cdmaOne Programming Commands

Agilent Technologies E4406A VSA Series Transmitter Tester

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These commands are only available when the cdmaOne mode has been selected using **INSTrument:SELect CDMA**. If cdmaOne 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.

Adjacent Channel Power—Limit Test

:CALCulate:ACP:LIMit:STATe OFF|ON|0|1

:CALCulate:ACP:LIMit:STATe?

Turn limit test on or off.

Factory Preset and *RST: On

Remarks: You must be in Basic, cdmaOne, iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Limit Test

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

:CALCulate:ACP:LIMit[:TEST]?

Turn limit test on or off.

Factory Preset and *RST: On

Remarks: You must be in the NADC, cdmaOne, or PDC 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 40 for information on the data that can be returned for each measurement.

Calculate/Compress Trace Data Query

:CALCulate:DATA[n]:COMPress?
BLOCk|CFIT|MAXimum|MEAN|MINimum|RMS|SAMPle|SDEViation
{,<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.

BLOCk or block data - returns whole segments from the queried trace. For example, it could be used to return a portion of an input signal over several timeslots.

CFIT or 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. It 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
BER - bit error rate (iDEN mode)	no traces	no markers
CDPower - code domain power (cdmaOne mode)	POWer (*n*=2)[a] TIMing (*n*=3)[a] PHASe (*n*=4)[a]	yes
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

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 (3GPP), W-CDMA (Trial & Arib) modes)	SPECtrum (*n*=2)[a]	no markers
CSPur - spurs close (cdmaOne mode)	SPECtrum (*n*=2)[a] ULIMit (*n*=3)[a]	yes
EEVM - EDGE error vector magnitude (EDGE mode)	EVMError (*n*=2)[a] MERRor (*n*=3)[a] PERRor (*n*=4)[a]	yes
EORFspectr - EDGE output RF spectrum (EDGE mode)	RFEModulation (*n*=2)[a] RFESwitching (*n*=3)[a]	yes, only for a single offset
EPVTime - EDGE power versus time (EDGE mode)	RFENvelope (*n*=2)[a] UMASk (*n*=3)[a] LMASk (*n*=4)[a]	yes
EVM - error vector magnitude (NADC, PDC modes)	EVM (*n*=2)[a] MERRor (*n*=3)[a] PERRor (*n*=4)[a]	yes
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*=0)[a]	yes

Measurement	Available Traces	Markers Available?
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
ORFSpectrum - output RF spectrum (GSM mode)	RFEModulation (*n*=2)[a] RFESwitching (*n*=3)[a]	yes, only for a single offset
PFERror - phase and frequency error (GSM mode)	PERRor (*n*=2)[a] PFERror (*n*=3)[a] RFENvelope (*n*=4)[a]	yes
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
PVTime - power versus time (GSM, Service modes)	RFENvelope (*n*=2)[a] UMASk (*n*=3)[a] LMASk (*n*=4)[a]	yes
RHO - modulation quality (cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib) mode)	EVM (*n*=2)[a] MERRor (*n*=3)[a] PERRor (*n*=4)[a]	yes
SEMask - spectrum emissions mask (cdma2000, W-CDMA (3GPP) mode)	SPECtrum (*n*=0)[a]	yes
TSPur - transmit band spurs (GSM mode)	SPECtrum (*n*=2)[a] ULIMit (*n*=3)[a]	yes
TXPower - transmit power (GSM mode)	RFENvelope (*n*=2)[a] IQ (*n*=8)[a]	yes

Measurement	Available Traces	Markers Available?
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.

Basic Mode - <measurement> key words

- ACPr - no markers
- CHPower - no markers
- PSTATistic - markers available
- SPECtrum - markers available
- WAVeform - markers available

Service Mode - <measurement> key words

- PVTime - no markers
- SPECtrum - markers available
- WAVeform - markers available

cdmaOne Mode - <measurement> key words

- ACPr - no markers
- CHPower - no markers
- CDPower - markers available
- CSPur - markers available
- RHO - markers available
- SPECtrum - markers available
- WAVeform - markers available

cdma2000 Mode - <measurement> key words

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

EDGE (with GSM) Mode - <measurement> key words

- EEVM - markers available
- EORFspectr - markers available
- EPVTime - no markers
- ORFSpectrum - markers available
- PFERror - markers available
- PVTime - no markers
- SPECtrum - markers available
- TSPur - markers available
- TXPower - no markers
- WAVeform - markers available

GSM Mode - <measurement> key words

- ORFSpectrum - markers available
- PFERror - markers available
- PVTime - no markers
- SPECtrum - markers available
- TSPur - markers available
- TXPower - no markers
- WAVeform - markers available

iDEN Mode - <measurement> key words

- ACP - no markers
- BER - no markers
- OBW - no markers
- SPECtrum - markers available
- WAVeform - markers available

NADC Mode - <measurement> key words

- ACP - no markers
- EVM - markers available
- SPECtrum - markers available
- WAVeform - markers available

PDC Mode - <measurement> key words

- ACP - no markers
- EVM - markers available
- OBW - no markers
- SPECtrum - markers available
- WAVeform - markers available

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

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. 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: M**arker, 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
BER - bit error rate (iDEN mode)	no traces	no markers
CDPower - code domain power (cdmaOne mode)	POWer (*n*=2)[a] TIMing (*n*=3)[a] PHASe (*n*=4)[a]	yes
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
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 (3GPP), W-CDMA (Trial & Arib) modes)	SPECtrum (*n*=2)[a]	no markers
CSPur - spurs close (cdmaOne mode)	SPECtrum (*n*=2)[a] ULIMit (*n*=3)[a]	yes
EEVM - EDGE error vector magnitude (EDGE mode)	EVMError (*n*=2)[a] MERRor (*n*=3)[a] PERRor (*n*=4)[a]	yes

Measurement	Available Traces	Markers Available?
EORFspectr - EDGE output RF spectrum (EDGE mode)	RFEModulation (*n*=2)[a] RFESwitching (*n*=3)[a]	yes, only for a single offset
EPVTime - EDGE power versus time (EDGE mode)	RFENvelope (*n*=2)[a] UMASk (*n*=3)[a] LMASk (*n*=4)[a]	yes
EVM - error vector magnitude (NADC, PDC modes)	EVM (*n*=2)[a] MERRor (*n*=3)[a] PERRor (*n*=4)[a]	yes
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*=0)[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
ORFSpectrum - output RF spectrum (GSM mode)	RFEModulation (*n*=2)[a] RFESwitching (*n*=3)[a]	yes, only for a single offset
PFERror - phase and frequency error (GSM mode)	PERRor (*n*=2)[a] PFERror (*n*=3)[a] RFENvelope (*n*=4)[a]	yes
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

Measurement	Available Traces	Markers Available?
PVTime - power versus time (GSM, Service modes)	RFENvelope (*n*=2)[a] UMASk (*n*=3)[a] LMASk (*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) mode)	SPECtrum (*n*=0)[a]	yes
TSPur - transmit band spurs (GSM mode)	SPECtrum (*n*=2)[a] ULIMit (*n*=3)[a]	yes
TXPower - transmit power (GSM mode)	RFENvelope (*n*=2)[a] IQ (*n*=8)[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)

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 40.

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.

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 40 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
BER - bit error rate (iDEN mode)	no traces	no markers
CDPower - code domain power (cdmaOne mode)	POWer (*n*=2)[a] TIMing (*n*=3)[a] PHASe (*n*=4)[a]	yes
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

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 (3GPP), W-CDMA (Trial & Arib) modes)	SPECtrum (*n*=2)[a]	no markers
CSPur - spurs close (cdmaOne mode)	SPECtrum (*n*=2)[a] ULIMit (*n*=3)[a]	yes
EEVM - EDGE error vector magnitude (EDGE mode)	EVMError (*n*=2)[a] MERRor (*n*=3)[a] PERRor (*n*=4)[a]	yes
EORFspectr - EDGE output RF spectrum (EDGE mode)	RFEModulation (*n*=2)[a] RFESwitching (*n*=3)[a]	yes, only for a single offset
EPVTime - EDGE power versus time (EDGE mode)	RFENvelope (*n*=2)[a] UMASk (*n*=3)[a] LMASk (*n*=4)[a]	yes
EVM - error vector magnitude (NADC, PDC modes)	EVM (*n*=2)[a] MERRor (*n*=3)[a] PERRor (*n*=4)[a]	yes
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*=0)[a]	yes

Measurement	Available Traces	Markers Available?
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
ORFSpectrum - output RF spectrum (GSM mode)	RFEModulation (*n*=2)[a] RFESwitching (*n*=3)[a]	yes, only for a single offset
PFERror - phase and frequency error (GSM mode)	PERRor (*n*=2)[a] PFERror (*n*=3)[a] RFENvelope (*n*=4)[a]	yes
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
PVTime - power versus time (GSM, Service modes)	RFENvelope (*n*=2)[a] UMASk (*n*=3)[a] LMASk (*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*=0)[a]	yes
TSPur - transmit band spurs (GSM mode)	SPECtrum (*n*=2)[a] ULIMit (*n*=3)[a]	yes
TXPower - transmit power (GSM mode)	RFENvelope (*n*=2)[a] IQ (*n*=8)[a]	yes

Measurement	Available Traces	Markers Available?
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 40.

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 40.

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.

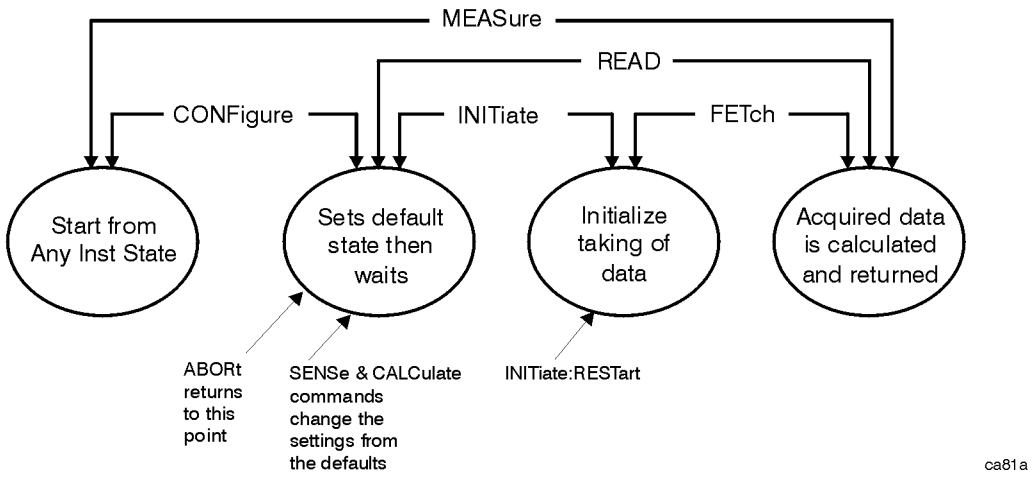
  If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. 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.
	not specified or n=1 NADC and PDC mode	Returns 22 comma-separated scalar results, in the following order: 1. Center frequency – absolute power (dBm) 2. Center frequency – absolute power (W) 3. Negative offset frequency (1) – relative power (dB) 4. Negative offset frequency (1) – absolute power (dBm) 5. Positive offset frequency (1) – relative power (dB) 6. Positive offset frequency (1) – absolute power (dBm) . . . 21. Positive offset frequency (5) – relative power (dB) 22. Positive offset frequency (5) – absolute power (dBm)

Measurement Type	n	Results Returned
	not specified or n=1 iDEN mode	Returns 13 comma-separated scalar results, in the following order: 1. Center frequency – relative power (dB) 2. Center frequency – absolute power (dBm) 3. Lower offset frequency – relative power (dB) 4. Lower offset freq– absolute power (dBm) 5. Upper offset frequency – relative power (dB) 6. Upper offset frequency – absolute power (dBm) 7. Total power (dBm) 8. Offset frequency (Hz) 9. Reference BW (Hz) 10. Offset BW (Hz) 11. Carrier/center frequency (Hz) 12. Frequency span (Hz) 13. Average count
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)

Measurement Type	n	Results Returned
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)
	2 NADC and PDC mode	Returns 10 comma-separated scalar values of the pass/fail (0=passed, or 1=failed) results determined by testing the absolute power of the offset frequencies: 1. Negative offset frequency (1) absolute power 2. Positive offset frequency (1) absolute power . . . 9. Negative offset frequency (5) absolute power 10. Positive offset frequency (5) absolute power
	2 iDEN mode	Returns 3 comma-separated scalar values of the histogram absolute power trace: 1. Lower offset frequency – absolute power 2. Reference frequency – absolute power 3. Upper offset frequency – absolute power
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)

Measurement Type	n	Results Returned
	3 NADC and PDC mode	Returns 10 comma-separated scalar values of the pass/fail (0=passed, or 1=failed) results determined by testing the relative power of the offset frequencies: 1. Negative offset frequency (1) relative power 2. Positive offset frequency (1) relative power . . . 9. Negative offset frequency (5) relative power 10. Positive offset frequency (5) relative power
	3 iDEN mode	Returns 3 comma-separated scalar values of the histogram relative power trace: 1. Lower offset frequency – relative power 2. Reference frequency – relative power 3. Upper offset frequency – relative power
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)
	4 NADC and PDC mode	Returns the frequency-domain spectrum trace (data array) for the entire frequency range being measured. In order to return spectrum data, the ACP display must be in the spectrum view and you must not turn off the spectrum trace.
	4 iDEN mode	Returns 4 comma-separated absolute power results for the reference and offset channels. 1. Reference channel – absolute power 2. Reference channel – absolute power (duplicate of above) 3. Lower offset channel – absolute power 4. Upper offset channel – absolute power

Measurement Type	n	Results Returned
(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.
	5 iDEN mode	Returns 4 comma-separated relative power values for the reference and offset channels: 1. Reference channel – relative power 2. Reference channel – relative power (duplicate of above) 3. Lower offset channel – relative power 4. Upper offset channel – relative power
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)

Measurement Type	n	Results Returned
	6 iDEN mode	Returns 4 comma-separated pass/fail test results for the absolute power of the reference and offset channels: 1. Reference channel absolute power pass/fail 2. Reference channel absolute power pass/fail (duplicate of above) 3. Lower offset channel absolute power pass/fail 4. Upper offset channel absolute power pass/fail
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)
	7 iDEN mode	Returns 4 comma-separated pass/fail test results for the relative power of the reference and offset channels: 1. Reference channel relative power pass/fail 2. Reference channel relative power pass/fail (duplicate of above) 3. Lower offset channel relative power pass/fail 4. Upper offset channel relative power pass/fail

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 cdmaOne mode	Returns the following 25 comma-separated scalar results: 1. **Time offset** is a floating point number with units of seconds. This is the time delay of the even second clock with respect to the start of the short code PN sequences, at offsets from the 15 zeros in the characteristic phase of the sequences. 2. **Frequency error** is a floating point number (in Hz) of the frequency error in the measured signal. This error is based on the linear best fit of the uncorrected measured phase. 3. **Carrier feedthrough** is a floating point number (in dB) of the dc offset, of I and Q, from the origin. 4. **Pilot power** is a floating point number with units of dB. It is the relative power of the pilot channel (Walsh code 0) with respect to the carrier power. 5. **Paging power** is a floating point number with units of dB. It is the relative power of the paging channel (Walsh code 1) with respect to the carrier power. 6. **Sync power** is a floating point number with units of dB. It is the relative power of the sync channel (Walsh code 32) with respect to the carrier power. 7. **Average traffic power** is a floating point number with units of dB. It is the average relative power of the active traffic channels with respect to the carrier power. Traffic channels are defined as all of the Walsh codes except Walsh 0,1,32. A traffic channel is active if its coding power is greater than the active threshold parameter which you have selected. 8. **Maximum inactive traffic power** is a floating point number with units of dB. It is the maximum relative power of an inactive traffic channel with respect to the carrier power. Traffic channels are defined as all of the Walsh codes except Walsh 0,1,32. A traffic channel is inactive if its coding power is less than the active threshold parameter which you have selected. 9. **Average inactive traffic power** is a floating point number with units of dB. It is the average relative power of the inactive traffic channels with respect to the carrier power. Traffic channels are defined as all of the Walsh codes except Walsh 0,1,32. A traffic channel is inactive if its coding power is less than the active threshold parameter which you have selected. 10. **Marker Values** The last 16 measurement results are the current values for all four available markers. The values are zero for any marker that is not active. 10. Marker 1 position (code number) 11, Marker 1 power level 12. Marker 1 time value 13. Marker 1 phase value . . . 25. Marker 4 phase value

n	Results Returned
not specified or n=1 cdma2000 mode	Returns the following 19 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. **Total active power** is a floating point number (in dB or dBm depending on the measurement type) of the sum of the active power. 8. **Pilot power** is a floating point number (in dB or dBm depending on the measurement type) of the average power of the Pilot code. 9. **Sync power** is a floating point number (in dB or dBm depending on the measurement type) of the average power of the Sync code. In the MS mode, the value returned is –999. 10. **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 code. If no active code is detected the value returned is –999. In the MS mode, the value returned is –999. 11. **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. 12. **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. In the MS mode, the value returned is –999. 13. **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. 14. **Number of active channel** In the MS mode, the value returned is –999.

n	Results Returned
not specified or n=1 cdma2000 mode (continued)	15. **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. 16. **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. 17. **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. 18. **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. 19. **Time between trigger to PN Offset** is a floating point number (in µs) of the time from the trigger point to the PN Offset. In the MS mode, the value returned is –999.

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.

n	Results Returned
not specified or n=1 W-CDMA (Trial & Arib) mode	Returns the following 14 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.)

n	Results Returned
not specified or n=1 W-CDMA (Trial & Arib) mode (continued)	Returns the following 14 comma-separated scalar results: 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.)
2 cdmaOne mode	Returns comma-separated floating point numbers that are the trace data of the code domain *power* trace for all 64 Walsh codes. This series of 64 numbers represent the relative power levels (in dB) of all 64 walsh codes, with respect to the carrier power.
2 cdma2000 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 64 or 128 numbers depending on CALCulate:CDPower:WCODe:BASE. If the active channel occupies more than the max spreading factor (64 or 128 Walsh Code length depending on CALCulate:CDPower:WCODe:BASE) the power is duplicated (CALCulate:CDPower:WCODe:BASE / active Walsh code length) 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 (C8) the power is duplicated (active Cx / C8) 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
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.
2 W-CDMA (Trial & Arib) mode	With a radio format (or band) of ARIB or TGPP: 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 With a radio format (or band) of TRIal: Returns a series of floating point numbers (in dB) with a multiplier of 16 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 / 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 cdmaOne mode	Returns comma-separated floating point numbers that are the trace data of the code domain *timing* trace for all 64 Walsh codes. This series of 64 numbers represent the relative timing estimations (in seconds) of the codes, relative to the pilot channel. Typical values are on the order of 1 ns.

n	Results Returned
3 cdma2000 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 64 or 128 numbers depending on CALCulate:CDPower:WCODe:BASE. If the active channel occupies more than the max spreading factor (64 or 128 Walsh code length depending on CALCulate:CDPower:WCODe:BASE) the power is duplicated (CALCulate:CDPower:WCODe:BASE / active Walsh code length) 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 (C8) the power is duplicated (active Cx / C8) 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.
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.

n	Results Returned
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 cdmaOne mode	Returns comma-separated floating point numbers that are the trace data of the code domain *phase* trace for all 64 Walsh codes. This series of 64 numbers represent the relative phase estimations (in radians) of the codes, relative to the pilot channel. Typical values are on the order of 1 mrad.
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)
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 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)
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 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)

n	Results Returned
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 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
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)
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.
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

n	Results Returned
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.

Spur Close Measurement

This measures the spurious emissions in the transmit band relative to the channel power in the selected channel. You must be in the 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:CSPur commands for more measurement related commands.

:CONFigure:CSPur

:FETCh:CSPur[n]?

:READ:CSPur[n]?

:MEASure:CSPur[n]?

Front Panel Access: **Measure, Spur Close**

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 3 comma-separated scalar results: 1. The worst spur's frequency difference from channel center frequency (in MHz) 2. The worst spur's amplitude difference from the limit (in dB) 3. The worst spur's amplitude difference from channel power (in dB)
2	Returns trace of the segment containing the worst spur.

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 cdmaOne 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. The standard sample rate is 7.5 MHz and the trace length is determined by the current measurement interval.
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 cdmaOne mode	Returns 7 comma-separated floating point numbers, in the following order: 1. **Rho** (no units) represents the correlation of the measured power compared to the ideal pilot channel. The calculation is performed after the complimentary filter, so it is IS95 compliant. It is performed at the decision points in the pilot waveform. If averaging is on, this is the average of the individual rms measurements. 2. **Time offset** (with units of seconds) is the time delay of the even second clock with respect to the start of the short code PN sequences, at offsets from the 15 zeros in the characteristic phase of the sequence. 3. **Frequency error** of the measured signal, with units of Hz. This is based on the linear best fit of the uncorrected measured phase. 4. **Carrier feedthrough** has units of dB and is the dc error offset of I and Q, from the origin. 5. **EVM** has units of percent. The calculation is based on the composite of the phase error and magnitude error, between the measured signal and the ideal pilot channel. It is performed after the complimentary filter which removes the inter-symbol interference in the modulated data. If averaging is on, this is the average of the individual rms measurements. 6. **Magnitude error** (with units of percent) is the rms error between the measured (compensated) magnitude and the ideal magnitude. This is performed after the complimentary filter which removes the inter-symbol interference in the modulated data. If averaging is on, this is the average of the individual rms measurements. 7. **Phase error** (with units in percent) is the rms phase error between the measured phase and the ideal phase. The calculation is performed after the complimentary filter which removes the inter-symbol interference in the modulated data. If averaging is on, this is the average of the individual rms measurements.

n	Results Returned
not specified or n=1 cdma2000 measurement	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. **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**. 11. **Time between trigger to PN offset** is a floating point number (in second) PN offset from the trigger point.
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**.

n	Results Returned
not specified or n=1 W-CDMA (Trial & Arib) mode	Returns 7 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
2	EVM Trace – returns error vector magnitude (EVM) data, as comma-separated trace points in percent. The first value is the chip 0 decision point. The trace is interpolated for the currently selected points/chips displayed on the front panel. The number of trace points depends on the current measurement interval setting.
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	Magnitude Error Trace – returns magnitude error data, as comma-separated trace points, in percent. The first value is the chip 0 decision point. The trace is interpolated for the currently selected points/chips displayed on the front panel. The number of trace points depends on the current measurement interval setting.
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 cdmaOne mode	Phase Error Trace – returns phase error data, as comma-separated trace points, in degrees. The first value is the symbol 0 decision point. The trace is interpolated for the currently selected chips/symbol displayed on the front panel. The number of trace points depends on the current measurement interval setting.
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 cdmaOne mode	Corrected Measured Data – returns a series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace data. The magnitude of each I and Q pair are normalized to 1.0. The number of trace points depends on the current measurement interval setting. The numbers are sent in the following order: In-phase (I) sample, of symbol 0 decision point Quadrature-phase (Q) sample, of symbol 0 decision point . . . In-phase (I) sample, of symbol 1 decision point Quadrature-phase (Q) sample, of symbol 1 decision point . . . The trace can be interpolated to 2,4,8 points/chip selected with the display Points/Chip softkey. This will change the number of points between decision points in the trace, changing the number of I/Q pairs sent for each decision point.
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	Reference IQ Data – returns a series of floating point numbers that alternately represent I and Q pairs of the reference trace data. The number of trace points depends on the current measurement interval and points per chip settings. The numbers are sent in the following order: In-phase (I) sample, of symbol 0 decision point Quadrature-phase (Q) sample, of symbol 0 decision point . . . In-phase (I) sample, of symbol 1 decision point Quadrature-phase (Q) sample, of symbol 1 decision point . . . The trace can be interpolated to 2,4,8 points/chip selected with the display Points/Chip softkey.

n	Results Returned
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
7 cdmaOne mode	Complimentary Filtered Measured Data – returns a series of floating point numbers that alternately represent I and Q pairs of the complimentary filtered measured data. This is inverse filtered data of the inter-symbol interference in CDMA signals due to the digital transmission filters defined in the standard as well as the base station phase equalization filter. The number of trace points depends on the current measurement interval setting. The numbers are sent in the following order: In-phase (I) sample, of symbol 0 decision point Quadrature-phase (Q) sample, of symbol 0 decision point . . . In-phase (I) sample, of symbol 1 decision point Quadrature-phase (Q) sample, of symbol 1 decision point . . . The trace can be interpolated to 2,4,8 points/chip selected with the display Points/Chip softkey. This will change the number of points between decision points in the trace, changing the number of I/Q pairs sent for each decision point.
8 cdmaOne mode	Complimentary Filtered Reference Data – returns a series of floating point numbers that alternately represent I and Q pairs of the complimentary filtered reference data. This is inverse filtered data of the inter-symbol interference in CDMA signals due to the digital transmission filters defined in the standard as well as the base station phase equalization filter. The number of trace points depends on the current measurement interval setting. The numbers are sent in the following order: In-phase (I) sample, of symbol 0 decision point Quadrature-phase (Q) sample, of symbol 0 decision point . . . In-phase (I) sample, of symbol 1 decision point Quadrature-phase (Q) sample, of symbol 1 decision point . . . The trace can be interpolated to 2,4,8 points/chip selected with the display Points/Chip softkey. This will change the number of points between decision points in the trace, changing the number of I/Q pairs sent for each decision point.

n	Results Returned
11 cdmaOne mode	Corrected Measured Data – returns a series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace data. The magnitude of each I and Q pair are normalized to 1.0. The number of trace points depends on the current setting for the number of displayed I/Q points in the I/Q display. The numbers are sent in the following order: In-phase (I) sample, of symbol 0 decision point Quadrature-phase (Q) sample, of symbol 0 decision point . . . In-phase (I) sample, of symbol 1 decision point Quadrature-phase (Q) sample, of symbol 1 decision point . . . The trace can be interpolated to 2,4,8 points/chip selected with the display Points/Chip softkey. This will change the number of points between decision points in the trace, changing the number of I/Q pairs sent for each decision point.
13 cdmaOne mode	Complimentary Filtered Measured Data – returns a series of floating point numbers that alternately represent I and Q pairs of the complimentary filtered measured data. This is inverse filtered data of the inter-symbol interference in CDMA signals due to the digital transmission filters defined in the standard as well as the base station phase equalization filter. The number of trace points depends on the current setting for the number of displayed I/Q points in the I/Q display. The numbers are sent in the following order: In-phase (I) sample, of symbol 0 decision point Quadrature-phase (Q) sample, of symbol 0 decision point . . . In-phase (I) sample, of symbol 1 decision point Quadrature-phase (Q) sample, of symbol 1 decision point . . . The trace can be interpolated to 2,4,8 points/chip selected with the display Points/Chip softkey. This will change the number of points between decision points in the trace, changing the number of I/Q pairs sent for each 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. 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.
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.

n	Results Returned
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. 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 360.

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 360.

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 40. 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)
	20 for Basic, cdmaOne, iDEN
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

Off for iDEN mode

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)

Exponential for NADC, PDC, iDEN

Remarks: Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Type of Carrier Averaging

[:SENSe]:ACP:AVERage:TYPE MAXimum|RMS

[:SENSe]:ACP:AVERage:TYPE?

Selects the type of averaging to be used for the measurement of the carrier.

Factory Preset and *RST: RMS

Remarks: You must be in Basic, cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

History: Revision A.03.00 or later, in cdmaOne revision A.04.00

Adjacent Channel Power—Carrier Channel BW

Basic, cdmaOne, iDEN mode

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

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

cdma2000, W-CMDA (3GPP) mode

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

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

cdmaOne, W-CMDA (Trial & Arib) mode

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

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

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).

INTegration[n]:

cdmaOne mode n=1 is cellular bands and 2 is pcs bands. The default is cellular.

W-CDMA (Trial & Arib) mode n=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	1.23 MHz		
W-CDMA (3GPP)	3.84 MHz		
W-CDMA (Trial & Arib)	ARIB (n=1)	3GPP (n=2)	Trial (n=3)
	4.069 MHz	3.84 MHz	4.096 MHz

Range: 300 Hz to 20 MHz for Basic, cdmaOne, cdma2000, W-CDMA (3GPP), 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 (3GPP), W-CDMA (Trial & Arib), iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Dynamic Range

[:SENSe]:ACP:DRANge HIGH|NORMal|MODified

[:SENSe]:ACP:DRANge?

Select a dynamic range optimization.

High - chooses settings that provide better dynamic range (better signal to noise ratio) at the expense of longer measurement times. This is a better choice for CDMA signals with multiple carriers turned on at the same time.

Normal - lets the measurement automatically choose settings that trade off dynamic range for faster measurement speed. This is a good choice for making CDMA measurements on a signal with only one carrier turned on at a time.

Modified- is not a customer settable option. This choice is automatically selected depending on your selection of other related settings in the advanced measurement setup, like the number of FFT segments.

Factory Preset and *RST:	Normal
Remarks:	You must be in the cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.
History:	Added revision A.04.00 or later

Adjacent Channel Power—Reference Channel FFT Segments

[:SENSe]:ACP:FFTSegment <integer>

[:SENSe]:ACP:FFTSegment?

Selects the number of FFT segments used in making the measurement of the reference channel (carrier). In automatic mode the measurement optimizes the number of FFT segments required for the shortest measurement time. The minimum number of segments required to make a measurement is set by your desired measurement bandwidth. Selecting more than the minimum number of segments will give you more dynamic range for making the measurement, but the measurement will take longer to execute.

To use this command you must first set SENSe:ACP:FFTS:AUTO to off.

Factory Preset and *RST: 1

Range: 1 to 12

Remarks: You must be in Basic, cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

History: Revision A.03.00 or later, in cdmaOne revision A.04.00

Adjacent Channel Power—Reference Channel FFT Segments State

[:SENSe]:ACP:FFTSegment:AUTO OFF|ON|0|1

[:SENSe]:ACP:FFTSegment:AUTO?

The automatic mode selects the optimum number of FFT segments to measure the reference channel (carrier), while making the fastest possible measurement.

Factory Preset and *RST: On

Remarks: You must be in Basic, cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

History: Revision A.03.00 or later, in cdmaOne revision A.04.00

Adjacent Channel Power—Absolute Amplitude Limits

iDEN mode

[:SENSe]:ACP:OFFSet:ABSolute <power>

[:SENSe]:ACP:OFFSet:ABSolute?

Basic, cdmaOne

[:SENSe]:ACP:OFFSet:LIST:ABSolute
<power>,<power>,<power>,<power>,<power>

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

cdma2000, W-CDMA (3GPP) mode

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

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

W-CDMA (Trial & Arib) mode

[:SENSe]:ACP:OFFSet[n]:LIST[n]:ABSolute
<power>,<power>,<power>,<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 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).

List[n]

cdmaOne mode n=1 is cellular bands and 2 is pcs bands. The default is cellular.

W-CDMA (Trial & Arib) mode n=1 is ARIB, 2 is 3GPP, and 3 is Trial. The default is ARIB (1).

Factory Preset and *RST:

Mode	Variant	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
W-CDMA (3GPP)		50 dBm	50 dBm	50 dBm	50 dBm	50 dBm
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: –200.0 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—Type of Offset Averaging

[:SENSe]:ACP:OFFSet:LIST:AVERage:TYPE LOG|MAXimum|MINimum|RMS|SCALar

[:SENSe]:ACP:OFFSet:LIST:AVERage:TYPE?

Selects the type of averaging to be used for the measurement at each offset. You can turn off (not use) specific offsets with the SENS:ACP:OFFSet:LIST:STATe command.

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
Basic & cdmaOne	RMS	RMS	RMS	RMS	RMS

Remarks: You must be in Basic, cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

History: Revision A.03.00 or later, in cdmaOne revision A.04.00

Adjacent Channel Power—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>,<res_bw>,<res_bw>,<res_bw>

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

cdma2000, W-CDMA (3GPP) mode

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

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

cdmaOne, W-CDMA (Trial & Arib) mode

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

List[n]

cdmaOne mode n=1 is cellular bands and 2 is pcs bands. The default is cellular.

W-CDMA (Trial & Arib) mode n=1 is ARIB, 2 is 3GPP, and 3 is Trial. The default is ARIB (1).

Factory Preset and *RST:

Mode	Variant	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 (3GPP)		3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz
W-CDMA (Trial & Arib)	3GPP	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz
	Trial, ARIB	4.096 MHz	4.096 MHz	4.096 MHz	4.096 MHz	4.096 MHz

Range: 300 Hz to 20 MHz for cdmaOne, Basic, cdma2000, W-CDMA (3GPP), or 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 (3GPP), W-CDMA (Trial & Arib), or iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—FFT Segments

[:SENSe]:ACP:OFFSet:LIST:FFTSegment <integer>,<integer>,<integer>,<integer>,<integer>

[:SENSe]:ACP:OFFSet:LIST:FFTSegment?

Selects the number of FFT segments used in making the measurement. In automatic mode the measurement optimizes the number of FFT segments required for the shortest measurement time. The minimum number of segments required to make a measurement is set by your desired measurement bandwidth. Selecting more than the minimum number of segments will give you more dynamic range for making the measurement, but the measurement will take longer to execute.

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
Basic & cdmaOne	1	1	1	1	1

Range: 1 to 12

Remarks: You must be in Basic, cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

History: Revision A.03.00 or later, in cdmaOne revision A.04.00

Adjacent Channel Power—Automatic FFT Segments

[:SENSe]:ACP:OFFSet:LIST:FFTSegment:AUTO OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1

[:SENSe]:ACP:OFFSet:LIST:FFTSegment:AUTO?

The automatic mode selects the optimum number of FFT segments to make the fastest possible measurement.

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
Basic & cdmaOne	On	On	On	On	On

Remarks: You must be in Basic mode to use this command. Use INSTrument:SELect to set the mode.

History: Revision A.03.00 or later

Adjacent Channel Power—Define Offset Frequency List

iDEN mode

[:SENSe]:ACP:OFFSet[:FREQuency] <f_offset>

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

Basic mode

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

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

cdma2000, W-CDMA (3GPP) mode

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

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

cdmaOne, W-CDMA (Trial & Arib) mode

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

[: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 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).

List[n]

cdmaOne mode n=1 is cellular bands and 2 is pcs bands. The default is cellular.

W-CDMA (Trial & Arib) mode n=1 is ARIB, 2 is 3GPP, and 3 is Trial. The default is ARIB (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
iDEN		25 kHz	n/a	n/a	n/a	n/a

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
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	750 kHz	1.98 MHz	0 Hz	0 Hz	0 Hz
	MS	885 kHz	1.98 MHz	0 Hz	0 Hz	0 Hz
W-CDMA (3GPP)		5 MHz	10 MHz	15 MHz	20 MHz	25 MHz
W-CDMA (Trial & Arib)		5 MHz	10 MHz	15 MHz	20 MHz	25 MHz

Range: 0 Hz to 20 MHz for iDEN, Basic

0 Hz to 45 MHz for cdmaOne

10 Hz to 45 MHz for cdmaOne

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—Number of Measured Points

[:SENSe]:ACP:OFFSet:LIST:POINts <integer>,<integer>,<integer>,<integer>,<integer>

[:SENSe]:ACP:OFFSet:LIST:POINts?

Selects the number of data points. The automatic mode chooses the optimum number of points for the fastest measurement time with acceptable repeatability. The minimum number of points that could be used is determined by the sweep time and the sampling rate. You can increase the length of the measured time record (capture more of the burst) by increasing the number of points, but the measurement will take longer. Use **[:SENSe]:ACP:POINts** to set the number of points used for measuring the reference channel.

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
Basic & cdmaOne	1024	1024	1024	1024	1024

Range: 64 to 65536

Remarks: The fastest measurement times are obtained when the number of points measured is 2^n.

You must be in Basic, cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Automatic Measurement Points

[:SENSe]:ACP:OFFSet:LIST:POINts:AUTO OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1

[:SENSe]:ACP:OFFSet:LIST:POINts:AUTO?

Automatically selects the number of points for the optimum measurement speed.

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
Basic & cdmaOne	On	On	On	On	On

Remarks: You must be in Basic or cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Relative Attenuation

[:SENSe]:ACP:OFFSet:LIST:RATTenuation <rel_powr>,<rel_powr>,<rel_powr>,<rel_powr>,<rel_powr>

[:SENSe]:ACP:OFFSet: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 SENS:ACP:OFFSet:LIST:STATe command.

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
Basic & cdmaOne	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 Basic or cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Relative Attenuation Control

[:SENSe]:ACP:OFFSet:LIST:RATTenuation:AUTO OFF|ON|0|1

[:SENSe]:ACP:OFFSet:LIST:RATTenuation:AUTO?

Automatically sets a relative attenuation to make measurements with the optimum dynamic range at the current carrier channel power.

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

Factory Preset and *RST: On

Remarks: Does this really work in Basic Mode? or just cdmaOne??

You must be in Basic or cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Amplitude Limits Relative to the Carrier

iDEN mode

[:SENSe]:ACP:OFFSet:RCARrier <rel_power>

[:SENSe]:ACP:OFFSet:RCARrier?

Basic mode, cdmaOne

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

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

cdma2000, W-CDMA (3GPP) mode

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

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

cdmaOne, W-CDMA (Trial & Arib) mode

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

List[n]

cdmaOne mode n=1 is cellular bands and 2 is pcs bands. The default is cellular.

W-CDMA (Trial & Arib) mode n=1 is ARIB, 2 is 3GPP, and 3 is Trial. The default is ARIB (1).

Factory Preset and *RST:

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

–200.0 dB to 50.0 dB for iDEN

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

iDEN mode

[:SENSe]:ACP:OFFSet:RPSDensity <rel_power>

[:SENSe]:ACP:OFFSet:RPSDensity?

Basic mode, cdmaOne

[:SENSe]:ACP:OFFSet:LIST:RPSDensity <rel_power>,<rel_power>,<rel_power>,<rel_power>,<rel_power>

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

cdma2000, W-CDMA (3GPP) mode

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

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

cdmaOne, W-CDMA (Trial & Arib) mode

[:SENSe]:ACP:OFFSet[n]:LIST[n]:RPSDensity <rel_power>,<rel_power>,<rel_power>,<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. [: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).

List[n]

cdmaOne mode n=1 is cellular bands and 2 is pcs bands. The default is cellular.

W-CDMA (Trial & Arib) mode n=1 is ARIB, 2 is 3GPP, and 3 is Trial. The default is ARIB (1).

Factory Preset and *RST:

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

–200.0 dB to 50.0 dB for iDEN

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—Select Sideband

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

[:SENSe]:ACP:OFFSet:LIST:SIDE?

Selects which sideband will be measured. You can turn off (not use) specific offsets with the SENS:ACP:OFFSet:LIST:STATe command.

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
Basic & cdmaOne	Both	Both	Both	Both	Both

Remarks: You must be in Basic or cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Control Offset Frequency List

Basic mode, cdmaOne

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

cdma2000, W-CDMA (3GPP) mode

[: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?

cdmaOne, W-CDMA (Trial & Arib) mode

[:SENSe]:ACP:OFFSet[n]:LIST[n]: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[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 [: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).

List[n]

cdmaOne mode n=1 is cellular bands and 2 is pcs bands. The default is cellular.

W-CDMA (Trial & Arib) mode n=1 is ARIB, 2 is 3GPP, and 3 is Trial. The default is ARIB (1).

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
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 (3GPP)		On	On	Off	Off	Off
W-CDMA (Trial & Arib)		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—Sweep Time

[:SENSe]:ACP:OFFSet:LIST:SWEep:TIME <seconds>,<seconds>,<seconds>,<seconds>,<seconds>

[:SENSe]:ACP:OFFSet:LIST:SWEep:TIME?

Selects a specific sweep time. 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:SWEep:TIME** to set the number of points used for measuring the reference channel.

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

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
Basic & cdmaOne	11.20 ms	11.20 ms	11.20 ms	11.20 ms	11.20 ms

Range: 1 µs to 50 ms

Default Unit: seconds

Remarks: You must be in Basic, cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

History: Revision A.03.00 or later, in cdmaOne revision A.04.00

Adjacent Channel Power—Automatic Sweep Time

[:SENSe]:ACP:OFFSet:LIST:SWEep:TIME:AUTO OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1

[:SENSe]:ACP:OFFSet:LIST:SWEep:TIME:AUTO?

Sets the sweep time to be automatically coupled for the fastest measurement time. You can turn off (not use) specific offsets with the SENS:ACP:OFFSet:LIST:STATe command.

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
Basic & cdmaOne	On	On	On	On	On

Remarks: You must be in Basic, cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

History: Revision A.03.00 or later, in cdmaOne revision A.04.00

Adjacent Channel Power—Define Type of Offset Frequency List

iDEN mode

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

[:SENSe]:ACP:OFFSet:TEST?

Basic mode, cdmaOne

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

cdma2000, W-CDMA (3GPP) mode

[: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?

cdmaOne, W-CDMA (Trial & Arib) mode

[:SENSe]:ACP:OFFSet[n]:LIST[n]: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[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 [: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).

List[n]

cdmaOne mode n=1 is cellular bands and 2 is pcs bands. The default is cellular.

W-CDMA (Trial & Arib) mode n=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:

- 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
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 (3GPP)		REL	REL	REL	REL	REL
W-CDMA (Trial & Arib)		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—Number of Measured Points

[:SENSe]:ACP:POINts <integer>

[:SENSe]:ACP:POINts?

Selects the number of data points used to measure the reference (carrier) channel. The automatic mode chooses the optimum number of points for the fastest measurement time with acceptable repeatability. The minimum number of points that could be used is determined by the sweep time and the sampling rate.

You can increase the length of the measured time record (capture more of the burst) by increasing the number of points, but the measurement will take longer. Use **[:SENSe]:ACP:OFFSet:LIST:POINts** to set the number of points used for measuring the offset channels.

Factory Preset and *RST: 1024

Remarks: The fastest measurement times are obtained when the number of points measured is 2^n.

You must be in Basic, cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Range: 64 to 65536

Adjacent Channel Power—Automatic Measurement Points

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

[:SENSe]:ACP:POINts:AUTO?

Automatically selects the number of points for the optimum measurement speed.

Factory Preset and *RST: On

Remarks: You must be in Basic, cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Adjacent Channel Power—Spectrum Trace Control

[:SENSe]:ACP:SPECtrum:ENABle OFF|ON|0|1

[:SENSe]:ACP:SPECtrum:ENABle?

Turns on/off the measurement of the spectrum trace data when the spectrum view is selected. (Select the view with DISPlay:ACP:VIEW.) 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 data.

Factory Preset and *RST: On

Remarks: You must be in Basic, cdmaOne, iDEN mode to use this command. Use INSTrument:SELect to set the mode.

History: Revision A.03.27 or later, in cdmaOne revision A.04.00

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)

1.25 ms for cdma2000

11.20 ms for Basic, cdmaOne

Range: 500 µs to 10 ms

1 µs to 50 ms for Basic, cdmaOne

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—Automatic Sweep Time

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

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

Sets the sweep time to be automatically coupled for the fastest measurement time.

Factory Preset and *RST: On

Remarks: You must be in Basic, cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

History: Revision A.03.00 or later, in cdmaOne revision A.04.00

Adjacent Channel Power—Trigger Source

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

[:SENSe]:ACP: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 for BS

RF Burst for MS

Remarks: You must be in Basic, cdmaOne, iDEN, NADC, or PDC mode to use this command. Use INSTrument:SELect to set the mode.

In Basic mode, for offset frequencies >12.5 MHz, the external triggers will be a more reliable trigger source than RF burst. Also, you can use the Waveform measurement to set up trigger delay.

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 40. 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—Average Count

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

[:SENSe]:CDPower:AVERage:COUNt?

Set the number of frames that will be averaged. After the specified number of frames (average counts) have been averaged, 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 mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Averaging State

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

[:SENSe]:CDPower:AVERage[:STATe]?

Turn code domain power averaging on or off.

Factory Preset and *RST: On

Remarks: You must be in the cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Averaging Termination Control

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

[:SENSe]:CDPower:AVERage:TCONtrol?

Select the type of termination 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: Repeat

Remarks: You must be in the cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Active Set Threshold

[:SENSe]:CDPower:ASET:THReshold <rel_power>

[:SENSe]:CDPower:ASET:THReshold?

Set the active set threshold value. Walsh channels with power less than this value, will be treated as non-active (noise) channels.

Factory Preset and *RST: –20 dB

Range: –30 dB to 0 dB

Default Unit: dB

Remarks: You must be in the cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Method

[:SENSe]:CDPower:METHod FPOWer|POWer|TPHase

[:SENSe]:CDPower:METHod?

Select the measurement method.

- Fast Power - Provides the fastest code domain power measurement. Only measures the power of those Walsh channels with powers greater than the active set threshold level.
- Power - Measures the code domain power of all 64 Walsh Channels.
- Timing & Phase - Measures the code domain power, code domain timing, and code domain phase of all 64 Walsh channels.

Factory Preset and *RST: Fast power

Remarks: You must be in the cdmaOne 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—Measurement Interval

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

[:SENSe]:CDPower:SWEep:TIME?

Set the length of the measurement interval that will be used.

Factory Preset and *RST: 1.250 ms

Range: 0.5 ms to 30 ms

Default Unit: seconds

Remarks: You must be in the cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Digital Demod PN Offset

[:SENSe]:CHANnel:PNOFfset <integer>

[:SENSe]:CHANnel:PNOFfset?

Set the PN offset number for the base station being tested.

Factory Preset and *RST: 0

Range: 0 to 511

Default Unit: None

Remarks: Global to the current mode.

You must be in the cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Front Panel Access: **FREQUENCY Channel**, **PN Offset**

or

Mode Setup, **Demod**, PN Offset

RF Channel Number

[:SENSe]:CHANnel:RFCHannel[:NUMBer] <integer>

[:SENSe]:CHANnel:RFCHannel[:NUMBer]?

Set the analyzer to a frequency that corresponds to the RF channel number.

Factory Preset and *RST: 1

Range: IS-95A—1 to 799 and 991 to 1023

J-STD-008—0 to 1199

ARIB STD-T53—1 to 799, 801-1039, 1041-1199

TTA.KO-06.0003 (Korea Cell)—1 to 799 and 991 to 1023

TTA.KO-06.0013 (Korea PCS)—1 to 599

TIA-95B Cell—1 to 799 and 991 to 1023

TIA-95B PCS—0 to 1199

TIA-95C Cell—1 to 799 and 991 to 1023

TIA-95C PCS—0 to 1199

History: Version A.04.00 or later.

Remarks: Global to the current mode.

You must be in the cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Front Panel Access: **FREQUENCY Channel, RF Channel** Number

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 40. 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: 1.23 MHz for Basic, cdmaOne, cdma2000

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: 2.0 MHz for Basic, cdmaOne, cdma2000

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: 68.27 µs

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 Base Station RF Port External Attenuation

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

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

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

Factory Preset and *RST: 0 dB

Range: 0 to 100 dB for cdmaOne

–50 to 50 dB for Basic, iDEN, NADC or PDC

Default Unit: dB

Remarks: You must be in the Basic, iDEN, cdmaOne, NADC or PDC mode to use this command. Use INSTrument:SELect to set the mode.

Value is global to the current 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 cdmaOne, GSM, EDGE (w/GWM), 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.

Spur Close—Measurement

Commands for querying the close spurs measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 40. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Spur Close** measurement has been selected from the **MEASURE** key menu.

Spur Close—Average Count

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

[:SENSe]:CSPur: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: 15

Range: 1 to 10,000

Remarks: You must be in the cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Spur Close—Averaging State

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

[:SENSe]:CSPur:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST: On

Remarks: You must be in the cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Spur Close—Averaging Termination Control

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

[:SENSe]:CSPur: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 mode to use this command. Use INSTrument:SELect to set the mode.

Front Panel Access: **Meas Setup**

Spur Close—Averaging Type

[:SENSe]:CSPur:AVERage:TYPE LOG|MAXimum|RMS|SCALar

[:SENSe]:CSPur: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.

RMS - The power is averaged, providing the rms of the voltage.

Scalar - The voltage is averaged.

Factory Preset and *RST: RMS

Remarks: You must be in the cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Spur Close—Type

[:SENSe]:CSPur:TYPE EXAMine|FULL

[:SENSe]:CSPur:TYPE?

Select the measurement type.

Examine - measures spurs in the upper, lower, and center segments and then displays the worst spur

Full - continuously measures the spurs in the upper, lower, and center segments

Factory Preset and *RST: Full

Remarks: You must be in the cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Front Panel Access: **Meas Setup, Advanced**

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

12 dB for iDEN

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(w/GSM), 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: –100.0 to 80.0 dBm for EDGE, GSM

–100.0 to 27.7 dBm for cdmaOne, iDEN

–200.0 to 50.0 dBm for NADC, PDC

–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(w/GSM),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)**

Radio Carrier Multiple

[:SENSe]:RADio:CARRier:NUMBer SINGle|MULTiple

[:SENSe]:RADio:CARRier:NUMBer?

Select if single or multiple carriers are present on the output of the base station under test. This enables/disables a software filter for the rho and code domain power measurements.

Factory Preset and *RST: Single

Remarks: You must be in the , iDEN mode to use this command. Use INSTrument:SELect to set the mode.

Front Panel Access: **Mode Setup, Demod, RF Carrier**

Radio Standard Band

[:SENSe]:RADio:STANdard:BAND
ARIBT53|C95B|CKOR|IS95A|JSTD8|P95B|PKOR|CUSTom

[:SENSe]:RADio:STANdard:BAND?

Select the standard variant that applies to the radio to be tested.

ARIBT53 - ARIB STD-T53

C95B - EIA/TIA-95B Cellular

CKOR - TTA.KO-06.0003 (Korea Cell)

IS95A - IS-95A Cellular

JSTD8 - J-STD-008 PCS

P95B - EIA/TIA-95B (PCS)

PKOR - TTA.KO-06.0013 (Korea PCS)

Factory Preset and *RST: IS-95A Cellular

Remarks: Global to the current mode.

You must be in the cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Front Panel Access: **Mode Setup, Radio, Band**

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 40. 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)—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: Off

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: Exponential

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)—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)—Sweep Time (Measurement Interval)

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

[:SENSe]:RHO:SWEep:TIME?

Set the length of the measurement interval that will be used.

Factory Preset and *RST: 1.250 ms

Range: 0.5 ms to 30 ms

Default Unit: seconds

Remarks: You must be in the cdmaOne 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**

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 40. 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

1.25 MHz for cdmaOne

155.0 kHz, for iDEN mode

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

250.0 Hz, for iDEN mode

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

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 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

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—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.

On - the window lengths are coupled to resolution bandwidth, window type (FFT), pre-FFT bandwidth (sample rate) and SENSe:SPECtrum:FFT:RBWPoints.

Off - lets you set `SENSe:SPECtrum:FFT:LENGth` and `SENSe:SPECtrum:FFT:WINDow:LENGth`.

Factory Preset and *RST: On

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

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—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

100.0 kHz for iDEN mode

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.

External1 - front panel external trigger input

External2 - 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.

Sync Type

[:SENSe]:SYNC ESECond|EXTernal[1]|EXTernal2|NONE|PSEQuence

[:SENSe]:SYNC?

Select the demodulation sync type for the waveform accuracy (Rho) and code domain power measurements.

Even Second - Even second clock

External1 - front panel external trigger input

External2 - rear panel external trigger input

None - no demod sync (uses free run trigger)

Pilot Sequence - pilot sequence sync (uses frame trigger)

Factory Preset and *RST: Even second

Remarks: Global to the current mode.

You must be in the cdmaOne mode to use this command. Use INSTrument:SELect to set the mode.

Front Panel Access: **Mode Setup, Trigger, Sync Type**

History: Front/Rear panel swapped EXT2/EXT1, A.03.00

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 40. 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
500.0 kHz for GSM
2.0 MHz for cdmaOne

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 on the IQ data stream. 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

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—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.