:PEAK? -40,10,FREQ** to identify the peaks above -40 dBm, with excursions of at least 10 dB, in order of increasing frequency.

Query Results: Returns a list of floating-point numbers. The first value in the list is the number of peak points that follow. A peak point consists of two values: a peak amplitude followed by the its corresponding frequency (or time).

If no peaks are found the peak list will consist of only the number of peaks, (0).

The peak list is limited to 100 peaks. Peaks in excess of 100 are ignored.

Remarks: This command uses the data setting specified by the FORMat:DATA command and can return real 32-bit, real 64-bit, or ASCII data. The default data format is ASCII.

History: Added in revision A.03.00 and later

CALCulate:MARKers Subsystem

Markers can be put on your displayed measurement data to supply information about specific points on the data. Some of the things that markers can be used to measure include: precise frequency at a point, minimum or maximum amplitude, and the difference in amplitude or frequency between two points.

When using the marker commands you must specify the measurement in the SCPI command. We recommend that you use the marker commands only on the current measurement. Many marker commands will return invalid results, when used on a measurement that is not current. (This is true for commands that do more than simply setting or querying an instrument parameter.) No error is reported for these invalid results.

You must make sure that the measurement is completed before trying to query the marker value. Using the MEASure or READ command, before the marker command, forces the measurement to complete before allowing the next command to be executed.

Each measurement has its own instrument state for marker parameters. Therefore, if you exit the measurement, the marker settings in each measurement are saved and are then recalled when you change back to that measurement.

W-CDMA (3GPP) Mode - <measurement> key words

- ACP - no markers
- CDPower - markers available
- CHPower - no markers
- EVMQpsk - markers available
- IM - markers available
- MCPower - no markers
- OBW - no markers
- PSTatistic - markers available
- RHO - markers available
- SEMask - markers available
- SPECtrum - markers available
- WAVeform - markers available

Example:

Suppose you are using the Spectrum measurement. To position marker 2 at the maximum peak value of the trace that marker 2 is currently on, the command is:

:CALCulate:SPECtrum:MARKer2:MAXimum

You must make sure that the measurement is completed before trying to query the marker value. Use the MEASure or READ command before using the marker command. This forces the measurement to complete before allowing the next command to be executed.

Markers All Off on All Traces

:CALCulate:<measurement>:MARKer:AOFF

Turns off all markers on all the traces in the specified measurement.

Example:	**CALC:SPEC:MARK:AOFF**
Remarks:	The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)
Front Panel Access:	**Marker, More, Marker All Off**

Marker Function

:CALCulate:<measurement>:MARKer[1]|2|3|4:FUNCtion BPOWer|NOISe|OFF

:CALCulate:<measurement>:MARKer[1]|2|3|4:FUNCtion?

Selects the type of marker for the specified marker. A particular measurement may not have all the types of markers that are commonly available.

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

Band Power – is the integrated power between the two markers for traces in the frequency domain and is the mean power between the two markers for traces in the time domain.

Noise – is the noise power spectral density in a 1 Hz bandwidth. It is averaged over 32 horizontal trace points.

Off – turns off the marker functions

Example:	**CALC:SPEC:MARK3:FUNC Noise**

Remarks: The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)

Front Panel Access: **Marker, Marker Function**

Marker Function Result

:CALCulate:<measurement>:MARKer[1]|2|3|4:FUNCtion:RESult?

Quires the result of the currently active marker function. The measurement must be completed before querying the marker.A particular measurement may not have all the types of markers available.

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

Example: **CALC:SPEC:MARK:FUNC:RES?**

Remarks: The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)

Front Panel Access: **Marker, Marker Function**

Marker Peak (Maximum) Search

:CALCulate:<measurement>:MARKer[1]|2|3|4:MAXimum

Places the selected marker on the highest point on the trace that is assigned to that particular marker number.

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

Example: **CALC:SPEC:MARK1:MAX**

Remarks: The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)

Front Panel Access: **Search**

Marker Peak (Minimum) Search

:CALCulate:<measurement>:MARKer[1]|2|3|4:MINimum

Places the selected marker on the lowest point on the trace that is assigned to that particular marker number.

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

Example: **CALC:SPEC:MARK2:MIN**

Remarks: The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)

Marker Mode

:CALCulate:<measurement>:MARKer[1]|2|3|4:MODE POSition|DELTa

:CALCulate:<measurement>:MARKer[1]|2|3|4:MODE?

Selects the type of marker to be a normal position-type marker or a delta marker.A specific measurement may not have both types of markers. For example, several measurements only have position markers.

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

Example: **CALC:SPEC:MARK:MODE DELTA**

Remarks: For the delta mode only markers 1 and 2 are valid.

The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)

Front Panel Access: **Marker, Marker [Delta]**

Marker On/Off

:CALCulate:<measurement>:MARKer[1]|2|3|4[:STATe] OFF|ON|0|1

:CALCulate:<measurement>:MARKer[1]|2|3|4[:STATe]?

Turns the selected marker on or off.

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

Example: **CALC:SPEC:MARK2: on**

Remarks: The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, AREFerence, WAVeform)

The WAVeform measurement only has two markers available.

Front Panel Access: **Marker, Select** then **Marker Normal** or **Marker On Off**

Marker to Trace

:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe <trace_name>

:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe?

Assigns the specified marker to the designated trace. Not all types of measurement data can have markers assigned to them.

Example: With the WAVeform measurement selected, a valid command is **CALC:SPEC:MARK2:TRACE rfenvelope**.

Range: The names of valid traces are dependent upon the selected measurement. See the following table for the available trace names. The trace name assignment is independent of the marker number.

Remarks: The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)

Front Panel Access: **Marker, Marker Trace**

Measurement	Available Traces	Markers Available?
ACP - adjacent channel power (Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), iDEN, NADC, PDC modes)	no traces	no markers
CDPower - code domain power (cdma2000, W-CDMA (3GPP) modes)	CDPower (*n*=2)[a] EVM (*n*=5)[a] MERRor (*n*=6)[a] PERRor (*n*=7)[a] SPOWer (*n*=9)[a] CPOWer (*n*=10)[a]	yes
CHPower - channel power (Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib) modes)	SPECtrum (*n*=2)[a]	no markers
EVMQpsk - QPSK error vector magnitude (cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib) modes)	EVM (*n*=2)[a] MERRor (*n*=3)[a] PERRor (*n*=4)[a]	yes
IM - intermodulation (cdma2000, W-CDMA (3GPP) modes)	SPECtrum (*n*=2)[a]	yes
MCPower - multi-carrier power (W-CDMA (3GPP) mode)	no traces	no markers
OBW - occupied bandwidth (cdmaOne, cdma2000, iDEN, PDC, W-CDMA (3GPP) modes)	no traces	no markers
PSTatistic - power statistics CCDF (Basic, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib) modes)	MEASured (*n*=2)[a] GAUSian (*n*=3)[a] REFerence (*n*=4)[a]	yes
RHO - modulation quality (cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib) modes)	EVM (*n*=2)[a] MERRor (*n*=3)[a] PERRor (*n*=4)[a]	yes

Measurement	Available Traces	Markers Available?
SEMask - spectrum emissions mask (cdma2000, W-CDMA (3GPP) modes)	SPECtrum (n=2)[a]	yes
SPECtrum - (frequency domain) (all modes)	RFENvelope (n=2)[a] for Service mode IQ (n=3)[a] SPECtrum (n=4)[a] ASPectrum (n=7)[a]	yes
WAVEform - (time domain) (all modes)	RFENvelope (n=2)[a] IQ (n=8)[a]	yes

a. The *n* number indicates the sub-opcode that corresponds to this trace. Detailed descriptions of the trace data can be found in the MEASure subsystem documentation by looking up the sub-opcode for the appropriate measurement.

Marker X Value

:CALCulate:<measurement>:MARKer[1]|2|3|4:X <param>

:CALCulate:<measurement>:MARKer[1]|2|3|4:X?

Position the designated marker on its assigned trace at the specified X value. The parameter value is in X-axis units (which is often frequency or time).

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

The query returns the current X value of the designated marker. The measurement must be completed before querying the marker.

Example: **CALC:SPEC:MARK2:X 1.2e6 Hz**

Default Unit: Matches the units of the trace on which the marker is positioned

Remarks: The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)

Front Panel Access: **Marker, <active marker>, RPG**

Marker X Position

:CALCulate:<measurement>:MARKer[1]|2|3|4:X:POSition <integer>

:CALCulate:<measurement>:MARKer[1]|2|3|4:X:POSition?

Position the designated marker on its assigned trace at the specified X position. A trace is composed of a variable number of measurement points. This number changes depending on the current measurement conditions. The current number of points must be identified before using this command to place the marker at a specific location.

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

The query returns the current X position for the designated marker. The measurement must be completed before querying the marker.

Example:	**CALC:SPEC:MARK:X:POS 500**
Range:	0 to a maximum of (3 to 920,000)
Remarks:	The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)
Front Panel Access:	**Marker, <active marker>, RPG**

Marker Readout Y Value

:CALCulate:<measurement>:MARKer[1]|2|3|4:Y?

Readout the current Y value for the designated marker on its assigned trace. The value is in the Y-axis units for the trace (which is often dBm).

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

The measurement must be completed before querying the marker.

Example:	**CALC:SPEC:MARK1:Y?**
Default Unit:	Matches the units of the trace on which the marker is positioned
Remarks:	The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)

Occupied Bandwidth—Frequency Band Limit

:CALCulate:OBW:LIMit:FBLimit <freq>

:CALCulate:OBW:LIMit:FBLimit?

Set the frequency bandwidth limit in Hz.

Factory Preset and *RST:	5 MHz for W-CDMA (3GPP)
Range:	10 kHz to 10 MHz for cdma2000, W-CDMA (3GPP)
Default Unit:	Hz
Remarks:	You must be in the iDEN, PDC, cdma2000, or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.02.00 or later

Occupied Bandwidth—Limit Test

:CALCulate:OBW:LIMit[:TEST] OFF|ON|0|1

:CALCulate:OBW:LIMit[:TEST]?

Turn limit testing on or off.

Factory Preset and *RST:	On
Remarks:	You must be in the iDEN, PDC, cdma2000, or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.02.00 or later

Power Statistic CCDF—Store Reference

:CALCulate:PSTatistic:STORe:REFerence ON

Store the current measured trace as the user-defined reference trace.

Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—Code Domain Error Limit

:CALCulate:RHO:LIMit:CDERror <float>

:CALCulate:RHO:LIMit:CDERror?

Set the Peak Code Domain Error in dB.

Factory Preset and *RST:	–40.0 dB
Range:	–100 to 0 dB
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—Peak EVM Limit

:CALCulate:RHO:LIMit:Peak <float>

:CALCulate:RHO:LIMit:Peak?

Set the Peak EVM limit in percent.

Factory Preset and *RST:	100.0%
Range:	0.0 to 100.0%
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—Rho Limit

:CALCulate:RHO:LIMit:RHO <float>

:CALCulate:RHO:LIMit:RHO?

Set the Rho limit.

Factory Preset and *RST:	0.5
Range:	0 to 1.0
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—RMS EVM Limit

:CALCulate:RHO:LIMit:RMS <float>

:CALCulate:RHO:LIMit:RMS?

Set the RMS EVM limit in percent.

Factory Preset and *RST:	50.0%
Range:	0.0 to 50.0%
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

CONFigure Subsystem

The CONFigure commands are used with several other commands to control the measurement process. These commands are described in the section on the “MEASure Group of Commands” on page 66.

Configure the Selected Measurement

:CONFigure:<measurement>

A CONFigure command must specify the desired measurement. It will set the instrument settings for that measurements standard defaults, but will not initiate the taking of data. The available measurements are described in the MEASure subsystem.

Configure Query

:CONFigure?

The CONFigure query returns the name of the current measurement.

DISPlay Subsystem

The DISPlay controls the selection and presentation of textual, graphical, and TRACe information. Within a DISPlay, information may be separated into individual WINDows.

Adjacent Channel Power - View Selection

:DISPlay:ACP:VIEW BGRaph|SPECtrum

:DISPlay:ACP:VIEW?

Select the adjacent channel power measurement display of bar graph or spectrum.

You may want to disable the spectrum trace data part of the measurement so you can increase the speed of the rest of the measurement display. Use SENSe:ACP:SPECtrum:ENABle to turn on or off the spectrum trace. (Basic and cdmaOne modes only)

Factory Preset and *RST:	Bar Graph (BGRaph)
Remarks:	You must be in the Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), NADC or PDC mode to use this command. Use INSTrument:SELect to set the mode.

Turn the Entire Display On/Off

:DISPlay:ENABle OFF|ON|0|1

:DISPlay:ENABle?

Controls the updating of the display. If enable is set to off, the display will appear to "freeze" in its current state. Having the display disabled may increase repetitive measurement rate. Measurements may run faster if the instrument doesn't update the display after every data acquisition.

Factory Preset and *RST: On

Remarks: The following key presses will turn display enable back on:

1. If in local, press any key
2. If in remote, press the local (system) key
3. If in local lockout, no key

Front Panel Access: **none**

Select Display Format

:DISPlay:FORMat:TILE

Selects the viewing format that displays multiple windows of the current measurement data simultaneously. Use DISP:FORM:ZOOM to return the display to a single window.

Front Panel Access: **Zoom**

Select Display Format

:DISPlay:FORMat:ZOOM

Selects the viewing format that displays only one window of the current measurement data (the current active window). Use DISP:FORM:TILE to return the display to multiple windows.

Front Panel Access: **Zoom**

Spectrum - Y-Axis Reference Level

:DISPlay:SPECtrum[n]:WINDow[m]:TRACe:Y[:SCALe]:RLEVel <power>

:DISPlay:SPECtrum[n]:WINDow[m]:TRACe:Y[:SCALe]:RLEVel?

Sets the amplitude reference level for the y-axis.

n – selects the view, the default is Spectrum.

— n=1, Spectrum

— n=2, I/Q Waveform

— n=3, numeric data (service mode)

— n=4, RF Envelope (service mode)

m – selects the window within the view. The default is 1.

Factory Preset and *RST:	0 dBm, for Spectrum
Range:	–250 to 250 dBm, for Spectrum
Default Unit:	dBm, for Spectrum
Remarks:	May affect input attenuator setting. To use this command, the appropriate mode should be selected with INSTrument:SELect.
Front Panel Access:	When in Spectrum measurement: **Amplitude Y Scale, Ref Level**

Turn a Trace Display On/Off

:DISPlay:TRACe[n][:STATe] OFF|ON|0|1

:DISPlay:TRACe[n][:STATe]?

Controls whether the specified trace is visible or not.

n is a sub-opcode that is valid for the current measurement. See the "MEASure Group of Commands" on page 66 for more information about sub-opcodes.

Factory Preset and *RST: On

Range: The valid traces and their sub-opcodes are dependent upon the selected measurement. See the following table.

The trace name assignment is independent of the window number.

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Front Panel Access: **Display, Display Traces**

Measurement	Available Traces	Markers Available?
ACP - adjacent channel power (Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), iDEN, NADC, PDC modes)	no traces	no markers
CDPower - code domain power (cdma2000, W-CDMA (3GPP) modes)	CDPower (*n*=2)[a] EVM (*n*=5)[a] MERRor (*n*=6)[a] PERRor (*n*=7)[a] SPOWer (*n*=9)[a] CPOWer (*n*=10)[a]	yes
CHPower - channel power (Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib) modes)	SPECtrum (*n*=2)[a]	no markers

Measurement	Available Traces	Markers Available?
EVMQpsk - QPSK error vector magnitude (cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib) modes)	EVM (n=2)[a] MERRor (n=3)[a] PERRor (n=4)[a]	yes
IM - intermodulation (cdma2000, W-CDMA (3GPP) modes)	SPECtrum (n=2)[a]	yes
MCPower - multi-carrier power (W-CDMA (3GPP) mode)	no traces	no markers
OBW - occupied bandwidth (cdmaOne, cdma2000, iDEN, PDC, W-CDMA (3GPP) modes)	no traces	no markers
PSTatistic - power statistics CCDF (Basic, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib) modes)	MEASured (n=2)[a] GAUSian (n=3)[a] REFerence (n=4)[a]	yes
RHO - modulation quality (cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib) modes)	EVM (n=2)[a] MERRor (n=3)[a] PERRor (n=4)[a]	yes
SEMask - spectrum emissions mask (cdma2000, W-CDMA (3GPP) modes)	SPECtrum (n=2)[a]	yes
SPECtrum - (frequency domain) (all modes)	RFENvelope (n=2)[a] for Service mode IQ (n=3)[a] SPECtrum (n=4)[a] ASPectrum (n=7)[a]	yes
WAVEform - (time domain) (all modes)	RFENvelope (n=2)[a] IQ (n=8)[a]	yes

a. The *n* number indicates the sub-opcode that corresponds to this trace. Detailed descriptions of the trace data can be found in the MEASure subsystem documentation by looking up the sub-opcode for the appropriate measurement.

Waveform - Y-Axis Reference Level

:DISPlay:WAVeform[n]:WINDow[m]:TRACe:Y[:SCALe]:RLEVel <power>

:DISPlay:WAVeform[n]:WINDow[m]:TRACe:Y[:SCALe]:RLEVel?

Sets the amplitude reference level for the y-axis.

n, selects the view, the default is RF envelope.

n=1, RF envelope

n=2, I/Q waveform

m, selects the window within the view. The default is 1.

Factory Preset and *RST:	0 dBm, for RF envelope
Range:	–250 to 250 dBm, for RF envelope
Default Unit:	dBm, for RF envelope
Remarks:	May affect input attenuator setting. To use this command, the appropriate mode should be selected with INSTrument:SELect.
Front Panel Access:	When in Waveform measurement: **Amplitude Y Scale, Ref Level**

FETCh Subsystem

The FETCh? commands are used with several other commands to control the measurement process. These commands are described in the section on the “MEASure Group of Commands” on page 66.

Fetch the Current Measurement Results

:FETCh:<measurement>[n]?

A FETCh? command must specify the desired measurement. It will return the valid results that are currently available, but will not initiate the taking of any new data. You can only fetch results from the measurement that is currently selected. The code number n selects the kind of results that will be returned. The available measurements and data results are described in the “MEASure Group of Commands” on page 66.

MEASure Group of Commands

This group includes commands used to make measurements and return results. The different commands can be used to provide fine control of the overall measurement process. Most measurements should be done in single measurement mode, rather than doing the measurement continuously.

Each measurement sets the instrument state that is appropriate for that measurement. Other commands are available for each **Mode** to allow changing settings, view, limits, etc. Refer to:

SENSe:<measurement>, SENSe:CHANnel, SENSe:CORRection, SENSe:FREQuency, SENSe:POWer, SENSe:RADio, SENSe:SNYC
CALCulate:<measurement>, CALCulate:CLIMits/DATA
DISPlay:<measurement>
TRIGger

Measure Commands

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Standard.

- Stops the current measurement and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement.

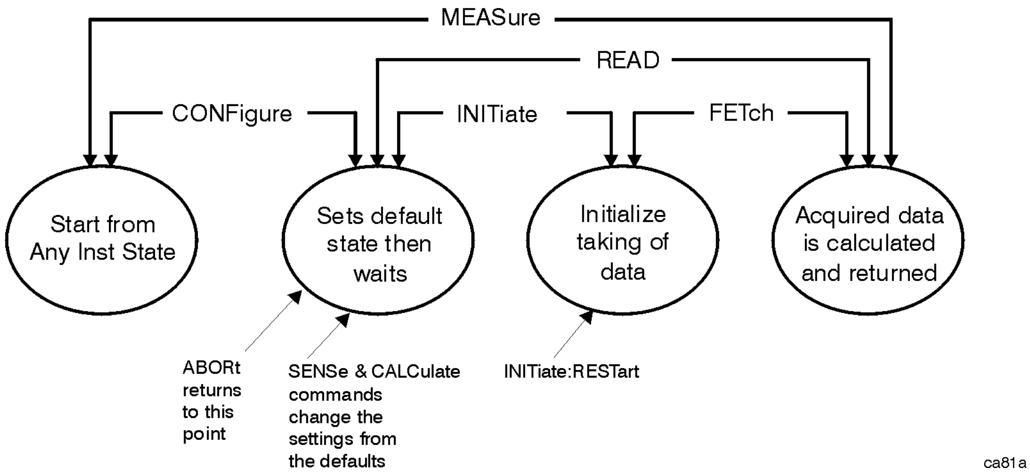
  If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and faster then the ASCII format.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command, or the INITiate and FETCh? commands, to initiate the measurement and query the results. See Figure 1-1.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command or INITiate and FETCh? commands, to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Figure 1-1 Measurement Group of Commands



Configure Commands

:CONFigure:<measurement>

This command stops the current measurement and sets up the instrument for the specified measurement using the factory default instrument settings. It does not initiate the taking of measurement data.

The CONFigure? query returns the current measurement name.

Fetch Commands

:FETCh:<measurement>[n]?

This command puts valid data into the output buffer, but does not initiate data acquisition. Use the INITiate[:IMMediate] command to acquire data before you use the FETCh command. You can only fetch results from the measurement that is currently selected.

If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and faster then the ASCII format.

Read Commands

:READ:<measurement>[n]?

- Does not preset the measurement to the factory defaults. (The MEASure? and CONFigure? commands reset the parameters to the default values.) It uses the settings from the last measurement.
- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
- Blocks other SCPI communication, waiting until the measurement is complete before returning the results

  If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster then the ASCII format.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Adjacent Channel Power Ratio (ACP) Measurement

This measures the total rms power in the specified channel and in 5 offset channels. You must be in Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), iDEN, NADC or PDC mode to use these commands. Use INSTrument:SELect to set the mode.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:ACP commands for more measurement related commands.

:CONFigure:ACP

:FETCh:ACP[n]?

:READ:ACP[n]?

:MEASure:ACP[n]?

For Basic mode, a channel frequency and power level can be defined in the command statement to override the default standard setting. A comma must precede the power value as a place holder for the frequency, when no frequency is sent.

History: Added to Basic mode, version A.03.00 or later

Front Panel Access: **Measure**, **ACP** or **ACPR**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

Measurement Type	n	Results Returned
	0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

Measurement Type	**n**	**Results Returned**
Total power reference	not specified or n=1 Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Returns 24 comma-separated scalar results, in the following order: 1. Upper adjacent chan center frequency - relative power (dB) 2. Upper adjacent chan center frequency - absolute power (dBm) 3. Lower adjacent chan center frequency - relative power (dB) (same as upper) 4. Lower adjacent chan center frequency - absolute power (dBm) (same as upper) 5. Negative offset frequency (1) - relative power (dB), 6. Negative offset frequency (1) - absolute power (dBm) 7. Positive offset frequency (1) - relative power (dB) 8. Positive offset frequency (1) - absolute power (dBm) . . . 23. Positive offset frequency (5) - relative power (dB) 24. Positive offset frequency (5) - absolute power (dBm)
Power spectral density reference	not specified or n=1 Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Returns 24 comma-separated scalar results, in the following order: 1. Upper adjacent chan center frequency - relative power (dB) 2. Upper adjacent chan center frequency - absolute power (dBm/Hz) 3. Lower adjacent chan center frequency - relative power (dB) (same as upper) 4. Lower adjacent chan center frequency - absolute power (dBm/Hz) (same as upper) 5. Negative offset frequency (1) - relative power (dB) 6. Negative offset frequency (1) - absolute power (dBm/Hz) 7. Positive offset frequency (1) - relative power (dB) 8. Positive offset frequency (1) - absolute power (dBm/Hz) . . . 23. Positive offset frequency (5) - relative power (dB) 24. Positive offset frequency (5) - absolute power (dBm/Hz)

Measurement Type	n	Results Returned
Total power reference	2 Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Returns 11 comma-separated scalar values (in dBm) corresponding to the total power histogram display. The values are returned in ascending frequency order: 1. Negative offset frequency (5) 2. Negative offset frequency (4) . . . 6. Center frequency 7. Positive offset frequency (1) . . . 11. Positive offset frequency (5)
Power spectral density reference	3 Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Returns 11 comma-separated scalar values (in dBm/Hz) corresponding to the power spectral density histogram display. The values are returned in ascending frequency order: 1. Negative offset frequency (5) 2. Negative offset frequency (4) . . . 6. Center frequency 7. Positive offset frequency (1) . . . 11. Positive offset frequency (5)
(For cdma2000 and W-CDMA the data is only available with spectrum display selected)	4 Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Returns the frequency-domain spectrum trace data for the entire frequency range being measured. With the spectrum view selected (DISPlay:ACP:VIEW SPECtrum) and the spectrum trace on (SENSe:ACP:SPECtrum:ENABle): • In FFT mode (SENSe:ACP:SWEep:TYPE FFT) the number of trace points returned are 343 (cdma2000) or 1715 (W-CDMA). This is with the default span of 5 MHz (cdma2000) or 25 MHz (W-CDMA). The number of points also varies if another offset frequency is set. • In sweep mode (SENSe:ACP:SWEep:TYPE SWEep), the number of trace points returned is 601 (for cdma2000 or W-CDMA) for any span. With bar graph display selected, one point of –999.0 will be returned.

Measurement Type	n	Results Returned
Total power reference	5 Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Returns 12 comma-separated scalar values (in dBm) of the absolute power of the center and the offset frequencies: 1. Upper adjacent chan center frequency 2. Lower adjacent chan center frequency 3. Negative offset frequency (1) 4. Positive offset frequency (1) . . . 11. Negative offset frequency (5) 12. Positive offset frequency (5)
Power spectral density reference	5 Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Returns 12 comma-separated scalar values (in dBm/Hz) of the absolute power of the center and the offset frequencies: 1. Upper adjacent chan center frequency 2. Lower adjacent chan center frequency 3. Negative offset frequency (1) 4. Positive offset frequency (1) . . . 11. Negative offset frequency (5) 12. Positive offset frequency (5)
Total power reference	6 Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Returns 12 comma-separated scalar values (total power in dB) of the power relative to the carrier at the center and the offset frequencies: 1. Upper adjacent chan center frequency 2. Lower adjacent chan center frequency 3. Negative offset frequency (1) 4. Positive offset frequency (1) 5. Negative offset frequency (5) . . . 11. Negative offset frequency (5) 12. Positive offset frequency (5)
Power spectral density reference	6 Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Returns 12 comma-separated scalar values (power spectral density in dB) of the power relative to the carrier at the center and offset frequencies: 1. Upper adjacent chan center frequency 2. Lower adjacent chan center frequency 3. Negative offset frequency (1) 4. Positive offset frequency (1) . . . 11. Negative offset frequency (5) 12. Positive offset frequency (5)

Measurement Type	n	Results Returned
Total power reference	7 Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Returns 12 comma-separated scalar values of the pass/fail (0=passed, or 1=failed) results determined by testing the absolute power limit of the center and offset frequencies (measured as total power in dB): 1. Upper adjacent chan center frequency 2. Lower adjacent chan center frequency 3. Negative offset frequency (1) 4. Positive offset frequency (1) . . . 11. Negative offset frequency (5) 12. Positive offset frequency (5)
Power spectral density reference	7 Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Returns 12 comma-separated scalar values of the pass/fail (0=passed, or 1=failed) results determined by testing the absolute power limit of the center and offset frequencies (measured as power spectral density in dB): 1. Upper adjacent chan center frequency 2. Lower adjacent chan center frequency 3. Negative offset frequency (1) 4. Positive offset frequency (1) . . . 11. Negative offset frequency (5) 12. Positive offset frequency (5)
Total power reference	8 Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Returns 12 comma-separated scalar values of the pass/fail (0=passed, or 1=failed) results determined by testing the power limit relative to the center frequency (measured as total power spectral in dB): 1. Upper adjacent chan center frequency 2. Lower adjacent chan center frequency 3. Negative offset frequency (1) 4. Positive offset frequency (1) . . . 11. Negative offset frequency (5) 12. Positive offset frequency (5)

Measurement Type	n	Results Returned
Power spectral density reference	8 Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Returns 12 comma-separated scalar values of the pass/fail (0=passed, or 1=failed) results determined by testing the power limit relative to the center frequency (measured as power spectral density in dB): 1. Upper adjacent chan center frequency 2. Lower adjacent chan center frequency 3. Negative offset frequency (1) 4. Positive offset frequency (1) . . . 11. Negative offset frequency (5) 12. Positive offset frequency (5)

Code Domain Measurement

This measures the power levels of the spread channels in RF channel(s). You must be in the cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use these commands. Use INSTrument:SELect to set the mode.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:CDPower commands for more measurement related commands.

:CONFigure:CDPower

:FETCh:CDPower[n]?

:READ:CDPower[n]?

:MEASure:CDPower[n]?

Front Panel Access: **Measure, Code Domain**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

n	Results Returned
not specified or n=1 W-CDMA (3GPP) mode	Returns the following 31 comma-separated scalar results: 1. **RMS symbol EVM** is a floating point number (in percent) of the EVM over the entire measurement area. 2. **Peak symbol EVM** is a floating point number (in percent) of the peak EVM in the measurement area. 3. **Symbol magnitude error** is a floating point number (in percent) of the average magnitude error over the entire measurement area. 4. **Symbol phase error** is a floating point number (in degrees) of the average phase error over the entire measurement area. 5. **Total power** is a floating point number (in dBm) of the total RF power over the measurement interval. 6. **Average power** is a floating point number (in dBm) of the power in the entire slot, for the selected code, averaged over the measurement interval. 7. **tDPCH** is a floating point number (in 256 chips) of DPCH delay time from the reference. 8. **Total power over a slot** is a floating point number (in dBm) of total RF power over the measurement interval. 9. **Total active power** is a floating point number (in dB or dBm depending on the measurement type) of sum of the active power. 10. **Pilot power** is a floating point number (in dB or dBm depending on the measurement type) of the average power of the CPICH code relative to the total slot power. In the MS mode, the value returned is –999. (SCH is excluded.) 11. **Maximum active traffic power** is a floating point number (in dB or dBm depending on the measurement type) of the maximum average power of the active traffic channels. If no active code is detected the value returned is –999. In the MS mode, the value returned is –999. (SCH is excluded.) 12. **Average active traffic power** is a floating point number (in dB or dBm depending on the measurement type) of the average power of all the active traffic channels. If no active code is detected the value returned is –999. In the MS mode, the value returned is –999. (SCH is excluded.) 13. **Maximum inactive traffic power** is a floating point number (in dB or dBm depending on the measurement type) of the maximum average power of the inactive traffic channels. The slot timing is determined by Perch. In the MS mode, the value returned is –999. (SCH is excluded.) 14. **Average inactive traffic power** is a floating point number (in dB or dBm depending on the measurement type) of the average power of the inactive traffic channels. In the MS mode, the value returned is –999.(SCH is excluded.) 15. **Number of active channel** In the MS mode, the value returned is –999.

n	Results Returned
not specified or n=1 W-CDMA (3GPP) mode (continued)	16. **P-SCH** is a floating point number (in dBm) of the primary search code power. In the MS mode, the value returned is –999. 17. **S-SCH** is a floating point number (in dBm) of the secondary search code power. In the MS mode, the value returned is –999. 18. **DPCCH Power** is a floating point number (in dB or dBm depending on the measurement type) of the average power of DPCCH. In the BS mode, the value returned is –999. 19. **DPCCH Beta Nominal** is a floating point number of the nominal beta value of DPCCH Beta factor. In the BS mode, the value returned is –999. 20. **DPCCH Beta Measured** is a floating point number of the measured value of the DPCCH Beta factor. In the BS mode, the value returned is –999. 21. **DPDCH Beta Nominal** is a floating point number of the nominal beta value of the DPDCH Beta factor. In the BS mode, the value returned is –999. 22. **DPDCH Beta 1 Measured** is a floating point number of the measured value of the DPDCH (C1) Beta factor. In the BS mode, the value returned is –999. 23. **DPDCH Beta 2 Measured** is a floating point number of the measured value of the DPDCH (C2) Beta factor. In the BS mode, the value returned is –999. 24. **DPDCH Beta 3 Measured** is a floating point number of the measured value of the DPDCH (C3) Beta factor. In the BS mode, the value returned is –999. 25. **DPDCH Beta 4 Measured** is a floating point number of the measured value of the DPDCH (C4) Beta factor. In the BS mode, the value returned is –999. 26. **DPDCH Beta 5 Measured** is a floating point number of the measured value of the DPDCH (C5) Beta factor. In the BS mode, the value returned is –999. 27. **DPDCH Beta 6 Measured** is a floating point number of the measured value of the DPDCH (C6) Beta factor. In the BS mode, the value returned is –999. 28. **I channel average active power** is a floating point number (in dB or dBm depending on the measurement type) of the average power of the active I channels. In the BS mode, the value returned is –999. 29. **I channel maximum inactive power** is a floating point number (in dB or dBm depending on the measurement type) of the maximum average power of the inactive I channels. In the BS mode, the value returned is –999.

n	Results Returned
not specified or n=1 W-CDMA (3GPP) mode (continued)	30. **Q channel average active power** is a floating point number (in dB or dBm depending on the measurement type) of the average power of the active Q channels. In the BS mode, the value returned is –999. 31. **Q channel maximum inactive power** is a floating point number (in dB or dBm depending on the measurement type) of the maximum average power of the inactive Q channels. In the BS mode, the value returned is –999.
2 W-CDMA (3GPP) mode	Returns a series of floating point numbers (in dB or dBm depending on the measurement type) that represents all the code domain powers. With a device of BTS, there are 512 numbers. If the active channel occupies more than the max spreading factor (7.5 ksps) the power is duplicated (active symbol rate/7.5 ksps) times. 1st number = 1st code power over the slot 2nd number = 2nd code power over the slot . . . Nth number = Nth code power over the slot With a device of MS, there are 256 I/Q pairs. If the active channel occupies more than the max spreading factor (15 ksps) the power is duplicated (active symbol rate / 15 ksps) times. 1st number = 1st in-phase code power over the slot 2nd number = 1st quad-phase code power over the slot . . . (2×N-1)th number = Nth in-phase code power over the slot (2×N)th number = Nth quad-phase code power over a slot N = the number of codes detected. The total number of codes varies because of the different symbol rates of each code.

n	Results Returned
3 W-CDMA (3GPP) mode	Returns a series of floating point numbers (in symbol rate) that represent all code domain symbol rates. With a device of BTS, there are 512 numbers. If the active channel occupies more than the max spreading factor (7.5 ksps) the power is duplicated (active symbol rate/7.5 ksps) times. 1st number = 1st code symbol rate over the slot 2nd number = 2nd code symbol rate over the slot . . . Nth number = Nth code symbol rate over the slot With a device of MS, there are 256 I/Q pairs. If the active channel occupies more than the max spreading factor (15 ksps) the power is duplicated (active symbol rate/15 ksps) times. 1st number = 1st in-phase code symbol rate over the slot 2nd number = 1st quad-phase code symbol rate over the slot . . . (2×N-1)th number = Nth in-phase code symbol rate over the slot (2×N)th number = Nth quad-phase code symbol rate over the slot N = the number of codes detected. The total number of codes varies because of the different symbol rates of each code.
4 cdma2000, or W-CDMA (3GPP) mode	Returns a series of floating point numbers that show either active or inactive status for each of the code powers returned in n=2. (See above.) If a code is inactive, the value returned is 0.0, otherwise a value >0.0 is returned. 1st number = active or inactive flag of the 1st code . . . Nth number = active or inactive flag of the Nth code (where N= the number of codes identified)
5 cdma2000, or W-CDMA (3GPP) mode	Returns a series of floating point numbers (in percent) that represent each sample in the *EVM* trace. The first number is the symbol 0 decision point and there are X points per symbol. Therefore, the decision points are at 0, 1×X, 2×X, 3×X. . . (where X = the number of points per chip)
6 cdma2000, or W-CDMA (3GPP) mode	Returns a series of floating point numbers (in percent) that represent each sample in the *magnitude error* trace. The first number is the symbol 0 decision point and there are X points per symbol. Therefore, the decision points are at 0, 1×X, 2×X, 3×X. . . (where X = the number of points per chip)
7 cdma2000, or W-CDMA (3GPP) mode	Returns a series of floating point numbers (in degrees) that represent each sample in the *phase error* trace. The first number is the symbol 0 decision point and there are X points per symbol. Therefore, the decision points are at 0, 1×X, 2×X, 3×X. . . (where X = the number of points per chip)

n	Results Returned
8 cdma2000, or W-CDMA (3GPP) mode	Returns series of floating point numbers that alternately represent I and Q pairs of the *corrected measured* trace. The magnitude of each I and Q pair is normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. As in the EVM, there are X points per symbol, so that: 1st number is I of the symbol 0 decision point 2nd number is Q of the symbol 0 decision point . . . (2×X)+1 number is I of the symbol 1 decision point (2×X)+2 number is Q of the symbol 1 decision point . . . (2×X)×N+1th number is I of the symbol N decision point (2×X)×N+2th number is Q of the symbol N decision point where X = the number of points per symbol, and N = the number of symbols
9 cdma2000, or W-CDMA (3GPP) mode	Returns series of floating point numbers (in dBm) that represent the trace data of the symbol power vs. time.
10 cdma2000, or W-CDMA (3GPP) mode	Returns series of floating point numbers (in dBm) that represent the trace data of the chip power vs. time.
11 cdma2000, or W-CDMA (3GPP) mode	Returns series of floating point numbers (0.0 or 1.0) of symbol values for the selected code with the entire capture length.

Channel Power Measurement

This measures the total rms power in a specified integration bandwidth. You must be in the Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use these commands. Use INSTrument:SELect to set the mode.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:CHPower commands for more measurement related commands.

:CONFigure:CHPower

:FETCh:CHPower[n]?

:READ:CHPower[n]?

:MEASure:CHPower[n]?

History: Added to Basic mode, version A.03.00 or later

Front Panel Access: **Measure, Channel Power**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
not specified or n=1	Returns 2 comma-separated scalar results: 1. **Channel Power** is a floating point number representing the total channel power in the specified integration bandwidth. 2. **PSD** (**Power Spectral Density**) is the power (in dBm/Hz) in the specified integration bandwidth.
2	Returns comma-separated floating point numbers that are the captured trace data of the power (in dBm/resolution BW) of the signal. The frequency span of the captured trace data is specified by the **Span** key.

QPSK Error Vector Magnitude Measurement

This measures the QPSK error vector magnitude of each symbol. You must be in the cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use these commands. Use INSTrument:SELect to set the mode.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:EVMQpsk commands for more measurement related commands.

:CONFigure:EVMQpsk

:FETCh:EVMQpsk[n]?

:READ:EVMQpsk[n]?

:MEASure:EVMQpsk[n]?

History: Version A.03.00 or later

Front Panel Access: **Measure, QPSK EVM**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

n	Results Returned
0	Returns unprocessed I/Q trace data, as a data array of comma-separated trace points, in volts.

n	Results Returned
1 (default) cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Returns 11 comma-separated scalar results, in the following order. 1. **RMS EVM** is a floating point number (in percent) of EVM over the entire measurement area 2. **RMS EVM maximum** is the maximum RMS EVM over the averaged counts 3. **Peak EVM error** is a floating point number (in percent) of peak EVM in the measurement area 4. **Peak EVM maximum** is the maximum peak EVM over the averaged counts 5. **Magnitude error** is a floating point number (in percent) of average magnitude error over the entire measurement area 6. **Magnitude error maximum** is the maximum magnitude error over the averaged counts 7. **Phase error** is a floating point number (in degree) of average phase error over the entire measurement area 8. **Phase error maximum** is the maximum phase error over the averaged counts 9. **Frequency error** is a floating point number (in Hz) of the frequency error in the measured signal 10. **Frequency error maximum** is the maximum frequency error over the averaged counts 11. **I/Q origin offset** is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin
2 cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	EVM trace – returns series of floating point numbers (in percent) that represent each sample in the EVM trace. The first number is the symbol 0 decision point. There are X points per symbol (X = points/chip). Therefore, the decision points are at 0, $1 \times X$, $2 \times X$, $3 \times X$ . . .
3 cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Magnitude error trace – returns series of floating point numbers (in percent) that represent each sample in the magnitude error trace. The first number is the symbol 0 decision point. There are X points per symbol (X = points/chip). Therefore, the decision points are at 0, $1 \times X$, $2 \times X$, $3 \times X$ . . .
4 cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Phase error trace – returns series of floating point numbers (in degree) that represent each sample in the phase error trace. There are X points per symbol (X = points/ chip). Therefore, the decision points are at 0, $1 \times X$, $2 \times X$, $3 \times X$ . . .

n	Results Returned
5 cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Corrected measured trace – returns series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. There are *X* points per symbol (*X* = points/chip), so the series of numbers is: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point . . . $(2 \times X) + 1$, number = I of the symbol 1 decision point $(2 \times X) + 2$, number = Q of the symbol 1 decision point . . . $(2 \times X) \times$ Nth + 1 number = I of the symbol N decision point $(2 \times X) \times$ Nth + 2 number = Q of the symbol N decision point

Intermodulation Measurement

This measures the third order and fifth order intermodulation products caused by the wanted signal and the interfering signal. You must be in cdma2000 or W-CDMA (3GPP) mode to use these commands. Use INSTrument:SELect to set the mode.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:IM commands for more measurement related commands.

:CONFigure:IM

:FETCh:IM[n]?

:READ:IM[n]?

:MEASure:IM[n]?

Front Panel
Access: **Measure, Intermod**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

n	Results Returned
0	Returns unprocessed I/Q trace data that acquired in the last acquisition when multiple acquisition is performed, as a data array of comma-separated trace points, in volts.

n	Results Returned
1 (default)	Returns 23 comma-separated scalar results, in the following order. 1. Absolute power of the reference (dBm) 2. Base lower frequency (Hz) 3. Base lower absolute power (dBm) 4. Base lower relative power to the reference (dBc) 5. Base upper frequency (Hz) 6. Base upper absolute power (dBm) 7. Base upper relative power to the reference (dBc) 8. Third order lower frequency (Hz) 9. Third order lower absolute power (dBm) 10. Third order lower relative power to the reference power (dBc) 11. Third order lower power spectrum density (dBm/Hz) 12. Third order upper frequency (Hz) 13. Third order upper absolute power (dBm) 14. Third order upper relative power to the reference power (dBc) 15. Third order upper power spectrum density (dBm/Hz) 16. Fifth order lower frequency (Hz) 17. Fifth order lower absolute power (dBm) 18. Fifth order lower relative power to the reference power (dBc) 19. Fifth order lower power spectrum density (dBm/Hz) 20. Fifth order upper frequency (Hz) 21. Fifth order upper absolute power (dBm) 22. Fifth order upper relative power to the reference power (dBc) 23. Fifth order upper power spectrum density (dBm/Hz) If the results are not available, –999.0 is returned for the power results and 0.0 for the frequency results.
2 W-CDMA (3GPP) mode	Returns a series of floating point numbers that represent the frequency-domain spectrum trace for the entire frequency range being measured. In the default settings (SENSe:IM:FREQuency:SPAN 50 MHz; SENSe:IM:BANDwidth | BWIDth[:RESolution] 140 kHz), there are 872 numbers.

n	Results Returned
3	Returns 2 comma-separated scalar values of the measured mode determined by the Auto algorithm. 1. Measurement Mode: 1: Two-tone 2: Transmit IM 3: Auto (Two-tone) 4: Auto (Transmit IM) 5: Unknown 2. Reference: 1: Lower 2: Upper 3: Average 4: Auto (Lower) 5: Auto (Upper)

Multi Carrier Power Measurement

This measures the power levels of two input carriers, out-of-channels from them, and the channels between them. You must be in W-CDMA (3GPP) mode to use these commands. Use INSTrument:SELect to set the mode.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:MCPower commands for more measurement related commands.

:CONFigure:MCPower

:FETCh:MCPower[n]?

:READ:MCPower[n]?

:MEASure:MCPower[n]?

Front Panel
Access: **Measure, Multi Carrier Power**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

n	Results Returned
0	Returns unprocessed I/Q trace data, as a data array of comma-separated trace points, in volts.

n	Results Returned
1 (default)	Returns 25 comma-separated scalar results, in the following order. 1. Reference – absolute power (dBm) 2. Center frequency – relative power (dBc) 3. Center frequency – absolute power (dBm) 4. Second carrier frequency – relative power (dBc) 5. Second carrier frequency – absolute power (dBm) 6. –5 MHz offset frequency adjacent to the center frequency – relative power (dBc) 7. –5 MHz offset frequency adjacent to the center frequency – absolute power (dBc) 8. –5 MHz offset frequency adjacent to the second carrier frequency – relative power (dBc) 9. –5 MHz offset frequency adjacent to the second carrier frequency – absolute power (dBc) 10. Reserved for the future use, returns –999.0. 11. Reserved for the future use, returns –999.0. 12. Reserved for the future use, returns –999.0. 13. Reserved for the future use, returns –999.0. 14. Negative offset frequency (1) – relative power (dBc) 15. Negative offset frequency (1) – absolute power (dBm) 16. Positive offset frequency (1) – relative power (dBc) 17. Positive offset frequency (1) – absolute power (dBm) 18. Negative offset frequency (2) – relative power (dBc) 19. Negative offset frequency (2) – absolute power (dBm) 20. Positive offset frequency (2) – relative power (dBc) 21. Positive offset frequency (2) – absolute power (dBm) 22. Negative offset frequency (3) – relative power (dBc) 23. Negative offset frequency (3) – absolute power (dBm) 24. Positive offset frequency (3) – relative power (dBc) 25. Positive offset frequency (3) – absolute power (dBm) If the results are not available, –999.0 is returned for the power results and 0.0 for the frequency results.
2	Returns 10 comma-separated scalar values of the pass/fail (0 for pass, and 1 for fail) results determined by testing the power based on the limit setting. 1. –5 MHz offset frequency adjacent to the center frequency 2. –5 MHz offset frequency adjacent to the second carrier frequency 3. Reserved for the future use, returns 0.0. 4. Reserved for the future use, returns 0.0. 5. Negative offset frequency (1) 6. Positive offset frequency (1) 7. Negative offset frequency (2) 8. Positive offset frequency (2) 9. Negative offset frequency (3) 10. Positive offset frequency (3) If the results are not available, 0.0 is returned.

Occupied Bandwidth Measurement

This measures the bandwidth of the carrier signal in the occupied part of the channel. You must be in the PDC, iDEN, cdma2000, or W-CDMA (3GPP) mode to use these commands. Use INSTrument:SELect to set the mode.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:OBW commands for more measurement related commands.

:CONFigure:OBW

:FETCh:OBW[n]?

:READ:OBW[n]?

:MEASure:OBW[n]?

History: Version A.02.00 or later

Front Panel Access: **Measure, Occupied BW**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement results available

n	Results Returned
0	Returns unprocessed I/Q trace data, as a data array of comma-separated trace points, in volts.
1 (default) PDC, cdma2000, or W-CDMA (3GPP) mode	Returns 2 comma-separated scalar results, in the following order: 1. Occupied bandwidth - Hz 2. Absolute Carrier Power - dBm
2 PDC, cdma2000, W-CDMA (3GPP) mode	Returns the frequency-domain spectrum trace (data array) for the entire frequency range being measured

Power Statistics CCDF Measurement

This is a statistical power measurement of the complimentary cumulative distribution function (CCDF). You must be in the Basic, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use these commands. Use INSTrument:SELect to set the mode.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:PSTat commands for more measurement related commands.

:CONFigure:PSTatistic

:FETCh:PSTatistic[n]?

:READ:PSTatastic[n]?

:MEASure:PSTatastic[n]?

History: Version A.03.00 or later, added in Basic A.04.00

Front Panel Access: **Measure, Power Stat CCDF**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

n	
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values,
not specified or n=1	Returns 10 comma-separated scalar results: 1. Average input power (in dBm) 2. Probability at the average input power level (in %) 3. Power level that has 10% of the power 4. Power level that has 1% of the power 5. Power level that has 0.1% of the power 6. Power level that has 0.01% of the power 7. Power level that has 0.001% of the power 8. Power level that has 0.0001% of the power 9. Peak power (in dB) 10. Count

n	
2	Returns a series of 5001 floating point numbers (in percent) that represent the current measured power stat trace. This is the probability at particular power levels (average power), in the following order: 1. Probability at 0 dB power 2. Probability at 0.1 dB power 3. Probability at 0.2 dB power . . . 5000.Probability at 49.9 dB power 5001.Probability at 50.0 dB power
3	Returns a series of 5001 floating point numbers (in percent) that represent the Gaussian trace. This is the probability at particular power levels (average power), in the following order: 1. Probability at 0 dB power 2. Probability at 0.1 dB power 3. Probability at 0.2 dB power . . . 5000.Probability at 49.9 dB power 5001.Probability at 50.0 dB power
4	Returns a series of 5001 floating point numbers (in percent) that represent the user-definable reference trace. This is the probability at particular power levels (average power), in the following order: 1. Probability at 0 dB power 2. Probability at 0.1 dB power 3. Probability at 0.2 dB power . . . 5000.Probability at 49.9 dB power 5001.Probability at 50.0 dB power

Modulation Accuracy (Rho) Measurement

This measures the modulation accuracy of the transmitter by checking the magnitude and phase error and the EVM (error vector magnitude). You must be in the cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use these commands. Use INSTrument:SELect to set the mode.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:RHO commands for more measurement related commands.

:CONFigure:RHO

:FETCh:RHO[n]?

:READ:RHO[n]?

:MEASure:RHO[n]?

Front Panel
Access: **Measure, Mod Accuracy (Rho)**

Measure, Mod Accuracy (Composite Rho) for cdma2000 or W-CDMA (3GPP)

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

n	Results Returned
0 cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Returns unprocessed I/Q trace data, as a series of comma-separated trace points. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

n	Results Returned
not specified or n=1 W-CDMA (3GPP) measurement	Returns 10 comma-separated scalar results, in the following order. 1. **RMS EVM** is a floating point number (in percent) of EVM over the entire measurement area 2. **Peak EVM error** is a floating point number (in percent) of peak EVM in the measurement area 3. **Magnitude error** is a floating point number (in percent) of average magnitude error over the entire measurement area 4. **Phase error** is a floating point number (in degree) of average phase error over the entire measurement area 5. **I/Q origin offset** is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin 6. **Frequency error** is a floating point number (in Hz) of the frequency error in the measured signal 7. **Rho** is a floating point number of Rho 8. **Peak Code Domain Error** is a floating point number (in dB) of the Peak Code Domain Error relative to the mean power 9. **Peak Code Domain Error Channel Number** is the channel number in which the peak code domain error is detected at the max spreading factor. 10. **Number of active channels**.
2 cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	EVM trace – returns series of floating point numbers (in percent) that represent each sample in the EVM trace. The first number is the symbol 0 decision point. There are X points per symbol (X = points/chip). Therefore, the decision points are at 0, $1 \times X$, $2 \times X$, $3 \times X$ . . .
3 cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Magnitude error trace – returns series of floating point numbers (in percent) that represent each sample in the magnitude error trace. The first number is the symbol 0 decision point. There are X points per symbol (X = points/chip). Therefore, the decision points are at 0, $1 \times X$, $2 \times X$, $3 \times X$ . . .
4 cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Phase error trace – returns series of floating point numbers (in degree) that represent each sample in the phase error trace. There are X points per symbol (X = points/ chip). Therefore, the decision points are at 0, $1 \times X$, $2 \times X$, $3 \times X$ . . .

n	Results Returned
5 cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode	Corrected measured trace – returns series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. There are *X* points per symbol (*X* = points/chip), so the series of numbers is: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point . . . $(2 \times X) + 1$, number = I of the symbol 1 decision point $(2 \times X) + 2$, number = Q of the symbol 1 decision point . . . $(2 \times X) \times$ Nth + 1 number = I of the symbol N decision point $(2 \times X) \times$ Nth + 2 number = Q of the symbol N decision point
6 cdma2000 or W-CDMA (3GPP) measurement	Returns 4 comma-separated scalar values of the pass/fail (0=passed, or 1=failed) results determined by testing the EVM and Peak EVM. 1. Test result of EVM 2. Test result of Peak EVM 3. Test result of Rho 4. Test result of Peak Code Domain Error

Spectrum Emission Mask Measurement

This measures spurious levels up to five pairs of offset/region frequencies and relates them to the carrier power. You must be in the cdma2000 or W-CDMA (3GPP) mode to use these commands. Use INSTrument:SELect to set the mode.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:SEMask commands for more measurement related commands.

:CONFigure:SEMask

:FETCh:SEMask[n]?

:READ:SEMask[n]?

:MEASure:SEMask[n]?

Front Panel Access: **Measure, Spectrum Emission Mask**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

Measurement Type	n	Results Returned
	0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts.

Measurement Type	n	Results Returned
Total power reference	not specified or n=1	Returns 60 comma-separated scalar results, in the following order: 1. Reserved for the future use, returns –999.0 2. Absolute power at the center frequency (reference) area (dBm) 3. Reserved for the future use, returns –999.0 4. Reserved for the future use, returns –999.0 5. Peak frequency in the center frequency (reference) area (Hz) 6. Reserved for the future use, returns –999.0 7. Reserved for the future use, returns –999.0 8. Reserved for the future use, returns –999.0 9. Reserved for the future use, returns –999.0 10. Reserved for the future use, returns –999.0 11. Relative power on the negative offset A (dBc) 12. Absolute power on the negative offset A (dBm) 13. Relative peak power on the negative offset A (dBc) 14. Absolute peak power on the negative offset A (dBm) 15. Peak frequency in the negative offset A (Hz) 16. Relative power on the positive offset A (dBc) 17. Absolute power on the positive offset A (dBm) 18. Relative peak power on the positive offset A (dBc) 19. Absolute peak power on the positive offset A (dBm) 20. Peak frequency in the positive offset A (Hz) 21. Relative power on the negative offset B (dBc) . . . 59. Absolute peak power on the positive offset E (dBm) 60. Peak frequency in the positive offset E (Hz) When [:SENSe]:SEMask:SEGMent is set to REGion, the positive offsets are not available and return –999.0.

<table>
<tr><th>Measurement Type</th><th>n</th><th>Results Returned</th></tr>
<tr><td>Power spectral density reference</td><td>not specified or n=1</td><td>Returns 60 comma-separated scalar results, in the following order:
1. Reserved for the future use, returns –999.0
2. Absolute power at the center frequency (reference) area (dBm)
3. Reserved for the future use, returns –999.0
4. Reserved for the future use, returns –999.0
5. Peak frequency in the center frequency (reference) area (Hz)
6. Reserved for the future use, returns –999.0
7. Reserved for the future use, returns –999.0
8. Reserved for the future use, returns –999.0
9. Reserved for the future use, returns –999.0
10. Reserved for the future use, returns –999.0
11. Relative power on the negative offset A (dB)
12. Absolute power on the negative offset A (dBm/Hz)
13. Relative peak power on the negative offset A (dB)
14. Absolute peak power on the negative offset A (dBm/Hz)
15. Peak frequency in the negative offset A (Hz)
16. Relative power on the positive offset A (dB)
17. Absolute power on the positive offset A (dBm/Hz)
18. Relative peak power on the positive offset A (dB)
19. Absolute peak power on the positive offset A (dBm/Hz)
20. Peak frequency in the positive offset A (Hz)
21. Relative power on the negative offset B (dB)
. . .
59. Absolute peak power on the positive offset E (dBm/Hz)
60. Peak frequency in the positive offset E (Hz)
When [:SENSe]:SEMask:SEGMent is set to REGion, the positive offsets are not available and return –999.0.</td></tr>
<tr><td></td><td>2</td><td>Returns the displayed frequency domain spectrum trace data separated by comma. The number of data is 2001 when DISPlay:SEMask:VIEW is set to ALL.</td></tr>
<tr><td></td><td>3</td><td>Returns the displayed frequency domain absolute limit trace data separated by comma. The number of data is 2001 when DISPlay:SEMask:VIEW is set to ALL.</td></tr>
<tr><td></td><td>4</td><td>Returns the displayed frequency domain relative limit trace data separated by comma. The number of data is 2001 when DISPlay:SEMask:VIEW is set to ALL.</td></tr>
</table>

Measurement Type	n	Results Returned
Total power reference	5	Returns 12 comma-separated scalar values (in dBm) of the absolute power of the segment frequencies: 1. Total power reference (dBm) 2. Reserved for the future use, returns –999.0 3. Negative offset frequency (A) or region (A) 4. Positive offset frequency (A) . . . 11. Negative offset frequency (E) or region (E) 12. Positive offset frequency (E) When [:SENSe]:SEMask:SEGMent is set to REGion, the positive offsets are not available and return –999.0.
Power spectral density reference	5	Returns 12 comma-separated scalar values (in dBm/Hz) of the absolute power of the segment frequencies: 1. Power spectral density reference (dBm/Hz) 2. Reserved for the future use, returns –999.0 3. Negative offset frequency (A) or region (A) 4. Positive offset frequency (A) . . . 11. Negative offset frequency (E) or region (E) 12. Positive offset frequency (E) When [:SENSe]:SEMask:SEGMent is set to REGion, the positive offsets are not available and return –999.0.
Total power reference	6	Returns 12 comma-separated scalar values (in dBc) of the power relative to the carrier at the segment frequencies: 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. Negative offset frequency (A) or region (A) 4. Positive offset frequency (A) . . . 11. Negative offset frequency (E) or region (E) 12. Positive offset frequency (E) When [:SENSe]:SEMask:SEGMent is set to REGion, the positive offsets are not available and return –999.0.

Measurement Type	n	Results Returned
Power spectral density reference	6	Returns 12 comma-separated scalar values (in dBc) of the power relative to the carrier at the segment frequencies: 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. Negative offset frequency (A) or region (A) 4. Positive offset frequency (A) . . . 11. Negative offset frequency (E) or region (E) 12. Positive offset frequency (E) When [:SENSe]:SEMask:SEGMent is set to REGion, the positive offsets are not available and return –999.0.
	7	Returns 12 comma-separated pass/fail test results (0 = passed, or 1 = failed) determined by testing the absolute power of the of the segment frequencies: 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. Negative offset frequency (A) or region (A) 4. Positive offset frequency (A) . . . 11. Negative offset frequency (E) or region (E) 12. Positive offset frequency (E) When [:SENSe]:SEMask:SEGMent is set to REGion, the positive offsets are not available and return –999.0.
	8	Returns 12 comma-separated scalar values of the pass/fail (0=passed, or 1=failed) results determined by testing the power relative to the segment frequencies: 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. Negative offset frequency (A) or region (A) 4. Positive offset frequency (A) . . . 11. Negative offset frequency (E) or region (E) 12. Positive offset frequency (E) When [:SENSe]:SEMask:SEGMent is set to REGion, the positive offsets are not available and return –999.0.

Measurement Type	n	Results Returned
	9	Returns 12 comma-separated scalar values of frequency (in Hz) that have peak power in each offset/region: 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. Negative offset frequency (A) or region (A) 4. Positive offset frequency (A) . . . 11. Negative offset frequency (E) or region (E) 12. Positive offset frequency (E) When [:SENSe]:SEMask:SEGMent is set to REGion, the positive offsets are not available and return –999.0.
	10	Returns 12 comma-separated scalar values (in dBm) of the absolute peak power of the segment frequencies: 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. Negative offset frequency (A) or region (A) 4. Positive offset frequency (A) . . . 11. Negative offset frequency (E) or region (E) 12. Positive offset frequency (E) When [:SENSe]:SEMask:SEGMent is set to REGion, the positive offsets are not available and return –999.0.
	11	Returns 12 comma-separated scalar values (in dBc) of the peak power relative to the carrier at the segment frequencies: 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. Negative offset frequency (A) or region (A) 4. Positive offset frequency (A) . . . 11. Negative offset frequency (E) or region (E) 12. Positive offset frequency (E) When [:SENSe]:SEMask:SEGMent is set to REGion, the positive offsets are not available and return –999.0.

Spectrum (Frequency Domain) Measurement

This measures the amplitude of your input signal with respect to the frequency. It provides spectrum analysis capability using FFT (fast Fourier transform) measurement techniques. You must select the appropriate mode using INSTrument:SELect, to use these commands.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:SPECtrum commands for more measurement related commands.

:CONFigure:SPECtrum

:FETCh:SPECtrum[n]?

:READ:SPECtrum[n]?

:MEASure:SPECtrum[n]?

Front Panel Access: **Measure, Spectrum (Freq Domain)**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

n	Results Returned
not specified or n=1	Returns the following comma-separated scalar results: 1. **FFT peak** is the FFT peak amplitude. 2. **FFT frequency** is the FFT frequency of the peak amplitude. 3. **FFT points** is the Number of points in the FFT spectrum. 4. **First FFT frequency** is the frequency of the first FFT point of the spectrum. 5. **FFT spacing** is the frequency spacing between the FFT points of the spectrum. 6. **Time domain points** is the number of points in the time domain trace used for the FFT. The number of points doubles if the data is complex instead of real. See the time domain scaler description below. 7. **First time point** is the time of the first time domain point, where time zero is the trigger event. 8. **Time spacing** is the time spacing between the time domain points. The time spacing value doubles if the data is complex instead of real. See the time domain scaler description below. 9. **Time domain** returns a 1 if time domain is complex (I/Q) and complex data will be returned. It returns a 0 if the data is real. (raw ADC samples) When this value is 1 rather than 0 (complex vs. real data), the time domain points and the time spacing scalers both increase by a factor of two. 10. **Scan time** is the total scan time of the time domain trace used for the FFT. The total scan time = (time spacing) X (time domain points – 1) 11. **Current average count** is the current number of data measurements that have already been combined, in the averaging calculation.
3	Returns the I and Q trace data. It is represented by I and Q pairs (in volts) versus time.
4	Returns spectrum trace data. That is, the trace of log-magnitude versus frequency. (The trace is computed using a FFT.)
6	Not used.
7	Returns the averaged spectrum trace data. That is, the trace of the averaged log-magnitude versus frequency.
8	Not used.

Waveform (Time Domain) Measurement

This measures the power in your input signal with respect to time and is equivalent to zero-span operation in a traditional spectrum analyzer. You must select the appropriate mode using INSTrument:SELect, to use these commands.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:WAVeform commands for more measurement related commands.

:CONFigure:WAVeform

:FETCh:WAVeform[n]?

:READ:WAVeform[n]?

:MEASure:WAVeform[n]?

Front Panel Access: **Measure, Waveform (Time Domain)**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

n	Results Returned
not specified or n=1	Returns the following comma-separated scalar results: 1. **Sample time** is a floating point number representing the time between samples when using the trace queries (n=0,2,etc). 2. **Mean power** is the mean power (in dBm). This is either the power across the entire trace, or the power between markers if the markers are enabled. If averaging is on, the power is for the latest acquisition. 3. **Mean power averaged** is the power (in dBm) for N averages, if averaging is on. This is either the power across the entire trace, or the power between markers if the markers are enabled. If averaging is on, the power is for the latest acquisition. If averaging is off, the value of the mean power averaged is the same as the value of the mean power. 4. **Number of samples** is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0,2,etc.). 5. **Peak-to-mean ratio** has units of dB. This is the ratio of the maximum signal level to the mean power. Valid values are only obtained with averaging turned off. If averaging is on, the peak-to-mean ratio is calculated using the highest peak value, rather than the displayed average peak value. 6. **Maximum value** is the maximum of the most recently acquired data (in dBm). 7. **Minimum value** is the minimum of the most recently acquired data (in dBm).
2	Returns comma-separated trace points of the entire captured trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the **number of samples**. The period between the samples is defined by the **sample time**.

READ Subsystem

The READ? commands are used with several other commands and are documented in the section on the “MEASure Group of Commands” on page 66.

Initiate and Read Measurement Data

:READ:<measurement>[n]?

A READ? query must specify the desired measurement. It will cause a measurement to occur without changing any of the current settings and will return any valid results. The code number n selects the kind of results that will be returned. The available measurements and data results are described in the “MEASure Group of Commands” on page 66.

SENSe Subsystem

Sets the instrument state parameters so that you can measure the input signal.

Adjacent Channel Power Measurement

Commands for querying the adjacent channel power measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 66. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **ACP** or **ACPR** measurement has been selected from the **MEASURE** key menu.

Adjacent Channel Power—Average Count

[:SENSe]:ACP:AVERage:COUNt <integer>

[:SENSe]:ACP:AVERage:COUNt?

Set the number of data acquisitions that will be averaged. After the specified number of average counts, the average mode (termination control) setting determines the average action.

Factory Preset and *RST:	10 for cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib)
Range:	1 to 10,000
Remarks:	Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Averaging State

[:SENSe]:ACP:AVERage[:STATe] OFF|ON|0|1

[:SENSe]:ACP:AVERage[:STATe]?

Turn average on or off.

Factory Preset and *RST:	On
Remarks:	Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Averaging Termination Control

[:SENSe]:ACP:AVERage:TCONtrol EXPonential|REPeat

[:SENSe]:ACP:AVERage:TCONtrol?

Select the type of termination control used for averaging. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

Exponential – Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.

Repeat – After reaching the average count, the averaging is reset and a new average is started.

Factory Preset and *RST: Repeat for basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib)

Remarks: Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Carrier Channel BW

[:SENSe]:ACP:BANDwidth[n]|BWIDth[n]:INTegration <freq>

[:SENSe]:ACP:BANDwidth[n]|BWIDth[n]:INTegration?

Set the Integration bandwidth that will be used for the main (carrier) channel.

BANDwidth[n]|BWIDth[n]:

n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Format (Modulation Standard)		
W-CDMA (3GPP)	3.84 MHz		

Range: 300 Hz to 20 MHz for Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib) mode

Default Unit: Hz

Remarks: With measurement type set at (TPR) total power reference, 1.40 MHz is sometimes used. Using 1.23 MHz will give a power that is very nearly identical to the 1.40 MHz value, and using 1.23 MHz will also yield the correct power spectral density with measurement type set at (PSD) reference. However, a setting of 1.40 MHz will not give the correct results with measurement type set at PSD reference.

You must be in Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Root Raised Cosine Filter Alpha

[:SENSe]:ACP:FILTer[:RRC]:ALPHa <numeric>

[:SENSe]:ACP:FILTer[:RRC]:ALPHa?

Set the alpha value of the Root Raised Cosine (RRC) filter.

Factory Preset and *RST: 0.22

Range: 0.01 to 0.5

Remarks: You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Root Raised Cosine Filter Control

[:SENSe]:ACP:FILTer[:RRC][:STATe] OFF|ON|0|1

[:SENSe]:ACP:FILTer[:RRC][:STATe]?

Turn the Root Raised Cosine (RRC) filter on or off.

Factory Preset and *RST: On

Remarks: You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Absolute Amplitude Limits

[:SENSe]:ACP:OFFSet[n]:LIST:ABSolute <abs_power>,<abs_power>,<abs_power>,<abs_power>,<abs_power>

[:SENSe]:ACP:OFFSet[n]:LIST:ABSolute

Sets the absolute amplitude levels to test against for each of the custom offsets. The list must contain five (5) entries. If there is more than one offset, the offset closest to the carrier channel is the first one in the list. [:SENSe]:ACP:OFFSet[n]:LIST[n]:TEST selects the type of testing to be done at each offset.

You can turn off (not use) specific offsets with the [:SENSe]:ACP:OFFSet[n]:LIST:STATe command.

The query returns five (5) real numbers that are the current absolute amplitude test limits.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)		50 dBm	50 dBm	50 dBm	50 dBm	50 dBm

Range: –200.0 dBm to 50.0 dBm

Default Unit: dBm

Remarks: You must be in Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), or iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Define Resolution Bandwidth List

[:SENSe]:ACP:OFFSet[n]:LIST:BANDwidth|BWIDth <res_bw>,<res_bw>,<res_bw>,<res_bw>,<res_bw>

[:SENSe]:ACP:OFFSet[n]:LIST:BANDwidth|BWIDth?

Define the custom resolution bandwidth(s) for the adjacent channel power testing. If there is more than one bandwidth, the list must contain five (5) entries. Each resolution bandwidth in the list corresponds to an offset frequency in the list defined by [:SENSe]:ACP:OFFSet[n]:LIST[n][:FREQuency]. You can turn off (not use) specific offsets with the [:SENSe]:ACP:OFFSet[n]:LIST[n]:STATe command.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)		3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz

Range: 300 Hz to 20 MHz for cdmaOne, Basic, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode

Default Unit: Hz

Remarks: You must be in Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), or iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Define Offset Frequency List

[:SENSe]:ACP:OFFSet[n]:LIST[:FREQuency] <f_offset>,<f_offset>,<f_offset>,<f_offset>,<f_offset>

[:SENSe]:ACP:OFFSet[n]:LIST[:FREQuency]?

Define the custom set of offset frequencies at which the switching transient spectrum part of the ACP measurement will be made. The list contains five (5) entries for offset frequencies. Each offset frequency in the list corresponds to a resolution bandwidth in the bandwidth list.

An offset frequency of zero turns the display of the measurement for that offset off, but the measurement is still made and reported. You can turn off (not use) specific offsets with the [:SENSe]:ACP:OFFSet:LIST:STATe command.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)		5 MHz	10 MHz	15 MHz	20 MHz	25 MHz

Range: 0 Hz to 100 MHz for cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib)

Default Unit: Hz

Remarks: You must be in Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), or iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Amplitude Limits Relative to the Carrier

[:SENSe]:ACP:OFFSet[n]:LIST:RCARrier <rel_power>,<rel_power>,<rel_power>,<rel_power>,<rel_power>

[:SENSe]:ACP:OFFSet[n]:LIST:RCARrier?

Sets the amplitude levels to test against for any custom offsets. This amplitude level is relative to the carrier amplitude. If multiple offsets are available, the list contains five (5) entries. The offset closest to the carrier channel is the first one in the list. [:SENSe]:ACP:OFFSet[n]:LIST[n]:TEST selects the type of testing to be done at each offset.

You can turn off (not use) specific offsets with the [:SENSe]:ACP:OFFSet[n]:LIST[n]:STATe command.

The query returns five (5) real numbers that are the current amplitude test limits, relative to the carrier, for each offset.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)		0 dBc	0 dBc	0 dBc	0 dBc	0 dBc

Range: –150.0 dB to 50.0 dB for cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), Basic

Default Unit: dB

Remarks: You must be in Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), or iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Amplitude Limits Relative to the Power Spectral Density

[:SENSe]:ACP:OFFSet[n]:LIST:RPSDensity <rel_powr>,<rel_powr>,<rel_powr>,<rel_powr>,<rel_powr>

[:SENSe]:ACP:OFFSet[n]:LIST:RPSDensity?

Sets the amplitude levels to test against for any custom offsets. This amplitude level is relative to the power spectral density. If multiple offsets are available, the list contains five (5) entries. The offset closest to the carrier channel is the first one in the list. [:SENSe]:ACP:OFFSet[n]:LIST[n]:TEST selects the type of testing to be done at each offset.

You can turn off (not use) specific offsets with the [:SENSe]:ACP:OFFSet[n]:LIST:STATe command.

The query returns five (5) real numbers that are the current amplitude test limits, relative to the power spectral density, for each offset.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)		0 dB	0 dB	0 dB	0 dB	0 dB

Range: –150.0 dB to 50.0 dB for cdmaOne, Basic, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib)

Default Unit: dB

Remarks: You must be in Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), or iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Control Offset Frequency List

[:SENSe]:ACP:OFFSet[n]:LIST:STATe OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1

[:SENSe]:ACP:OFFSet[n]:LIST:STATe?

Selects whether testing is to be done at the custom offset frequencies. The measured powers are tested against the absolute values defined with [:SENSe]:ACP:OFFSet[n]:LIST[n]:ABSolute, or the relative values defined with [:SENSe]:ACP:OFFSet[n]:LIST[n]:RPSDensity and [:SENSe]:ACP:OFFSet[n]:LIST[n]:RCARier.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)		On	On	Off	Off	Off

Remarks: You must be in Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Define Type of Offset Frequency List

[:SENSe]:ACP:OFFSet[n]:LIST:TEST ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative

[:SENSe]:ACP:OFFSet[n]:LIST:TEST?

Defines the type of testing to be done at any custom offset frequencies. The measured powers are tested against the absolute values defined with [:SENSe]:ACP:OFFSet[n]:LIST[n]:ABSolute, or the relative values defined with [:SENSe]:ACP:OFFSet[n]:LIST[n]:RPSDensity and [:SENSe]:ACP:OFFSet[n]:LIST[n]:RCARrier.

You can turn off (not use) specific offsets with the [:SENS]:ACP:OFFSet[n]:LIST[n]:STATe command.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

The types of testing that can be done for each offset include:

- Absolute - Test the absolute power measurement. If it fails, then return a failure for the measurement at this offset.
- And - Test both the absolute power measurement and the power relative to the carrier. If they both fail, then return a failure for the measurement at this offset.
- Or - Test both the absolute power measurement and the power relative to the carrier. If either one fails, then return a failure for the measurement at this offset.
- Relative - Test the power relative to the carrier. If it fails, then return a failure for the measurement at this offset.

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)		REL	REL	REL	REL	REL

Remarks: You must be in Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), or iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Sweep Mode Resolution Bandwidth

[:SENSe]:ACP:SWEep:BANDwidth|BWIDth[:RESolution] <freq>

[:SENSe]:ACP:SWEep:BANDwidth|BWIDth[:RESolution]?

Sets the resolution bandwidth when using the spectrum analyzer type sweep mode. See **[:SENSe]:ACP:SWEep:TYPE**.

Factory Preset and *RST: Auto coupled.

Range: 1.0 kHz to 1.0 MHz

Default Unit: Hz

Remarks: You must be in the cdmaOne cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Sweep Mode Resolution BW Control

[:SENSe]:ACP:SWEep:BANDwidth|BWIDth[:RESolution]:AUTO OFF|ON|0|1

[:SENSe]:ACP:SWEep:BANDwidth|BWIDth[:RESolution]:AUTO?

Sets the resolution bandwidth to automatic, when using the spectrum analyzer type sweep mode. See **[:SENSe]:ACP:SWEep:TYPE**.

Factory Preset
and *RST: On

Remarks: You must be in the cdmaOne cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Sweep Mode Detection

[:SENSe]:ACP:SWEep:DETector[:FUNCtion] AAVerage|POSitive

[:SENSe]:ACP:SWEep:DETector[:FUNCtion]?

Selects the detector type when using the sweep mode. See **[:SENSe]:ACP:SWEep:TYPE**.

Absolute average (AAVerage) - the absolute average power in each frequency is measured across the spectrum

Positive - the positive peak power in each frequency is measured across the spectrum

Factory Preset
and *RST: Positive

Remarks: You must be in the cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Sweep Time

[:SENSe]:ACP:SWEep:TIME <seconds>

[:SENSe]:ACP:SWEep:TIME?

Selects a specific sweep time used to measure the reference (carrier) channel. If you increase the sweep time, you increase the length of the time data captured and the number of points measured. You might need to specify a specific sweep speed to accommodate a specific condition in your transmitter. For example, you may have a burst signal and need to measure an exact portion of the burst.

Selecting a specific sweep time may result in a long measurement time since the resulting number of data points my not be the optimum 2^n. Use **[:SENSe]:ACP:OFFSet:LIST:SWEep:TIME** to set the number of points used for measuring the offset channels for Basic and cdmaOne.

For cdma2000 and W-CDMA, this command sets the sweep time when using the sweep mode. See **[:SENSe]:ACP:SWEep:TYPE**.

Factory Preset and *RST:	625 µs (1 slot) for W-CDMA (3GPP), W-CDMA (Trial & Arib)
Range:	500 µs to 10 ms
Default Unit:	seconds
Remarks:	You must be in the Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Added to Basic revision A.03.00, to cdmaOne revision A.04.00

Adjacent Channel Power—Sweep Type

[:SENSe]:ACP:SWEep:TYPE FFT|SWEep

[:SENSe]:ACP:SWEep:TYPE?

Selects the type of sweeping. This can be either FFT or conventional spectrum analyzer sweeping.

FFT - makes fast ACP measurements

Sweep - is slower than FFT, but the results correlate with traditional spectrum analyzer measurements though the signals peak/average ratio is higher. See **[:SENSe]:ACP:SWEep:DETector[:FUNCtion]**.

Factory Preset and *RST: FFT

Remarks: You must be in the cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Power Reference

[:SENSe]:ACP:TYPE PSDRef|TPRef

[:SENSe]:ACP:TYPE?

Selects the measurement type. This allows you to make absolute and relative power measurements of either total power, or the power normalized to the measurement bandwidth.

Power Spectral Density Reference (PSDRef) - the power spectral density is used as the power reference

Total Power Reference (TPRef) - the total power is used as the power reference

Factory Preset and *RST: Total power reference (TPRef)

Remarks: You must be in the Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), NADC, or PDC mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain Measurement

Commands for querying the code domain power measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 66. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Code Domain** measurement has been selected from the **MEASURE** key menu.

Code Domain—Demod Alpha

[:SENSe]:CDPower:ALPHa <number>

[:SENSe]:CDPower:ALPHa?

Set alpha for the root nyquist filter.

Factory Preset and *RST:	0.22
Range:	0.01 to 0.5
Remarks:	You must be in the W-CDMA (3GPP) or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Data Capture Time

[:SENSe]:CDPower:CAPTure:TIME <integer>

[:SENSe]:CDPower:CAPTure:TIME?

Set the length of data capture in Power Control Groups (PGC; 1 PCG = 1.25 ms) for cdma2000 or frames (1 frame = 10 ms) for W-CDMA (3GPP) that will be used in the acquisition.

Factory Preset and *RST:	2 for W-CDMA (3GPP)
Range:	1 to 2 frames (10 to 20 ms) for W-CDMA (3GPP)
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Chip Rate

[:SENSe]:CDPower:CRATe <freq>

[:SENSe]:CDPower:CRATe?

Set chip rate.

Factory Preset and *RST:	3.84 MHz for W-CDMA (3GPP)
Range:	3.456 to 4.224 MHz for W-CDMA (3GPP)
Remarks:	You must be in the cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Spectrum Normal/Invert

[:SENSe]:CDPower:SPECtrum INVert|NORMal

[:SENSe]:CDPower:SPECtrum?

Select normal or inverted spectrum for demodulation.

Factory Preset and *RST:	Normal
Remarks	You must be in the cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Sync Type

[:SENSe]:CDPower:SYNC CPICh|SCH

[:SENSe]:CDPower:SYNC?

Set the synchronization type for BTS. (MS always locks DPCCH.)

CPICH - synchronize to common pilot channel.

SCH - synchronize to SCH.

Factory Preset and *RST:	CPICH
Remarks:	You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Scramble Code Down Link

[:SENSe]:CDPower:SYNC:SCRamble[:BTS] <integer>

[:SENSe]:CDPower:SYNC:SCRamble[:BTS]?

Set the BTS primary scramble code for synchronization.

Factory Preset and *RST:	0
Range:	0 to 511
Remarks:	You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Scramble Code Offset

[:SENSe]:CDPower:SYNC:SCRamble[:BTS]:OFFSet <integer>

[:SENSe]:CDPower:SYNC:SCRamble[:BTS]:OFFSet?

Set the BTS scramble code offset for synchronization.

Factory Preset and *RST:	0
Range:	0 to 15 (0 for the primary scramble code; 1 to 15 for the secondary scramble code)
Remarks:	You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Sync Scramble Code Type Down Link

[:SENSe]:CDPower:SYNC:SCRamble[:BTS]:TYPE LEFT|RIGHt|STANdard

[:SENSe]:CDPower:SYNC:SCRamble[:BTS]:TYPE?

Set the BTS primary scramble code type for synchronization.

Left – the left alternative scrambling code whose number is the primary scramble code number + 8192 is used.

Right – the right alternative scrambling code whose number is the primary scrambling code number + 16384 is used.

Standard – the standard scrambling code whose number is the primary scrambling code number is used.

Factory Preset and *RST: Standard

Remarks: You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Scramble Code Up Link

[:SENSe]:CDPower:SYNC:SCRamble:MS <integer>

[:SENSe]:CDPower:SYNC:SCRamble:MS?

Set the MS scramble code for synchronization.

Factory Preset and *RST: 0

Range: 0 to 16,777,215 (0h to FFF,FFFh)

Remarks: You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Trigger Source

[:SENSe]:CDPower:TRIGger:SOURce EXTernal[1]|External2|FRAMe|IF|IMMediate|RFBurst

[:SENSe]:CDPower:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

External 1 – front panel external trigger input

External 2 – rear panel external trigger input

Frame – internal frame trigger from front panel input

IF – internal IF envelope trigger

Immediate – the next data acquisition is immediately taken, capturing the signal asynchronously (also called free run).

RF Burst – internal wideband RF burst envelope trigger that has automatic level control for periodic burst signals.

Factory Preset and *RST:	Immediate
Remarks:	You must be in the cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.
Front Panel Access:	**Meas Setup**, **Trig Source**

Channel Power Measurement

Commands for querying the channel power measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 66. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Channel Power** measurement has been selected from the **MEASURE** key menu. CHPower used instead of the more std-compliant CPOWer, as that syntax was already used for Carrier Power measurement (but has since been renamed).

Channel Power—Average Count

[:SENSe]:CHPower:AVERage:COUNt <integer>

[:SENSe]:CHPower:AVERage:COUNt?

Set the number of data acquisitions that will be averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

Factory Preset and *RST:	20
Range:	1 to 10,000
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), or Basic mode to use this command. Use INSTrument:SELect to set the mode.

Channel Power—Averaging State

[:SENSe]:CHPower:AVERage[:STATe] OFF|ON|0|1

[:SENSe]:CHPower:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST:	On
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), or Basic mode to use this command. Use INSTrument:SELect to set the mode.

Channel Power—Averaging Termination Control

[:SENSe]:CHPower:AVERage:TCONtrol EXPonential|REPeat

[:SENSe]:CHPower:AVERage:TCONtrol?

Select the type of termination control used for the averaging function. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

Exponential - Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.

Repeat - After reaching the average count, the averaging is reset and a new average is started.

Factory Preset and *RST:	Repeat
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), or Basic mode to use this command. Use INSTrument:SELect to set the mode.

Channel Power—Integration BW

[:SENSe]:CHPower:BANDwidth|BWIDth:INTegration <freq>

[:SENSe]:CHPower:BANDwidth|BWIDth:INTegration?

Set the Integration BW (IBW) that will be used.

Factory Preset and *RST:	5.0 MHz for W-CDMA (3GPP), W-CDMA (Trial & Arib)
Range:	1 kHz to 10 MHz
Default Unit:	Hz
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), or Basic mode to use this command. Use INSTrument:SELect to set the mode.

Channel Power—Span

[:SENSe]:CHPower:FREQuency:SPAN <freq>

[:SENSe]:CHPower:FREQuency:SPAN?

Set the frequency span that will be used.

Factory Preset and *RST:	6.0 MHz for W-CDMA (3GPP), W-CDMA (Trial & Arib)
Range:	1.0 kHz to 10.0 MHz
Default Unit:	Hz
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), or Basic mode to use this command. Use INSTrument:SELect to set the mode.

Channel Power—Data Points

[:SENSe]:CHPower:POINts <integer>

[:SENSe]:CHPower:POINts?

Set the number of data points that will be used. Changing this will change the time record length and resolution BW that are used.

Factory Preset and *RST:	512
Range:	64 to 32768, in a 2^n sequence
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), or Basic mode to use this command. Use INSTrument:SELect to set the mode.

Channel Power—Data Points Auto

[:SENSe]:CHPower:POINts:AUTO OFF|ON|0|1

[:SENSe]:CHPower:POINts:AUTO?

Select auto or manual control of the data points. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default, may cause invalid measurement results.

Off - the Data Points is uncoupled from the Integration BW.

On - couples the Data Points to the Integration BW.

Factory Preset and *RST:	On
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), or Basic mode to use this command. Use INSTrument:SELect to set the mode.

Channel Power—Sweep Time

[:SENSe]:CHPower:SWEep:TIME <time>

[:SENSe]:CHPower:SWEep:TIME?

Sets the sweep time when using the sweep mode.

Factory Preset and *RST:	17.07 μs for W-CDMA (3GPP), W-CDMA (Trial & Arib)
Range:	1 μs to 50 ms
Default Unit:	seconds
Remarks:	You must be in Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 and later

Channel Power—Sweep Time

[:SENSe]:CHPower:SWEep:TIME:AUTO OFF|ON|0|1

[:SENSe]:CHPower:SWEep:TIME:AUTO?

Selects the automatic sweep time, optimizing the measurement.

Factory Preset and *RST:	On
Remarks:	You must be in Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 and later

Channel Power—Trigger Source

[:SENSe]:CHPower:TRIGger:SOURce EXTernal[1]|EXTernal2|IMMediate

[:SENSe]:CHPower:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions. This is an Advanced control that normally does not need to be changed.

External 1 - front panel external trigger input

External 2 - rear panel external trigger input

Immediate - the next data acquisition is immediately taken (also called Free Run).

Factory Preset and *RST:	Immediate (Free Run)
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), or Basic mode to use this command. Use INSTrument:SELect to set the mode.

Correction for BTS RF Port External Attenuation

[:SENSe]:CORRection:BTS[:RF]:LOSS <rel_power>

[:SENSe]:CORRection:BTS[:RF]:LOSS?

Set equal to the external attenuation used when measuring base transmit stations.

Factory Preset and *RST:	0.0 dB
Range:	–50.0 to 50.0 dB for cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib)
Default Unit:	dB
Remarks:	Global to the current mode. You must be in the EDGE, GSM, cdma2000,W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Correction for Mobile Station RF Port External Attenuation

[:SENSe]:CORRection:MS[:RF]:LOSS <rel_power>

[:SENSe]:CORRection:MS[:RF]:LOSS?

Set the correction equal to the external attenuation used when measuring mobile stations.

Factory Preset and *RST:	0.0 dB
Range:	–50.0 to 50.0 dB
Default Unit:	dB
Remarks:	You must be in the cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), iDEN, NADC or PDC mode to use this command. Use INSTrument:SELect to set the mode. Value is global to the current mode.

QPSK Error Vector Magnitude Measurement

Commands for querying the QPSK error vector magnitude measurement results and for setting to the default values are found in the “MEASure Group of Commands” on page 66. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **QPSK EVM** measurement has been selected from the **MEASURE** key menu.

QPSK Error Vector Magnitude—Demod Alpha

[:SENSe]:EVMQpsk:ALPHa <float>

[:SENSe]:EVMQpsk:ALPHa?

Set alpha for the root nyquist filter.

Factory Preset and *RST:	0.22
Range:	0.01 to 0.5
Remarks:	You must be in the W-CDMA (3GPP) or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

QPSK Error Vector Magnitude—Average Count

[:SENSe]:EVMQpsk:AVERage:COUNt <integer>

[:SENSe]:EVMQpsk:AVERage:COUNt?

Set the number of data acquisitions that will be averaged. After the specified number of average counts, the average mode (termination control) setting determines the average action.

Factory Preset and *RST:	10
Range:	1 to 10,000
Remarks:	You must be in the cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

QPSK Error Vector Magnitude—Averaging State

[:SENSe]:EVMQpsk:AVERage[:STATe] OFF|ON|0|1

[:SENSe]:EVMQpsk:AVERage[:STATe]?

Turn average on or off.

Factory Preset and *RST: On

Remarks: You must be in the cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

QPSK Error Vector Magnitude—Averaging Termination Control

[:SENSe]:EVMQpsk:AVERage:TCONtrol EXPonential|REPeat

[:SENSe]:EVMQpsk:AVERage:TCONtrol?

Select the type of termination control used to averaging. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

Exponential – Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.

Repeat – After reaching the average count, the averaging is reset and a new average is started.

Factory Preset and *RST: Repeat

Remarks: You must be in the cdam2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

QPSK Error Vector Magnitude—Chip Rate

[:SENSe]:EVMQpsk:CRATe <freq>

[:SENSe]:EVMQpsk:CRATe?

Set chip rate.

Factory Preset and *RST:	3.84 MHz for W-CDMA (3GPP) and 3GPP of W-CDMA (Trial & Arib)
Range:	3.456 to 4.224 MHz for W-CDMA (3GPP) and 3GPP of W-CDMA (Trial & Arib)
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA mode to use this command. Use INSTrument:SELect to set the mode.

QPSK Error Vector Magnitude—Length

[:SENSe]:EVMQpsk:SWEep:POINts <integer>

[:SENSe]:EVMQpsk:SWEep:POINts?

Set the number of data points that will be used.

Factory Preset and *RST:	256
Range:	128 to 512 for W-CDMA (3GPP) and W-CDMA (Trial & Arib)
Unit:	chips
Remarks:	You must be in the cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

QPSK Error Vector Magnitude—Trigger Source

[:SENSe]:EVMQpsk:TRIGger:SOURce EXTernal[1]|EXTernal2|FRAMe|IF|IMMediate|RFBurst

[:SENSe]:EVMQpsk:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

External 1 – front panel external trigger input

External 2 – rear panel external trigger input

Frame – internal frame trigger from front panel input

IF – internal IF envelope (video) trigger

Immediate – the next data acquisition is immediately taken, capturing the signal asynchronously (also called free run)

RF Burst – wideband RF burst envelope trigger that has automatic level control for periodic burst signals

Factory Preset and *RST:	Immediate
Remarks:	You must be in the cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Center Frequency

[:SENSe]:FREQuency:CENTer <freq>

[:SENSe]:FREQuency:CENTer?

Set the center frequency.

Factory Preset and *RST:	1.0 GHz
Range:	1.0 kHz to 4.321 GHz
Default Unit:	Hz
Front Panel Access:	**FREQUENCY/Channel, Center Freq**

Center Frequency Step Size

[:SENSe]:FREQuency:CENTer:STEP[:INCRement] <freq>

[:SENSe]:FREQuency:CENTer:STEP[:INCRement]?

Specifies the center frequency step size.

Factory Preset and *RST:	5.0 MHz
Range:	1.0 kHz to 1.0 GHz, in 10 kHz steps
Default Unit:	Hz
History:	Version A.03.00 or later
Front Panel Access:	**FREQUENCY/Channel, CF Stepl**

Intermodulation Measurement

Commands for querying the intermodulation measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 66. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Intermod** measurement has been selected from the **MEASURE** key menu.

History:	Added version A.04.00 and later

Intermodulation—Average Count

[:SENSe]:IM:AVERage:COUNt <number>

[:SENSe]:IM:AVERage:COUNt?

Set the number of data acquisitions that will be averaged. After the specified number of average counts, the average mode (termination control) setting determines the average action.

Factory Preset and *RST:	10
Range:	1 to 10,000
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Intermodulation—Averaging State

[:SENSe]:IM:AVERage[:STATe] OFF|ON|0|1

[:SENSe]:IM:AVERage[:STATe]?

Turn average on or off.

Factory Preset and *RST:	On
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Intermodulation—Averaging Termination Control

[:SENSe]:IM:AVERage:TCONtrol EXPonential|REPeat

[:SENSe]:IM:AVERage:TCONtrol?

Select the type of termination control used for averaging. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

Exponential – Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.

Repeat – After reaching the average count, the averaging is reset and a new average is started.

Factory Preset and *RST:	Repeat
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Intermodulation—Integration Bandwidth

[:SENSe]:IM:BANDwidth|BWIDth:INTegration <freq>

[:SENSe]:IM:BANDwidth|BWIDth:INTegration?

Set the Integration Bandwidth (IBW) that will be used.

Factory Preset and *RST:	3.84 MHz for W-CDMA (3GPP)
Range:	100.0 kHz to 5.0 MHz
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Intermodulation—Resolution Bandwidth

[:SENSe]:IM:BANDwidth|BWIDth[:RESolution] <freq>

[:SENSe]:IM:BANDwidth|BWIDth[:RESolution]?

Set the resolution bandwidth that will be used for the Transmitter IM measurement mode. If span is set to a value greater than 5 MHz, minimum resolution bandwidth is limited to 1 kHz.

Factory Preset and *RST:	Auto coupled.
Range:	100 Hz to 300.0 kHz
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Intermodulation—Resolution Bandwidth State

[:SENSe]:IM:BANDwidth|BWIDth[:RESolution]:AUTO OFF|ON|0|1

[:SENSe]:IM:BANDwidth|BWIDth[:RESolution]:AUTO?

Select auto (default value) or manual (user entered value) to set the resolution bandwidth.

Factory Preset and *RST:	On
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Intermodulation—Root Raised Cosine Filter Alpha

[:SENSe]:IM:FILTer[:RRC]:ALPHa <numeric>

[:SENSe]:IM:FILTer[:RRC]:ALPHa?

Set the alpha value of the Root Raised Cosine (RRC) filter.

Factory Preset and *RST:	0.22
Range:	0.01 to 0.5
Remarks:	You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Intermodulation—Root Raised Cosine Filter State

[:SENSe]:IM:FILTer[:RRC][:STATe] OFF|ON|0|1

[:SENSe]:IM:FILTer[:RRC][:STATe]?

Turn the Root Raised Cosine (RRC) filter on or off.

Factory Preset and *RST:	On
Remarks:	You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Intermodulation—Base Frequency Auto Search

[:SENSe]:IM:FREQuency:AUTO OFF|ON|0|1

[:SENSe]:IM:FREQuency:AUTO?

Turn the base frequency auto search function on or off.

Off – the frequencies set by the **[:SENSe]:IM:FREQuency** are used.

On – automatically determined by searching the entire span.

Factory Preset and *RST:	On
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Intermodulation—Base Frequencies Delta

[:SENSe]:IM:FREQuency[:BASE]:DELTa <freq>

[:SENSe]:IM:FREQuency[:BASE]:DELTa?

Set the delta frequency, the base upper frequency – the base lower frequency.

Factory Preset and *RST:	Auto coupled.
Range:	–4.3214 GHz to 4.3214 GHz
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Intermodulation—Base Lower Frequency

[:SENSe]:IM:FREQuency[:BASE]:LOWer <freq>

[:SENSe]:IM:FREQuency[:BASE]:LOWer?

Set the frequency value of the base lower frequency.

Factory Preset and *RST:	Auto coupled.
Range:	1.0 kHz to 4.3214 GHz
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Intermodulation—Base Upper Frequency

[:SENSe]:IM:FREQuency[:BASE]:UPPer <freq>

[:SENSe]:IM:FREQuency[:BASE]:UPPer?

Set the frequency value of the base upper frequency.

Factory Preset and *RST:	Auto coupled.
Range:	1.0 kHz to 4.3214 GHz
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Intermodulation—Span

[:SENSe]:IM:FREQuency:SPAN <freq>

[:SENSe]:IM:FREQuency:SPAN?

Set the span.

Factory Preset and *RST:	50.0 MHz for W-CDMA (3GPP)
Range:	100.0 kHz to 100.0 MHz
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Intermodulation—Measurement Mode

[:SENSe]:IM:MODE AUTO|TWOTone|TXIM

[:SENSe]:IM:MODE?

Select the measurement mode of the intermodulation measurement.

Auto – Automatically identifies the intermodulation caused by the two-tone or transmit intermodulation signals.

Two-tone – Measures the two-tone intermodulation products.

Transmit (TX) IM – Measures the transmit intermodulation products.

Factory Preset and *RST:	Auto
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Intermodulation—Measurement Reference

[:SENSe]:IM:REFerence AUTO|AVERage|LOWer|UPPer

[:SENSe]:IM:REFerence?

Select the measurement reference of the intermodulation measurement.

Auto – Automatically sets the highest level signal in two base signals as measurement reference.

Average – Sets the average level of the base lower carrier and upper carrier frequency as measurement reference.

Lower – Sets the base lower carrier as measurement reference.

Upper – Sets the base upper carrier as measurement reference.

Factory Preset and *RST:	Auto
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Multi Carrier Power Measurement

Commands for querying the multi carrier power measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 66. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Multi Carrier Power** measurement has been selected from the **MEASURE** key menu.

History: Added version A.04.00 and later

Multi Carrier Power—Average Count

[:SENSe]:MCPower:AVERage:COUNt <integer>

[:SENSe]:MCPower:AVERage:COUNt?

Set the number of data acquisitions that will be averaged. After the specified number of average counts, the average mode (termination control) setting determines the average action.

Factory Preset and *RST: 10

Range: 1 to 10,000

Remarks: You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Multi Carrier Power—Averaging State

[:SENSe]:MCPower:AVERage[:STATe] OFF|ON|0|1

[:SENSe]:MCPower:AVERage[:STATe]?

Turn average on or off.

Factory Preset and *RST: On

Remarks: You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Multi Carrier Power—Averaging Termination Control

[:SENSe]:MCPower:AVERage:TCONtrol EXPonential|REPeat

[:SENSe]:MCPower:AVERage:TCONtrol?

Select the type of termination control used for averaging. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

Exponential – Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.

Repeat – After reaching the average count, the averaging is reset and a new average is started.

Factory Preset and *RST: Repeat

Remarks: You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Multi Carrier Power—Root Raised Cosine Filter Alpha

[:SENSe]:MCPower:FILTer[:RRC]:ALPHa <numeric>

[:SENSe]:MCPower:FILTer[:RRC]:ALPHa?

Set the alpha value of the Root Raised Cosine (RRC) filter.

Factory Preset and *RST: 0.22

Range: 0.01 to 0.5

Remarks: You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Multi Carrier Power—Root Raised Cosine Filter State

[:SENSe]:MCPower:FILTer[:RRC][:STATe] OFF|ON|0|1

[:SENSe]:MCPower:FILTer[:RRC][:STATe]?

Turn the Root Raised Cosine (RRC) filter on or off.

Factory Preset and *RST: On

Remarks: You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Multi Carrier Power—Base Frequencies Delta

[:SENSe]:MCPower:FREQuency[:BASE]:DELTa <freq>

[:SENSe]:MCPower:FREQuency[:BASE]:DELTa?

Set the delta frequency, the base upper frequency – the base lower frequency.

Factory Preset and *RST: 5 MHz

Range: –15 MHz, –10 MHz, –5 MHz, 5 MHz, 10 MHz, or 15 MHz

Default Unit: Hz

Remarks: You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Multi Carrier Power—Offset Frequency Absolute Limit

[:SENSe]:MCPower:OFFSet:LIST:ABSolute <abs_power>,<abs_pwer>,<abs_pwer>,<abs_pwer>

[:SENSe]:MCPower:OFFSet:LIST:ABSolute?

Sets the absolute amplitude levels to test against for each of the custom offsets. The list must contain four (4) entries. If there is more than one offset, the offset closest to the carrier channel is the first one in the list. [:SENSe]:MCPower:OFFSet:LIST:TEST selects the type of testing to be done at each offset.

The query returns four (4) real numbers that are the current absolute amplitude test limits.

Factory Preset and *RST:

Offset A	Offset B	Offset C	Offset D
50 dBm	50 dBm	50 dBm	50 dBm

Range: –200.0 to 50.0 dBm

Remarks: You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Multi Carrier Power—Offset Frequency Relative Limit to Carrier

[:SENSe]:MCPower:OFFSet:LIST:RCARrier <rel_power>,<rel_power>,<rel_power>,<rel_power>

[:SENSe]:MCPower:OFFSet:LIST:RCARrier?

Sets the amplitude levels to test against for any custom offsets. This amplitude level is relative to the carrier amplitude. If multiple offsets are available, the list contains four (4) entries. The offset closest to the carrier channel is the first one in the list. [:SENSe]:MCPower:OFFSet:LIST:TEST selects the type of testing to be done at each offset.

The query returns four (4) real numbers that are the current amplitude test limits, relative to the carrier, for each offset.

Factory Preset and *RST:

Offset A	Offset B	Offset C	Offset D
0 dB	0 dB	0 dB	0 dB

Range: –150.0 to 50.0 dB

Remarks: You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Multi Carrier Power—Offset Frequency Test Mode

[:SENSe]:MCPower:OFFSet:LIST:TEST ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative

[:SENSe]:MCPower:OFFSet:LIST:TEST?

Define the type of testing to be done at any custom offset frequencies. The measured powers are tested against the absolute values defined with [:SENSe]:MCPower:OFFSet[n]:LIST:ABSolute, or the relative values defined with [:SENSe]:MCPower:OFFSet[n]:LIST:RCARrierr.

The types of the testing that can be done for each offset include:

- Absolute - Test the absolute power measurement. If it fails, then return a failure for the measurement at this offset.

- And - Test both the absolute power measurement and the power relative to the carrier. If they both fail, then return a failure for the measurement at this offset.
- Or - Test both the absolute power measurement and the power relative to the carrier. If either one fails, then return a failure for the measurement at this offset.
- Relative - Test the power relative to the carrier. If it fails, then return a failure for the measurement at this offset.

Factory Preset and *RST:

Offset A	Offset B	Offset C	Offset D
REL	REL	REL	REL

Remarks: You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Multi Carrier Power—Offset Selection

[:SENSe]:MCPower:OFFSet:SELect ALL|TFS|TOI

[:SENSe]:MCPower:OFFSet:SELect?

Select measurements on offsets.

All – All adjacent and alternate channels are measured include between two carriers.

Third, fifth, and seventh order intermodulation (TFS) – The third, fifth, and seventh order intermodulation parts are measured.

Third order intermodulation (TOI) – Only the third order intermodulation part is measured.

Factory Preset and *RST: All

Remarks: You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Multi Carrier Power—Measurement Reference

[:SENSe]:MCPower:REFerence AUTO|AVERage|LOWer|UPPer

[:SENSe]:MCPower:REFerence?

Select the measurement reference of the multi carrier power measurement.

Auto – Automatically sets the highest level signal in two base signals as measurement reference.

Average – Sets the average level of the base lower carrier and upper carrier frequency as measurement reference.

Lower – Sets the base lower carrier as measurement reference.

Upper – Sets the base upper carrier as measurement reference.

Factory Preset and *RST:	Auto
Remarks:	You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Occupied Bandwidth Measurement

Commands for querying the occupied bandwidth measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 66. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Occupied BW** measurement has been selected from the **MEASURE** key menu.

Occupied Bandwidth—Average Count

[:SENSe]:OBW:AVERage:COUNt <integer>

[:SENSe]:OBW:AVERage:COUNt?

Set the number of data acquisitions that will be averaged. After the specified number of average counts, the average mode (termination control) setting determines the average action.

Factory Preset and *RST:	10
Range:	1 to 10,000
Remarks:	You must be in the PDC, cdma2000, or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.02.00 or later
Front Panel Access:	**Meas Setup, Avg Number**

Occupied Bandwidth—Averaging State

[:SENSe]:OBW:AVERage[:STATe] OFF|ON|0|1

[:SENSe]:OBW:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST:	On
Remarks:	You must be in the PDC, cdma2000, or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.02.00 or later
Front Panel Access:	**Meas Setup, Avg Number**

Occupied Bandwidth—Averaging Termination Control

[:SENSe]:OBW:AVERage:TCONtrol EXPonential|REPeat

[:SENSe]:OBW:AVERage:TCONtrol?

Select the type of termination control used for the averaging function. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

Exponential - After the average count is reached, each successive data acquisition is exponentially weighted and combined with the existing average.

Repeat - After reaching the average count, the averaging is reset and a new average is started.

Factory Preset and *RST:	Repeat for cdma2000, W-CDMA (3GPP)
Remarks:	You must be in the PDC, cdma2000, or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.02.00 or later
Front Panel Access:	**Meas Setup**, **Avg Mode**

Occupied Bandwidth—Resolution Bandwidth

[:SENSe]:OBW:BANDwidth|BWIDth[:RESolution] <freq>

[:SENSe]:OBW:BANDwidth|BWIDth[:RESolution]?

Set the resolution bandwidth that will be used.

Factory Preset and *RST:	30.0 kHz
Range:	1.0 kHz to 1.0 MHz
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Occupied Bandwidth—FFT Window

[:SENSe]:OBW:FFT:WINDow[:TYPE] BH4Tap|BLACkman|FLATtop|GAUSsian|HAMMing|HANNing|KB70|KB90 |KB110|UNIForm

[:SENSe]:OBW:FFT:WINDow[:TYPE]?

Select the FFT window type.

BH4Tap - Blackman Harris with 4 taps

Blackman - Blackman

Flat Top - flat top, the default (for high amplitude accuracy)

Gaussian - Gaussian with alpha of 3.5

Hamming - Hamming

Hanning - Hanning

KB70, 90, and 110 - Kaiser Bessel with sidelobes at –70, –90, or –110 dBc

Uniform - no window is used. (This is the unity response.)

Factory Preset and *RST: Gaussian

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Occupied Bandwidth—Span

[:SENSe]:OBW:FREQuency:SPAN <freq>

[:SENSe]:OBW:FREQuency:SPAN?

Set the occupied bandwidth span. The analyzer span will retain this value throughout the measurement.

Factory Preset and *RST: 10.0 MHz

Range: 10.0 kHz to 10.0 MHz

Default Unit: Hz

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Occupied Bandwidth—Trigger Source

[:SENSe]:OBW:TRIGger:SOURce EXTernal[1]|EXTernal2|FRAMe|IF|IMMediate|LINE|RFBurst

[:SENSe]:OBW:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions for the occupied bandwidth measurement.

External 1 – rear panel external trigger input

External 2 – front panel external trigger input

Frame – internal frame trigger (cdma2000, W-CDMA (3GPP) mode only)

IF – internal IF envelope (video) trigger

Immediate – the next data acquisition is immediately taken, capturing the signal asynchronously (also called free run)

Line – power line (cdma2000, W-CDMA (3GPP) mode only)

RF Burst – wideband RF burst envelope trigger that has automatic level control for periodic burst signals

Factory Preset and *RST:	Immediate for BS of PDC, cdma2000, W-CDMA (3GPP)
Remarks:	You must be in the PDC, iDEN, cdma2000, or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.02.00 or later

RF Port Input Attenuation

[:SENSe]:POWer[:RF]:ATTenuation <rel_power>

[:SENSe]:POWer[:RF]:ATTenuation?

Set the RF input attenuator. This value is set at its auto value if input attenuation is set to auto.

Factory Preset and *RST:	0 dB
Range:	0 to 40 dB
Default Unit:	dB
Front Panel Access:	**Input, Input Atten**

RF Port Power Range Auto

[:SENSe]:POWer[:RF]:RANGe:AUTO OFF|ON|0|1

[:SENSe]:POWer[:RF]:RANGe:AUTO?

Select the RF port power range to be set either automatically or manually.

On - power range is automatically set as determined by the actual measured power level at the start of a measurement.

Off - power range is manually set

Factory Preset and *RST:	On
Remarks:	You must be in the cdmaOne, EDGE, GSM, NADC, PDC, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.
Front Panel Access:	**Input, Max Total Pwr (at UUT)**

RF Port Power Range Maximum Total Power

[:SENSe]:POWer[:RF]:RANGe[:UPPer] <power>

[:SENSe]:POWer[:RF]:RANGe[:UPPer]?

Set the maximum expected total power level at the radio unit under test. This value is ignored if RF port power range is set to auto. External attenuation required above 30 dBm.

Factory Preset and *RST:	–15.0 dBm
Range:	–200.0 to 100.0 dBm for cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib)
Default Unit:	dBm
Remarks:	Global to the current mode. This is coupled to the RF input attenuation You must be in the Service, cdmaOne, EDGE,GSM, NADC, PDC, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.
Front Panel Access:	**Input, Max Total Pwr (at UUT)**

Power Statistics CCDF Measurement

Commands for querying the statistical power measurement of the complimentary cumulative distribution function (CCDF) measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 66. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Power Stat CCDF** measurement has been selected from the **MEASURE** key menu.

History: Added PSTatistic to Basic Mode version A.04.00

Power Statistics CCDF—Channel Bandwidth

[:SENSe]:PSTatistic:BANDwidth|BWIDth <freq>

[:SENSe]:PSTatistic:BANDwidth|BWIDth?

Set the bandwidth that will be used for acquiring the signal.

Factory Preset and *RST:	5.0 MHz
Range:	10.0 kHz to 6.7 MHz
Default Unit:	Hz
Remarks:	You must be in the Basic, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Power Statistics CCDF—Sample Counts

[:SENSe]:PSTatistic:COUNts <integer>

[:SENSe]:PSTatistic:COUNts?

Set the counts. Measurement stops when the sample counts reach this value.

Factory Preset and *RST:	10,000,000
Range:	1,000 to 2,000,000,000
Unit:	counts
Remarks:	You must be in the Basic, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Power Statistics CCDF—Sweep Time

[:SENSe]:PSTatistic:SWEep:TIME <time>

[:SENSe]:PSTatistic:SWEep:TIME?

Set the length of measurement interval that will be used.

Factory Preset and *RST:	1.0 ms
Range:	0.1 ms to 10 ms
Default Unit:	seconds
Remarks:	You must be in the Basic, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Power Statistics CCDF—Trigger Source

[:SENSe]:PSTatistic:TRIGger:SOURce EXTernal[1]|EXTernal2|FRAMe|IF|IMMediate|RFBurst

[:SENSe]:PSTatistic:TRIGger:SOURce?

Set the trigger source used to control the data acquisitions.

External 1 - front panel external trigger input

External 2 - rear panel external trigger input

Frame - uses the internal frame timer, which has been synchronized to the selected burst sync.

IF - internal IF envelope (video) trigger

Immediate - the next data acquisition is immediately taken, capturing the signal asynchronously (also called Free Run).

RF Burst - wideband RF burst envelope trigger that has automatic level control for periodic burst signals.

Factory Preset and *RST:	Immediate
Remarks:	You must be in the Basic, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Radio Device Under Test

[:SENSe]:RADio:DEVice BTS|MS

[:SENSe]:RADio:DEVice?

Select the type of radio device to be tested.

BTS - Base station transmitter test

MS - Mobile station transmitter test

Factory Preset and *RST:	BTS
Remarks:	Global to the current mode.
	You must be in cdma2000, EDGE, GSM, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later
Front Panel Access:	**Mode Setup, Radio, Device**

Modulation Accuracy (Rho) Measurement

Commands for querying the rho measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 66. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Mod Accuracy (Rho)** or **Mod Accuracy (Composite Rho)** measurement has been selected from the **MEASURE** key menu.

Modulation Accuracy (Rho)—Demod Alpha

[:SENSe]:RHO:ALPHa <float>

[:SENSe]:RHO:ALPHa?

Set alpha for the root nyquist filter.

Factory Preset and *RST:	0.22
Range:	0.01 to 0.5
Remarks:	You must be in the W-CDMA (3GPP) or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—Average Count

[:SENSe]:RHO:AVERage:COUNt <integer>

[:SENSe]:RHO:AVERage:COUNt?

Set the number of frames that will be averaged. After the specified number of frames (average counts), the averaging mode (termination control) setting determines the averaging action.

Factory Preset and *RST:	10
Range:	1 to 10,000
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—Averaging State

[:SENSe]:RHO:AVERage[:STATe] OFF|ON|0|1

[:SENSe]:RHO:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST:	On for cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib)
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—Averaging Termination Control

[:SENSe]:RHO:AVERage:TCONtrol EXPonential|REPeat

[:SENSe]:RHO:AVERage:TCONtrol?

Select the type of termination control used for the averaging function. This determines the averaging action after the specified number of frames (average count) is reached.

Exponential - Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.

Repeat - After reaching the average count, the averaging is reset and a new average is started.

Factory Preset and *RST:	Repeat for cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib)
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—Chip Rate

[:SENSe]:RHO:CRATe <freq>

[:SENSe]:RHO:CRATe?

Set chip rate.

Factory Preset and *RST:	3.84 MHz for W-CDMA (3GPP)
Range:	3.456 to 4.224 MHz for W-CDMA (3GPP)
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—Multi Carrier Estimator

[:SENSe]:RHO:MCEStimator OFF|ON|0|1

[:SENSe]:RHO:MCEStimator?

Turns the multi carrier estimator on or off.

Off - computes the phase information only from one coded signal.

On - aligns the code phases to be orthogonal before computing the phase information.

Factory Preset and *RST:	Off
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—Spectrum Normal/Invert

[:SENSe]:RHO:SPECtrum INVert|NORMal

[:SENSe]:RHO:SPECtrum?

Select inverted or normal spectrum for demodulation.

Factory Preset and *RST:	Normal
Remarks	You must be in the cdmaOne, cama2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—Sync Type

[:SENSe]:RHO:SYNC CPICh|SCH

[:SENSe]:RHO:SYNC?

Set the synchronization type for BTS.

CPICH – synchronize to common pilot channel

SCH – synchronize to SCH

Factory Preset and *RST:	CPICH
Remarks:	You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—Scramble Code Down Link

[:SENSe]:RHO:SYNC:SCRamble[:BTS] <integer>

[:SENSe]:RHO:SYNC:SCRamble[:BTS]?

Set the BTS primary scramble code for synchronization.

Factory Preset and *RST:	0
Range:	0 to 511
Remarks:	You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—Scramble Code Offset

[:SENSe]:RHO:SYNC:SCRamble[:BTS]:OFFSet <integer>

[:SENSe]:RHO:SYNC:SCRamble[:BTS]:OFFSet?

Set the BTS scramble code offset (secondary scramble code) for synchronization.

Factory Preset and *RST:	0
Range:	0 to 15
Remarks:	You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—Sync Scramble Code Type Down Link

[:SENSe]:RHO:SYNC:SCRamble[:BTS]:TYPE LEFT|RIGHt|STANdard

[:SENSe]:RHO:SYNC:SCRamble[:BTS]:TYPE?

Set the BTS primary scramble code type for synchronization.

Left – the left alternative scrambling code whose number is the primary scramble code number + 8192 is used.

Right – the right alternative scrambling code whose number is the primary scrambling code number + 16384 is used.

Standard – the standard scrambling code whose number is the primary scrambling code number is used.

Factory Preset and *RST: Standard

Remarks: You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—Scramble Code Up Link

[:SENSe]:RHO:SYNC:SCRamble:MS <integer>

[:SENSe]:RHO:SYNC:SCRamble:MS?

Set the MS scramble code for synchronization.

Factory Preset and *RST: 0

Range: 0 to 16,777,215 (0h to FFF,FFFh)

Remarks: You must be in the W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—Trigger Source

[:SENSe]:RHO:TRIGger:SOURce EXTernal[1]|External2|FRAMe|IF|IMMediate|RFBurst

[:SENSe]:RHO:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

External 1 – front panel external trigger input

External 2 – rear panel external trigger input

Frame – internal frame trigger from front panel input

IF – internal IF envelope trigger

Immediate – the next data acquisition is immediately taken, capturing the signal asynchronously (also called free run).

RF Burst – internal wideband RF burst envelope trigger that has automatic level control for periodic burst signals.

Factory Preset and *RST:	Immediate
Remarks:	You must be in the cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.
Front Panel Access:	**Meas Setup**, **Trig Source**

Reference Oscillator External Frequency

[:SENSe]:ROSCillator:EXTernal:FREQuency <frequency>

[:SENSe]:ROSCillator:EXTernal:FREQuency?

Set to the frequency of the external reference oscillator being supplied to the instrument. Switch to the external reference with ROSC:SOUR.

Preset and *RST:	Value remains at last user selected value (persistent)
	Factory default, 10 MHz
Range:	1 MHz to 40 MHz, with 1 Hz steps
Default Unit:	Hz
Remarks:	Global to system
Front Panel Access:	**System, Reference, Ref Oscillator**

Reference Oscillator Rear Panel Output

[:SENSe]:ROSCillator:OUTPut[:STATe] OFF|ON|0|1

[:SENSe]:ROSCillator:OUTPut?

Turn on and off the 10 MHz frequency reference signal going to the rear panel.

Preset and *RST:	Persistent State with factory default of On
Remarks:	Global to system. Was SENS:ROSC:REAR
Front Panel Access:	**System, Reference, 10 MHz Out**

Reference Oscillator Source

`[:SENSe]:ROSCillator:SOURce INTernal|EXTernal`

`[:SENSe]:ROSCillator:SOURce?`

Select the reference oscillator (time base) source. Use `ROSC:EXT:FREQ` to tell the instrument the frequency of the external reference.

Internal - uses internal 50 MHz reference signal

External - uses the signal at the rear panel external reference input port.

Preset and *RST:	Persistent State with factory default of Internal
Remarks:	Global to system.
Front Panel Access:	**System, Reference, Ref Oscillator**

Spectrum Emission Mask Measurement

Commands for querying the spectrum emission measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 66. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Spectrum Emission Mask** measurement has been selected from the **MEASURE** key menu.

History:	Added version A.04.00 and later

Spectrum Emission Mask—Average Count

[:SENSe]:SEMask:AVERage:COUNt <integer>

[:SENSe]:SEMask:AVERage:COUNt?

Set the number of data acquisitions that will be averaged. After the specified number of average counts, the average mode (termination control) setting determines the average action.

Factory Preset and *RST:	10
Range:	1 to 10,000
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Averaging State

[:SENSe]:SEMask:AVERage[:STATe] OFF|ON|0|1

[:SENSe]:SEMask:AVERage[:STATe]?

Turn average on or off.

Factory Preset and *RST:	Off
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Channel BW

[:SENSe]:SEMask:BANDwidth[n]|BWIDth[n]:INTegration <freq>

[:SENSe]:SEMask:BANDwidth[n]|BWIDth[n]:INTegration?

Set the Integration bandwidth that will be used for the main (carrier) channel.

BANDwidth[n]|BWIDth[n]	n=1 is base station and 2 is mobiles. The default is base station (1).
Factory Preset and *RST:	3.84 MHz for W-CDMA (3GPP)
Range:	100.0 kHz to [:SENSe]:SEMask:FREQuency:SPAN
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Reference Channel Resolution BW

[:SENSe]:SEMask:BANDwidth[n]|BWIDth[n]:RESolution <freq>

[:SENSe]:SEMask:BANDwidth[n]|BWIDth[n]:RESolution?

Set the reference channel resolution BW.

BANDwidth[n]|BWIDth[n]	n=1 is base station and 2 is mobiles. The default is base station (1).
Factory Preset and *RST:	Auto coupled.
Range:	1.0 kHz to 7.5 MHz
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Reference Channel Resolution BW Auto Mode

[:SENSe]:SEMask:BANDwidth[n]|BWIDth[n]:RESolution:AUTO OFF|ON|0|1

[:SENSe]:SEMask:BANDwidth[n]|BWIDth[n]:RESolution:AUTO?

Select auto or manual control of the resolution BW.

BANDwidth[n]|
BWIDth[n]	n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset
and *RST:	On

Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Detector Mode

[:SENSe]:SEMask:DETector[:FUNCtion] AAVerage|POSitive

[:SENSe]:SEMask:DETector[:FUNCtion]?

Selects the detector type.

Absolute average (AAVerage) - the absolute average power in each frequency is measured across the spectrum

Positive - the positive peak power in each frequency is measured across the spectrum

Factory Preset
and *RST:	Absolute Average (AAVerage)

Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Frequency Span

[:SENSe]:SEMask:FREQuency:SPAN <freq>

[:SENSe]:SEMask:FREQuency:SPAN?

Set the frequency span to be measured.

Factory Preset and *RST:	5.0 MHz for W-CDMA
Range:	100.0 kHz to 10.0 MHz
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Reference Channel Step Frequency

[:SENSe]:SEMask:FREQuency[n]:STEP <freq>

[:SENSe]:SEMask:FREQuency[n]:STEP?

Set the reference step frequency.

FREQuency[n]	n=1 is base station and 2 is mobiles. The default is base station (1).
Factory Preset and *RST:	Auto coupled.
Range:	100 Hz to 7.5 MHz
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Reference Channel Step Frequency Auto Mode List

[:SENSe]:SEMask:FREQuency[n]:STEP:AUTO OFF|ON|0|1

[:SENSe]:SEMask:FREQuency[n]:STEP:AUTO?

Set the auto mode of the reference step frequency.

Off - the reference step frequency is set manually.

On - the reference step frequency is set to a half of the resolution bandwidth.

FREQuency[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST: On

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Define Resolution Bandwidth List

[:SENSe]:SEMask:OFFSet[n]:LIST:BANDwidth|BWIDth <res_bw>,<res_bw>,<res_bw>,<res_bw>,<res_bw>

[:SENSe]:SEMask:OFFSet[n]:LIST:BANDwidth|BWIDth?

Define the custom resolution bandwidth(s) for the spectrum emission mask testing. If there is more than one bandwidth, the list must contain five (5) entries. You can turn off (not use) specific offsets with the [:SENSe]:SEMask:OFFSet:LIST:STATe command.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	BTS	30.0 kHz	30.0 kHz	30.0 kHz	1.0 MHz	1.0 MHz
	MS	30.0 kHz	1.0 MHz	1.0 MHz	1.0 MHz	1.0 MHz

Range: 300 Hz to 7.5 MHz

Default Unit: Hz

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Define Resolution Bandwidth List Auto Mode

[:SENSe]:SEMask:OFFSet[n]:LIST:BANDwidth|BWIDth:AUTO OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,ff

[:SENSe]:SEMask:OFFSet[n]:LIST:BANDwidth|BWIDth:AUTO?

Set the auto mode of the resolution bandwidth in the offset list.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	Off	Off	Off	Off	Off

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Offset Start Frequency

[:SENSe]:SEMask:OFFSet[n]:LIST:FREQuency:STARt <f_offset>,<f_offset>,<f_offset>,<f_offset>,<f_offset>

[:SENSe]:SEMask:OFFSet[n]:LIST:FREQuency:STARt?

Sets the five (5) offset start frequencies.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	BTS	2.515 MHz	2.715 MHz	3.515 MHz	4.0 MHz	7.5 MHz
	MS	2.515 MHz	4.0 MHz	7.5 MHz	8.5 MHz	12.5 MHz

Range: 10.0 kHz to 100.0 MHz

Default Unit: Hz

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Offset Step Frequency

[:SENSe]:SEMask:OFFSet[n]:LIST:FREQuency:STEP <f_offset>,<f_offset>,<f_offset>,<f_offset>,<f_offset>

[:SENSe]:SEMask:OFFSet[n]:LIST:FREQuency:STEP?

Sets the five (5) offset step frequencies.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST: Auto coupled.

Range: 100 Hz to 7.5 MHz

Default Unit: Hz

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Offset Step Frequency Auto Mode

[:SENSe]:SEMask:OFFSet[n]:LIST:FREQuency:STEP:AUTO OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1

[:SENSe]:SEMask:OFFSet[n]:LIST:FREQuency:STEP:AUTO?

Set the auto mode of the offset step frequency.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	On	On	On	On	On

Remarks: You must be in cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Offset Stop Frequency

[:SENSe]:SEMask:OFFSet[n]:LIST:FREQuency:STOP <f_offset>,<f_offset>,<f_offset>,<f_offset>,<f_offset>

[:SENSe]:SEMask:OFFSet[n]:LIST:FREQuency:STOP?

Sets the five (5) offset stop frequencies.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	BTS	2.715 MHz	3.515 MHz	4.0 MHz	7.5 MHz	12.5 MHz
	MS	3.485 MHz	7.5 MHz	8.5 MHz	12.0 MHz	15.0 MHz

Range: 10.0 kHz to 100.0 MHz

Default Unit: Hz

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Relative Attenuation

[:SENSe]:SEMask:OFFSet[n]:LIST:RATTenuation <rel_power>,<rel_power>,<rel_power>,<rel_power>,<rel_power>

[:SENSe]:SEMask:OFFSet[n]:LIST:RATTenuation?

Sets a relative amount of attenuation for the measurements made at your offsets. The amount of attenuation is always specified relative to the attenuation that is required to measure the carrier channel. Since the offset channel power is lower than the carrier channel power, less attenuation is required to measure the offset channel and you get wider dynamic range for the measurement.

You can turn off (not use) specific offsets with the [:SENSe]:SEMask:OFFSet[n]:LIST:STATe command.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	0 dB	0 dB	0 dB	0 dB	0 dB

Range: –40 to 0 dB, but this relative attenuation cannot exceed the absolute attenuation range of 0 to 40 dB.

Default Unit: dB

Remarks: Remember that the attenuation that you specify is always relative to the amount of attenuation used for the carrier channel. Selecting negative attenuation means that you want less attenuation used. For example, if the measurement must use 20 dB of attenuation for the carrier measurement and you want to use 12 dB less attenuation for the first offset, you would send the value –12 dB.

You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Select Sideband

[:SENSe]:SEMask:OFFSet[n]:LIST:SIDE BOTH|NEGative|POSitive, BOTH|NEGative|POSitive, BOTH|NEGative|POSitive, BOTH|NEGative|POSitive, BOTH|NEGative|POSitive

[:SENSe]:SEMask:OFFSet[n]:LIST:SIDE?

Selects which sideband will be measured. You can turn off (not use) specific offsets with the [:SENSe]:SEMask:OFFSet[n]:LIST:STATe command.

Both - both of the negative (lower) and positive (upper) sidebands

Negative - negative (lower) sideband only

Positive - positive (upper) sideband only

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	Both	Both	Both	Both	Both

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Absolute Amplitude Limits at Offset Start

[:SENSe]:SEMask:OFFSet[n]:LIST:STARt:ABSolute <abs_power>,<abs_power>,<abs_power>,<abs_power>,<abs_power>

[:SENSe]:SEMask:OFFSet[n]:LIST:STARt:ABSolute?

Sets the absolute amplitude levels to test against for each of the custom offsets. The list must contain five (5) entries. If there is more than one offset, the offset closest to the carrier channel is the first one in the list. [:SENSe]:SEMask:OFFSet[n]:LIST:TEST selects the type of testing to be done at each offset.

You can turn off (not use) specific offsets with the [:SENSe]:SEMask:OFFSet[n]:LIST:STATe command.

The query returns five (5) real numbers that are the current absolute amplitude test limits.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	BTS	–14.0 dBm	–14.0 dBm	–26.0 dBm	–13.0 dBm	–13.0 dBm
	MS	–71.1 dBm	–55.84 dBm	–55.84 dBm	–55.84 dBm	–55.84 dBm

Range: –200.0 dBm to 50.0 dBm

Default Unit: dBm

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Relative Amplitude Limits to Carrier at Offset Start

[:SENSe]:SEMask:OFFSet[n]:LIST:STARt:RCARrier <rel_power>,<rel_power>,<rel_power>,<rel_power>,<rel_power>

[:SENSe]:SEMask:OFFSet[n]:LIST:STARt:RCARrier?

Sets the relative amplitude levels to carrier to test against for each of the custom offsets. The list must contain five (5) entries. If there is more than one offset, the offset closest to the carrier channel is the first one in the list. [:SENSe]:SEMask:OFFSet[n]:LIST:TEST selects the type of testing to be done at each offset.

You can turn off (not use) specific offsets with the [:SENSe]:SEMask:OFFSet[n]:LIST:STATe command.

The query returns five (5) real numbers that are the current absolute amplitude test limits.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	BTS	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB
	MS	–35.23 dB	–35.5 dB	–39.0 dB	–49.0 dB	–49.0 dB

Range: –150.0 dBm to 50.0 dB

Default Unit: dB

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Control Offset Frequency List

[:SENSe]:SEMask:OFFSet[n]:LIST:STATe OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1

[:SENSe]:SEMask:OFFSet[n]:LIST:STATe?

Selects whether testing is to be done at the custom offset frequencies. The measured powers are tested against the absolute values defined with [:SENSe]:SEMask:OFFSet[n]:LIST[n]:ABSolute, or the relative values defined with [:SENSe]:SEMask:OFFSet[n]:LIST[n]:RCARrier.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	BTS	On	On	On	On	On
	MS	On	On	On	On	Off

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Absolute Amplitude Limits at Offset Stop

[:SENSe]:SEMask:OFFSet[n]:LIST:STOP:ABSolute <abs_power>,<abs_power>,<abs_power>,<abs_power>,<abs_power>

[:SENSe]:SEMask:OFFSet[n]:LIST:STOP:ABSolute?

Sets the absolute amplitude levels to test against for each of the custom offsets. The list must contain five (5) entries. If there is more than one offset, the offset closest to the carrier channel is the first one in the list. [:SENSe]:SEMask:OFFSet[n]:LIST:TEST selects the type of testing to be done at each offset.

You can turn off (not use) specific offsets with the [:SENSe]:SEMask:OFFSet[n]:LIST:STATe command.

The query returns five (5) real numbers that are the current absolute amplitude test limits.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	BTS	–14.0 dBm	–26.0 dBm	–26.0 dBm	–13.0 dBm	–13.0 dBm
	MS	–71.1 dBm	–55.84 dBm	–55.84 dBm	–55.84 dBm	–55.84 dBm

Range: –200.0 dBm to 50.0 dBm

Default Unit: dBm

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Absolute Amplitude Limits at Offset Stop Coupled

[:SENSe]:SEMask:OFFSet[n]:LIST:STOP:ABSolute:COUPle OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1

[:SENSe]:SEMask:OFFSet[n]:LIST:STOP:ABSolute:COUPle?

Define the absolute limit mode for the offset stop frequencies.

Off - the limit at the offset stop frequency can be set manually.

On - the limit at the offset stop frequency is same as it at the offset start frequency.

You can turn off (not use) specific offsets with the [:SENSe]:SEMask:OFFSet[n]:LIST:STATe command.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	BTS	On	Off	On	On	On
	MS	On	On	On	On	On

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Relative Amplitude Limits to Carrier at Offset Stop

[:SENSe]:SEMask:OFFSet[n]:LIST:STOP:RCARrier <rel_power>,<rel_power>,<rel_power>,<rel_power>,<rel_power>

[:SENSe]:SEMask:OFFSet[n]:LIST:STOP:RCARrier?

Sets the relative amplitude levels to carrier to test against for each of the custom offsets. The list must contain five (5) entries. If there is more than one offset, the offset closest to the carrier channel is the first one in the list. [:SENSe]:SEMask:OFFSet[n]:LIST:TEST selects the type of testing to be done at each offset.

You can turn off (not use) specific offsets with the [:SENSe]:SEMask:OFFSet[n]:LIST:STATe command.

The query returns five (5) real numbers that are the current absolute amplitude test limits.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	BTS	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB
	MS	–49.78 dB	–39.0 dB	–49.0 dB	–49.0 dB	–49.0 dB

Range: –150.0 dBm to 50.0 dB

Default Unit: dB

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Relative Amplitude Limits to Carrier at Offset Stop Coupled

[:SENSe]:SEMask:OFFSet[n]:LIST:STOP:RCARrier:COUPle OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1

[:SENSe]:SEMask:OFFSet[n]:LIST:STOP:RCARrier:COUPle?

Define the relative limit mode for the offset stop frequencies.

Off - the limit at the offset stop frequency can be set manually.

On - the limit at the offset stop frequency is same as it at the offset start frequency.

You can turn off (not use) specific offsets with the [:SENSe]:SEMask:OFFSet[n]:LIST:STATe command.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	BTS	On	On	On	On	On
	MS	Off	Off	Off	On	On

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Define Type of Offset Frequency List

[:SENSe]:SEMask:OFFSet[n]:LIST:TEST ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative

[:SENSe]:SEMask:OFFSet[n]:LIST:TEST?

Defines the type of testing to be done at any custom offset frequencies. The measured powers are tested against the absolute values defined with [:SENSe]:SEMask:OFFSet[n]:LIST:ABSolute, or the relative values defined with [:SENSe]:SEMask:OFFSet[n]:LIST:RCARrier.

You can turn off (not use) specific offsets with the [:SENSe]:SEMask:OFFSet[n]:LIST:STATe command.

Offset[n] n=1 is base station and 2 is mobiles. The default is base station (1).

The types of testing that can be done for each offset include:

- And - Test both the absolute power measurement and the power relative to the carrier. If they both fail, then return a failure for the measurement at this offset.
- Absolute - Test the absolute power measurement. If it fails, then return a failure for the measurement at this offset.
- Or - Test both the absolute power measurement and the power relative to the carrier. If either one fails, then return a failure for the measurement at this offset.
- Relative - Test the power relative to the carrier. If it fails, then return a failure for the measurement at this offset.

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	BTS	ABS	ABS	ABS	ABS	ABS
	MS	AND	AND	AND	AND	AND

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Define Resolution Bandwidth List

[:SENSe]:SEMask:REGion[n]:LIST:BANDwidth|BWIDth <res_bw>,<res_bw>,<res_bw>,<res_bw>,<res_bw>

[:SENSe]:SEMask:REGion[n]:LIST:BANDwidth|BWIDth?

Define the custom resolution bandwidth(s) for the spectrum emission mask testing. If there is more than one bandwidth, the list must contain five (5) entries. You can turn off (not use) specific Regions with the [:SENSe]:SEMask:REGion[n]:LIST:STATe command.

Region[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST: Auto coupled.

Range: 300 Hz to 7.5 MHz

Default Unit: Hz

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Define Resolution Bandwidth List Auto Mode

[:SENSe]:SEMask:REGion[n]:LIST:BANDwidth|BWIDth:AUTO OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1

[:SENSe]:SEMask:REGion[n]:LIST:BANDwidth|BWIDth:AUTO?

Set the auto mode of the region step frequency.

REGion[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
W-CDMA (3GPP)	On	On	On	On	On

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Region Start Frequency

[:SENSe]:SEMask:REGion[n]:LIST:FREQuency:STARt <f_region>,<f_region>,<f_region>,<f_region>,<f_region>

[:SENSe]:SEMask:REGion[n]:LIST:FREQuency:STARt?

Sets the five (5) region start frequencies.

REGion[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
W-CDMA (3GPP)	1920.0 MHz	1893.5 MHz	2100.0 MHz	2175.0 MHz	800.0 MHz

Range: 329.0 MHz to 3.678 GHz

Default Unit: Hz

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Region Step Frequency

[:SENSe]:SEMask:REGion[n]:LIST:FREQuency:STEP <f_region>,<f_region>,<f_region>,<f_region>,<f_region>

[:SENSe]:SEMask:REGion[n]:LIST:FREQuency:STEP?

Sets the five (5) region step frequencies.

Region[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST: Auto coupled.

Range: 100 Hz to 7.5 MHz

Default Unit: Hz

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Region Step Frequency Auto Mode

[:SENSe]:SEMask:REGion[n]:LIST:FREQuency:STEP:AUTO OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1

[:SENSe]:SEMask:REGion[n]:LIST:FREQuency:STEP:AUTO?

Set the auto mode of the region step frequency.

Region[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
W-CDMA (3GPP)	On	On	On	On	On

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Region Stop Frequency

[:SENSe]:SEMask:REGion[n]:LIST:FREQuency:STOP <f_region>,<f_region>,<f_region>,<f_region>,<f_region>

[:SENSe]:SEMask:REGion[n]:LIST:FREQuency:STOP?

Sets the five (5) region stop frequencies.

Region[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
W-CDMA (3GPP)	1980.0 MHz	1919.6 MHz	2105.0 MHz	2180.0 MHz	1000.0 MHz

Range: 329.0 MHz to 3.678 MHz

Default Unit: Hz

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Relative Attenuation

[:SENSe]:SEMask:REGion[n]:LIST:RATTenuation <rel_power>,<rel_power>,<rel_power>,<rel_power>,<rel_power>

[:SENSe]:SEMask:REGion[n]:LIST:RATTenuation?

Sets a relative amount of attenuation for the measurements made at your regions. The amount of attenuation is always specified relative to the attenuation that is required to measure the carrier channel. Since the region channel power is lower than the carrier channel power, less attenuation is required to measure the region channel and you get wider dynamic range for the measurement.

You can turn off (not use) specific regions with the [:SENSe]:SEMask:REGion[n]:LIST:STATe command.

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
W-CDMA (3GPP)	0 dB	0 dB	0 dB	0 dB	0 dB

Range: –40.0 to 0.0 dB, but this relative attenuation cannot exceed the absolute attenuation range of 0.0 to 40.0 dB.

Default Unit: dB

Remarks: Remember that the attenuation that you specify is always relative to the amount of attenuation used for the carrier channel. Selecting negative attenuation means that you want less attenuation used. For example, if the measurement must use 20 dB of attenuation for the carrier measurement and you want to use 12 dB less attenuation for the first region, you would send the value –12 dB.

You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Absolute Amplitude Limits at Region Start

[:SENSe]:SEMask:REGion[n]:LIST:STARt:ABSolute <abs_power>,<abs_power>,<abs_power>,<abs_power>,<abs_power>

[:SENSe]:SEMask:REGion[n]:LIST:STARt:ABSolute?

Sets the absolute amplitude levels to test against for each of the custom regions. The list must contain five (5) entries. If there is more than one region, the region closest to the carrier channel is the first one in the list. [:SENSe]:SEMask:REGion[n]:LIST:TEST selects the type of testing to be done at each region.

You can turn off (not use) specific regions with the [:SENSe]:SEMask:REGion[n]:LIST:STATe command.

The query returns five (5) real numbers that are the current absolute amplitude test limits.

Region[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
W-CDMA (3GPP)	–50.0 dBm	–50.0 dBm	–50.0 dBm	–50.0 dBm	–50.0 dBm

Range: –200.0 dBm to 50.0 dBm

Default Unit: dBm

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Relative Amplitude Limits to Carrier at Region Start

[:SENSe]:SEMask:REGion[n]:LIST:STARt:RCARrier <rel_power>,<rel_power>,<rel_power>,<rel_power>,<rel_power>

[:SENSe]:SEMask:REGion[n]:LIST:STARt:RCARrier?

Sets the relative amplitude levels to carrier to test against for each of the custom regions. The list must contain five (5) entries. If there is more than one region, the region closest to the carrier channel is the first one in the list. [:SENSe]:SEMask:REGion[n]:LIST:TEST selects the type of testing to be done at each region.

You can turn off (not use) specific regions with the [:SENSe]:SEMask:REGion[n]:LIST:STATe command.

The query returns five (5) real numbers that are the current absolute amplitude test limits.

Region[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
W-CDMA (3GPP)	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB

Range: –150.0 dBm to 50.0 dB

Default Unit: dB

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Control Region Frequency List

[:SENSe]:SEMask:REGion[n]:LIST:STATe OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1

[:SENSe]:SEMask:REGion[n]:LIST:STATe?

Selects whether testing is to be done at the custom region frequencies. The measured powers are tested against the absolute values defined with [:SENSe]:SEMask:REGion[n]:LIST[n]:ABSolute, or the relative values defined with [:SENSe]:SEMask:REGion[n]:LIST[n]:RCARrier.

Region[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
W-CDMA (3GPP)	On	On	On	Off	Off

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Absolute Amplitude Limits at Region Stop

[:SENSe]:SEMask:REGion[n]:LIST:STOP:ABSolute <abs_power>,<abs_power>,<abs_power>,<abs_power>,<abs_power>

[:SENSe]:SEMask:REGion[n]:LIST:STOP:ABSolute?

Sets the absolute amplitude levels to test against for each of the custom regions. The list must contain five (5) entries. If there is more than one region, the region closest to the carrier channel is the first one in the list. [:SENSe]:SEMask:REGion[n]:LIST:TEST selects the type of testing to be done at each region.

You can turn off (not use) specific regions with the [:SENSe]:SEMask:REGion[n]:LIST:STATe command.

The query returns five (5) real numbers that are the current absolute amplitude test limits.

Region[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
W-CDMA (3GPP)	–50.0 dBm	–50.0 dBm	–50.0 dBm	–50.0 dBm	–50.0 dBm

Range: –200.0 dBm to 50.0 dBm

Default Unit: dBm

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Absolute Amplitude Limits at Region Stop Coupled

[:SENSe]:SEMask:REGion[n]:LIST:STOP:ABSolute:COUPle OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1

[:SENSe]:SEMask:REGion[n]:LIST:STOP:ABSolute:COUPle?

Define the absolute limit mode for the region stop frequencies.

Off - the limit at the region stop frequency can be set manually.

On - the limit at the region stop frequency is same as it at the region start frequency.

You can turn off (not use) specific regions with the [:SENSe]:SEMask:REGion[n]:LIST:STATe command.

Region[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
W-CDMA (3GPP)	On	On	On	On	On

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Relative Amplitude Limits to Carrier at Region Stop

[:SENSe]:SEMask:REGion[n]:LIST:STOP:RCARrier <rel_power>,<rel_power>,<rel_power>,<rel_power>,<rel_power>

[:SENSe]:SEMask:REGion[n]:LIST:STOP:RCARrier?

Sets the relative amplitude levels to carrier to test against for each of the custom regions. The list must contain five (5) entries. If there is more than one region, the region closest to the carrier channel is the first one in the list. [:SENSe]:SEMask:REGion[n]:LIST:TEST selects the type of testing to be done at each region.

You can turn off (not use) specific regions with the [:SENSe]:SEMask:REGion[n]:LIST:STATe command.

The query returns five (5) real numbers that are the current absolute amplitude test limits.

Region[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
W-CDMA (3GPP)	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB

Range: –150.0 dBm to 50.0 dB

Default Unit: dB

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Relative Amplitude Limits to Carrier at Region Stop Coupled

[:SENSe]:SEMask:REGion[n]:LIST:STOP:RCARrier:COUPle OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1

[:SENSe]:SEMask:REGion[n]:LIST:STOP:RCARrier:COUPle?

Define the relative limit mode for the region stop frequencies.

Off - the limit at the region stop frequency can be set manually.

On - the limit at the region stop frequency is same as the region start frequency.

You can turn off (not use) specific offsets with the [:SENSe]:SEMask:REGion[n]:LIST:STATe command.

Region[n] n=1 is base station and 2 is mobiles. The default is base station (1).

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	On	On	On	On	On

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Define Type of Region Frequency List

[:SENSe]:SEMask:REGion[n]:LIST:TEST ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative

[:SENSe]:SEMask:REGion[n]:LIST:TEST?

Defines the type of testing to be done at any custom region frequencies. The measured powers are tested against the absolute values defined with [:SENSe]:SEMask:REGion[n]:LIST:ABSolute, or the relative values defined with [:SENSe]:SEMask:REGion[n]:LIST:RCARrier.

You can turn off (not use) specific regions with the [:SENSe]:SEMask:REGion[n]:LIST:STATe command.

Region[n] n=1 is base station and 2 is mobiles. The default is base station (1).

The types of testing that can be done for each region include:

- And - Test both the absolute power measurement and the power relative to the carrier. If they both fail, then return a failure for the measurement at this region.
- Absolute - Test the absolute power measurement. If it fails, then return a failure for the measurement at this region.
- Or - Test both the absolute power measurement and the power relative to the carrier. If either one fails, then return a failure for the measurement at this region.
- Relative - Test the power relative to the carrier. If it fails, then return a failure for the measurement at this region.

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
W-CDMA (3GPP)	ABS	ABS	ABS	ABS	ABS

Remarks: You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Spectrum Segment

[:SENSe]:SEMask:SEGMent OFFSet|REGion

[:SENSe]:SEMask:SEGMent?

Select the frequency spectrum segment in which spectrum emission mask levels are measured.

Offset – measurement segments are set as offset from the center frequency.

Region – measurement segments are set as the absolute frequencies.

Factory Preset and *RST:	Offset
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Measurement Interval

[:SENSe]:SEMask:SWEep:TIME <time>

[:SENSe]:SEMask:SWEep:TIME?

Sets the length of the measurement interval (acquisition length in each bin).

Factory Preset and *RST:	1 ms
Range:	100 µs to 10 ms
Default Unit:	seconds
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Trigger Source

[:SENSe]:SEMask:TRIGger:SOURce EXTernal[1]|EXTernal2|FRAMe|IMMediate|LINE

[:SENSe]:SEMask:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

External 1 – front panel external trigger input

External 2 – rear panel external trigger input

Frame – internal frame trigger from front panel input

Immediate – the next data acquisition is immediately taken, capturing the signal asynchronously (also called free run).

Line – power line

Factory Preset and *RST:	Immediate
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Power Reference

[:SENSe]:SEMask:TYPE PSDRef|TPRef

[:SENSe]:SEMask:TYPE?

Selects the measurement type. This allows you to make absolute and relative power measurements of either total power, or the power normalized to the measurement bandwidth.

Power Spectral Density Reference (PSDRef) - the power spectral density is used as the power reference

Total Power Reference (TPRef) - the total power is used as the power reference

Factory Preset and *RST:	Total power reference (TPRef)
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum (Frequency-Domain) Measurement

Commands for querying the spectrum measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 66. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Spectrum (Freq Domain)** measurement has been selected from the **MEASURE** key menu.

Spectrum—Data Acquisition Packing

[:SENSe]:SPECtrum:ACQuisition:PACKing AUTO|LONG|MEDium|SHORt

[:SENSe]:SPECtrum:ACQuisition:PACKing?

Select the amount of data acquisition packing. This is an advanced control that normally does not need to be changed.

Factory Preset and *RST:	Auto
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum—ADC Dither

[:SENSe]:SPECtrum:ADC:DITHer[:STATe] AUTO|ON|OFF|2|1|0

[:SENSe]:SPECtrum:ADC:DITHer[:STATe]?

Turn the ADC dither on or off. This is an advanced control that normally does not need to be changed.

Factory Preset and *RST:	Auto
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum—ADC Range

[:SENSe]:SPECtrum:ADC:RANGe AUTO|APEak|APLock|M6|P0|P6|P12|P18|P24|

[:SENSe]:SPECtrum:ADC:RANGe?

Select the range for the gain-ranging that is done in front of the ADC. This is an advanced control that normally does not need to be changed. Auto peak ranging is the default for this measurement. If you are measuring a CW signal please see the description below.

- Auto - automatic range

  For FFT spectrums - auto ranging should not be not be used. An exception to this would be if you know that your signal is “bursty”. Then you might use auto to maximize the time domain dynamic range as long as you are not very interested in the FFT data.

- Auto Peak - automatically peak the range

  For CW signals, the default of auto-peak ranging can be used, but a better FFT measurement of the signal can be made by selecting one of the manual ranges that are available: M6, P0 - P24. Auto peaking can cause the ADC range gain to move monotonically down during the data capture. This movement should have negligible effect on the FFT spectrum, but selecting a manual range removes this possibility. Note that if the CW signal being measured is close to the auto-ranging threshold, the noise floor may shift as much as 6 dB from sweep to sweep.

- Auto Peak Lock - automatically peak lock the range

  For CW signals, auto-peak lock ranging may be used. It will find the best ADC measurement range for this particular signal and will not move the range as auto-peak can. Note that if the CW signal being measured is close to the auto-ranging threshold, the noise floor may shift as much as 6 dB from sweep to sweep. For “bursty” signals, auto-peak lock ranging should not be used. The measurement will fail to operate, since the wrong (locked) ADC range will be chosen often and overloads will occur in the ADC.

- M6 - manually selects an ADC range that subtracts 6 dB of fixed gain across the range. Manual ranging is best for CW signals.

- P0 to 24 - manually selects ADC ranges that add 0 to 24 dB of fixed gain across the range. Manual ranging is best for CW signals.

Factory Preset and *RST:	Auto peak
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum—Average Clear

[:SENSe]:SPECtrum:AVERage:CLEAr

The average data is cleared and the average counter is reset.

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum—Number of Averages

[:SENSe]:SPECtrum:AVERage:COUNt <integer>

[:SENSe]:SPECtrum:AVERage:COUNt?

Set the number of ‘sweeps’ that will be averaged. After the specified number of ‘sweeps’ (average counts), the averaging mode (terminal control) setting determines the averaging action.

Factory Preset and *RST: 25

Range: 1 to 10,000

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum—Averaging State

[:SENSe]:SPECtrum:AVERage[:STATe] OFF|ON|0|1

[:SENSe]:SPECtrum:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST: On

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum—Averaging Mode

[:SENSe]:SPECtrum:AVERage:TCONtrol EXPonential|REPeat

[:SENSe]:SPECtrum:AVERage:TCONtrol?

Select the type of termination control used for the averaging function. This determines the averaging action after the specified number of 'sweeps' (average count) is reached.

Exponential - Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.

Repeat - After reaching the average count, the averaging is reset and a new average is started.

Factory Preset and *RST:	Exponential
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum—Averaging Type

[:SENSe]:SPECtrum:AVERage:TYPE LOG|MAXimum|MINimum|RMS|SCALar

[:SENSe]:SPECtrum:AVERage:TYPE?

Select the type of averaging.

Log – The log of the power is averaged. (This is also known as video averaging.)

Maximum – The maximum values are retained.

Minimum – The minimum values are retained.

RMS – The power is averaged, providing the rms of the voltage.

Scalar – The voltage is averaged.

Factory Preset and *RST:	Log
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum—Pre-ADC Bandpass Filter

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PADC OFF|ON|0|1

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PADC?

Turn the pre-ADC bandpass filter on or off. This is an advanced control that normally does not need to be changed.

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum—Pre-FFT BW Auto

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PFFT:AUTO OFF|ON|0|1

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PFFT:AUTO?

Select auto or manual control of the pre-FFT BW. This is an advanced control that normally does not need to be changed.

Auto - couples the pre-FFT BW to the frequency span.

Manual - the pre-FFT BW is uncoupled from the frequency span.

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum—Pre-FFT BW

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PFFT[:SIZE] <freq>

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PFFT[:SIZE]?

Set the pre-FFT bandwidth. This is an advanced control that normally does not need to be changed.

Frequency span, resolution bandwidth, and the pre-FFT bandwidth settings are normally coupled. If you are not auto-coupled, there can be combinations of these settings that are not valid.

Factory Preset and *RST: 1.55 MHz

Range: 1 Hz to 10.0 MHz

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum—Pre-FFT BW Filter Type

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PFFT:TYPE FLAT|GAUSsian

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PFFT:TYPE?

Select the type of pre-FFT filter that is used. This is an advanced control that normally does not need to be changed.

Flat top- a filter with a flat amplitude response, which provides the best amplitude accuracy.

Gaussian - a filter with Gaussian characteristics, which provides the best pulse response.

Factory Preset and *RST: Flat top

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum—Resolution BW

[:SENSe]:SPECtrum:BANDwidth|BWIDth[:RESolution] <freq>

[:SENSe]:SPECtrum:BANDwidth|BWIDth[:RESolution]?

Set the resolution bandwidth for the FFT. This is the bandwidth used for resolving the FFT measurement. It is not the pre-FFT bandwidth. This value is ignored if the function is auto-coupled.

Frequency span, resolution bandwidth, and the pre-FFT bandwidth settings are normally coupled. If you are not auto-coupled, there can be combinations of these settings that are not valid.

Factory Preset and *RST: 20.0 kHz

Range: 0.10 Hz to 3.0 MHz

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum—Resolution BW Auto

[:SENSe]:SPECtrum:BANDwidth|BWIDth[:RESolution]:AUTO OFF|ON|0|1

[:SENSe]:SPECtrum:BANDwidth|BWIDth[:RESolution]:AUTO?

Select auto or manual control of the resolution BW. The automatic mode couples the resolution bandwidth setting to the frequency span.

Factory Preset and *RST:	On
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Decimation of Spectrum Display

[:SENSe]:SPECtrum:DECimate[:FACTor] <integer>

[:SENSe]:SPECtrum:DECimate[:FACTor]?

Set the amount of data decimation done by the hardware and/or the software. Decimation by 3 keeps every third sample, throwing away the two in between. Similarly, decimation by 5 keeps every fifth sample, throwing away the four in between.

Using zero (0) decimation selects the automatic mode. The measurement will then automatically choose decimation by “1” or “2” as is appropriate for the bandwidth being used. This is an advanced control that normally does not need to be changed.

Factory Preset and *RST:	0
Range:	0 to 1,000, where 0 sets the function to automatic
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.
History:	Version A.02.00 or later

Spectrum—FFT Length

[:SENSe]:SPECtrum:FFT:LENGth <integer>

[:SENSe]:SPECtrum:FFT:LENGth?

Set the FFT length. This value is only used if length control is set to manual. The value must be greater than or equal to the window length value. Any amount greater than the window length is implemented by zero-padding. This is an advanced control that normally does not need to be changed.

Factory Preset and *RST:	4096
Range:	8 to 1,048,576
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.
History:	Short form changed from LENgth to LENGth, A.03.00

Spectrum—FFT Length Auto

[:SENSe]:SPECtrum:FFT:LENGth:AUTO OFF|ON|0|1

[:SENSe]:SPECtum:FFT:LENGth:AUTO?

Select auto or manual control of the FFT and window lengths.

This is an advanced control that normally does not need to be changed.

Auto - the window lengths are coupled to resolution bandwidth, window type (FFT), pre-FFT bandwidth (sample rate) and SENSe:SPECtrum:FFT:RBWPoints.

Manual - lets you set `SENSe:SPECtrum:FFT:LENGth` and `SENSe:SPECtrum:FFT:WINDow:LENGth`.

Factory Preset and *RST:	Auto
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.
History:	Short form changed from LENgth to LENGth, A.03.00

Spectrum—FFT Minimum Points in Resolution BW

[:SENSe]:SPECtrum:FFT:RBWPoints <real>

[:SENSe]:SPECtum:FFT:RBWPoints?

Set the minimum number of data points that will be used inside the resolution bandwidth. The value is ignored if length control is set to manual. This is an advanced control that normally does not need to be changed.

Factory Preset and *RST:	1.30
Range:	0.1 to 100
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum—Window Length

[:SENSe]:SPECtrum:FFT:WINDow:LENGth <integer>

[:SENSe]:SPECtrum:FFT:WINDow:LENGth?

Set the FFT window length. This value is only used if length control is set to manual. This is an advanced control that normally does not need to be changed.

Factory Preset and *RST:	706
Range:	8 to 1,048,576
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.
History:	Short form changed from LENgth to LENGth, A.03.00

Spectrum—FFT Window

[:SENSe]:SPECtrum:FFT:WINDow[:TYPE] BH4Tap|BLACkman|FLATtop|GAUSsian|HAMMing|HANNing|KB70|KB90 |KB110|UNIForm

[:SENSe]:SPECtrum:FFT:WINDow[:TYPE]?

Select the FFT window type.

BH4Tap - Blackman Harris with 4 taps

Blackman - Blackman

Flat Top - flat top, the default (for high amplitude accuracy)

Gaussian - Gaussian with alpha of 3.5

Hamming - Hamming

Hanning - Hanning

KB70, 90, and 110 - Kaiser Bessel with sidelobes at –70, –90, or –110 dBc

Uniform - no window is used. (This is the unity response.)

Factory Preset and *RST:	Flat top
Remarks:	This selection affects the acquisition point quantity and the FFT size, based on the resolution bandwidth selected. To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum—Frequency Span

[:SENSe]:SPECtrum:FREQuency:SPAN <freq>

[:SENSe]:SPECtrum:FREQuency:SPAN?

Set the frequency span to be measured.

Factory Preset and *RST:	1.0 MHz
Range:	10 Hz to 10.0 MHz (15 MHz when Service mode is selected)
Default Unit:	Hz
Remarks:	The actual measured span will generally be slightly wider due to the finite resolution of the FFT. To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum—Trigger Source

[:SENSe]:SPECtrum:TRIGger:SOURce EXTernal[1]|EXTernal2|FRAMe|IF|LINE|IMMediate|RFBurst

[:SENSe]:SPECtrum:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

External 1 - front panel external trigger input

External 2 - rear panel external trigger input

Frame - internal frame timer from front panel input

IF - internal IF envelope (video) trigger

Line - internal line trigger

Immediate - the next data acquisition is immediately taken (also called free run)

RF Burst - wideband RF burst envelope trigger that has automatic level control for periodic burst signals

Factory Preset and *RST:	Immediate (free run)
	RF burst, for GSM, iDEN mode
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform (Time-Domain) Measurement

Commands for querying the waveform measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 66. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Waveform (Time Domain)** measurement has been selected from the **MEASURE** key menu.

Waveform—Pre-ADC Bandpass Filter

[:SENSe]:WAVeform:ADC:FILTer:[:STATe] OFF|ON|0|1

[:SENSe]:WAVeform:ADC:FILTer:[:STATe]?

Turn the pre-ADC bandpass filter on or off. This is an Advanced control that normally does not need to be changed.

Preset: Off

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform—ADC Range

[:SENSe]:WAVeform:ADC:RANGe AUTO|APEak|APLock|GROund|M6|P0|P6|P12|P18|P24|

[:SENSe]:WAVeform:ADC:RANGe?

Select the range for the gain-ranging that is done in front of the ADC. This is an Advanced control that normally does not need to be changed.

Auto - automatic range

Auto Peak - automatically peak the range

Auto Peak Lock - automatically peak lock the range

Ground - ground

M6 - subtracts 6 dB of fixed gain across the range

P0 to 24 - adds 0 to 24 dB of fixed gain across the range

Factory Preset and *RST: Auto

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform—Number of Averages

[:SENSe]:WAVeform:AVERage:COUNt <integer>

[:SENSe]:WAVeform:AVERage:COUNt?

Set the number of sweeps that will be averaged. After the specified number of sweeps (average counts), the averaging mode (terminal control) setting determines the averaging action.

Factory Preset and *RST:	10
Range:	1 to 10,000
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform—Averaging State

[:SENSe]:WAVeform:AVERage[:STATe] OFF|ON|0|1

[:SENSe]:WAVeform:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST:	Off
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform—Averaging Mode

[:SENSe]:WAVeform:AVERage:TCONtrol EXPonential|REPeat

[:SENSe]:WAVeform:AVERage:TCONtrol?

Select the type of termination control used for the averaging function. This determines the averaging action after the specified number of ‘sweeps’ (average count) is reached.

Exponential - Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.

Repeat - After reaching the average count, the averaging is reset and a new average is started.

Factory Preset and *RST:	Exponential
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform—Averaging Type

[:SENSe]:WAVeform:AVERage:TYPE LOG|MAXimum|MINimum|RMS|SCALar

[:SENSe]:WAVeform:AVERage:TYPE?

Select the type of averaging.

Log - The log of the power is averaged. (This is also known as video averaging.)

Maximum - The maximum values are retained.

Minimum - The minimum values are retained.

RMS - The power is averaged, providing the rms of the voltage.

Factory Preset and *RST:	RMS
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform—Resolution BW

[:SENSe]:WAVeform:BANDwidth|BWIDth[:RESolution] <freq>

[:SENSe]:WAVeform:BANDwidth|BWIDth[:RESolution]?

Set the resolution bandwidth. This value is ignored if the function is auto-coupled.

Factory Preset and *RST:	100.0 kHz for NADC, PDC, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), basic, service
Range:	1.0 kHz to 5.0 MHz
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform—Resolution BW Filter Type

[:SENSe]:WAVeform:BANDwidth|BWIDth[:RESolution]:TYPE FLATtop|GAUSsian

[:SENSe]:WAVeform:BANDwidth|BWIDth[:RESolution]:TYPE?

Select the type of Resolution BW filter that is used. This is an Advanced control that normally does not need to be changed.

Flat top - a filter with a flat amplitude response, which provides the best amplitude accuracy.

Gaussian - a filter with Gaussian characteristics, which provides the best pulse response.

Factory Preset and *RST:	Gaussian
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform—Decimation of Waveform Display

[:SENSe]:WAVeform:DECimate[:FACTor] <integer>

[:SENSe]:WAVeform:DECimate[:FACTor]?

Set the amount of data decimation done by the hardware and/or the firmware. For example, if 4 is selected, three out of every four data points will be thrown away. So every 4th data point will be kept.

Factory Preset and *RST:	1
Range:	1 to 4
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform—Control Decimation of Waveform Display

[:SENSe]:WAVeform:DECimate:STATe OFF|ON|0|1

[:SENSe]:WAVeform:DECimate:STATe?

Set the amount of data decimation done by the hardware in order to decrease the number of acquired points in a long capture time. This is the amount of data that the measurement ignores.

Factory Preset and *RST:	Off
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform—Sweep (Acquisition) Time

[:SENSe]:WAVeform:SWEep:TIME <time>

[:SENSe]:WAVeform:SWEep:TIME?

Set the measurement acquisition time. It is used to specify the length of the time capture record.

Factory Preset and *RST:	2.0 ms
Range:	1 µs to 100 s
Default Unit:	seconds
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform—Trigger Source

[:SENSe]:WAVeform:TRIGger:SOURce EXTernal[1]|EXTernal2|FRAMe|IF|IMMediate|LINE|RFBurst

[:SENSe]:WAVeform:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

External 1 - front panel external trigger input

External 2 - rear panel external trigger input

Frame - internal frame timer from front panel input

IF - internal IF envelope (video) trigger

Immediate - the next data acquisition is immediately taken (also called free run)

Line - internal line trigger

RF Burst - wideband RF burst envelope trigger that has automatic level control for periodic burst signals

Factory Preset and *RST:	Immediate (free run), for Basic, cdmaOne, NADC, PDC mode
	RF burst, for GSM, iDEN mode
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

TRIGger Subsystem

The Trigger Subsystem is used to set the controls and parameters associated with triggering the data acquisitions. Other trigger-related commands are found in the INITiate and ABORt subsystems.

The trigger parameters are global within the selected Mode. The commands in the TRIGger subsystem set up the way the triggers function, but selection of the trigger source is made from each measurement. There is a separate trigger source command in the SENSe:<meas> subsystem for each measurement. The equivalent front panel keys for the parameters described in the following commands, can be found under the **Mode Setup, Trigger** key.

Automatic Trigger Control

:TRIGger[:SEQuence]:AUTO:STATe OFF|ON|0|1

:TRIGger[:SEQuence]:AUTO:STATe?

Turns the automatic trigger function on and off. This function causes a trigger to occur if the designated time has elapsed and no trigger occurred. It can be used with unpredictable trigger sources, like external or burst, to make sure a measurement is initiated even if a trigger doesn't occur. Use TRIGger[:SEQuence]:AUTO[:TIME] to set the time limit.

Factory Preset and *RST	On for cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), NADC, or PDC
Front Panel Key Access	**Mode Setup, Trigger, Auto Trigger**

Automatic Trigger Time

:TRIGger[:SEQuence]:AUTO[:TIME] <time>

:TRIGger[:SEQuence]:AUTO[:TIME]?

After the measurement is activated the instrument will take a data acquisition immediately upon receiving a signal from the selected trigger source. If no trigger signal is received by the end of the time specified in this command, a data acquisition is taken anyway. TRIGger[:SEQuence]:AUTO:STATE must be on.

Factory Preset and *RST:	100.0 ms
Range:	0.0 to 1000.0 s for cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib)
Default Unit:	seconds

Front Panel External Trigger Delay Value

:TRIGger[:SEQuence]:EXTernal[1]:DELay <time>

:TRIGger[:SEQuence]:EXTernal[1]:DELay?

Set the amount of trigger delay when using the front panel external trigger input. Set the trigger value to zero (0) seconds to turn off trigger delay.

Factory Preset and *RST:	0.0 s
Range:	–100.0 ms to 500.0 ms for cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib)
Default Unit:	seconds
Front Panel Access:	**Mode Setup, Trigger, Ext Front, Delay**

Front Panel External Trigger Level

:TRIGger[:SEQuence]:EXTernal[1]:LEVel <voltage>

:TRIGger[:SEQuence]:EXTernal[1]:LEVel?

Set the trigger level when using the front panel external trigger input.

Factory Preset and *RST: 2.0 V

Range: –5.0 to +5.0 V

Default Unit: volts

Front Panel Access: **Mode Setup, Trigger, Ext Front, Level**

Front Panel External Trigger Slope

:TRIGger[:SEQuence]:EXTernal[1]:SLOPe NEGative|POSitive

:TRIGger[:SEQuence]:EXTernal[1]:SLOPe?

Sets the triggering to occur on a positive-going edge or a negative-going edge of the trigger when using the front panel external trigger input.

Factory Preset and *RST: Positive

Front Panel Access: **Mode Setup, Trigger, Ext Front, Slope**

Rear Panel External Trigger Delay

:TRIGger[:SEQuence]:EXTernal2:DELay <time>

:TRIGger[:SEQuence]:EXTernal2:DELay?

Set the trigger delay when using the rear panel external trigger.

Factory Preset and *RST: 0.0 s

Range: –100.0 ms to 500.0 ms for cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib)

Default Unit: seconds

Front Panel Access: **Mode Setup, Trigger, Ext Rear, Delay**

Rear Panel External Trigger Level

:TRIGger[:SEQuence]:EXTernal2:LEVel <voltage>

:TRIGger[:SEQuence]:EXTernal2:LEVel?

Set the trigger level when using the rear panel external trigger input.

Factory Preset and *RST:	2.0 V
Range:	–5.0 to +5.0 V
Default Unit:	volts
Front Panel Access:	**Mode Setup, Trigger, Ext Rear, Level**

Rear Panel External Trigger Slope

:TRIGger[:SEQuence]:EXTernal2:SLOPe NEGative|POSitive

:TRIGger[:SEQuence]:EXTernal2:SLOPe?

Sets the trigger slope when using the rear panel external trigger input.

Factory Preset and *RST:	Positive
Front Panel Access:	**Mode Setup, Trigger, Ext Rear, Slope**

Frame Trigger Adjust

:TRIGger[:SEQuence]:FRAMe:ADJust <time>

Lets you advance the phase of the frame trigger by the specified amount. It does not change the period of the trigger waveform. If the command is sent multiple times, it advances the phase of the frame trigger more each time it is sent.

Factory Preset and *RST:	0.0 s
Range:	0.0 to 10.0 s
Default Unit:	seconds
Front Panel Access:	**None**

Frame Trigger Period

:TRIGger[:SEQuence]:FRAMe:PERiod <time>

:TRIGger[:SEQuence]:FRAMe:PERiod?

Set the frame period that you want when using the external frame timer trigger. If the traffic rate is changed, the value of the frame period is initialized to the preset value.

Factory Preset and *RST:	10.0 ms (1 radio frame) for W-CDMA (3GPP), W-CDMA (Trial & Arib)
Range:	0.0 ms to 559.0 ms for Basic, cdmaOne, GSM, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib)
Default Unit:	seconds
Front Panel Access:	**Mode Setup, Trigger, Frame Timer, Period**

Trigger Holdoff

:TRIGger[:SEQuence]:HOLDoff <time>

:TRIGger[:SEQuence]:HOLDoff?

Set the holdoff time between triggers. After a trigger, another trigger will not be allowed until the holdoff time expires. This parameter affects all trigger sources.

Factory Preset and *RST:	0.0 s
Range:	0.0 to 500.0 ms
Default Unit:	seconds
Front Panel Access:	**Mode Setup, Trigger, Trig Holdoff**

Video (IF) Trigger Delay

:TRIGger[:SEQuence]:IF:DELay <time>

:TRIGger[:SEQuence]:IF:DELay?

Set the trigger delay when using the IF (video) trigger (after the Resolution BW filter).

Factory Preset and *RST:	0.0 s
Range:	–100.0 ms to 500.0 ms for cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib)
Default Unit:	seconds
Front Panel Access:	**Mode Setup, Trigger, Video (IF Envlp), Delay**

Video (IF) Trigger Level

:TRIGger[:SEQuence]:IF:LEVel <power>

:TRIGger[:SEQuence]:IF:LEVel?

Set the trigger level when using the IF (video) trigger.

Factory Preset and *RST:	–6.0 dBm for cdmaOne, GSM, Basic, Service, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib)
Range:	–200.0 to 50.0 dBm
Default Unit:	dBm
Front Panel Access:	**Mode Setup, Trigger, Video (IF Envlp), Level**

Video (IF) Trigger Slope

:TRIGger[:SEQuence]:IF:SLOPe NEGative|POSitive

:TRIGger[:SEQuence]:IF:SLOPe?

Sets the trigger slope when using the IF (video) trigger.

Factory Preset and *RST:	Positive
Front Panel Access:	**Mode Setup, Trigger, Video (IF Envlp), Slope**

RF Burst Trigger Delay

:TRIGger[:SEQuence]:RFBurst:DELay <time>

:TRIGger[:SEQuence]:RFBurst:DELay?

Set the trigger delay when using the RF burst (wideband) trigger.

Factory Preset and *RST:	0.0 s
Range:	–100.0 ms to 500.0 ms for cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib)
Default Unit:	seconds
Front Panel Access:	**Mode Setup, Trigger, RF Burst, Delay**

RF Burst Trigger Level

:TRIGger[:SEQuence]:RFBurst:LEVel <rel_power>

:TRIGger[:SEQuence]:RFBurst:LEVel?

Set the trigger level when using the RF Burst (wideband) Trigger. The value is relative to the peak of the signal. RF Burst is also known as RF Envelope.

Factory Preset and *RST:	–6.0 dB
Range:	–25.0 to 0.0 dB
Default Unit:	dB
Front Panel Access:	**Mode Setup**, **Trigger, RF Burst, Peak Level**

RF Burst Trigger Slope

:TRIGger[:SEQuence]:RFBurst:SLOPe NEGative|POSitive

:TRIGger[:SEQuence]:RFBurst:SLOPe?

Set the trigger slope when using the RF Burst (wideband) Trigger.

Factory Preset and *RST:	Positive
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use :INSTrument:SELect to set the mode.
Front Panel Access:	**Mode Setup, Trigger, RF Burst, Slope**

2 W-CDMA (Trial & Arib) Programming Commands

These commands are only available when W-CDMA (Trial & Arib) mode has been selected using **`INST:SELect ARIBWCDMA`**. If this mode is selected, commands that are unique to another mode are not available.

SCPI Command Subsystems

CALCulate Subsystem

This subsystem is used to perform post-acquisition data processing. In effect, the collection of new data triggers the CALCulate subsystem. In this instrument, the primary functions in this subsystem are markers and limits.

Code Domain Power Measurement Power Offset

:CALCulate:CDPower:PO1 <rel_power>

:CALCulate:CDPower:PO1?

Set the power offset value of the pilot bits.

:CALCulate:CDPower:PO2 <rel_power>

:CALCulate:CDPower:PO2?

Set the power offset value of the transmit control bits.

:CALCulate:CDPower:PO3 <rel_power>

:CALCulate:CDPower:PO3?

Set the power offset value of the transport format control indicator bits.

Factory Preset and *RST:	0 dB
Range:	–20 to 50 dB
Remarks:	You must be in the W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain Power Measurement Spread Code

:CALCulate:CDPower:SPRead <integer>

:CALCulate:CDPower:SPRead?

Set a spread code.

Factory Preset and *RST:	0
Range:	0 to 511, when **CALCulate:CDPower:SRATe** = 8
	0 to 255, when **CALCulate:CDPower:SRATe** = 16
	0 to 127, when **CALCulate:CDPower:SRATe** = 32
	0 to 63, when **CALCulate:CDPower:SRATe** = 64
	0 to 31, when **CALCulate:CDPower:SRATe** = 128
	0 to 15, when **CALCulate:CDPower:SRATe** = 256
	0 to 7, when **CALCulate:CDPower:SRATe** = 512
	0 to 3, when **CALCulate:CDPower:SRATe** = 1024
Remarks:	You must be in the W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain Power Measurement Symbol Rate

:CALCulate:CDPower:SRATe <integer>

:CALCulate:CDPower:SRATe?

Set a symbol rate.

Factory Preset and *RST:	16
Range:	8, 16, 32, 64, 128, 256, 512, 1024, when **[SENSe:]RADio:FORMat** = ARIB
	16, 32, 64, 128, 256, 512, 1024, when **[SENSe:]RADio:FORMat** = Trial
Unit:	ksps
Remarks:	You must be in the W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain Power Measurement Sweep Offset (Measurement Offset)

:CALCulate:CDPower:SWEep:OFFSet <integer>

:CALCulate:CDPower:SWEep:OFFSet?

Set the timing offset of measurement interval in slots. (1 slot = 625 µs)

The sum of **CALCulate:CDPower:SWEep:TIME** and **CALCulate:CDPower:SWEep:OFFSet** must be equal to or less than 32, because data of 32 slots are acquired. If the sum becomes more than 32, **CALCulate:CDPower:SWEep:TIME** is adjusted automatically.

Factory Preset and *RST:	0
Range:	0 to 31
Unit:	slots
Remarks:	You must be in the W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain Power Measurement Sweep Time (Measurement Interval)

:CALCulate:CDPower:SWEep:TIME <integer>

:CALCulate:CDPower:SWEep:TIME?

Set the length of measurement interval in slots. (1 slot = 625 µs)

The sum of **CALCulate:CDPower:SWEep:TIME** and **CALCulate:CDPower:SWEep:OFFSet** must be equal to or less than 32, because data of 32 slots are acquired. If the sum becomes more than 32, **CALCulate:CDPower:SWEep:OFFSet** is adjusted automatically.

Factory Preset and *RST:	1
Range:	1 to 32
Unit:	slots
Remarks:	You must be in the W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Query the Current Measurement Status

:CALCulate:CLIMits:FAIL?

Checks if the current measurement is outside its limits. It returns a 0 (zero) if it is passing or a 1 (one) if it is failing.

Front Panel
Access: None

Data Query

:CALCulate:DATA[n]?

Returns the designated measurement data for the currently selected measurement and sub-opcode.

n = any valid sub-opcode for the current measurement. See the "MEASure Group of Commands" on page 244 for information on the data that can be returned for each measurement.

Calculate/Compress Trace Data Query

:CALCulate:DATA[n]:COMPress? MAXimum|MEAN|MINimum|RMS|SAMPle|SDEViation|CFIT {,<soffset>}{,<length>}{,<roffset>}

Returns the designated trace data for the currently selected measurement. The command can be used with sub-opcodes (*n*) for measurement results that are trace data. See the following table.

This command is used to compress/decimate a long trace to extract the desired data and only return to the computer the necessary data. A typical example would be to acquire N bursts of GSM data and return the mean power of each burst.

The command can also be used to identify the best curve fit for the data.

Curve Fit - applies curve fitting routines to the data. Where <soffset> and <length> are required, and <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in points) and the curve coefficients ((order + 1) values).

<Start offset> - is an optional integer. It specifies the amount of data, at the beginning of the trace, that will be ignored before the decimation process starts. It is an integer index (that starts counting at zero) for all the elements in the trace. The default value is zero.

<Length> - is an optional integer that defines how many trace elements will be compressed into one value. This parameter has a default value equal to the current trace length.

<Repeat offset> - is an optional real number. It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Select a number such that repeated additions will round to the correct starting index.

Example: To query the mean power of a set of GSM bursts:

1. Set the waveform measurement sweep time to acquire the required number of bursts.
2. Set the triggers such that acquisition happens at a known position relative to a burst.
3. Then query the mean burst levels using, **CALC:DATA2:COMP? MEAN,62,1315,1442.3** (These parameter values correspond to GSM signals.)

Remarks: The optional parameters must be entered in the specified order. If you want to specify <length>, you must also specify <soffset> or it's default. (e.g. **CALC:DATA2:COMP? MEAN,62,1315**

This command uses the data setting specified by the FORMat:DATA command and can return binary or ascii data.

History: Added in revision A.03.00 and later

Measurement	Available Traces	Markers Available?
ACP - adjacent channel power (Basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib), iDEN, NADC, PDC modes)	no traces	no markers
CDPower - code domain power (W-CDMA (Trial & Arib) mode)	CDPower (*n*=2)[a] EVM (*n*=4)[a] MERRor (*n*=5)[a] PERRor (*n*=6)[a] SPOWer (*n*=8)[a]	yes
CHPower - channel power (Basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode)	SPECtrum (*n*=2)[a]	no markers

Measurement	Available Traces	Markers Available?
EVMQpsk - QPSK error vector magnitude (cdma2000, W-CDMA (Trial & Arib) modes)	EVM (*n*=2)[a] MERRor (*n*=3)[a] PERRor (*n*=4)[a]	yes
PSTatistic - power statistics CCDF (cdma2000, W-CDMA (Trial & Arib) modes)	MEASured (*n*=2)[a] GAUSsian (*n*=3)[a] REFerence (*n*=4)[a]	yes
RHO - modulation quality (cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode)	EVM (*n*=2)[a] MAGerror (*n*=3)[a] PHASe (*n*=4)[a]	yes
SPECtrum - (frequency domain) (all modes)	RFENvelope (*n*=2)[a] for Service mode IQ (*n*=3)[a] SPECtrum (*n*=4)[a] ASPectrum (*n*=7)[a]	yes
WAVEform - (time domain) (all modes)	RFENvelope (*n*=2)[a] IQ (*n*=8)[a]	yes

a. The *n* number indicates the sub-opcode that corresponds to this trace. Detailed descriptions of the trace data can be found in the MEASure subsystem documentation by looking up the sub-opcode for the appropriate measurement.

Calculate Peaks of Trace Data

:CALCulate:DATA[n]:PEAKs? <threshold>,<excursion>[,AMPLitude|FREQuency|TIME]

Returns a list of peaks for the designated trace data *n* for the currently selected measurement. The peaks must meet the requirements of the peak threshold and excursion values.

The command can be used with sub-opcodes (*n*) for any measurement results that are trace data. See the table above. Subopcode *n*=0, raw trace data cannot be searched for peaks. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm.

Threshold - is the level below which trace data peaks are ignored

Excursion - To be defined as a peak, the signal must rise above the threshold by a minimum amplitude change. Excursion is measured from the lowest point above the threshold (of the rising edge of the peak), to the highest signal point that begins the falling edge.

Amplitude - lists the peaks in order of descending amplitude, so the highest peak is listed first. This is the default peak order listing if the optional parameter is not specified.

Frequency - lists the peaks in order of occurrence, left to right across the x-axis

Time - lists the peaks in order of occurrence, left to right across the x-axis

Example: Select the spectrum measurement.

Use **CALC:DATA4:PEAK? -40,10,FREQ** to identify the peaks above -40 dBm, with excursions of at least 10 dB, in order of increasing frequency.

Query Results: Returns a list of floating-point numbers. The first value in the list is the number of peak points that follow. A peak point consists of two values: a peak amplitude followed by the its corresponding frequency (or time).

If no peaks are found the peak list will consist of only the number of peaks, (0).

The peak list is limited to 100 peaks. Peaks in excess of 100 are ignored.

Remarks: This command uses the data setting specified by the FORMat:DATA command and can return real 32-bit, real 64-bit, or ASCII data. The default data format is ASCII.

History: Added in revision A.03.00 and later

CALCulate:MARKers Subsection

When using the marker commands you must specify the measurement in the SCPI command. We recommend that you use the marker commands only on the current measurement. Many marker commands will return invalid results, when used on a measurement that is not current. (This is true for commands that do more than simply setting or querying an instrument parameter.) No error is reported for these invalid results.

You must make sure that the measurement is completed before trying to query the marker value. Using the MEASure or READ command, before the marker command, forces the measurement to complete before allowing the next command to be executed.

Each measurement has its own instrument state for marker parameters. Therefore, if you exit the measurement, the marker settings in each measurement are saved and are then recalled when you change back to that measurement.

W-CDMA (Trial & Arib) Mode - <measurement> key words

- ACP - no markers
- CDPower - markers available
- CHPower - no markers
- EVMQpsk - markers available
- PSTatistic - markers available
- RHO - markers available
- SPECtrum - markers available
- WAVeform - markers available

Example:

Suppose you are using the Spectrum measurement. To position marker 2 at the maximum peak value, of the trace that marker 2 is currently on, the command is:

```
:CALCulate:SPECtrum:MARKer2:MAXimum
```

You must make sure that the measurement is completed before trying to query the marker value. Using the MEASure or READ command, before the marker command, forces the measurement to complete before allowing the next command to be executed.

Markers All Off on All Traces

:CALCulate:<measurement>:MARKer:AOFF

Turns off all markers on all the traces.

Example:	**CALC:SPEC:MARK:AOFF**
Remarks:	The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)
Front Panel Access:	**Marker, More, Marker All Off**

Marker Function

:CALCulate:<measurement>:MARKer[1]|2|3|4:FUNCtion BPOWer|NOISe|OFF

:CALCulate:<measurement>:MARKer[1]|2|3|4:FUNCtion?

Selects the type of marker for the specified marker. A particular measurement may not have all the types of markers that are commonly available.

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

Band Power – is the integrated power between the two markers for traces in the frequency domain and is the mean power between the two markers for traces in the time domain.

Noise – is the noise power spectral density in a 1 Hz bandwidth. It is averaged over 32 horizontal trace points.

Off – turns off the marker functions

Example:	**CALC:SPEC:MARK3:FUNC Noise**
Remarks:	The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)
Front Panel Access:	**Marker, Marker Function**

Marker Function Result

:CALCulate:<measurement>:MARKer[1]|2|3|4:FUNCtion:RESult?

Quires the result of the currently active marker function. The measurement must be completed before querying the marker.A particular measurement may not have all the types of markers available.

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

Example:	**CALC:SPEC:MARK:FUNC:RES?**
Remarks:	The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)
Front Panel Access:	**Marker, Marker Function**

Marker Peak (Maximum) Search

:CALCulate:<measurement>:MARKer[1]|2|3|4:MAXimum

Places the selected marker on the highest point on the trace that is assigned to that particular marker number.

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

Example:	**CALC:SPEC:MARK1:MAX**
Remarks:	The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)
Front Panel Access:	**Search**

Marker Peak (Minimum) Search

:CALCulate:<measurement>:MARKer[1]|2|3|4:MINimum

Places the selected marker on the lowest point on the trace that is assigned to that particular marker number.

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

Example: **CALC:SPEC:MARK2:MIN**

Remarks: The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)

Front Panel Access: None

Marker Mode

:CALCulate:<measurement>:MARKer[1]|2|3|4:MODE POSition|DELTa

:CALCulate:<measurement>:MARKer[1]|2|3|4:MODE?

Selects the type of marker to be a normal position-type marker or a delta marker.A specific measurement may not have both types of markers. For example, several measurements only have position markers.

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

Example: **CALC:SPEC:MARK:MODE DELTA**

Remarks: For the delta mode only markers 1 and 2 are valid.

The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)

Front Panel Access: **Marker, Marker [Delta]**

Marker On/Off

:CALCulate:<measurement>:MARKer[1]|2|3|4[:STATe] OFF|ON|0|1

:CALCulate:<measurement>:MARKer[1]|2|3|4[:STATe]?

Turns the selected marker on or off.

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

Example: **CALC:SPEC:MARK2: on**

Remarks: The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, AREFerence, WAVeform)

The WAVeform measurement only has two markers available.

Front Panel Access: **Marker, Select** then **Marker Normal** or **Marker On Off**

Marker to Trace

:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe <trace_name>

:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe?

Assigns the specified marker to the designated trace. Not all types of measurement data can have markers assigned to them.

Example: With the WAVeform measurement selected, a valid command is **CALC:SPEC:MARK2:TRACE rfenvelope**.

Range: The names of valid traces are dependent upon the selected measurement. See the following table for the available trace names. The trace name assignment is independent of the marker number.

Remarks: The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)

Front Panel Access: **Marker, Marker Trace**

Measurement	Available Traces	Markers Available?
ACP - adjacent channel power (Basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib), iDEN, NADC, PDC modes)	no traces	no markers

Measurement	Available Traces	Markers Available?
CDPower - code domain power (W-CDMA (Trial & Arib) mode)	CDPower (*n*=2)[a] EVM (*n*=4)[a] MERRor (*n*=5)[a] PERRor (*n*=6)[a] SPOWer (*n*=8)[a]	yes
CHPower - channel power (Basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode)	SPECtrum (*n*=2)[a]	no markers
EVMQpsk - QPSK error vector magnitude (cdma2000, W-CDMA (Trial & Arib) modes)	EVM (*n*=2)[a] MERRor (*n*=3)[a] PERRor (*n*=4)[a]	yes
PSTatistic - power statistics CCDF (cdma2000, W-CDMA (Trial & Arib) modes)	MEASured (*n*=2)[a] GAUSian (*n*=3)[a] REFerence (*n*=4)[a]	yes
RHO - modulation quality (cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode)	EVM (*n*=2)[a] MAGerror (*n*=3)[a] PHASe (*n*=4)[a]	yes
SPECtrum - (frequency domain) (all modes)	RFENvelope (*n*=2)[a] for Service mode IQ (*n*=3)[a] SPECtrum (*n*=4)[a] ASPectrum (*n*=7)[a]	yes
WAVEform - (time domain) (all modes)	RFENvelope (*n*=2)[a] IQ (*n*=8)[a]	yes

a. The *n* number indicates the sub-opcode that corresponds to this trace. Detailed descriptions of the trace data can be found in the MEASure subsystem documentation by looking up the sub-opcode for the appropriate measurement.

Marker X Value

:CALCulate:<measurement>:MARKer[1]|2|3|4:X <param>

:CALCulate:<measurement>:MARKer[1]|2|3|4:X?

Position the designated marker on its assigned trace at the specified X value. The parameter value is in X-axis units (which is often frequency or time).

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

The query returns the current X value of the designated marker. The measurement must be completed before querying the marker.

Example:	**CALC:SPEC:MARK2:X 1.2e6 Hz**
Default Unit:	Matches the units of the trace on which the marker is positioned
Remarks:	The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)
Front Panel Access:	**Marker, <active marker>, RPG**

Marker X Position

:CALCulate:<measurement>:MARKer[1]|2|3|4:X:POSition <integer>

:CALCulate:<measurement>:MARKer[1]|2|3|4:X:POSition?

Position the designated marker on its assigned trace at the specified X position. A trace is composed of a variable number of measurement points. This number changes depending on the current measurement conditions. The current number of points must be identified before using this command to place the marker at a specific location.

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

The query returns the current X position for the designated marker. The measurement must be completed before querying the marker.

Example:	**CALC:SPEC:MARK:X:POS 500**
Range:	0 to a maximum of (3 to 920,000)
Remarks:	The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)
Front Panel Access:	**Marker, <active marker>, RPG**

Marker Readout Y Value

:CALCulate:<measurement>:MARKer[1]|2|3|4:Y?

Readout the current Y value for the designated marker on its assigned trace. The value is in the Y-axis units for the trace (which is often dBm).

The marker must have already been assigned to a trace. Use **:CALCulate:<measurement>:MARKer[1]|2|3|4:TRACe** to assign a marker to a particular trace.

The measurement must be completed before querying the marker.

Example:	**CALC:SPEC:MARK1:Y -20 dB**
Default Unit:	Matches the units of the trace on which the marker is positioned
Remarks:	The keyword for the current measurement must be specified in the command. (Some examples include: SPECtrum, WAVeform)

CONFigure Subsystem

:CONFigure:<measurement>

The CONFigure commands are used with several other commands and are documented in the section on the "MEASure Group of Commands" on page 244.

DISPlay Subsystem

The DISPlay controls the selection and presentation of textual, graphical, and TRACe information. Within a DISPlay, information may be separated into individual WINDows.

Adjacent Channel Power Measurement View Selection

:DISPlay:ACP:VIEW BGRaph|SPECtrum

:DISPlay:ACP:VIEW?

Select the adjacent channel power measurement display of bar graph or spectrum.

Factory Preset and *RST:	BGRaph
Remarks:	You must be in the cdma2000, W-CDMA (Trial & Arib), NADC or PDC mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Measurement Y-Axis Reference Level

:DISPlay:SPECtrum[n]:WINDow[m]:TRACe:Y[:SCALe]:RLEVel <power>

:DISPlay:SPECtrum[n]:WINDow[m]:TRACe:Y[:SCALe]:RLEVel?

Sets the amplitude reference level for the y-axis.

n – selects the view, the default is Spectrum.

— n=1, Spectrum

— n=2, I/Q Waveform

— n=3, numeric data (service mode)

— n=4, RF Envelope (service mode)

m – selects the window within the view. The default is 1.

Factory Preset and *RST:	0 dBm, for Spectrum

Range: –250 to 250 dBm, for Spectrum

Default Unit: dBm, for Spectrum

Remarks: May affect input attenuator setting.

To use this command, the appropriate mode should be selected with INSTrument:SELect.

Front Panel Access: When in Spectrum measurement: **Amplitude Y Scale, Ref Level**

Turn a Trace Display On/Off

:DISPlay:TRACe[n][:STATe] OFF|ON|0|1

:DISPlay:TRACe[n][:STATe]?

Controls whether the specified trace is visible or not.

n is a sub-opcode that is valid for the current measurement. See the "MEASure Group of Commands" on page 244 for more information about sub-opcodes.

Factory Preset and *RST: On

Range: The valid traces and their sub-opcodes are dependent upon the selected measurement. See the following table.

The trace name assignment is independent of the window number.

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Front Panel Access: **Display, Display Traces**

Measurement	Available Traces	Markers Available?
ACP - adjacent channel power (Basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib), iDEN, NADC, PDC modes)	no traces	no markers

Measurement	Available Traces	Markers Available?
CDPower - code domain power (W-CDMA (Trial & Arib) mode)	CDPower (*n*=2)[a] EVM (*n*=4)[a] MERRor (*n*=5)[a] PERRor (*n*=6)[a] SPOWer (*n*=8)[a]	yes
CHPower - channel power (Basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode)	SPECtrum (*n*=2)[a]	no markers
EVMQpsk - QPSK error vector magnitude (cdma2000, W-CDMA (Trial & Arib) modes)	EVM (*n*=2)[a] MERRor (*n*=3)[a] PERRor (*n*=4)[a]	yes
PSTatistic - power statistics CCDF (cdma2000, W-CDMA (Trial & Arib) modes)	MEASured (*n*=2)[a] GAUSian (*n*=3)[a] REFerence (*n*=4)[a]	yes
RHO - modulation quality (cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode)	EVM (*n*=2)[a] MAGerror (*n*=3)[a] PHASe (*n*=4)[a]	yes
SPECtrum - (frequency domain) (all modes)	RFENvelope (*n*=2)[a] for Service mode IQ (*n*=3)[a] SPECtrum (*n*=4)[a] ASPectrum (*n*=7)[a]	yes
WAVEform - (time domain) (all modes)	RFENvelope (*n*=2)[a] IQ (*n*=8)[a]	yes

a. The *n* number indicates the sub-opcode that corresponds to this trace. Detailed descriptions of the trace data can be found in the MEASure subsystem documentation by looking up the sub-opcode for the appropriate measurement.

Waveform Measurement Y-Axis Reference Level

`:DISPlay:WAVEform[n]:WINDow[m]:TRACe:Y[:SCALe]:RLEVel <power>`

`:DISPlay:WAVEform[n]:WINDow[m]:TRACe:Y[:SCALe]:RLEVel?`

Sets the amplitude reference level for the y-axis.

n – selects the view, the default is RF envelope.

— n=1, RF Envelope

— n=2, I/Q Waveform

m – selects the window within the view. The default is 1.

Factory Preset and *RST:	0 dBm, for RF envelope
Range:	–250 to 250 dBm, for RF envelope
Default Unit:	dBm, for RF envelope
Remarks:	May affect input attenuator setting.
	To use this command, the appropriate mode should be selected with INSTrument:SELect.
Front Panel Access:	When in Waveform measurement: **Amplitude Y Scale, Ref Level**

FETCh Subsystem

:FETCh:<measurement>[n]?

The FETCh? commands are used with several other commands and are documented in the section on the "MEASure Group of Commands" on page 244.

MEASure Group of Commands

This group includes commands used to make measurements and return results. The different commands can be used to provide fine control of the overall measurement process. Most measurements should be done in single measurement mode, rather than doing the measurement continuously.

Each measurement sets the instrument state that is appropriate for that measurement. Other commands are available for each **Mode** to allow changing settings, view, limits, etc. Refer to:

SENSe:<measurement>, SENSe:CHANnel, SENSe:CORRection, SENSe:FREQuency, SENSe:POWer, SENSe:RADio, SENSe:SNYC
CALCulate:<measurement>, CALCulate:CLIMits/DATA
DISPlay:<measurement>
TRIGger

Measure Commands

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Standard.

- Stops the current measurement and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement.

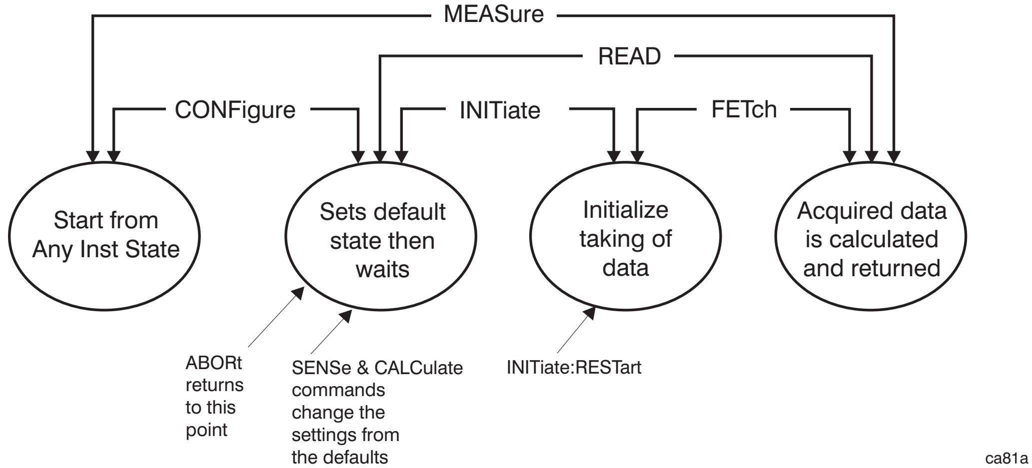
  If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and faster then the ASCII format.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command, or the INITiate and FETCh? commands, to initiate the measurement and query the results. See Figure 2-1.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command or INITiate and FETCh? commands, to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Figure 2-1 Measurement Group of Commands



Configure Commands

:CONFigure:<measurement>

This command sets up the instrument for the specified measurement using the factory default instrument settings and stops the current measurement. It does not initiate the taking of measurement data.

The CONFigure? query returns the current measurement name.

Fetch Commands

:FETCh:<measurement>[n]?

This command puts valid data into the output buffer, but does not initiate data acquisition. Use the INITiate[:IMMediate] command to acquire data before you use the FETCh command. You can only fetch results from the measurement that is currently selected.

If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and faster then the ASCII format.

Read Commands

:READ:<measurement>[n]?

- Does not preset the measurement to the factory defaults. (The MEASure? command does preset.) It uses the settings from the last measurement.
- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
- Blocks other SCPI communication, waiting until the measurement is complete before returning the results

  If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster then the ASCII format.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Adjacent Channel Power Ratio (ACP) Measurement

This measures the total rms power in the specified channel and in 5 offset channels. You must be in Basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib), iDEN, NADC or PDC mode to use these commands. Use INSTrument:SELect to set the mode.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:ACP commands for more measurement related commands.

:CONFigure:ACP

:FETCh:ACP[n]?

:READ:ACP[n]?

:MEASure:ACP[n]?

For Basic mode, a channel frequency and power level can be defined in the command statement to override the default standard setting. A comma must precede the power value as a place holder for the frequency, when no frequency is sent.

History: Added to Basic mode, version A.03.00 or later

Front Panel Access: **Measure, ACPR**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

Measurement Type	n	Results Returned
	0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

Measurement Type	n	Results Returned
Total power reference	not specified or n=1 cdmaOne, cdma2000, or W-CDMA (Trial & Arib) mode	Returns 24 comma-separated scalar results, in the following order: Center freq - relative power (dB) Center freq - absolute power (dBm) Center freq - relative power (dB) Center freq - absolute power (dBm) Negative offset freq(1) - relative power (dB), Negative offset freq(1) - absolute power (dBm) Positive offset freq(1) - relative power (dB) Positive offset freq(1) - absolute power (dBm) . . . Positive offset freq(5) - relative power (dB) Positive offset freq(5) - absolute power (dBm)
Power spectral density reference	not specified or n=1 cdmaOne, cdma2000, or W-CDMA (Trial & Arib) mode	Returns 24 comma-separated scalar results, in the following order: Center freq - relative power (dB) Center freq - absolute power (dBm/Hz) Center freq - relative power (dB) Center freq - absolute power (dBm/Hz) Negative offset freq(1) - relative power (dB) Negative offset freq(1) - absolute power (dBm/Hz) Positive offset freq(1) - relative power (dB) Positive offset freq(1) - absolute power (dBm/Hz) . . . Positive offset freq(5) - relative power (dB) Positive offset freq(5) - absolute power (dBm/Hz)
Total power reference	2 cdmaOne, cdma2000, or W-CDMA (Trial & Arib) mode	Returns 11 comma-separated scalar values (in dBm) corresponding to the total power histogram display. The values are returned in ascending frequency order: Negative offset frequency(5) Negative offset frequency(4) . . . Center frequency Positive Offset frequency(1) . . . Positive Offset frequency(5)

Measurement Type	n	Results Returned
Power spectral density reference	3 cdmaOne, cdma2000, or W-CDMA (Trial & Arib) mode	Returns 11 comma-separated scalar values (in dBm/Hz) corresponding to the power spectral density histogram display. The values are returned in ascending frequency order: Negative offset frequency(5) Negative offset frequency(4) . . . Center frequency Positive Offset frequency(1) . . . Positive Offset frequency(5)
(For cdma2000 and W-CDMA (Trial & Arib) the data is only available with spectrum display selected)	4 cdmaOne, cdma2000, or W-CDMA (Trial & Arib) mode	Returns the frequency-domain spectrum trace data for the entire frequency range being measured. With spectrum display selected (DISPlay:ACP:VIEW SPEC): • In FFT mode (SENSe:ACPR:SWEep:TYPE FFT) the number of trace points returned are 343 (cdma2000 SR1), 1029 (cdma2000 SR3) or 1715 (W-CDMA (Trial & Arib)). This is with the default span of 5 MHz (cdma2000 SR1), 15 MHz (cdma2000 SR3), or 25 MHz (W-CDMA (Trial & Arib)). The number of points also varies if another offset frequency is set. • In sweep mode (SENSe:ACPR:SWEep:TYPE SWEep), the number of trace points returned is 601 (for cdma2000 or W-CDMA (Trial & Arib)) for any span. With bar graph display selected, one point of –999.0 will be returned.
Total power reference	5 cdmaOne, cdma2000, or W-CDMA (Trial & Arib) mode	Returns 12 comma-separated scalar values (in dBm) of the absolute power of the center and the offset frequencies: Center frequency Center frequency Negative offset frequency(1) Positive offset frequency(1) . . . Negative Offset frequency(5) Positive Offset frequency(5)
Power spectral density reference	5 cdmaOne, cdma2000, or W-CDMA (Trial & Arib) mode	Returns 12 comma-separated scalar values (in dBm/Hz) of the absolute power of the center and the offset frequencies: Center frequency Center frequency Negative offset frequency(1) Positive offset frequency(1) . . . Negative offset frequency(5) Positive offset frequency(5)

Measurement Type	n	Results Returned
Total power reference	6 cdmaOne, cdma2000, or W-CDMA (Trial & Arib) mode	Returns 12 comma-separated scalar values (total power in dB) of the power relative to the carrier at the center and the offset frequencies: Center frequency Center frequency Negative offset frequency(1) Positive offset frequency(1) . . . Negative offset frequency(5) Positive offset frequency(5)
Power spectral density reference	6 cdmaOne, cdma2000, or W-CDMA (Trial & Arib) mode	Returns 12 comma-separated scalar values (power spectral density in dB) of the power relative to the carrier at the center and offset frequencies: Center frequency Center frequency Negative offset frequency(1) Positive offset frequency(1) . . . Negative offset frequency(5) Positive offset frequency(5)
Total power reference	7 cdmaOne, cdma2000, or W-CDMA (Trial & Arib) mode	Returns 12 comma-separated scalar values of the pass/fail (1=passed, or 0=failed) results determined by testing the absolute power limit of the center and offset frequencies (measured as total power in dB): Center frequency Center frequency Negative offset frequency(1) Positive offset frequency(1) . . . Negative offset frequency(5) Positive offset frequency(5)
Power spectral density reference	7 cdmaOne, cdma2000, or W-CDMA (Trial & Arib) mode	Returns 12 comma-separated scalar values of the pass/fail (1=passed, or 0=failed) results determined by testing the absolute power limit of the center and offset frequencies (measured as power spectral density in dB): Center frequency Center frequency Negative offset frequency(1) Positive offset frequency(1) . . . Negative offset frequency(5) Positive Offset frequency(5)

Measurement Type	n	Results Returned
Total power reference	8 cdmaOne, cdma2000, or W-CDMA (Trial & Arib) mode	Returns 12 comma-separated scalar values of the pass/fail (1=passed, or 0=failed) results determined by testing the power limit relative to the center frequency (measured as total power spectral in dB): Center frequency Center frequency Negative offset frequency(1) Positive offset frequency(1) . . . Negative offset frequency(5) Positive Offset frequency(5)
Power spectral density reference	8 cdmaOne, cdma2000, or W-CDMA (Trial & Arib) mode	Returns 12 comma-separated scalar values of the pass/fail (1=passed, or 0=failed) results determined by testing the power limit relative to the center frequency (measured as power spectral density in dB): Center frequency Center frequency Negative offset frequency(1) Positive offset frequency(1) . . . Negative offset frequency(5) Positive Offset frequency(5)

Code Domain Power Measurement

This measures the power for each of the 64 Walsh codes/channels, relative to the total power in the pilot channel. You must be in the cdmaOne or W-CDMA (Trial & Arib) mode to use these commands. Use INSTrument:SELect to set the mode.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:CDPower commands for more measurement related commands.

:CONFigure:CDPower

:FETCh:CDPower[n]?

:READ:CDPower[n]?

:MEASure:CDPower[n]?

Front Panel Access: **Measure, Code Domain Power**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

n	Results Returned
not specified or n=1 W-CDMA (Trial & Arib) mode	Returns the following14 comma-separated scalar results: 1. **RMS symbol EVM** is a floating point number (in percent) of the EVM over the entire measurement area. 2. **Peak symbol EVM** is a floating point number (in percent) of the peak EVM in the measurement area. 3. **Symbol magnitude error** is a floating point number (in percent) of the average magnitude error over the entire measurement area. 4. **Symbol phase error** is a floating point number (in degrees) of the average phase error over the entire measurement area. 5. **Total power** is a floating point number with units of dBm. It is the total RF power over the measurement interval. 6. **Average power** is a floating point number with units of dBm. It is the power in the entire slot, for the selected code, averaged over the measurement interval. 7. **Tslot** is an integer number (in symbols) of the frame timing offset within the slot. It is the measured offset of the start of the radio frame of the selected code. The code is determined by the current spread code and symbol rate. 8. **Tframe** is an integer number (in slots) of the frame timing offset within the frame. It is the measured offset of the start of the radio frame of the selected code. The code is determined by the current spread code and symbol rate. 9. **Total power in slot** is a floating point number in units of dBm. It is the total RF power in the first slot timing in the acquired data. The slot timing is determined by Perch. (The search code portion of Perch is excluded.) 10. **Perch power** is a floating point number (in dB) of the average power of the Perch code relative to the total slot power. The slot timing is determined by Perch. (The search code portion of Perch is excluded.) 11. **Maximum active traffic power** is a floating point number (in dB) of the maximum average power of the active traffic channels. If no active code is detected the value returned is –999. The slot timing is determined by Perch. (The search code portion of Perch is excluded.) 12. **Average active traffic power** is a floating point number (in dB) of the average power of all the active traffic channels. If no active code is detected the value returned is –999. The slot timing is determined by Perch. (The search code portion of Perch is excluded.) 13. **Maximum inactive traffic power** is a floating point number (in dB) of the maximum average power of the inactive traffic channels. The slot timing is determined by Perch. (The search code portion of Perch is excluded.) 14. **Average inactive traffic power** is a floating point number (in dB) of the average power of the inactive traffic channels. The slot timing is determined by Perch. (The search code portion of Perch is excluded.)

n	Results Returned
2 W-CDMA (Trial & Arib) mode	With a radio format (or band) of ARIB: Returns a series of floating point numbers (in dB) with a multiplier of 8 ksymbols per second that represent all the code domain powers. 1st number = 1st code power relative to the total power over a slot 2nd number = 1st code symbol rate / 8 ksps . . . (2×N-1)th number = Nth code power relative to the total power over a slot (2×N)th number = Nth code symbol rate / 8 ksps N = the number of codes detected. The total number of codes varies because of the different symbol rates of each code.
2 W-CDMA (Trial & Arib) mode	With a radio format (or band) of Trial: Returns a series of floating point numbers (in dB) with a multiplier of 16 ksymbols/second that represent all the code domain powers. 1st number = 1st code power relative to the total power over a slot 2nd number = 1st code symbol rate / 16 ksps . . . (2×N-1)th number = Nth code power relative to the total power over a slot (2×N)th number = Nth code symbol rate / 16 ksps N = the number of codes detected. The total number of codes varies because of the different symbol rates of each code.
3 W-CDMA (Trial & Arib) mode	Returns a series of floating point numbers that show either active or inactive status for each of the code powers returned in n=2. (See above.) If a code is inactive, the value returned is 0.0, otherwise a value >0.0 is returned. 1st number = active or inactive flag of the 1st code . . . Nth number = active or inactive flag of the Nth code (where N= the number of codes identified)
4 W-CDMA (Trial & Arib) mode	Returns a series of floating point numbers (in percent) that represent each sample in the *EVM* trace. The first number is the symbol 0 decision point and there are X points per symbol. Therefore, the decision points are at 0, 1×X, 2×X, 3×X. . . (where X = the number of points per chip)
5 W-CDMA (Trial & Arib) mode	Returns a series of floating point numbers (in percent) that represent each sample in the *magnitude error* trace. The first number is the symbol 0 decision point and there are X points per symbol. Therefore, the decision points are at 0, 1×X, 2×X, 3×X. . . (where X = the number of points per chip)

n	Results Returned
6 W-CDMA (Trial & Arib) mode	Returns a series of floating point numbers (in degrees) that represent each sample in the *phase error* trace. The first number is the symbol 0 decision point and there are X points per symbol. Therefore, the decision points are at 0, 1×X, 2×X, 3×X. . . (where X = the number of points per chip)
7 W-CDMA (Trial & Arib) mode	Returns series of floating point numbers that alternately represent I and Q pairs of the *corrected measured* trace. The magnitude of each I and Q pair is normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. As in the EVM, there are X points per symbol, so that: 1st number is I of the symbol 0 decision point 2nd number is Q of the symbol 0 decision point . . . (2×X)+1 number is I of the symbol 1 decision point (2×X)+2 number is Q of the symbol 1 decision point . . . (2×X)×N+1th number is I of the symbol N decision point (2×X)×N+2th number is Q of the symbol N decision point where X = the number of points per symbol, and N = the number of symbols
8 W-CDMA (Trial & Arib) mode	Returns series of floating point numbers (in dBm) that represent the trace data of the symbol power vs. time.

Channel Power Measurement

This measures the total rms power in a specified integration bandwidth. You must be in the Basic, cdmaOne mode to use these commands. Use INSTrument:SELect to set the mode.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:CHPower commands for more measurement related commands.

:CONFigure:CHPower

:FETCh:CHPower[n]?

:READ:CHPower[n]?

:MEASure:CHPower[n]?

History: Added to Basic mode, version A.03.00 or later

Front Panel Access: **Measure, Channel Power**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
not specified or n=1	Returns 2 comma-separated scalar results: 1. **Channel power** is a floating point number representing the total channel power in the specified integration bandwidth. 2. **PSD** (Power Spectral Density) is the power (in dBm/Hz) in the specified integration bandwidth.
2	Returns comma-separated floating point numbers that are the captured trace data of the power (in dBm/resolution BW) of the signal. The frequency span of the captured trace data is specified by the **Span** key.

QPSK Error Vector Magnitude Measurement

This measures the QPSK error vector magnitude of each symbol. You must be in the cdma2000 or W-CDMA (Trial & Arib) mode to use these commands. Use INSTrument:SELect to set the mode.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:EVM commands for more measurement related commands.

:CONFigure:EVMQpsk

:FETCh:EVMQpsk[n]?

:READ:EVMQpsk[n]?

:MEASure:EVMQpsk[n]?

History: Version A.03.00 or later

Front Panel Access: **Measure, QPSK EVM**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

n	Results Returned
0	Returns unprocessed I/Q trace data, as a data array of comma-separated trace points, in volts.

n	Results Returned
1 (default) cdma2000, W-CDMA (Trial & Arib) mode	Returns 11 comma-separated scalar results, in the following order. 1. RMS EVM – a floating point number (in percent) of EVM over the entire measurement area 2. RMS EVM maximum – the maximum RMS EVM over the averaged counts 3. Peak EVM error – a floating point number (in percent) of peak EVM in the measurement area 4. Peak EVM maximum – the maximum peak EVM over the averaged counts 5. Magnitude error – a floating point number (in percent) of average magnitude error over the entire measurement area 6. Magnitude error maximum – the maximum magnitude error over the averaged counts 7. Phase error – a floating point number (in degree) of average phase error over the entire measurement area 8. Phase error maximum – the maximum phase error over the averaged counts 9. Frequency error – a floating point number (in Hz) of the frequency error in the measured signal 10. Frequency error maximum – the maximum frequency error over the averaged counts 11. I/Q origin offset – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin
2 cdma2000, W-CDMA (Trial & Arib) mode	EVM trace – returns series of floating point numbers (in percent) that represent each sample in the EVM trace. The first number is the symbol 0 decision point. There are X points per symbol (X = points/chip). Therefore, the decision points are at 0, $1 \times X$, $2 \times X$, $3 \times X$ . . .
3 cdma2000, W-CDMA (Trial & Arib) mode	Magnitude error trace – returns series of floating point numbers (in percent) that represent each sample in the magnitude error trace. The first number is the symbol 0 decision point. There are X points per symbol (X = points/chip). Therefore, the decision points are at 0, $1 \times X$, $2 \times X$, $3 \times X$ . . .
4 cdma2000, W-CDMA (Trial & Arib) mode	Phase error trace – returns series of floating point numbers (in degree) that represent each sample in the phase error trace. There are X points per symbol (X = points/ chip). Therefore, the decision points are at 0, $1 \times X$, $2 \times X$, $3 \times X$ . . .

n	Results Returned
5 cdma2000, W-CDMA (Trial & Arib) mode	Corrected measured trace – returns series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. There are X points per symbol (X = points/chip), so the series of numbers is: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point . . . $(2 \times X) + 1$, number = I of the symbol 1 decision point $(2 \times X) + 2$, number = Q of the symbol 1 decision point . . . $(2 \times X) \times$ Nth + 1 number = I of the symbol N decision point $(2 \times X) \times$ Nth + 2 number = Q of the symbol N decision point

Power Statistics CCDF Measurement

This is a statistical power measurement of the complimentary cumulative distribution function (CCDF). You must be in the cdma2000 or W-CDMA (Trial & Arib) mode to use these commands. Use INSTrument:SELect to set the mode.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:PSTat commands for more measurement related commands.

:CONFigure:PSTatistic

:FETCh:PSTatistic[n]?

:READ:PSTatastic[n]?

:MEASure:PSTatastic[n]?

History: Version A.03.00 or later

Front Panel Access: **Measure, Power Stat CCDF**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

n	
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values,
not specified or n=1	Returns 10 comma-separated scalar results: 1. Average input power (in dBm) 2. Probability at the average input power level (in %) 3. Power level that has 10% of the power 4. Power level that has 1% of the power 5. Power level that has 0.1% of the power 6. Power level that has 0.01% of the power 7. Power level that has 0.001% of the power 8. Power level that has 0.0001% of the power 9. Peak power (in dB) 10. Count

n	
2	Returns a series of 5001 floating point numbers (in percent) that represent the current measured power stat trace. This is the probability at particular power levels (average power), in the following order: Probability at 0 dB power Probability at 0.1 dB power Probability at 0.2 dB power . . . Probability at 49.9 dB power Probability at 50.0 dB power
3	Returns a series of 5001 floating point numbers (in percent) that represent the Gaussian trace. This is the probability at particular power levels (average power), in the following order: Probability at 0 dB power Probability at 0.1 dB power Probability at 0.2 dB power . . . Probability at 49.9 dB power Probability at 50.0 dB power
4	Returns a series of 5001 floating point numbers (in percent) that represent the user-definable reference trace. This is the probability at particular power levels (average power), in the following order: Probability at 0 dB power Probability at 0.1 dB power Probability at 0.2 dB power . . . Probability at 49.9 dB power Probability at 50.0 dB power

Rho (Waveform Quality) Measurement

This measures the modulation accuracy of the transmitter by checking the magnitude and phase error and the EVM (error vector magnitude). You must be in the cdma2000 or W-CDMA (Trial & Arib) mode to use these commands. Use INSTrument:SELect to set the mode.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:RHO commands for more measurement related commands.

`:CONFigure:RHO`

`:FETCh:RHO[n]?`

`:READ:RHO[n]?`

`:MEASure:RHO[n]?`

Front Panel Access: **Measure, Mod Accuracy (Rho)**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

n	Results Returned
0	Returns unprocessed I/Q trace data, as a data array of comma-separated trace points, in volts.
1 (default) cdma2000, W-CDMA (Trial & Arib) mode	Returns 7 comma-separated scalar results, in the following order. 1. RMS EVM – a floating point number (in percent) of EVM over the entire measurement area 2. Peak EVM error – a floating point number (in percent) of peak EVM in the measurement area 3. Magnitude error – a floating point number (in percent) of average magnitude error over the entire measurement area 4. Phase error – a floating point number (in degree) of average phase error over the entire measurement area 5. I/Q origin offset – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin 6. Frequency error – a floating point number (in Hz) of the frequency error in the measured signal 7. Rho – a floating point number of Rho
2 cdma2000, W-CDMA (Trial & Arib) mode	EVM trace – returns series of floating point numbers (in percent) that represent each sample in the EVM trace. The first number is the symbol 0 decision point. There are X points per symbol (X = points/chip). Therefore, the decision points are at 0, $1 \times X$, $2 \times X$, $3 \times X$ . . .

n	Results Returned
3 cdma2000, W-CDMA (Trial & Arib) mode	Magnitude error trace – returns series of floating point numbers (in percent) that represent each sample in the magnitude error trace. The first number is the symbol 0 decision point. There are *X* points per symbol (*X* = points/chip). Therefore, the decision points are at 0, $1 \times X$, $2 \times X$, $3 \times X$ . . .
4 cdma2000, W-CDMA (Trial & Arib) mode	Phase error trace – returns series of floating point numbers (in degree) that represent each sample in the phase error trace. There are *X* points per symbol (*X* = points/ chip). Therefore, the decision points are at 0, $1 \times X$, $2 \times X$, $3 \times X$ . . .
5 cdma2000, W-CDMA (Trial & Arib) mode	Corrected measured trace – returns series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. There are *X* points per symbol (*X* = points/chip), so the series of numbers is: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point . . . $(2 \times X) + 1$, number = I of the symbol 1 decision point $(2 \times X) + 2$, number = Q of the symbol 1 decision point . . . $(2 \times X) \times$ Nth + 1 number = I of the symbol N decision point $(2 \times X) \times$ Nth + 2 number = Q of the symbol N decision point

Spectrum (Frequency Domain) Measurement

This measures the amplitude of your input signal with respect to the frequency. It provides spectrum analysis capability using FFT (fast Fourier transform) measurement techniques. You must select the appropriate mode using INSTrument:SELect, to use these commands.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:SPECtrum commands for more measurement related commands.

`:CONFigure:SPECtrum`

`:FETCh:SPECtrum[n]?`

`:READ:SPECtrum[n]?`

`:MEASure:SPECtrum[n]?`

Front Panel
Access: **Measure, Spectrum (Freq Domain)**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

n	Results Returned
not specified or n=1	Returns the following comma-separated scalar results: 1. **FFT peak** is the FFT peak amplitude. 2. **FFT frequency** is the FFT frequency of the peak amplitude. 3. **FFT points** is the Number of points in the FFT spectrum. 4. **First FFT frequency** is the frequency of the first FFT point of the spectrum. 5. **FFT spacing** is the frequency spacing between the FFT points of the spectrum. 6. **Time domain points** is the number of points in the time domain trace used for the FFT. 7. **First time point** is the time of the first time domain point, where time zero is the trigger event. 8. **Time spacing** is the time spacing between the time domain points. 9. **Time domain** returns a 1, if time domain is complex (I/Q), or 0 if it is real. (raw ADC samples) 10. **Scan time** is the total scan time of the time domain trace used for the FFT. The total scantime = (time spacing) x (time domain points – 1) 11. **Current average count** is the current number of data measurements that have already been combined, in the averaging calculation.
2, **Service** mode only	Returns the trace data of the log-magnitude versus time. (That is, the RF envelope.)
3	Returns the I and Q trace data. It is represented by I and Q pairs (in volts) versus time.
4	Returns spectrum trace data. That is, the trace of log-magnitude versus frequency. (The trace is computed using a FFT.)
5, **Service** mode only	Returns the averaged trace data of log-magnitude versus time. (That is, the RF envelope.)
6	Not used.
7	Returns the averaged spectrum trace data. That is, the trace of the averaged log-magnitude versus frequency.
8	Not used.
9, **Service** mode only	Returns a trace containing the shape of the FFT window.
10, **Service** mode only	Returns trace data of the phase of the FFT versus frequency.

Waveform (Time Domain) Measurement

This measures the power in your input signal with respect to time and is equivalent to zero-span operation in a traditional spectrum analyzer. You must select the appropriate mode using INSTrument:SELect, to use these commands.

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:WAVeform commands for more measurement related commands.

:CONFigure:WAVeform

:FETCh:WAVeform[n]?

:READ:WAVeform[n]?

:MEASure:WAVeform[n]?

Front Panel Access: **Measure, Waveform (Time Domain)**

After the measurement is selected, press **Restore Meas Defaults** to restore factory defaults.

Measurement Results Available

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

n	Results Returned
not specified or n=1	Returns the following comma-separated scalar results: 1. **Sample time** is a floating point number representing the time between samples when using the trace queries (n=0,2,etc). 2. **Mean power** is the mean power (in dBm). This is either the power across the entire trace, or the power between markers if the markers are enabled. If averaging is on, the power is for the latest acquisition. 3. **Mean power averaged** is the power (in dBm) for N averages, if averaging is on. This is either the power across the entire trace, or the power between markers if the markers are enabled. If averaging is on, the power is for the latest acquisition. If averaging is off, the value of the mean power averaged is the same as the value of the mean power. 4. **Number of samples** is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0,2,etc.). 5. **Peak-to-mean ratio** has units of dB. The peak is defined to be the maximum level of the signal (non-averaged). The mean is the mean power (non-averaged). If averaging is on, the peak-to-mean ratio is invalid. 6. **Maximum value** is the maximum of the most recently acquired data (in dBm). 7. **Minimum value** is the minimum of the most recently acquired data (in dBm).
2	Returns comma-separated trace points of the entire captured trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the **number of samples**. The period between the samples is defined by the **sample time**.

READ Subsystem

:READ:<measurement>[n]?

The READ? commands are used with several other commands and are documented in the section on the "MEASure Group of Commands" on page 244.

SENSe Subsystem

Sets the instrument state parameters so that you can measure the input signal.

Adjacent Channel Power Measurement

Commands for querying the adjacent channel power measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 244. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **ACP** measurement has been selected from the **MEASURE** key menu.

Adjacent Channel Power Measurement Average Count

[:SENSe]:ACP:AVERage:COUNt <integer>

[:SENSe]:ACP:AVERage:COUNt?

Set the number of data acquisitions that will be averaged. After the specified number of average counts, the average mode (termination control) setting determines the average action.

Factory Preset and *RST:	10, for cdma2000, W-CDMA (Trial & Arib) mode
	20, for Basic, cdmaOne, iDEN mode
Range:	1 to 10,000
Remarks:	Use INSTrument:SELect to set the mode.

Adjacent Channel Power Measurement Averaging State

[:SENSe]:ACP:AVERage[:STATe] OFF|ON|0|1

[:SENSe]:ACP:AVERage[:STATe]?

Turn average on or off.

Factory Preset and *RST:	On
	Off, for iDEN mode
Remarks:	Use INSTrument:SELect to set the mode.

Adjacent Channel Power Measurement Averaging Termination Control

[:SENSe]:ACP:AVERage:TCONtrol EXPonential|REPeat

[:SENSe]:ACP:AVERage:TCONtrol?

Select the type of termination control used for averaging. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

Exponential – Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.

Repeat – After reaching the average count, the averaging is reset and a new average is started.

Factory Preset and *RST:	Repeat, for basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode
	Exponential, for NADC, PDC, iDEN mode
Remarks:	Use INSTrument:SELect to set the mode.

Adjacent Channel Power Measurement Channel Integration BW

Basic, iDEN mode

[:SENSe]:ACP:BANDwidth|BWIDth:INTegration <freq>

[:SENSe]:ACP:BANDwidth|BWIDth:INTegration?

cdmaOne, cdma2000, W-CMDA mode

[:SENSe]:ACP:BANDwidth|BWIDth[n]:INTegration[n] <freq>

[:SENSe]:ACP:BANDwidth|BWIDth[n]:INTegration[n]?

Set the Integration bandwidth that will be used for the main (carrier) channel.

cdmaOne mode

Bandwidth [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

Integration [n] - Where 1 is cellular bands and 2 is pcs bands. The default is cellular (1).

cdma2000 mode

Bandwidth [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

Integration [n] - Where 1 is SR1, 2 is SR3 DS, and 3 is SR3 MC. The default is SR1 (1).

W-CDMA (Trial & Arib) mode

Bandwidth [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

Integration [n] - Where 1 is ARIB, 2 is 3GPP, and 3 is Trial. The default is ARIB (1).

Factory Preset
and *RST:

Mode	Format (Modulation Standard)		
Basic	1.23 MHz		
cdmaOne	1.23 MHz		
iDEN	18 kHz		
cdma2000	SR1 (n=1) 1.23 MHz	SR3 DC (n=2) 3.69 MHz	SR3 MC (n=3) 3.69 MHz

Mode	Format (Modulation Standard)		
W-CDMA (Trial & Arib)	ARIB (n=1) 4.069 MHz	3GPP (n=2) 3.84 MHz	Trial (n=3) 4.096 MHz

Range: 300 Hz to 20 MHz for Basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode

1 kHz to 5 MHz for iDEN

Default Unit: Hz

Remarks: With measurement type set at (TPR) total power reference, 1.40 MHz is sometimes used. Using 1.23 MHz will give a power that is very nearly identical to the 1.40 MHz value, and using 1.23 MHz will also yield the correct power spectral density with measurement type set at (PSD) reference. However, a setting of 1.40 MHz will not give the correct results with measurement type set at PSD reference.

You must be in Basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib), iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power Measurement Absolute Amplitude Limits

iDEN mode

[:SENSe]:ACP:OFFSet:ABSolute <power>

[:SENSe]:ACP:OFFSet:ABSolute?

Basic mode

[:SENSe]:ACP:OFFSet:LIST:ABSolute <power>{,<power>}

[:SENSe]:ACP:OFFSet:LIST:ABSolute?

cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode

[:SENSe]:ACP:OFFSet[n]:LIST[n]:ABSolute <power>{,<power>}

[:SENSe]:ACP:OFFSet[n]:LIST[n]:ABSolute?

Sets the absolute amplitude levels to test against for each of the custom offsets. The list contains five (5) entries. If there is more than one offset, the offset closest to the carrier channel is the first one in the list. ACP:OFFS[n]:LIST[n]:TEST selects the type of testing to be done at each offset.

The query returns five (5) real numbers that are the current absolute amplitude test limits.

cdmaOne, Basic mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is cellular bands and 2 is pcs bands. The default is cellular.

cdma2000 mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is SR1, 2 is SR3 DS, and 3 is SR3 MC. The default is SR1 (1).

W-CDMA (Trial & Arib) mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is ARIB, 2 is 3GPP, and 3 is Trial. The default is ARIB (1).

Factory Preset and *RST:

	Offset A	**Offset B**	**Offset C**	**Offset D**	**Offset E**
Basic					
	0 dBm	0 dBm	0 dBm	0 dBm	0 dBm
cdmaOne					
BS cellular	0 dBm	0 dBm	0 dBm	0 dBm	0 dBm
BS pcs	0 dBm	–13 dBm	–13 dBm	0 dBm	0 dBm
MS cellular	0 dBm	0 dBm	0 dBm	0 dBm	0 dBm
MS pcs	0 dBm	–13 dBm	–13 dBm	0 dBm	0 dBm
cdma2000					
	50 dBm	50 dBm	50 dBm	50 dBm	50 dBm

	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (Trial & Arib)					
	50 dBm	50 dBm	50 dBm	50 dBm	50 dBm
iDEN					
	0 dBm	n/a	n/a	n/a	n/a

Range: –200 dBm to 50 dBm

Default Unit: dBm

Remarks: You must be in Basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib), iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power Measurement Define Resolution Bandwidth List

iDEN mode

[:SENSe]:ACP:OFFSet:BANDwidth|BWIDth <res_bw>

[:SENSe]:ACP:OFFSet:BANDwidth|BWIDth?

Basic mode

[:SENSe]:ACP:OFFSet:LIST:BANDwidth|BWIDth <res_bw>{,<res_bw>}

[:SENSe]:ACP:OFFSet:LIST:BANDwidth|BWIDth?

cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode

[:SENSe]:ACP:OFFSet[n]:LIST[n]:BANDwidth|BWIDth <res_bw>{,<res_bw>}

[:SENSe]:ACP:OFFSet[n]:LIST[n]:BANDwidth|BWIDth?

Define the custom resolution bandwidth(s) for the adjacent channel power testing. If there is more than one bandwidth, the list contains five (5) entries. Each resolution bandwidth in the list corresponds to an offset frequency in the list defined by ACP:OFFSet[n]:LIST[n][:FREQ.

cdmaOne mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is cellular bands and 2 is pcs bands. The default is cellular.

cdma2000 mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is SR1, 2 is SR3 DS, and 3 is SR3 MC. The default is SR1 (1).

W-CDMA (Trial & Arib) mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is ARIB, 2 is 3GPP, and 3 is Trial. The default is ARIB (1).

Factory Preset and *RST:

	Offset A	**Offset B**	**Offset C**	**Offset D**	**Offset E**
iDEN					
	10 kHz	n/a	n/a	n/a	n/a
Basic					
	30 kHz	30 kHz	30 kHz	30 kHz	30 kHz
cdmaOne					
BS cellular	30 kHz	30 kHz	30 kHz	30 kHz	30 kHz
BS pcs	30 kHz	12.5 kHz	1 MHz	30 kHz	30 kHz
MS cellular	30 kHz	30 kHz	30 kHz	30 kHz	30 kHz
MS pcs	30 kHz	12.5 kHz	1 MHz	30 kHz	30 kHz
cdma2000					
	30 kHz	30 kHz	30 kHz	30 kHz	30 kHz
W-CDMA (Trial & Arib)					
Trial and ARIB	4.096 MHz	4.096 MHz	4.096 MHz	4.096 MHz	4.096 MHz
3GPP	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz

Range: 300 Hz to 20 MHz for cdmaOne, Basic, cdma2000, W-CDMA (Trial & Arib) mode

1 kHz to 5 MHz for iDEN mode

Default Unit: Hz

Remarks: You must be in Basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib), iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power Measurement Define Offset Frequency List

iDEN mode

[:SENSe]:ACP:OFFSet[:FREQuency] <offset_freq>

[:SENSe]:ACP:OFFSet[:FREQuency]?

Basic mode

[:SENSe]:ACP:OFFSet:LIST[:FREQuency] <offset_freq>{,<offset_freq>}

[:SENSe]:ACP:OFFSet:LIST[:FREQuency]?

cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode

[:SENSe]:ACP:OFFSet[n]:LIST[n][:FREQuency] <offset_freq>{,<offset_freq>}

[:SENSe]:ACP:OFFSet[n]:LIST[n][:FREQuency]?

Define the custom set of offset frequencies at which the switching transient spectrum part of the ACP measurement will be made. The list contains five (5) entries for offset frequencies. Each offset frequency in the list corresponds to a resolution bandwidth in the bandwidth list. An offset frequency of zero turns “off” the measurement for that offset.

cdmaOne mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is cellular frequency bands and 2 is pcs frequency bands. The default is cellular bands (1).

cdma2000 mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is SR1, 2 is SR3 DS, and 3 is SR3 MC. The default is SR1 (1).

W-CDMA (Trial & Arib) mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is ARIB, 2 is 3GPP, and 3 is Trial. The default is ARIB (1).

Factory Preset and *RST:

	Offset A	Offset B	Offset C	Offset D	Offset E
iDEN					
	25 kHz	n/a	n/a	n/a	n/a
Basic					
	750 kHz	1.98 MHz	0 Hz	0 Hz	0 Hz
cdmaOne					
BS cellular	750 kHz	1.98 MHz	0 Hz	0 Hz	0 Hz
BS pcs	885 kHz	1.25625 MHz	2.75 MHz	0 Hz	0 Hz
MS cellular	885 kHz	1.98 MHz	0 Hz	0 Hz	0 Hz
MS pcs	885 kHz	1.25625 MHz	2.75 MHz	0 Hz	0 Hz
cdma2000					
BTS SR1	750 kHz	1.98 MHz	0 Hz	0 Hz	0 Hz
BTS SR3 DS	2.655 MHz	3.75 MHz	0 Hz	0 Hz	0 Hz
BTS SR3 MC	2.135 kHz	2.5 MHz	0 Hz	0 Hz	0 Hz
MS SR1	885 kHz	1.98 MHz	0 Hz	0 Hz	0 Hz
MS SR3 DS	2.655 MHz	3.75 MHz	0 Hz	0 Hz	0 Hz
MS SR3 MC	2.655 kHz	3.75 MHz	0 Hz	0 Hz	0 Hz
W-CDMA (Trial & Arib)					
	5 MHz	10 MHz	15 MHz	20 MHz	25 MHz

Range: 0 Hz to 20 MHz for cdmaOne, iDEN, Basic mode

0 Hz to 100 MHz for cdma2000, W-CDMA (Trial & Arib) mode

Default Unit: Hz

Remarks: You must be in Basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib), iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power Measurement Amplitude Limits Relative to the Carrier

iDEN mode

[:SENSe]:ACP:OFFSet:RCARrier <rel_power>

[:SENSe]:ACP:OFFSet:RCARrier?

Basic mode

[:SENSe]:ACP:OFFSet:LIST:RCARrier <rel_power>{,<rel_power>}

[:SENSe]:ACP:OFFSet:LIST:RCARrier?

cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode

[:SENSe]:ACP:OFFSet[n]:LIST[n]:RCARrier <rel_power>{,<rel_power>}

[:SENSe]:ACP:OFFSet[n]:LIST[n]:RCARrier?

Sets the amplitude levels to test against for any custom offsets. This amplitude level is relative to the carrier amplitude. If multiple offsets are available, the list contains five (5) entries. The offset closest to the carrier channel is the first one in the list. ACP:OFFS[n]:LIST[n]:TEST selects the type of testing to be done at each offset.

The query returns five (5) real numbers that are the current amplitude test limits, relative to the carrier, for each offset.

cdmaOne, Basic mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is cellular frequency bands and 2 is pcs frequency bands. The default is cellular bands (1).

cdma2000 mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is SR1, 2 is SR3 DS, and 3 is SR3 MC. The default is SR1 (1).

W-CDMA (Trial & Arib) mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is ARIB, 2 is 3GPP, and 3 is Trial. The default is ARIB (1).

Factory Preset and *RST:

	Offset A	Offset B	Offset C	Offset D	Offset E
iDEN					
	0 dBc	n/a	n/a	n/a	n/a
Basic					
	–45 dBc	–60 dBc	0 dBc	0 dBc	0 dBc
cdmaOne					
BS cellular	–45 dBc	–60 dBc	0 dBc	0 dBc	0 dBc
BS pcs	–45 dBc	0 dBc	0 dBc	0 dBc	0 dBc
MS cellular	–42 dBc	–54 dBc	0 dBc	0 dBc	0 dBc
MS pcs	–42 dBc	0 dBc	0 dBc	0 dBc	0 dBc
cdma2000					
	0 dBc	0 dBc	0 dBc	0 dBc	0 dBc
W-CDMA (Trial & Arib)					
	0 dBc	0 dBc	0 dBc	0 dBc	0 dBc

Range: –150 dB to 50 dB for cdmaOne, Basic mode

–200 dB to 50 dB for cdma2000, W-CDMA (Trial & Arib), iDEN mode

Default Unit: dB

Remarks: You must be in Basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib), iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power Measurement Amplitude Limits Relative to the Power Spectral Density

iDEN mode

[:SENSe]:ACP:OFFSet:RPSDensity <rel_power>

[:SENSe]:ACP:OFFSet:RPSDensity?

Basic mode

[:SENSe]:ACP:OFFSet:LIST:RPSDensity <rel_power>{,<rel_power>}

[:SENSe]:ACP:OFFSet:LIST:RPSDensity?

cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode

[:SENSe]:ACP:OFFSet[n]:LIST[n]:RPSDensity <rel_power>{,<rel_power>}

[:SENSe]:ACP:OFFSet[n]:LIST[n]:RPSDensity?

Sets the amplitude levels to test against for any custom offsets. This amplitude level is relative to the power spectral density. If multiple offsets are available, the list contains five (5) entries. The offset closest to the carrier channel is the first one in the list. ACP:OFFS[n]:LIST[n]:TEST selects the type of testing to be done at each offset.

The query returns five (5) real numbers that are the current amplitude test limits, relative to the power spectral density, for each offset.

cdmaOne, Basic mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is cellular frequency bands and 2 is pcs frequency bands. The default is cellular bands (1).

cdma2000 mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is SR1, 2 is SR3 DS, and 3 is SR3 MC. The default is SR1 (1).

W-CDMA (Trial & Arib) mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is ARIB, 2 is 3GPP, and 3 is Trial. The default is ARIB (1).

Factory Preset and *RST:

	Offset A	Offset B	Offset C	Offset D	Offset E
iDEN					
	0 dB	n/a	n/a	n/a	n/a
Basic					
	–28.87 dB	–43.87 dB	0 dB	0 dB	0 dB
cdmaOne					
BS cellular	–28.87 dB	–43.87 dB	0 dB	0 dB	0 dB
BS pcs	–28.87 dB	0 dB	0 dB	0 dB	0 dB
MS cellular	–25.87 dB	–37.87 dB	0 dB	0 dB	0 dB
MS pcs	–25.87 dB	0 dB	0 dB	0 dB	0 dB
cdma2000					
	0 dB	0 dB	0 dB	0 dB	0 dB
W-CDMA (Trial & Arib)					
	0 dB	0 dB	0 dB	0 dB	0 dB

Range: –150 dB to 50 dB for cdmaOne, Basic, cdma2000, W-CDMA (Trial & Arib) mode

–200 dB to 50 dB for iDEN mode

Default Unit: dB

Remarks: You must be in Basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib), iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power Measurement Control Offset Frequency List

iDEN mode

[:SENSe]:ACP:OFFSet:STATe OFF|ON|0|1

[:SENSe]:ACP:OFFSet:STATe?

Basic mode

[:SENSe]:ACP:OFFSet:LIST:STATe OFF|ON|0|1{, OFF|ON|0|1}

[:SENSe]:ACP:OFFSet:LIST:STATe?

cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode

[:SENSe]:ACP:OFFSet[n]:LIST[n]:STATe OFF|ON|0|1 {, OFF|ON|0|1}

[:SENSe]:ACP:OFFSet[n]:LIST[n]:STATe?

Selects whether testing is to be done at the custom offset frequencies. The measured powers are tested against the absolute values defined with ACP:OFFS[n]:LIST[n]:ABS, or the relative values defined with ACP:OFFS[n]:LIST[n]:RPSD and ACP:OFFS[n]:LIST[n]:RCAR.

cdmaOne mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is cellular frequency bands and 2 is pcs frequency bands. The default is cellular bands (1).

cdma2000 mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is SR1, 2 is SR3 DS, and 3 is SR3 MC. The default is SR1 (1).

W-CDMA (Trial & Arib) mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is ARIB, 2 is 3GPP, and 3 is Trial. The default is ARIB (1).

Factory Preset and *RST:

	Offset A	Offset B	Offset C	Offset D	Offset E
iDEN					
	On	n/a	n/a	n/a	n/a
Basic					
	On	On	On	On	On
cdmaOne					
BS cellular	On	On	On	On	On
BS pcs	On	On	On	On	On
MS cellular	On	On	On	On	On
MS pcs	On	On	On	On	On
cdma2000					
	On	On	Off	Off	Off
W-CDMA (Trial & Arib)					
	On	On	Off	Off	Off

Remarks: You must be in Basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib), iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power Measurement Define Type of Offset Frequency List

iDEN mode

[:SENSe]:ACP:OFFSet:TEST ABSolute|AND|RELative|OR

[:SENSe]:ACP:OFFSet:TEST?

Basic mode

[:SENSe]:ACP:OFFSet:LIST:TEST ABSolute|AND|RELative|OR {, ABSolute|AND|RELative|OR}

[:SENSe]:ACP:OFFSet:LIST:TEST?

cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode

[:SENSe]:ACP:OFFSet[n]:LIST[n]:TEST ABSolute|AND|RELative|OR{, ABSolute|AND|RELative|OR}

[:SENSe]:ACP:OFFSet[n]:LIST[n]:TEST?

Defines the type of testing to be done at any custom offset frequencies. The measured powers are tested against the absolute values defined with ACP:OFFS[n]:LIST[n]:ABS, or the relative values defined with ACP:OFFS[n]:LIST[n]:RPSD and ACP:OFFS[n]:LIST[n]:RCAR.

cdmaOne, Basic mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is cellular frequency bands and 2 is pcs frequency bands. The default is cellular bands (1).

cdma2000 mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is SR1, 2 is SR3 DS, and 3 is SR3 MC. The default is SR1 (1).

W-CDMA (Trial & Arib) mode

Offset [n] - Where 1 is base station and 2 is mobiles. The default is base station (1).

List [n] - Where 1 is ARIB, 2 is 3GPP, and 3 is Trial. The default is ARIB (1).

The types of testing that can be done for each offset include:

- And - Test both the absolute power measurement and the power relative to the carrier. If they both fail, then return a failure for the measurement at this offset.
- Absolute - Test the absolute power measurement. If it fails, then return a failure for the measurement at this offset.
- Or - Test both the absolute power measurement and the power relative to the carrier. If either one fails, then return a failure for the measurement at this offset.
- Relative - Test the power relative to the carrier. If it fails, then return a failure for the measurement at this offset.

Factory Preset
and *RST:

	Offset A	**Offset B**	**Offset C**	**Offset D**	**Offset E**
iDEN					
	REL	n/a	n/a	n/a	n/a
Basic					
	REL	REL	REL	REL	REL
cdmaOne					
BS cellular	REL	REL	REL	REL	REL
BS pcs	REL	ABS	ABS	REL	REL
MS cellular	REL	REL	REL	REL	REL
MS pcs	REL	ABS	ABS	REL	REL
cdma2000					
	REL	REL	REL	REL	REL
W-CDMA (Trial & Arib)					
	REL	REL	REL	REL	REL

Remarks: You must be in Basic, cdmaOne, cdma2000, W-CDMA (Trial & Arib), iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power Measurement Sweep Mode Resolution Bandwidth

[:SENSe]:ACP:SWEep:BANDwidth|BWIDth[:RESolution] <freq>

[:SENSe]:ACP:SWEep:BANDwidth|BWIDth[:RESolution]?

Sets the resolution bandwidth when using the spectrum analyzer type sweep mode. See [:SENSe]:ACP:SWEep:TYPE.

Factory Preset and *RST:	In the automatic mode, the resolution bandwidth is set based on the current span, which is determined by the furthest selected offset.
Range:	1.0 kHz to 1.0 MHz
Default Unit:	Hz
Remarks:	You must be in the cdma2000, W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power Measurement Sweep Mode Resolution BW Control

[:SENSe]:ACP:SWEep:BANDwidth|BWIDth[:RESolution]:AUTO OFF|ON|0|1

[:SENSe]:ACP:SWEep:BANDwidth|BWIDth[:RESolution]:AUTO?

Sets the resolution bandwidth to automatic, when using the spectrum analyzer type sweep mode. See [:SENSe]:ACP:SWEep:TYPE.

Factory Preset and *RST:	On
Remarks:	You must be in the cdma2000, W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power Measurement Sweep Mode Detection

[:SENSe]:ACP:SWEep:DETector[:FUNCtion] AAVerage|POSitive

[:SENSe]:ACP:SWEep:DETector[:FUNCtion]?

Selects the detector type when using the sweep mode. See `[:SENSe]:ACP:SWEep:TYPE`.

Absolute average - the absolute average power in each frequency is measured across the spectrum

Positive - the positive peak power in each frequency is measured across the spectrum

Factory Preset and *RST: Positive

Remarks: You must be in the cdma2000, W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power Measurement Sweep Time

[:SENSe]:ACP:SWEep:TIME <time>

[:SENSe]:ACP:SWEep:TIME?

Sets the sweep time when using the sweep mode. See `[:SENSe]:ACP:SWEep:TYPE`.

Factory Preset and *RST: 625 μs (1 slot)

Range: 500 μs to 10 ms

Default Unit: seconds

Remarks: You must be in the cdma2000, W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power Measurement Sweep Type

[:SENSe]:ACP:SWEep:TYPE FFT|SWEep

[:SENSe]:ACP:SWEep:TYPE?

Selects the type of sweeping. This can be either FFT or conventional spectrum analyzer sweeping.

FFT - makes fast ACP measurements

Sweep - is slower than FFT, but the results correlate with traditional spectrum analyzer measurements though the signals peak/average ratio is higher. See [SENSe:]ACP:SWEep:DETector[:FUNCtion]

Factory Preset and *RST:	FFT
Remarks:	You must be in the cdma2000, W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power Measurement Power Reference

[:SENSe]:ACP:TYPE TPRef|PSDRef

[:SENSe]:ACP:TYPE?

Selects the measurement type. This allows you to make absolute and relative power measurements of either total power, or the power normalized to the measurement bandwidth.

Total Power Reference - the total power is used as the power reference

Power Spectral Density Reference - the power spectral density is used as the power reference

Factory Preset and *RST:	Total power reference
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (Trial & Arib), NADC, PDC mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain Power Measurement

Commands for querying the code domain power measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 244. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Code Domain Power** measurement has been selected from the **MEASURE** key menu.

Code Domain Power Measurement Demod Alpha

[:SENSe]:CDPower:ALPHa <float>

[:SENSe]:CDPower:ALPHa?

Set alpha for the root nyquist filter.

Factory Preset and *RST:	0.22
Range:	0.01 to 0.5
Remarks:	You must be in the W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain Power Measurement Chip Rate

[:SENSe]:CDPower:CRATe <freq>

[:SENSe]:CDPower:CRATe?

Set chip rate.

Factory Preset and *RST:	4.096 MHz
Range:	3.6864 to 4.5056 MHz
Remarks:	You must be in the W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain Power Measurement Spectrum Normal/Invert

[:SENSe]:CDPower:SPECtrum NORMal|INVert

[:SENSe]:CDPower:SPECtrum?

Select normal or inverted spectrum for demodulation.

Normal - normal spectrum is used

Invert - inverted spectrum is used

Factory Preset and *RST:	Normal
Remarks	You must be in the cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain Power Measurement Scramble Code

[:SENSe]:CDPower:SYNC:SCRamble <integer>

[:SENSe]:CDPower:SYNC:SCRamble?

Set the scramble code for synchronization.

Factory Preset and *RST:	1
Range:	0 to 262143 (0h to 3FFFFh) (0 is for no-scramble)
Remarks:	You must be in the W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain Power Measurement Trigger Source

[:SENSe]:CDPower:TRIGger:SOURce EXTernal[1]|External2|FRAMe|IF|IMMediate|IF|RFBurst

[:SENSe]:CDPower:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

External 1 – front panel external trigger input

External 2 – rear panel external trigger input

Frame – internal frame trigger from front panel input

IF – internal IF envelope trigger

Immediate – the next data acquisition is immediately taken, capturing the signal asynchronously (also called free run).

RF Burst – internal wideband RF burst envelope trigger that has automatic level control for periodic burst signals.

Factory Preset and *RST:	Immediate
Remarks:	You must be in the W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.
Front Panel Access:	**Meas Setup**, **Trig Source**

Channel Power Measurement

Commands for querying the channel power measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 244. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Channel Power** measurement has been selected from the **MEASURE** key menu. CHPower used instead of the more std-compliant CPOWer, as that syntax was already used for Carrier Power measurement (but has since been renamed).

Channel Power Measurement Average Count

[:SENSe]:CHPower:AVERage:COUNt <integer>

[:SENSe]:CHPower:AVERage:COUNt?

Set the number of data acquisitions that will be averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

Factory Preset and *RST:	20
Range:	1 to 10,000
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (Trial & Arib), or Basic mode to use this command. Use INSTrument:SELect to set the mode.

Channel Power Measurement Averaging State

[:SENSe]:CHPower:AVERage[:STATe] OFF|ON|0|1

[:SENSe]:CHPower:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST:	On
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (Trial & Arib), or Basic mode to use this command. Use INSTrument:SELect to set the mode.

Channel Power Measurement Averaging Termination Control

[:SENSe]:CHPower:AVERage:TCONtrol EXPonential|REPeat

[:SENSe]:CHPower:AVERage:TCONtrol?

Select the type of terminal control used for averaging. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

Exponential - Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.

Repeat - After reaching the average count, the averaging is reset and a new average is started.

Factory Preset and *RST:	Repeat
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (Trial & Arib), or Basic mode to use this command. Use INSTrument:SELect to set the mode.

Channel Power Measurement Integration BW

[:SENSe]:CHPower:BANDwidth|BWIDth:INTegration <freq>

[:SENSe]:CHPower:BANDwidth|BWIDth:INTegration?

Set the Integration BW (IBW) that will be used.

Factory Preset and *RST:	1.23 MHz for Basic, cdmaOne, SR1 of cdma2000
	3.69 MHz for SR3 of cdma2000
	5 MHz for W-CDMA (Trial & Arib)
Range:	1 kHz to 10 MHz
Default Unit:	Hz
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (Trial & Arib), or Basic mode to use this command. Use INSTrument:SELect to set the mode.

Channel Power Measurement Span

[:SENSe]:CHPower:FREQuency:SPAN <freq>

[:SENSe]:CHPower:FREQuency:SPAN?

Set the frequency span that will be used.

Factory Preset and *RST:	2 MHz for Basic, cdmaOne, SR1 of cdma2000
	5 MHz for SR3 of cdma2000
	6 MHz for W-CDMA (Trial & Arib)
Range:	1 kHz to 10 MHz
Default Unit:	Hz
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (Trial & Arib), or Basic mode to use this command. Use INSTrument:SELect to set the mode.

Channel Power Measurement Data Points

[:SENSe]:CHPower:POINts <integer>

[:SENSe]:CHPower:POINts?

Set the number of data points that will be used. Changing this will change the time record length and resolution BW that are used.

Factory Preset and *RST:	512
Range:	64 to 32768, in a 2^n sequence
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (Trial & Arib), or Basic mode to use this command. Use INSTrument:SELect to set the mode.

Channel Power Measurement Data Points Auto

[:SENSe]:CHPower:POINts:AUTO OFF|ON|0|1

[:SENSe]:CHPower:POINts:AUTO?

Select auto or manual control of the data points. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default, may cause invalid measurement results.

Auto - couples the Data Points to the Integration BW.

Manual - the Data Points is uncoupled from the Integration BW.

Factory Preset and *RST:	Auto
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (Trial & Arib), or Basic mode to use this command. Use INSTrument:SELect to set the mode.

Channel Power Measurement Trigger Source

[:SENSe]:CHPower:TRIGger:SOURce EXTernal[1]|EXTernal 2|IMMediate

[:SENSe]:CHPower:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions. This is an Advanced control that normally does not need to be changed.

External 1 - front panel external trigger input

External 2 - rear panel external trigger input

Immediate - the next data acquisition is immediately taken (also called Free Run).

Factory Preset and *RST:	Immediate (Free Run)
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (Trial & Arib), or Basic mode to use this command. Use INSTrument:SELect to set the mode.

Correction for BTS RF Port External Attenuation

[:SENSe]:CORRection:BTS[:RF]:LOSS <rel_power>

[:SENSe]:CORRection:BTS[:RF]:LOSS?

Set equal to the external attenuation used when measuring base transmit stations.

Factory Preset and *RST:	0 dB
Range:	0 to 100 dB for GSM
	–50 to 50 dB for cdma2000, W-CDMA (Trial & Arib)
Default Unit:	dB
Remarks:	Global to the current mode.
	You must be in the GSM, cdma2000, or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Correction for Mobile Station RF Port External Attenuation

[:SENSe]:CORRection:MS[:RF]:LOSS <rel_power>

[:SENSe]:CORRection:MS[:RF]:LOSS?

Set the correction equal to the external attenuation used when measuring mobile stations.

Factory Preset and *RST:	0 dB
Range:	–50 to 50 dB for cdma2000, W-CDMA (Trial & Arib), iDEN, NADC or PDC
Default Unit:	dB
Remarks:	You must be in the cdma2000, W-CDMA (Trial & Arib), iDEN, NADC or PDC mode to use this command. Use INSTrument:SELect to set the mode.
	Value is global to the current mode.

QPSK Error Vector Magnitude Measurement

Commands for querying the QPSK error vector magnitude measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 244. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **EVM** measurement has been selected from the **MEASURE** key menu.

QPSK Error Vector Magnitude Measurement Demod Alpha

[:SENSe]:EVMQpsk:ALPHa <float>

[:SENSe]:EVMQpsk:ALPHa?

Set alpha for the root nyquist filter.

Factory Preset and *RST:	0.22
Range:	0.01 to 0.5
Remarks:	You must be in the W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

QPSK Error Vector Magnitude Measurement Average Count

[:SENSe]:EVMQpsk:AVERage:COUNt <integer>

[:SENSe]:EVMQpsk:AVERage:COUNt?

Set the number of data acquisitions that will be averaged. After the specified number of average counts, the average mode (termination control) setting determines the average action.

Factory Preset and *RST:	10
Range:	1 to 10,000
Remarks:	You must be in the cdma2000 or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

QPSK Error Vector Magnitude Measurement Averaging State

[:SENSe]:EVMQpsk:AVERage[:STATe] OFF|ON|0|1

[:SENSe]:EVMQpsk:AVERage[:STATe]?

Turn average on or off.

Factory Preset and *RST: On

Remarks: You must be in the cdma2000 or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

QPSK Error Vector Magnitude Measurement Averaging Termination Control

[:SENSe]:EVMQpsk:AVERage:TCONtrol EXPonential|REPeat

[:SENSe]:EVMQpsk:AVERage:TCONtrol?

Select the type of termination control used to averaging. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

Exponential – Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.

Repeat – After reaching the average count, the averaging is reset and a new average is started.

Factory Preset and *RST: Repeat

Remarks: You must be in the cdam2000 or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

QPSK Error Vector Magnitude Measurement Chip Rate

[:SENSe]:EVMQpsk:CRATe <freq>

[:SENSe]:EVMQpsk:CRATe?

Set chip rate.

Factory Preset and *RST:	1.2288 MHz for SR1 and SR3 MC BTS of cdma2000
	3.6864 MHz for SR3 MC MS and SR3 DS of cdma2000
	3.84 MHz for 3GPP of W-CDMA (Trial & Arib)
	4.096 MHz for Trial and ARIB of W-CDMA (Trial & Arib)
Range:	1.10592 to 1.35168 MHz for SR1 and SR3 MC BTS of cdma2000
	3.31776 to 4.05504 MHz for SR3 MC MS and SR3 DS of cdma2000
	3.456 to 4.224 MHz for 3GPP of W-CDMA (Trial & Arib)
	3.6864 to 4.5056 MHz for Trial and ARIB of W-CDMA (Trial & Arib)
Remarks:	You must be in the cdma2000 or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

QPSK Error Vector Magnitude Measurement Length

[:SENSe]:EVMQpsk:SWEep:POINts <integer>

[:SENSe]:EVMQpsk:SWEep:POINts?

Set the number of data points that will be used.

Factory Preset and *RST:	256
Range:	128 to 1536 for cdma2000
	128 to 512 for W-CDMA (Trial & Arib)
Unit:	chips
Remarks:	You must be in the cdma2000 or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

QPSK Error Vector Magnitude Measurement Trigger Source

[:SENSe]:EVMQpsk:TRIGger:SOURce EXTernal[1]|EXTernal2|FRAMe|IF|IMMediate|RFBurst

[:SENSe]:EVMQpsk:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

External 1 – front panel external trigger input

External 2 – rear panel external trigger input

IF – internal IF envelope (video) trigger

Immediate – the next data acquisition is immediately taken, capturing the signal asynchronously (also called free run)

Frame – internal frame trigger from front panel input

RF Burst – internal wideband RF burst envelope trigger that has automatic level control for periodic burst signals

Factory Preset and *RST:	Immediate
Remarks:	You must be in the cdma2000 or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Power Statistics CCDF Measurement

Commands for querying the statistical power measurement of the complimentary cumulative distribution function (CCDF) measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 244. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Power Stat CCDF** measurement has been selected from the **MEASURE** key menu.

Power Statistics CCDF Measurement Channel Bandwidth

[:SENSe]:PSTatistic:BANDwidth|BWIDth <freq>

[:SENSe]:PSTatistic:BANDwidth|BWIDth?

Set the bandwidth that will be used for acquiring the signal.

Factory Preset and *RST:	5.0 MHz
Range:	10.0 kHz to 6.7 MHz
Resolution:	0.1 kHz
Step:	1.0 kHz
Remarks:	You must be in the cdma2000 or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Power Statistics CCDF Measurement Sample Counts

[:SENSe]:PSTatistic:COUNts <integer>

[:SENSe]:PSTatistic:COUNts?

Set the counts. Measurement stops when the sample counts reach this value.

Factory Preset and *RST:	10,000,000
Range:	1,000 to 2,000,000,000
Unit:	counts
Remarks:	You must be in the cdma2000 or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Power Statistics CCDF Measurement Sweep Time

[:SENSe]:PSTatistic:SWEep:TIME <time>

[:SENSe]:PSTatistic:SWEep:TIME?

Set the length of measurement interval that will be used.

Factory Preset and *RST:	1.0 ms
Range:	0.1 ms to 10 ms
Resolution:	0.001 ms
Step:	0.001 ms
Remarks:	You must be in the cdma2000 or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Power Statistics CCDF Measurement Trigger Source

[:SENSe]:PSTatistic:TRIGger:SOURce EXTernal[1]|EXTernal2|FRAMe|IF|IMMediate|RF Burst

[:SENSe]:PSTatistic:TRIGger:SOURce?

Set the trigger source used to control the data acquisitions.

External 1 - front panel external trigger input

External 2 - rear panel external trigger input

Frame - uses the internal frame timer, which has been synchronized to the selected burst sync.

IF - internal IF envelope (video) trigger

Immediate - the next data acquisition is immediately taken, capturing the signal asynchronously (also called Free Run).

RF Burst - internal wideband RF burst envelope trigger that has automatic level control for periodic burst signals.

Factory Preset and *RST:	Immediate
Remarks:	You must be in the cdma2000 or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Radio Device Under Test

[:SENSe]:RADio:DEVice BTS|MS

[:SENSe]:RADio:DEVice?

Select the type of radio device to be tested.

BTS - Base station transmitter test

MS - Mobile station transmitter test

Factory Preset and *RST:	BTS
Remarks:	Global to the current mode. You must be in cdma2000, W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later
Front Panel Access:	**Mode Setup, Radio, Device**

Frequency Offset of MS to BTS

[:SENSe]:RADio:FOFFset <freq>

[:SENSe]:RADio:FOFFset?

Set the amount of frequency offset (MS freq – BTS freq).

Factory Preset and *RST:	190 MHz
Range:	–500 MHz to 500 MHz
Remarks:	Global to the current mode. You must be in the W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later
Front Panel Access:	**Mode Setup, Radio, MS-BTS Offset**

Radio Format (Standard)

[:SENSe]:RADio:FORMat ARIB|TGPP|TRIal

[:SENSe]:RADio:FORMat?

Select the format that testing will be compliant with when measurements are made.

ARIB, is the standard format defined by the Association of Radio Industries and Business in Japan

TGPP, is the standard format defined by the Third Generation Partnership Projects (3GPP)

Trial, is a 1998 trial format being evaluated

Factory Preset and *RST:	Trial
Remarks:	You must be in the W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later
Front Panel Access:	**Mode Setup, Radio, Standard**

Rho (Waveform Quality) Measurement

Commands for querying the rho measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 244. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Mod Accuracy (Rho)** measurement has been selected from the **MEASURE** key menu.

Rho Measurement Demod Alpha

[:SENSe]:RHO:ALPHa <float>

[:SENSe]:RHO:ALPHa?

Set alpha for the root nyquist filter.

Factory Preset and *RST:	0.22
Range:	0.01 to 0.5
Remarks:	You must be in the W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Rho Measurement Average Count

[:SENSe]:RHO:AVERage:COUNt <integer>

[:SENSe]:RHO:AVERage:COUNt?

Set the number of frames that will be averaged. After the specified number of frames (average counts), the averaging mode (terminal control) setting determines the averaging action.

Factory Preset and *RST:	10
Range:	1 to 10,000
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Rho Measurement Averaging State

[:SENSe]:RHO:AVERage[:STATe] OFF|ON|0|1

[:SENSe]:RHO:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST:	On
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Rho Measurement Averaging Termination Control

[:SENSe]:RHO:AVERage:TCONtrol EXPonential|REPeat

[:SENSe]:RHO:AVERage:TCONtrol?

Select the type of terminal control used for averaging. This determines the averaging action after the specified number of frames (average count) is reached.

Exponential - Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.

Repeat - After reaching the average count, the averaging is reset and a new average is started.

Factory Preset and *RST:	Exponential Repeat for cdma2000 and W-CDMA (Trial & Arib) mode
Remarks:	You must be in the cdmaOne, cdma2000, W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Rho Measurement Spectrum Normal/Invert

[:SENSe]:RHO:SPECtrum NORMal|INVert

[:SENSe]:RHO:SPECtrum?

Select normal or inverted spectrum for demodulation.

Normal - normal spectrum is used

Invert - inverted spectrum is used

Factory Preset and *RST:	Normal
Remarks	You must be in the cdmaOne, cama2000, W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Rho Measurement Scramble Code

[:SENSe]:RHO:SYNC:SCRamble <integer>

[:SENSe]:RHO:SYNC:SCRamble?

Set the scramble code for synchronization.

Factory Preset and *RST:	1
Range:	0 to 262143 (0h to 3FFFFh) (0 is for no-scramble)
Remarks:	You must be in the W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Rho Measurement Trigger Source

[:SENSe]:RHO:TRIGger:SOURce EXTernal[1]|External2|FRAMe|IF|IMMediate|IF|RFBurst

[:SENSe]:RHO:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

External 1 – front panel external trigger input

External 2 – rear panel external trigger input

Frame – internal frame trigger from front panel input

IF – internal IF envelope trigger

Immediate – the next data acquisition is immediately taken, capturing the signal asynchronously (also called free run).

RF Burst – internal wideband RF burst envelope trigger that has automatic level control for periodic burst signals.

Factory Preset and *RST: Immediate

Remarks: You must be in the cdma2000 or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Front Panel Access: **Meas Setup**, **Trig Source**

Spectrum (Frequency-Domain) Measurement

Commands for querying the spectrum measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 244. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Spectrum (Freq Domain)** measurement has been selected from the **MEASURE** key menu.

Spectrum Measurement Data Acquisition Packing

[:SENSe]:SPECtrum:ACQuisition:PACKing AUTO|LONG|MEDium|SHORt

[:SENSe]:SPECtrum:ACQuisition:PACKing?

Select the amount of data acquisition packing. This is an advanced control that normally does not need to be changed.

Factory Preset and *RST: Auto

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum Measurement ADC Dither

[:SENSe]:SPECtrum:ADC:DITHer[:STATe] AUTO|ON|OFF|2|1|0

[:SENSe]:SPECtrum:ADC:DITHer[:STATe]?

Turn the ADC dither on or off. This is an advanced control that normally does not need to be changed.

Factory Preset and *RST: Auto

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum Measurement ADC Range

[:SENSe]:SPECtrum:ADC:RANGe AUTO|APEak|APLock|M6|P0|P6|P12|P18|P24|

[:SENSe]:SPECtrum:ADC:RANGe?

Select the range for the gain-ranging that is done in front of the ADC. This is an advanced control that normally does not need to be changed. Auto peak ranging is the default for this measurement. If you are measuring a CW signal please see the description below.

- Auto - automatic range

  For FFT spectrums - auto ranging should not be not be used. An exception to this would be if you know that your signal is "bursty". Then you might use auto to maximize the time domain dynamic range as long as you are not very interested in the FFT data.

- Auto Peak - automatically peak the range

  For CW signals, the default of auto-peak ranging can be used, but a better FFT measurement of the signal can be made by selecting one of the manual ranges that are available: M6, P0 - P24. Auto peaking can cause the ADC range gain to move monotonically down during the data capture. This movement should have negligible effect on the FFT spectrum, but selecting a manual range removes this possibility. Note that if the CW signal being measured is close to the auto-ranging threshold, the noise floor may shift as much as 6 dB from sweep to sweep.

- Auto Peak Lock - automatically peak lock the range

  — For CW signals, auto-peak lock ranging may be used. It will find the best ADC measurement range for this particular signal and will not move the range as auto-peak can. Note that if the CW signal being measured is close to the auto-ranging threshold, the noise floor may shift as much as 6 dB from sweep to sweep.

  — For "bursty" signals, auto-peak lock ranging should not be used. The measurement will fail to operate, since the wrong (locked) ADC range will be chosen often and overloads will occur in the ADC.

- M6 - manually selects an ADC range that subtracts 6 dB of fixed gain across the range. Manual ranging is best for CW signals.

- P0 to 24 - manually selects ADC ranges that add 0 to 24 dB of fixed gain across the range. Manual ranging is best for CW signals.

Factory Preset and *RST:	Auto peak
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum Measurement Average Clear

[:SENSe]:SPECtrum:AVERage:CLEAr

The average data is cleared and the average counter is reset.

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum Measurement Number of Averages

[:SENSe]:SPECtrum:AVERage:COUNt <integer>

[:SENSe]:SPECtrum:AVERage:COUNt?

Set the number of 'sweeps' that will be averaged. After the specified number of 'sweeps' (average counts), the averaging mode (terminal control) setting determines the averaging action.

Factory Preset and *RST: 25

Range: 1 to 10,000

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum Measurement Averaging State

[:SENSe]:SPECtrum:AVERage[:STATe] OFF|ON|0|1

[:SENSe]:SPECtrum:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST: On

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum Measurement Averaging Mode

[:SENSe]:SPECtrum:AVERage:TCONtrol EXPonential|REPeat

[:SENSe]:SPECtrum:AVERage:TCONtrol?

Select the type of terminal control used for averaging. This determines the averaging action after the specified number of 'sweeps' (average count) is reached.

Exponential - Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.

Repeat - After reaching the average count, the averaging is reset and a new average is started.

Factory Preset and *RST:	Exponential
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum Measurement Averaging Type

[:SENSe]:SPECtrum:AVERage:TYPE LOG|MAXimum|MINimum|RMS|SCALar

[:SENSe]:SPECtrum:AVERage:TYPE?

Select the type of averaging.

Log – The log of the power is averaged. (This is also known as video averaging.)

Maximum – The maximum values are retained.

Minimum – The minimum values are retained.

RMS – The power is averaged, providing the rms of the voltage.

Scalar – The voltage is averaged.

Factory Preset and *RST:	Log
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum Measurement pre-ADC Bandpass Filter

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PADC OFF|ON|0|1

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PADC?

Turn the pre-ADC bandpass filter on or off. This is an advanced control that normally does not need to be changed.

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum Measurement pre-FFT BW Auto

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PFFT:AUTO OFF|ON|0|1

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PFFT:AUTO?

Select auto or manual control of the pre-FFT BW. This is an advanced control that normally does not need to be changed.

Auto - couples the pre-FFT BW to the frequency span.

Manual - the pre-FFT BW is uncoupled from the frequency span.

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum Measurement pre-FFT BW

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PFFT[:SIZE] <freq>

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PFFT[:SIZE]?

Set the pre-FFT bandwidth. This is an advanced control that normally does not need to be changed.

Frequency span, resolution bandwidth, and the pre-FFT bandwidth settings are normally coupled. If you are not auto-coupled, there can be combinations of these settings that are not valid.

Factory Preset and *RST: 1.55 MHz

1.25 MHz for cdmaOne

155 kHz, for iDEN mode

Range: 1 Hz to 10 MHz

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum Measurement Pre-FFT BW Filter Type

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PFFT:TYPE FLAT|GAUSsian

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PFFT:TYPE?

Select the type of pre-FFT filter that is used. This is an advanced control that normally does not need to be changed.

Flat top- a filter with a flat amplitude response, which provides the best amplitude accuracy.

Gaussian - a filter with Gaussian characteristics, which provides the best pulse response.

Factory Preset and *RST:	Flat top
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum Measurement Resolution BW

[:SENSe]:SPECtrum:BANDwidth|BWIDth[:RESolution] <freq>

[:SENSe]:SPECtrum:BANDwidth|BWIDth[:RESolution]?

Set the resolution bandwidth for the FFT. This is the bandwidth used for resolving the FFT measurement. It is not the pre-FFT bandwidth. This value is ignored if the function is auto-coupled.

Frequency span, resolution bandwidth, and the pre-FFT bandwidth settings are normally coupled. If you are not auto-coupled, there can be combinations of these settings that are not valid.

Factory Preset and *RST:	20 kHz
	250 Hz, for iDEN mode
Range:	0.10 Hz to 3 MHz
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum Measurement Resolution BW Auto

[:SENSe]:SPECtrum:BANDwidth|BWIDth[:RESolution]:AUTO OFF|ON|0|1

[:SENSe]:SPECtrum:BANDwidth|BWIDth[:RESolution]:AUTO?

Select auto or manual control of the resolution BW. The automatic mode couples the resolution bandwidth setting to the frequency span.

Factory Preset
and *RST: On

Off, for iDEN mode

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Decimation of Spectrum Display

[:SENSe]:SPECtrum:DECimate[:FACTor] <integer>

[:SENSe]:SPECtrum:DECimate[:FACTor]?

Set the amount of data decimation done by the hardware and/or the software. Decimation by 3 keeps every third sample, throwing away the two in between. Similarly, decimation by 5 keeps every fifth sample, throwing away the four in between.

Using zero (0) decimation selects the automatic mode. The measurement will then automatically choose decimation by “1” or “2” as is appropriate for the bandwidth being used. This is an advanced control that normally does not need to be changed.

Factory Preset
and *RST: 0

Range: 0 to 1000, where 0 sets the function to automatic

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

History: Version A.02.00 or later

Spectrum Measurement FFT Length

[:SENSe]:SPECtrum:FFT:LENGth <integer>

[:SENSe]:SPECtrum:FFT:LENGth?

Set the FFT length. This value is only used if length control is set to manual. The value must be greater than or equal to the window length value. Any amount greater than the window length is implemented by zero-padding. This is an advanced control that normally does not need to be changed.

Factory Preset

and *RST: 4096

32768, for iDEN mode

Range: 8 to 1,048,576

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

History: Short form changed from LENgth to LENGth, A.03.00

Spectrum Measurement FFT Length Auto

[:SENSe]:SPECtrum:FFT:LENGth:AUTO OFF|ON|0|1

[:SENSe]:SPECtum:FFT:LENGth:AUTO?

Select auto or manual control of the FFT and window lengths.

This is an advanced control that normally does not need to be changed.

Auto - the window lengths are coupled to resolution bandwidth, window type (FFT), pre-FFT bandwidth (sample rate) and SENSe:SPECtrum:FFT:RBWPoints.

Manual - lets you set `SENSe:SPECtrum:FFT:LENGth` and `SENSe:SPECtrum:FFT:WINDow:LENGth`.

Factory Preset and *RST: Auto

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

History: Short form changed from LENgth to LENGth, A.03.00

Spectrum Measurement FFT Minimum Points in Resolution BW

[:SENSe]:SPECtrum:FFT:RBWPoints <real>

[:SENSe]:SPECtum:FFT:RBWPoints?

Set the minimum number of data points that will be used inside the resolution bandwidth. The value is ignored if length control is set to manual. This is an advanced control that normally does not need to be changed.

Factory Preset and *RST: 1.30

Range: 0.1 to 100

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum Measurement Window Length

[:SENSe]:SPECtrum:FFT:WINDow:LENGth <integer>

[:SENSe]:SPECtrum:FFT:WINDow:LENGth?

Set the FFT window length. This value is only used if length control is set to manual. This is an advanced control that normally does not need to be changed.

Factory Preset and *RST:	706
	5648, for iDEN mode
Range:	8 to 1,048,576
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.
History:	Short form changed from LENgth to LENGth, A.03.00

Spectrum Measurement FFT Window

[:SENSe]:SPECtrum:FFT:WINDow[:TYPE] BH4Tap|BLACkman|FLATtop|GAUSsian|HAMMing|HANNing|KB70|KB90|KB110|UNIForm

[:SENSe]:SPECtrum:FFT:WINDow[:TYPE]?

Select the FFT window type.

BH4Tap - Blackman Harris with 4 taps

Blackman - Blackman

Flat Top - flat top, the default (for high amplitude accuracy)

Gaussian - Gaussian with alpha of 3.5

Hamming - Hamming

Hanning - Hanning

KB70, 90, and 110 - Kaiser Bessel with sidelobes at –70, –90, or –110 dBc

Uniform - no window is used. (This is the unity response.)

Factory Preset and *RST:	Flat top
Remarks:	This selection affects the acquisition point quantity and the FFT size, based on the resolution bandwidth selected.
	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum Measurement Frequency Span

[:SENSe]:SPECtrum:FREQuency:SPAN <freq>

[:SENSe]:SPECtrum:FREQuency:SPAN?

Set the frequency span to be measured.

Factory Preset and *RST:	1 MHz
	100 kHz for iDEN mode
Range:	10 Hz to 10 MHz (15 MHz when Service mode is selected)
Default Unit:	Hz
Remarks:	The actual measured span will generally be slightly wider due to the finite resolution of the FFT.
	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Spectrum Measurement Trigger Source

[:SENSe]:SPECtrum:TRIGger:SOURce EXTernal[1]|EXTernal 2|FRAMe|IF|LINE|IMMediate|RFBurst

[:SENSe]:SPECtrum:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

External 1 - front panel external trigger input

External 2 - rear panel external trigger input

Frame - internal frame timer from front panel input

IF - internal IF envelope (video) trigger

Line - internal line trigger

Immediate - the next data acquisition is immediately taken (also called free run)

RF Burst - internal wideband RF burst envelope trigger that has automatic level control for periodic burst signals

Factory Preset and *RST:	Immediate (free run)
	RF burst, for GSM, iDEN mode
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform (Time-Domain) Measurement

Commands for querying the waveform measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 244. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Waveform (Time Domain)** measurement has been selected from the **MEASURE** key menu.

Waveform Measurement pre-ADC Bandpass Filter

[:SENSe]:WAVeform:ADC:FILTer:[:STATe] OFF|ON|0|1

[:SENSe]:WAVeform:ADC:FILTer:[:STATe]?

Turn the pre-ADC bandpass filter on or off. This is an Advanced control that normally does not need to be changed.

Preset: Off

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform Measurement ADC Range

[:SENSe]:WAVeform:ADC:RANGe AUTO|APEak|APLock|GROund|M6|P0|P6|P12|P18|P24|

[:SENSe]:WAVeform:ADC:RANGe?

Select the range for the gain-ranging that is done in front of the ADC. This is an Advanced control that normally does not need to be changed.

Auto - automatic range

Auto Peak - automatically peak the range

Auto Peak Lock - automatically peak lock the range

Ground - ground

M6 - subtracts 6 dB of fixed gain across the range

P0 to 24 - adds 0 to 24 dB of fixed gain across the range

Factory Preset and *RST: Auto

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform Measurement Number of Averages

[:SENSe]:WAVeform:AVERage:COUNt <integer>

[:SENSe]:WAVeform:AVERage:COUNt?

Set the number of sweeps that will be averaged. After the specified number of sweeps (average counts), the averaging mode (terminal control) setting determines the averaging action.

Factory Preset and *RST:	10
Range:	1 to 10,000
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform Measurement Averaging State

[:SENSe]:WAVeform:AVERage[:STATe] OFF|ON|0|1

[:SENSe]:WAVeform:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST:	Off
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform Measurement Averaging Mode

[:SENSe]:WAVeform:AVERage:TCONtrol EXPonential|REPeat

[:SENSe]:WAVeform:AVERage:TCONtrol?

Select the type of terminal control used for averaging. This determines the averaging action after the specified number of ‘sweeps’ (average count) is reached.

Exponential - Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.

Repeat - After reaching the average count, the averaging is reset and a new average is started.

Factory Preset and *RST:	Exponential
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform Measurement Averaging Type

[:SENSe]:WAVeform:AVERage:TYPE LOG|MAXimum|MINimum|RMS|SCALar

[:SENSe]:WAVeform:AVERage:TYPE?

Select the type of averaging.

Log - The log of the power is averaged. (This is also known as video averaging.)

Maximum - The maximum values are retained.

Minimum - The minimum values are retained.

RMS - The power is averaged, providing the rms of the voltage.

Factory Preset and *RST:	RMS
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform Measurement Resolution BW

[:SENSe]:WAVeform:BANDwidth|BWIDth[:RESolution] <freq>

[:SENSe]:WAVeform:BANDwidth|BWIDth[:RESolution]?

Set the resolution bandwidth. This value is ignored if the function is auto-coupled.

Factory Preset and *RST:	100 kHz, for NADC, PDC, cdma2000, W-CDMA (Trial & Arib), basic, service mode
	500 kHz, for GSM mode
	2 MHz. for cdmaOne
Range:	1 kHz to 5 MHz
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform Measurement Resolution BW Filter Type

[:SENSe]:WAVeform:BANDwidth|BWIDth[:RESolution]:TYPE FLATtop|GAUSsian

[:SENSe]:WAVeform:BANDwidth|BWIDth[:RESolution]:TYPE?

Select the type of Resolution BW filter that is used. This is an Advanced control that normally does not need to be changed.

Flat top - a filter with a flat amplitude response, which provides the best amplitude accuracy.

Gaussian - a filter with Gaussian characteristics, which provides the best pulse response.

Factory Preset and *RST: Gaussian

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Decimation of Waveform Display

[:SENSe]:WAVeform:DECimate[:FACTor] <integer>

[:SENSe]:WAVeform:DECimate[:FACTor]?

Set the amount of data decimation done by the hardware and/or the firmware. For example, if 4 is selected, three out of every four data points will be thrown away. So every 4th data point will be kept.

Factory Preset and *RST: 1

Range: 1 to 4

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Control Decimation of Waveform Display

[:SENSe]:WAVeform:DECimate:STATe OFF|ON|0|1

[:SENSe]:WAVeform:DECimate:STATe?

Set the amount of data decimation done by the hardware in order to decrease the number of acquired points in a long capture time. This is the amount of data that the measurement ignores.

Factory Preset and *RST: Off

Remarks: To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform Measurement Sweep (Acquisition) Time

[:SENSe]:WAVeform:SWEep:TIME <time>

[:SENSe]:WAVeform:SWEep:TIME?

Set the measurement acquisition time. It is used to specify the length of the time capture record.

Factory Preset and *RST:	2.0 ms
	10.0 ms, for NADC, PDC
	15.0 ms, for iDEN mode
Range:	1 µs to 100 s
Default Unit:	seconds
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.

Waveform Measurement Trigger Source

[:SENSe]:WAVeform:TRIGger:SOURce EXTernal[1]|EXTernal 2|FRAMe|IF|IMMediate|LINE|RFBurst

[:SENSe]:WAVeform:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

External 1 - front panel external trigger input

External 2 - rear panel external trigger input

Frame - internal frame timer from front panel input

IF - internal IF envelope (video) trigger

Immediate - the next data acquisition is immediately taken (also called free run)

Line - internal line trigger

RF Burst - internal wideband RF burst envelope trigger that has automatic level control for periodic burst signals

Factory Preset and *RST:	Immediate (free run), for Basic, cdmaOne, NADC, PDC mode
	RF burst, for GSM, iDEN mode
Remarks:	To use this command, the appropriate mode should be selected with INSTrument:SELect.