Programming Commands

Agilent Technologies
ESA-E Series Spectrum Analyzers
GSM Measurement Personality

This manual provides documentation for the following instruments:

ESA-E Series

E4402B (9 kHz - 3.0 GHz)
E4404B (9 kHz - 6.7 GHz)
E4405B (9 kHz - 13.2 GHz)
E4407B (9 kHz - 26.5 GHz)

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Functional Index to SCPI Subsection

The following table lists the SCPI subsystems or subsections associated with the instrument cdmaOne function categories. The commands listed are for cdmaOne specific functions. These commands are documented in Chapter 2 , "Language Reference." If you require information on the commands for the Agilent ESA Spectrum Analyzers, refer to the *Agilent ESA Spectrum Analyzers Programmer's Guide.*

Function Category	**SCPI Subsection or Subsystem**
AMPLITUDE	:CALCulate:ORFSpectrum :CALCulate:PSTeps :CALCulate:RSPur :CALCulate:TSPur [:SENSe]:PVTime [:SENSe]:TXPower [:SENSe]:OOBSpur [:SENSe]:POWer :CONFigure :FETCh :MEASure :READ
ATTENUATION	[:SENSe]:POWer [:SENSe]:CORRection [:SENSe]:OOBSpur
AVERAGING	[:SENSe]:ORFSpectrum [:SENSe]:MONitor [:SENSe]:OOBSpur [:SENSe]:CFLocation [:SENSe]:PFERror [:SENSe]:PVTime [:SENSe]:TSPur [:SENSe]:TXPower
BAND, BANDWIDTH	[:SENSe]:MONitor [:SENSe]:OOBSpur [:SENSe]:RADio [:SENSe]:CFLocation [:SENSe]:TXPower [:SENSe]:PSTeps [:SENSe]:PVTime :CONFigure :FETCh :MEASure :READ

Function Category	**SCPI Subsection or Subsystem**
BURST	TRIGger [:SENSe]:TXPower [:SENSe]:SYNC [:SENSe]:CHANnel [:SENSe]:PFERror
CABLE FAULTS	[:SENSe]:CFLocation :CONFigure :FETCh :MEASure :READ
CORRECTED MEASUREMENTS	[:SENSe]:CORRection
DEMODULATION	[:SENSe]:TXPower
DETECTOR	[:SENSe]:MONitor
DISPLAY	[:SENSe]:MONitor
FREQUENCY	[:SENSe]:OOBSpur [:SENSe]:FREQuency [:SENSe]:CHANnel [:SENSe]:PFERror [:SENSe]:CFLocation :CONFigure :FETCh :MEASure :READ
FREQUENCY SPAN	[:SENSe]:CFLocation [:SENSe]:OOBSpur :CONFigure :FETCh :MEASure :READ
LIMIT MASK	[:SENSe]:PVTime
LIMITS	:CALCulate:ORFSpectrum :CALCulate:OOBSpur :CALCulate:PFERror :CALCulate:PSTeps :CALCulate:RSPur :CALCulate:TSPur
MARKER	[:SENSe]:CFLocation

Function Category	SCPI Subsection or Subsystem
MEASURE	:CONFigure :FETCh :MEASure :READ [:SENSe]:MONitor [:SENSe]:OOBSpur
MIXER	[:SENSe]:OOBSpur
POWER VERSUS TIME	[:SENSe]:PVTime
REFERENCE OSCILLATOR	[:SENSe]:ROSCillator
SPECTRUM/ MODULATION	MEASure :CALCulate:ORFSpectrum
SPURIOUS	:CALCulate:OOBSpur
SWEEP	[:SENSe]:OOBSpur [:SENSe]:PSTeps
TIME SLOT	[:SENSe]:TXPower [:SENSe]:CHANnel
TIMING SEQUENCE CODE	[:SENSe]:CHANnel
TRIGGER	TRIGger [:SENSe]:TXPower [:SENSe]:PSTeps [:SENSe]:PFERror [:SENSe]:ORFSpectrum :CONFigure :FETCh :MEASure :READ

2 Language Reference

These commands are only available when the GSM mode has been selected using INSTrument:SELect. If GSM mode is selected, commands that are unique to another mode are not available.

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.

Out Of Band Spurious Emissions (OOBSpur): Absolute Limits Commands

Use the commands in this section to change out of band spurious limits to your own custom limits values.

The commands in this section are presented according to the following devices: MS, BTS, UBTS1, UBTS2 and UBTS3.

Out Of Band Spurious Emissions Absolute Limits Commands—MS

:CALCulate:OOBSpur:LIMit:<standard>:MS[:UPPer]:DATA[n]

:CALCulate:OOBSpur:LIMit:<standard>:MS[:UPPer]:DATA[n]?

Set or query any of the MS related limits for the out of band spurious measurement. Replace <standard> in the above command strings with PGSM, EGSM, RGSM, DCS or PCS.

Table 2-1 shows how each <standard> is associated with a value that must be indexed using a numeric between 1 and 7. Replace n in the above command strings with the appropriate numeric to set or query the desired limit.

Factory Preset and *RST:	Refer to Table 2-1.
Range:	–150 dBm to 150 dBm
Default Unit:	dBm
Remarks:	You must be in GSM mode to use this command. Use INSTrument:SELect to set the mode.
Front Panel Access:	None: accessible via remote panel only.

Table 2-1 Out Of Band Spurious Absolute Limits Commands—MS: Default Values

	Standard				
Details	**PGSM**	**EGSM**	**RGSM**	**DCS**	**PCS**
For MS allocated: <= 1000 kHz	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)
For MS allocated:> 1000 kHz	–30.0 (n=2)	–30.0 (n=2)	–30.0 (n=2)	–30.0 (n=2)	–30.0 (n=2)
For MS idle: <= 1000 kHz	–57.0 (n=3)	–57.0 (n=3)	–57.0 (n=3)	–57.0 (n=3)	–57.0 (n=3)
For MS idle: > 1000 kHz	–47.0 (n=4)	–47.0 (n=4)	–47.0 (n=4)	–47.0 (n=4)	–47.0 (n=4)
For MS idle: GSM Tx band limit (880 - 915 MHz)	–59.0 (n=5)	–59.0 (n=5)	–59.0 (n=5)	–59.0 (n=5)	N/A
For MS idle: DCS Tx band limit (1710 - 1785 MHz)	–53.0 (n=6)	–53.0 (n=6)	–53.0 (n=6)	–53.0 (n=6)	N/A
For MS idle: PCS Tx Band Limit (1850 - 1910 MHz)	N/A	N/A	N/A	N/A	–53.0 (n=5)

Out Of Band Spurious Emissions Absolute Limits Commands—BTS

:CALCulate:OOBSpur:LIMit:<standard>:BTS[:UPPer]:DATA[n]

:CALCulate:OOBSpur:LIMit:<standard>:BTS[:UPPer]:DATA[n]?

Set or query any of the MS related limits for the out of band spurious measurement. Replace <standard> in the above command strings with PGSM, EGSM, RGSM, DCS or PCS.

Table 2-2 shows how each <standard> is associated with a value that must be indexed using a numeric between 1 and 4. Replace n in the above command strings with the appropriate numeric to set or query the desired limit.

Factory Preset and *RST: Limit values default to the PGSM/EGSM/RGSM/DCS /PCS standards as shown in Table 2-2.

Range: –150 dBm to 150 dBm

Default Unit: dBm

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

Front Panel Access: None: accessible via remote panel only.

Table 2-2 Out Of Band Spurious Absolute Limits Commands—BTS: Default Values

	Standard				
Details	**PGSM**	**EGSM**	**RGSM**	**DCS**	**PCS**
<= 1000 kHz	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)
> 1000 kHz	–30.0 (n=2)	–30.0 (n=2)	–30.0 (n=2)	–30.0 (n=2)	–30.0 (n=2)
GSM Tx band limit (921 - 960 MHz)	N/A	N/A	N/A	–57.0 (n=3)	N/A
DCS Tx band limit (1805 - 1880 MHz)	–47.0 (n=3)	–47.0 (n=3)	–47.0 (n=3)	N/A	N/A

Out Of Band Spurious Emissions Absolute Limits Commands—UBTS1

:CALCulate:OOBSpur:LIMit:<standard>:UBTS1[:UPPer]:DATA[n]

:CALCulate:OOBSpur:LIMit:<standard>:UBTS1[:UPPer]:DATA[n]?

Set or query any of the UBTS1 related limits for the out of band spurious measurement. Replace <standard> in the above command strings with PGSM, EGSM, RGSM, DCS or PCS.

Table 2-3 shows how each <standard> is associated with a value that must be indexed using a numeric between 1 and 4. Replace n in the above command strings with the appropriate numeric to set or query the desired limit.

Factory Preset and *RST: Limit values default to the PGSM/EGSM/RGSM/DCS /PCS standards as shown in Table 2-3.

Range: –150 dBm to 150 dBm

Default Unit: dBm

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

Front Panel Access: None: accessible via remote panel only.

Table 2-3 Out Of Band Spurious Absolute Limits Commands—UBTS1: Default Values

	Standard				
Details	**PGSM**	**EGSM**	**RGSM**	**DCS**	**PCS**
<= 1000 kHz	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)
> 1000 kHz	–30.0 (n=2)	–30.0 (n=2)	–30.0 (n=2)	–30.0 (n=2)	–30.0 (n=2)
GSM Tx band limit (921 - 960 MHz)	N/A	N/A	N/A	–57.0 (n=3)	N/A
DCS Tx band limit (1805 - 1880 MHz)	–47.0 (n=3)	–47.0 (n=3)	–47.0 (n=3)	N/A	N/A

Out Of Band Spurious Emissions Absolute Limits Commands—UBTS2

:CALCulate:OOBSpur:LIMit:<standard>:UBTS2[:UPPer]:DATA[n]

:CALCulate:OOBSpur:LIMit:<standard>:UBTS2[:UPPer]:DATA[n]?

Set or query any of the UBTS2 related limits for the out of band spurious measurement. Replace <standard> in the above command strings with PGSM, EGSM, RGSM, DCS or PCS.

Table 2-4 shows how each <standard> is associated with a value that must be indexed using a numeric between 1 and 4. Replace n in the above command strings with the appropriate numeric to set or query the desired limit.

Factory Preset and *RST: Limit values default to the PGSM/EGSM/RGSM/DCS /PCS standards as shown in Table 2-4.

Range: –150 dBm to 150 dBm

Default Unit: dBm

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

Front Panel Access: None: accessible via remote panel only.

Table 2-4 Out Of Band Spurious Absolute Limits Commands—UBTS2: Default Values

	Standard				
Details	**PGSM**	**EGSM**	**RGSM**	**DCS**	**PCS**
<= 1000 kHz	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)
> 1000 kHz	–30.0 (n=2)	–30.0 (n=2)	–30.0 (n=2)	–30.0 (n=2)	–30.0 (n=2)
GSM Tx band limit (921 - 960 MHz)	N/A	N/A	N/A	–57.0 (n=3)	N/A
DCS Tx band limit (1805 - 1880 MHz)	–47.0 (n=3)	–47.0 (n=3)	–47.0 (n=3)	N/A	N/A

Out Of Band Spurious Emissions Absolute Limits Commands—UBTS3

:CALCulate:OOBSpur:LIMit:<standard>:UBTS3[:UPPer]:DATA[n]

:CALCulate:OOBSpur:LIMit:<standard>:UBTS3[:UPPer]:DATA[n]?

Set or query any of the UBTS3 related limits for the out of band spurious measurement. Replace <standard> in the above command strings with PGSM, EGSM, RGSM, DCS or PCS.

Table 2-5 shows how each <standard> is associated with a value that must be indexed using a numeric between 1 and 4. Replace n in the above command strings with the appropriate numeric to set or query the desired limit.

Factory Preset and *RST: Limit values default to the PGSM/EGSM/RGSM/DCS /PCS standards as shown in Table 2-5.

Range: –150 dBm to 150 dBm

Default Unit: dBm

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

Front Panel Access: None: accessible via remote panel only.

Table 2-5 Out Of Band Spurious Absolute Limits Commands—UBTS3: Default Values

	Standard				
Details	**PGSM**	**EGSM**	**RGSM**	**DCS**	**PCS**
<= 1000 kHz	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)
> 1000 kHz	–30.0 (n=2)	–30.0 (n=2)	–30.0 (n=2)	–30.0 (n=2)	–30.0 (n=2)
GSM Tx band limit (921 - 960 MHz)	N/A	N/A	N/A	–57.0 (n=3)	N/A
DCS Tx band limit (1805 - 1880 MHz)	–47.0 (n=3)	–47.0 (n=3)	–47.0 (n=3)	N/A	N/A

Output RF Spectrum (ORFS) Due To Modulation Absolute Limits Commands

Use the commands in this section to change the output RF spectrum absolute limits to your own custom limits values.

ORFS limits are generally specified in dB relative to the reference power. This equates to the absolute power which the result must not exceed. Standards documents also supply an absolute power level—which the calculated relative limit (ref power – relative limit) must not lie below—for each ORFS type, radio standard, device type and offset frequency.

Therefore the relative limit applies if the calculated limit (ref power – relative limit) is greater than the absolute limit. Otherwise the absolute limit applies.

Example:

If relative limit = –75 dB and absolute limit = –65 dBm.

1. If the ref power is measured at 43 dBm, then:

   Upper result limit due to relative limit = 43 – 75 = –32 dBm
   Upper result limit due to absolute limit = –65 dBm

   A relative limit of –32 dBm therefore applies.

2. If the ref power is measured at 0 dBm, then:

   Upper result limit due to relative limit = 0 – 75 = –75 dBm
   Upper result limit due to absolute limit = –65 dBm

   An absolute limit of –65 dBm therefore applies.

The commands are presented according to the following devices: MS, BTS, UBTS1, UBTS2 and UBTS3.

ORFS Due To Modulation Absolute Limits—MS

:CALCulate:ORFSpectrum:MODulation:LIMit:<standard>:MS :ABSolute[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:MODulation:LIMit:<standard>:MS :ABSolute[:UPPer]:DATA[n]?

Set or query any of the absolute MS related limits for the ORFS due to modulation measurement. Replace <standard> in the above command strings with GSM, DCS or PCS. Note that GSM applies to all of PGSM, EGSM and RGSM.

Table 2-6 below shows how each <standard> is associated with a value that must be indexed using a numeric between 1 and 3. Replace n in the above command strings with the appropriate numeric to set or query the desired limit.

Example:

The following command sets the absolute result limit to –40 dBm when testing a PGSM MS device at 1800 kHz offset (the default value is –46.0 dBm):

```
:CALCulate:ORFSpectrum:MODulation:LIMit:GSM:MS
:ABSolute:UPPer:DATA3 -40.0
```

Factory Preset and *RST: Refer to Table 2-6.

Range: –150 dBm to 150 dBm

Default Unit: dBm

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

Front Panel Access: None: accessible via remote panel only.

Table 2-6 ORFS Due To Modulation Absolute Limits—MS: Default Values

	Standard		
Details	**GSM**	**DCS**	**PCS**
< 600 kHz,	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)
>= 600 kHz, < 1800 kHz	–51.0 (n=2)	–56.0 (n=2)	–56.0 (n=2)
>= 1800 kHz	–46.0 (n=3)	–51.0 (n=3)	–51.0 (n=3)

ORFS Due To Modulation Absolute Limits—BTS

```
:CALCulate:ORFSpectrum:MODulation:LIMit:<standard>:BTS
:ABSolute[:UPPer]:DATA[n]
```

```
:CALCulate:ORFSpectrum:MODulation:LIMit:<standard>:BTS
:ABSolute[:UPPer]:DATA[n]?
```

Set or query any of the absolute BTS related limits for the ORFS due to modulation measurement. Replace <standard> in the above command strings with GSM, DCS or PCS. Note that GSM applies to all of PGSM, EGSM and RGSM.

Table 2-7 below shows how each <standard> is associated with a value that must be indexed using a numeric between 1 and 2. Replace n in the above command strings with the appropriate numeric to set or query the desired limit. For further information, refer to the example provided earlier in this section for the ORFS Due To Modulation Absolute Limits—MS command.

Factory Preset and *RST: Refer to Table 2-7.

Range: –150 dBm to 150 dBm

Default Unit: dBm

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

Front Panel Access: None: accessible via remote panel only.

Table 2-7 ORFS Due To Modulation Absolute Limits—BTS: Default Values

	Standard		
Details	**GSM**	**DCS**	**PCS**
< 1800 kHz	–65.0 (n=1)	–57.0 (n=1)	–57.0 (n=1)
>= 1800 kHz	–65.0 (n=2)	–57.0 (n=2)	–57.0 (n=2)

ORFS Due To Modulation Absolute Limits—UBTS1

:CALCulate:ORFSpectrum:MODulation:LIMit:<standard>:UBTS1 :ABSolute[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:MODulation:LIMit:<standard>:UBTS1 :ABSolute[:UPPer]:DATA[n]?

Set or query any of the absolute UBTS1 related limits for the ORFS due to modulation measurement. Replace <standard> in the above command strings with GSM, DCS or PCS. Note that GSM applies to all of PGSM, EGSM and RGSM.

Table 2-8 below shows how each <standard> is associated with a value that must be indexed using the numeric 1. Replace n in the above command strings with 1 to set or query the desired limit. For further information, refer to the example provided earlier in this section for the ORFS Due To Modulation Absolute Limits—MS command.

Factory Preset and *RST: Refer to Table 2-8.

Range: –150 dBm to 150 dBm

Default Unit: dBm

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

Front Panel Access: None: accessible via remote panel only.

Table 2-8 ORFS Due To Modulation Absolute Limits—UBTS1: Default Values

	Standard		
Details	**GSM**	**DCS**	**PCS**
>= 1800 kHz	–59.0 (n=1)	–57.0 (n=1)	–57.0 (n=1)

ORFS Due To Modulation Absolute Limits—UBTS2

:CALCulate:ORFSpectrum:MODulation:LIMit:<standard>:UBTS2 :ABSolute[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:MODulation:LIMit:<standard>:UBTS2 :ABSolute[:UPPer]:DATA[n]?

Set or query any of the absolute UBTS2 related limits for the ORFS due to modulation measurement. Replace <standard> in the above command strings with GSM, DCS or PCS. Note that GSM applies to all of PGSM, EGSM and RGSM.

Table 2-9 below shows how each <standard> is associated with a value that must be indexed using the numeric 1. Replace n in the above command strings with 1 to set or query the desired limit. For further information, refer to the example provided earlier in this section for the ORFS Due To Modulation Absolute Limits—MS command.

Factory Preset and *RST: Refer to Table 2-9.

Range: –150 dBm to 150 dBm

Default Unit: dBm

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

Front Panel Access: None: accessible via remote panel only.

Table 2-9 ORFS Due To Modulation Absolute Limits—UBTS2: Default Values

	Standard		
Details	**GSM**	**DCS**	**PCS**
>= 1800 kHz	–64.0 (n=1)	–62.0 (n=1)	–62.0 (n=1)

ORFS Due To Modulation Absolute Limits—UBTS3

:CALCulate:ORFSpectrum:MODulation:LIMit:<standard>:UBTS3 :ABSolute[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:MODulation:LIMit:<standard>:UBTS3 :ABSolute[:UPPer]:DATA[n]?

Set or query any of the absolute UBTS3 related limits for the ORFS due to modulation measurement. Replace <standard> in the above command strings with GSM, DCS or PCS. Note that GSM applies to all of PGSM, EGSM and RGSM.

Table 2-10 below shows how each <standard> is associated with a value that must be indexed using the numeric 1. Replace n in the above command strings with 1 to set or query the desired limit. For further information, refer to the example provided earlier in this section for the ORFS Due To Modulation Absolute Limits—MS command.

Factory Preset and *RST: Refer to Table 2-10.

Range: –150 dBm to 150 dBm

Default Unit: dBm

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

Front Panel Access: None: accessible via remote panel only.

Table 2-10 ORFS Due To Modulation Absolute Limits—UBTS3: Default Values

	Standard		
Details	**GSM**	**DCS**	**PCS**
>= 1800 kHz	–69.0 (n=1)	–67.0 (n=1)	–67.0 (n=1)

Output RF Spectrum (ORFS) Due To Modulation Relative Limits Commands

Use the commands in this section to change the output RF spectrum relative limits to your own custom limits values.

ORFS limits are generally specified in dB relative to the reference power. This equates to the absolute power which the result must not exceed. Standards documents also supply an absolute power level—which the calculated relative limit (ref power – relative limit) must not lie below—for each ORFS type, radio standard, device type and offset frequency.

Therefore the relative limit applies if the calculated limit (ref power – relative limit) is greater than the absolute limit. Otherwise the absolute limit applies.

Example:

If relative limit = –75 dB and absolute limit = –65 dBm.

1. If the ref power is measured at 43 dBm, then:

   Upper result limit due to relative limit = 43 – 75 = –32 dBm
   Upper result limit due to absolute limit = –65 dBm

   A relative limit of –32 dBm therefore applies.

2. If the ref power is measured at 0 dBm, then:

   Upper result limit due to relative limit = 0 – 75 = –75 dBm
   Upper result limit due to absolute limit = –65 dBm

   An absolute limit of –65 dBm therefore applies.

The commands are presented according to standards DCS, GSM and PCS for devices MS, BTS and UBTS.

ORFS Due To Modulation DCS Relative Limits—MS

:CALCulate:ORFSpectrum:MODulation:LIMit:DCS:MS:<Pnn>[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:MODulation:LIMit:DCS:MS:<Pnn>[:UPPer]:DATA[n]?

Table 2-11 below shows how each <Pnn> is associated with a value that must be indexed using a numeric between 1 and 9. Replace n in the above command strings with the appropriate numeric to set or query the desired relative limit for the required offset frequency.

Set or query any of the absolute DCS relative MS related limits for the ORFS due to modulation measurement. Replace <Pnn> in the above command strings with the appropriate Pnn entry.

NOTE The relative limit applied depends on the measured total carrier power. If the measured reference power lies between these discrete power values noted in the specific table the limit value is linearly interpolated.

Example:

The following command sets the relative result limit to –65.0 dB (the default value is –46.0 dB) when testing a DCS MS device at 400 kHz offset and total carrier power = 39 dBm:

```
:CALCulate:ORFSpectrum:MODulation:LIMit:DCS:MS
:P39:UPPer:DATA4 -65.0
```

Factory Preset and *RST: Refer to Table 2-11.

Range: –150 dB to 150 dB

Default Unit: dB

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

Front Panel Access: None: accessible via remote panel only.

Table 2-11 ORFS Due To Modulation DCS Relative Limits—MS: Default Values

Pnn	Power Level (dBm)	Power	Maximum relative level (dB) at specific carrier offsets (kHz), using specified measurement resolution bandwidths. DCS 1800 MS							
			100	200	250	400	600 to <1200	1200 to <1800	1800 to <6000	>6000
			30 kHz RBW						100 kHz RBW	
P36	>36	36 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–60 (n=7)	–71 (n=8)	–79 (n=9)
P34	34	34 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–60 (n=7)	–69 (n=8)	–77 (n=9)
P32	32	32 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–60 (n=7)	–67 (n=8)	–75 (n=9)
P30	30	30 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–60 (n=7)	–65 (n=8)	–73 (n=9)
P28	28	28 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–60 (n=7)	–63 (n=8)	–71 (n=9)

Table 2-11 ORFS Due To Modulation DCS Relative Limits—MS: Default Values

P26	**26**	26 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–60 (n=7)	–61 (n=8)	–69 (n=9)
P24	**<24**	24 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–60 (n=7)	–59 (n=8)	–67 (n=9)

ORFS Due To Modulation DCS Relative Limits—BTS

:CALCulate:ORFSpectrum:MODulation:LIMit:DCS:BTS:<Pnn>[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:MODulation:LIMit:DCS:BTS:<Pnn>[:UPPer]:DATA[n]?

Set or query any of the absolute DCS relative BTS related limits for the ORFS due to modulation measurement. Replace <Pnn> in the above command strings with the appropriate Pnn entry.

Table 2-12 below shows how each <Pnn> is associated with a value that must be indexed using a numeric between 1 and 9. Replace n in the above command strings with the appropriate numeric to set or query the desired relative limit for the required offset frequency. For further information, refer to the example provided earlier in this section for the ORFS Due To Modulation DCS Relative Limits—MS command.

NOTE The relative limit applied depends on the measured total carrier power. If the measured reference power lies between these discrete power values noted in the specific table the limit value is linearly interpolated.

Factory Preset and *RST: Refer to Table 2-12.

Range: –150 dB to 150 dB

Default Unit: dB

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

Front Panel Access: None: accessible via remote panel only.

Table 2-12 ORFS Due To Modulation DCS Relative Limits—BTS: Default Values

Pnn	Power Level (dBm)	Power	Maximum relative level (dB) at specific carrier offsets (kHz), using specified measurement resolution bandwidths. DCS1800 BTS							
			100	200	250	400	600 to <1200	1200 to <1800	1800 to <6000	>6000
			30 kHz RBW						100 kHz RBW	
P43	>43	43 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–70 (n=6)	–73 (n=7)	–75 (n=8)	–80 (n=9)
P41	41	41 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–68 (n=6)	–71 (n=7)	–73 (n=8)	–80 (n=9)
P39	39	39 (n=1)	+0.5 (n=2)	–30 (n=3	–33 (n=4)	–60 (n=5)	–66 (n=6)	–69 (n=7)	–71 (n=8)	–80 (n=9)
P37	37	37 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–64 (n=6)	–67 (n=7)	–69 (n=8)	–80 (n=9)
P35	35	35 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–62 (n=6)	–65 (n=7)	–67 (n=8)	–80 (n=9)
P33	<33	33 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–63 (n=7)	–65 (n=8)	–80 (n=9)

ORFS Due To Modulation DCS Relative Limits—UBTS

:CALCulate:ORFSpectrum:MODulation:LIMit:DCS:UBTS:<Pnn>[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:MODulation:LIMit:DCS:UBTS:<Pnn>[:UPPer]:DATA[n]?

Set or query any of the absolute DCS relative UBTS related limits for the ORFS due to modulation measurement. Replace <Pnn> in the above command strings with the appropriate Pnn entry.

Table 2-13 below shows how each <Pnn> is associated with a value that must be indexed using a numeric between 1 and 9. Replace n in the above command strings with the appropriate numeric to set or query the desired relative limit for the required offset frequency. For further information, refer to the example provided earlier in this section for the ORFS Due To Modulation DCS Relative Limits—MS command.

NOTE The relative limit applied depends on the measured total carrier power. If the measured reference power lies between these discrete power values noted in the specific table the limit value is linearly interpolated.

Factory Preset and *RST: Refer to Table 2-13.

Range: –150 dB to 150 dB

Default Unit: dB

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

Front Panel Access: None: accessible via remote panel only.

Table 2-13 ORFS Due To Modulation DCS Relative Limits—UBTS: Default Values

Pnn	Power Level (dBm)	Power	Maximum relative level (dB) at specific carrier offsets (kHz), using specified measurement resolution bandwidths. DCS1800 uBTS							
			100	200	250	400	600 to <1200	1200 to <1800	1800 to <6000	>6000
			30 kHz RBW						100 kHz RBW	
P33	>35	35 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–62 (n=6)	–65 (n=7)	–76 (n=8)	–76 (n=9)
P35	<33	33 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–63 (n=7)	–76 (n=8)	–76 (n=9)

ORFS Due To Modulation GSM Relative Limits—MS

:CALCulate:ORFSpectrum:MODulation:LIMit:GSM:MS:<Pnn>[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:MODulation:LIMit:GSM:MS:<Pnn>[:UPPer]:DATA[n]?

Set or query any of the absolute GSM relative MS related limits for the ORFS due to modulation measurement. Replace <Pnn> in the above command strings with the appropriate Pnn entry.

Table 2-14 below shows how each <Pnn> is associated with a value that must be indexed using a numeric between 1 and 9. Replace n in the above command strings with the appropriate numeric to set or query the desired relative limit for the required offset frequency. For further information, refer to the example provided earlier in this section for the ORFS Due To Modulation DCS Relative Limits—MS command.

NOTE The relative limit applied depends on the measured total carrier power. If the measured reference power lies between these discrete power values noted in the specific table the limit value is linearly interpolated.

Factory Preset and *RST: Refer to Table 2-14.

Range: –150 dB to 150 dB

Default Unit: dB

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

Front Panel Access: None: accessible via remote panel only.

Table 2-14 ORFS Due To Modulation GSM Relative Limits—MS: Default Values

Pnn	Power Level (dBm)	Power	Maximum relative level (dB) at specific carrier offsets (kHz), using specified measurement resolution bandwidths. GSM900 MS							
			100	200	250	400	600 to <1200	1200 to <1800	1800 to <6000	>6000
			30 kHz RBW						100 kHz RBW	
P39	>39	39 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–66 (n=6)	–69 (n=7)	–71 (n=8)	–77 (n=9)
P37	37	37 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–64 (n=6)	–67 (n=7)	–69 (n=8)	–75 (n=9)
P35	35	35 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–62 (n=6)	–65 (n=7)	–67 (n=8)	–73 (n=9)
P33	<33	33 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–63 (n=7)	–65 (n=8)	–71 (n=9)

ORFS Due To Modulation GSM Relative Limits—BTS

:CALCulate:ORFSpectrum:MODulation:LIMit:GSM:BTS:<Pnn>[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:MODulation:LIMit:GSM:BTS:<Pnn>[:UPPer]:DATA[n]?

Set or query any of the absolute GSM relative BTS related limits for the ORFS due to modulation measurement. Replace <Pnn> in the above command strings with the appropriate Pnn entry.

Table 2-15 below shows how each <Pnn> is associated with a value that must be indexed using a numeric between 1 and 9. Replace n in the above command strings with the appropriate numeric to set or query the desired relative limit for the required offset frequency. For further information, refer to the example provided earlier in this section for the ORFS Due To Modulation DCS Relative Limits—MS command.

NOTE The relative limit applied depends on the measured total carrier power. If the measured reference power lies between these discrete power values noted in the specific table the limit value is linearly interpolated.

Factory Preset and *RST: Refer to Table 2-15.

Range: –150 dB to 150 dB

Default Unit: dB

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

Front Panel Access: None: accessible via remote panel only.

Table 2-15 ORFS Due To Modulation GSM Relative Limits—BTS: Default Values

Pnn	Power Level (dBm)	Power	Maximum relative level (dB) at specific carrier offsets (kHz), using specified measurement resolution bandwidths. GSM900 BTS							
			100	200	250	400	600 to <1200	1200 to <1800	1800 to <6000	>6000
			30 kHz RBW						100 kHz RBW	
P43	>43	43 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–70 (n=6)	–73 (n=7)	–75 (n=8)	–80 (n=9)
P41	41	41 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–68 (n=6)	–71 (n=7)	–73 (n=8)	–80 (n=9)
P39	39	39 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–66 (n=6)	–69 (n=7)	–71 (n=8)	–80 (n=9)
P37	37	37 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–64 (n=6)	–67 (n=7)	–69 (n=8)	–80 (n=9)
P35	35	35 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–62 (n=6)	–65 (n=7)	–67 (n=8)	–80 (n=9)
P33	<33	33 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–63 (n=7)	–65 (n=8)	–80 (n=9)

ORFS Due To Modulation GSM Relative Limits—UBTS

:CALCulate:ORFSpectrum:MODulation:LIMit:GSM:UBTS:<Pnn>[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:MODulation:LIMit:GSM:UBTS:<Pnn>[:UPPer]:DATA[n]?

Set or query any of the absolute GSM relative UBTS related limits for the ORFS due to modulation measurement. Replace <Pnn> in the above command strings with the appropriate Pnn entry.

Table 2-16 below shows how each <Pnn> is associated with a value that must be indexed using a numeric between 1 and 9. Replace n in the above command strings with the appropriate numeric to set or query the desired relative limit for the required offset frequency. For further information, refer to the example provided earlier in this section for the ORFS Due To Modulation DCS Relative Limits—MS command.

NOTE The relative limit applied depends on the measured total carrier power. If the measured reference power lies between these discrete power values noted in the specific table the limit value is linearly interpolated.

Factory Preset and *RST: Refer to Table 2-16.

Range: –150 dB to 150 dB

Default Unit: dB

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

Front Panel Access: None: accessible via remote panel only.

Table 2-16 ORFS Due To Modulation GSM Relative Limits—UBTS: Default Values

Pnn	Power Level (dBm) (SCPI node)	Power	Maximum relative level (dB) at specific carrier offsets (kHz), using specified measurement resolution bandwidths. GSM900 MS							
			100	200	250	400	600 to <1200	1200 to <1800	1800 to <6000	>6000
			30 kHz RBW						100 kHz RBW	
P33	<33	33 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–63 (n=7)	–70 (n=8)	–70 (n=9)

ORFS Due To Modulation PCS Relative Limits—MS

:CALCulate:ORFSpectrum:MODulation:LIMit:PCS:MS:<Pnn>[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:MODulation:LIMit:PCS:MS:<Pnn>[:UPPer]:DATA[n]?

Set or query any of the absolute PCS relative MS related limits for the ORFS due to modulation measurement. Replace <Pnn> in the above command strings with the appropriate Pnn entry.

Table 2-17 below shows how each <Pnn> is associated with a value that must be indexed using a numeric between 1 and 9. Replace n in the above command strings with the appropriate numeric to set or query the desired relative limit for the required offset frequency. For further information, refer to the example provided earlier in this section for the ORFS Due To Modulation DCS Relative Limits—MS command.

NOTE The relative limit applied depends on the measured total carrier power. If the measured reference power lies between these discrete power values noted in the specific table the limit value is linearly interpolated.

Factory Preset and *RST: Refer to Table 2-17.

Range: –150 dB to 150 dB

Default Unit: dB

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

Front Panel Access: None: accessible via remote panel only.

Table 2-17 ORFS Due To Modulation PCS Relative Limits—MS: Default Values

Pnn	Power Level (dBm)	Power	Maximum relative level (dB) at specific carrier offsets (kHz), using specified measurement resolution bandwidths. PCS1800 MS							
			100	200	250	400	600 to <1200	1200 to <1800	1800 to <6000	>6000
			30 kHz RBW						100 kHz RBW	
P33	>33	33 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–60 (n=7)	–68 (n=8)	–76 (n=9)
P32	32	32 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–60 (n=7)	–67 (n=8)	–75 (n=9)

Table 2-17 ORFS Due To Modulation PCS Relative Limits—MS: Default Values

P30	**30**	30 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–60 (n=7)	–65 (n=8)	–73 (n=9)
P28	**28**	28 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–60 (n=7)	–63 (n=8)	–73 (n=9)
P26	**26**	26 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–60 (n=7)	–61 (n=8)	–69 (n=9)
P24	**<24**	24 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–60 (n=7)	–59 (n=8)	–67 (n=9)

ORFS Due To Modulation PCS Relative Limits—BTS

:CALCulate:ORFSpectrum:MODulation:LIMit:PCS:BTS:<Pnn>[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:MODulation:LIMit:PCS:BTS:<Pnn>[:UPPer]:DATA[n]?

Set or query any of the absolute PCS relative BTS related limits for the ORFS due to modulation measurement. Replace <Pnn> in the above command strings with the appropriate Pnn entry.

Table 2-18 below shows how each <Pnn> is associated with a value that must be indexed using a numeric between 1 and 9. Replace n in the above command strings with the appropriate numeric to set or query the desired relative limit for the required offset frequency. For further information, refer to the example provided earlier in this section for the ORFS Due To Modulation DCS Relative Limits—MS command.

NOTE The relative limit applied depends on the measured total carrier power. If the measured reference power lies between these discrete power values noted in the specific table the limit value is linearly interpolated.

Factory Preset and *RST: Refer to Table 2-18.

Range: –150 dB to 150 dB

Default Unit: dB

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

Front Panel Access: None: accessible via remote panel only.

Table 2-18 ORFS Due To Modulation PCS Relative Limits—BTS: Default Values

Pnn	Power Level (dBm)	Power	Maximum relative level (dB) at specific carrier offsets (kHz), using specified measurement resolution bandwidths. PCS1900 BTS							
			100	200	250	400	600 to <1200	1200 to <1800	1800 to <6000	>6000
			30 kHz RBW						100 kHz RBW	
P43	>43	43 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	70 (n=6)	–73 (n=7)	–75 (n=8)	–80 (n=9
P41	41	41 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–68 (n=6)	–71 (n=7)	–73 (n=8)	–80 (n=9)
P39	39	39 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–66) (n=6)	–69 (n=7)	–71 (n=8)	–80 (n=9)
P37	<37	37 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–64 (n=6)	–67 (n=7)	–69 (n=8)	–80 (n=9)
P35	35	35 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–62 (n=6)	–65 (n=7)	–67 (n=8)	–80 (n=9)
P33	<33	33 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–63 (n=7)	–65 (n=8)	–80 (n=9)

ORFS Due To Modulation PCS Relative Limits—UBTS

:CALCulate:ORFSpectrum:MODulation:LIMit:PCS:UBTS:<Pnn>[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:MODulation:LIMit:PCS:UBTS:<Pnn>[:UPPer]:DATA[n]?

Set or query any of the absolute PCS relative UBTS related limits for the ORFS due to modulation measurement. Replace <Pnn> in the above command strings with the appropriate Pnn entry.

Table 2-19 below shows how each <Pnn> is associated with a value that must be indexed using a numeric between 1 and 9. Replace n in the above command strings with the appropriate numeric to set or query the desired relative limit for the required offset frequency. For further information, refer to the example provided earlier in this section for the ORFS Due To Modulation DCS Relative Limits—MS command.

NOTE The relative limit applied depends on the measured total carrier power. If the measured reference power lies between these discrete power values noted in the specific table the limit value is linearly interpolated.

Factory Preset and *RST: Refer to Table 2-19.

Range: –150 dB to 150 dB

Default Unit: dB

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

Front Panel Access: None: accessible via remote panel only.

Table 2-19 ORFS Due To Modulation PCS Relative Limits—UBTS: Default Values

Pnn	Power Level (dBm)	Power	Maximum relative level (dB) at specific carrier offsets (kHz), using specified measurement resolution bandwidths. PCS1900 uBTS							
			100	200	250	400	600 to <1200	1200 to <1800	1800 to <6000	>6000
			30 kHz RBW						100 kHz RBW	
P43	>43	43 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–70 (n=6)	–73 (n=7)	–76 (n=8)	–76 (n=9)
P41	41	41 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–68 (n=6)	–71 (n=7)	–76 (n=8)	–76 (n=9)
P39	39	39 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–66 (n=6)	–69 (n=7)	–76 (n=8)	–76 (n=9)
P37	37	37 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–64 (n=6)	–67 (n=7)	–76 (n=8)	–76 (n=9)
P35	35	35 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–62 (n=6)	–65 (n=7)	–76 (n=8)	–76 (n=9)
P33	<33	33 (n=1)	+0.5 (n=2)	–30 (n=3)	–33 (n=4)	–60 (n=5)	–60 (n=6)	–63 (n=7)	–76 (n=8)	–76 (n=9)

Output RF Spectrum (ORFS) Due To Switching Transients Absolute Limits Commands—BTS and UBTS

Use the commands in this section to change the output RF spectrum absolute limits to your own custom limits values.

ORFS limits are generally specified in dB relative to the reference power. This equates to the absolute power which the result must not exceed. Standards documents also supply an absolute power level—which the calculated relative limit (ref power – relative limit) must not lie below—for each ORFS type, radio standard, device type and offset frequency.

Therefore the relative limit applies if the calculated limit (ref power – relative limit) is greater than the absolute limit. Otherwise the absolute limit applies.

Example:

If relative limit = –75 dB and absolute limit = –65 dBm.

1. If the ref power is measured at 43 dBm, then:

   Upper result limit due to relative limit = 43 – 75 = –32 dBm
   Upper result limit due to absolute limit = –65 dBm

   A relative limit of –32 dBm therefore applies.

2. If the ref power is measured at 0 dBm, then:

   Upper result limit due to relative limit = 0 – 75 = –75 dBm
   Upper result limit due to absolute limit = –65 dBm

   An absolute limit of –65 dBm therefore applies.

Note that for ORFS the above only applies to BTS and uBTS devices as MS limits are specified in absolute terms (dBm) only.

The commands are presented according to devices BTS, UBTS1, UBTS2 and UBTS3.

ORFS Due To Switching Transients Absolute Limits—BTS

:CALCulate:ORFSpectrum:SWITching:LIMit:<standard>:BTS:ABSolute[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:SWITching:LIMit:<standard>:BTS:ABSolute[:UPPer]:DATA[n]?

Set or query any of the absolute BTS related limits for the ORFS due to switching transients measurement. Replace <standard> in the above command strings with GSM, DCS or PCS. Note that GSM applies to all of PGSM, EGSM and RGSM.

Table 2-20 shows how each <standard> is associated with a value that must be indexed using the numerics 1 or 2. Replace n in the above command strings with the appropriate numeric to set or query the desired limit.

Example:

The following command sets the absolute result limit to –40 dBm when testing an E-GSM BTS device for offsets >= 1800 kHz (the default value is –36.0 dBm):

```
:CALCulate:ORFSpectrum:SWITching:LIMit:GSM:BTS:ABSolute
:UPPer:DATA2 -40.0
```

Factory Preset and *RST: Refer to Table 2-20.

Range: –150 dBm to 150 dBm

Default Unit: dBm

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

Front Panel Access: None: accessible via remote panel only.

Table 2-20 ORFS Due To Switching Transients Absolute Limits Commands—BTS: Default Values

	Standard		
Details	**GSM**	**DCS**	**PCS**
< 1800 kHz	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)
>= 1800 kHz	–36.0 (n=2)	–36.0 (n=2)	–36.0 (n=2)

ORFS Due To Switching Transients Absolute Limits—UBTS1

:CALCulate:ORFSpectrum:SWITching:LIMit:<standard>:UBTS1:ABSolute[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:SWITching:LIMit:<standard>:UBTS1:ABSolute[:UPPer]:DATA[n]?

Set or query any of the absolute UBTS1 related limits for the ORFS due to switching transients measurement. Replace <standard> in the above command strings with GSM, DCS or PCS. Note that GSM applies to all of PGSM, EGSM and RGSM.

Table 2-21 shows how each <standard> is associated with a value that must be indexed using the numeric 1. Replace n in the above command strings with 1 to set or query the desired limit. For further information, refer to the example provided earlier in this section for the ORFS Due To Switching Transients Absolute Limits—BTS command.

Factory Preset and *RST: Refer to Table 2-21.

Range: –150 dBm to 150 dBm

Default Unit: dBm

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

Front Panel Access: None: accessible via remote panel only.

Table 2-21 ORFS Due To Switching Transients Absolute Limits Commands—UBTS1: Default Values

	Standard		
Details	**GSM**	**DCS**	**PCS**
>= 1800 kHz	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)

ORFS Due To Switching Transients Absolute Limits—UBTS2

:CALCulate:ORFSpectrum:SWITching:LIMit:<standard>:UBTS2:ABSolute[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:SWITching:LIMit:<standard>:UBTS2:ABSolute[:UPPer]:DATA[n]?

Set or query any of the absolute UBTS2 related limits for the ORFS due to switching transients measurement. Replace <standard> in the above command strings with GSM, DCS or PCS. Note that GSM applies to all of PGSM, EGSM and RGSM.

Table 2-22 shows how each <standard> is associated with a value that must be indexed using the numeric 1. Replace n in the above command strings with 1 to set or query the desired limit. For further information, refer to the example provided earlier in this section for the ORFS Due To Switching Transients Absolute Limits—BTS command.

Factory Preset and *RST: Refer to Table 2-22.

Range: –150 dBm to 150 dBm

Default Unit: dBm

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

Front Panel Access: None: accessible via remote panel only.

Table 2-22 ORFS Due To Switching Transients Absolute Limits Commands—UBTS2: Default Values

	Standard		
Details	**GSM**	**DCS**	**PCS**
>= 1800 kHz	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)

ORFS Due To Switching Transients Absolute Limits—UBTS3

:CALCulate:ORFSpectrum:SWITching:LIMit:<standard>:UBTS3:ABSolute[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:SWITching:LIMit:<standard>:UBTS3:ABSolute[:UPPer]:DATA[n]?

Set or query any of the absolute UBTS2 related limits for the ORFS due to switching transients measurement. Replace <standard> in the above command strings with GSM, DCS or PCS. Note that GSM applies to all of PGSM, EGSM and RGSM.

Table 2-23 shows how each <standard> is associated with a value that must be indexed using the numeric 1. Replace n in the above command strings with 1 to set or query the desired limit. For further information, refer to the example provided earlier in this section for the ORFS Due To Switching Transients Absolute Limits—BTS command.

Factory Preset and *RST: Refer to Table 2-23.

Range: –150 dBm to 150 dBm

Default Unit: dBm

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

Front Panel Access: None: accessible via remote panel only.

Table 2-23 ORFS Due To Switching Transients Absolute Limits Commands—UBTS3: Default Values

	Standard		
Details	**GSM**	**DCS**	**PCS**
>= 1800 kHz	–36.0 (n=1)	–36.0 (n=1)	–36.0 (n=1)

Output RF Spectrum (ORFS) Due To Switching Transients Relative Limits Commands—BTS and UBTS

Use the commands in this section to change the output RF spectrum limits to your own custom limits values.

ORFS limits are generally specified in dB relative to the reference power. This equates to the absolute power which the result must not exceed. Standards documents also supply an absolute power level—which the calculated relative limit (ref power – relative limit) must not lie below—for each ORFS type, radio standard, device type and offset frequency.

Therefore the relative limit applies if the calculated limit (ref power – relative limit) is greater than the absolute limit. Otherwise the absolute limit applies.

Example:

If relative limit = –75 dB and absolute limit = –65 dBm.

1. If the ref power is measured at 43 dBm, then:

   Upper result limit due to relative limit = 43 – 75 = –32 dBm
   Upper result limit due to absolute limit = –65 dBm

   A relative limit of –32 dBm therefore applies.

2. If the ref power is measured at 0 dBm, then:

   Upper result limit due to relative limit = 0 – 75 = –75 dBm
   Upper result limit due to absolute limit = –65 dBm

   An absolute limit of –65 dBm therefore applies.

Note that for ORFS due to switching transients the above only applies to BTS and uBTS devices as MS limits are specified in absolute terms (dBm) only.

ORFS Due To Switching Transients Relative Limits—GSM

:CALCulate:ORFSpectrum:SWITching:LIMit:GSM:<device>:[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:SWITching:LIMit:GSM:<device>:[:UPPer]:DATA[n]?

Set or query any of the relative GSM related limits for the ORFS due to switching transients measurement. Replace <device> in the above command strings with the appropriate entry.

Table 2-24 shows how each <device> is associated with a value that must be indexed using a numeric from 2 to 5. Replace n in the above command strings with the appropriate numeric to set or query the desired relative limit for the required offset frequency. Note that entries in the Power column (n=1) are currently not used.

Example:

The following command sets the relative result limit to –70 dB (the default value is –74.0 dB) when testing a GSM BTS device at 1200 kHz offset:

```
:CALCulate:ORFSpectrum:SWITching:LIMit:GSM:BTS:UPPer:DATA4 -70.0
```

Factory Preset and *RST: Refer to Table 2-24.

Range: –150 dB to 150 dB

Default Unit: dB

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

Front Panel Access: None: accessible via remote panel only.

Table 2-24 ORFS Due To Switching Transients Relative Limits—GSM: Default Values

		Offset Frequency (kHz)			
Device	**Power**	**400**	**600**	**1200**	**1800**
BTS	0.0 (n=1)	–57dB (n=2)	–67dB (n=3)	–74dB (n=4)	–74dB (n=5)
UBTS	0.0 (n=1)	–57dB (n=2)	–67dB (n=3)	–74dB (n=4)	–74dB (n=5)

ORFS Due To Switching Transients Relative Limits—DCS

```
:CALCulate:ORFSpectrum:SWITching:LIMit:DCS:<device>:[:UPPer]:DATA[n]
```

```
:CALCulate:ORFSpectrum:SWITching:LIMit:DCS:<device>:[:UPPer]:DATA[n]?
```

Set or query any of the relative DCS related limits for the ORFS due to switching transients measurement. Replace <device> in the above command strings with the appropriate entry.

Table 2-25 shows how each <device> is associated with a value that must be indexed using a numeric from 2 to 5. Replace n in the above command strings with the appropriate numeric to set or query the desired relative limit for the required offset frequency. Note that entries in the Power column (n=1) are currently not used. For further information, refer to the example provided earlier in this section for the ORFS Due To Switching Transients Relative Limits—GSM command.

Factory Preset and *RST: Refer to Table 2-25.

Range: –150 dB to 150 dB

Default Unit: dB

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

Front Panel Access: None: accessible via remote panel only.

Table 2-25 ORFS Due To Switching Transients Relative Limits—DCS: Default Values

		Offset Frequency (kHz)			
Device	**Power**	**400**	**600**	**1200**	**1800**
BTS	0.0 (n=1)	–50dB (n=2)	–58dB (n=3)	–66dB (n=4)	–66dB (n=5)
UBTS	0.0 (n=1)	–50dB (n=2)	–58dB (n=3)	–66dB (n=4)	–66dB (n=5)

ORFS Due To Switching Transients Relative Limits—PCS

:CALCulate:ORFSpectrum:SWITching:LIMit:PCS:<device>:[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:SWITching:LIMit:PCS:<device>:[:UPPer]:DATA[n]?

Set or query any of the relative PCS related limits for the ORFS due to switching transients measurement. Replace <device> in the above command strings with the appropriate entry.

Table 2-25 shows how each <device> is associated with a value that must be indexed using a numeric from 2 to 5. Replace n in the above command strings with the appropriate numeric to set or query the desired relative limit for the required offset frequency. Note that entries in the Power column (n=1) are currently not used. For further information, refer to the example provided earlier in this section for the ORFS Due To Switching Transients Relative Limits—GSM command.

Factory Preset and *RST: Refer to Table 2-25.

Range: –150 dB to 150 dB

Default Unit: dB

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

Front Panel Access: None: accessible via remote panel only.

Table 2-26 ORFS Due To Switching Transients Relative Limits—PCS: Default Values

		Offset Frequency (kHz)			
Device	**Power**	**400**	**600**	**1200**	**1800**
BTS	0.0 (n=1)	–50dB (n=2)	–58dB (n=3)	–66dB (n=4)	–66dB (n=5)
UBTS	0.0 (n=1)	–50dB (n=2)	–58dB (n=3)	–66dB (n=4)	–66dB (n=5)

Output RF Spectrum (ORFS) Due To Switching Transients Commands—MS

Use the commands in this section to change the output RF spectrum limits for MS devices, to your own custom limits values. The output RF spectrum test for MS devices, uses limits that are specified in absolute units—that is, dBm.

Note that the limit applied—as shown in the table that accompanies each command—depends on the total carrier power. If the measured carrier power lies between these discrete power values, the limit value is linearly interpolated. If it lies above or below the range specified, the upper or lower limit set are used respectively.

ORFS Due To Switching Transients GSM MS Limits

:CALCulate:ORFSpectrum:SWITching:LIMit:GSM:MS:<Pnn>:[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:SWITching:LIMit:GSM:MS:<Pnn>:[:UPPer]:DATA[n]?

Set or query any of the GSM MS related limits for the ORFS due to switching transients measurement. Replace <Pnn> in the above command strings with the appropriate Pnn entry. The measured total carrier power will determine which row of limits will be applied.

Table 2-27 shows how each <Pnn> is associated with a value that must be indexed using a numeric from 1 to 5. Replace n in the above command strings with the appropriate numeric to set or query the desired relative limit for the required offset frequency. You can also change the values in the Power column (n=1) to alter the carrier power required for each set of limits.

Example 1:

The following command sets the result limit to –30.0 dBm (the default value is –21.0 dBm) when testing a GSM MS device, total carrier power 39 dBm, at 400 kHz offset:

```
:CALCulate:ORFSpectrum:SWITching:LIMit:GSM:MS:P39:UPPER
:DATA2 -30.0
```

Example 2:

The following command configures the limits to use the P39 limits when the total carrier power level is 37dBm (instead of the default 39.0 dBm) when testing a GSM MS device:

```
:CALCulate:ORFSpectrum:SWITching:LIMit:GSM:MS:P39:UPPER
:DATA1 -37.0
```

Factory Preset and *RST: Refer to Table 2-27.

Range: –150 dBm to 150 dBm

Default Unit: dBm

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

Front Panel Access: None: accessible via remote panel only.

Table 2-27 ORFS Due To Switching Transients GSM MS Limits: Default Values

			Offset Frequency (kHz)			
Pnn	**Power Level (dBm)**	**Power (dBm)**	**400**	**600**	**1200**	**1800**
39	39	39.0 (n=1)	–21dBm (n=2)	–26dBm (n=3)	–32dBm (n=4)	–36dBm (n=5)
37	<=37	37.0 (n=1)	–23dBm (n=2)	–26dBm (n=3)	–32dBm (n=4)	–36dBm (n=5)

ORFS Due To Switching Transients DCS MS Limits

:CALCulate:ORFSpectrum:SWITching:LIMit:DCS:MS:<Pnn>:[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:SWITching:LIMit:DCS:MS:<Pnn>:[:UPPer]:DATA[n]?

Set or query any of the DCS MS related commands for the ORFS due to switching transients measurement. Replace <Pnn> in the above command strings with the appropriate Pnn entry. The measured total carrier power will determine which row of limits will be applied.

Table 2-28 shows how each <Pnn> is associated with a value that must be indexed using a numeric from 1 to 5. Replace n in the above command strings with the appropriate numeric to set or query the desired relative limit for the required offset frequency. You can also change the values in the Power column (n=1) to alter the carrier power required for each set of limits. For further information, refer to the examples provided earlier in this section for the ORFS Due To Switching Transients GSM MS Limits command.

Factory Preset and *RST: Refer to Table 2-28.

Range: –150 dBm to 150 dBm

Default Unit: dBm

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

Front Panel Access: None: accessible via remote panel only.

Table 2-28 ORFS Due To Switching Transients DCS MS Limits: Default Values

			Offset Frequency (kHz)			
Pnn	**Power Level (dBm)**	**Power (dBm)**	**400**	**600**	**1200**	**1800**
39	39	39.0 (n=1)	–21dBm (n=2)	–26dBm (n=3)	–32dBm (n=4)	–36dBm (n=5)
37	<=37	37.0 (n=1)	–32dBm (n=2)	–26dBm (n=3)	–32dBm (n=4)	–36dBm (n=5)

ORFS Due To Switching Transients PCS MS Limits

:CALCulate:ORFSpectrum:SWITching:LIMit:PCS:MS:<Pnn>:[:UPPer]:DATA[n]

:CALCulate:ORFSpectrum:SWITching:LIMit:PCS:MS:<Pnn>:[:UPPer]:DATA[n]?

Set or query any of the PCS MS related commands for the ORFS due to switching transients measurement. Replace <Pnn> in the above command strings with the appropriate Pnn entry. The measured total carrier power will determine which row of limits will be applied.

Table 2-29 shows how each <Pnn> is associated with a value that must be indexed using a numeric from 1 to 5. Replace n in the above command strings with the appropriate numeric to set or query the desired relative limit for the required offset frequency. You can also change the values in the Power column (n=1) to alter the carrier power required for each set of limits. For further information, refer to the examples provided earlier in this section for the ORFS Due To Switching Transients GSM MS Limits command.

Factory Preset and *RST: Refer to Table 2-29.

Range: –150 dBm to 150 dBm

Default Unit: dBm

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

Front Panel Access: None: accessible via remote panel only.

Table 2-29 ORFS Due To Switching Transients PCS MS Limits: Default Values

			Offset Frequency (kHz)			
Pnn	**Power Level (dBm)**	**Power (dBm)**	**400**	**600**	**1200**	**1800**
39	39	39.0 (n=1)	–23dBm (n=2)	–26dBm (n=3)	–32dBm (n=4)	–36dBm (n=5)
37	<=37	37.0 (n=1)	–23dBm (n=2)	–26dBm (n=3)	–32dBm (n=4)	–36dBm (n=5)

Phase and Frequency Error Measurement Limits Commands

Phase and Frequency Error—Limits State

:CALCulate:PFERror:LIMit[:STATe]ON|OFF|1|0

:CALCulate:PFERror:LIMit[:STATe]?

Turn limit checking on or off.

Factory Preset and *RST: On

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

Front Panel Access: **Meas Setup, Limit Test**

Phase and Frequency Error—RMS Phase Limit

:CALCulate:PFERror:LIMit:<standard>:MS|BS/BTS|UBTS1|UBTS2|UBTS3:RPERror[:UPPer][:DATA] <degrees>

:CALCulate:PFERror:LIMit:<standard>:MS|BS/BTS|UBTS1|UBTS2|UBTS3:RPERror[:UPPer][:DATA]?

Set the maximum value for RMS phase limit.

Factory Preset and *RST: Values default to the GSM/DCS/PCS standards as shown in Table 2-30.

Range: 0 to 180

Default Unit: degrees RMS

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

Front Panel Access: **Meas Setup, Limits....**

Phase and Frequency Error—Peak Phase Limit

:CALCulate:PFERror:LIMit:<standard>:MS|BS/BTS|UBTS1|UBTS2|UBTS3:PPERror[:UPPer][:DATA] <degrees>

:CALCulate:PFERror:LIMit:<standard>:MS|BS/BTS|UBTS1|UBTS2|UBTS3:PPERror[:UPPer][:DATA]?

Set the maximum value for peak phase limit.

Factory Preset and *RST: Values default to the GSM/DCS/PCS standards as shown in Table 2-30.

Range: 0 to 180

Default Unit: degrees peak

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

Front Panel Access: **Meas Setup, Limits....**

Phase and Frequency Error—Frequency Limit

:CALCulate:PFERror:LIMit:<standard>:MS|BS/BTS|UBTS1|UBTS2|UBTS3:MFERror[:UPPer][:DATA] <ppm>

:CALCulate:PFERror:LIMit:<standard>:MS|BS/BTS|UBTS1|UBTS2|UBTS3:MFERror[:UPPer][:DATA]?

Set the absolute maximum value for frequency limit.

Factory Preset and *RST: Values default to the GSM/DCS/PCS standards as shown in Table 2-30.

Range: 0 to 100

Default Unit: parts per million (ppm)

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

Front Panel Access: **Meas Setup, Limits....**

Table 2-30 Phase And Frequency Error Commands: Default Values

Standard	RMS Phase Limit (deg) RPERror	Peak Phase Limit (deg) PPERror	Mean Frequency Limit (ppm) MFERror
PGSM BTS	6	20	0.05
EGSM BTS	6	20	0.05
RGSM BTS	6	20	0.05
DCS BTS	6	20	0.05
PCS BTS	6	20	0.05
PGSM MS	6	20	0.1
EGSM MS	6	20	0.1
RGSM MS	6	20	0.1
DCS MS	6	20	0.1
PCS MS	6	20	0.1

Power Steps Measurement Limits Commands

Power Steps—Limits State

:CALCulate:PSTeps:LIMit[:STATe]ON|OFF|1|0

:CALCulate:PSTeps:LIMit[:STATe]?

Turn limits state on or off.

Factory Preset and *RST: On

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

Front Panel Access: **Meas Setup, Limit Test**

Power Steps—Power Step Upper Limit

:CALCulate:PSTeps:LIMit:<standard>:MS|BS/BTS|UBTS1|UBTS2|UBTS3:PDELta[:UPPer][:DATA] <dB>

:CALCulate:PSTeps:LIMit:<standard>:MS|BS/BTS|UBTS1|UBTS2|UBTS3:PDELta[:UPPer][:DATA]?

Set the delta power step upper limit.

Factory Preset and *RST: Values default to the GSM/DCS/PCS standards as shown in Table 2-31.

Range: 0 to 200

Default Unit: dB

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

Front Panel Access: **Meas Setup, Limits....**

Power Steps—Power Step Lower Limit

:CALCulate:PSTeps:LIMit:<standard>:MS|BS/BTS|UBTS1|UBTS2|UBTS3:PDELta[:LOWer][:DATA] <dB>

:CALCulate:PSTeps:LIMit:<standard>:MS|BS/BTS|UBTS1|UBTS2|UBTS3:PDELta[:LOWer][:DATA]?

Set the delta power step lower limit.

Factory Preset and *RST: Values default to the GSM/DCS/PCS standards as shown in Table 2-31.

Range: 0 to 200

Default Unit: dB

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

Front Panel Access: **Meas Setup, Limits....**

Table 2-31 Power Steps Commands: Default Values

	Power Step Upper Limit (dB) PDEL:UPP	Power Step Lower Limit (dB) PDEL:LOW
PGSM BTS	3.5	0.5
EGSM BTS	3.5	0.5
RGSM BTS	3.5	0.5
DCS BTS	3.5	0.5
PCS BTS	3.5	0.5
PGSM MS	3.5	0.5
EGSM MS	3.5	0.5
RGSM MS	3.5	0.5
DCS MS	3.5	0.5
PCS MS	3.5	0.5

Receive Band Spurious Limit

:CALCulate:RSPur:LIMit:<standard>:MS|BTS|UBTS1|UBTS2|UBTS3[:IDLE][:UPPer][:DATA]<dBm>

:CALCulate:RSPur:LIMit?

Set the maximum limit value for the current measurement.

Factory Preset and *RST: Limit values default to the GSM/DCS/PCS standards as shown in Table 2-32.

Range: –200 to 100

Default Unit: dBm

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

Front Panel Access: **Meas Setup, Limits....**

Table 2-32 Receive Band Spurious Command: Default Limit Values

Standard	MS	BTS	UBTS1	UBTS2	UBTS3
PGSM	–79.0	–98.0	–91.0	–86.0	–81.0
EGSM	–67.0	–98.0	–91.0	–86.0	–81.0
RGSM	–60.0	–89.0	–91.0	–86.0	–81.0
DCS	–71.0	–98.0	–96.0	–91.0	–86.0
PCS	–71.0	–98.0	–96.0	–91.0	–86.0

Transmit Band Spurious Limit

:CALCulate:TSPur:LIMit:<standard>:MS|BTS|UBTS1|UBTS2|UBTS3[:IDLE][:UPPer][:DATA] <dBm>

:CALCulate:TSPur:LIMit?

Set the maximum limit value for the current measurement.

Factory Preset and *RST: Limit values default to the GSM/DCS/PCS standards as shown in Table 2-33.

Range: –200 to 100 dBm

Default Unit: dBm

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

Front Panel Access: **Meas Setup, Limits.....**

Table 2-33 Transmit Band Spurious Command: Default Limit Values

Standard	Active Mode	Idle Mode
PGSM BTS	–79.0	–98.0
EGSM BTS	–67.0	–98.0
RGSM BTS	–60.0	–89.0
DCS BTS	–71.0	–98.0
PCS BTS	–71.0	–98.0
PGSM MS	–36.0	–59.0
EGSM MS	–36.0	–59.0
RGSM MS	–42.0	–59.0
DCS MS	–36.0	–53.0
PCS MS	–36.0	–53.0

CONFigure Subsystem

:CONFigure:<measurement>

The CONFigure commands are used with several other commands and are documented in the section on the “MEASure Group of Commands” on page 51.

FETCh Subsystem

:FETCh:<measurement>[n]?

The FETCh? commands are used with several other commands and are documented in the section on the "MEASure Group of Commands" on page 51.

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, at the completion of each trigger cycle, the trigger system immediately initiates another trigger cycle.

When set to OFF, the trigger system remains in an “idle” state until CONTinuous is set to ON or 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: ON (OFF recommended for remote operation)

Front Panel Access: **Meas Control, Measure Single Cont**

Pause the Measurement

:INITiate:PAUSe

Pauses the current measurement by changing the current measurement state from the “wait for trigger” state to the “paused” state. If the measurement is not in the “wait for trigger” state, when the command is issued, the transition will be made the next time that state is entered as part of the trigger cycle. When in the pause state, the spectrum analyzer auto-align process stops. If the analyzer is paused for long a period of time, measurement accuracy may degrade.

Front Panel Access: **Meas Control, Pause**

Restart the Measurement

:INITiate:RESTart

Restarts the current measurement 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

Resume the Measurement

:INITiate:RESume

Resumes the current measurement by changing the current measurement state from the “paused state” back to the “wait for trigger” state. If the measurement is not in the “paused” state, when the command is issued, an error is reported.

Front Panel Access: **Meas Control, Resume**

INSTrument Subsystem

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

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=SA

3=GSM

4=cdmaOne

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 1
Range:	1 to x, where x depends upon which applications are installed.
Front Panel Access:	**Mode**

Select Application

:INSTrument[:SELect] SA|CDMA|GSM

:INSTrument[:SELect]?

Select the measurement application by enumerated choice. The actual available choices depends upon which applications (modes) are installed in the instrument.

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.

Spectrum Analyzer - No down-loadable software is being used.

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

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

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 Spectrum Analyzer

Front Panel Access: **Mode**

MEASure Group of Commands

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

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

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

Measure Commands

:MEASure:<measurement>[n]?

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

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

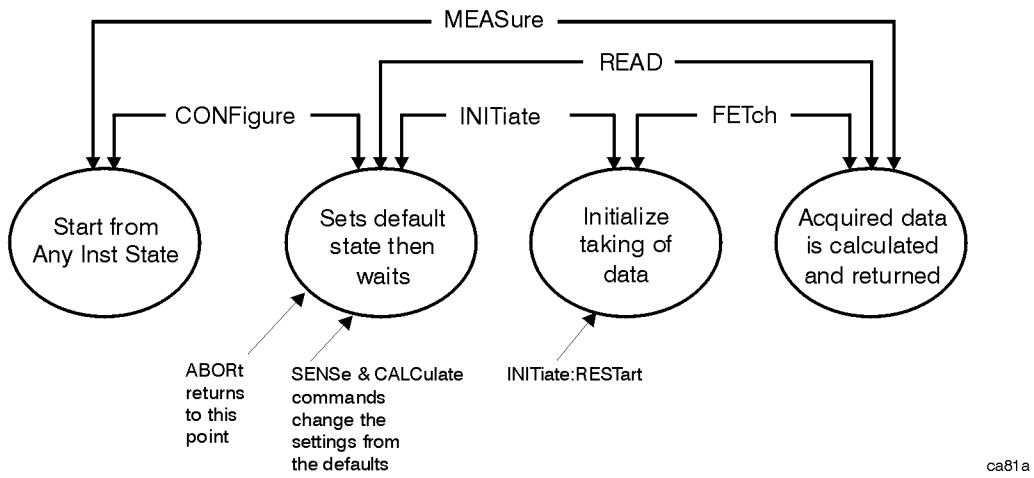
  If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command, or the INITiate and FETCh? commands, to initiate the measurement and query the results. See Figure 2-1.

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

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

Figure 2-1 Measurement Group of Commands



Configure Commands

:CONFigure:<measurement>

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

The CONFigure? query returns the current measurement name.

Fetch Commands

:FETCh:<measurement>[n]?

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

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

Read Commands

:READ:<measurement>[n]?

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

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

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

Cable Fault Location Measurement

Displays the reflected signal of a transmission line as a function of the distance down the line. This complements the return loss measurement: if a cable under test fails a return loss measurement, the cable fault location measurement can be used to identify the location of the fault. The measurement is particularly useful when a base station and antenna are connected by a long length of cable

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

:CONFigure:CFLocation

:FETCh:CFLocation[n]?

:READ:CFLocation[n]?

:MEASure:CFLocation[n]?

Front Panel Access: **Measure, Cable Fault Location**

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 Seven scalar values: 1. **Max Range** 2. **Marker Distance** 3. **Marker Amplitude** 4. **Marker Amplitude Coeff (rho)** 5. **Accuracy** 6. **Velocity Factor** 7. **Cable Loss**
2	Returns the RF Envelope Trace (data array). This data array contains 401 data points.
3	Returns the FFT Trace (data array). This data array contains 401 data points.

Monitor Band/Channel Measurement

Verified the GSM band and channels are free of interference by measuring the spurious signals in the bands and channels specified by the selected standard and tuning plan.

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

:CONFigure:MONitor:BAND|CHANnel|FRAMe

:FETCh:MONitor:BAND|CHANnel|FRAMe[n]

:READ:MONitor:BAND|CHANnel|FRAMe[n]

:MEASure:MONitor:BAND|CHANnel|FRAMe[n]

Front Panel Access: **Measure, Monitor Band/Channel**

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 one scalar value: Total Power (only for band meas)
2	Returns the RF Envelope Trace (data array). This data array contains 401 data points.
3	Returns the Max Hold Trace (data array). This trace contains 401 data points.

Out of Band Spurious Emissions Measurement

This measures the out of band spurious emissions relative to the receive channel power in the selected channel. You must be in the GSM or 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:OOBSpur commands for more measurement related commands.

:CONFigure:OOBSpur

:FETCh:OOBSpur[n]?

:READ:OOBSpur[n]?

:MEASure:OOBSpur[n]?

Front Panel Access:. **Measure, Out Of Band Spurious**

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 a list of spurious result values for each of the spurs found: 1. Frequency (a) Hz 2. Amplitude (a) dBm 3. Limit specification (a) dBm 4. Delta from limit (a) dB Where a = 0 to number of spurs (variable).
2	Returns the number of spurs found.

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 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
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 and so on Offset 14 - modulation measurement values Carrier - switching transients measurement values Offset 16 - switching transients measurement values Offset 29 - switching transients measurement values and so on 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, dBc 2. Modulation spectrum power, dBm 3. Switching transient power, dBc 4. Switching transient power, dBm
Single offset	2	Returns floating point numbers (in dBm) of the captured trace data. It contains 401 data points of the “spectrum due to modulation” signal.
Single offset	3	Returns floating point numbers (in dBm) of the captured trace data. It contains 401 points of the “spectrum due to switching transients” signal.

Measurement Method	n	Results Returned
Swept	Not specified, or n=1	Returns l boolean value: 1 if limits passed, 0 if limits failed.
Swept	2	Returns floating point numbers (in dBm) of the captured trace data. It contains 401 points of the “spectrum due to modulation” signal.
Swept	3	Returns floating point numbers (in dBm) of the captured trace data. It contains 401 points of the “spectrum due to switching transients” signal.

Phase & Frequency Error Measurement

This measures the modulation quality of the transmitter by checking phase and frequency accuracy. You must be in the 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 a series of floating point numbers (in volts) that represent each sample of the complete current time record raw I/Q vector trace length scalar value (giving the total number of I/Q vector sample pairs = n/2). The II/Q vector sample pair data is organized as: I(0), Q(0), I(1), Q(1), ---------- I([n/2]–1), Q([n/2]–1) The start of bit 0 (zero) of the useful part of the measured GSM burst within the vector sample pairs is located at I(x/2), Q(x/2) where x = raw I/Q vector trace index to burst.

n	Results Returned
not specified or n=1	Returns the following 15 scalar values: 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 (that is 2 points/symbol). If averaging is on, this is the average of the individual rms phase error measurements. 2. **Peak phase error** is a floating point number (in degrees) of the peak phase error of all the individual symbol decision points (prior to the rms averaging process). If averaging is on, this is the average of the individual peak phase error measurements. 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. If averaging is on, this is the average of the individual frequency error measurements. 5. **I/Q origin offset** is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. If averaging is on, this is the average of the individual IQ Offset measurements. 6. **Trace 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. **Trace bit 0 decision offset** is an integer number in units of sample pairs for the sample points in an I/Q vector trace that represents the bit 0 (zero) decision point. The sample pairs in the trace are numbered 0 to N. 8. **Trace sync start** is an integer number in units of bits for the bit number, within the data bits trace, that represents the start of the sync word. 9. **Trace 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. 10. **Phase error trace length** is an integer number (in units of samples) representing the number of samples returned by the current phase error trace and phase error with frequency trace. 11. **RF envelope trace length** is an integer number (in units of samples) representing the number of samples returned by the current RF envelope trace. 12. **RF envelope trace index to burst** is an integer number (in units of samples) representing the trace sample which represents the start of bit 0 (zero) decision point of the useful part of the measured GSM burst.

n	Results Returned
not specified or n=1 (cont)	13. **I/Q vector trace length** is an integer number (in units of samples) representing the number of samples returned by the current RF envelope trace (ie this number divided by two represents the number of sample pairs in the trace.) 14. **Raw I/Q vector trace length** is an integer number (in units of samples) representing the number of samples returned by the current RF envelope trace (ie this number divided by two represents the number of sample pairs in the trace). 15. **Raw I/Q vector trace index to burst** is an integer number (in units of samples) representing the trace sample which represents the start of bit 0 (zero) decision point of the useful part of the measured GSM burst.
2	Returns a series of floating point numbers (in degrees) that represent each sample of the current phase error trace data over the useful part of the measured GSM burst. It contains n samples, where n = phase error trace length scalar value. The first sample represents the start of bit 0 (zero) of the useful part of the demodulated burst.
3	Returns a series of floating point numbers (in degrees) that represent each sample of the current phase error with frequency trace data over the useful part of the measured GSM burst. Phase error with frequency is the error vector between the measured phase (that has not had frequency compensation) and the ideal reference phase. It contains n samples, where n = phase error trace length scalar value. The first sample represents the start of bit 0 (zero) of the useful part of the demodulated burst.
4	Returns a series of floating point numbers (in dB relative to peak of signal) that represent each sample of the complete current time record RF envelope trace data. It contains n samples where n = RF envelope trace length scalar value. The start of bit 0 (zero) so the useful part of the measured GSM burst within the sample time record is located at: I(x), Q(x) where x = RF envelope trace index to burst.

n	Results Returned
5	Returns a series of floating point numbers (with magnitudes normalized to 1) that represent each sample of the current correlated I/Q vector trace data over the useful part of the measured GSM burst. It contains n samples where n = I/Q vector trace length scalar value (giving the total number of I/Q vector sample pairs = n/2. The I/Q vector sample pair data is organized as: I(0), Q(0), I(1), Q(1), ---------- I([n/2]–1), Q([n/2]–1) The decision point pairs are located at: I(d), Q(d) I(d+10), Q(d+10) I(d+20), Q(d+20) and so on. where d = trace bit 0 decision offset.

Power Steps Measurement

This measurement uses long sweep times to display the different power steps resulting from adaptive power control. You must be in 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:PSTeps commands for more measurement related commands.

:CONFigure:PSTeps

:FETCh:PSTeps[n]?

:READ:PSTeps[n]?

:MEASure:PSTeps[n]?

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

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 5 scalar values: 1. **Power Difference** is the relative difference in power (in dB) between the two active marker positions. 2. **Time Difference** is the relative difference in time (in seconds) between the two active marker positions. 3. **Mean Carrier Power** is the mean power (in dBm) of the trace data between the two active marker positions. 4. **Max Carrier Power** is the maximum power (in dBm) of the trace data between the two active marker positions. 5. **Min Carrier Power** is the minimum power (in dBm) of the trace data between the two active marker positions.

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 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
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, et cetera). 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 (that is when n=0, 2, et cetera). 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 **T_0** values.
2	Returns the entire captured RF envelope (data array). It is represented as log-magnitude versus time. This array contains 401 points of 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 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]?

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
Not specified or n=1	Returns 3 comma-separated scalar results: 1. The frequency of the worst spur (in Hz) 2. The amplitude of the worst spur relative to limit (in dB) 3. Float32NAN is returned at all times for GSM
2	Returns the current trace data (401 point real number comma separated list).

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 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

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, et cetera). 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 (that is when n=0, 2, et cetera). 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 the RF Envelope Trace (data array). This array contains 401 points of data.

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.

The forward slash / and the reverse slash \ are both acceptable delimiters for specifying a directory path.

Store a Measurement Results in a File

`:MMEMory:STORe:RESults filename.csv`

Saves the measurement results to a file in memory. The file name must have a file extension of .csv and will be in the CSV (comma-separated values) format.

Example: MMEM:STOR:RES 'C:mymeas.csv'

Front Panel Access: **File**, **Save**, **Type**, **More**, **Measurement Results**

READ Subsystem

:READ:<measurement>[n]?

The READ? commands are used with several other commands and are documented in the section on the "MEASure Group of Commands" on page 51.

SENSe Subsystem

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

Cable Fault Location Measurement

Commands for querying the cable fault location measurement results and for setting to the default values are found in the MEASure group of commands. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Cable Fault** measurement has been selected from the **MEASURE** key menu.

Cable Fault Location—Average Count

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

[:SENSe]:CFLocation: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 1000

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

Cable Fault Location—Averaging State

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

[:SENSe]:CFLocation:AVERage:STATe?

Turn cable fault location averaging on or off.

Factory Preset and *RST: On

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

Cable Fault Location—Averaging Termination Control

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

[:SENSe]:CFLocation: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: Exp

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

Cable Fault Location—Resolution Bandwidth

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

[:SENSe]:CFLocation:BANDwidth[: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: 3 MHz

Default Unit: Hz

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

Cable Fault Location—Resolution Bandwidth Coupling Mode

[:SENSe]:CFLocation:BANDwidth|BWIDth:RAUTo AUTO|MANual

[:SENSe]:CFLocation:BANDwidth|BWIDth:RAUTo?

Specify the resolution bandwidth (MAN) or couple the resolution bandwidth to the frequency span (AUTO).

Factory Preset and *RST: Auto

Range: Auto/Man

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

Cable Fault Location—Video Bandwidth

[:SENSe]:CFLocation:BANDwidth|BWIDth:VIDeo <freq>

[:SENSe]:CFLocation:BANDwidth|BWIDth:VIDeo?

Specifies the video bandwidth.

Factory Preset and *RST: 3 MHz

Range: 1 kHz to 5 MHz

Default Unit: Hz

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

Cable Fault Location—Video Bandwidth Coupling Mode

[:SENSe]:CFLocation:BANDwidth|BWIDth:VAUTo AUTO|MANual

[:SENSe]:CFLocation:BANDwidth|BWIDth:VAUTo?

Couples the video bandwidth to the resolution bandwidth.

Factory Preset and *RST: Auto

Range: Auto/Man

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

Cable Fault Location—Calibrate

[:SENSe]:CFLocation:CALibrate

Calibrate for the measurement.

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

Cable Fault Location—Cable Loss Per Meter

[:SENSe]:CFLocation:CLOSs <cable loss dB>

[:SENSe]:CFLocation:CLOSs?

Specify the known loss per meter for the cable to be measured.

Factory Preset and *RST: 0 dB

Range: 0 to 5 dB

Default Unit: dB

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

Cable Fault Location—FFT Window

[:SENSe]:CFLocation:FFT:WINDow RECTangular|FTOP|GAUSsian|HANNing

[:SENSe]:CFLocation:FFT:WINDow?

Specify the type of windowing function to apply when performing the FFT.

Factory Preset and *RST: FTOP

Range RECT/FTOP/GAUS/HANN

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

Cable Fault Location—Center Frequency

[:SENSe]:CFLocation:FREQuency CENTer <freq>

[:SENSe]:CFLocation:FREQuency CENTer?

Set the center frequency.

Default Unit: Hz

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

Cable Fault Location—Frequency Span

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

[:SENSe]:CFLocation:FREQuency SPAN?

Set the frequency span.

Default Unit: Hz

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

Cable Fault Location—Start Frequency

[:SENSe]:CFLocation:FREQuency STARt <freq>

[:SENSe]:CFLocation:FREQuency STARt?

Set the start frequency.

Factory Preset and *RST: 0 Hz

Default Unit: Hz

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

Cable Fault Location—Stop Frequency

[:SENSe]:CFLocation:FREQuency STOP <freq>

[:SENSe]:CFLocation:FREQuency STOP?

Set the stop frequency.

Default Unit: Hz

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

Cable Fault Location—Distance Marker

[:SENSe]:CFLocation:MARKer <distance>

[:SENSe]:CFLocation:MARKer?

Adjust the position of the marker on the display.

Factory Preset and *RST: 10 m

Range: 0 to the value of CFLocation:RANGe? (for further information, refer to the next command)

Default Unit: meters

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

Cable Fault Location—Measured Range

[:SENSe]:CFLocation:RANGe <distance>

[:SENSe]:CFLocation:RANGe?

Specify the range in meters to be measured. This is usually slightly more than the DUT length.

Factory Preset and *RST: 20 m

Range: Minimum: (trace pts/2)(speed of light x velocity)/2 x max span
Maximum: not enforced and is dependent on cable quality.

Default Unit: meters

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

Cable Fault Location—TG Amplitude

[:SENSe]:CFLocation:SOURce:POWer <dBm power>

[:SENSe]:CFLocation:SOURce:POWer?

Set the source power.

Factory Preset and *RST: –10 dBm

Range: –66 to +3 dBm

Default Unit: dBm

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

Cable Fault Location—Velocity Factor

[:SENSe]:CFLocation:VFACtor <velocity factor>

[:SENSe]:CFLocation:VFACtor?

Specify the speed a signal can travel through the cable as a factor of the speed of light (3×10^8).

Factory Preset and *RST: 0.71

Range: 0 to 1

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

Select the ARFCN—Absolute RF Channel Number

[:SENSe]:CHANnel:ARFCn <integer>

[:SENSe]:CHANnel:ARFCn?

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 974 for R-GSM

512 to 885 for DCS1800

512 to 810 for PCS1900

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

Global to the current mode.

Front Panel Access: FREQUENCY Channel, ARFCN

Channel Burst Type

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

[:SENSe]:CHANnel:BURSt?

Set the training sequence code that the analyzer will search for and sync to. This only applies with normal burst selected.

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

Sync: Synchronization Channel (SCH)

Access: Random Access Channel (RACH)

Remarks: Global to the current mode.

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

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

Auto ARFCN

[:SENSe]:CHANnel:LOCate

Locate the strongest signal in the current band.

Remarks: Global to the current mode.

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

Front Panel Access: **FREQUENCY Channel, Auto ARFCN**

DCS/PCS Overlap Priority

[:SENSe]:CHANnel:PREFerences DCS|PCS

[:SENSe]:CHANnel:PREFerences?

Select a priority band when entering an ARFCN that is common to more than one band.

Factory Preset and *RST: DCS

Remarks: Global to the current mode.

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

Front Panel Access: **Mode Setup, Radio, DCS/PCS Overlap Priority**

Burst Type

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

[:SENSe]:CHANnel:RBURSst?

Select the type of burst to be measured.

Factory Preset and *RST: Normal

Remarks: Global to the current mode.

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

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

Reference Training Sequence Code

[:SENSe]:CHANnel:RTSCode <integer>

[:SENSe]:CHANnel:RTSCode?

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

Factory Preset and *RST: 0

Range: 0 to 7

Remarks: Global to the current mode.

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

Front Panel Access: **TIMESLOT, Ref TSC (Std)**

Reference Training Sequence Code Auto

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

[:SENSe]:CHANnel:RTSCode:AUTO?

Select auto or manual control for reference training sequence code (RTSC) 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 (that is 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 GSM mode to use this command. Use INSTrument:SELect to set the mode.

Front Panel Access: **TIMESLOT, Ref TSC (Std)**

Frequency Hopping

[:SENSe]:CHANnel:SFHopping ON|OFF|1|0

[:SENSe]:CHANnel:SFHopping?

Set the signal's frequency hopping repetition factor on or off.

Factory Preset and *RST: Off

Remarks: Global to the current mode.

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

Front Panel Access: **Mode Setup, Radio, Frequency Hopping Repetition Factor**

Frequency Hopping Repetition Factor

[:SENSe]:CHANnel:SFHRepeat <integer>

[:SENSe]:CHANnel:SFHRepeat?

Set the frequency hopping repetition factor.

Factory Preset and *RST: 3

Range: 1 to 100

Remarks: Global to the current mode.

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

Front Panel Access: **Mode Setup, Radio, Frequency Hopping Repetition Factor**

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. Optimum alignment of these measurement timeslots with the actual data timeslots may require some trigger time delay. A trigger delay of about 20 ms is a reasonable offset to use for a typical signal.

Factory Preset and *RST: 0

Range: 0 to 7

Remarks: The command is only applicable for mobile station testing, device = MS.

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

Front Panel Access: **Frequency Channel, Timeslot, Timeslot**

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: OFF

Remarks: The command is only applicable for mobile station testing, device = MS.

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

Front Panel Access: **Frequency Channel, Timeslot, Timeslot**

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.

Factory Preset and *RST: 0

Range: 0 to 7

Remarks: Global to the current mode.

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

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 (that is 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 GSM mode to use this command. Use INSTrument:SELect to set the mode.

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

Correction For BTS RF Port External Gain

[:SENSe]:CORRection:BTS:GAIN <rel_power>

[:SENSe]:CORRection:BTS:GAIN?

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

Factory Preset and *RST: 0 dB

Range: 0 to 81.9 dB

Default Unit: dB

Remarks: Global to the current mode.

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

Front Panel Access: **Mode Setup, Input....**

or

Input, Ext Gain, Base Gain

Correction For BTS RF Port External Attenuation

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

[:SENSe]:CORRection:BTS:LOSS?

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

Factory Preset and *RST: 0 dB

Range: 0 to 81.9 dB

Default Unit: dB

Remarks: Global to the current mode.

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

Front Panel Access: **Mode Setup, Input....**

or

Input, Ext Atten, Base Atten

Correction For MS RF Port External Gain

[:SENSe]:CORRection:MS:GAIN <rel_power>

[:SENSe]:CORRection:MS:GAIN?

Set equal to the external gain used when measuring mobile stations.

Factory Preset and *RST: 0 dB

Range: 0 to 81.9 dB

Default Unit: dB

Remarks: Global to the current mode.

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

Front Panel Access: **Mode Setup, Input....**

or

Input, Ext Gain, Mobile Gain

Correction For MS RF Port External Attenuation

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

[:SENSe]:CORRection:MS:LOSS?

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

Factory Preset and *RST: 0 dB

Range: 0 to 81.9 dB

Default Unit: dB

Remarks: Global to the current mode.

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

Front Panel Access: **Mode Setup, Input....**

or

Input, Ext Atten, Mobile Atten

Center Frequency

[:SENSe]:FREQuency:CENTer <freq>

[:SENSe]:FREQuency:CENTer?

Set the center frequency.

Factory Preset and *RST: 942.6 MHz

Range: 9 kHz to 3.0 GHz

Default Unit: Hz

Remarks: Global to the current mode.

Front Panel Access: **FREQUENCY/Channel, Center Freq**

Monitor Band/Channel Measurement

Commands for querying the monitor band/channel measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 51. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Monitor Band/Channel** measurement has been selected from the **MEASURE** key menu.

Monitor Band/Channel—Average Count

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

[:SENSe]:MONitor: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: 10

Range: 1 to 1000

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

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

Monitor Band/Channel—Averaging State

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

[:SENSe]:MONitor:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST: On

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

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

Monitor Band/Channel—Averaging Termination Control

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

[:SENSe]:MONitor: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: Exponential

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

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

Monitor Band/Channel—Band Method Resolution Bandwidth

[:SENSe]:MONitor:BAND:BANDwidth|BWIDth[:RESolution] <freq>

[:SENSe]:MONitor:BAND:BANDwidth|BWIDth[:RESolution]?

Set the value of the resolution bandwidth for the band method of the monitor band/channel measurement.

Factory Preset and *RST: 100 kHz

Range: 10 Hz to 5 MHz

Default Unit: Hz

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

Front Panel Access: **Meas Setup, Band Setup, Res BW**

Monitor Band/Channel—Band Method Video Bandwidth

[:SENSe]:MONitor:BAND:BANDwidth|BWIDth:VIDeo <freq>

[:SENSe]:MONitor:BAND:BANDwidth|BWIDth:VIDeo?

Set the video bandwidth for the band method of the monitor band/channel measurement.

Factory Preset and *RST: 100 kHz

Range: Option 1DR—1 Hz to 3 MHz

non-Option 1DR—1 kHz to 3 MHz

Default Unit: Hz

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

Front Panel Access: **Meas Setup, Band Setup, Video BW**

Monitor Band/Channel—Band Method Detector Mode

[:SENSe]:MONitor:BAND:DETector POSitive|SAMPle|NEGative

[:SENSe]:MONitor:BAND:DETector?

Set the detector mode type for the band method of the monitor band/channel measurement.

POSitive - positive peak detection displays the highest sample taken during the interval being displayed.

SAMPle - sample detection displays the first sample taken during the interval being displayed.

NEGative - negative peak detection displays the lowest sample taken during the interval being displayed.

Factory Preset and *RST: Positive

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

Front Panel Access: **Meas Setup, Band Setup, Detector**

Monitor Band/Channel—Band Method Maximum Hold Trace Average State

[:SENSe]:MONitor:BAND:MAXHold[:STATe] OFF|ON|0|1

[:SENSe]:MONitor:BAND:MAXHold[:STATe]?

Turn maximum hold trace average feature on or off for the band method of the monitor band/channel measurement.

Factory Preset and *RST: Off

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

Front Panel Access: **Meas Setup, Band Setup, Max Hold**

Monitor Band/Channel—Channel Span

[:SENSe]:MONitor:CHANnel SINGle|TRIPle

[:SENSe]:MONitor:CHANnel?

Switch view between a single or triple channel display.

Factory Preset and *RST: Single

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

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

Monitor Band/Channel—Transmit or Receive Band Selection

[:SENSe]:MONitor:BAND TRANsmit|RECeive

[:SENSe]:MONitor:BAND?

Set the band monitor measurement to monitor the transmit or receive band.

Factory Preset and *RST: Transmit

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

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

Monitor Band/Channel—Channel Method Resolution Bandwidth

[:SENSe]:MONitor:CHANnel:BANDwidth|BWIDth[:RESolution] <freq>

[:SENSe]:MONitor:CHANnel:BANDwidth|BWIDth[:RESolution]?

Set the resolution bandwidth for the channel method of the monitor band/channel measurement.

Factory Preset and *RST: 10 kHz

Range: Option 1DR—10 Hz to 5 MHz

non-Option 1DR—1 kHz to 5 MHz

Default Unit: Hz

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

Front Panel Access: **Meas Setup, Chan Setup, Res BW**

Monitor Band/Channel—Channel Method Video Bandwidth

[:SENSe]:MONitor:CHANnel:BANDwidth|BWIDth:VIDeo <freq>

[:SENSe]:MONitor:CHANnel:BANDwidth|BWIDth:VIDeo?

Set the video bandwidth for the channel method of the monitor band/channel measurement.

Factory Preset and *RST: 10 kHz

Range: Option 1DR—1 Hz to 3 MHz

non- Option 1DR—1 kHz to 3 MHz

Default Unit: Hz

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

Front Panel Access: **Meas Setup, Chan Setup, Video BW**

Monitor Band/Channel—Channel Method Detector Mode

[:SENSe]:MONitor:CHANnel:DETector POSitive|SAMPle|NEGative

[:SENSe]:MONitor:CHANnel:DETector?

Set the detector mode type for the channel method of the monitor band/channel measurement.

Factory Preset and *RST: Positive

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

Front Panel Access: **Meas Setup, Band Setup, Detector**

Monitor Band/Channel—Channel Method Maximum Hold Trace Average State

[:SENSe]:MONitor:CHANnel:MAXHold[:STATe] OFF|ON|0|1

[:SENSe]:MONitor:CHANnel:MAXHold[:STATe]?

Turn maximum hold trace average feature on or off for the channel method of the monitor band/channel measurement. When max hold is turned on, trace averaging is turned off.

Factory Preset and *RST: Off

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

Front Panel Access: **Meas Setup, Chan Setup, Max Hold**

Monitor Band/Channel—Method Selection

[:SENSe]:MONitor:METHod CHANnel|BAND

[:SENSe]:MONitor:METHod?

Sets the monitor measurement method to either channel or band.

Factory Preset and *RST: Band

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

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

Out of Band Spurious Measurement

Commands for querying the out of band spurious measurement results and for setting to the default values are found in the Measure group of commands. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Out Of Band Spurious** measurement has been selected from the **MEASURE** key menu.

Out of Band Spurious—Average Count

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

[:SENSe]:OOBSpur:AVERage:COUNt?

Set the number of max hold data acquisitions that will be averaged per frequency range. The averaging mode (terminal control) setting is unavailable for this measurement.

Factory Preset and *RST: 10

Range: 1 to 1000

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

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

Out of Band Spurious—Averaging State

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

[:SENSe]:OOBSpur:AVERage[:STATe]?

Turn averaging on or off.

Factory Preset and *RST: Off

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

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

Out of Band Spurious—Inspect Spur Resolution Bandwidth

[:SENSe]:OOBSpur:BANDwidth[:RESolution] <freq>

[:SENSe]:OOBSpur:BANDwidth[:RESolution]?

Set the resolution bandwidth of the out of band spurious measurement. Can only be used when the measurement has completed and Inspect Spur is set to on. ([:SENSe]:OOBSpur:ISPur:STATe ON)

Range: 1 kHz to 5 Mhz

Default Unit: Hz

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

Front Panel Access: **Meas Setup, Inspect Spur, Res BW**

Out of Band Spurious—Inspect Spur Video Bandwidth

[:SENSe]:OOBSpur:BANDwidth:VIDeo <freq>

[:SENSe]:OOBSpur:BANDwidth:VIDeo?

Set the video bandwidth of the out of band spurious measurement. Can only be used when the measurement has completed and Inspect Spur is set to on. ([:SENSe]:OOBSpur:ISPur:STATe ON)

Range: 1 kHz to 3 MHz

Default Unit: Hz

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

Front Panel Access: **Meas Setup, Inspect Spur, Video BW**

Out of Band Spurious—Inspect Spur Center Frequency

[:SENSe]:OOBSpur:FREQuency[:CENTer] <freq>

[:SENSe]:OOBSpur:FRequency[:CENTer]?

Set the center frequency of the out of band spurious measurement. Can only be used when the measurement has completed and Inspect Spur is set to on. ([:SENSe]:OOBSpur:ISPur:STATe ON)

Range: 9 kHz to maximum of current ESA model.

Default Unit: Hz

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

Front Panel Access: **FREQUENCY Channel**

Out of Band Spurious—Inspect Spur Frequency Span

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

[:SENSe]:OOBSpur:FREQuency:SPAN?

Set the frequency span of the out of band spurious measurement. Can only be used when the measurement has completed and Inspect Spur is set to on. ([:SENSe]:OOBSpur:ISPur:STATe ON)

Range: ESA model dependent.

Default Unit: Hz

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

Front Panel Access: **SPAN X Scale**

Out of Band Spurious—Inspect Spur

[:SENSe]:OOBSpur:ISPur:COUNt <integer>

[:SENSe]:OOBSpur:ISPUR:COUNt?

Select the spur number that you want to inspect from the table of results. Can only be used when the measurement has completed and Inspect Spur is set to on. ([:SENSe]:OOBSpur:ISPur:STATe ON)

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

Front Panel Access: **Meas Setup, Inspect Spur, Inspect Spur**

Out of Band Spurious—Inspect Spur

[:SENSe]:OOBSpur:ISPur:[STATe] ON|OFF|1|0

[:SENSe]:OOBSpur:ISPUR?

Set inspect spur on or off. The measurement must have completed and found at least one spur.

Factory Preset and *RST: OFF

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

Front Panel Access: **Meas Setup, Inspect Spur, Inspect Spur**

Out of Band Spurious—MS Idle

[:SENSe]:OOBSpur:MSIDle ON|OFF|1|0

[:SENSe]:OOBSpur:MSIDle?

Set MS idle on to specify that you wish to measure a mobile station that is in idle mode—that is, with no call in progress. The measurement uses filter bandwidth and sweep times according to the specifications. This may involve sweep times of greater than 60 seconds.

Factory Preset and *RST: OFF

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

Front Panel Access: **Meas Setup, MS Idle**

Out of Band Spurious—Maximum Mixer Level

[:SENSe]:OOBSpur:POWer:MIXer:RANGe[:UPPer] <dB>

[:SENSe]:OOBSpur:POWer:MIXer:RANGe?

Set the maximum power at the input mixer for the out of band spurious measurement.

Factory Preset and *RST: 5 dBm

Default Unit: dBm

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

Front Panel Access: **Meas Setup, Advanced, Max Mxr Lvl**

Out of Band Spurious—Inspect Spur RF Port Input Attenuation

[:SENSe]:OOBSpur:POWer[:RF]:ATTenuation <dB>

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

Set the RF input attenuator. Can only be used when the measurement has completed and Inspect Spur is set to on. ([:SENSe]:OOBSpur:ISPur:STATe ON)

Range: 0 to 75 dB in 5 dB steps.

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

Default Unit: dBm

Front Panel Access: **AMPLITUDE Y Scale, Atten**

Out Of Band Spurious—Inspect Spur Reference Level

[:SENSe]:OOBSpur:RLEVel <dBm>

[:SENSe]:OOBSpur:RLEVel?

Set the reference level when inspecting spurs. Can only be used when the measurement has completed and Inspect Spur is set to on. ([:SENSe]:OOBSpur:ISPur:STATe ON)

Range: –150 to 150 dBm

Default Unit: dBm

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

Front Panel Access: **AMPLITUDE Y Scale**

Out Of Band Spurious—Inspect Spur Sweep Time

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

[:SENSe]:OOBSpur:SWEep:TIME?

Change the sweep time when inspecting spurs. Can only be used when the measurement has completed and Inspect Spur is set to on ([:SENSe]:OOBSpur:ISPur:STATe ON)

Factory Preset and *RST:	2 s
Range:	4 ms to 500 s
Default Unit:	Seconds
Remarks:	You must be in GSM mode to use this command. Use INSTrument:SELect to set the mode.
Front Panel Access:	**Meas Setup, Inspect Spur, Sweep Time**

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 51. 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: 10

Range: 1 to 1,000

Remarks: You must be in the 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]?

#define help_SENS_ORFS_AVER_STAT \

Turn averaging on or off.

Factory Preset and *RST: On

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

Output RF Spectrum—Averaging Mode

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

[:SENSe]:ORFSpectrum: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.

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

Factory Preset and *RST: Repeat

Output RF Spectrum—Resolution BW For Modulation At Close Offsets

[:SENSe]:ORFSpectrum:BANDwidth[:RESolution] :MODulation:OFFSet:CLOSe <freq>

[:SENSe]:ORFSpectrum:BANDwidth[: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.

Factory Preset and *RST: 30 kHz

Range: 1 kHz to 5 MHz

Default Unit: Hz

Remarks: You must be in the 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[:RESolution]
:MODulation:OFFSet:FAR <freq>

[:SENSe]:ORFSpectrum:BANDwidth[: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.

Factory Preset and *RST: 100 kHz

Range: 1 kHz to 5 MHz

Default Unit: Hz

Remarks: You must be in the 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[:RESolution]
:SWITching:OFFSet:CLOSe <freq>

[:SENSe]:ORFSpectrum:BANDwidth[: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.

Factory Preset and *RST: 30 kHz

Range: 1 kHz to 5 MHz

Default Unit: Hz

Remarks: You must be in the 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[:RESolution] :SWITching:OFFSet:FAR <freq>

[:SENSe]:ORFSpectrum:BANDwidth[: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.

Factory Preset and *RST: 100 kHz

Range: 1 kHz to 5 MHz

Default Unit: Hz

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

Output RF Spectrum—Burst Synchronization Source

[:SENSe]:ORFSpectrum:BSYNc:SOURce TSEQuence|RFAMplitude |NONE

[:SENSe]:ORFSpectrum:BSYNc:SOURce?

Select the method of synchronizing the measurement to the GSM bursts.

Training Sequence - the training sequence burst synch 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.

RF amplitude - the RF amplitude burst synch approximates the start and stop of the useful part of the burst without digital demodulation of the burst.

None - no burst sync is used.

Factory Preset and *RST: Training sequence

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

Output RF Spectrum—Offset Frequency List

[:SENSe]:ORFSpectrum:LIST:SELect SHORt|STANdard

[:SENSe]:ORFSpectrum:LIST:SELect?

Select the list of frequency offsets and bandwidths to be used to make the ORFS measurement. Frequency offsets are used only in ORFS multiple measurement method for both ORFS due to modulation and switching transients.

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.

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

Output RF Spectrum Measurement Method

[:SENSe]:ORFSpectrum:MEASure MULTiple|SINGle|SWEPt

[: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.

Swept - the measurement is done in the frequency domain. For output RF spectrum due to modulation it is done using time-gated spectrum analysis to sweep the analyzer with the gate turned on for the desired portion of the burst only.

Factory Preset and *RST: Multiple

Remarks: You must be in the 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

Range: –6.0 MHz to +6.0 MHz, step size: steps through the values in the selected offset frequency list.

Default Unit: Hz

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

Output RF Spectrum—Reference Power Averages

[:SENSe]:ORFSpectrum:REFerence:AVERage:COUNt <integer>

[:SENSe]:ORFSpectrum:REFerence:AVERage:COUNt?

#define help_SENS_ORFS_REF_AVER_COUN \

Set the number of bursts to be averaged when measuring the reference power. Reference power average state must be set to OFF (for further information refer to the next command). Reference power averages is valid only if SENS:ORFS:MEAS is set to single.

Factory Preset and *RST: 10

Range: 1 to 1000

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

Output RF Spectrum—Reference Power Average State

[:SENSe]:ORFSpectrum:REFerence:AVERage[:AUTO] ON|OFF|1|0

[:SENSe]:ORFSpectrum:REFerence:AVERage[:AUTO]?

Specifies how many averages to use when measuring the reference power. Set it to ON to use the same number of averages as specified in the number of bursts averaged command. Set it to OFF to use the number specified in the reference power averages command (for further information refer to the previous command). Reference power average state is valid only if SENS:ORFS:MEAS is set to single.

Factory Preset and *RST: ON

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

Output RF Spectrum—Trigger Source

[:SENSe]:ORFSpectrum:TRIGger:SOURce EXTernal|RFBurst|FRAMe|IMMediate

[:SENSe]:ORFSpectrum:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

External - front 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)

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

Factory Preset and *RST: RF burst

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

Output RF Spectrum—Measurement Type

[:SENSe]:ORFSpectrum:TYPE MODulation|SWITching

[:SENSe]:ORFSpectrum:TYPE?

Select the measurement type.

Modulation - only the modulation spectrum is measured.

Switching - only the switching transient spectrum is measured.

Factory Preset and *RST: Modulation

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

Output RF Spectrum—Wideband Noise

[:SENSe]:ORFSpectrum:WBNoise ON|OFF|1|0

[:SENSe]:ORFSpectrum:WBNoise?

Set wideband noise functiion to ON or OFF. When set to OFF, the analyzer is tuned to the carrier and –1800 kHz to +1800 kHz either side of the center frequency is swept. When set to ON, the whole of the relevant band 2 MHz either side is swept.

Factory Preset and *RST: OFF

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

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 51. 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 1000

Remarks: You must be in the 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 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: Exp

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

Phase & Frequency Error—Averaging Type

[:SENSe]:PFERror:AVERage:TYPE MEAN|MAXimum

[:SENSe]:PFERror:AVERage:TYPE?

Select the type of averaging:

Mean - the scalar results are averaged.

Maximum - the maximum scalar results are retained.

Factory Preset and *RST: Maximum.

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

Phase & Frequency Error—Burst Synchronization

[:SENSe]:PFERror:BSYNc:SOURce TSEQuence|RFAMplitude|NONE

[:SENSe]:PFERror:BSYNc:SOURce?

Select the method of synchronizing the measurement to the GSM bursts.

Training Sequence - 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.

RF Amplitude - 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: Training sequence

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

Phase & Frequency Error—Trigger Source

[:SENSe]:PFERror:TRIGger:SOURce EXTernal|FRAMe|IMMediate|RFBurst

[:SENSe]:PFERror:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

External - external trigger input. Uses rear panel.

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).

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

Factory Preset and *RST: External

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

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 RF input attenuation is set to auto.

Factory Preset and *RST: 5 dB

Range: 0 to 75 dB in 5 dB steps

Default Unit: dB

Remarks: Global to the current mode.

Front Panel Access: **Input, Input Atten**

or

Mode Setup, Input, Input, Tab⇒, Input Atten

RF Carriers

[:SENSe]:POWer[:RF]:CARRiers SINGle|MULTiple

[:SENSe]:POWer[:RF]:CARRiers?

Switch between single and multiple carrier modes.

Factory Preset and *RST: Single

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

Front Panel Access: **Input, Tab⇒, Input Atten**

or

Input/Output, Tab⇒, Input Atten

RF Input Port Power Gain

[:SENSe]:POWer[:RF]:GAIN[:STATe] OFF|ON|0|1

[:SENSe]:POWer[:RF]:GAIN[:STATe]?

Turns the internal preamp on or off for the currently selected measurement.

Factory Preset and *RST: Off

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

Front Panel Access: **Mode Setup, Input....**

or

Input, Int Preamp

RF Port Power Range

[:SENSe]:POWer[:RF]:RANGe <dBm>

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

Set the maximum total power to be applied at the RF input. There are two modes of operation as follows:

When RF Port Power Range Auto = AUTO, Max Total Pwr displays the actual measured power level.

When RF Port Power Range Auto = MANual, the input power range is determined by the manually entered Max Total Pwr value.

Range: –100 to +80

Default Unit: dBm

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

Front Panel Access: **Mode Setup, Input....**

or

Input, Max Total Pwr

RF Port Power Range Auto

[:SENSe]:POWer[:RF]:RANGe:AUTO AUTO|MAN

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

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

AUTO - power range is automatically set as determined by the actual measured power level at the start of a measurement, as displayed by the Max Total Pwr value.

MAN - power range is manually set by either the manually entered Max Total Pwr or Input Atten value.

Factory Preset and *RST: On

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

Front Panel Access: **Mode Setup, Input....**

or

Input, Max Total Pwr

Power Steps Measurement (PST)

Commands for querying the power steps measurement results and for setting to the default values are found in the "MEASure Group of Commands" on page 51. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Power Steps** measurement has been selected from the **MEASURE** key menu.

Power Steps—Sweep Time

[:SENSe]:PSTeps:SWEep:TIME <integer>

[:SENSe]:PSTeps:SWEep:TIME?

Set the sweep time that will be used to make the power steps measurement over. The value should be set to >= 2 seconds to ensure that the GSM modulation does not affect the trace.

Factory Preset and *RST: 2

Range: 5 ms to 4000 s

Default unit: Seconds

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

Power Steps—Resolution Bandwidth

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

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

Set the resolution bandwidth to be used to make the power steps measurement over.

Factory Preset and *RST: 1 MHz

Range: 10 Hz to 5 MHz

Default unit: Hz

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

Power Steps—Video Bandwidth

[:SENSe]:PSTeps:BANDwidth|BWIDth:VIDeo <freq>

[:SENSe]:PSTeps:BANDwidth|BWIDth:VIDeo?

Set the video bandwidth to be used to make the power steps measurement over.

Factory Preset and *RST:	300 khz
Range:	30 Hz to 3 MHz
Default unit:	Hz
Remarks:	You must be in GSM mode to use this command. Use INSTrument:SELect to set the mode.

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 51. 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 1,000

Remarks: You must be in the GSM 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: On

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

Power vs. Time—Averaging Type

[:SENSe]:PVTime:AVERage:TYPE LPOWer|POWer

[:SENSe]:PVTime:AVERage:TYPE?

Select the type of averaging to be performed.

LPOWer - logarithmically averages the power of the video data.

POWer - averages the linear power of successive measurements.

Factory Preset and *RST: POWer

Remarks: You must be in GSMmode to use this command. Use INSTrument:SELect to set the mode. We are using this command somewhat differently than defined in SCPI Manual. We use this command to specify what data type is being averaged (LPOW or POW). The SCPI manual defines a SCALar average; and would require a separate command to select the type of data to which the scalar averaging is applied.

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: 300 kHz

Range: 1 kHz to 5 MHz

Default Unit: Hz

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

Power vs. Time—Video BW

[:SENSe]:PVTime:BANDwidth|BWIDth:VIDeo <freq>

[:SENSe]:PVTime:BANDwidth|BWIDth:Video?

Specify the video bandwidth.

Factory Preset and *RST: 300 kHz

Range: 1 Hz to 3 MHz

Default Unit: Hz

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

Power vs. Time—Burst Synchronization Source

[:SENSe]:PVTime:BSYNc:SOURce TSEQuence|RFAMplitude|NONE

[:SENSe]:PVTime:BSYNc:SOURce?

Select the method of synchronizing the measurement to the GSM bursts.

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.

RFAMplitude - performs burst synchronization based on the rising and falling edges of the burst.

NONE - performs no burst synchronization.

Factory Preset and *RST: TSEQuence

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

Power vs. Time—Current Data Calculation

[:SENSe]:PVTime:CDATa 0|1|ON|OFF

[:SENSe]:PVTime:CDATa?

Turn calculation of current data results on or off. Current data is calculated at the end of each sweep and is based only on that sweep.

Factory Preset and *RST: ON

Range: ON/OFF

Remarks: Set the parameter to OFF to gain additional measurement speed over averaged results.

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

Power vs. Time—Limit Line Mask Display

[:SENSe]:PVTime:LIMit:MASK 0|1|ON|OFF

[: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—Limit Line Mask Test

[:SENSe]:PVTime:LIMit:TEST 0|1|ON|OFF

[:SENSe]:PVTime:LIMit:TEST?

Turn on or off limit pass/fail testing. Does not affect limit line display.

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. The defined relative mask values are normally 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. Then that absolute power will be used as the test limit.

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 GSM mode to use this command. Use INSTrument:SELect to set the mode.

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 GSM mode to use this command. Use INSTrument:SELect to set the mode.

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.

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 GSM mode to use this command. Use INSTrument:SELect to set the mode.

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 2-2 on page 122.

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 GSM mode to use this command. Use INSTrument:SELect to set the mode.

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 GSM mode to use this command. Use INSTrument:SELect to set the mode.

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. The defined relative mask values are normally used as the limits for testing. If the power of the reference level is increased, all of these relative mask power levels will increase by the same amount until they reach a defined maximum absolute power. Then that absolute power will be used as the test limit. See Figure 2-2 on page 122.

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 GSM mode to use this command. Use INSTrument:SELect to set the mode.

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 GSM mode to use this command. Use INSTrument:SELect to set the mode.

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. For further information, refer to Figure 2-2 on page 122.

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 GSM mode to use this command. Use INSTrument:SELect to set the mode.

Power vs. Time—Upper Mask Time Points

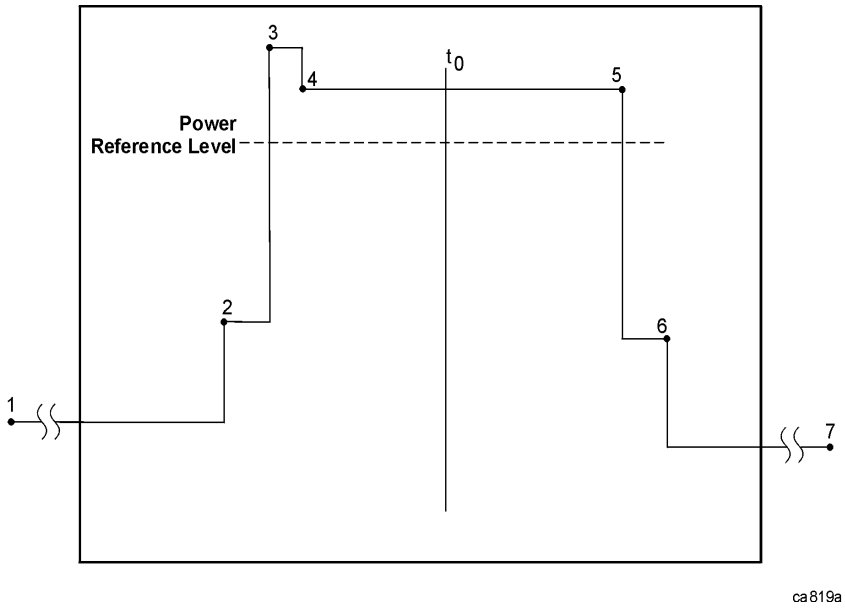
[:SENSe]:PVTime:MASK:LIST:UPPer:TIME <seconds>{,<seconds>}

[: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 2-2 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]
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 GSM mode to use this command. Use INSTrument:SELect to set the mode.

Power vs. Time—Maximum Hold

[:SENSe]:PVTime:MAXHold 0|1|ON|OFF

[:SENSe]:PVTime:MAXHold?

#define help_SENS_PVT_MAXH \

Turn the max hold feature on or off. Available only in monitor view.

Factory Preset and *RST: OFF

Range: OFF/ON

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

Power vs. Time—Maximum Timeslots

[:SENSe]:PVTime:MTIMe <integer>

[:SENSe]:PVTime:MTIMe?

Set the number of timeslots to show on screen.

Factory Preset and *RST: 1

Range: 1 to 8

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

Power vs. Time—Trigger Source

[:SENSe]:PVTime:TRIGger:SOURce EXTernal|RFBurst|FRAMe

[:SENSe]:PVTime:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

External - rear panel external trigger input

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

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

Factory Preset and *RST: RF burst

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

Radio Device Under Test

[:SENSe]:RADio:DEVice MS|BTS|UBTS1|UBTS2|UBTS3|

[:SENSe]:RADio:DEVice?

Select the type of radio device to be tested.

MS – Mobile station transmitter test

BTS – Base station transmitter test

UBTS1 – Micro base station class M1 transmitter test

UBTS2 – Micro base station class M2 transmitter test

UBTS3 – Micro base station class M3 transmitter test

Factory Preset and *RST: BTS

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

Global to current mode.

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

Radio Standard Band

[:SENSe]:RADio:STANdard:BAND PGSM|EGSM|RGSM|DCS|PCS

[:SENSe]:RADio:STANDard:BAND?

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

PGSM - P-GSM900

EGSM - E-GSM900

RGSM - R-GSM900

DCS - DCS-1800

PCS - PCS-1900

Factory Preset and *RST: PGSM

Remarks: Global to the current mode.

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

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

Reference Oscillator External Frequency

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

[:SENSe]:ROSCillator:EXTernal:FREQuency?

Set to the frequency of the external reference signal being supplied to the instrument's 10MHZ REF IN input BNC connector. If the external frequency reference signal is not 10MHz, the following procedure must be followed:

Connect the external reference signal to the DDRF board EXT REF IN input BNC connector.

Connect the DDRF board EXT 10MHZ OUT output BNC to the SA base box 10MHZ REF IN input BNC connector.

Enter the external reference signal frequency value as the Opt Freq Ref parameter.

Set Opt Freq Ref = External

The DDRF Option B7E reference PLL circuit will attempt to lock to the external reference signal and if successful will produce a phase locked 10MHz reference on the DDRF board EXT 10MHZ OUT output BNC, which in turn will drive the base box 10MHZ REF IN.

Preset and *RST:	10 MHz
Range:	1 MHz to 30 MHz
Default Unit:	Hz
Remarks:	Global to system.
Front Panel Access:	**Mode Setup, Demod....** or **Det/Demod, Opt Freq Ref**

Reference Oscillator Rear Panel Output

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

[:SENSe]:ROSCillator:OUTPut?

Turn on and off the external reference signal going to the rear panel.

Preset and *RST: On

Remarks: Global to system.

Front Panel Access: **Mode Setup, Demod....**

or

Det/Demod, Opt 10MHz Out

Reference Oscillator Source

[:SENSe]:ROSCillator:SOURce INTernal|EXTernal

[:SENSe]:ROSCillator:SOURce?

Select the reference oscillator (time base) source.

Internal - uses internal 10 MHz reference signal

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

Preset and *RST: Internal

Remarks: Global to system.

Front Panel Access: **Mode Setup, Demod....**

or

Det/Demod, Opt Freq Ref

Sync Alignment

[:SENSe]:SYNC:ALIGnment GSM|HALF

[: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

HALF - burst alignment is advanced by1/2 bit, which corresponds to an earlier interpretation of the GSM standard

Factory Preset and *RST: Half bit

Remarks: Global to the current mode.

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

Front Panel Access: **Mode Setup, Demod, Burst Align**

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: –5 ms to 5 ms

Default Unit: seconds

Remarks: Global to the current mode.

You must be in the 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:BURSt:STHReshold <rel_power>

[:SENSe]:SYNC:BURSt:STHReshold?

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: –10 dB

Range: –200 to –0.01 dB

Default Unit: dB

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

Front Panel Access: **Mode Setup, Demod....**

or

Det/Demod, Burst Search Threshold

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 51. The equivalent front panel keys for the parameters described in the following commands, are found under the **Meas Setup** key, after the **Tx Band 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: 10

Range: 1 to 1,000

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

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 GSM mode to use this command. Use INSTrument:SELect to set the mode.

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: Exp

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

Transmit Band Spurs—Idle Mode

[:SENSe]:TSPur:IDLE ON|OFF|1|0

[:SENSe]:TSPur:IDLE?

Set idle mode to YES if the transmitter is set to idle, or NO if the transmitter has an active channel.

Factory Preset and *RST: NO

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

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.

Factory Preset and *RST: Full

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

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 51. 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: 10

Range: 1 to 10,000

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

Transmit Power—Averaging Type

[:SENSe]:TXPower:AVERage:TYPE LPOWer|POWer

[:SENSe]:TXPower:AVERage:TYPE?

Select the type of averaging to be performed.

LPOWer - logarithmically averages the power of the video data.

POWer - averages the linear power of successive measurements.

Factory Preset and *RST: POWer

Remarks: You must be in the 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: 300 kHz

Range: 1 kHz to 5 MHz

Default Unit: Hz

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

Transmit Power—Video Bandwidth

[:SENSe]:TXPower:BANDwidth|BWIDth:video <freq>

[:SENSe]:TXPower:BANDwidth|BWIDth:video?

Specify the video bandwidth.

Factory Preset and *RST: 300 kHz

Range: 1Hz to 3MHz

Default Unit: Hz

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

Transmit Power—Burst Synchronization Source

[:SENSe]:TXPower:BSYNc:SOURce TSEQuence|RFAMplitude|NONE

[:SENSe]:TXPower:BSYNc:SOURce?

Select the method of synchronizing the measurement to the GSM bursts.

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.

RFAMplitude - the RF amplitude burst synch approximates the start and stop of the useful part of the burst without digital demodulation of the burst.

NONE - performs no burst synchronization.

Factory Preset and *RST: NONE

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

Transmit Power—Current Data Calculation

[:SENSe]:TXPower:CDATa ON|OFF|1|0

[:SENSe]:TXPower:CDATa?

Turns calculation of current data calculation on of off. Current data is calculated at the end of each sweep and is based only on that sweep.

Factory Preset and *RST: ON

Range: ON/OFF

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

Transmit Power—Maximum Timeslots

[:SENSe]:TXPower:MTIMe <num timeslots>

[:SENSe]:TXPower:MTIMe?

Sets the number of timeslots to show on screen.

Factory Preset and *RST: 1

Range: 1 to 8

Remarks: You must be in the GSM 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

Range: –60 dB to 0 dB, for relative mode

–60 dBm to +60 dBm, for absolute mode

Default Unit: dB for relative mode

dBm for absolute mode

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

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 GSM mode to use this command. Use INSTrument:SELect to set the mode.

Transmit Power—Trigger Source

[:SENSe]:TXPower:TRIGger:SOURce IMMediate|EXTernal|RFBurst|FRAMe

[:SENSe]:TXPower:TRIGger:SOURce?

Select the trigger source used to control the data acquisitions.

Immediate - the next data acquisition is immediately taken (also called free run).

External - rear panel external trigger input.

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

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

Factory Preset and *RST: External

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

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.

Rear Panel External Trigger Delay

:TRIGger[:SEQuence]:EXTernal:DELay <time>

:TRIGger[:SEQuence]:EXTernal:DELay?

Set the trigger delay when using the rear panel external trigger.

Factory Preset and *RST: 0 s

Range: –5 ms to +5 ms

Default Unit: seconds

Front Panel Access: **Mode Setup, Trigger....**

or

Trig, External, Delay

Rear Panel External Trigger Slope

:TRIGger[:SEQuence]:EXTernal:SLOPe POSitive|NEGative

:TRIGger[:SEQuence]:EXTernal:SLOPe?

Sets the trigger slope when using the rear panel external trigger input.

Factory Preset and *RST: Positive

Front Panel Access: **Mode Setup, Trigger....**

or

Trig, External, Slope

Frame Trigger Delay

:TRIGger[:SEQuence]:FRAMe:DELay <time>

:TRIGger[:SEQuence]:FRAMe:DELay?

Set trigger delay to be used in zero span measurements to adjust the active burst within a mask. Use positive values to achieve trigger delay (that is, to measure later than the trigger source event) and use negative values to achieve pre-trigger (that is, to measure earlier than the trigger source event).

Factory Preset and *RST: 0

Range: –5 ms to +5 ms

Default Unit: seconds

Front Panel Access: **Mode Setup, Trigger....**

or

Trig, Frame Delay

RF Burst Trigger Delay

:TRIGger:RFBurst:DELay <time>

:TRIGger:RFBurst:DELay?

Set the trigger delay when using the RF burst (wideband) trigger.

Factory Preset and *RST: 0 sec

Range: –5 ms to +5 ms

Default Unit: seconds

Front Panel Access: **Mode Setup, Trigger....**

or

Trig, RF Burst, Delay

RF Burst Trigger Slope

:TRIGger:RFBurst:SLOPe POSitive|NEGative

:TRIGger:RFBurst:SLOPe?

Set the trigger slope when using the RF Burst (wideband) Trigger.

Factory Preset and *RST: Positive

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

Front Panel Access: **Mode Setup, Trigger....**

or

Trig, RF Burst, Slope

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