VSA Programming Commands
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E4406A VSA Series Transmitter Tester

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Commands

1 Common IEEE Commands

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Common IEEE Commands

These commands are specified in IEEE Standard 488.2-1992, *IEEE Standard Codes, Formats, Protocols and Common Commands for Use with ANSI/IEEE Std 488.1-1987*. New York, NY, 1992.

Calibration Query

***CAL?**

Performs a full alignment and returns a number indicating the success of the alignment. A zero is returned if the alignment is successful. A one is returned if any part of the alignment fails. The equivalent SCPI command is **CALibrate[:ALL]?**

Front Panel Access: **System**, **Alignments**, **Align All Now**

Clear Status

***CLS**

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

Remarks: See ***STB?**

Standard Event Status Enable

***ESE <number>**

***ESE?**

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

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

Range: Integer, 0 to 255

Standard Event Status Register Query

***ESR?**

Queries and clears the standard event status event register. (This is a destructive read.)

Range: Integer, 0 to 255

Identification Query

***IDN?**

Returns an instrument identification information string to GPIB. The string will contain the model number, serial number and firmware revision.

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

- Manufacturer
- Model
- Serial number
- Firmware version

For example:

`Hewlett-Packard,E4406A,US00000040,A.01.42`

Remarks: An @ in the firmware revision information indicates that it is proto firmware.

Front Panel Access: **System, Show System**

Instrument State Query

***LRN?**

Returns current instrument state data in a block of defined length. The <state data> is in a machine readable format only. Sending the query returns the following format:

`SYST:SET #NMMMM<state_data>`

The following example is a response to ***LRN?** The actual sizes will vary depending on the instrument state data size.

Example: `:SYST:SET #42016<state data>`

Where: 4 (the N in the preceding query response example) represents the

number of digits to follow
Where: 2016 (the MMMM in the preceding query response example) represents the number of bytes that follow in the <state data>.

The state can be changed by sending this block of data to the instrument after removing the size information:

:SYST:SET <state data>

Operation Complete Command

***OPC**

Sets bit 0 in the standard event status register to “1” when all pending operations have finished.

Operation Complete Query

***OPC?**

This query stops any new commands from being processed until the current processing is complete. Then it returns a “1”, and the program continues. This query can be used to synchronize events of other instruments on the external bus.

Query Instrument Options

***OPT?**

Returns a string of all the installed instrument options.It is a comma separated list such as: BAC,BAH. There are a few options that include more then one mode. An istrument with one of these options will report the option number once for each mode. You would get a response: BAC,BAE,BAE,BAH For an instrument that contains cdmaOne (BAC), NADC (BAE), PDC (BAE), and GSM (BAH).

Recall

***RCL <register>**

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

Range: registers are an integer, 0 to 19

Front Panel Access: **File, Recall State**

Reset

***RST**

This command presets the instrument to a factory defined condition that is appropriate for remote programming operation. ***RST** is equivalent to performing the two commands **:SYSTem:PRESet** and ***CLS**.

The **:SYSTem:PRESet** command is equivalent to a front panel **Preset**. The front panel **Preset** sets instrument parameters to values for good local/human interaction. The ***RST** and front panel **Preset** will be different. For example, the ***RST** will place the instrument in single sweep while the front panel **Preset** will place the instrument in continuous sweep.

Front Panel Access: **Preset**

Save

***SAV <register>**

This command saves the instrument state to the specified instrument memory register.

Range: Registers are an integer, 0 to 19

Front Panel Access: **File, Save State**

Service Request Enable

***SRE <integer>**

***SRE?**

This command sets the value of the service request enable register.

The query returns the value of the register.

Range: Integer, 0 to 63, or 128 to 191

Read Status Byte Query

***STB?**

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

Remarks: See ***CLS**

Trigger

***TRG**

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

The desired measurement has been selected and is waiting. The command causes the system to exit this "waiting" state and go to the "initiated" state. The trigger system is initiated and completes one full trigger cycle. It returns to the "waiting" state on completion of the trigger cycle. See the MEASure subsystem for more information about controlling the measurement process.

The instrument must be in the single measurement mode. If INIT:CONT ON, then the command is ignored. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle.

Remarks: See also the **:INITiate:IMMediate** command

Front Panel Access: **Restart**

Self Test Query

***TST?**

This query performs a full self alignment and returns a number indicating the success of the alignment. A zero is returned if the alignment is successful. Same as CAL[:ALL]? and *CAL?

Front Panel Access: **System, Alignments, Align All Now**

Wait-to-Continue

***WAI**

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

2 ABORt Subsystem

ABORt Subsystem

Abort Command

:ABORt

Stops any sweep or measurement in progress and resets the sweep or trigger system. A measurement refers to any of the measurements found in the **MEASURE** menu.

If **:INITiate:CONTinuous** is off (single measure), then **:INITiate:IMMediate** will start a new single measurement.

If :**INITiate:CONTinuous** is on (continuous measure), a new continuous measurement begins immediately.

The INITiate and/or TRIGger subsystems contain additional related commands.

Front Panel Access:	For the continuous measurement mode, the **Restart** key is equivalent to **ABORt**.

3 CALCulate Subsystem

October 24, 2000 12:25 pm

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.

ACP - Limits [VSA-B,C,I]

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.

BER - Limits

Bit Error Rate—Frame Count

:CALCulate:BER:FRAMes <integer>

:CALCulate:BER:FRAMes?

Indicates the number of frames to be used for calculating the bit error rate.

Factory Preset

and *RST:	16
Factory Preset and *RST:	1 to 1024 frames
Remarks:	You must be in the iDEN mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later

Bit Error Rate—Error Limit

:CALCulate:BER:LIMit:ERATe <percent>

:CALCulate:BER:LIMit:ERATe?

Set the percent error limit on the bit error rate.

Factory Preset and *RST:	5%
Range:	0.1 to 20%
Default Unit:	Hz
Remarks:	You must be in the iDEN mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later

Bit Error Rate—Limit Testing

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

:CALCulate:BER:LIMit:STATe?

Turn limit testing on or off.

Factory Preset and *RST:	On
Remarks:	You must be in the iDEN mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later

Code Domain Power - Limits

Code Domain—Decode Axis [VSA-C2,WC(3)]

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

:CALCulate:CDPower:AXIS[:MS]?

CALCulate Subsystem

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

IPH – I phase

QPH – Q phase

Factory Preset and *RST: IPH for cdma2000

QPH for W-CDMA (3GPP)

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

Code Domain—Power Offset [VSA-WC(A)]

:CALCulate:CDPower:PO1 <rel_power>

:CALCulate:CDPower:PO1?

Set the power offset value of the pilot bits.

:CALCulate:CDPower:PO2 <rel_power>

:CALCulate:CDPower:PO2?

Set the power offset value of the transmit control bits.

:CALCulate:CDPower:PO3 <rel_power>

:CALCulate:CDPower:PO3?

Set the power offset value of the transport format control indicator bits.

Factory Preset and *RST: 0 dB

Range: –20 to 50 dB

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

Code Domain—Spread Code

:CALCulate:CDPower:SPRead <integer>

:CALCulate:CDPower:SPRead?

Set a spread code.

Factory Preset and *RST: 0

Range:
- For W-CDMA (3GPP)

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

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

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

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

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

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

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

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

- For W-CDMA (Trial & Arib)

0 to 511, when **CALCulate:CDPower:SRATe** = 8

0 to 255, when **CALCulate:CDPower:SRATe** = 16

0 to 127, when **CALCulate:CDPower:SRATe** = 32

0 to 63, when **CALCulate:CDPower:SRATe** = 64

0 to 31, when **CALCulate:CDPower:SRATe** = 128

0 to 15, when **CALCulate:CDPower:SRATe** = 256

0 to 7, when **CALCulate:CDPower:SRATe** = 512

0 to 3, when **CALCulate:CDPower:SRATe** = 1024

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

Code Domain—Symbol Rate

:CALCulate:CDPower:SRATe <integer>

:CALCulate:CDPower:SRATe?

Set a symbol rate.

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

16 for W-CDMA (Trial & Arib)

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

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

8, 16, 32, 64, 128, 256, 512, 1024 for ARIB of W-CDMA (Trial & Arib)

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	16, 32, 64, 128, 256, 512, 1024 for Trial of W-CDMA (Trial & Arib)
Remarks:	You must be in the W-CDMA (3GPP) or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Sweep Offset (Measurement Offset)

:CALCulate:CDPower:SWEep:OFFSet <integer>

:CALCulate:CDPower:SWEep:OFFSet?

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

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

Factory Preset and *RST:	0
Range:	0 to **CALCulate:CDPower:CAPTure:TIME** – 1 for cdma2000
	0 to **CALCulate:CDPower:CAPTure:TIME** × 15 – 1 for W-CDMA (3GPP)
	0 to 31 for W-CDMA (Trial & Arib)
Remarks:	You must be in the cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Sweep Time (Measurement Interval)

:CALCulate:CDPower:SWEep:TIME <integer>

:CALCulate:CDPower:SWEep:TIME?

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

The sum of **CALCulate:CDPower:SWEep:TIME** and **CALCulate:CDPower:SWEep:OFFSet** must be equal to or less than**CALCulate:CDPower:CAPTure:TIME** for cdma2000,

CALCulate:CDPower:CAPTure:TIME × 15 for W-CDMA (3GPP), or 32 for W-CDMA (Trial & Arib). If the sum becomes more than the value, **CALCulate:CDPower:SWEep:OFFSet** is adjusted automatically.

Factory Preset and *RST: 1

Range: 1 to **CALCulate:CDPower:CAPTure:TIME** for cdma2000

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

1 to 31 for W-CDMA (Trial & Arib)

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

Code Domain—Computation Type

:CALCulate:CDPower:TYPE ABSolute|RELative

:CALCulate:CDPower:TYPE?

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

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

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

Factory Preset and *RST: Relative

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

Code Domain—Walsh Code Base Length

:CALCulate:CDPower:WCODe:BASE <integer>

:CALCulate:CDPower:WCODe:BASE?

Set the Walsh Code base length for BTS. (For MS, this value is always 32.)

Factory Preset and *RST: 64

Range: 64, 128

Remarks: You must be in the cdma2000 mode to use this

command. Use INSTrument:SELect to set the mode.

Code Domain—Walsh Code Length

:CALCulate:CDPower:WCODe:LENGth <integer>

:CALCulate:CDPower:WCODe:LENGth?

Set the Walsh Code length.

Factory Preset and *RST:	64 for BTS
	32 for MS
Range:	4, 8, 16, 32, 64, 128 for BTS
	2, 4, 8, 16, 32 for MS
Remarks:	You must be in the cdma2000 mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Walsh Code Number

:CALCulate:CDPower:WCODe[:NUMBer] <integer>

:CALCulate:CDPower:WCODe[:NUMBer]?

Set the Walsh Code number.

Factory Preset and *RST:	0
Range:	0 to **CALCulate:CDPower:WCODe:LENGth** – 1
Remarks:	You must be in the cdma2000 mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Walsh Code Order [VSA-C2]

:CALCulate:CDPower:WCODe:ORDer BREVerse|HADMrd

:CALCulate:CDPower:WCODe:ORDer?

Set the Walsh Code order.

Bit Reverse (BREVerse) – Order to show the higher (consolidated) spreading code as a single bundle in the CDP display

Hadamard (HADMrd) – Regular order

Factory Preset and *RST:	Hadamard (HADMrd)

Remarks: You must be in the cdma2000 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 144 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

This table is in three locations: CALC:DATA:COMP, DISP:TRACe:STATe, and CALC:<meas>: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

Measurement	Available Traces	Markers Available?
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
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

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Measurement	Available Traces	Markers Available?
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=2)[a]	yes
MCPower - multi-carrier power (W-CDMA (3GPP) mode)	no traces	no markers
OBW - occupied bandwidth (cdmaOne, cdma2000, iDEN, PDC, W-CDMA (3GPP) modes)	no traces	no markers
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

CALCulate Subsystem

Measurement	Available Traces	Markers Available?
SEMask - spectrum emissions mask (cdma2000, W-CDMA (3GPP) mode)	SPECtrum (*n*=2)[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.

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

EVM - Limits

Error Vector Magnitude—First 10 Symbols EVM Limit [VSA-N]

:CALCulate:EVM:LIMit:F10 <percent>

:CALCulate:EVM:LIMit:F10?

Set the first 10 symbols EVM limit in percent. This functionality is only for mobile testing.

Factory Preset and *RST: 25.0%

Range: 0 to 50%

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

History: Version A.02.00 or later

Error Vector Magnitude—I/Q Origin Offset Error Limit

:CALCulate:EVM:LIMit:IQOOffset <dB>

:CALCulate:EVM:LIMit:IQOOffset?

Set the I/Q origin offset error limit in dB.

Factory Preset and *RST: –20 dB

Range: –100 dB to 0 dB

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

History: Version A.02.00 or later

Error Vector Magnitude—Peak EVM Limit

:CALCulate:EVM:LIMit:PEAK <percent>

:CALCulate:EVM:LIMit:PEAK?

Set the peak EVM limit in percent.

Factory Preset and *RST: 40.0%

Range: 0 to 50%

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

History: Version A.02.00 or later

Error Vector Magnitude—RMS EVM Limit

:CALCulate:EVM:LIMit:RMS <percent>

:CALCulate:EVM:LIMit:RMS?

Set the RMS EVM limit in percent.

Factory Preset and *RST: 12.5%

Range: 0 to 50%

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

History: Version A.02.00 or later

Error Vector Magnitude—Limit Test

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

:CALCulate:EVM:LIMit[:TEST]?

Turn limit test on or off.

Factory Preset and *RST: On

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

History: Version A.02.00 or later

Error Vector Magnitude—Time to Sync Word

:CALCulate:EVM:TTSWord?

Query returns the time between the trigger and the start of the first sync word.

Default Unit: Seconds

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

History: Version A.03.00 or 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

CALCulate Subsystem

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 [VSA-P]

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

W-CDMA (3GPP) Mode - <measurement> key words [VSA-WC(3)]

- 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 [VSA-WC(A)]

- 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: **Marker, Select** then **Marker Normal** or **Marker On Off**

Marker to Trace

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

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

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

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

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

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

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

Measurement	Available Traces	Markers Available?
ACP - adjacent channel power (Basic, cdmaOne, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & Arib), iDEN, NADC, PDC modes)	no traces	no markers
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

CALCulate Subsystem

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=2)[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) mode)	SPECtrum (*n*=2)[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.

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**

CALCulate Subsystem

Marker X Position

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

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

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

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

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

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

Marker Readout Y Value

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

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

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

The measurement must be completed before querying the marker.

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

Occupied Bandwidth - Limits

Occupied Bandwidth—Frequency Band Limit

PDC, cdma2000, W-CDMA (3GPP) mode

:CALCulate:OBW:LIMit:FBLimit <freq>

:CALCulate:OBW:LIMit:FBLimit?

iDEN mode

:CALCulate:OBWidth:LIMit:FBLimit <freq>

:CALCulate:OBWidth:LIMit:FBLimit?

Set the frequency bandwidth limit in Hz.

Factory Preset and *RST:	32 kHz for PDC
	20 kHz for iDEN
	1.48 MHz for cdma2000
	5 MHz for W-CDMA (3GPP)
Range:	10 kHz to 60 kHz for PDC, iDEN
	10 kHz to 10 MHz for cdma2000, W-CDMA (3GPP)
Default Unit:	Hz
Remarks:	You must be in the iDEN, PDC, cdma2000, or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.02.00 or later

Occupied Bandwidth—Limit Test

PDC, cdma2000, W-CDMA (3GPP) mode

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

:CALCulate:OBW:LIMit[:TEST]?

iDEN mode

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

:CALCulate:OBWidth:LIMit:STATe?

Turn limit testing on or off.

Factory Preset and *RST:	On
Remarks:	You must be in the iDEN, PDC, cdma2000, or W-CDMA

	(3GPP) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.02.00 or later

CALCulate Subsystem

Power Statistic CCDF—Store Reference

:CALCulate:PSTatistic:STORe:REFerence ON |Off|1|0

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

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

Modulation Accuracy - Limits

Modulation Accuracy (Rho)—Code Domain Error Limit

:CALCulate:RHO:LIMit:CDERror <float>

:CALCulate:RHO:LIMit:CDERror?

Set the Peak Code Domain Error in dB.

Factory Preset and *RST: –40.0 dB

Range: –100 to 0 dB

Resolution: 0.1 dB

Step: 0.1 dB

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

Modulation Accuracy (Rho)—Peak EVM Limit

:CALCulate:RHO:LIMit:Peak <float>

:CALCulate:RHO:LIMit:Peak?

Set the Peak EVM limit in percent.

Factory Preset and *RST: 100.0%

Range: 0.0 to 100.0%

Resolution: 0.1%

Step: 0.1%

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

CALCulate Subsystem

Modulation Accuracy (Rho)—Rho Limit

:CALCulate:RHO:LIMit:RHO <float>

:CALCulate:RHO:LIMit:RHO?

Set the Rho limit.

Factory Preset and *RST:	0.5
Range:	0 to 1.0
Resolution:	0.001
Step:	0.001
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—RMS EVM Limit

:CALCulate:RHO:LIMit:RMS <float>

:CALCulate:RHO:LIMit:RMS?

Set the RMS EVM limit in percent.

Factory Preset and *RST:	50.0%
Range:	0.0 to 50.0%
Resolution:	0.1%
Step:	0.1%
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Transmit Band Spurious - Limits

Transmit Band Spurs—Type of Limit Testing [VSA-E,G]

:CALCulate:TSPur:LIMit:TEST ABSolute|RELative

:CALCulate:TSPur:LIMit:TEST?

Select the limit testing to be done using either absolute or relative power limits.

Factory Preset and *RST:	Absolute

Remarks:	You must be in the GSM, EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later
Front Panel Access:	**Meas Setup, Limit**

Transmit Band Spurs—Define Limits

:CALCulate:TSPur:LIMit[:UPPer][:DATA] <power>

:CALCulate:TSPur:LIMit[:UPPer][:DATA]?

Set the value for the test limit. This command does not accept units. Use CALCulate:TSPur:LIMit:TEST to select the units dBm (absolute) or dB (relative).

Factory Preset and *RST:	–36
Range:	–200 to 100
Remarks:	You must be in the GSM, EDGE (w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later
Front Panel Access:	**Meas Setup, Limit**

CALCulate Subsystem

4 CALibration Subsystem

October 21, 2000 10:56 am l

CALibration Subsystem

These commands control the self-alignment and self-diagnostic processes.

Calibration Abort

:CALibration:ABORt

Abort any alignment in progress.

The query stops any other processing until the abort is complete.

Front Panel
Access: **ESC**, when alignment is in progress

Align the ADC Auto-range Threshold

:CALibration:ADC:ARANge

:CALibration:ADC:ARANge?

Align the ADC auto-range thresholds. This same alignment is run as part of the CAL:ALL routine.

Front Panel
Access: **System, Alignments, Align subsystem, Align ADC**

Align the ADC Dither Center Frequency

:CALibration:ADC:DITHer

:CALibration:ADC:DITHer?

Align the ADC dithering center frequency. This same alignment is run as part of the CAL:ALL routine.

Front Panel
Access: **System, Alignments, Align subsystem, Align ADC**

Align the ADC Offset

:CALibration:ADC:OFFSet

:CALibration:ADC:OFFSet?

Align the six ADC offset DACs. This same alignment is run as part of the CAL:ALL routine.

CALibration Subsystem

Front Panel
Access: **System, Alignments, Align subsystem, Align ADC**

Align the ADC RAM Gain

:CALibration:ADCRam:GAIN

:CALibration:ADCRam:GAIN?

Align the gain of the six ADC RAM pages. This same alignment is run as part of the CAL:ALL routine.

Front Panel
Access: **System, Alignments, Align subsystem, Align ADC???**

Align All Instrument Assemblies

:CALibration[:ALL]

:CALibration[:ALL]?

Performs an alignment of all the assemblies within the instrument.

The query performs a full alignment and returns a number indicating the success of the alignment. A zero is returned if the alignment is successful. A one is returned if any part of the alignment failed.

Front Panel
Access: **System, Alignments, Align All Now**

Calibrate the Attenuator

:CALibration:ATTenuator

:CALibration:ATTenuator?

Calculate the gain error of 40 RF attenuator steps. The nominal setting of 10 dB is assumed to have 0 dB error.

Remarks: A valid service password needs to be entered prior to sending the command.

Front Panel
Access: **System, Alignments, Align subsystem, RF**

Automatic Alignment

:CALibration:AUTO OFF|ALERT|ON

:CALibration:AUTO?

Turns the automatic alignment routines on and off. When turned on, they are run once every 5 minutes, or if the ambient temperature changes by 3 degrees.

If alignment is turned off, the instrument may drift out of specification. The alert mode allows you to turn off the automatic alignment, but reminds you to when to run the alignment again. You will get a warning message if 24 hours has expired or the temperature has change by 3 degrees since the last alignment.

Factory Preset and *RST: Alert

Your setting for the auto alignment is persistent and will remain the same even through an instrument power cycle.

Front Panel Access: **System, Alignments, Auto Align**

Calibration Comb Alignment

:CALibration:COMB

:CALibration:COMB?

Aligns the comb frequencies by measuring them relative to the internal 50 MHz reference signal.

Remarks: A valid service password needs to be entered prior to sending the command.

Front Panel Access: **System, Alignments, Align Subsystem, RF**

Calibration Display Detail

:CALibration:DISPlay:LEVel OFF|LOW|HIGH

:CALibration:DISPlay:LEVel?

Controls the amount of detail shown on the display while the alignment routines are running. The routines run faster if they are off, so they do not have to update the display.

Off - displays no trace points

Low - displays every 10th trace

High - displays every trace

Factory Preset and *RST: Low

Front Panel Access: **System, Alignments, Visible Align**

Align the IF Flatness

:CALibration:FLATness:IF

:CALibration:FLATness:IF?

Finds the flatness shape of the current IF setup (prefilter, mgain, natBW). This information is then used for compensating measurements that use FFT functionality, like the spectrum measurement. The alignment is done frequently in the background. This same alignment is run as part of the CAL:ALL routine.

Front Panel Access: Select **Timebase Freq** under **Measure**, then press **Meas Setup, Auto Adjust Now**.

Auto Adjust the Internal 10 MHz Frequency Reference

:CALibration:FREQuency:REFerence:AADJust

Auto adjustment of the internal frequency reference (10 MHz timebase). .

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

Requires the current measurement to be timebase frequency. A valid password needs to be entered sometime prior to sending this command. See the timebase frequency measurement for more information.

Front Panel Access: Select **Timebase Freq** under **Measure**, then press **Meas Setup, Auto Adjust Now**.

Align the ADC

:CALibration:GADC

:CALibration:GADC?

Performs the ADC group of alignments. The query returns a 0 if the alignments occurred without problems.

Front Panel
Access: **System, Alignments, Align Subsystem, Align ADC**

Align the IF Gain

:CALibration:GAIN:IF

:CALibration:GAIN:IF?

Calculate the curve coefficients for the IF gain DAC.

Front Panel
Access: **System, Alignments, Align Subsystem, IF**

Calibrate the Nominal System Gain

:CALibration:GAIN:CSYStem

:CALibration:GAIN:CSYStem?

Calculate the current system gain correction for nominal settings. That is, with 10 dB attenuation, 500 MHz center frequency, 0 dB IF gain and the prefilter off.

Front Panel
Access: **System, Alignments, Align Subsystem, IF**

Align the IF

:CALibration:GIF

:CALibration:GIF?

Performs the IF group of alignments. The query returns a 0 if the alignments occurred without problems.

Front Panel
Access: **System, Alignments, Align Subsystem, Align IF**

Align the RF

:CALibration:GRF

:CALibration:GRF?

Performs the RF group of alignments. The query returns a 0 if the alignments occurred without problems.

Front Panel
Access: **System, Alignments, Align Subsystem, Align RF**

CALibration Subsystem

Align the Image Filter Circuitry

:CALibration:IMAGefilter

:CALibration:IMAGefilter?

Align the eight image filter tuning DACs.

Remarks: A valid service password needs to be entered prior to sending the command.

Front Panel Access: **System, Diagnostics**

Load the Factory Default Calibration Constants

:CALibration:LOAD:DEFault

Load the factory default alignment data, ignoring the effect of any alignments already done.

Front Panel Access: **System, Alignments, Restore Align Defaults**

Align the Wide LC Prefilter

:CALibration:PFILter:LCWide

:CALibration:PFILter:LCWide?

Align the wide LC prefilter. (1.2 MHz to 7.5 MHz)

Remarks: A valid service password needs to be entered prior to sending the command.

Front Panel Access: **System, Diagnostics**

Align the Narrow LC Prefilter

:CALibration:PFILter:LCNarrow

:CALibration:PFILter:LCNarrow?

Align the narrow LC prefilter. (200 kHz to 1.2 MHz)

Remarks: A valid service password needs to be entered prior to sending the command.

Front Panel
Access: **System, Alignments, Align Subsystem, IF**

Align the Wide Crystal Prefilter

:CALibration:PFILter:XTALWide

:CALibration:PFILter:XTALWide?

Align the wide crystal prefilter. (20 kHz to 200 kHz)

Remarks: A valid service password needs to be entered prior to sending the command.

Front Panel
Access: Enter service password and press **System, Diagnostics**

Align the Narrow Crystal Prefilter

:CALibration:PFILter:XTALNarrow

:CALibration:PFILter:XTALNarrow?

Align the narrow crystal prefilter. (2.5 kHz to 20 kHz)

Remarks: A valid service password needs to be entered prior to sending the command.

Front Panel
Access: Enter service password and press **System, Diagnostics**

Adjust the Level of the 321.4 MHz Alignment Signal

:CALibration:REF321

:CALibration:REF321?

Calculate the curve coefficients for setting the level of the 321.4 MHz alignment signal.

Remarks: A valid service password needs to be entered prior to sending the command.

Front Panel
Access: **System, Diagnostics**

CALibration Subsystem

50 MHz Reference Alignment Signal

Process	Process Step Description	Command
Both	Attach a 50 MHz signal to the RF input.	
Automatic	Does the entire procedure	CAL:REF50[:DOIT]
Interactive	Enter the interactive mode	CAL:REF50:ENTer
Interactive	Tell the instrument what the external signal’s power is. (approx. -25 dBm)	CAL:REF50:AMPL
Interactive	Proceed with the adjustment phase.	CAL:REF50:ANOW
Interactive	Exit from the interactive mode.	CAL:REF50:EXIT
Query	Return the last alignment value of the absolute level of the 50 MHz cal signal.	CAL:REF50:LAST:ABSLevel?
Query	Return the last alignment value of the ALC DAC.	CAL:REF50:LAST:ALCDac?

External Signal Power for Internal 50 MHz Amplitude Reference Alignment

:CALibration:REF50:AMPL <power>

:CALibration:REF50:AMPL?

You must set this value equal to the actual amplitude of the external 50 MHz amplitude reference signal applied to the RF INPUT connector. This is used for aligning the 50 MHz amplitude reference with CAL:REF50.

Preset and *RST: –25.00 dBm

Range: –30 to –20 dBm

Default Unit: dBm

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

A valid service password needs to be entered prior to sending this command.

Front Panel Access: **System**, **Alignments, Align subsystem**, **Align 50 MHz Reference**

Internal 50 MHz Amplitude Reference Alignment Control

:CALibration:REF50:ANOW

Immediately does the automatic alignment of the internal 50 MHz amplitude reference oscillator. This command is used with the interactive mode of the 50 MHz alignment, i.e. CAL:REF50:ENTer.

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

A valid service password needs to be entered prior to sending this command.

Front Panel Access: **System**, **Alignments, Align subsystem**, **Align 50 MHz Reference**

Internal 50 MHz Amplitude Reference Alignment Control

:CALibration:REF50[:DOIT]

:CALibration:REF50[:DOIT]?

Does automatic alignment of the internal 50 MHz amplitude reference oscillator. You do this by setting an external source to –25.00 dBm and using a power meter to measure the exact value. Then use CAL:REF50:AMPL to input the source amplitude, measured on the power meter. Finally, connect the source to the instrument RF INPUT port and run the adjustment.

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

A valid service password needs to be entered prior to sending this command

Front Panel Access: **System**, **Alignments, Align subsystem**, **Align 50 MHz Reference**

Enter Interactive Mode for Internal 50 MHz Amplitude Reference Alignment

:CALibration:REF50:ENTer

Turns on the interactive mode for alignment of the internal 50 MHz amplitude reference signal. Use CAL:REF50:ANOW to do the alignment and CAL:REF50:EXIT to exit the interactive mode.

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

A valid service password needs to be entered prior to sending this command.

Front Panel
Access: **System, Alignments, Align subsystem, Align 50 MHz Reference**

Exit Interactive Mode for Internal 50 MHz Amplitude Reference Alignment

:CALibration:REF50:EXIT

Turns off the interactive mode for alignment of the internal 50 MHz amplitude reference signal. Use CAL:REF50:ENTer to turn the mode on and CAL:REF50:ANOW to do the alignment immediately.

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

A valid service password needs to be entered prior to sending the command.

Front Panel
Access: **System, Alignments, Align subsystem, Align 50 MHz Reference**

Query the Absolute Level for the 50 MHz Amplitude Reference

:CALibration:REF50:LAST:ABSLevel?

Query returns the last value of the absolute level of the 50 MHz reference alignment.

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

A valid service password needs to be entered prior to sending this command.

Front Panel
Access: **System, Alignments, Align subsystem, Align 50 MHz Reference**

Query the ALC DAC Value for the 50 MHz Amplitude Reference

:CALibration:REF50:LAST:ALCDac?

Query returns the last value of the ALC DAC of the 50 MHz reference alignment.

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

A valid service password needs to be entered prior to sending this command.

Front Panel Access: **System**, **Alignments, Align subsystem**, **Align 50 MHz Reference**

Select Time Corrections

:CALibration:TCORrections AUTO|ON|OFF

Controls time corrections used to compensate for the complex (magnitude and phase) response of the analog and digital IF hardware. When only scalar (magnitude) FFT flatness is required, time corrections take more CPU cycles and so are less efficient than frequency corrections. For demod or other time-based (not FFT) measurements, only time corrections can improve the flatness that results from imperfect IF hardware. When the time correction functionality is set to Auto (the default), the individual measurements activate the corrections when they are needed.

.

NOTE Turning time corrections on or off effects all measurements. Time corrections should be left in Auto unless you have specific reasons for forcing them on or off

Always return time corrections to Auto.

Factory Preset and *RST: AUTO

Front Panel Access: **System**, **Alignments**, **Time Corr**

Align the Trigger Delay

:CALibration:TRIGger:DELay

:CALibration:TRIGger:DELay?

Align any trigger delays needed. One place that this alignment is used is for the even second clock functionality in cdmaOne mode. This same alignment is run as part of the CAL:ALL routine.

Front Panel Access: **System**, **Alignments, Align subsystem**, **Align 50 MHz Reference**

CALibration Subsystem

Align the Trigger Interpolator

:CALibration:TRIGger:INTerp

:CALibration:TRIGger:INTerp?

Align the partial sample trigger interpolator. This same alignment is run as part of the CAL:ALL routine.

Front Panel Access:	**System**, **Alignments, Align subsystem**, **Align 50 MHz Reference**

Calibration Wait

:CALibration:WAIT

Waits until any alignment procedure that is underway is completed.

CALibration Subsystem

5 CONFigure Subsystem

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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 144.

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:SYNC
CALCulate:<measurement>, CALCulate:CLIMits
DISPlay:<measurement>
TRIGger

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.

6 COUPle Subsystem

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COUPle Subsystem

Some measurement settings are automatically coupled together to optimize speed and accuracy. These commands control that coupling.

7 DISPlay Subsystem

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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

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)

asfdfdadfafsasfsadfadfafasddsafa

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.

Front Panel Access: **ACP, View/Trace**

Display Annotation Title Data

:DISPlay:ANNotation:TITLe:DATA <string>

:DISPlay:ANNotation:TITLe:DATA?

Enters the text that will be displayed in the user title area of the display.

Front Panel Access: **Display, Title**

Display, Title, Change Title

Display, Title, Clear Title

DISPlay Subsystem

Display Annotation Title On/Off

`:DISPlay:ANNotation:TITLe[:STATe] OFF|ON|0|1`

`:DISPlay:ANNotation:TITLe[:STATe]?`

Turns the display of the title annotation on or off.

Front Panel Access: **Display, Title, Title On Off**

Turn the Entire Display On/Off

`:DISPlay:ENABle OFF|ON|0|1`

Controls the updating of the display. If enable is set to off, the display will appear to “freeze” in its current state. Measurements may run faster if the instrument doesn’t update the display after every data acquisition. There is often no need to update the display information when using remote operation.

Factory Preset and *RST: On

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

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

Front Panel Access: **none**

EDGE PVT - Limit Mask Control

`:DISPlay:EPVTime:LIMit:MASK OFF|ON|0|1`

`:DISPlay:EPVTime:LIMit:MASK?`

Turns on/off the display of the limit mask lines. It also disables the limit checking.

Factory Preset and *RST: On

Remarks: You must be in EDGE (w/GSM) to use this command. Use INSTrument:SELect to set the mode.

Front Panel Access: **Display**, with EPVT measurement selected

Error Vector Magnitude - View Selection

:DISPlay:EVMagnitude:VIEW POLar|CONStln|QUAD

:DISPlay:EVMagnitude:VIEW?

Select the view of EVM measurement

Factory Preset
and *RST: POLar

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

Select Display Format

:DISPlay:FORMat:TILE

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

Front Panel
Access: **Zoom (toggles between Tile and Zoom)**

Select Display Format

:DISPlay:FORMat:ZOOM

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

Front Panel
Access: **Zoom** (toggles between Tile and Zoom)

PVT - Limit Mask Control

:DISPlay:PVTime:LIMit:MASK OFF|ON|0|1

:DISPlay:PVTime:LIMit:MASK?

Turns on/off the display of the limit mask lines. It also disables the limit checking.

Factory Preset
and *RST: On

Remarks: You must be in GSM, EDGE (w/GSM) to use this command. Use INSTrument:SELect to set the mode.

Front Panel Access: **Display**, with PVT measurement selected

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 144 for more information about sub-opcodes.

DISPlay Subsystem

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
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

Measurement	Available Traces	Markers Available?
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*=2)[a]	yes
MCPower - multi-carrier power (W-CDMA (3GPP) mode)	no traces	no markers
OBW - occupied bandwidth (cdmaOne, cdma2000, iDEN, PDC, W-CDMA (3GPP) modes)	no traces	no markers

DISPlay Subsystem

Measurement	Available Traces	Markers Available?
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=2)[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.

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**

DISPlay Subsystem

8 FETCh Subsystem

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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 144.

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 144.

9 FORMat Subsystem

October 21, 2000 10:56 am

FORMat Subsystem

The FORMat subsystem sets a data format for transferring numeric and array information.

Byte Order

:FORMat:BORDer NORMal|SWAPped

:FORMat:BORDer?

Selects the binary data byte order for numeric data output. It controls whether binary data is transferred in normal or swapped mode. In normal mode the most significant byte is sent first. In swapped mode the least significant byte is first.

Factory Preset
and *RST: Normal

Numeric Data format

:FORMat[:DATA] ASCii|REAL,32|REAL,64

:FORMat[:DATA]?

This command changes the format of the data output. It specifies the format used for trace data during data transfer across any remote port. REAL and ASCII formats will format trace data in the current amplitude units. The format of state data cannot be changed. It is always in a machine readable format only.

NOTE This command specifies the formats used for trace data during data transfer across any remote port.

For corrected trace data (:TRACe[:DATA] with parameter <trace_name>), REAL and ASCii formats will provide trace data in the current amplitude units. INTeger format will provide trace data in mdBm. The fastest mode is INTeger,32.

For uncorrected trace data (:TRACe[:DATA] with parameter RAWTRACE), UINTeger and INTeger formats apply to RAWTRACE queries, and return uncorrected ADC values. The fastest mode is UINTeger,16.

For state data, the format cannot be changed. It is always in a machine

FORMat Subsystem

readable format only (machine units).

Corrected Trace Data Types :TRACe:DATA?<trace_name>	
Data Type	**Result**
ASCii	Amplitude Units
INT,32 (fastest)	Internal Units
REAL,32	Amplitude Units
REAL,64	Amplitude Units

Uncorrected Trace Data Types :TRACe:DATA? RAWTRACE	
Data Type	**Result**
INT,32	Uncorrected ADC Values
UINT,16 (fastest)	Uncorrected ADC Values

ASCII - Amplitude values are in ASCII, in amplitude units, separated by commas. ASCII format requires more memory than the binary formats. Therefore, handling large amounts of this type of data, will take more time and storage space.

Real,32 (or 64) - Binary 32-bit, or 64-bit, real values in amplitude units), in a definite length block. Transfers of real data are done in a binary block format.

A definite length block of data starts with an ASCII header that begins with # and indicates how many additional data points are following in the block. Suppose the header is #512320.

- The first digit in the header (5) tells you how many additional digits/bytes there are in the header.
- The 12320 means 12 thousand, 3 hundred, 20 data bytes follow the header.
- Divide this number of bytes by your selected data format bytes/point, either 8 (for real 64), or 4 (for real 32). In this example, if you are using real 64 then there are 1540 points in the block.

Factory Preset
and *RST: ASCII

FORMat Subsystem

10 HCOPy Subsystem

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HCOPy Subsystem

The HCOPy subsystem controls the setup of printing to an external device.

Screen Printout Destination

:HCOPy:DESTination FPANel|PRINter

:HCOPy:DESTination?

This command was created to support backward compatibility to early instrument functionality. It is used to specify whether the hardcopy printout goes to the printer or to a destination that is specified from the front panel key **Print Setup, Print To File|Printer**.

Example: HCOP:DEST printer

Factory Preset and *RST: Front panel. This parameter is persistent, which means it retains the value previously selected even through a power cycle.

History: Revision A.04.00 and later

Front Panel Access: **Print Setup, Print To**

Custom Printer Color Capability

:HCOPy:DEVice:COLor NO|YES

:HCOPy:DEVice:COLor?

Specifies whether the printer is color capable, not whether you want to print in color. HCOPY:DEVICE:TYPE CUSTOM must be selected.

Example: HCOP:DEV:COLOR YES

Factory Preset and *RST: Yes. This parameter is persistent, which means it retains the value previously selected even through a power cycle.

History: Revision A.04.00 and later

Front Panel Access: **Print Setup, Define Custom**, with Print To:Printer and Printer Type:Custom selected

Custom Printer Language

:HCOPy:DEVice:LANGuage PCL3|PCL5

:HCOPy:DEVice:LANGuage?

Specifies the type of printer control language that your custom printer uses. HCOPY:DEVICE:TYPE CUSTOM must be selected.

Example: HCOP:DEV:LANG pcl3

Factory Preset and *RST: PCL3. This parameter is persistent, which means it retains the value previously selected even through a power cycle.

History: Revision A.04.00 and later

Front Panel Access: **Print Setup, Define Custom**, with Print To:Printer and Printer Type:Custom selected

Printer Type

:HCOPy:DEVice[:TYPE] CUSTom|NONE

:HCOPy:DEVice[:TYPE]?

Set up the printer by selecting the type of printer.

CUSTom - allows you to configure a custom printer if your printer cannot be auto-configured. Use other HCOPy:DEVice commands to specify some of the characteristics of your custom printer. The color and language must be defined for your custom printer. You must select the custom printer type to print hardcopy output.

NONE - tells the instrument that there is no hard copy (printer) device available.

Factory Preset and *RST: NONE This parameter is persistent, which means that it retains the setting previously selected, even through a power cycle.

History: Revision A.04.00 and later

Front Panel Access: **Print Setup, Printer Type**, with Print To Printer selected

Color Hard Copy

:HCOPy:IMAGe:COLor[:STATe] OFF|ON|0|1

:HCOPy:IMAGe:COLor[:STATe]?

Selects between color and monochrome mode for hard copy output. You must set HCOP:DEV:COLOR YES before using this command.

Factory Preset and *RST: On. This parameter is persistent, which means that it retains the setting previously selected, even through a power cycle.

Remarks: Revision A.04.00 and later

Front Panel Access: **Print Setup, Color** with Print To:Printer selected

Print a Hard Copy

:HCOPy[:IMMediate]

The entire screen image is output to the printer at the parallel port.

Front Panel Access: **Print**

Form Feed the Print Item

:HCOPy:ITEM:FFEed[:IMMediate]

Sends the printer a command to form feed. No form feed will occur unless the printer is only partly done. That is, unless it has only printed one image of a multi-image printout.

History: Revision A.04.00 and later

Front Panel Access: **Print Setup, Eject Page**

Page Orientation

:HCOPy:PAGE:ORIentation LANDscape|PORTrait

:HCOPy:PAGE:ORIentation?

Specifies the orientation of the print image.

NOTE Landscape mode is not presently supported for PCL-3 printers.

Factory Preset and *RST: Portrait. This parameter is persistent, which means

HCOPy Subsystem

that it retains the setting previously selected, even through a power cycle.

History: Revision A.04.00 and later

Front Panel Access: **Print Setup, Orientation** with Print To:Printer selected

Number of Items Printed on a Page

:HCOPy:PAGE:PRINts 1|2

:HCOPy:PAGE:PRINts?

Sets the number of display print outputs sent to print on one sheet of paper, before a form feed is sent.

Factory Preset and *RST: 1. This parameter is persistent, which means that it retains the setting previously selected, even through a power cycle.

History: Revision A.04.00 and later

Remarks: This must be set to 1 if the paper orientation is landscape.

Front Panel Access: **Print Setup, Prints/Page** with Print To:Printer selected

Reprint the Last Image

:HCOPy:REPRint[:IMMediate]

Reprint the most recently printed image.

Example: HCOP:REPR

History: Revision A.04.00 and later

Front Panel Access: **Print Setup** with Print To:Printer selected

Screen Dump Query

:HCOPy:SDUMp:DATA? [GIF]|BMP|WMF

The query returns the current screen image as a file. If the optional file type is not specified it returns GIF type graphic data. The orientation is always portrait and the image is always in color.

The data is formatted as block data where the block of data starts with an ASCII header that indicates how many additional binary data bytes are following in the block. (e.g. #DNNN<binary data>) The binary data is the actual graphics file. To process the block of data you would:

- Read the first header byte #. The # tells you to read the next digit (D). That digit tells you how many additional digits there are in the header. (In the above example D=3.)
- Then read the next D bytes. The digits NNN tell you the number of bytes of data there are following the header. (The data format, like binary16, affects how many values are represented by the bytes.)
- Those data bytes can then be saved as a separate file with a .gif .bmp or .wmf suffix to use in other applications.

Factory Preset
and *RST: GIF

History: Firmware revision A.03.28 and later, changed A.04.00

Screen Dump Image Inverting

:HCOPy:SDUMp:IMAGe NORMal|INVert

:HCOPy:SDUMp:IMAGe?

Controls the trace background color when using the HCOPY:SDUMP command.

Normal, is black trace background

Invert, is white trace background

Factory Preset
and *RST: Invert

History: Revision A.04.00 and later

Screen Dump Now

:HCOPy:SDUMp[:IMMediate]

The entire screen is output to the SCPI interface.

History: Revision A.04.00 and later

11 INITiate Subsystem

October 24, 2000 12:27 pm

INITiate Subsystem

The INITiate subsystem is used to control the initiation of the trigger. Refer to the TRIGger and ABORt subsystems for related commands.

Continuous or Single Measurements

:INITiate:CONTinuous OFF|ON|0|1

:INITiate:CONTinuous?

Selects whether the trigger system is continuously initiated or not. This corresponds to continuous measurement or single measurement operation.

When set to ON another trigger cycle is initiated at the completion of each trigger cycle.

When set to OFF, the trigger system remains in the “idle” state until an INITiate[:IMMediate] command is received. On receiving the INITiate[:IMMediate] command, it will go through a single trigger cycle, and then return to the “idle” state.

Factory Preset:	On
*RST:	Off (recommended for remote operation)
Front Panel Access:	**Sweep, Sweep Cont Single**
	Single
	Meas Control, Measure Cont Single

Take New Data Acquisitions

:INITiate[:IMMediate]

The instrument must be in the single measurement mode. If INIT:CONT is ON, then the command is ignored. The desired measurement must be selected and waiting. The command causes the system to exit the “waiting” state and go to the “initiated” state.

The trigger system is initiated and completes one full trigger cycle. It returns to the “waiting” state on completion of the trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle.

This command triggers the instrument, if external triggering is the type of trigger event selected. Otherwise, the command is ignored. Use the TRIGer[:SEQuence]:SOURce EXT command to select the external trigger.

Remarks: See also the *TRG command and the TRIGger subsystem.

Front Panel Access: **Sweep, Sweep Cont Single**

Single

Meas Control, Measure Cont Single

Restart the Measurement

:INITiate:RESTart

It restarts the current measurement from the “idle” state regardless of its current operating state. It is equivalent to:

INITiate[:IMMediate] (for single measurement mode)

ABORt (for continuous measurement mode)

Front Panel Access: **Restart**

or

Meas Control, Restart

INITiate Subsystem

12 INPut Subsystem

October 23, 2000 10:47 am

INPut Subsystem

The INPut subsystem controls the characteristics of all the instrument input ports.

Input Impedance for IQ Input

:INPut:IMPedance:IQ 50|600

:INPut:IMPedance:IQ?

Select the impedance for the baseband I/Q input.

Factory Preset and *RST:	50 Ohm
Front Panel Access:	**Input, I/Q Input Z**

13 INSTrument Subsystem

October 24, 2000 12:27 pm

INSTrument Subsystem

This subsystem includes commands for querying and selecting instrument measurement (personality option) modes.

Catalog Query

:INSTrument:CATalog[:FULL]?

Returns a comma separated list of strings which contains the names of all installed applications. If the optional **FULL** keyword is specified, each name is followed by its associated instrument number, also comma-separated. These instrument numbers are assigned internally and can be used with the **INST:NSELect** command.

Select Application by Number

:INSTrument:NSELect <integer>

:INSTrument:NSELect?

Select the measurement application by its instrument number. The actual available choices depends upon which applications are installed in the instrument. These instrument numbers can be identified with **INST:CATalog:FULL**.

1 = Service
3 = GSM
4 = cdmaOne
5 = NADC
6 = PDC
8 = Basic
9 = W-CDMA, 3GPP
10 = cdma2000
11 = iDEN
12 = W-CDMA, Trial/ARIB
13 = GSM EDGE

Factory Preset and *RST:	Persistent state with factory default of 1
Range:	1 to x, where x depends upon which applications are installed.
Front Panel Access:	**Mode**

Select Application

:INSTrument[:SELect]
BASIC|SERVICE|CDMA|CDMA2K|GSM|GSMEDGE|IDEN|NADC|PDC|
WCDMA|ARIBWCDMA

:INSTrument[:SELect]?

Select the measurement application mode. The actual available choices depend upon which applications (modes) are installed in the instrument. See the manual for your installed options for the mode designator.

Once the instrument mode is selected, only the commands that are valid for that mode can be executed. SYSTem:HELP:HEADers? provides a list of the valid commands.

Basic mode - Makes basic receiver measurements

Service mode - Used only for servicing the instrument

CDMA mode - Makes cdmaOne (code division multiple access) standard measurements

CDMA2K mode - Makes cdma2000 (wide-band code division multiple access) standard measurements

GSM mode - Makes GSM (global system for mobile communications) standard measurements

EDGEGSM mode - Makes GSM (global system for mobile communications) and EDGE (enhanced data rates for global evolution) standard measurements

IDEN mode - Makes iDEN (integrated digital enhanced network) standard measurements

NADC mode - Makes NADC (North American Digital Cellular) standard measurements

PDC mode - Makes PDC (Pacific Digital Cellular) standard measurements

WCDMA mode - Makes W-CDMA (wide-band CDMA) measurements for the 3GPP (third generation partnership project) standards

ARIBWCDMA mode - Makes W-CDMA (wide-band CDMA) measurements for the trial 98 and ARIB standards

NOTE If you are using the status bits and the analyzer mode is changed, the status bits should be read, and any errors resolved, prior to switching modes. Error conditions that exist prior to switching modes cannot be detected using the condition registers after the mode change. This is true unless they recur after the mode change, although transitions of these conditions can be detected using the event registers.

Changing modes resets all SCPI status registers and mask registers to their power-on defaults. Hence, any event or condition register masks must be re-established after a mode change. Also note that the power up status bit is set by any mode change, since that is the default state after power up.

Factory Preset and *RST: Persistent state with factory default of the first installed application other than the service mode.

Front Panel Access: **Mode**

14 MEASure Subsystem

October 24, 2000 12:27 pm

MEASure Group of Commands

This group includes the CONFigure, FETCH, MEASure, and READ commands that are used to make measurements and return results. The different commands can be used to provide fine control of the overall measurement process, like altering measurement parameters from their default settings. Most measurements should be done in single measurement mode, rather than doing the measurement continuously.

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 Radio Standard that is currently selected.

- 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.

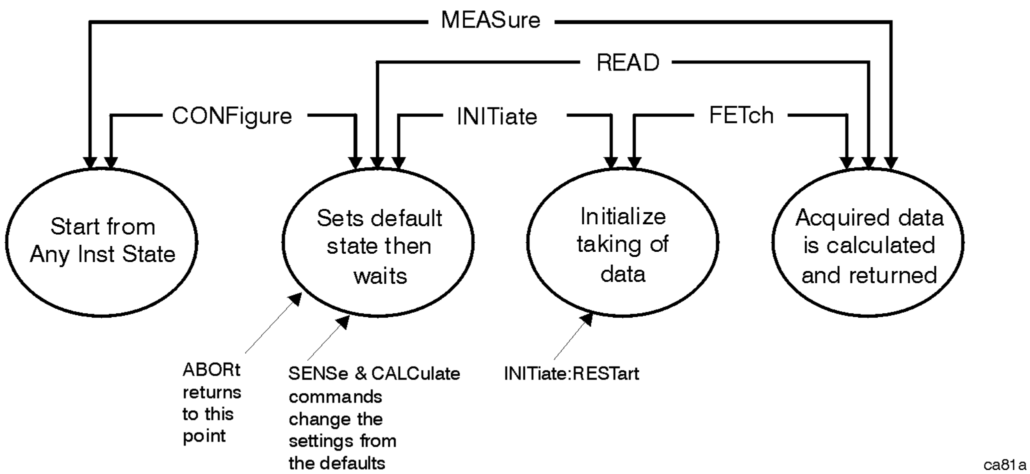
  If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. 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 14-1.

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 14-1 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 selected data from the most recent measurement into the output buffer (data acquisition is not initiated, however). 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.

FETCh may be used to return results other than those specified with the READ or MEASure commands.

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.) READ uses the settings from the last measurement.
- Initiates the measurement which puts new 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.

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

<table>
<tr><th>Measurement Type</th><th>n</th><th>Results Returned</th></tr>
<tr><td>(For cdma2000 and W-CDMA the data is only available with spectrum display selected)</td><td>4

Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode</td><td>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.</td></tr>
<tr><td></td><td>5

iDEN mode</td><td>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</td></tr>
<tr><td>Total power reference</td><td>5

Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode</td><td>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)</td></tr>
<tr><td>Power spectral density reference</td><td>5

Basic, cdmaOne, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode</td><td>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)</td></tr>
</table>

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)

50 MHz Amplitude Reference Measurement

This aligns the internal 50 MHz reference signal to an external reference signal that you supply. You must be in the Service 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:AREFerence commands for more measurement related commands.

:CONFigure:AREFerence

:FETCh:AREFerence[n]?

:READ:AREFerence[n]?

:MEASure:AREFerence[n]?

Remarks: For auto adjustment of the internal 50 MHz amplitude reference, use CALibration:AMPLitude:REFerence:AADJust command after this measurement has been selected.t

Front Panel Access: **Measure, 50 MHz Amptd**

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

Measurement Results Available

n	Results Returned
not specified or n=1	Returns 7 scalar results: 1. RF input average amplitude 2. 50 MHz reference oscillator average amplitude 3. Average amplitude error 4. State (for factory use only) 5. Level (for factory use only) 6. Monitored level (for factory use only) 7. Connector status (for factory use only)
2	RF input amplitude trace data.
3	50 MHz oscillator amplitude trace data
4	Amplitude error strip chart trace data

Bit Error Rate Measurement

This tests for bit errors in the demodulated signal. You must be in the iDEN 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:BER commands for more measurement related commands.

:CONFigure:BER

:FETCh:BER[n]?

:READ:BER[n]?

:MEASure:BER[n]?

History: Version A.03.00 or later

Front Panel Access: **Measure, Bit Error Rate**

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 these 15 comma-separated scalar results in the following order: 1. Total bit error rate (BER in %) 2. Total number of bits tested 3. Total number of bits failed 4. Total number of frames tested 5. Total number of frames attempted to find 6. Current frame word found 7. Bit error rate for current word 8. Measured carrier frequency 9. Calculated center frequency error 10. Frequency span 11. Average count 12. EVM for first sub-channel 13. EVM for second sub-channel 14. EVM for third sub-channel 15. EVM for fourth sub-channel
2	Returns unprocessed frame I/Q data, as a data array of comma-separated trace points, in volts.

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.

<table>
<tr><th>n</th><th>Results Returned</th></tr>
<tr><td>not specified or n=1

cdmaOne mode</td><td>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</td></tr>
</table>

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.

EDGE Error Vector Magnitude Measurement

This measures the vector error of the magnitude of each symbol. You must be in the EDGE(w/GSM) 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:EEVM commands for more measurement related commands.

:CONFigure:EEVM

:FETCh:EEVM[n]?

:READ:EEVM[n]?

:MEASure:EEVM[n]?

History: Version A.04.00 or later

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

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

Measurement Results Available

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

n	Results Returned
1 (default)	Returns the following 8 comma-separated scalar results, in order. 1. RMS 95th %tile EVM – a floating point number (in percent) of EVM over 95% of the entire measurement area. 2. RMS EVM – a floating point number (in percent) of EVM over the entire measurement area. 3. Maximum RMS EVM – a floating point number (in percent) of highest EVM over the entire measurement area. 4. Peak EVM – a floating point number (in percent) of the average of the peak EVMs. Take the peak EVMs from each burst and average them together. 5. Maximum peak EVM – a floating point number (in percent) of the maximum peak EVM. Take the peak EVMs from each burst and identify the highest peak. 6. Symbol position of the peak EVM error – an integer number of the symbol position where the peak EVM error is detected. 7. Magnitude error – a floating point number (in percent) of average magnitude error over the entire measurement area. 8. Maximum magnitude error – a floating point number (in percent) of maximum magnitude error over the entire measurement area. 9. Phase error – a floating point number (in degree) of average phase error over the entire measurement area. 10. Maximum Phase error – a floating point number (in degree) of maximum phase error over the entire measurement area. 11. Frequency error – a floating point number (in Hz) of the frequency error in the measured signal. 12. Maximum frequency error – a floating point number (in Hz) of the highest frequency error in the measured signal. 13. I/Q origin offset – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin.
2	Returns series of floating point numbers (in percent) that represent each sample in the EVM vector trace for the last slot. The first number is the symbol 0 decision point and there are 5 points per symbol. Therefore, the decision points are at 0, 5, 10, 15. . . .
3	Returns series of floating point numbers (in percent) that represent each sample in the magnitude error vector trace for the last slot. The first number is the symbol 0 decision point and there are 5 points per symbol. Therefore, the decision points are at 0, 5, 10, 15. . . .
4	Returns series of floating point numbers (in degree) that represent each sample in the phase error vector trace for the last slot. The first number is the symbol 0 decision point and there are 5 points per symbol. Therefore, the decision points are at 0, 5, 10, 15 . . .

n	Results Returned
5	Returns series of floating point numbers that alternately represent I and Q pairs of the final corrected measured data for the last slot. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. As in the EVM, there are 5 points per symbol, so the series of numbers is: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point . . . $(2 \times 5) + 1$ (or 11th) number = I of the symbol 1 decision point $(2 \times 5) + 2$ (or 12th) number = Q of the symbol 1 decision point . . . $(2 \times 5) \times N + 1$ number = I of the symbol N decision point $(2 \times 5) \times N + 2$ number = Q of the symbol N decision point

EDGE Output RF Spectrum Measurement

This measures adjacent channel power. From 1 to 15 offsets can be measured at one time. You must be in the EDGE(w/GSM) 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:EORFspectr commands for more measurement related commands.

:CONFigure:EORFspectr

:FETCh:EORFspectr[n]?

:READ:EORFspectr[n]?

:MEASure:EORFspectr[n]?

History: Version A.04.00 or later

Front Panel Access: **Measure, EDGE Output RF Spectrum**

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

Measurement Results Available

The default settings for the MEASure command only measure the carrier and 5 standard offsets. The default does not measure the switching transients. If you use the CONFigure, INITiate, and FETCh commands in place of the MEASure command, you can then use the SENSe commands to change the settings from these defaults. Use `[:SENSe]:EORFspectr:LIST:SWITch CUSTom` to select a customized set of offsets. Use `[:SENSe]:EORFspectr:TYPE MSWitching` to measure switching in addition to measuring modulation. (The measurement will take longer when measuring switching transients.

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

Measurement Method	n	Results Returned
Multiple offsets	not specified or n=1	Returns a list of comma-separated values for the modulation spectrum at all the offsets (lower and upper.) This is followed by the switching transients results at all the offsets (lower and upper). Note that the carrier is considered offset zero (0) and is the first set of results sent. Four values are provided for each of the offsets (including the carrier), in this order: 1. Negative offset(a) - power relative to carrier (dB) 2. Negative offset(a) - absolute average power (dBm) 3. Positive offset(a) - power relative to carrier (dB) 4. Positive offset(a) - absolute average power (dBm) Values for all possible offsets are sent. Zeros are sent for offsets that have not been defined. The total number of values sent (120) = (4 results/offset) × (15 offsets) × (2 measurement types - modulation & switching) Carrier - modulation measurement values Offset 1 - modulation measurement values . . . Offset 14 - modulation measurement values Carrier - switching transients measurement values Offset 1 - switching transients measurement values . . . Offset 14- switching transients measurement values This measurement defaults to modulation measurements and not switching measurements. If you want to return the switching measurement values, you must change that default condition and use FETCh or READ to return values, rather than MEASure. NOTE: When using custom modulation and switching offsets the maximum number of measured values returned is: 13 modulation offsets + 0 Hz carrier 4 switching offsets + 0 Hz carrier
Single offset	not specified or n=1	Returns 4 comma-separated results for the specified offset: 1. Modulation spectrum power, dB 2. Modulation spectrum power, dBm 3. Switching transient power, dB 4. Switching transient power, dBm
Single offset	2	Returns floating point numbers (in dBm) of the captured trace data. It contains N data points of the “spectrum due to modulation” signal, where N is the specified number of samples.

Measurement Method	n	Results Returned
Single offset	3	Returns floating point numbers (in dBm) of the captured trace data. It contains N data points of the “spectrum due to switching transients” signal, where N is the specified number of samples.

EDGE Power vs. Time Measurement

This measures the average power during the “useful part” of the burst comparing the power ramp to required timing mask. You must be in EDGE(w/GSM) 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:EPVTime commands for more measurement related commands.

:CONFigure:EPVTime

:FETCh:EPVTime[n]?

:READ:EPVTime[n]?

:MEASure:EPVTime[n]?

Front Panel
Access: **Measure, EDGE Pwr vsTime**

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 that represents the time between samples when using the trace queries (n=0,2,etc.). 2. **Power single burst** is the mean power (in dBm) across the useful part of the selected burst in the most recently acquired data, or in the last data acquired at the end of a set of averages. If averaging is on, the power is for the last burst. 3. **Power averaged** is the power (in dBm) of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. Average *m* is a single burst from the acquired trace. If there are multiple bursts in the acquired trace, only one burst is used for average *m*. This means that N traces are acquired to make the complete average. If averaging is off, the value of **power averaged** is the same as the **power single burst** value. 4. **Number of samples** is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0,2,etc.). 5. **Start** is the index of the data point at the start of the useful part of the burst 6. **Stop** is the index of the data point at the end of the useful part of the burst 7. **T_0** is the index of the data point where t_0 occurred 8. **Burst width** is the width of the burst measured at –3dB below the mean power in the useful part of the burst. 9. **Maximum value** is the maximum value of the most recently acquired data (in dBm). 10. **Minimum value** is the minimum value of the most recently acquired data (in dBm). 11. **Burst search threshold** is the value (in dBm) of the threshold where a valid burst is identified, after the data has been acquired. 12. **IQ point delta** is the number of data points offset that are internally applied to the useful data in traces *n*=2,3,4. You must apply this correction value to find the actual location of the **Start**, **Stop**, or **T_0** values. (e.g. for *n*=2, Start (for the IQ trace data) = Start + IQ_point_delta)
2	Returns comma-separated trace points of the entire waveform 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**. If averaging is set to both maximum and minimum with SENSe:EPVT:AVERage:TYPE MXMinimum, this trace contains the maximum trace points. n=5 returns the corresponding minimum trace.

n	Results Returned
3	Returns comma-separated points representing the upper mask (in dBm).
4	Returns comma-separated points representing the lower mask (in dBm).
5, only available when averaging is set to both maximum and minimum	Returns comma-separated trace points of the minimum waveform 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**. Use SENSe:EPVT:AVERage:TYPE MXMinimum to set averaging to max and min. Use n=2 to return the corresponding maximum trace.

EDGE Transmit Band Spurs Measurement

This measures the spurious emissions in the transmit band relative to the channel power in the selected channel. You must be in the EDGE (w/GSM) 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:TSPur commands for more measurement related commands.

:CONFigure:ETSPur

:FETCh:ETSPur[n]?

:READ:ETSPur[n]?

:MEASure:ETSPur[n]?

History: Version A.05.00 or later

Front Panel Access: **Measure, EDGE Tx Band Spurs**

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 the mean transmit power (in dB)
2	Returns trace of the segment containing the worst spur.

Error Vector Magnitude Measurement

This measures the vector error of the magnitude of each symbol. You must be in the 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:EVM commands for more measurement related commands.

:CONFigure:EVM

:FETCh:EVM[n]?

:READ:EVM[n]?

:MEASure:EVM[n]?

History: Version A.02.00 or later

Front Panel Access: **Measure, EVM**

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

Measurement Results Available

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

n	Results Returned
1 (default) EDGE GSM mode	Returns the following 8 comma-separated scalar results, in order. 1. RMS EVM – a floating point number (in percent) of EVM over the entire measurement area. 2. Peak EVM error – a floating point number (in percent) of the peak EVM in the measurement area. 3. Symbol position of the peak EVM error – an integer number of the symbol position where the peak EVM error is detected. 4. First 10 symbols EVM error – a floating point number (in percent) of EVM over the first 10 symbols. 5. Magnitude error – a floating point number (in percent) of average magnitude error over the entire measurement area. 6. Phase error – a floating point number (in degree) of average phase error over the entire measurement area. 7. Frequency error – a floating point number (in Hz) of the frequency error in the measured signal. 8. I/Q origin offset – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin.
1 (default) NADC mode	Returns the following 8 comma-separated scalar results, in order. 1. RMS EVM – a floating point number (in percent) of EVM over the entire measurement area. 2. Peak EVM error – a floating point number (in percent) of the peak EVM in the measurement area. 3. Symbol position of the peak EVM error – an integer number of the symbol position where the peak EVM error is detected. 4. First 10 symbols EVM error – a floating point number (in percent) of EVM over the first 10 symbols. 5. Magnitude error – a floating point number (in percent) of average magnitude error over the entire measurement area. 6. Phase error – a floating point number (in degree) of average phase error over the entire measurement area. 7. Frequency error – a floating point number (in Hz) of the frequency error in the measured signal. 8. I/Q origin offset – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin.

n	Results Returned
1 (default) PDC mode	Returns the following 7 comma-separated scalar results, in order. 1. RMS EVM – a floating point number (in percent) of EVM over the entire measurement area. 2. Peak EVM error – a floating point number (in percent) of peak EVM in the measurement area. 3. Symbol position of the peak EVM error – an integer number of the symbol position where the peak EVM error is detected. 4. Magnitude error – a floating point number (in percent) of average magnitude error over the entire measurement area. 5. Phase error – a floating point number (in degree) of average phase error over the entire measurement area. 6. Frequency error – a floating point number (in Hz) of the frequency error in the measured signal. 7. I/Q origin offset – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin.
2	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 and there are 5 points per symbol. Therefore, the decision points are at 0, 5, 10, 15. . . .
3	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 and there are 5 points per symbol. Therefore, the decision points are at 0, 5, 10, 15. . . .
4	Returns series of floating point numbers (in degree) that represent each sample in the phase error trace. The first number is the symbol 0 decision point and there are 5 points per symbol. Therefore, the decision points are at 0, 5, 10, 15 . . .
5	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. As in the EVM, there are 5 points per symbol, so the series of numbers is: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point . . . $(2 \times 5) + 1$ (or 11th) number = I of the symbol 1 decision point $(2 \times 5) + 2$ (or 12th) number = Q of the symbol 1 decision point . . . $(2 \times 5) \times N + 1$ number = I of the symbol N decision point $(2 \times 5) \times N + 2$ number = Q of the symbol N decision point

n	Results Returned
6 NADC mode	Returns the following 4 comma-separated scalar values of 1 or 0, in the order given. The pass/fail results (0=passed, or 1=failed) are determined by testing the EVM, peak EVM, first 10 symbols EVM and IQ origin offsets. Test result of EVM Test result of peak EVM Test result of first 10 symbols EVM Test result of IQ origin offset
6 PDC mode	Returns the following 3 comma-separated scalar values of 1 or 0, in the order given. The pass/fail results (0=passed, or 1=failed) are determined by testing the EVM, peak EVM, and IQ origin offsets. Test result of EVM Test result of peak EVM Test result of IQ origin offset

QPSK Error Vector Magnitude Measurement

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

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

:CONFigure:EVMQpsk

:FETCh:EVMQpsk[n]?

:READ:EVMQpsk[n]?

:MEASure:EVMQpsk[n]?

History: Version A.03.00 or later

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

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

Measurement Results Available

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

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

Intermodulation Measurement

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

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

:CONFigure:IM

:FETCh:IM[n]?

:READ:IM[n]?

:MEASure:IM[n]?

Front Panel
Access: **Measure, Intermod**

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

Measurement Results Available

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

n	Results Returned
1 (default)	Returns 23 comma-separated scalar results, in the following order. 1. Absolute power of the reference (dBm) 2. Base lower frequency (Hz) 3. Base lower absolute power (dBm) 4. Base lower relative power to the reference (dBc) 5. Base upper frequency (Hz) 6. Base upper absolute power (dBm) 7. Base upper relative power to the reference (dBc) 8. Third order lower frequency (Hz) 9. Third order lower absolute power (dBm) 10. Third order lower relative power to the reference power (dBc) 11. Third order lower power spectrum density (dBm/Hz) 12. Third order upper frequency (Hz) 13. Third order upper absolute power (dBm) 14. Third order upper relative power to the reference power (dBc) 15. Third order upper power spectrum density (dBm/Hz) 16. Fifth order lower frequency (Hz) 17. Fifth order lower absolute power (dBm) 18. Fifth order lower relative power to the reference power (dBc) 19. Fifth order lower power spectrum density (dBm/Hz) 20. Fifth order upper frequency (Hz) 21. Fifth order upper absolute power (dBm) 22. Fifth order upper relative power to the reference power (dBc) 23. Fifth order upper power spectrum density (dBm/Hz) If the results are not available, –999.0 is returned for the power results and 0.0 for the frequency results.
2 cdma2000 mode	Returns a series of floating point numbers that represent the frequency-domain spectrum trace for the entire frequency range being measured. In the default settings (SENSe:IM:FREQuency:SPAN 20 MHz; SENSe:IM:BANDwidth|BWIDth[:RESolution] 140 kHz), there are 345 numbers.
2 W-CDMA (3GPP) mode	Returns a series of floating point numbers that represent the frequency-domain spectrum trace for the entire frequency range being measured. In the default settings (SENSe:IM:FREQuency:SPAN 50 MHz; SENSe:IM:BANDwidth|BWIDth[:RESolution] 140 kHz), there are 872 numbers.

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

Multi Carrier Power Measurement

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

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

:CONFigure:MCPower

:FETCh:MCPower[n]?

:READ:MCPower[n]?

:MEASure:MCPower[n]?

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

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

Measurement Results Available

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

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

Occupied Bandwidth Measurement

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

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

:CONFigure:OBW

:FETCh:OBW[n]?

:READ:OBW[n]?

:MEASure:OBW[n]?

History: Version A.02.00 or later

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

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

Measurement results available

n	Results Returned
0	Returns unprocessed I/Q trace data, as a data array of comma-separated trace points, in volts.
1 (default) PDC, cdma2000, or W-CDMA (3GPP) mode	Returns 2 comma-separated scalar results, in the following order: 1. Occupied bandwidth - Hz 2. Absolute Carrier Power - dBm
1 (default) iDEN mode	Returns the following 7 comma-separated scalar results, in order. 1. Absolute power of occupied bandwidth (dBm) 2. Relative power of occupied bandwidth (dB) 3. Bandwidth for specified power percentage 4. Power percentage 5. Measured carrier frequency 6. Frequency span 7. Average count
2 PDC, cdma2000, W-CDMA (3GPP) mode	Returns the frequency-domain spectrum trace (data array) for the entire frequency range being measured

n	Results Returned
2, spectrum display only iDEN mode	Returns the frequency-domain spectrum trace (data array) for the entire frequency range (9003 points) being measured.

Output RF Spectrum Measurement

This measures adjacent channel power. From 1 to 15 offsets can be measured at one time. You must be in the EDGE, GSM 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:ORFSpectrum commands for more measurement related commands.

:CONFigure:ORFSpectrum

:FETCh:ORFSpectrum[n]?

:READ:ORFSpectrum[n]?

:MEASure:ORFSpectrum[n]?

Front Panel Access: **Measure, Output RF Spectrum**

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

Measurement Results Available

The default settings for the MEASure command only measure the carrier and 5 standard offsets. The default does not measure the switching transients. If you use the CONFigure, INITiate, and FETCh commands in place of the MEASure command, you can then use the SENSe commands to change the settings from these defaults. Use `[:SENSe]:ORFSpectrum:LIST:SWITch CUSTom` to select a customized set of offsets. Use `[:SENSe]:ORFSpectrum:TYPE MSWitching` to measure switching in addition to measuring modulation. (The measurement will take longer when measuring switching transients.

Measurement Method	n	Results Returned
	0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
Single offset	not specified or n=1	Returns 4 comma-separated results for the specified offset: 1. Modulation spectrum power, dB 2. Modulation spectrum power, dBm 3. Switching transient power, dB 4. Switching transient power, dBm
Multiple offsets	not specified or n=1	Returns a list of comma-separated values for the modulation spectrum at all the offsets (lower and upper.) This is followed by the switching transients results at all the offsets (lower and upper). Note that the carrier is considered offset zero (0) and is the first set of results sent. Four values are provided for each of the offsets (including the carrier), in this order: 1. Negative offset(a) - power relative to carrier (dB) 2. Negative offset(a) - absolute average power (dBm) 3. Positive offset(a) - power relative to carrier (dB) 4. Positive offset(a) - absolute average power (dBm) Values for all possible offsets are sent. Zeros are sent for offsets that have not been defined. The total number of values sent (120) = (4 results/offset) × (15 offsets) × (2 measurement types - modulation & switching) Carrier - modulation measurement values Offset 1 - modulation measurement values . . . Offset 14 - modulation measurement values Carrier - switching transients measurement values Offset 1 - switching transients measurement values . . . Offset 14- switching transients measurement values This measurement defaults to modulation measurements and not switching measurements. If you want to return the switching measurement values, you must change that default condition and use FETCh or READ to return values, rather than MEASure. NOTE: When using custom modulation and switching offsets the maximum number of measured values returned is: 13 modulation offsets + 0 Hz carrier 4 switching offsets + 0 Hz carrier

Measurement Method	n	Results Returned
Single offset	2	Returns floating point numbers (in dBm) of the captured trace data. It contains N data points of the “spectrum due to modulation” signal, where N is the specified number of samples.
Single offset	3	Returns floating point numbers (in dBm) of the captured trace data. It contains N data points of the “spectrum due to switching transients” signal, where N is the specified number of samples.

Phase & Frequency Error Measurement

This measures the modulation quality of the transmitter by checking phase and frequency accuracy. You must be in the EDGE, GSM 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:PFERror commands for more measurement related commands.

:CONFigure:PFERror

:FETCh:PFERror[n]?

:READ:PFERror[n]?

:MEASure:PFERror[n]?

Front Panel Access: **Measure, Phase & Freq**

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. **RMS phase error** is a floating point number (in degrees) of the rms phase error between the measured phase and the ideal phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). If averaging is on, this is the average of the individual rms measurements. 2. **Peak phase error** is a floating point number (in degrees) of the peak phase error of all the symbol decision points. rms averaging does not affect this calculation. 3. **Peak phase symbol** is a floating point number (in symbols) representing the symbol number at which the peak phase error occurred. Averaging does not affect this calculation. 4. **Frequency error** is a floating point number (in Hz) of the frequency error in the measured signal. This is the difference between the measured phase trajectory and the reference phase trajectory. 5. **I/Q origin offset** is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. 6. **Phase sample** is a floating point number (in units of bits) representing the time between samples. It is used in querying phase error vector traces. 7. **Bit 0 offset** is an integer number for the sample point in a phase error vector trace that represents the bit 0 (zero) decision point. The sample points in the trace are numbered 0 to N. 8. **Sync start** is an integer number for the bit number, within the data bits trace, that represents the start of the sync word. 9. **Time sample** is a floating point number (in seconds) of the time between samples. It is used in querying time domain traces. For the n=0 trace, of acquired I/Q pairs, this is the time between pairs.
2, and **Multi View** is the selected view	Returns a series of floating point numbers (in degrees) that represent each sample in the phase error trace. The first number is the symbol 0 decision point and there are 10 points per symbol. Therefore, decision points are at 0, 10, 20, etc.
3, and **Multi View** is the selected view	Returns a series of floating point numbers (in degrees) that represent each sample in the phase error with frequency trace. Phase error with frequency is the error vector between the measured phase (that has not had frequency compensation) and the ideal reference phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). The first number is the symbol 0 decision point and there are 10 points per symbol. Therefore, decision points are at 0, 10, 20, etc.
4, and **Multi View** is the selected view	Returns a series of floating point numbers that represent each sample in the log magnitude trace of the original time record. Each number represents a value (in dBm) of the time record.

n	Results Returned
5, and **IQ Measured Polar Vector** is the selected view	Returns a series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. As in the rms phase error, there are ten points per symbol, so that: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point . . 10th number = Q of the symbol 0 decision point 11th number = I of the symbol 1 decision point 12th number = Q of the symbol 1 decision point . . 10 × Nth number = Q of the symbol N decision point
6, and **Multi View** is the selected view	Returns a series of logical values (0 or 1) that represent the demodulated bit value of the measured waveform. The first number is the symbol 0 decision point and there are 10 points per symbol. Therefore, decision points are at 0, 10, 20, etc.

Power Statistics CCDF Measurement

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

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

:CONFigure:PSTatistic

:FETCh:PSTatistic[n]?

:READ:PSTatastic[n]?

:MEASure:PSTatastic[n]?

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

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

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

Measurement Results Available

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

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

Power vs. Time Measurement

This measures the average power during the “useful part” of the burst comparing the power ramp to required timing mask. You must be in EDGE, GSM or Service 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:PVTime commands for more measurement related commands.

:CONFigure:PVTime

:FETCh:PVTime[n]?

:READ:PVTime[n]?

:MEASure:PVTime[n]?

Front Panel
Access: **Measure, Power vs Time**

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 that represents the time between samples when using the trace queries (n=0,2,etc.). 2. **Power of single burst** is the mean power (in dBm) across the useful part of the selected burst in the most recently acquired data, or in the last data acquired at the end of a set of averages. If averaging is on, the power is for the last burst. 3. **Power averaged** is the power (in dBm) of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. Average *m* is a single burst from the acquired trace. If there are multiple bursts in the acquired trace, only one burst is used for average *m*. This means that N traces are acquired to make the complete average. If averaging is off, the value of **power averaged** is the same as the **power single burst** value. 4. **Number of samples** is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0,2,etc.). 5. **Start point of the useful part of the burst** is the index of the data point at the start of the useful part of the burst 6. **Stop point of the useful part of the burst** is the index of the data point at the end of the useful part of the burst 7. **Index of the data point where T_0 occurred.** 8. **Burst width of the useful part of the burst** is the width of the burst measured at –3dB below the mean power in the useful part of the burst. 9. **Maximum value** is the maximum value of the most recently acquired data (in dBm). 10. **Minimum value** is the minimum value of the most recently acquired data (in dBm). 11. **Burst search threshold** is the value (in dBm) of the threshold where a valid burst is identified, after the data has been acquired. 12. **IQ point delta** is the number of data points offset that are internally applied to the useful data in traces *n*=2,3,4. You must apply this correction value to find the actual location of the **Start**, **Stop**, or $\mathbf{T_0}$ values.
2	Returns comma-separated trace points of the entire captured I/Q 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**. If averaging is set to both maximum and minimum with SENSe:PVT:AVERage:TYPE MXMinimum, this trace contains the maximum trace points. n=5 returns the corresponding minimum trace.
3	Returns comma-separated points representing the upper mask (in dBm).

n	Results Returned
4	Returns comma-separated points representing the lower mask (in dBm).
5, only available when averaging is set to both maximum and minimum	Returns comma-separated trace points of the minimum waveform 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**. Use SENSe:PVT:AVERage:TYPE MXMinimum to set averaging to max and min. Use n=2 to return the corresponding maximum trace.

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.

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

<table>
<tr><th>n</th><th>Results Returned</th></tr>
<tr><td>11

cdmaOne mode</td><td>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.</td></tr>
<tr><td>13

cdmaOne mode</td><td>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.</td></tr>
</table>

Spectrum Emission Mask Measurement

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

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

:CONFigure:SEMask

:FETCh:SEMask[n]?

:READ:SEMask[n]?

:MEASure:SEMask[n]?

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

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

Measurement Results Available

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

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

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

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

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

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

Sensor Measurement

This checks the output of three sensors in the RF and IF circuitry. You must be in the Service 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.

:CONFigure:SENSors

:FETCh:SENSors[n]?

:READ:SENSors[n]?

:MEASure:SENSors[n]?

Front Panel
Access: With Service Mode selected, **Measure, Sensors**

Measurement Results Available

n	Results Returned
0	Not valid
not specified or n=1	Returns the following comma-separated scalar results: 1. **IF signal amplitude** is the ADC value for the detected 21.4 MHz IF signal at the input to the analog IF. 2. **Calibration Oscillator Level** is a floating point number (is not implemented, currently returns a zero). 3. **RF temperature** is a floating point number for the current temperature in the RF section (in degrees Celsius).

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.

Timebase Frequency Measurement

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

You must be in the Service mode to use these commands. Use INSTrument:SELect to set the mode.

:CONFigure:TBFRequency

:FETCh:TBFRequency[n]?

:READ:TBFRequency[n]?

:MEASure:TBFRequency[n]?

Remarks: For auto adjustment of the internal frequency reference (10 MHz timebase), use the CALibration:FREQuency:REFerence:AADJust command after this measurement has been selected.

Front Panel Access: **Measure, Timebase Freq**

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

Measurement Results Available

n	Results Returned
0	Not valid
not specified or n=1	Returns 3 scalar results: 1. RF input average amplitude 2. Average frequency error 3. Adjustment in process (returns 1 if an adjustment is being performed, returns 0 if no adjustment is in process)
2	Frequency error stripchart trace data.

Transmit Band Spurs Measurement

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

:CONFigure:TSPur

:FETCh:TSPur[n]?

:READ:TSPur[n]?

:MEASure:TSPur[n]?

History: Version A.03.00 or later

Front Panel Access: **Measure, Tx Band Spurs**

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 the mean transmit power (in dB)
2	Returns trace of the segment containing the worst spur.

Transmit Power Measurement

This measures the power in the channel. It compares the average power of the RF signal burst to a specified threshold value. You must be in the EDGE, GSM 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:TXPower commands for more measurement related commands.

:CONFigure:TXPower

:FETCh:TXPower[n]?

:READ:TXPower[n]?

:MEASure:TXPower[n]?

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

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

Measurement Results Available

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

n	Results Returned
not specified or n=1	Returns the following comma-separated scalar results: 1. **Sample time** is a floating point number representing the time between samples when using the trace queries (n=0,2,etc). 2. **Power** is the mean power (in dBm) of the power above the threshold value. If averaging is on, the power is for the latest acquisition. 3. **Power averaged** is the threshold power (in dBm) for N averages, if averaging is on. An average consists of N acquisitions of data which represents the current trace. If averaging is off, the value of **power averaged** is the same as the **power** value. 4. **Number of samples** is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0,2,etc.). 5. **Threshold value** is the threshold (in dBm) above which the power is calculated. 6. **Threshold points** is the number of points that were above the threshold and were used for the power calculation. 7. **Maximum value** is the maximum of the most recently acquired data (in dBm). 8. **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**.

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**.

15 MEMory Subsystem

October 23, 2000 10:47 am

MEMory Subsystem

The purpose of the MEMory subsystem is to manage instrument memory. This specifically excludes memory used for mass storage which is defined in the MMEMory Subsystem.

Install Application

:MEMory:INSTall:APPLication <filename>

Installs the specified application from an external drive to the instrument. Each application allows you to make a specific set of measurements easily and accurately. Installation requires a 12-character license key that you received with your application. The license key number is unique to the option and instrument serial number. If it cannot be located, contact your local Hewlett-Packard Sales and Service office to re-obtain the information. (Have the instrument model number, option and serial number available.)

Front Panel
Access: **System, Uninstall**

Un-install Application

:MEMory:UNINstall:APPLication <filename>

Uninstalls (deletes) the specified application from the instrument memory. Re-installation of these programs requires a license key that can be found in the documentation. It can also be found in the **System**, **Options** information screen. Please make a note of this number as it will be needed later to re-install the application.

Front Panel
Access: **System, Uninstall**

16 MMEMory Subsystem

October 24, 2000 12:27 pm

MMEMory Subsystem

The purpose of the MMEMory subsystem is to provide access to mass storage devices such as internal or external disk drives. Any part of memory that is treated as a device will be in the MMEMory subsystem.

If mass storage is not specified in the filename, the default mass storage specified in the MSIS command will be used.

Memory Available or In-Use

:MMEMory:FREE?

Queries the memory for optional application modes, like option BAH (GSM mode) or option BAE (NADC/PDC mode). The query returns two values, the memory currently in use and the free memory. The sum of the two values is the total instrument memory.

History: Revision A.03.00 or later

Front Panel Access: **System, File System**

Select a Memory Device

:MMEMory:MSIS A|[C]

:MMEMory:MSIS?

Selects a default mass storage device which is used by all MMEMory commands.

The query returns the default mass storage device.

A is the 3.5 inch floppy disk

C is the internal memory

Example: MMEM:MSIS C

History: Added in version A.04.00 and later

Front Panel Access: **Print Setup, Print To File, File Location**

Store a Screen Image in a Graphic File

:MMEMory:STORe:SCReen[:IMMediate] <filename>

The :MMEMory:STORe:SCReen[:IMMediate] command will write the

MMEMory Subsystem

screen image to a file regardless of what the front panel **Print Setup, Print To** key function is set to. Screen files are always saved in color with an orientation of portrait.

The <filename> variable is composed of:
[<device>:]<name>[.<extension>] where:

<filename> is a string that must be enclosed in single (') or double (") quotes.

<device> must be A or C. Upper or lower case is acceptable. If device is not specifed the default is set by MMEM:MSIS.

<name> must be 1 to 8 characters in length and consist only of the characters a..z, A..Z and 0..9 (no underscore). If a name is not specified the default is screen1.

<.extension> must be .gif|.bmp|.wmf. (Note the lower case.) If a file type extension is not specified the default is set by MMEM:STORE:SCREEN:FILE:TYPE

Example: MMEM:STOR:SCR “C:myscreen.gif”

Remarks: When writing to A, <name> can be any valid DOS-compatible name.

When writing to C, <name> must be screen1 . . . screen6. (Note the lower case.)

If you write a file to C any existing screen file with the same name will be replaced, regardless of the extensions. For example, file screen3.gif will replace file screen3.bmp

History: VSA - Added in version A.04.00 and later

Front Panel Access: **Print Setup, Print To File**

Print

Screen File Type

:MMEMory:STORe:SCReen:FILE[:TYPE] GIF|BMP|WMF

Sets the default file type for the :MMEMory:STORe:SCReen command.

Factory Preset and *RST: GIF. The file type setting is persistant. It stays at the last user-selected setting even through a power cycle.

Default: GIF

History: Added in version A.04.00 and later

Front Panel
Access: **Print Setup, Print To File, File Type**

Screen Image Background

:MMEMory:STORe:SCReen:IMAGe NORMal|INVert

:MMEMory:STORe:SCReen:IMAGe?

Selects the background color of trace data windows when writing to a file.

NORMal background is black.

INVert background is white.

Factory Preset
and *RST: The image setting is persistant. It stays at the last user-selected setting even through a power cycle.

Default: Invert

History: Added in version A.04.00 and later

Front Panel
Access: **Print Setup, Print To File, Image**

17 READ Subsystem

October 23, 2000 10:47 am

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 144.

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 144.

18 SENSe Subsystem

October 24, 2000 12:28 pm

SENSe Subsystem

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 144. 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 platform 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.

SENSe Subsystem

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

Front Panel Access: **Meas Setup, Avg Mode**

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[m] <freq>

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

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

BANDwidth[n]|BWIDth[n]:

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

INTegration[n]:

cdmaOne mode m=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—Root Raised Cosine Filter Alpha

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

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

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

Factory Preset and *RST: 0.22

Range: 0.01 to 0.5

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

Adjacent Channel Power—Root Raised Cosine Filter Control

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

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

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

Factory Preset and *RST: On

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

Adjacent Channel Power—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—Frequency Span Query

[:SENSe]:ACP:FREQuency:SPAN?

Returns the span of the spectrum view.

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

MEAS|READ|FETC:ACP4? returns the frequency-domain spectrum trace data for the entire frequency range being measured..

History: Revision A.05.00 or later

Adjacent Channel Power—Offset Frequency Absolute Limit

[:SENSe]:ACP:LIST:ALIMit <abs_powr>,<abs_powr>,<abs_powr>,<abs_powr>,<abs_powr>

[:SENSe]:ACP:LIST:ALIMit?

Set the absolute limit on offset frequencies relative to the carrier. You can turn off (not use) specific offsets with the [:SENSe]:ACP:LIST:STATe command.

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
NADC	0 dBm	0 dBm	–13 dBm	0 dBm	0 dBm
PDC	0 dBm	0 dBm	0 dBm	0 dBm	0 dBm

Range: –200 to 50 dBm

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

Adjacent Channel Power—Offset Frequency

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

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

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

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
NADC	30 kHz	60 kHz	90 kHz	120 kHz	0 Hz
PDC	50 kHz	100 kHz	0 kHz	0 kHz	0 kHz

Range: 10 Hz to 45 MHz

0 to 200 kHz

Default Unit: Hz

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

Adjacent Channel Power—Offset Frequency Power Mode

[:SENSe]:ACP:LIST:POWer INTeg|PEAK,INTeg|PEAK,INTeg|PEAK,INTeg|PEAK,INTeg|PEAK

[:SENSe]:ACP:LIST:POWer?

Define the power measurement mode for each of the offset frequencies. You can turn off (not use) specific offsets with the SENS:ACP:LIST:STATe command.

Factory Preset and *RST: INTeg, INTeg, INTeg, INTeg, INTeg

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

Adjacent Channel Power—Offset Frequency Relative Limit

[:SENSe]:ACP:LIST:RLIMit <rel_powr>,<rel_powr>,<rel_powr>,<rel_powr>,<rel_powr>

[:SENSe]:ACP:LIST:RLIMit?

Set the relative limit on offset frequencies. You can turn off (not use)

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specific offsets with the SENS:ACP:LIST:STATe command.

Factory Preset
and *RST: –45 dB

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
NADC	–26 dB	–45 dB	–45 dB	0 dB	0 dB
PDC	–45 dB	–60 dB	0 dB	0 dB	0 dB

Range: –200 to 50 dB

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

Adjacent Channel Power—Offset Frequency Control

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

[:SENSe]:ACP:LIST:STATe?

Turn measurement on or off for the custom offset frequencies.

Factory Preset
and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
NADC	ON	ON	ON	OFF	OFF
PDC	ON	ON	OFF	OFF	OFF

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

Adjacent Channel Power—Offset Frequency Test Mode

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

[:SENSe]:ACP:LIST:TEST?

Define the type of testing to be done for the five custom offset frequencies. You can turn off (not use) specific offsets with the SENS:ACP:LIST:STATe command.

Factory Preset

and *RST:	RELative, RELative, OR, AND, AND for NADC, PDC mode
Remarks:	You must be in the NADC, cdmaOne, or PDC mode to use this command. Use INSTrument:SELect to set the mode.

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[m]:ABSolute <power>,<power>,<power>,<power>,<power>

[:SENSe]:ACP:OFFSet[n]:LIST[m]: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[m]: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[m]	
cdmaOne mode	m=1 is cellular bands and 2 is pcs bands. The default is cellular.
W-CDMA (Trial	

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& Arib) mode m=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

[: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

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[: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
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

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

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

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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.

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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: 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

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>

[: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

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Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
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

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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

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[: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.

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- Relative - Test the power relative to the carrier. If it fails, then return a failure for the measurement at this offset.
- OFF - Turns the power test off.

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 Mode Resolution Bandwidth

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

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

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

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

Adjacent Channel Power—Sweep Mode Resolution BW Control

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

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

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

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

Adjacent Channel Power—Sweep Mode Detection

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

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

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

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

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

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

Adjacent Channel Power—Sweep Time

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

[:SENSe]:ACP:SWEep:TIME?

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

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

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

Factory Preset and *RST:	625 µs (1 slot) for W-CDMA (3GPP), W-CDMA (Trial & Arib)
	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—Sweep Type

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

[:SENSe]:ACP:SWEep:TYPE?

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

FFT - makes fast ACP measurements

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

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

Adjacent Channel Power—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).

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

Factory Preset and *RST:	IMMediate for BS

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RFBurst 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.

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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 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Code Domain** measurement has been selected from the **MEASURE** key menu.

Code Domain—Demod Alpha

[:SENSe]:CDPower:ALPHa <number>

[:SENSe]:CDPower:ALPHa?

Set alpha for the root nyquist filter.

Factory Preset
and *RST: 0.22

Range: 0.01 to 0.5

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

Code Domain—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—Data Capture Time

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

[:SENSe]:CDPower:CAPTure:TIME?

Set the length of data capture in Power Control Groups (PGC; 1 PCG =

1.25 ms) for cdma2000 or frames (1 frame = 10 ms) for W-CDMA (3GPP) that will be used in the acquisition.

Factory Preset and *RST:	32 for cdma2000
	2 for W-CDMA (3GPP)
Range:	2 to 32 PCGs (2.5 to 40 ms) for cdma2000
	1 to 2 frames (10 to 20 ms) for W-CDMA (3GPP)
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Chip Rate

[:SENSe]:CDPower:CRATe <freq>

[:SENSe]:CDPower:CRATe?

Set chip rate.

Factory Preset and *RST:	1.2288 MHz for cdma2000
	3.84 MHz for W-CDMA (3GPP)
	4.096 MHz for W-CDMA (Trial & Arib)
Range:	1.1059 to 1.3517 MHz for cdma2000
	3.456 to 4.224 MHz for W-CDMA (3GPP)
	3.6864 to 4.5056 MHz for W-CDMA (Trial & Arib)
Remarks:	You must be in the cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Method

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

[:SENSe]:CDPower:METHod?

Select the measurement method.

- Fast Power (FPOWer)- 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 (TPHase)- Measures the code domain power, code

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domain timing, and code domain phase of all 64 Walsh channels.

Factory Preset and *RST:	FPOWer
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.

Code Domain—Sync Type

[:SENSe]:CDPower:SYNC CPICh|SCH

[:SENSe]:CDPower:SYNC?

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

CPICH - synchronize to common pilot channel.

SCH - synchronize to SCH.

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and *RST: CPICH

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

Code Domain—Long Code Mask

[:SENSe]:CDPower:SYNC:LCMask <integer>

[:SENSe]:CDPower:SYNC:LCMask?

Set the long code mask for MS measurement.

Factory Preset
and *RST: 2,199,023,255,552 (20,000,000,000h)

Range: 0 to 4,398,046,511,103 (0h to 3F,FFF,FFF,FFFh)

Remarks: You must be in the cdma2000 mode to use this command. Use INSTrument:SELect to set the mode.

Code Domain—Scramble Code

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

[:SENSe]:CDPower:SYNC:SCRamble?

Set the scramble code for synchronization.

Factory Preset
and *RST: 1

Range: 0 to 262143 (0h to 3FFFFh) (0 is for no-scramble)

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

Code Domain—Scramble Code Down Link

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

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

Set the BTS primary scramble code for synchronization.

Factory Preset
and *RST: 0

Range: 0 to 511

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

Code Domain—Scramble Code Offset

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

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

Set the BTS scramble code offset for synchronization.

Factory Preset and *RST: 0

Range: 0 to 15 (0 for the primary scramble code; 1 to 15 for the secondary scramble code)

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

Code Domain—Sync Scramble Code Type Down Link

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

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

Set the BTS primary scramble code type for synchronization.

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

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

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

Factory Preset and *RST: STANdard

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

Code Domain—Scramble Code Up Link

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

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

Set the MS scramble code for synchronization.

Factory Preset and *RST: 0

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

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

Code Domain—Trigger Source

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

[:SENSe]:CDPower:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

EXTernal 1 – front panel external trigger input

EXTernal 2 – rear panel external trigger input

FRAMe – internal frame trigger from front panel input

IF – internal IF envelope trigger

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

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

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

Channel Commands

Select the ARFCN—Absolute RF Channel Number

[:SENSe]:CHANnel:ARFCn|RFCHannel <integer>

[:SENSe]:CHANnel:ARFCn|RFCHannel?

Set the analyzer to a frequency that corresponds to the ARFCN (Absolute RF Channel Number).

Factory Preset and *RST:	38
Range:	0 to 124, and 975 to 1023 for E-GSM
	1 to 124 for P-GSM
	0 to 124, and 955 to 1023 for R-GSM
	512 to 885 for DCS1800
	512 to 810 for PCS1900
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Global to the current mode.
History:	Version A.03.00 or later
Front Panel Access:	**FREQUENCY Channel, ARFCN**

Select the Lowest ARFCN

[:SENSe]:CHANnel:ARFCn|RFCHannel:BOTTom

Set the analyzer to the frequency of the lowest ARFCN (Absolute RF Channel Number) of the selected radio band.

Factory Preset and *RST:	975 for E-GSM
	1 for P-GSM
	955 for R-GSM
	512 for DCS1800
	512 PCS1900
	259 GSM450
	306 GSM480
	128 GSM850

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Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Global to the current mode.

History: Version A.03.00 or later

Front Panel Access: **FREQUENCY Channel, BMT Freq**

Select the Middle ARFCN

[:SENSe]:CHANnel:ARFCn|RFCHannel:MIDDle

Set the analyzer to the frequency of the middle ARFCN (Absolute RF Channel Number) of the selected radio band.

Factory Preset and *RST: 38 for E-GSM

63 for P-GSM

28 for R-GSM

699 for DCS1800

661 for PCS1900

276 for GSM450

323 for GSM480

189 for GSM850

Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Global to the current mode.

History: Version A.03.00 or later

Front Panel Access: **FREQUENCY Channel, BMT Freq**

Select the Highest ARFCN

[:SENSe]:CHANnel:ARFCn|RFCHannel:TOP

Set the analyzer to the frequency of the highest ARFCN (Absolute RF Channel Number) of the selected radio band.

Factory Preset and *RST: 124 for E-GSM

	124 for P-GSM
	124 for R-GSM
	885 for DCS1800
	810 for PCS1900
	293 for GSM450
	340 for GSM480
	251 for GSM850
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Global to the current mode.
History:	Version A.03.00 or later
Front Panel Access:	**FREQUENCY Channel, BMT Freq**

Burst Type

[:SENSe]:CHANnel:BURSt TCH|CCH

[:SENSe]:CHANnel:BURSt?

Set the burst type for mobile station testing.

Traffic Channel (TCH) – burst for traffic channel

Control Channel (CCH) – burst for control channel

Factory Preset and *RST:	TCH
Remarks:	The command is only applicable for mobile station testing, device = MS.
	You must be in the NADC or PDC mode to use this command. Use INSTrument:SELect to set the mode.

Channel Burst Type

[:SENSe]:CHANnel:BURSt NORMal|SYNC|ACCess

[:SENSe]:CHANnel:BURSt?

Set the burst type that the analyzer will search for and to which it will sync. This only applies with normal burst selected.

NORMal: Traffic Channel (TCH) and Control Channel (CCH)

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SYNC: Synchronization Channel (SCH)

ACCess: Random Access Channel (RACH)

Remarks: Global to the current mode.

You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Front Panel Access: **FREQUENCY Channel, Burst Type**

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

Time Slot number

[:SENSe]:CHANnel:SLOT <integer>

[:SENSe]:CHANnel:SLOT?

Select the slot number that you want to measure.

In GSM mode the measurement frame is divided into the eight expected measurement timeslots.

Factory Preset and *RST: 0 for GSM, PDC mode

1 for NADC mode

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Range:	0 to 5 for PDC mode
	1 to 6 for NADC mode
	0 to 7 for GSM mode
Remarks:	You must be in EDGE(w/GSM), GSM, NADC, PDC mode to use this command. Use INSTrument:SELect to set the mode.
Front Panel Access:	**Mode Setup, Radio, Frequency Hopping Repetition Factor**

Time Slot Auto

[:SENSe]:CHANnel:SLOT:AUTO OFF|ON|0|1

[:SENSe]:CHANnel:SLOT:AUTO?

Select auto or manual control for slot searching. The feature is only supported in external and frame trigger source modes. In external trigger mode when timeslot is set on, the demodulation measurement is made on the nth timeslot specified by the external trigger point + n timeslots, where n is the selected timeslot value 0 to 7. In frame trigger mode when timeslot is set on, then demodulation measurement is only made on the nth timeslot specified by bit 0 of frame reference burst + n timeslots, where n is the selected timeslot value 0 to 7 and where the frame reference burst is specified by Ref Burst and Ref TSC (Std) combination.

Factory Preset and *RST:	ON, for NADC, PDC mode
	OFF, for GSM mode
Remarks:	The command is only applicable for mobile station testing, device = MS.
	You must be in EDGE(w/GSM), GSM, NADC, PDC mode to use this command.Use INSTrument:SELect to set the mode.
History:	Added GSM mode, version A.03.00 or later

Training Sequence Code (TSC)

[:SENSe]:CHANnel:TSCode <integer>

[:SENSe]:CHANnel:TSCode?

Set the training sequence code to search for, with normal burst selected and TSC auto set to off.

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Factory Preset and *RST: 0

Range: 0 to 7

Remarks: Global to the current mode.

You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

History: Version A.03.00 or later

Front Panel Access: **FREQUENCY Channel, TSC (Std)**

Training Sequence Code (TSC) Auto

[:SENSe]:CHANnel:TSCode:AUTO OFF|ON|0|1

[:SENSe]:CHANnel:TSCode:AUTO?

Select auto or manual control for training sequence code (TSC) search. With auto on, the measurement is made on the first burst found to have one of the valid TSCs in the range 0 to 7 (i.e. normal bursts only). With auto off, the measurement is made on the 1st burst found to have the selected TSC.

Factory Preset and *RST: AUTO

Remarks: Global to the current mode.

You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Front Panel Access: **FREQUENCY Channel, TSC (Std)**

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 144. 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
	200, for W-CDMA
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.

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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.

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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
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.

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Signal Corrections Commands

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 BTS RF Port External Attenuation

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

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

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

Factory Preset and *RST:	0.0 dB
Range:	0.0 to 100.0 dB for GSM
	–50.0 to 50.0 dB for cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib)
Default Unit:	dB
Remarks:	Global to the current mode.
	You must be in the EDGE(w/GSM), GSM, cdma2000,W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

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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/GSM), 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 144. 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**

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EDGE Error Vector Magnitude Measurement

Commands for querying the EDGE error vector magnitude measurement results and for setting to the default values are found in the “MEASure Group of Commands” on page 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **EVM** measurement has been selected from the **MEASURE** key menu.

History: EEVM measurement added version A.04.00 and later.

EDGE Error Vector Magnitude—Averaging State

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

[:SENSe]:EEVM:AVERage[:STATe]?

Turn average on or off.

Factory Preset and *RST: ON

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

History: Added version A.04.00 and later

EDGE Error Vector Magnitude—Averaging Termination Control

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

[:SENSe]:EEVM:AVERage:TCONtrol?

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

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

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

Factory Preset and *RST: EXPonential

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

History: Added version A.04.00 and later

EDGE Error Vector Magnitude—Burst Synchronization Source

[:SENSe]:EEVM:BSYNc:SOURce RFBurst|TSEQuence|NONE

[:SENSe]:EEVM:BSYNc:SOURce?

Select the method of synchronizing the measurement to the bursts.

RFBurst – The burst synchronization approximates the start and stop of the useful part of the burst without demodulation of the burst. This type of synchronization has a frequency lock range of up to 9 kHz and allows you to demodulate RF bursts that do not have a training sequence.

Training Sequence (TSEQuence) – The burst synchronization performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sync sequence. This type of synchronization provides better noise immunity but has a smaller frequency lock range (~200 Hz).

None – The measurement is performed without searching burst.

Factory Preset and *RST:	TSEQuence
Remarks:	You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Added version A.04.00 and later

EDGE Error Vector Magnitude—Filter

[:SENSe]:EEVM:TRACe:FILTer FLAT|LINear

[:SENSe]:EEVM:TRACe:FILTer?

Select the filter shape for the measurement trace.

Factory Preset and *RST:	FLAT??
Remarks:	You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Added version A.04.00 and later

EDGE Error Vector Magnitude—Points/Symbol

[:SENSe]:EEVM:TRACe:SDOTs <integer>

[:SENSe]:EEVM:TRACe:SDOTs?

Selects the number of dots that will be displayed for each symbol.

Factory Preset

and *RST: 5

Range: 1 to 5

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

History: Added version A.04.00 and later

EDGE Error Vector Magnitude—Trigger Source

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

[:SENSe]:EEVM:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

EXTernal 1 – front panel external trigger input

EXTernal 2 – rear panel external trigger input

IF – internal IF envelope (video) trigger

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

FRAMe – internal frame trigger from front panel input

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

Factory Preset and *RST: IMMediate for BS

RFBurst for MS

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

History: Added version A.04.00 and later

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EDGE Output RF Spectrum Measurement

Commands for querying the EDGE output RF spectrum measurement results and for setting to the default values are found in the “MEASure Group of Commands” on page 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **EDGE Output RF Spectrum** measurement has been selected from the **MEASURE** key menu.

History: EORF measurement added version A.04.00 and later.

EDGE Output RF Spectrum—Number of Bursts Averaged

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

[:SENSe]:EORFspectr:AVERage:COUNt?

Set the number of bursts that will be averaged. For the output RF spectrum due to switching transients, it is more accurate to consider this the number of frames that are measured. After the specified number of bursts (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 EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Fast Averaging

[:SENSe]:EORFspectr:AVERage:FAST[:STATe] OFF|ON|0|1

[:SENSe]:EORFspectr:AVERage:FAST[:STATe]?

Make the measurement faster by using an averaging technique different from that defined by the standard. A valid average can be obtained by measuring the power in half the normal number of bursts by using 50% - 90% of the burst, 10% - 50% of the burst and excluding the midamble.

This faster averaging is only done when averaging is on and only the modulation results are being measured. If both modulation and switching transients results are being measured, then the measurement uses the default averaging.

Factory Preset and *RST: ON

Remarks: You must be in the EDGE(w/GSM) mode to use this

command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Averaging Type for Modulation Spectrum

[:SENSe]:EORFspectr:AVERage:MODulation:TYPE LOG|RMS

[:SENSe]:EORFspectr:AVERage:MODulation:TYPE?

Select the type of averaging for measuring the modulation spectrum. 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.

LOG - The log of the power is averaged. (This is also known as video averaging.)

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

Factory Preset and *RST: LOG

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Averaging Control

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

[:SENSe]:EORFspectr:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST: ON

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Averaging Type for Switching Transient Spectrum

[:SENSe]:EORFspectr:AVERage:SWITching:TYPE LOG|RMS

[:SENSe]:EORFspectr:AVERage:SWITching:TYPE?

Select the type of averaging for measuring the switching transient spectrum. 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.

LOG - The log of the power is averaged. (This is also known as video

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averaging.)

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

Factory Preset and *RST: LOG

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Resolution BW for the Modulation Spectrum at the Carrier

[:SENSe]:EORFspectr:BANDwidth|BWIDth[:RESolution]:MODulation:CARRier <freq>

[:SENSe]:EORFspectr:BANDwidth|BWIDth[:RESolution]:MODulation:CARRier?

Selects the resolution bandwidth for measuring the carrier when measuring spectrum due to modulation and wideband noise.

This parameter is only used with the Standard or Short lists, and not with the Custom list.

Factory Preset and *RST: 30 kHz

Range: 1 kHz to 5 MHz

Default Unit: Hz

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Resolution BW For Modulation At Close Offsets

[:SENSe]:EORFspectr:BANDwidth|BWIDth[:RESolution]:MODulation:OFFSet:CLOSe <freq>

[:SENSe]:EORFspectr:BANDwidth|BWIDth[:RESolution]:MODulation:OFFSet:CLOSe?

Set the resolution bandwidth used for the spectrum due to modulation part of the EORF measurement for offset frequencies less than 1800 kHz.

This parameter is only used with the Standard or Short lists, and not with the Custom list.

Factory Preset and *RST: 30 kHz

Range:	1 kHz to 5 MHz
Default Unit:	Hz
Remarks:	You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Resolution BW for Modulation at Far Offsets

[:SENSe]:EORFspectr:BANDwidth|BWIDth[:RESolution]:MODulation:OFFSet:FAR <freq>

[:SENSe]:EORFspectr:BANDwidth|BWIDth[:RESolution]:MODulation:OFFSet:FAR?

Set the resolution bandwidth used for the spectrum due to modulation part of the EORF measurement for offset frequencies greater than or equal to 1800 kHz.

This parameter is only used with the Standard or Short lists, and not with the Custom list.

Factory Preset and *RST:	100 kHz
Range:	1 kHz to 5 MHz
Default Unit:	Hz
Remarks:	You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Resolution BW for the Switching Transient Spectrum at the Carrier

[:SENSe]:EORFspectr:BANDwidth|BWIDth[:RESolution]:SWITching:CARRier <freq>

[:SENSe]:EORFspectr:BANDwidth|BWIDth[:RESolution]:SWITching:CARRier?

Selects the resolution bandwidth for the carrier when measuring spectrum due to switching transients.

This parameter is only used with the Standard or Short lists, and not with the Custom list.

Factory Preset and *RST:	300 kHz
Range:	1 kHz to 5 MHz
Default Unit:	Hz

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Remarks:	You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Resolution BW For Switching Transients At Close Offsets

[:SENSe]:EORFspectr:BANDwidth|BWIDth[:RESolution]:SWITching:OFFSet:CLOSe <freq>

[:SENSe]:EORFspectr:BANDwidth|BWIDth[:RESolution]:SWITching:OFFSet:CLOSe?

Set the resolution bandwidth used for the spectrum due to switching transients part of the EORF measurement for offset frequencies less than 1800 kHz.

This parameter is only used with the Standard or Short lists, and not with the Custom list.

Factory Preset and *RST:	30 kHz
Range:	1 kHz to 5 MHz
Default Unit:	Hz
Remarks:	You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Resolution BW For Switching Transients At Far Offsets

[:SENSe]:EORFspectr:BANDwidth|BWIDth[:RESolution]:SWITching:OFFSet:FAR <freq>

[:SENSe]:EORFspectr:BANDwidth|BWIDth[:RESolution]:SWITching:OFFSet:FAR?

Set the resolution bandwidth used for the spectrum due to switching transients part of the EORF measurement for offset frequencies greater than or equal to 1800 kHz.

This parameter is only used with the standard or short lists, and not with the custom list.

Factory Preset and *RST:	30 kHz
	100 kHz
Range:	1 kHz to 5 MHz
Default Unit:	Hz

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Break Frequency

[:SENSe]:EORFspectr:BFRequency <freq>

[:SENSe]:EORFspectr:BFRequency?

Set the direct time break frequency. An FFT measurement method is used for offsets below this break frequency. The direct time measurement method is used for offsets above the break frequency. See the Measurement Guide for more information about these two methods.

Factory Preset and *RST: 600 kHz

Range: 0 kHz to 775 kHz

Default Unit: Hz

History: Added revision A.04.00 and later

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

Front Panel Access: **Meas Setup, Advanced, Direct Time Break Freq**

EDGE Output RF Spectrum—Define Custom Modulation Resolution Bandwidth List

[:SENSe]:EORFspectr:LIST:MODulation:BANDwidth|BWIDth <res bw>{,<res bw>}

[:SENSe]:EORFspectr:LIST:MODulation:BANDwidth|BWIDth?

Define the custom set of resolution bandwidths for the modulation spectrum part of the EORF measurement. The first bandwidth specified is for the carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists needs to be the same.

Factory Preset and *RST: Same as standard list

Range: 1 kHz to 5 MHz

Default Unit: Hz

Remarks: This command is only valid if SENS:EORF:MEAS is set to multiple and the custom list type is selected with SENS:EORF:LIST:SEL CUST.

SENSe Subsystem

You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Define Custom Modulation Offset Frequency List

[:SENSe]:EORFspectr:LIST:MODulation[:FREQuency] <offset freq>{,<offset freq>}

[:SENSe]:EORFspectr:LIST:MODulation[:FREQuency]?

Define the custom set of offset frequencies at which the modulation spectrum part of the EORF measurement will be made. The first offset specified must be 0 Hz for the carrier. For each offset frequency specified, the power will be measured at both the lower and upper offsets. Up to 14 (+ the 0 Hz carrier frequency) offset frequencies may be defined.

Factory Preset and *RST: Same as standard list

Range: 10 kHz to 10 MHz

Default Unit: Hz

Remarks: This command is only valid if SENS:EORF:MEAS is set to multiple and the custom list type is selected with SENS:EORF:LIST:SEL CUST.

You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Define Custom Modulation Level Offsets

[:SENSe]:EORFspectr:LIST:MODulation:LOFFset <level>{,<level>}

[:SENSe]:EORFspectr:LIST:MODulation:LOFFset?

Define the custom set of level offsets for the modulation spectrum part of the EORF measurement. This allows you to modify the standard limits by adding a delta amplitude value to them. The first level offset specified must be 0 dB for the carrier. Each level offset in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists needs to be the same.

Example: `EORF:LIST:MOD:FREQ 0,300e3,1.3e6,2.0e6`

Sets custom offset freqs: 300 kHz, 1.3 MHz, 2 MHz

`EORF:LIST:MOD:BAND 30e3,30e3,30e3,100e3`

Sets corresponding RBWs: 30 kHz, 30 kHz, 100 kHz

`EORF:LIST:MOD:loffset 0,-5,3,5`

Assume the power level of the signal is -43 dBm, then the standard limits for these three offsets are: -42 dBc, -72 dBc, -75 dBc respectively. The loffset command adjusts these limits to: -47 (-42-5) dBc, -70 (-73+3) dBc, -70 (-75+5) dBc.

Factory Preset and *RST: 0 dB level offsets (limits remain the same as the standards)

Range: 0 to 50 dB

Default Unit: dB

Remarks: This command is only valid if SENS:EORF:MEAS is set to multiple and the custom list type is selected with SENS:EORF:LIST:SEL CUST.

You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

History: Version A.04.00 and later

EDGE Output RF Spectrum—Offset Frequency List

[:SENSe]:EORFspectr:LIST:SELect CUSTom|SHORt|STANdard

[:SENSe]:EORFspectr:LIST:SELect?

Select the list of settings that will be used to make the EORF measurement. This specifies standard or customized lists and short lists. The lists contain the offset frequencies (and bandwidths) that are used for the modulation spectrum and transient spectrum parts of the EORF measurement.

CUSTom - uses the four user-defined lists that specify:

— Offset frequencies for modulation spectrum measurement
— Corresponding resolution bandwidths for each of the modulation offset frequencies
— Offset frequencies for switching transient spectrum measurement
— Corresponding resolution bandwidths for each of the switching transient offset frequencies

SHORt - a shortened list of the offset frequencies specified in the EDGE Standards. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the SENSe:EORFpectr subsystem.

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STANdard - the complete list of the offset frequencies specified in the EDGE Standards, except for those offsets greater than 6 MHz. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the SENSe:EORFpectr subsystem.

Factory Preset and *RST: SHORt

Remarks: This command is only valid if SENS:EORF:MEAS is set to multiple.

If you change the number of custom offsets then the number of offset bandwidths, frequencies and level offsets must also be changed.

You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Define Custom Switching Transient Resolution Bandwidth List

[:SENSe]:EORFspectr:LIST:SWITching:BANDwidth|BWIDth <res bw>{,<res bw>}

[:SENSe]:EORFspectr:LIST:SWITching:BANDwidth|BWIDth?

Define the custom set of resolution bandwidths for the switching transient spectrum part of the EORF measurement. The first bandwidth specified is for the carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the switching transient offset frequency list. The number of items in each of these lists needs to be the same.

Factory Preset and *RST: Same as standard list

Range: 1 kHz to 5 MHz

Default Unit: Hz

Remarks: This command is only valid if SENS:EORF:MEAS is set to multiple and the custom list type is selected with SENS:EORF:LIST:SEL CUST.

You must be in EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Define Custom Switching Transient Offset Frequency List

[:SENSe]:EORFspectr:LIST:SWITching[:FREQuency] <offset freq>{,<offset freq>}

[:SENSe]:EORFspectr:LIST:SWITching[:FREQuency]?

Define the custom set of offset frequencies at which the switching transient spectrum part of the EORF measurement will be made. The first offset specified must be 0 Hz, for the carrier. For each offset frequency specified, the power will be measured at both the lower and upper offsets. Up to 14 (+ the 0 Hz carrier frequency) offset frequencies may be defined.

Factory Preset and *RST:	Same as standard list
Range:	10 kHz to 10 MHz
Default Unit:	Hz
Remarks:	This command is only valid if SENS:EORF:MEAS is set to multiple and the custom list type is selected with SENS:EORF:LIST:SEL CUST. You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Define Custom Switching Transient Level Offsets

[:SENSe]:EORFspectr:LIST:SWITching:LOFFset <level>{,<level>}

[:SENSe]:EORFspectr:LIST:SWITching:LOFFset?

Define the custom set of level offsets for the switching transient spectrum part of the EORF measurement. This allows you to modify the standard limits by adding a delta amplitude value to them. The first level offset specified must be 0 dB for the carrier. Each level offset in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists needs to be the same.

Example:	See the EORF:LIST:MOD:LOFF example above.
Factory Preset and *RST:	0 dB level offsets (limits remain the same as the standards)
Range:	0 to 50 dB
Default Unit:	dB

Remarks:	This command is only valid if SENS:EORF:MEAS is set to multiple and the custom list type is selected with SENS:EORF:LIST:SEL CUST. You must be in EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.04.00 and later

EDGE Output RF Spectrum—Measure Offsets Measurement Method

[:SENSe]:EORFspectr:MEASure MULTiple|SINGle

[:SENSe]:EORFspectr:MEASure?

Select the measurement method to be used.

MULTiple - the measurement is done at all offsets in the offset frequency list.

SINGle - the measurement is done at only one offset as determined by the offset frequency setting. This allows detailed examination of the time-domain waveform at the specified offset frequency.

Factory Preset and *RST:	MULTiple
Remarks:	You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Offset Frequency

[:SENSe]:EORFspectr:OFRequency <freq>

[:SENSe]:EORFspectr:OFRequency?

Set the offset frequency that is used to measure a single offset. This command is only valid if SENS:EORF:MEAS is set to single.

Factory Preset and *RST:	250 kHz
Range:	–12.0 MHz to +12.0 MHz, step size: steps through the values in the selected offset frequency list.
Default Unit:	Hz
Remarks:	You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Trigger Source

[:SENSe]:EORFspectr:TRIGger:SOURce

SENSe Subsystem

EXTernal[1]|EXTernal2|FRAMe|IMMediate|RFBurst

[:SENSe]:EORFspectr: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 - uses the internal frame timer, which has been synchronized to the selected burst sync

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

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

Factory Preset and *RST: RFburst

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Output RF Spectrum—Measurement Type

[:SENSe]:EORFspectr:TYPE MODulation|MSWitching|SWITching

[:SENSe]:EORFspectr:TYPE?

Select the measurement type.

MODulation - only the modulation spectrum is measured.

Modulation & Switching (MSWitching) - both modulation and switching transient spectrums are measured.

SWITching - only the switching transient spectrum is measured.

Factory Preset and *RST: MODulation

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Power vs. Time (Burst Power) Measurement

Commands for querying the power versus time measurement results and for setting to the default values are found in the “MEASure Group of Commands” on page 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **EDGE PvT** measurement has been selected from the **MEASURE** key menu.

History: EPVT measurement added version A.04.00 and later.

EDGE Power vs. Time—Number of Bursts Averaged

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

[:SENSe]:EPVTime:AVERage:COUNt?

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

Factory Preset and *RST: 10

Range: 1 to 10,000

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Power vs. Time—Averaging State

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

[:SENSe]:EPVTime:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST: OFF

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Power vs. Time—Averaging Mode

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

[:SENSe]:EPVTime:AVERage:TCONtrol?

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

SENSe Subsystem

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: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Power vs. Time—Averaging Type

[:SENSe]:EPVTime:AVERage:TYPE LOG|MAXimum|MINimum|MXMinimum|RMS

[:SENSe]:EPVTime:AVERage:TYPE?

Select the type of averaging to be performed.

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.

MXMinimum - Both the maximum and the minimum values are retained.

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

Factory Preset and *RST: RMS

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Power vs. Time—Resolution BW

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

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

Set the resolution BW. 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.

Factory Preset and *RST: 500 kHz

Range: 1 kHz to 5 MHz

Default Unit: Hz

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Power vs. Time—RBW Filter Type

[:SENSe]:EPVTime:BANDwidth|BWIDth[:RESolution]:TYPE FLATtop|GAUSsian

[:SENSe]:EPVTime:BANDwidth|BWIDth[:RESolution]:TYPE?

Select the type of resolution BW filter. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default, may cause invalid measurement results.

FLATtop - a filter with a flat amplitude response, which provides the best amplitude accuracy.

GAUSsian - a filter with Gaussian characteristics, which provides the best pulse response.

Factory Preset and *RST: GAUSsian

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Power vs. Time—Burst Synchronization Source

[:SENSe]:EPVTime:BSYNc:SOURce RFBurst|TSEQuence

[:SENSe]:EPVTime:BSYNc:SOURce?

Select the method of synchronizing the measurement to the EDGE bursts.

RFBurst - the RF burst sync approximates the start and stop of the useful part of the burst without digital demodulation of the burst.

TSEQuence - the training sequence burst sync performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sequence.

Factory Preset and *RST: TSEQuence

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

Power vs. Time—Limit Line Mask Display

[:SENSe]:EPVTime:LIMit:MASK OFF|ON|0|1

[:SENSe]:EPVTime:LIMit:MASK?

Show or hide the limit mask. Does not affect limit pass/fail calculation.

Factory Preset and *RST: ON

Range: ON/OFF

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

EDGE Power vs. Time—Lower Mask Absolute Amplitude Levels

[:SENSe]:EPVTime:MASK:LIST:LOWer:ABSolute <power>{,<power>}

[:SENSe]:EPVTime:MASK:LIST:LOWer:ABSolute?

Enter the absolute power level for any of your mask line segments that require absolute limits in addition to their relative limits. Normally, your defined relative mask values are used as the limits for testing. If the power of the reference level is decreased, all of these relative mask power levels will decrease by the same amount until they reach a defined minimum absolute power. That minimum absolute power will be used as the test limit. For each segment, that power will either be the default value, or the value you set using this command.

Any portion of the signal that has no limit line segment defined for it, will default its to a very low limit (–200 dBm). Because of this, all data in that undefined area will pass the test.

Factory Preset and *RST: Selected EDGE standard

Range: –200 dBm to +100 dBm

Default Unit: dBm

Remarks: You need power values for each of the defined time points. You must put a comma in the SCPI command as a place holder for any points where an absolute power is not specified.

You must be in EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Power vs. Time—Lower Mask Points

[:SENSe]:EPVTime:MASK:LIST:LOWer:POINts?

SENSe Subsystem

Query the number of elements in the lower mask. This value is determined by the number of time points entered using `[:SENSe]:EPVTime:MASK:LIST:LOWer:TIME`.

Range:	integer, 1 to 25
Remarks:	You must be in EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Power vs. Time—Lower Mask Relative Amplitude Levels

[:SENSe]:EPVTime:MASK:LIST:LOWer:RELative <rel_power>{,<rel_power>}

[:SENSe]:EPVTime:MASK:LIST:LOWer:RELative?

Enter the relative power level for each of the horizontal line segments in the lower limit mask. There should be a power level for each time point entered using the `[:SENSe]:EPVTime:MASK:LIST:LOWer:TIME` command. These power levels are all relative to the defined Reference Power Level (the average power in the useful part of the data).

Any portion of the signal that has no limit line segment defined for it, will default to a very low limit (–100 dB relative to the reference power). This will keep the measurement from indicating a failure for that portion of the data.

Factory Preset and *RST:	Selected EDGE standard
Range:	+200 dB to –100 dB, relative to the reference power
Default Unit:	dB
Remarks:	You must be in EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Power vs. Time—Lower Mask Time Points

[:SENSe]:EPVTime:MASK:LIST:LOWer:TIME <seconds>{,<seconds>}

[:SENSe]:EPVTime:MASK:LIST:LOWer:TIME?

Enter the time intervals for the horizontal line segments that define the lower limit mask. All the line segments begin at the time = t_0 reference point at the center of the useful data (usually the center of the burst). For example, all the mask line segments to the right of t_0 will have positive time values that get successively larger, while those to the left get successively more negative. See Figure 18-2 on page 375.

We recommend that you select a large time value for your first and last

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mask points (e.g. –1 and +1 second). This guarantees that you've defined a limit for all the measured data.

Factory Preset and *RST: Selected EDGE standard

Range: –1s to +1s, referenced to t_0 at the center of the useful data (burst center)

1 to 25 time points in a mask

Default Unit: seconds

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Power vs. Time—Custom Limit Masks

[:SENSe]:EPVTime:MASK:SELect STANdard|CUSTom

[:SENSe]:EPVTime:MASK:SELect?

Select standard masks or user-defined custom masks to compare you measured data against.

Factory Preset and *RST: STANdard

Remarks: You must be in EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Power vs. Time—Upper Mask Absolute Amplitude Levels

[:SENSe]:EPVTime:MASK:LIST:UPPer:ABSolute <power>{,<power>}

[:SENSe]:EPVTime:MASK:LIST:UPPer:ABSolute?

Enter the absolute power level for any of your mask line segments that require absolute limits in addition to their relative limits. Normally, your defined relative mask values are used as the limits for testing. If the power of the reference level is increased, all of the relative mask power levels will increase by the same amount until they reach a defined maximum absolute power. That maximum absolute power will be used as the test limit. For each segment, that power will either be the default value, or the value you set using this command. See Figure 18-2 on page 375.

Any portion of the signal that has no limit line segment defined for it, will default its to a very high limit (100 dBm). Because of this, all data in that undefined area will pass the test.

Factory Preset and *RST: Selected EDGE standard

Range: –200 dBm to +100 dBm

Default Unit: dBm

Remarks: You need power values for each of the defined time points. You must put a comma in the SCPI command as a place holder for any points where an absolute power is not specified.

You must be in EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Power vs. Time—Upper Mask Points

[:SENSe]:EPVTime:MASK:LIST:UPPer:POINts?

Query the number of elements in the upper mask. This value is determined by the number of time points entered using [:SENSe]:EPVTime:MASK:LIST:UPPer:TIME.

Range: integer, 1 to 25

Remarks: You must be in EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Power vs. Time—Upper Mask Relative Amplitude Levels

[:SENSe]:EPVTime:MASK:LIST:UPPer:RELative <rel_power>{,<rel_power>}

[:SENSe]:EPVTime:MASK:LIST:UPPer:RELative?

Enter the relative power level for each of the horizontal line segments in the upper limit mask. There should be a power level for each time point entered using [:SENSe]:EPVTime:MASK:LIST:UPPer:TIME. These power levels are all relative to the defined Reference Power Level (the average power in the useful part of the data). See Figure 18-2 on page 375.

Factory Preset and *RST: Selected EDGE standard

Range: 200 dB to –100 dB, relative to the reference power

Default Unit: dB

Remarks: You must be in EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

SENSe Subsystem

EDGE Power vs. Time—Upper Mask Time Points

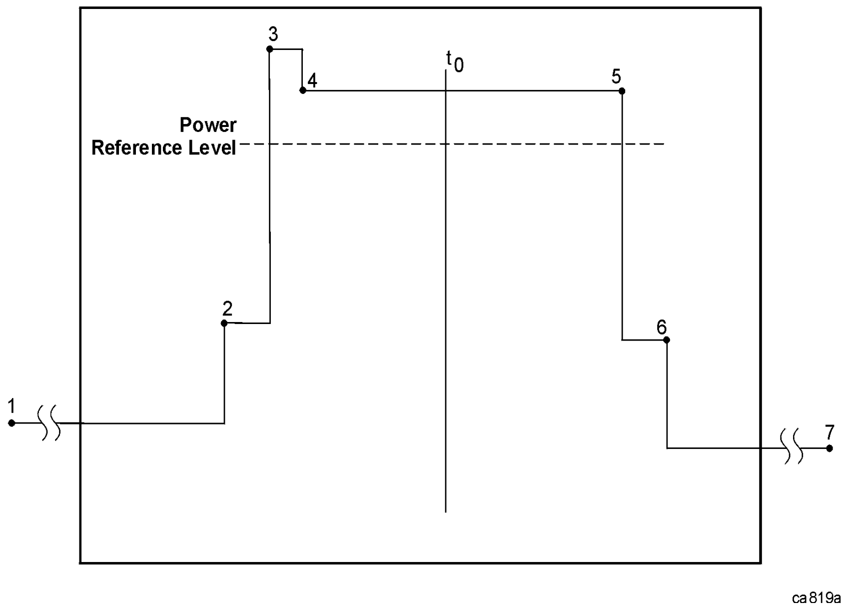
[:SENSe]:EPVTime:MASK:LIST:UPPer:TIME <seconds>{,<seconds>}

[:SENSe]:EPVTime:MASK:LIST:UPPer:TIME?

Enter the time intervals for the horizontal line segments that define the upper limit mask. All the line segments begin at the time = t_0 reference point at the center of the useful data (usually the center of the burst). For example, all the mask line segments to the right of t_0 will have positive time values that get successively larger, while those to the left get successively more negative.

We recommend that you select a large time value for your first and last mask points (e.g. –1 and +1 second). This guarantees that you've defined a limit for all the measured data.

Figure 18-1 Custom Upper Limit Mask Example



Mask Segment	Selected Time Value	Selected Relative Power (with Ref Level = –12 dBm)		Selected Absolute Power	Segment Position on Screen
		Selected Power	Equivalent Absolute Power		
1	–1 sec	–43 dB	–55 dBm	–68 dBm	–55
2	–300 µs	–25 dB	–37 dBm		–37
3	–280 µs	7 dB	–5 dBm	0 dBm[a]	0[a]

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Mask Segment	Selected Time Value	Selected Relative Power (with Ref Level = –12 dBm)		Selected Absolute Power	Segment Position on Screen
		Selected Power	Equivalent Absolute Power		
4	–270 µs	4 dB	–8 dBm		–8
5	280 µs	4 dB	–8 dBm		–8
6	295 µs	–32 dB	–44 dBm		–44
7	1 sec	–48 dB	–60 dBm	–68 dBm	–60

a. The zero value was selected because the absolute power specifies the lowest allowed value of the mask, in this case 0 dBm.

Example: **EPVT:mask:list:upper:time -1, -300e-6, -280e-6, -270e-6, 280e-6, 295e-6, 1**

Factory Preset and *RST: Selected EDGE standard

Range: –1s to +1s, referenced to t_0 at the center of the useful data (burst center)

1 to 25 time points in a mask

Default Unit: seconds

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Power vs. Time—Sweep Time

[:SENSe]:EPVTime:SWEep:TIME <integer>

[:SENSe]:EPVTime:SWEep:TIME?

Set the number of slots which are used in each data acquisition. Each slot is approximately equal to 570 ms. The measurement is made for a small additional amount of time (about 130 µs) in order to view the burst edges.

Factory Preset and *RST: 1

Range: 1 to 50 (for resolution BW = 500 kHz)

Remarks: You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

SENSe Subsystem

EDGE Power vs. Time—Trigger Source

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

[:SENSe]:EPVTime: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 - uses the internal frame timer, which has been synchronized to the selected burst sync.

IF - internal IF envelope (video) trigger

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

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

Factory Preset and *RST:	RFBurst
Remarks:	You must be in the EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

EDGE Transmit Band Spurs Measurement

Commands for querying the EDGE transmit band spurs measurement results and for setting to the default values are found in the “MEASure Group of Commands” on page 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **TxBand Spur** measurement has been selected from the **MEASURE** key menu.

Transmit Band Spurs—Average Count

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

[:SENSe]:ETSPur: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:	30
Range:	1 to 10,000
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use

this command. Use INSTrument:SELect to set the mode.

History: Version A.05.00 or later

Transmit Band Spurs—Averaging State

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

[:SENSe]:ETSPur:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST: ON

Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

History: Version A.05.00 or later

Transmit Band Spurs—Averaging Termination Control

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

[:SENSe]:ETSPur: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 EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

History: Version A.05.00 or later

Transmit Band Spurs—Averaging Type

[:SENSe]:ETSPur:AVERage:TYPE LOG|MAXimum|RMS

[:SENSe]:ETSPur: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.

Factory Preset and *RST:	MAXimum
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.05.00 or later

SENSe Subsystem

Transmit Band Spurs—Type

[:SENSe]:ETSPur:TYPE EXAMine|FULL

[:SENSe]:ETSPur:TYPE?

Select the measurement type.

EXAMine - measures spurs in all the valid segments and then displays the segment that has the worst spur

FULL - continuously measures the spurs in all the valid segments

Factory Preset and *RST:	FULL
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.05.00 or later

SENSe Subsystem

Error Vector Magnitude Measurement

Commands for querying the error vector magnitude measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **EVM** measurement has been selected from the **MEASURE** key menu.

Error Vector Magnitude—Average Count

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

[:SENSe]:EVM:AVERage:COUNt?

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

Factory Preset and *RST:	10
Range:	1 to 10,000
Remarks:	You must be in the NADC or PDC mode to use this command. Use INSTrument:SELect to set the mode.

Error Vector Magnitude—Averaging State

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

[:SENSe]:EVM:AVERage[:STATe]?

Turn average on or off.

Factory Preset and *RST:	ON
Remarks:	You must be in the NADC or PDC mode to use this command. Use INSTrument:SELect to set the mode.

Error Vector Magnitude—Averaging Termination Control

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

[:SENSe]:EVM:AVERage:TCONtrol?

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

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

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

Factory Preset and *RST: EXPonential

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

Error Vector Magnitude—Burst Synchronization Source

[:SENSe]:EVM:BSYNc:SOURce RFBurst|TSEQuence|NONE

[:SENSe]:EVM:BSYNc:SOURce?

Select the method of synchronizing the measurement to the bursts.

RFBurst – The burst sync approximates the start and stop of the useful part of the burst without demodulation of the burst.

Training Sequence (TSEQuence)– The burst sync performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sync sequence.

NONE – The measurement is performed without searching burst.

Factory Preset and *RST: NONE for BS

TSEQuence for MS

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

Error Vector Magnitude—Points/Symbol

[:SENSe]:EVM:TRACe:PPSYmbol <integer>

[:SENSe]:EVM:TRACe:PPSYmbol?

Select the points/symbol for EVM measurement. Only 1 or 5 are valid entries.

Factory Preset and *RST: 5

Range: 1, 5

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

SENSe Subsystem

Error Vector Magnitude—Trigger Source

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

[:SENSe]:EVM:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

EXTernal 1 – front panel external trigger input

EXTernal 2 – rear panel external trigger input

IF – internal IF envelope (video) trigger

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

FRAMe – internal frame trigger from front panel input

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

Factory Preset and *RST:	IMMediate for BS
	RFBurst for MS
Remarks:	You must be in the NADC or PDC mode to use this command. Use INSTrument:SELect to set the mode.

SENSe Subsystem

QPSK Error Vector Magnitude Measurement

Commands for querying the QPSK error vector magnitude measurement results and for setting to the default values are found in the “MEASure Group of Commands” on page 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **QPSK EVM** measurement has been selected from the **MEASURE** key menu.

QPSK Error Vector Magnitude—Demod Alpha

[:SENSe]:EVMQpsk:ALPHa <float>

[:SENSe]:EVMQpsk:ALPHa?

Set alpha for the root nyquist filter.

Factory Preset and *RST: 0.22

Range: 0.01 to 0.5

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

QPSK Error Vector Magnitude—Average Count

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

[:SENSe]:EVMQpsk:AVERage:COUNt?

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

Factory Preset and *RST: 10

Range: 1 to 10,000

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

QPSK Error Vector Magnitude—Averaging State

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

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

Turn average on or off.

Factory Preset and *RST: ON

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

QPSK Error Vector Magnitude—Averaging Termination Control

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

[:SENSe]:EVMQpsk:AVERage:TCONtrol?

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

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

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

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

QPSK Error Vector Magnitude—Chip Rate

[:SENSe]:EVMQpsk:CRATe <freq>

[:SENSe]:EVMQpsk:CRATe?

Set chip rate.

Factory Preset and *RST:	1.2288 MHz for cdma2000
	3.84 MHz for W-CDMA (3GPP) and 3GPP of W-CDMA (Trial & Arib)
	4.096 MHz for Trial and ARIB of W-CDMA (Trial & Arib)
Range:	1.10592 to 1.35168 MHz for cdma2000
	3.456 to 4.224 MHz for W-CDMA (3GPP) and 3GPP of W-CDMA (Trial & Arib)
	3.6864 to 4.5056 MHz for Trial and ARIB of W-CDMA (Trial & Arib)

Default Unit: Hz

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

QPSK Error Vector Magnitude—RF Carrier Mode

[:SENSe]:EVMQpsk:RFCarrier MULTiple|SINGle

[:SENSe]:EVMQpsk:RFCarrier?

Select either the single carrier or multi carrier mode.

MULTiple – The measurement assumes that the input signal is the multiple carriers with adjacent channel signals. The filter is used to cut the adjacent channel signals. (The filter may affect the measurement result.)

SINGle – The measurement assumes that the input signal is the single carrier without adjacent channel signals.

Factory Preset and *RST: SINGle

Remarks: You must be in the cdma2000 mode to use this command. Use INSTrument:SELect to set the mode.

QPSK Error Vector Magnitude—Length

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

[:SENSe]:EVMQpsk:SWEep:POINts?

Set the number of data points that will be used.

Factory Preset and *RST: 256

Range: 128 to 1536 for cdma2000

128 to 512 for W-CDMA (3GPP) and W-CDMA (Trial & Arib)

Unit: chips

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

QPSK Error Vector Magnitude—Trigger Source

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

[:SENSe]:EVMQpsk:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

EXTernal 1 – front panel external trigger input

EXTernal 2 – rear panel external trigger input

FRAMe – internal frame trigger from front panel input

IF – internal IF envelope (video) trigger

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

RFBurst – 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.

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Select the Input Port

[:SENSe]:FEED IONLy|IQ|RF|IFALign|AREFerence

[:SENSe]:FEED?

Select the input port.

IONLy is the Iin-phase component of an IQ signal

IQ is the IQ Input port

RF in the RF INPUT port

IFALign is the IF alignment signal source (internal, 321.4 MHz)

Amplitude Reference (AREFerence) is the internal amplitude reference source (50 MHz)

Factory Preset and *RST:	RF
Front Panel Access:	**Input, Input Port**

Intermodulation Measurement

Commands for querying the intermodultaion measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Intermod** measurement has been selected from the **MEASURE** key menu.

History:	Added version A.04.00 and later

Intermodulation—Average Count

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

[:SENSe]:IM:AVERage:COUNt?

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

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

Intermodulation—Averaging State

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

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

Turn average on or off.

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

Intermodulation—Averaging Termination Control

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

[:SENSe]:IM:AVERage:TCONtrol?

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

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

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

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

Intermodulation—Integration Bandwidth

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

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

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

Factory Preset and *RST:	1.23 MHz for cdma2000
	3.84 MHz for W-CDMA (3GPP)
Range:	100.0 kHz to 5.0 MHz
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Intermodultaion—Resolution Bandwidth

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

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

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

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

to use this command. Use INSTrument:SELect to set the mode.

Intermodulation—Resolution Bandwidth State

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

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

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

Factory Preset and *RST: ON

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

Intermodulation—Root Raised Cosine Filter Alpha

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

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

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

Factory Preset and *RST: 0.22

Range: 0.01 to 0.5

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

Intermodulation—Root Raised Cosine Filter State

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

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

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

Factory Preset and *RST: ON

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

Intermodulation—Base Frequency Auto Search

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

[:SENSe]:IM:FREQuency:AUTO?

Turn the base frequency auto search function on or off.

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

ON – automatically determined by searching the entire span.

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

Intermodulation—Base Frequencies Delta

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

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

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

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

Intermodulation—Base Lower Frequency

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

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

Set the frequency value of the base lower frequency.

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

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the mode.

Intermodulation—Base Upper Frequency

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

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

Set the frequency value of the base upper frequency.

Factory Preset and *RST: Auto coupled.

Range: 1.0 kHz to 4.3214 GHz

Default Unit: Hz

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

Intermodulation—Span

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

[:SENSe]:IM:FREQuency:SPAN?

Set the span.

Factory Preset and *RST: 20.0 MHz for cdma2000

50.0 MHz for W-CDMA (3GPP)

Range: 100.0 kHz to 100.0 MHz

Default Unit: Hz

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

Intermodulation—Measurement Mode

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

[:SENSe]:IM:MODE?

Select the measurement mode of the intermodulation measurement.

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

Two-tone (TWOTone)– Measures the two-tone intermodulation products.

Transmit (TXIM)– Measures the transmit intermodulation products.

Factory Preset and *RST: AUTO

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

Intermodulation—Measurement Reference

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

[:SENSe]:IM:REFerence?

Select the measurement reference of the intermodulation measurement.

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

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

LOWer – Sets the base lower carrier as measurement reference.

UPPer – Sets the base upper carrier as measurement reference.

Factory Preset and *RST: AUTO

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

Multi Carrier Power Measurement

Commands for querying the multi carrier power measurement results and for setting to the default values are found in the “MEASure Group of Commands” on page 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Multi Carrier Power** measurement has been selected from the **MEASURE** key menu.

History: Added version A.04.00 and later

Multi Carrier Power—Average Count

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

[:SENSe]:MCPower:AVERage:COUNt?

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

Factory Preset and *RST: 10

Range: 1 to 10,000

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

Multi Carrier Power—Averaging State

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

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

Turn average on or off.

Factory Preset and *RST: ON

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

Multi Carrier Power—Averaging Termination Control

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

[:SENSe]:MCPower:AVERage:TCONtrol?

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

EXPonential – Each successive data acquisition after the average

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count is reached, is exponentially weighted and combined with the existing average.

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

Factory Preset and *RST: REPeat

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

Multi Carrier Power—Root Raised Cosine Filter Alpha

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

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

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

Factory Preset and *RST: 0.22

Range: 0.01 to 0.5

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

Multi Carrier Power—Root Raised Cosine Filter State

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

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

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

Factory Preset and *RST: ON

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

Multi Carrier Power—Base Frequencies Delta

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

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

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

Factory Preset and *RST: 5 MHz

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

Default Unit: Hz

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

Multi Carrier Power—Offset Frequency Absolute Limit

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

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

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

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

Factory Preset and *RST:

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

Range: –200.0 to 50.0 dBm

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

Multi Carrier Power—Offset Frequency Relative Limit to Carrier

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

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

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

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

Factory Preset and *RST:

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

Range: –150.0 to 50.0 dB

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

Multi Carrier Power—Offset Frequency Test Mode

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

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

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

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

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

Factory Preset and *RST:

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

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

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Multi Carrier Power—Offset Selection

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

[:SENSe]:MCPower:OFFSet:SELect?

Select measurements on offsets.

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

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

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

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

Multi Carrier Power—Measurement Reference

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

[:SENSe]:MCPower:REFerence?

Select the measurement reference of the multi carrier power measurement.

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

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

LOWer – Sets the base lower carrier as measurement reference.

UPPer – Sets the base upper carrier as measurement reference.

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

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Occupied Bandwidth Measurement

Commands for querying the occupied bandwidth measurement results and for setting to the default values are found in the “MEASure Group of Commands” on page 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Occupied BW** measurement has been selected from the **MEASURE** key menu.

Occupied Bandwidth—Average Count

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

[:SENSe]:OBW:AVERage:COUNt?

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

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

Occupied Bandwidth—Averaging State

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

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

Turn averaging on or off.

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

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Front Panel
Access: **Meas Setup, Avg Number**

Occupied Bandwidth—Averaging Termination Control

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

[:SENSe]:OBW:AVERage:TCONtrol?

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

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

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

Factory Preset
and *RST: EXPonential for PDC

REPeat for cdma2000, W-CDMA (3GPP)

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

History: Version A.02.00 or later

Front Panel
Access: **Meas Setup**, **Avg Mode**

Occupied Bandwidth—Resolution Bandwidth

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

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

Set the resolution bandwidth that will be used.

Factory Preset
and *RST: 30.0 kHz

Range: 1.0 kHz to 1.0 MHz

Default Unit: Hz

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

Occupied Bandwidth—FFT Window

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

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

Select the FFT window type.

BH4Tap - Blackman Harris with 4 taps

BLACkman - Blackman

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

GAUSsian - Gaussian with alpha of 3.5

HAMMing - Hamming

HANNing - Hanning

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

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

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

Occupied Bandwidth—Span

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

[:SENSe]:OBW:FREQuency:SPAN?

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

Factory Preset and *RST:	10.0 MHz 3.75 MHz for cdma2000
Range:	10.0 kHz to 10.0 MHz
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

SENSe Subsystem

Occupied Bandwidth—Percent of Total Power

[:SENSe]:OBWidth:PERCent <number>

[:SENSe]:OBWidth:PERCent?

Set the percentage of the total power for which the occupied bandwidth is calculated.

Factory Preset and *RST:	99%
Range:	0.1% to 99.9%
Default Unit:	percent
Remarks:	You must be in the iDEN mode to use this command. Use INSTrument:SELect to set the mode.
Front Panel Access:	**Meas Setup**, **Occ BW % Pwr**

Occupied Bandwidth—Trigger Source

iDEN mode

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

[:SENSe]:OBWidth:TRIGger:SOURce?

PDC mode

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

[:SENSe]:OBW:TRIGger:SOURce?

cdma2000, W-CDMA (3GPP) mode

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

[:SENSe]:OBW:TRIGger:SOURce?

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

EXTernal1 – rear panel external trigger input

EXTernal2 – front panel external trigger input

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

IF – internal IF envelope (video) trigger

IMMediate – the next data acquisition is immediately taken,

SENSe Subsystem

capturing the signal asynchronously (also called free run)

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

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

Factory Preset and *RST: IMMediate for BS of PDC, cdma2000, W-CDMA (3GPP)

RFBurst for MS of PDC, iDEN

RFBurst for iDEN

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

History: Version A.02.00 or later

Output RF Spectrum Measurement

Commands for querying the output RF spectrum measurement results and for setting to the default values are found in the “MEASure Group of Commands” on page 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Output RF Spectrum** measurement has been selected from the **MEASURE** key menu.

Output RF Spectrum—Number of Bursts Averaged

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

[:SENSe]:ORFSpectrum:AVERage:COUNt?

Set the number of bursts that will be averaged. For the output RF spectrum due to switching transients, it is more accurate to consider this the number of frames that are measured. After the specified number of bursts (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 EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Fast Averaging

[:SENSe]:ORFSpectrum:AVERage:FAST[:STATe] OFF|ON|0|1

[:SENSe]:ORFSpectrum:AVERage:FAST[:STATe]?

Make the measurement faster by using an averaging technique different from that defined by the standard. A valid average can be obtained by measuring the power in half the normal number of bursts by using 50% - 90% of the burst, 10% - 50% of the burst and excluding the midamble.

This faster averaging is only done when averaging is on and only the modulation results are being measured. If both modulation and switching transients results are being measured, then the measurement uses the default averaging.

Factory Preset and *RST:	ON
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

SENSe Subsystem

Output RF Spectrum—Averaging Type for Modulation Spectrum

[:SENSe]:ORFSpectrum:AVERage:MODulation:TYPE LOG|RMS

[:SENSe]:ORFSpectrum:AVERage:MODulation:TYPE?

Select the type of averaging for measuring the modulation spectrum. 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.

LOG - The log of the power is averaged. (This is also known as video averaging.)

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

Factory Preset and *RST:	LOG
Remarks:	You must be in the EDGE(w/GSM),GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Averaging Control

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

[:SENSe]:ORFSpectrum:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST:	ON
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Averaging Type for Switching Transient Spectrum

[:SENSe]:ORFSpectrum:AVERage:SWITching:TYPE LOG|RMS

[:SENSe]:ORFSpectrum:AVERage:SWITching:TYPE?

Select the type of averaging for measuring the switching transient spectrum. 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.

LOG - The log of the power is averaged. (This is also known as video averaging.)

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

Factory Preset and *RST:	LOG
Remarks:	You must be in the GSM, EDGE(w/GSM) mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Resolution BW for the Modulation Spectrum at the Carrier

[:SENSe]:ORFSpectrum:BANDwidth|BWIDth[:RESolution]:MODulation:CARRier <freq>

[:SENSe]:ORFSpectrum:BANDwidth|BWIDth[:RESolution]:MODulation:CARRier?

Selects the resolution bandwidth for measuring the carrier when measuring spectrum due to modulation and wideband noise.

This parameter is only used with the Standard or Short lists, and not with the Custom list.

Factory Preset and *RST:	30 kHz
Range:	1 kHz to 5 MHz
Default Unit:	Hz
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Resolution BW For Modulation At Close Offsets

[:SENSe]:ORFSpectrum:BANDwidth|BWIDth[:RESolution]:MODulation:OFFSet:CLOSe <freq>

[:SENSe]:ORFSpectrum:BANDwidth|BWIDth[:RESolution]:MODulation:OFFSet:CLOSe?

Set the resolution bandwidth used for the spectrum due to modulation part of the ORFS measurement for offset frequencies less than 1800 kHz.

This parameter is only used with the Standard or Short lists, and not with the Custom list.

Factory Preset and *RST:	30 kHz
Range:	1 kHz to 5 MHz
Default Unit:	Hz
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Resolution BW for Modulation at Far Offsets

[:SENSe]:ORFSpectrum:BANDwidth|BWIDth[:RESolution]:MODulation:OFFSet:FAR <freq>

[:SENSe]:ORFSpectrum:BANDwidth|BWIDth[:RESolution]:MODulation:OFFSet:FAR?

Set the resolution bandwidth used for the spectrum due to modulation part of the ORFS measurement for offset frequencies greater than or equal to 1800 kHz.

This parameter is only used with the Standard or Short lists, and not with the Custom list.

Factory Preset and *RST:	100 kHz
Range:	1 kHz to 5 MHz
Default Unit:	Hz
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Resolution BW for the Switching Transient Spectrum at the Carrier

[:SENSe]:ORFSpectrum:BANDwidth|BWIDth[:RESolution]:SWITching:CARRier <freq>

[:SENSe]:ORFSpectrum:BANDwidth|BWIDth[:RESolution]:SWITching:CARRier?

Selects the resolution bandwidth for the carrier when measuring spectrum due to switching transients.

This parameter is only used with the Standard or Short lists, and not with the Custom list.

Factory Preset and *RST: 300 kHz

Range: 1 kHz to 5 MHz

Default Unit: Hz

Remarks: You must be in the EDGE(w/GSM),GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Resolution BW For Switching Transients At Close Offsets

[:SENSe]:ORFSpectrum:BANDwidth|BWIDth[:RESolution]:SWITching:OFFSet:CLOSe <freq>

[:SENSe]:ORFSpectrum:BANDwidth|BWIDth[:RESolution]:SWITching:OFFSet:CLOSe?

Set the resolution bandwidth used for the spectrum due to switching transients part of the ORFS measurement for offset frequencies less than 1800 kHz.

This parameter is only used with the Standard or Short lists, and not with the Custom list.

Factory Preset and *RST: 30 kHz

Range: 1 kHz to 5 MHz

Default Unit: Hz

Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Resolution BW For Switching Transients At Far Offsets

[:SENSe]:ORFSpectrum:BANDwidth|BWIDth[:RESolution]:SWITching:OFFSet:FAR <freq>

[:SENSe]:ORFSpectrum:BANDwidth|BWIDth[:RESolution]:SWITching:OFFSet:FAR?

Set the resolution bandwidth used for the spectrum due to switching transients part of the ORFS measurement for offset frequencies greater than or equal to 1800 kHz.

This parameter is only used with the standard or short lists, and not with the custom list.

SENSe Subsystem

Factory Preset
and *RST: 30 kHz

Range: 1 kHz to 5 MHz

Default Unit: Hz

Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Break Frequency

[:SENSe]:ORFSpectrum:BFRequency <freq>

[:SENSe]:ORFSpectrum:BFRequency?

Set the direct time break frequency. An FFT measurement method is used for offsets below this break frequency. The direct time measurement method is used for offsets above the break frequency. See the Measurement Guide for more information about these two methods.

Factory Preset
and *RST: 600 kHz

Range: 0 kHz to 775 kHz

Default Unit: Hz

History: Added revision A.04.00 and later

Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Front Panel
Access: **Meas Setup, Advanced, Direct Time Break Freq**

Output RF Spectrum—Define Custom Modulation Resolution Bandwidth List

[:SENSe]:ORFSpectrum:LIST:MODulation:BANDwidth|BWIDth <res bw>{,<res bw>}

[:SENSe]:ORFSpectrum:LIST:MODulation:BANDwidth|BWIDth?

Define the custom set of resolution bandwidths for the modulation spectrum part of the ORFS measurement. The first bandwidth specified is for the carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists needs to be the same.

Factory Preset

and *RST:	Same as standard list
Range:	1 kHz to 5 MHz
Default Unit:	Hz
Remarks:	This command is only valid if SENS:ORFS:MEAS is set to multiple and the custom list type is selected with SENS:ORFS:LIST:SEL CUST. You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Define Custom Modulation Offset Frequency List

[:SENSe]:ORFSpectrum:LIST:MODulation[:FREQuency] <offset freq>{,<offset freq>}

[:SENSe]:ORFSpectrum:LIST:MODulation[:FREQuency]?

Define the custom set of offset frequencies at which the modulation spectrum part of the ORFS measurement will be made. The first offset specified must be 0 Hz for the carrier. For each offset frequency specified, the power will be measured at both the lower and upper offsets. Up to 14 (+ the 0 Hz carrier frequency) offset frequencies may be defined.

Factory Preset and *RST:	Same as standard list
Range:	10 kHz to 10 MHz
Default Unit:	Hz
Remarks:	This command is only valid if SENS:ORFS:MEAS is set to multiple and the custom list type is selected with SENS:ORFS:LIST:SEL CUST. You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Define Custom Modulation Level Offsets

[:SENSe]:ORFSpectrum:LIST:MODulation:LOFFset <level>{,<level>}

[:SENSe]:ORFSpectrum:LIST:MODulation:LOFFset?

Define the custom set of level offsets for the modulation spectrum part of the ORFS measurement. This allows you to modify the standard limits by adding a delta amplitude value to them. The first level offset specified must be 0 dB for the carrier. Each level offset in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists needs to be the same.

Example: `ORFS:LIST:MOD:FREQ 0,300e3,1.3e6,2.0e6`

Sets custom offset freqs: 300 kHz, 1.3 MHz, 2 MHz

`ORFS:LIST:MOD:BAND 30e3,30e3,30e3,100e3`

Sets corresponding RBWs: 30 kHz, 30 kHz, 100 kHz

`ORFS:LIST:MOD:loffset 0,-5,3,5`

Assume the power level of the signal is -43 dBm, then the standard limits for these three offsets are: -42 dBc, -72 dBc, -75 dBc respectively. The loffset command adjusts these limits to: -47 (-42-5) dBc, -70 (-73+3) dBc, -70 (-75+5) dBc.

Factory Preset and *RST: 0 dB level offsets (limits remain the same as the standards)

Range: 0 to 50 dB

Default Unit: dB

Remarks: This command is only valid if SENS:ORFS:MEAS is set to multiple and the custom list type is selected with SENS:ORFS:LIST:SEL CUST.

You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

History: Version A.03.00 or later

Output RF Spectrum—Offset Frequency List

`[:SENSe]:ORFSpectrum:LIST:SELect CUSTom|SHORt|STANdard`

`[:SENSe]:ORFSpectrum:LIST:SELect?`

Select the list of settings that will be used to make the ORFS measurement. This specifies standard or customized lists and short lists. The lists contain the offset frequencies (and bandwidths) that are used for the modulation spectrum and transient spectrum parts of the ORFS measurement.

CUSTom - uses the four user-defined lists that specify:

— Offset frequencies for modulation spectrum measurement
— Corresponding resolution bandwidths for each of the modulation

offset frequencies

— Offset frequencies for switching transient spectrum measurement
— Corresponding resolution bandwidths for each of the switching transient offset frequencies

SHORt - a shortened list of the offset frequencies specified in the GSM Standards. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the SENSe:ORFSpectrum subsystem.

STANdard - the complete list of the offset frequencies specified in the GSM Standards, except for those offsets greater than 6 MHz. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the SENSe:ORFSpectrum subsystem.

Factory Preset and *RST: SHORt

Remarks: This command is only valid if SENS:ORFS:MEAS is set to multiple.

If you change the number of custom offsets then the number of offset bandwidths, frequencies and level offsets must also be changed.

You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Define Custom Switching Transient Resolution Bandwidth List

[:SENSe]:ORFSpectrum:LIST:SWITching:BANDwidth|BWIDth <res bw>{,<res bw>}

[:SENSe]:ORFSpectrum:LIST:SWITching:BANDwidth|BWIDth?

Define the custom set of resolution bandwidths for the switching transient spectrum part of the ORFS measurement. The first bandwidth specified is for the carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the switching transient offset frequency list. The number of items in each of these lists needs to be the same.

Factory Preset and *RST: Same as standard list

Range: 1 kHz to 5 MHz

Default Unit: Hz

Remarks: This command is only valid if SENS:ORFS:MEAS is set to multiple and the custom list type is selected with SENS:ORFS:LIST:SEL CUST.

You must be in EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Define Custom Switching Transient Offset Frequency List

[:SENSe]:ORFSpectrum:LIST:SWITching[:FREQuency] <offset freq>{,<offset freq>}

[:SENSe]:ORFSpectrum:LIST:SWITching[:FREQuency]?

Define the custom set of offset frequencies at which the switching transient spectrum part of the ORFS measurement will be made. The first offset specified must be 0 Hz, for the carrier. For each offset frequency specified, the power will be measured at both the lower and upper offsets. Up to 14 (+ the 0 Hz carrier frequency) offset frequencies may be defined.

Factory Preset and *RST: Same as standard list

Range: 10 kHz to 10 MHz

Default Unit: Hz

Remarks: This command is only valid if SENS:ORFS:MEAS is set to multiple and the custom list type is selected with SENS:ORFS:LIST:SEL CUST.

You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Define Custom Switching Transient Level Offsets

[:SENSe]:ORFSpectrum:LIST:SWITching:LOFFset <level>{,<level>}

[:SENSe]:ORFSpectrum:LIST:SWITching:LOFFset?

Define the custom set of level offsets for the switching transient spectrum part of the ORFS measurement. This allows you to modify the standard limits by adding a delta amplitude value to them. The first level offset specified must be 0 dB for the carrier. Each level offset in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists needs to be the same.

Example: See the ORFS:LIST:MOD:LOFF example above.

Factory Preset and *RST: 0 dB level offsets (limits remain the same as the standards)

Range: 0 to 50 dB

Default Unit: dB

Remarks: This command is only valid if SENS:ORFS:MEAS is set to multiple and the custom list type is selected with SENS:ORFS:LIST:SEL CUST.

You must be in EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

History: Version A.03.00 or later

Output RF Spectrum—Measure Offsets Measurement Method

[:SENSe]:ORFSpectrum:MEASure MULTiple|SINGle

[:SENSe]:ORFSpectrum:MEASure?

Select the measurement method to be used.

MULTiple - the measurement is done at all offsets in the offset frequency list.

SINGle - the measurement is done at only one offset as determined by the offset frequency setting. This allows detailed examination of the time-domain waveform at the specified offset frequency.

Factory Preset and *RST: MULTiple

Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Offset Frequency

[:SENSe]:ORFSpectrum:OFRequency <freq>

[:SENSe]:ORFSpectrum:OFRequency?

Set the offset frequency that is used to measure a single offset. This command is only valid if SENS:ORFS:MEAS is set to single.

Factory Preset and *RST: 250 kHz

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Range:	–12.0 MHz to +12.0 MHz, step size: steps through the values in the selected offset frequency list.
Default Unit:	Hz
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Trigger Source

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

[:SENSe]:ORFSpectrum: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 - uses the internal frame timer, which has been synchronized to the selected burst sync

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

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

Factory Preset and *RST: RFBurst if the RF Burst Hardware (option B7E) has been installed

EXTernal if option B7E has not been installed

Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Output RF Spectrum—Measurement Type

[:SENSe]:ORFSpectrum:TYPE MODulation|MSWitching|SWITching

[:SENSe]:ORFSpectrum:TYPE?

Select the measurement type.

MODulation - only the modulation spectrum is measured.

Modulation & Switching (MSWitching) - both modulation and switching transient spectrums are measured.

SWITching - only the switching transient spectrum is measured.

Factory Preset and *RST: MODulation

Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

SENSe Subsystem

SENSe Subsystem

Phase & Frequency Error Measurement

Commands for querying the phase and frequency error measurement results and for setting to the default values are found in the “MEASure Group of Commands” on page 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Phase & Frequency** measurement has been selected from the **MEASURE** key menu.

Phase & Frequency Error—Number Of Bursts Averaged

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

[:SENSe]:PFERror:AVERage:COUNt?

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

Factory Preset and *RST:	10
Range:	1 to 1,000
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Phase & Frequency Error—Averaging State

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

[:SENSe]:PFERror:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST:	OFF
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Phase & Frequency Error—Averaging Mode

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

[:SENSe]:PFERror:AVERage:TCONtrol?

Select the type of termination control used for the averaging function. This determines the averaging action after the specified number of bursts (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 EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Phase & Frequency Error—Burst Synchronization

[:SENSe]:PFERror:BSYNc:SOURce EXTernal[1]|EXTernal2|NONE|RFBurst|TSEQuence

[:SENSe]:PFERror:BSYNc:SOURce?

Select the method of synchronizing the measurement to the GSM bursts.

EXTernal 1 - burst sync at front panel external trigger input

EXTernal 2 - burst sync at rear panel external trigger input

Training Sequence (TSEQuence) - the training sequence burst sync performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sequence.

RFBurst - the RF amplitude burst sync approximates the start and stop of the useful part of the burst without demodulation of the burst.

None - no burst synchronization is used

Factory Preset and *RST: TSEQuence

Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Phase & Frequency Error—Trigger Source

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

[:SENSe]:PFERror:TRIGger:SOURce?

SENSe Subsystem

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

IF - internal IF envelope (video) trigger.

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

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

Factory Preset and *RST: RFBurst

Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

RF Power Commands

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 Input Attenuator Auto

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

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

Select the RF input attenuator range to be set either automatically or manually.

ON - Input attenuation is automatically set as determined by the reference level setting.

OFF - Input attenuation is manually set.

Front Panel Access: **Input/Output (or 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)

SENSe Subsystem

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)**

Power Statistics CCDF Measurement

Commands for querying the statistical power measurement of the complimentary cumulative distribution function (CCDF) measurement results and for setting to the default values are found in the “MEASure Group of Commands” on page 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Power Stat CCDF** measurement has been selected from the **MEASURE** key menu.

History: Added PStatistic to Basic Mode version A.04.00

Power Statistics CCDF—Channel Bandwidth

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

[:SENSe]:PSTatistic:BANDwidth|BWIDth?

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

Factory Preset and *RST:	5.0 MHz
Range:	10.0 kHz to 6.7 MHz
Resolution:	0.1 kHz
Step:	1.0 kHz
Default Unit:	Hz
Remarks:	You must be in the Basic, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Power Statistics CCDF—Sample Counts

[:SENSe]:PSTatistic:COUNts <integer>

[:SENSe]:PSTatistic:COUNts?

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

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

Power Statistics CCDF—Sweep Time

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

[:SENSe]:PSTatistic:SWEep:TIME?

Set the length of measurement interval that will be used.

Factory Preset and *RST:	1.0 ms
Range:	0.1 ms to 10 ms
Resolution:	0.001 ms
Step:	0.001 ms
Default Unit:	seconds
Remarks:	You must be in the Basic, cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.

Power Statistics CCDF—Trigger Source

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

[:SENSe]:PSTatistic:TRIGger:SOURce?

Set the trigger source used to control the data acquisitions.

EXTernal 1 - front panel external trigger input

EXTernal 2 - rear panel external trigger input

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

IF - internal IF envelope (video) trigger

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

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

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

Power vs. Time Measurement

Commands for querying the power versus time measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Power vs Time** measurement has been selected from the **MEASURE** key menu.

Power vs. Time—Number of Bursts Averaged

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

[:SENSe]:PVTime:AVERage:COUNt?

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

Factory Preset
and *RST: 10

Range: 1 to 10,000

Remarks: You must be in the EDGE(w/GSM), GSM or Service mode to use this command. Use INSTrument:SELect to set the mode.

Power vs. Time—Averaging State

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

[:SENSe]:PVTime:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset
and *RST: OFF

Remarks: You must be in the EDGE(w/GSM), GSM or Service mode to use this command. Use INSTrument:SELect to set the mode.

Power vs. Time—Averaging Mode

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

[:SENSe]:PVTime:AVERage:TCONtrol?

Select the type of termination control used for the averaging function. This specifies the averaging action after the specified number of bursts (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: You must be in the EDGE(w/GSM), GSM or Service mode to use this command. Use INSTrument:SELect to set the mode.

Power vs. Time—Averaging Type

[:SENSe]:PVTime:AVERage:TYPE LOG|MAXimum|MINimum|MXMinimum|RMS

[:SENSe]:PVTime:AVERage:TYPE?

Select the type of averaging to be performed.

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.

MXMinimum - Both the maximum and the minimum values are retained.

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

Factory Preset
and *RST: RMS

Remarks: You must be in the EDGE(w/GSM), GSM or Service mode to use this command. Use INSTrument:SELect to set the mode.

Power vs. Time—Resolution BW

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

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

Set the resolution BW. 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.

Factory Preset and *RST: 500 kHz

Range: 1 kHz to 5 MHz

Default Unit: Hz

Remarks: You must be in the EDGE(w/GSM), GSM or Service mode to use this command. Use INSTrument:SELect to set the mode.

Power vs. Time—RBW Filter Type

[:SENSe]:PVTime:BANDwidth|BWIDth[:RESolution]:TYPE FLATtop|GAUSsian

[:SENSe]:PVTime:BANDwidth|BWIDth[:RESolution]:TYPE?

Select the type of resolution BW filter. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default, may cause invalid measurement results.

FLATtop - a filter with a flat amplitude response, which provides the best amplitude accuracy.

GAUSsian - a filter with Gaussian characteristics, which provides the best pulse response.

Factory Preset and *RST: GAUSsian

Remarks: You must be in the EDGE(w/GSM), GSM or Service mode to use this command. Use INSTrument:SELect to set the mode.

Power vs. Time—Burst Synchronization Source

[:SENSe]:PVTime:BSYNc:SOURce RFBurst|TSEQuence

[:SENSe]:PVTime:BSYNc:SOURce?

Select the method of synchronizing the measurement to the GSM bursts.

RFBurst - the RF burst sync approximates the start and stop of the useful part of the burst without digital demodulation of the burst.

Training Sequence (TSEQuence) - the training sequence burst sync performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sequence.

Factory Preset

SENSe Subsystem

and *RST: RFBurst

Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Power vs. Time—Limit Line Mask Display

[:SENSe]:PVTime:LIMit:MASK OFF|ON|0|1

[:SENSe]:PVTime:LIMit:MASK?

Show or hide the limit mask. Does not affect limit pass/fail calculation.

Factory Preset
and *RST: ON

Range: ON/OFF

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

Power vs. Time—Lower Mask Absolute Amplitude Levels

[:SENSe]:PVTime:MASK:LIST:LOWer:ABSolute <power>{,<power>}

[:SENSe]:PVTime:MASK:LIST:LOWer:ABSolute?

Enter the absolute power level for any of your mask line segments that require absolute limits in addition to their relative limits. Normally, your defined relative mask values are used as the limits for testing. If the power of the reference level is decreased, all of these relative mask power levels will decrease by the same amount until they reach a defined minimum absolute power. That minimum absolute power will then be used as the test limit. For each segment, that minimum absolute power will either be the default value, or the value you set using this command.

Any portion of the signal that has no limit line segment defined for it, will default its to a very low limit (–200 dBm). Because of this, all data in that undefined area will pass the test.

Factory Preset
and *RST: Selected GSM standard

Range: –200 dBm to +100 dBm

Default Unit: dBm

Remarks: You need power values for each of the defined time points. You must put a comma in the SCPI command as a place holder for any points where an absolute power is not specified.

You must be in EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

History: Revised A.03.00 and later

Power vs. Time—Lower Mask Points

[:SENSe]:PVTime:MASK:LIST:LOWer:POINts?

Query the number of elements in the lower mask. This value is determined by the number of time points entered using `[:SENSe]:PVTime:MASK:LIST:LOWer:TIME`.

Range: integer, 1 to 25

Remarks: You must be in EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

History: Revision A.03.00 or later

Power vs. Time—Lower Mask Relative Amplitude Levels

[:SENSe]:PVTime:MASK:LIST:LOWer:RELative <rel_power>{,<rel_power>}

[:SENSe]:PVTime:MASK:LIST:LOWer:RELative?

Enter the relative power level for each of the horizontal line segments in the lower limit mask. There should be a power level for each time point entered using the `[:SENSe]:PVTime:MASK:LIST:LOWer:TIME` command. These power levels are all relative to the defined Reference Power Level (the average power in the useful part of the data). When an upper and lower limit mask have been defined, the Reference Power Level is the mid-point between these two limits at time t_0.

Any portion of the signal that has no limit line segment defined for it, will default to a very low limit (–100 dB relative to the reference power). This will keep the measurement from indicating a failure for that portion of the data.

Factory Preset and *RST: Selected GSM standard

Range: +200 dB to –100 dB, relative to the reference power

Default Unit: dB

Remarks: You must be in EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

History: Revision A.03.00 or later

Power vs. Time—Lower Mask Time Points

[:SENSe]:PVTime:MASK:LIST:LOWer:TIME <seconds>{,<seconds>}

[:SENSe]:PVTime:MASK:LIST:LOWer:TIME?

Enter the ending points for the horizontal line segments that define the lower limit mask. All the line segments begin at the time = t_0 reference point at the center of the useful data (usually the center of the burst). For example, all the mask line segments to the right of t_0 will have positive time values that get successively larger, while those to the left get successively more negative. See Figure 18-2 on page 375.

We recommend that you select a large time value for your first and last mask points (e.g. –1 and +1 second). This guarantees that you've defined a limit for all the measured data.

Factory Preset and *RST:	Selected GSM standard
Range:	–1s to +1s, referenced to t_0 at the center of the useful data (burst center)
	1 to 25 time points in a mask
Default Unit:	seconds
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.
History:	Revision A.03.00 or later

Power vs. Time—Upper Mask Absolute Amplitude Levels

[:SENSe]:PVTime:MASK:LIST:UPPer:ABSolute <power>{,<power>}

[:SENSe]:PVTime:MASK:LIST:UPPer:ABSolute?

Enter the absolute power level for any of your mask line segments that require absolute limits in addition to their relative limits. Normally, your defined relative mask values are used as the limits for testing. If the power of the reference level is increased, all of the relative mask power levels will increase by the same amount until they reach a defined maximum absolute power. That maximum absolute power will then be used as the test limit. For each segment, that maximum absolute power will either be the default value, or the value you set using this command. See Figure 18-2 on page 375.

Any portion of the signal that has no limit line segment defined for it, will default its to a very high limit (100 dBm). Because of this, all data in that undefined area will pass the test.

Factory Preset and *RST:	Selected GSM standard
Range:	–200 dBm to +100 dBm
Default Unit:	dBm
Remarks:	You need power values for each of the defined time points. You must put a comma in the SCPI command as a place holder for any points where an absolute power is not specified. You must be in EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.
History:	Revision A.03.00 or later

Power vs. Time—Upper Mask Points

[:SENSe]:PVTime:MASK:LIST:UPPer:POINts?

Query the number of elements in the upper mask. This value is determined by the number of time points entered using [:SENSe]:PVTime:MASK:LIST:UPPer:TIME.

Range:	integer, 1 to 25
Remarks:	You must be in EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.
History:	Revision A.03.00 or later

Power vs. Time—Upper Mask Relative Amplitude Levels

[:SENSe]:PVTime:MASK:LIST:UPPer:RELative <rel_power>{,<rel_power>}

[:SENSe]:PVTime:MASK:LIST:UPPer:RELative?

Enter the relative power level for each of the horizontal line segments in the upper limit mask. There should be a power level for each time point entered using [:SENSe]:PVTime:MASK:LIST:UPPer:TIME. These power levels are all relative to the defined Reference Power Level (the average power in the useful part of the data). When an upper and lower limit mask have been defined, the Reference Power Level is the mid-point between these two limits at time t_0. See Figure 18-2 on page 375.

Factory Preset and *RST:	Selected GSM standard

SENSe Subsystem

Range:	200 dB to –100 dB, relative to the reference power
Default Unit:	dB
Remarks:	You must be in EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.
History:	Revision A.03.00 or later

Power vs. Time—Upper Mask Time Points

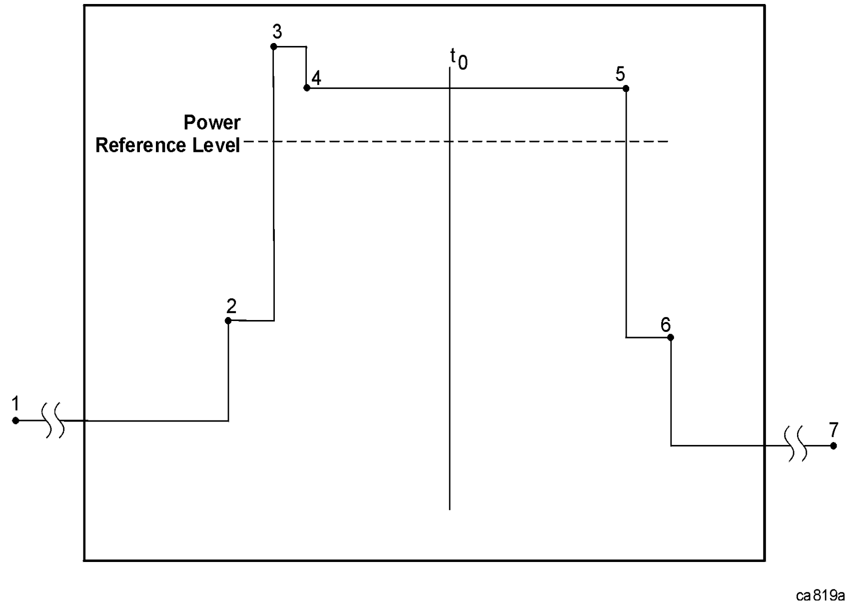
[:SENSe]:PVTime:MASK:LIST:UPPer:TIME <seconds>{,<seconds>}

[:SENSe]:PVTime:MASK:LIST:UPPer:TIME?

Enter the ending points for the horizontal line segments that define the upper limit mask. All the line segments begin at the time = t_0 reference point at the center of the useful data (usually the center of the burst). For example, all the mask line segments to the right of t_0 will have positive time values that get successively larger, while those to the left get successively more negative.

We recommend that you select a large time value for your first and last mask points (e.g. –1 and +1 second). This guarantees that you've defined a limit for all the measured data.

Figure 18-2 Custom Upper Limit Mask Example



SENSe Subsystem

Mask Segment	Selected Time Value	Selected Relative Power (with Ref Level = –12 dBm)		Selected Absolute Power	Segment Position on Screen
		Selected Power	Equivalent Absolute Power		
1	–1 sec	–43 dB	–55 dBm	–68 dBm	–55
2	–300 µs	–25 dB	–37 dBm		–37
3	–280 µs	7 dB	–5 dBm	0 dBm[a]	0[a]
4	–270 µs	4 dB	–8 dBm		–8
5	280 µs	4 dB	–8 dBm		–8
6	295 µs	–32 dB	–44 dBm		–44
7	1 sec	–48 dB	–60 dBm	–68 dBm	–60

a. The zero value was selected because the absolute power specifies the lowest allowed value of the mask, in this case 0 dBm.

Example: **PVT:mask:list:upper:time -1, -300e-6, -280e-6, -270e-6, 280e-6, 295e-6, 1**

Factory Preset and *RST: Selected GSM standard

Range: –1s to +1s, referenced to t_0 at the center of the useful data (burst center)

1 to 25 time points in a mask

Default Unit: seconds

Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

History: Revision A.03.00 or later

Power vs. Time—Custom Limit Masks

[:SENSe]:PVTime:MASK:SELect STANdard|CUSTom

[:SENSe]:PVTime:MASK:SELect?

Select standard masks or user-defined custom masks to compare you measured data against.

Factory Preset and *RST: STANdard

Remarks: You must be in EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

History: Revision A.03.00 or later

Power vs. Time—Sweep Time

[:SENSe]:PVTime:SWEep:TIME <integer>

[:SENSe]:PVTime:SWEep:TIME?

Set the number of slots which are used in each data acquisition. Each slot is approximately equal to 570 ms. The measurement is made for a small additional amount of time (about 130 µs) in order to view the burst edges.

Factory Preset and *RST: 1

Range: 1 to 50 (for resolution BW = 500 kHz)

Remarks: You must be in the EDGE(w/GSM), GSM or Service mode to use this command. Use INSTrument:SELect to set the mode.

Power vs. Time—Trigger Source

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

[:SENSe]:PVTime: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 - uses the internal frame timer, which has been synchronized to the selected burst sync.

IF - internal IF envelope (video) trigger

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

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

Factory Preset and *RST: RFBurst if the RF Burst Hardware (option B7E) has been installed

EXTernal if option B7E has not been installed

SENSe Subsystem

Remarks: You must be in the EDGE(w/GSM), GSM or Service mode to use this command. Use INSTrument:SELect to set the mode.

SENSe Subsystem

Radio Standards Commands

Radio Carrier Hopping

[:SENSe]:RADio:CARRier:HOP OFF|ON|0|1

[:SENSe]:RADio:CARRier:HOP?

Turns the carrier hopping mode on and off.

Factory Preset and *RST:	OFF
Remarks:	Global to the current mode. You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later
Front Panel Access:	**Mode Setup, Radio, Carrier**

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 Carrier Burst

[:SENSe]:RADio:CARRier[:TYPE] BURSt|CONTinuous

[:SENSe]:RADio:CARRier[:TYPE]?

Select the type of RF carrier on the device to be tested.

Factory Preset and *RST:	BURSt

Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Global to the current mode.

History: Version A.03.00 or later

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

Radio Device Under Test

[:SENSe]:RADio:DEVice BS|MS

[:SENSe]:RADio:DEVice?

Select the type of radio device to be tested.

BS – Base station transmitter test.

MS – Mobile station transmitter test.

Factory Preset and *RST: BS

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

Global to current mode.

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

Radio Device Under Test

[:SENSe]:RADio:DEVice BTS|MS

[:SENSe]:RADio:DEVice?

Select the type of radio device to be tested.

BTS - Base station transmitter test

MS - Mobile station transmitter test

Factory Preset and *RST: BTS

Remarks: Global to the current mode.

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

SENSe Subsystem

History: Version A.03.00 or later

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

Radio Device Under Test

[:SENSe]:RADio:DEVice INBound|OUTBound

[:SENSe]:RADio:DEVice?

Select the type of radio device to be tested. If you are testing a base station, it must be put into the test mode to transmit known bit patterns.

OUTBound – Base station transmitter test

INBound – Mobile station transmitter test

Factory Preset
and *RST: Inbound

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

Global to current mode.

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

Radio Base Station Type

[:SENSe]:RADio:DEVice:BASE[:TYPE] NORMal|MICRo|PICO

[:SENSe]:RADio:DEVice:BASE[:TYPE]?

Select the type of base station to be tested. If you are testing a base station, it must be put into the test mode to transmit known bit patterns.

Factory Preset
and *RST: NORMal

Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Global to current mode.

History: Added revision A.04.00 and later

Front Panel
Access: **Mode Setup, Radio, BTS Type**

SENSe Subsystem

Frequency Offset of MS to BTS

[:SENSe]:RADio:FOFFset <freq>

[:SENSe]:RADio:FOFFset?

Set the amount of frequency offset (MS freq – BTS freq).

Factory Preset and *RST:	190.0 MHz
Range:	–500.0 MHz to 500.0 MHz
Remarks:	Global to the current mode.
	You must be in the W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later
Front Panel Access:	**Mode Setup, Radio, MS-BTS Offset**

Radio Format (Standard)

[:SENSe]:RADio:FORMat ARIB|TGPP|TRIal

[:SENSe]:RADio:FORMat?

Select the format that testing will be compliant with when measurements are made.

ARIB, is the standard format defined by the Association of Radio Industries and Business in Japan

TGPP, is the standard format defined by the Third Generation Partnership Projects (3GPP)

TRIal, is a 1998 trial format being evaluated

Factory Preset and *RST:	TRIal
Remarks:	You must be in the W-CDMA (Trial & Arib) mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later
Front Panel Access:	**Mode Setup, Radio, Standard**

SENSe Subsystem

Radio Format (Standard)

[:SENSe]:RADio:FORMat M16QAM|M64QAM|DJSMR

[:SENSe]:RADio:FORMat?

Select the format that testing will be compliant with when measurements are made.

M16QAM, is a standard iDEN format defined by Motorola

M64QAM, is a standard iDEN format defined by Motorola

DJSMR, is Japanese standard format that is based on the ARIB RCR-32A standard

Factory Preset and *RST:	M16QAM
Remarks:	You must be in the iDEN mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later
Front Panel Access:	**Mode Setup, Radio, Format**

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**

Radio Standard Band

[:SENSe]:RADio:STANdard:BAND PGSM900|EGSM900|RGSM900|DCS1800|PCS1900|GSM450|GSM480|GSM850

[:SENSe]:RADio:STANdard:BAND?

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

EGSM900 - Extended GSM in the 900 MHz band

PGSM900 - Primary GSM in the 900 MHz band

RGSM900 - Railway GSM in the 900 MHz band

DCS1800 - DSC1800 band; also known as GSM-1800

PCS - PCS1900 band; also known as GSM-1900

GSM450 - GSM450 band

GSM480 - GSM480 band

GSM850 - GSM850 band, for IS-136HS

Factory Preset
and *RST: EGSM-900

Remarks: Global to the current mode.

You must be in EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

History: More standards added A.02.00, A.03.00

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

Radio Traffic Rate

[:SENSe]:RADio:TRATe FULL|HALF

[:SENSe]:RADio:TRATe?

Select the traffic rate.

FULL – full traffic rate (a slot is every 20 ms)

HALF – half traffic rate (a slot is every 40 ms)

Factory Preset
and *RST: FULL

SENSe Subsystem

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

SENSe Subsystem

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 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Mod Accuracy (Rho)** or **Mod Accuracy (Composite Rho)** measurement has been selected from the **MEASURE** key menu.

Modulation Accuracy (Rho)—Demod Alpha

[:SENSe]:RHO:ALPHa <float>

[:SENSe]:RHO:ALPHa?

Set alpha for the root nyquist filter.

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

Modulation Accuracy (Rho)—Average Count

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

[:SENSe]:RHO:AVERage:COUNt?

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

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

Modulation Accuracy (Rho)—Averaging State

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

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

Turn averaging on or off.

Factory Preset

and *RST: 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.

SENSe Subsystem

Modulation Accuracy (Rho)—Chip Rate

[:SENSe]:RHO:CRATe <freq>

[:SENSe]:RHO:CRATe?

Set chip rate.

Factory Preset and *RST:	1.2288 MHz for cdma2000
	3.84 MHz for W-CDMA (3GPP)
Range:	1.1059 to 1.3517 MHz for cdma2000
	3.456 to 4.224 MHz for W-CDMA (3GPP)
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—Multi Carrier Estimator

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

[:SENSe]:RHO:MCEStimator?

Turns the multi carrier estimator on or off.

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

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

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

Modulation Accuracy (Rho)—Spectrum Normal/Invert

[:SENSe]:RHO:SPECtrum INVert|NORMal

[:SENSe]:RHO:SPECtrum?

Select inverted or normal spectrum for demodulation.

Factory Preset and *RST:	NORMal
Remarks	You must be in the cdmaOne, cama2000, W-CDMA (3GPP), or W-CDMA (Trial & Arib) mode to use this

command. Use INSTrument:SELect to set the mode.

Modulation Accuracy (Rho)—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)—Sync Type

[:SENSe]:RHO:SYNC CPICh|SCH

[:SENSe]:RHO:SYNC?

Set the synchronization type for BTS.

CPICh – synchronize to common pilot channel

SCH – synchronize to SCH

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

Modulation Accuracy (Rho)—Long Code Mask

[:SENSe]:RHO:SYNC:LCMask <integer>

[:SENSe]:RHO:SYNC:LCMask?

Set the long code mask for MS measurement.

Factory Preset and *RST:	2,199,023,255,552 (20,000,000,000h)
Range:	0 to 4,398,046,511,103 (0h to 3F,FFF,FFF,FFFh)
Remarks:	You must be in the cdma2000 mode to use this command. Use INSTrument:SELect to set the mode.

SENSe Subsystem

Modulation Accuracy (Rho)—Scramble Code

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

[:SENSe]:RHO:SYNC:SCRamble?

Set the scramble code for synchronization.

Factory Preset and *RST: 1

Range: 0 to 262,143 (0h to 3F,FFFh) (0 is for no-scramble)

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

Modulation Accuracy (Rho)—Scramble Code Down Link

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

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

Set the BTS primary scramble code for synchronization.

Factory Preset and *RST: 0

Range: 0 to 511

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

Modulation Accuracy (Rho)—Scramble Code Offset

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

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

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

Factory Preset and *RST: 0

Range: 0 to 15

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

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

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

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

Set the BTS primary scramble code type for synchronization.

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

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

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

Factory Preset and *RST: STANdard

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

Modulation Accuracy (Rho)—Scramble Code Up Link

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

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

Set the MS scramble code for synchronization.

Factory Preset and *RST: 0

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

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

Modulation Accuracy (Rho)—Trigger Source

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

[:SENSe]:RHO:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

EXTernal 1 – front panel external trigger input

EXTernal 2 – rear panel external trigger input

FRAMe – internal frame trigger from front panel input

IF – internal IF envelope trigger

SENSe Subsystem

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

RFBurst – 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**

SENSe Subsystem

Reference Oscillator Commands

Reference Oscillator External Frequency

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

[:SENSe]:ROSCillator:EXTernal:FREQuency?

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

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

Reference Oscillator Rear Panel Output

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

[:SENSe]:ROSCillator:OUTPut?

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

ESA? - Option oscillator commands, if applicable, are found as SENSe:OPTion:ROSCillator.

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

Reference Oscillator Source

[:SENSe]:ROSCillator:SOURce INTernal|EXTernal

[:SENSe]:ROSCillator:SOURce?

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

INTernal - uses internal 50 MHz reference signal

SENSe Subsystem

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

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

Spectrum Emission Mask Measurement

Commands for querying the spectrum emission mask measurement results and for setting to the default values are found in the “MEASure Group of Commands” on page 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Spectrum Emission Mask** measurement has been selected from the **MEASURE** key menu.

History: Added version A.04.00 and later

Spectrum Emission Mask—Average Count

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

[:SENSe]:SEMask:AVERage:COUNt?

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

Factory Preset and *RST: 10

Range: 1 to 10,000

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

Spectrum Emission Mask—Averaging State

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

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

Turn average on or off.

Factory Preset and *RST: OFF

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

Spectrum Emission Mask—Channel BW

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

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

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

SENSe Subsystem

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

Factory Preset and *RST:	1.23 MHz for cdma2000

3.84 MHz for W-CDMA (3GPP)

Range:	100.0 kHz to [:SENSe]:SEMask:FREQuency:SPAN

Default Unit:	Hz

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

Spectrum Emission Mask—Reference Channel Resolution BW

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

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

Set the reference channel resolution BW.

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

Factory Preset and *RST:	Auto coupled.

Range:	1.0 kHz to 7.5 MHz

Default Unit:	Hz

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

Spectrum Emission Mask—Reference Channel Resolution BW Auto Mode

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

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

Select auto or manual control of the resolution BW.

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

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

Spectrum Emission Mask—Detector Mode

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

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

Selects the detector type.

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

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

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

Spectrum Emission Mask—Frequency Span

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

[:SENSe]:SEMask:FREQuency:SPAN?

Set the frequency span to be measured.

Factory Preset and *RST:	1.25 MHz for cdma2000
	5.0 MHz for W-CDMA (3GPP)
Range:	100.0 kHz to 10.0 MHz
Default Unit:	Hz
Remarks:	You must be in the cdma2000 or W-CDMA (3GPP) mode to use this command. Use INSTrument:SELect to set the mode.

Spectrum Emission Mask—Reference Channel Step Frequency

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

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

Set the reference step frequency.

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

Spectrum Emission Mask—Reference Channel Step Frequency Auto Mode List

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

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

Set the auto mode of the reference step frequency.

OFF - the reference step frequency is set manually.

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

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

Spectrum Emission Mask—Define Resolution Bandwidth List

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

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

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

SENSe Subsystem

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

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
cdma2000	BTS	30.0 kHz	30.0 kHz	100.0 kHz	1.0 MHz	1.0 MHz
	MS	30.0 kHz	30.0 kHz	1.0 MHz	1.0 MHz	1.0 MHz
W-CDMA (3GPP)	BTS	30.0 kHz	30.0 kHz	30.0 kHz	1.0 MHz	1.0 MHz
	MS	30.0 kHz	1.0 MHz	1.0 MHz	1.0 MHz	1.0 MHz

Range: 300 Hz to 7.5 MHz

Default Unit: Hz

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

Spectrum Emission Mask—Define Resolution Bandwidth List Auto Mode

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

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

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

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

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
cdma2000	OFF	OFF	OFF	OFF	OFF
W-CDMA (3GPP)	OFF	OFF	OFF	OFF	OFF

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

SENSe Subsystem

Spectrum Emission Mask—Offset Start Frequency

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

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

Sets the five (5) offset start frequencies.

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

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
cdma2000	BTS	750 kHz	1.98 MHz	3.125 MHz	4.0 MHz	7.5 MHz
	MS	900 kHz	1.98 MHz	7.5 MHz	8.5 MHz	12.5 MHz
W-CDMA (3GPP)	BTS	2.515 MHz	2.715 MHz	3.515 MHz	4.0 MHz	7.5 MHz
	MS	2.515 MHz	4.0 MHz	7.5 MHz	8.5 MHz	12.5 MHz

Range: 10.0 kHz to 100.0 MHz

Default Unit: Hz

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

Spectrum Emission Mask—Offset Step Frequency

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

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

Sets the five (5) offset step frequencies.

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

Factory Preset and *RST: Auto coupled.

Range: 100 Hz to 7.5 MHz

Default Unit: Hz

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

SENSe Subsystem

Spectrum Emission Mask—Offset Step Frequency Auto Mode

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

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

Set the auto mode of the offset step frequency.

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

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
cdma2000	ON	ON	ON	ON	ON
W-CDMA (3GPP)	ON	ON	ON	ON	ON

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

Spectrum Emission Mask—Offset Stop Frequency

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

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

Sets the five (5) offset stop frequencies.

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

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
cdma2000	BTS	1.98 MHz	3.125 MHz	7.5 MHz	7.5 MHz	12.5 MHz
	MS	1.98 MHz	7.5 MHz	8.5 MHz	12.0 MHz	15.0 MHz
W-CDMA (3GPP)	BTS	2.715 MHz	3.515 MHz	4.0 MHz	7.5 MHz	12.5 MHz
	MS	3.485 MHz	7.5 MHz	8.5 MHz	12.0 MHz	15.0 MHz

Range: 10.0 kHz to 100.0 MHz

Default Unit: Hz

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

Spectrum Emission Mask—Relative Attenuation

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

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

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

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

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

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
cdma2000	0 dB	0 dB	0 dB	0 dB	0 dB
W-CDMA (3GPP)	0 dB	0 dB	0 dB	0 dB	0 dB

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

Default Unit: dB

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

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

Spectrum Emission Mask—Select Sideband

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

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

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

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

NEGative - negative (lower) sideband only

POSitive - positive (upper) sideband only

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

Factory Preset and *RST:

Mode	Offset A	Offset B	Offset C	Offset D	Offset E
cdma2000	BOTH	BOTH	BOTH	BOTH	BOTH
W-CDMA (3GPP)	BOTH	BOTH	BOTH	BOTH	BOTH

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

Spectrum Emission Mask—Absolute Amplitude Limits at Offset Start

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

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

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

SENSe Subsystem

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

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

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

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
cdma2000	BTS	–13.0 dBm	–13.0 dBm	–13.0 dBm	–13.0 dBm	–13.0 dBm
	MS	–13.0 dBm	–13.0 dBm	–13.0 dBm	–13.0 dBm	–13.0 dBm
W-CDMA (3GPP)	BTS	–14.0 dBm	–14.0 dBm	–26.0 dBm	–13.0 dBm	–13.0 dBm
	MS	–71.1 dBm	–55.84 dBm	–55.84 dBm	–55.84 dBm	–55.84 dBm

Range: –200.0 dBm to 50.0 dBm

Default Unit: dBm

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

Spectrum Emission Mask—Relative Amplitude Limits to Carrier at Offset Start

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

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

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

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

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

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

SENSe Subsystem

Factory Preset
and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
cdma2000	BTS	–45.0 dB	–55.0 dB	–55.0 dB	–55.0 dB	–55.0 dB
	MS	–42.0 dB	–54.0 dB	–54.0 dB	–54.0 dB	–54.0 dB
W-CDMA (3GPP)	BTS	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB
	MS	–35.23 dB	–35.5 dB	–39.0 dB	–49.0 dB	–49.0 dB

Range: –150.0 dBm to 50.0 dB

Default Unit: dB

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

Spectrum Emission Mask—Control Offset Frequency List

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

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

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

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

Factory Preset
and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
cdma2000	BTS	ON	ON	ON	OFF	OFF
	MS	ON	ON	OFF	OFF	OFF
W-CDMA (3GPP)	BTS	ON	ON	ON	ON	ON
	MS	ON	ON	ON	ON	OFF

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

Spectrum Emission Mask—Absolute Amplitude Limits at Offset Stop

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

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

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

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

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

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

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
cdma2000	BTS	−13.0 dBm	−13.0 dBm	−13.0 dBm	−13.0 dBm	−13.0 dBm
	MS	−13.0 dBm	−13.0 dBm	−13.0 dBm	−13.0 dBm	−13.0 dBm
W-CDMA (3GPP)	BTS	−14.0 dBm	−26.0 dBm	−26.0 dBm	−13.0 dBm	−13.0 dBm
	MS	−71.1 dBm	−55.84 dBm	−55.84 dBm	−55.84 dBm	−55.84 dBm

Range: –200.0 dBm to 50.0 dBm

Default Unit: dBm

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

Spectrum Emission Mask—Absolute Amplitude Limits at Offset Stop Coupled

[:SENSe]:SEMask:OFFSet[n]:LIST:STOP:ABSolute:COUPle OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1

[:SENSe]:SEMask:OFFSet[n]:LIST:STOP:ABSolute:COUPle?

Define the absolute limit mode for the offset stop frequencies.

OFF - the limit at the offset stop frequency can be set manually.

ON - the limit at the offset stop frequency is same as it at the offset start frequency.

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

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

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
cdma2000	BTS	ON	ON	ON	ON	ON
	MS	ON	ON	ON	ON	ON
W-CDMA (3GPP)	BTS	ON	OFF	ON	ON	ON
	MS	ON	ON	ON	ON	ON

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

Spectrum Emission Mask—Relative Amplitude Limits to Carrier at Offset Stop

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

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

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

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

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

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

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
cdma2000	BTS	–45.0 dB	–55.0 dB	–55.0 dB	–55.0 dB	–55.0 dB
	MS	–42.0 dB	–54.0 dB	–54.0 dB	–54.0 dB	–54.0 dB
W-CDMA (3GPP)	BTS	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB
	MS	–49.78 dB	–39.0 dB	–49.0 dB	–49.0 dB	–49.0 dB

Range: –150.0 dBm to 50.0 dB

Default Unit: dB

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

Spectrum Emission Mask—Relative Amplitude Limits to Carrier at Offset Stop Coupled

[:SENSe]:SEMask:OFFSet[n]:LIST:STOP:RCARrier:COUPle OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1

[:SENSe]:SEMask:OFFSet[n]:LIST:STOP:RCARrier:COUPle?

Define the relative limit mode for the offset stop frequencies.

OFF - the limit at the offset stop frequency can be set manually.

ON - the limit at the offset stop frequency is same as it at the offset start frequency.

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

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

Factory Preset and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
cdma2000	BTS	ON	ON	ON	ON	ON
	MS	ON	ON	ON	ON	ON

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
W-CDMA (3GPP)	BTS	ON	ON	ON	ON	ON
	MS	OFF	OFF	OFF	ON	ON

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

Spectrum Emission Mask—Define Type of Offset Frequency List

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

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

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

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

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

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

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

Factory Preset

SENSe Subsystem

and *RST:

Mode	Variant	Offset A	Offset B	Offset C	Offset D	Offset E
cdma2000	BTS	REL	REL	ABS	REL	REL
	MS	REL	REL	REL	REL	REL
W-CDMA (3GPP)	BTS	ABS	ABS	ABS	ABS	ABS
	MS	AND	AND	AND	AND	AND

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

Spectrum Emission Mask—Define Resolution Bandwidth List

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

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

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

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

Factory Preset and *RST: Auto coupled.

Range: 300 Hz to 7.5 MHz

Default Unit: Hz

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

Spectrum Emission Mask—Define Resolution Bandwidth List Auto Mode

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

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

Set the auto mode of the region step frequency.

SENSe Subsystem

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

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
cdma2000	ON	ON	ON	ON	ON
W-CDMA (3GPP)	ON	ON	ON	ON	ON

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

Spectrum Emission Mask—Region Start Frequency

[:SENSe]:SEMask:REGion[n]:LIST:FREQuency:STARt <f_region>,<f_region>,<f_region>,<f_region>,<f_region>

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

Sets the five (5) region start frequencies.

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

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
cdma2000	1920.0 MHz	1893.5 MHz	2100.0 MHz	2175.0 MHz	800.0 MHz
W-CDMA (3GPP)	1920.0 MHz	1893.5 MHz	2100.0 MHz	2175.0 MHz	800.0 MHz

Range: 329.0 MHz to 3.678 GHz

Default Unit: Hz

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

Spectrum Emission Mask—Region Step Frequency

[:SENSe]:SEMask:REGion[n]:LIST:FREQuency:STEP <f_region>,<f_region>,<f_region>,<f_region>,<f_region>

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

Sets the five (5) region step frequencies.

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

Spectrum Emission Mask—Region Step Frequency Auto Mode

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

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

Set the auto mode of the region step frequency.

Region[n]	n=1 is base station and 2 is mobiles. The default is base station (1).
Factory Preset and *RST:	

Mode	Region A	Region B	Region C	Region D	Region E
cdma2000	ON	ON	ON	ON	ON
W-CDMA (3GPP)	ON	ON	ON	ON	ON

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

Spectrum Emission Mask—Region Stop Frequency

[:SENSe]:SEMask:REGion[n]:LIST:FREQuency:STOP <f_region>,<f_region>,<f_region>,<f_region>,<f_region>

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

Sets the five (5) region stop frequencies.

SENSe Subsystem

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

Factory Preset and *RST:

Mode	**Region A**	**Region B**	**Region C**	**Region D**	**Region E**
cdma2000	1980.0 MHz	1919.6 MHz	2105.0 MHz	2180.0 MHz	1000.0 MHz
W-CDMA (3GPP)	1980.0 MHz	1919.6 MHz	2105.0 MHz	2180.0 MHz	1000.0 MHz

Range: 329.0 MHz to 3.678 MHz

Default Unit: Hz

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

Spectrum Emission Mask—Relative Attenuation

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

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

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

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

Factory Preset and *RST:

Mode	**Region A**	**Region B**	**Region C**	**Region D**	**Region E**
cdma2000	0 dB	0 dB	0 dB	0 dB	0 dB
W-CDMA (3GPP)	0 dB	0 dB	0 dB	0 dB	0 dB

Range: –40.0 to 0.0 dB, but this relative attenuation cannot exceed the absolute attenuation range of 0.0 to 40.0 dB.

Default Unit: dB

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

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

Spectrum Emission Mask—Absolute Amplitude Limits at Region Start

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

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

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

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

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

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

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
cdma2000	–50.0 dBm	–50.0 dBm	–50.0 dBm	–50.0 dBm	–50.0 dBm
W-CDMA (3GPP)	–50.0 dBm	–50.0 dBm	–50.0 dBm	–50.0 dBm	–50.0 dBm

Range: –200.0 dBm to 50.0 dBm

Default Unit: dBm

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

SENSe Subsystem

Spectrum Emission Mask—Relative Amplitude Limits to Carrier at Region Start

[:SENSe]:SEMask:REGion[n]:LIST:STARt:RCARrier <rel_power>,<rel_power>,<rel_power>,<rel_power>,<rel_power>

[:SENSe]:SEMask:REGion[n]:LIST:STARt:RCARrier?

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

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

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

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

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
cdma2000	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB
W-CDMA (3GPP)	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB

Range: –150.0 dBm to 50.0 dB

Default Unit: dB

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

Spectrum Emission Mask—Control Region Frequency List

[:SENSe]:SEMask:REGion[n]:LIST:STATe OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1

[:SENSe]:SEMask:REGion[n]:LIST:STATe?

Selects whether testing is to be done at the custom region frequencies. The measured powers are tested against the absolute values defined with [:SENSe]:SEMask:REGion[n]:LIST[n]:ABSolute, or the relative values defined with [:SENSe]:SEMask:REGion[n]:LIST[n]:RCARrier.

SENSe Subsystem

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

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
cdma2000	ON	ON	ON	OFF	OFF
W-CDMA (3GPP)	ON	ON	ON	OFF	OFF

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

Spectrum Emission Mask—Absolute Amplitude Limits at Region Stop

[:SENSe]:SEMask:REGion[n]:LIST:STOP:ABSolute <abs_power>,<abs_power>,<abs_power>,<abs_power>,<abs_power>

[:SENSe]:SEMask:REGion[n]:LIST:STOP:ABSolute?

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

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

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

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

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
cdma2000	–50.0 dBm	–50.0 dBm	–50.0 dBm	–50.0 dBm	–50.0 dBm
W-CDMA (3GPP)	–50.0 dBm	–50.0 dBm	–50.0 dBm	–50.0 dBm	–50.0 dBm

Range: –200.0 dBm to 50.0 dBm

Default Unit: dBm

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

Spectrum Emission Mask—Absolute Amplitude Limits at Region Stop Coupled

[:SENSe]:SEMask:REGion[n]:LIST:STOP:ABSolute:COUPle OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1

[:SENSe]:SEMask:REGion[n]:LIST:STOP:ABSolute:COUPle?

Define the absolute limit mode for the region stop frequencies.

Off - the limit at the region stop frequency can be set manually.

On - the limit at the region stop frequency is same as it at the region start frequency.

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

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

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
cdma2000	ON	ON	ON	ON	ON
W-CDMA (3GPP)	ON	ON	ON	ON	ON

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

Spectrum Emission Mask—Relative Amplitude Limits to Carrier at Region Stop

[:SENSe]:SEMask:REGion[n]:LIST:STOP:RCARrier <rel_power>,<rel_power>,<rel_power>,<rel_power>,<rel_power>

[:SENSe]:SEMask:REGion[n]:LIST:STOP:RCARrier?

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

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

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

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

Factory Preset and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
cdma2000	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB
W-CDMA (3GPP)	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB	–30.0 dB

Range: –150.0 dBm to 50.0 dB

Default Unit: dB

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

Spectrum Emission Mask—Relative Amplitude Limits to Carrier at Region Stop Coupled

[:SENSe]:SEMask:REGion[n]:LIST:STOP:RCARrier:COUPle OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1

[:SENSe]:SEMask:REGion[n]:LIST:STOP:RCARrier:COUPle?

Define the relative limit mode for the region stop frequencies.

Off - the limit at the region stop frequency can be set manually.

On - the limit at the region stop frequency is same as the region start frequency.

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

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

Factory Preset

SENSe Subsystem

and *RST:

Mode	**Offset A**	**Offset B**	**Offset C**	**Offset D**	**Offset E**
cdma2000	ON	ON	ON	ON	ON
W-CDMA (3GPP)	ON	ON	ON	ON	ON

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

Spectrum Emission Mask—Define Type of Region Frequency List

[:SENSe]:SEMask:REGion[n]:LIST:TEST ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative

[:SENSe]:SEMask:REGion[n]:LIST:TEST?

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

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

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

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

- AND - Test both the absolute power measurement and the power relative to the carrier. If they both fail, then return a failure for the measurement at this region.
- ABSolute - Test the absolute power measurement. If it fails, then return a failure for the measurement at this region.
- OR - Test both the absolute power measurement and the power relative to the carrier. If either one fails, then return a failure for the measurement at this region.
- RELative - Test the power relative to the carrier. If it fails, then return a failure for the measurement at this region.

Factory Preset

and *RST:

Mode	Region A	Region B	Region C	Region D	Region E
cdma2000	ABS	ABS	ABS	ABS	ABS
W-CDMA (3GPP)	ABS	ABS	ABS	ABS	ABS

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

Spectrum Emission Mask—Spectrum Segment

[:SENSe]:SEMask:SEGMent OFFSet|REGion

[:SENSe]:SEMask:SEGMent?

Select the frequency spectrum segment in which spectrum emission mask levels are measured.

OFFset – measurement segments are set as offset from the center frequency.

REGion – measurement segments are set as the absolute frequencies.

Factory Preset and *RST: OFFset

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

Spectrum Emission Mask—Measurement Interval

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

[:SENSe]:SEMask:SWEep:TIME?

Sets the length of the measurement interval (acquisition length in each bin).

Factory Preset and *RST: 1 ms

Range: 100 µs to 10 ms

Default Unit: seconds

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

Spectrum Emission Mask—Trigger Source

[:SENSe]:SEMask:TRIGger:SOURce EXTernal[1]|EXTernal2|FRAMe|IMMediate|LINE

[:SENSe]:SEMask:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

EXTernal 1 – front panel external trigger input

EXTernal 2 – rear panel external trigger input

FRAMe – internal frame trigger from front panel input

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

LINE – power line

Factory Preset and *RST: IMMediate

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

Spectrum Emission Mask—Power Reference

[:SENSe]:SEMask:TYPE PSDRef|TPRef

[:SENSe]:SEMask:TYPE?

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

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

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

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

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

Spectrum (Frequency-Domain) Measurement

Commands for querying the spectrum measurement results and for setting to the default values are found in the “MEASure Group of Commands” on page 144. 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

SENSe Subsystem

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 (APEak) - 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 (APLock) - 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: APEak

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.

SENSe Subsystem

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—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— Select Pre-FFT Bandwidth

[:SENSe]:SPECtrum:BANDwidth|BWIDth:IF:AUTO OFF|ON|0|1

[:SENSe]:SPECtrum:BANDwidth|BWIDth:IF:AUTO?

Select auto or manual control of the pre-FFT BW.

Factory Preset AUTO, 1.55 MHz

Front Panel Access: **Measure**, **Spectrum**, **Meas Setup**, **More**, **Advanced**, **Pre-FFT BW**.

Spectrum — IF Flatness Corrections

[:SENSe]:SPECtrum:BANDwidth|BWIDth:IF:FLATness OFF|ON|0|1

[:SENSe]:SPECtrum:BANDwidth|BWIDth:IF:FLATness?

Turns IF flatness corrections on and off.

Factory Preset and *RST: ON

Front Panel Access: **Measure**, **Spectrum**, **Meas Setup**, **More**, **Advanced**, **Pre-FFT BW**

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

[: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

SENSe Subsystem

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 (FLAT)- 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
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.

Spectrum— Select Pre-FFT Bandwidth

[:SENSe]:SPECtrum:BANDwidth|BWIDth:IF:AUTO OFF|ON|0|1

[:SENSe]:SPECtrum:BANDwidth|BWIDth:IF:AUTO?

Select auto or manual control of the pre-FFT BW.

Remarks: This command is an alias that does the same thing as

[:SENSe]:SPECtrum:BANDwidth|BWIDth:PFET:AUTO

Factory Preset and *RST: AUTO, 1.55 MHz

Front Panel Access: **Measure**, **Spectrum**, **Meas Setup**, **More**, **Advanced**, **Pre-FFT BW**.

Decimation of Spectrum Display

[:SENSe]:SPECtrum:DECimate[:FACTor] <integer>

[:SENSe]:SPECtrum:DECimate[:FACTor]?

Sets the amount of data decimation done by the hardware and/or the software. Decimation by n keeps every nth sample, throwing away each of the remaining samples in the group of n. For example, 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:

History: Version A.02.00 or later

Spectrum—FFT Length

[:SENSe]:SPECtrum:FFT:LENGth[:VALue] <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 Delay

[:SENSe]:SPECtrum:FFT:WINDow:DELay <real>

[:SENSe]:SPECtrum:FFT:WINDow:DELay?

Set the FFT window delay to move the FFT window from its nominal position of being centered within the time capture. This function is not available from the front panel. It is an advanced control that normally does not need to be changed.

Factory Preset and *RST:	0
Range:	–10.0 to +10.0s
Default Unit:	seconds
Remarks:	To use this command, the Service mode must be selected with INSTrument:SELect. In Service mode, it is possible to get an acquisition time that is longer than the window time so that this function can be used.

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

FLATtop - 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:	FLATtop
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—Sweep (Acquisition) Time

[:SENSe]:SPECtrum:SWEep:TIME[:VALue}<time>

[:SENSe]:SPECtrum:SWEep:TIME?

Set the sweep (measurement acquisition) time. It is used to specify the length of the time capture record. If the specified value is less than the capture time required for the specified span and resolution bandwidth, the value is ignored. The value is set at its auto value when auto is selected. This is an advanced control that normally does not need to be changed.

Factory Preset and *RST:	188.0 μs 15.059 ms, for iDEN mode
Range:	100 ns to 10 s
Default Unit:	seconds
Remarks:	NOTE: You must be in the Service mode to use this command. Use INSTrument:SELect to set the mode. This command only effects the RF envelope trace.

Spectrum—Sweep (Acquisition) Time Auto

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

[:SENSe]:SPECtrum:SWEep:TIME:AUTO

Select auto or manual control of the sweep (acquisition) time. This is an advanced control that normally does not need to be changed.

AUTO - couples the Sweep Time to the Frequency Span and Resolution BW

Manual - the Sweep Time is uncoupled from the Frequency Span and Resolution BW.

Factory Preset and *RST: AUTO

Remarks: 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)

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

Factory Preset and *RST: IMMediate (free run)

RFBurst, for GSM, iDEN mode

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

Synchronization Commands

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 (ESECond) - Even second clock

EXTernal 1 - front panel external trigger input

EXTernal 2 - rear panel external trigger input

NONE - no demod sync (uses free run trigger)

Pilot Sequence (PSEQuence) - pilot sequence sync (uses frame trigger)

Factory Preset and *RST:	ESECond
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

Sync Alignment

[:SENSe]:SYNC:ALIGnment GSM|HBIT

[:SENSe]:SYNC:ALIGnment?

Select the sync alignment to be either to the GSM standard or the standard offset by 1/2 bit.

GSM - burst alignment as defined in the GSM standard

HBIT - burst alignment is advanced by1/2 bit, which corresponds to an earlier interpretation of the GSM standard

Factory Preset and *RST:	HBIT
Remarks:	Global to the current mode. You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Front Panel
Access: **Mode Setup, Demod, Burst Align**

Burst Sync Delay

[:SENSe]:SYNC:BURSt:DELay <time>

[:SENSe]:SYNC:BURSt:DELay?

Set the delay for the burst measurement position from the reference position that is determined by sync word or the burst rising/falling edges.

Factory Preset
and *RST: 0 sec

Range: –500 ms to 500 ms

Default Unit: seconds

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

Sync Burst RF Amplitude Delay

[:SENSe]:SYNC:BURSt:RFAMplitude:DELay <time>

[:SENSe]:SYNC:BURSt:RFAMplitude:DELay?

Set the delay for the RF amplitude sync.

Factory Preset
and *RST: 0 s

Range: –100 ms to 100 ms

Default Unit: seconds

Remarks: Global to the current mode.

You must be in the EDGE(w/GSM), Bluetooth or GSM mode to use this command. Use INSTrument:SELect to set the mode.

Front Panel
Access: **Mode Setup, Trigger, RF Burst, Delay**

Burst Search Threshold

[:SENSe]:SYNC:STHReshold <rel_power>

[:SENSe]:SYNC:STHReshold?

SENSe Subsystem

Set the power threshold, relative to the peak power, that is used to determine the burst rising edge and falling edge.

Factory Preset and *RST:	–30 dB
Range:	–200 to –0.01 dB
Default Unit:	dB
Remarks:	You must be in the iDEN, NADC or PDC mode to use this command. Use INSTrument:SELect to set the mode.
Front Panel Access:	**Mode Setup, Trigger, Burst Search Threshold**

SENSe Subsystem

Transmit Band Spurs Measurement

Commands for querying the transmit band spurs measurement results and for setting to the default values are found in the “MEASure Group of Commands” on page 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **TxBand Spur** measurement has been selected from the **MEASURE** key menu.

Transmit Band Spurs—Average Count

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

[:SENSe]:TSPur: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:	30
Range:	1 to 10,000
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later

Transmit Band Spurs—Averaging State

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

[:SENSe]:TSPur:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST:	ON
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later

Transmit Band Spurs—Averaging Termination Control

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

[:SENSe]:TSPur: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 EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later

Transmit Band Spurs—Averaging Type

[:SENSe]:TSPur:AVERage:TYPE LOG|MAXimum|RMS

[:SENSe]:TSPur: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.

Factory Preset and *RST:	MAXimum
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later

Transmit Band Spurs—Type

[:SENSe]:TSPur:TYPE EXAMine|FULL

[:SENSe]:TSPur:TYPE?

Select the measurement type.

EXAMine - measures spurs in all the valid segments and then displays the segment that has the worst spur

FULL - continuously measures the spurs in all the valid segments

SENSe Subsystem

Factory Preset and *RST:	FULL
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.
History:	Version A.03.00 or later

Transmit Power Measurement

Commands for querying the transmit power measurement results and for setting to the default values are found in the “MEASure Group of Commands” on page 144. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Transmit Power** measurement has been selected from the **MEASURE** key menu.

Transmit Power—Number of Bursts Averaged

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

[:SENSe]:TXPower:AVERage:COUNt?

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

Factory Preset and *RST:	50
Range:	1 to 10,000
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Transmit Power—Averaging State

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

[:SENSe]:TXPower:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST:	ON
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Transmit Power—Averaging Mode

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

[:SENSe]:TXPower: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

Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Transmit Power—Resolution BW

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

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

Set the resolution BW. This is an advanced control that normally does not need to be changed. Setting it to a value other than the factory default, may cause invalid measurement results.

Factory Preset and *RST: 500 kHz

Range: 1 kHz to 5 MHz

Default Unit: Hz

Remarks: You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Transmit Power—Resolution BW Filter Type

[:SENSe]:TXPower:BANDwidth|BWIDth[:RESolution]:TYPE FLAT|GAUSsian

[:SENSe]:TXPower:BANDwidth|BWIDth[:RESolution]:TYPE?

Select the type of resolution BW filter. 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.

Flat top (FLAT) - 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:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Transmit Power—Sweep Time

[:SENSe]:TXPower:SWEep:TIME <integer>

[:SENSe]:TXPower:SWEep:TIME?

Set the number of slots which are used in each data acquisition. Each slot is approximately equal to 600 ms.

Factory Preset and *RST:	1
Range:	1 to 50 time slots (for resolution BW = 500 kHz)
Remarks:	You must be in the EDGE(w/GSM), GSM or Service mode to use this command. Use INSTrument:SELect to set the mode.

Transmit Power—Threshold Level

[:SENSe]:TXPower:THReshold <power>

[:SENSe]:TXPower:THReshold?

Set the amplitude threshold level. Only the data above the threshold level is kept and used to compute the average transmit carrier power.

Factory Preset and *RST:	–6.0 dB
	–6.0 dB
Range:	–100 dB to 0 dB, for relative mode
	–100 dB to +30 dB, for absolute mode
Default Unit:	dB
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.
	The command (SENSe:TXPower:THReshold:TYPe ABSolute|RELative) determines whether this command is setting an absolute or a relative power level.

SENSe Subsystem

Transmit Power—Threshold Type

[:SENSe]:TXPower:THReshold:TYPE ABSolute|RELative

[:SENSe]:TXPower:THReshold:TYPE?

Select auto or manual control of the threshold level.

ABSolute - threshold value is set to an absolute power level

RELative - threshold value is set relative to the reference

Factory Preset and *RST:	RELative
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

Transmit Power—Trigger Source

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

[:SENSe]:TXPower:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

EXTernal 1 - front panel external trigger input

EXTernal 2 - rear panel external trigger input

IF - internal IF envelope (video) trigger

IMMediate - the next data acquisition is immediately taken (also called free run)

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

Factory Preset and *RST:	RFBurst
Remarks:	You must be in the EDGE(w/GSM), GSM mode to use this command. Use INSTrument:SELect to set the mode.

SENSe Subsystem

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 144. 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—Data Acquisition Packing

[:SENSe]:WAVeform:ACQuistion:PACKing AUTO|LONG|MEDium|SHORt

[:SENSe]:WAVeform:ACQuistion:PACKing?

This is an advanced control that normally does not need to be changed.

Factory Preset and *RST:	AUTO
Remarks:	You must be in the Service mode to use this command. Use INSTrument:SELect to set the mode.

Waveform—ADC Dither State

[:SENSe]:WAVeform:ADC:DITHer[:STATe] |OFF|ON|0|1

[:SENSe]:WAVeform:ADC:DITHer[:STATe]?

This is an Advanced control that normally does not need to be changed.

Factory Preset and *RST:	OFF
Remarks:	You must be in the Service mode to use this command. Use INSTrument:SELect to set the mode.

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 (APEak) - automatically peak the range

Auto Peak Lock (APLock)- 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.

FLATtop - a filter with a flat amplitude response, which provides the best amplitude accuracy.

GAUSsian - a filter with Gaussian characteristics, which provides the best pulse response.

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.

SENSe Subsystem

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

RFBurst - 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

RFBurst, for GSM, iDEN mode

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

SENSe Subsystem

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October 23, 2000 10:47 am

SERVice Subsystem

Provides SCPI access for the calibration manager.

Read and Write Calibration Data

:SERVice[:PRODuction]:CALibrate <cal_fid>,<idx>,<numeric_value>

:SERVice[:PRODuction]:CALibrate? <cal_fid>,<idx>

Write or read the calibration data specified by the cal_fid and idx. This write is done to NRAM, it is not stored to EEROM until DIAGnostic:CALibrate:STORe is executed.

Example: DIAGnostic:CALibrate 2,1,0

Range: cal_fid ::= numeric_value corresponds to the CALibrate file ID

idx, is the index into the CALibrate file specified by cal_fid

Prepare Calibration Files for Access

:SERVice[:PRODuction]:CALibrate:BEGin

Locks all of the calibration files for memory accesses.

Remarks: No query.

Load Default Calibration Data to NRAM

:SERVice[:PRODuction]:CALibrate:DEFault <cal_fid>

Loads the specified calibration data from EEROM to NRAM, initializing the alignment data to the factory defaults..

Range: cal_fid, corresponds to the Calibrate file ID

Remarks: No query.

Unlock Calibration Files

:SERVice[:PRODuction]:CALibrate:END

Unlocks all of the calibration files.

SERVice Subsystem

Set Default Calibration Data

:SERVice[:PRODuction]:CALibrate:INITialize <cal_fid>

Loads the specified calibration data with default values.

Range: cal_fid, corresponds to the calibration data file ID

Remarks: No query.

Store Calibration Data in EEROM

:SERVice[:PRODuction]:CALibrate:STORe <cal_fid>

Stores the specified calibration data into EEROM. The data will survive power cycles and will be reloaded into NRAM on power up.

Range: cal_fid, corresponds to the calibration data file ID

Remarks: No query.

SERVice Subsystem

20 STATus Subsystem

October 23, 2000 10:47 am

STATus Subsystem

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

Operation Register

Operation Condition Query

:STATus:OPERation:CONDition?

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

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

Operation Enable

:STATus:OPERation:ENABle <integer>

:STATus:OPERation:ENABle?

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

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

Factory Preset and *RST:	The last user setting persists through power on/off. Factory default is 0.
Range:	0 to 32767

Operation Event Query

:STATus:OPERation[:EVENt]?

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

NOTE The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register.

The data in this register is latched until it is queried. Once queried, the register is cleared.

Operation Negative Transition

:STATus:OPERation:NTRansition <integer>

:STATus:OPERation:NTRansition?

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

Factory Preset and *RST:	0, factory default. (The user setting is persistent.)
Range:	0 to 32767

Operation Positive Transition

:STATus:OPERation:PTRansition <integer>

:STATus:OPERation:PTRansition?

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

Factory Preset and *RST:	The last user setting persists through power on/off. Factory default is 32767 (all 1's).
Range:	0 to 32767

Preset the Status Byte

:STATus:PRESet

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

Questionable Register

Questionable Condition

:STATus:QUEStionable:CONDition?

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

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

Questionable Enable

:STATus:QUEStionable:ENABle <number>

:STATus:QUEStionable:ENABle?

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

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

Factory Preset and *RST:	The last user setting persists through power on/off. Factory default is 0.

Range: 0 to 32767

Questionable Event Query

:STATus:QUEStionable[:EVENt]?

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

NOTE The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register.

The data in this register is latched until it is queried. Once queried, the register is cleared.

Questionable Negative Transition

:STATus:QUEStionable:NTRansition <number>

:STATus:QUEStionable:NTRansition?

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

Factory Preset and *RST: The last user setting persists through power on/off. Factory default is 0.

Range: 0 to 32767

Questionable Positive Transition

:STATus:QUEStionable:PTRansition <number>

:STATus:QUEStionable:PTRansition?

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

Factory Preset and *RST: The last user setting persists through power on/off. Factory default is 32767 (all 1's).

Range: 0 to 32767

Questionable Calibration Register

Questionable Calibration Condition

:STATus:QUEStionable:CALibration:CONDition?

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

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

Questionable Calibration Enable

:STATus:QUEStionable:CALibration:ENABle <number>

:STATus:QUEStionable:CALibration:ENABle?

This command determines what bits in the Questionable Calibration Condition Register will set bits in the Questionable Calibration Event register, which also sets the Calibration Summary bit (bit 8) in the Questionable Register. The variable <number> is the sum of the decimal values of the bits you want to enable.

Example	STAT:QUES:CAL:ENABLE 16384 could be used if you have turned off the automatic alignment and you want to query if an alignment is needed.
Factory Preset and *RST:	The last user setting persists through power on/off. Factory default is 32767 (all 1's).
Range:	0 to 32767

Questionable Calibration Event Query

:STATus:QUEStionable:CALibration[:EVENt]?

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

NOTE The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register.

The data in this register is latched until it is queried. Once queried, the register is cleared.

Questionable Calibration Negative Transition

:STATus:QUEStionable:CALibration:NTRansition <number>

:STATus:QUEStionable:CALibration:NTRansition?

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

Factory Preset and *RST: The last user setting persists through power on/off. Factory default is 0.

Range: 0 to 32767

Questionable Calibration Positive Transition

:STATus:QUEStionable:CALibration:PTRansition <number>

:STATus:QUEStionable:CALibration:PTRansition?

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

Factory Preset and *RST: The last user setting persists through power on/off. Factory default is 32767 (all 1’s).

Range: 0 to 32767

Questionable Frequency Register

Questionable Frequency Condition

:STATus:QUEStionable:FREQuency:CONDition?

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

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

Questionable Frequency Enable

:STATus:QUEStionable:FREQuency:ENABle <number>

:STATus:QUEStionable:FREQuency:ENABle?

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

Factory Preset and *RST:	The last user setting persists through power on/off. Factory default is 32767 (all 1's).
Range:	0 to 32767

Questionable Frequency Event Query

:STATus:QUEStionable:FREQuency[:EVENt]?

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

NOTE The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register.

The data in this register is latched until it is queried. Once queried, the register is cleared.

Questionable Frequency Negative Transition

:STATus:QUEStionable:FREQuency:NTRansition <number>

:STATus:QUEStionable:FREQuency:NTRansition?

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

Factory Preset and *RST:	0, factory default. (The user setting is persistent.)
Range:	0 to 32767

Questionable Frequency Positive Transition

:STATus:QUEStionable:FREQuency:PTRansition <number>

:STATus:QUEStionable:FREQuency:PTRansition?

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

Factory Preset and *RST:	The last user setting persists through power on/off. Factory default is 32767 (all 1's).
Range:	0 to 32767

Questionable Integrity Register

Questionable Integrity Condition

:STATus:QUEStionable:INTegrity:CONDition?

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

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

Questionable Integrity Enable

:STATus:QUEStionable:INTegrity:ENABle <number>

:STATus:QUEStionable:INTegrity:ENABle?

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

Factory Preset and *RST:	The last user setting persists through power on/off. Factory default is 32767 (all 1's).
Range:	0 to 32767

Questionable Integrity Event Query

:STATus:QUEStionable:INTegrity[:EVENt]?

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

NOTE The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register.

The data in this register is latched until it is queried. Once queried, the register is cleared.

Questionable Integrity Negative Transition

:STATus:QUEStionable:INTegrity:NTRansition <number>

:STATus:QUEStionable:INTegrity:NTRansition?

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

Factory Preset and *RST:	The last user setting persists through power on/off. Factory default is 0.
Range:	0 to 32767

Questionable Integrity Positive Transition

:STATus:QUEStionable:INTegrity:PTRansition <number>

:STATus:QUEStionable:INTegrity:PTRansition?

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

Factory Preset and *RST:	The last user setting persists through power on/off. Factory default is 32767 (all 1’s).
Range:	0 to 32767

Questionable Integrity Signal Register

Questionable Integrity Signal Condition

:STATus:QUEStionable:INTegrity:SIGNal:CONDition?

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

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

Questionable Integrity Signal Enable

:STATus:QUEStionable:INTegrity:SIGNal:ENABle <number>

:STATus:QUEStionable:INTegrity:SIGNal:ENABle?

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

Factory Preset and *RST:	The last user setting persists through power on/off. Factory default is 32767 (all 1's).
Range:	0 to 32767

Questionable Integrity Signal Event Query

:STATus:QUEStionable:INTegrity:SIGNal[:EVENt]?

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

NOTE The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register.

The data in this register is latched until it is queried. Once queried, the register is cleared.

Questionable Integrity Signal Negative Transition

:STATus:QUEStionable:INTegrity:SIGNal:NTRansition <number>

:STATus:QUEStionable:INTegrity:SIGNal:NTRansition?

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

Factory Preset and *RST:	The last user setting persists through power on/off. Factory default is 0.
Range:	0 to 32767

Questionable Integrity Signal Positive Transition

:STATus:QUEStionable:INTegrity:SIGNal:PTRansition <number>

:STATus:QUEStionable:INTegrity:SIGNal:PTRansition?

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

Factory Preset and *RST:	The last user setting persists through power on/off. Factory default is 32767 (all 1's).
Range:	0 to 32767

Questionable Integrity Uncalibrated Register

Questionable Integrity Uncalibrated Condition

:STATus:QUEStionable:INTegrity:UNCalibrated:CONDition?

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

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

Questionable Integrity Uncalibrated Enable

:STATus:QUEStionable:INTegrity:UNCalibrated:ENABle

:STATus:QUEStionable:INTegrity:UNCalibrated:ENABle?

This command determines which bits in the Questionable Integrity

Uncalibrated Condition Register will set bits in the Questionable Integrity Uncalibrated Event register, which also sets the Data Uncalibrated Summary bit (bit 3) in the Questionable Integrity Register. The variable <number> is the sum of the decimal values of the bits you want to enable.

Factory Preset and *RST:	32767 (all 1's)
Range:	0 to 32767

Questionable Integrity Uncalibrated Event Query

:STATus:QUEStionable:INTegrity:UNCalibrated[:EVENt]?

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

NOTE The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register.

The data in this register is latched until it is queried. Once queried, the register is cleared.

Questionable Integrity Uncalibrated Negative Transition

:STATus:QUEStionable:INTegrity:UNCalibrated:NTRansition <number>

:STATus:QUEStionable:INTegrity:UNCalibrated:NTRansition?

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

Factory Preset and *RST:	0
Range:	0 to 32767

Questionable Integrity Uncalibrated Positive Transition

:STATus:QUEStionable:INTegrity:UNCalibrated:PTRansition <number>

:STATus:QUEStionable:INTegrity:UNCalibrated:PTRansition?

This command determines which bits in the Questionable Integrity

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

Factory Preset and *RST:	32767 (all 1’s)
Range:	0 to 32767

Questionable Power Register

Questionable Power Condition

:STATus:QUEStionable:POWer:CONDition?

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

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

Questionable Power Enable

:STATus:QUEStionable:POWer:ENABle <number>

:STATus:QUEStionable:POWer:ENABle?

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

Factory Preset and *RST:	The last user setting persists through power on/off. Factory default is 32767 (all 1’s).
Range:	0 to 32767

Questionable Power Event Query

:STATus:QUEStionable:POWer[:EVENt]?

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

NOTE The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register.

The data in this register is latched until it is queried. Once queried, the register is cleared.

Questionable Power Negative Transition

:STATus:QUEStionable:POWer:NTRansition <number>

:STATus:QUEStionable:POWer:NTRansition?

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

Factory Preset
and *RST: The last user setting persists through power on/off. Factory default is 0.

Range: 0 to 32767

Questionable Power Positive Transition

:STATus:QUEStionable:POWer:PTRansition <number>

:STATus:QUEStionable:POWer:PTRansition?>

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

Factory Preset
and *RST: The last user setting persists through power on/off. Factory default is 32767 (all 1's).

Range: 0 to 32767

Questionable Temperature Register

Questionable Temperature Condition

:STATus:QUEStionable:TEMPerature:CONDition?

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

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

Questionable Temperature Enable

:STATus:QUEStionable:TEMPerature:ENABle <number>

:STATus:QUEStionable:TEMPerature:ENABle?

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

Factory Preset and *RST: The last user setting persists through power on/off. Factory default is 32767 (all 1's).

Range: 0 to 32767

Questionable Temperature Event Query

:STATus:QUEStionable:TEMPerature[:EVENt]?

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

NOTE The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register.

The data in this register is latched until it is queried. Once queried, the register is cleared

Questionable Temperature Negative Transition

:STATus:QUEStionable:TEMPerature:NTRansition <number>

:STATus:QUEStionable:TEMPerature:NTRansition?

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

Factory Preset and *RST: The last user setting persists through power on/off.

Factory default is 0.

Range: 0 to 32767

Questionable Temperature Positive Transition

:STATus:QUEStionable:TEMPerature:PTRansition <number>

:STATus:QUEStionable:TEMPerature:PTRansition?

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

Factory Preset and *RST: The last user setting persists through power on/off. Factory default is 32767 (all 1's).

Range: 0 to 32767

21 SYSTem Subsystem

October 23, 2000 10:47 am

SYSTem Subsystem

This subsystem is used to set the controls and parameters associated with the overall system communication. These are functions that are not related to instrument performance. Examples include functions for performing general housekeeping and functions related to setting global configurations.

GPIB Address

:SYSTem:COMMunicate:GPIB[:SELF]:ADDRess <integer>

:SYSTem:COMMunicate:GPIB[:SELF]:ADDRess?

Sets and queries the GPIB address.

Factory Preset and *RST: The factory default is 18.

This function is persistent which means that it stays at the setting previously selected, even through a power cycle.

Range: Integer, 0 to 30

Example: SYST:COMM:GIPB:ADDRESS 18

Front Panel Access: **System, Config I/O, GPIB Addr**

LAN IP Address with Host Name

:SYSTem:COMMunicate:LAN[:SELF]:IP <string>

:SYSTem:COMMunicate:LAN[:SELF]:IP?

Set the IP (internet protocol) address, domain name and node name for the instrument.

<string> is a string that contains: <IP address> <host name> as shown in the following example:

`141.4.402.222 sigan`

where: 141.4.402.222, is the IP address and sigan, is the host name.

Example: SYST:COMM:LAN:IP “22.121.44.45 analyz”

Front Panel Access: **System, Config I/O, Config LAN**

SYSTem Subsystem

Hardware Configuration Query

`:SYSTem:CONFigure:DEFault`

Resets all instrument functions to the factory defaults, including the persistent functions. Persistent functions are system settings that stay at their current settings even through instrument power-on, such as I/O bus addresses and preset preferences.

Front Panel
Access: **System, Restore Sys Defaults**

System Configuration Query

`:SYSTem:CONFigure[:SYSTem]?`

Returns a block of data listing of all the information on the **Show System** screen. For more information about how to use block data see the FORMat:DATA command or the Programming Fundamentals: SCPI Language Basics discussion on arbitrary length block data.

Front Panel
Access: **System, Show System**

Set Date

`:SYSTem:DATE <year>,<month>,<day>`

`:SYSTem:DATE?`

Sets the date of the real-time clock of the instrument.

Year - is a 4-digit integer

Month - is an integer from 1 to 12

Day - is an integer from 1 to 31 (depending on the month)

Front Panel
Access: **System, Time/Date, Set Date**

Error Information Query

`:SYSTem:ERRor[:NEXT]?`

This command queries the earliest entry in the error queue and then deletes that entry. *CLS clears the entire error queue. It can be used to continuously monitor the error queue for errors to occur.

Front Panel

SYSTem Subsystem

Access: **System, Show Errors**

Locate SCPI Command Errors

:SYSTem:ERRor:VERBose OFF|ON|0|1

:SYSTem:ERRor:VERBose?

Adds additional information to the error messages returned by the SYSTem:ERRor? command. It indicates which SCPI command was executing and where in that command the error was detected.

<error number>,"<error message>;<annotated SCPI command>"

Example: First set SYST:ERR:VERBOSE ON

If the command SENSe:FREQuently:CENTer 942.6MHz is sent, then sending SYST:ERR? returns:

`–113,"Undefined header;SENSe:FREQuently:<Err>CENTer 942.6MHz $<NL>"`

The <Err> shown after FREQuently shows you the spelling error. (The $<NL> is the typical representation for the command terminator.

If the command SENSe:FREQuency:CENTer 942.6Sec is sent, then sending SYST:ERR? returns:

`–113,"Invalid suffix;SENSe:FREQuency:CENTer 942.6Sec<Err> $<NL>"`

The <Err> shown after Sec shows you the invalid suffix.

Factory Preset and *RST: Off. This parameter is persistent, which means that it retains the setting previously selected, even through a power cycle.

Remarks: The verbose SCPI error debugging state is global to all the SCPI interfaces.

History: Added version A.04.00

Front Panel Access: System, Show Errors, Verbose

Exit Main Firmware for Upgrade

:SYSTem:EXIT

Exit the main firmware to allow the firmware to be upgraded.

Front Panel Access: **System, Install, Exit Main Firmware**

SCPI Command Help Headers Query

:SYSTem:HELP:HEADers?

Outputs a list of valid SCPI commands from the instrument.

NOTE The commands that are listed are only for the base instrument and for the currently selected mode (e.g. Service mode, GSM mode) Use INSTrument:SELect to change the mode. The core set of system-type commands are common to all modes.

Example: syst:help:head?

Host Identification Query

:SYSTem:HID?

Returns a string that contains the host identification. This ID is required in order to obtain the license key that enables a new application (mode) or option.

Front Panel
Access: **System, Show System**

License Key for Installing New Applications

:SYSTem:LKEY <'option'>,<'license key'>

:SYSTem:LKEY? <'option'>

Enter the license key required for installing the specified new application (mode) or option. The query returns a string that contains the license key for a specified application or option that is already installed in the instrument. The license key will also be returned if the application is not currently in memory, but had been installed at some previous time.

Option – is a string that is the 3-character designation for the desired option. For example: BAC is the option for cdmaOne.

License key – is a 12 character alphanumeric string given to you with your option.

Example: **SYST:LKEY "BAC","123A456B789C"**

Remarks: The license key is unique to the specific option installed in the instrument with the specified serial number.

SYSTem Subsystem

Front Panel
Access: **System, Install, License Key**

Delete a License Key

:SYSTem:LKEY:DELete <'application option'>,<'license key'>

Allows you to delete the license key, for the selected application, from instrument memory.

NOTE Do not delete the license key number. If the license key is deleted, you will be unable to reload or update the application in instrument memory without re-entering the license key. The license key only works with one particular instrument serial number.

<application> - is a string that is the same as one of the enumerated items used in the INSTrument[:SELect] command.

<license key> - is a 12 character alphanumeric string given to you with your application

Front Panel
Access: **None**

Preset

:SYSTem:PRESet

Returns the instrument to a set of defined conditions. This command does not change any persistent parameters.

Front Panel
Access: **Preset**

Set Time

:SYSTem:TIME <hour>,<min>,<sec>

:SYSTem:TIME?

Sets the time of the real-time clock of the instrument.

Hour must be an integer from 0 to 23.

Minute must be an integer from 0 to 59.

Second must be an integer from 0 to 59.

Front Panel Access: **System, Time/Date, Set Time**

Adjust Time

:SYSTem:TIME:ADJust <seconds>

Adjust the instruments internal time by the value entered.

Range: Larger than you should ever need

Example: **SYST:TIME:ADJ 3600** will advance the time one hour.

SYST:TIME:ADJ -86400 will back the date up one day, without changing the time of day (minutes or seconds).

History: In revision A.02.00 and later

Default Unit: seconds

SCPI Version Query

:SYSTem:VERSion?

Returns the SCPI version number with which the instrument complies.

SYSTem Subsystem

22 TRIGger Subsystem

October 24, 2000 12:29 pm

TRIGger Subsystem

The Trigger Subsystem is used to set the controls and parameters associated with triggering the data acquisitions. Other trigger-related commands are found in the INITiate and ABORt subsystems.

The trigger parameters are global within the selected Mode. The commands in the TRIGger subsystem set up the way the triggers function, but selection of the trigger source is made from each measurement. There is a separate trigger source command in the SENSe:<meas> subsystem for each measurement. The equivalent front panel keys for the parameters described in the following commands, can be found under the **Mode Setup, Trigger** key.

Automatic Trigger Control

:TRIGger[:SEQuence]:AUTO:STATe OFF|ON|0|1

:TRIGger[:SEQuence]:AUTO:STATe?

Turns the automatic trigger function on and off. This function causes a trigger to occur if the designated time has elapsed and no trigger occurred. It can be used with unpredictable trigger sources, like external or burst, to make sure a measurement is initiated even if a trigger doesn't occur. Use TRIGger[:SEQuence]:AUTO[:TIME] to set the time limit.

Factory Preset and *RST	Off for cdma2000, W-CDMA (3GPP) , W-CDMA (Trial & ARIB), NADC, and PDC
Front Panel Key Access	**Mode Setup, Trigger, Auto Trigger**

Automatic Trigger Time

:TRIGger[:SEQuence]:AUTO[:TIME] <time>

:TRIGger[:SEQuence]:AUTO[:TIME]?

After the measurement is activated the instrument will take a data acquisition immediately upon receiving a signal from the selected trigger source. If no trigger signal is received by the end of the time specified in this command, a data acquisition is taken anyway. TRIGger[:SEQuence]:AUTO:STATE must be on.

Factory Preset and *RST:	100.0 ms
Range:	1.0 ms to 1000.0 s

TRIGger Subsystem

	0.0 to 1000.0 s for cdma2000, W-CDMA (3GPP), W-CDMA (Trial & ARIB)
Default Unit:	seconds

External Trigger Delay

:TRIGger[:SEQuence]:EXTernal[1]|2:DELay <time>

:TRIGger[:SEQuence]:EXTernal[1]|2:DELay?

Set the trigger delay when using an external trigger. Set the trigger value to zero (0) seconds to turn off the delay.

EXT or EXT1is the front panel trigger input

EXT2 is the rear panel trigger input

Factory Preset and *RST:	0.0 s
Range:	–500.0 ms to 500.0 ms
	–100.0 ms to 500.0 ms for cdma2000, W-CDMA (3GPP), W-CDMA (Trial & ARIB)
Default Unit:	seconds
Front Panel Access:	**Mode Setup, Trigger, Ext Rear (or Ext Front), Delay**

External Trigger Level

:TRIGger[:SEQuence]:EXTernal[1]|2:LEVel <voltage>

:TRIGger[:SEQuence]:EXTernal[1]|2:LEVel?

Set the trigger level when using an external trigger input.

EXT or EXT1is the front panel trigger input

EXT2 is the rear panel trigger input

Factory Preset and *RST:	2.0 V
Range:	–5.0 to +5.0 V
Default Unit:	volts
Front Panel Access:	**Mode Setup, Trigger, Ext Rear, Level**
	Mode Setup, Trigger, Ext Front, Level

External Trigger Slope

:TRIGger[:SEQuence]:EXTernal[1]|2:SLOPe NEGative|POSitive

:TRIGger[:SEQuence]:EXTernal[1]|2:SLOPe?

Sets the trigger slope when using an external trigger input.

EXT or EXT1is the front panel trigger input

EXT2 is the rear panel trigger input

Factory Preset and *RST: Positive

Front Panel Access: **Mode Setup, Trigger, Ext Rear (or Ext Front), Slope**

Frame Trigger Adjust

:TRIGger[:SEQuence]:FRAMe:ADJust <time>

Lets you advance the phase of the frame trigger by the specified amount. It does not change the period of the trigger waveform. If the command is sent multiple times, it advances the phase of the frame trigger more each time it is sent.

Factory Preset and *RST: 0.0 s

Range: 0.0 to 10.0 s

Default Unit: seconds

Front Panel Access: **None**

Frame Trigger Period

:TRIGger[:SEQuence]:FRAMe:PERiod <time>

:TRIGger[:SEQuence]:FRAMe:PERiod?

Set the frame period that you want when using the external frame timer trigger. If the traffic rate is changed, the value of the frame period is initialized to the preset value.

Factory Preset and *RST: 250.0 μs for Basic, cdmaOne

4.615383 ms, for GSM

26.666667 ms for cdma2000

	10.0 ms (1 radio frame) for W-CDMA (3GPP), W-CDMA (Trial & ARIB)
	90.0 ms for iDEN
	20.0 ms with rate=full for NADC, PDC
	40.0 ms with rate=half for NADC, PDC
Range:	0.0 ms to 559.0 ms for Basic, cdmaOne, GSM, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & ARIB)
	1.0 ms to 559.0 ms for iDEN, NADC, PDC
Default Unit:	seconds
Front Panel Access:	**Mode Setup, Trigger, Frame Timer, Period**

Frame Trigger Sync Mode

:TRIGger[:SEQuence]:FRAMe:SYNCmode EXTFront|EXTRear|OFF|RFBurst

:TRIGger[:SEQuence]:FRAMe:SYNCmode?

Selects the input port location for the external frame trigger that you are using.

Factory Preset and *RST:	Off
Remarks:	You must be in the Basic, cdmaOne, EDGE (w/GSM), GSM, iDEN, NADC, PDC, Service mode to use this command. Use INSTrument:SELect to set the mode.
Front Panel Access:	**Mode Setup, Trigger, Frame Timer, Sync Source**

Frame Trigger Synchronization Offset

:TRIGger[:SEQuence]:FRAMe:SYNCmode:OFFSet <time>

Lets you adjust the frame triggering with respect to the external trigger input that you are using.

Factory Preset and *RST:	0.0 s
Range:	0.0 to 10.0 s
Default Unit:	seconds
Remarks:	You must be in the Basic, cdmaOne, EDGE (w/GSM),

TRIGger Subsystem

	GSM, iDEN, NADC, PDC, Service mode to use this command. Use INSTrument:SELect to set the mode.
History:	Revision A.03.27 or later
Front Panel Access:	**Mode Setup, Trigger, Frame Timer, Offset**

Trigger Holdoff

:TRIGger[:SEQuence]:HOLDoff <time>

:TRIGger[:SEQuence]:HOLDoff?

Set the holdoff time between triggers. After a trigger, another trigger will not be allowed until the holdoff time expires. This parameter affects all trigger sources.

Factory Preset and *RST:	0.0 s
	20.0 ms for iDEN
	10.0 ms for NADC or PDC
Range:	0.0 to 500.0 ms
Default Unit:	seconds
Front Panel Access:	**Mode Setup, Trigger, Trig Holdoff**

Video (IF) Trigger Delay

:TRIGger[:SEQuence]:IF:DELay <time>

:TRIGger[:SEQuence]:IF:DELay?

Set the trigger delay when using the IF (video) trigger (after the Resolution BW filter).

Factory Preset and *RST:	0.0 s
Range:	–500.0 ms to 500.0 ms
	–100.0 ms to 500.0 ms for cdma2000, W-CDMA (3GPP), W-CDMA (Trial & ARIB)
Default Unit:	seconds
Front Panel Access:	**Mode Setup, Trigger, Video (IF Envlp), Delay**

Video (IF) Trigger Level

:TRIGger[:SEQuence]:IF:LEVel <power>

:TRIGger[:SEQuence]:IF:LEVel?

Set the trigger level when using the IF (video) trigger.

Factory Preset and *RST:	–6.0 dBm for cdmaOne, GSM, Basic, Service, cdma2000, W-CDMA (3GPP), W-CDMA (Trial & ARIB)
	–20.0 dBm for iDEN
	–30.0 dBm for NADC, PDC
Range:	–200.0 to 50.0 dBm
Default Unit:	dBm
Front Panel Access:	**Mode Setup, Trigger, Video (IF Envlp), Level**

Video (IF) Trigger Slope

:TRIGger[:SEQuence]:IF:SLOPe NEGative|POSitive

:TRIGger[:SEQuence]:IF:SLOPe?

Sets the trigger slope when using the IF (video) trigger.

Factory Preset and *RST:	Positive
Front Panel Access:	**Mode Setup, Trigger, Video (IF Envlp), Slope**

RF Burst Trigger Delay

:TRIGger[:SEQuence]:RFBurst:DELay <time>

:TRIGger[:SEQuence]:RFBurst:DELay?

Set the trigger delay when using the RF burst (wideband) trigger.

Factory Preset and *RST:	0.0 s
Range:	–500.0 ms to 500.0 ms
	–100.0 ms to 500.0 ms for cdma2000, W-CDMA (3GPP), or W-CDMA (Trial & ARIB)

Default Unit: seconds

Front Panel Access: **Mode Setup, Trigger, RF Burst, Delay**

RF Burst Trigger Level

:TRIGger[:SEQuence]:RFBurst:LEVel <rel_power>

:TRIGger[:SEQuence]:RFBurst:LEVel?

Set the trigger level when using the RF Burst (wideband) Trigger. The value is relative to the peak of the signal. RF Burst is also known as RF Envelope.

Factory Preset and *RST: –6.0 dB

Range: –25.0 to 0.0 dB

–200.0 to 0.0 dB for NADC, PDC

Default Unit: dB

Front Panel Access: **Mode Setup**, **Trigger, RF Burst, Peak Level**

RF Burst Trigger Slope

:TRIGger[:SEQuence]:RFBurst:SLOPe NEGative|POSitive

:TRIGger[:SEQuence]:RFBurst:SLOPe?

Set the trigger slope when using the RF Burst (wideband) Trigger.

Factory Preset and *RST: Positive

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

Front Panel Access: **Mode Setup, Trigger, RF Burst, Slope**

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