MX269015A
TD-SCDMA Measurement Software
Operation Manual
Remote Control

Fourth Edition

- **For safety and warning information, please read this manual before attempting to use the equipment.**
- **Additional safety and warning information is provided within the MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Main Frame Operation) or MS2830A Signal Analyzer Operation Manual (Main Frame Operation) and MX269015A TD-SCDMA Measurement Software Operation Manual (Operation). Please also refer to these documents before using the equipment.**
- **Keep this manual with the equipment.**

ANRITSU CORPORATION

Document No.: M-W3045AE-4.0

Safety Symbols

To prevent the risk of personal injury or loss related to equipment malfunction, Anritsu Corporation uses the following safety symbols to indicate safety-related information. Ensure that you clearly understand the meanings of the symbols BEFORE using the equipment. Some or all of the following symbols may be used on all Anritsu equipment. In addition, there may be other labels attached to products that are not shown in the diagrams in this manual.

Symbols used in manual

DANGER This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

WARNING This indicates a hazardous procedure that could result in serious injury or death if not performed properly.

CAUTION This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.

This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.

This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.

This indicates a warning or caution. The contents are indicated symbolically in or near the triangle.

This indicates a note. The contents are described in the box.

These indicate that the marked part should be recycled.

MX269015A
TD-SCDMA Measurement Software
Operation Manual Remote Control

7 February 2008 (First Edition)
30 September 2011 (Fourth Edition)

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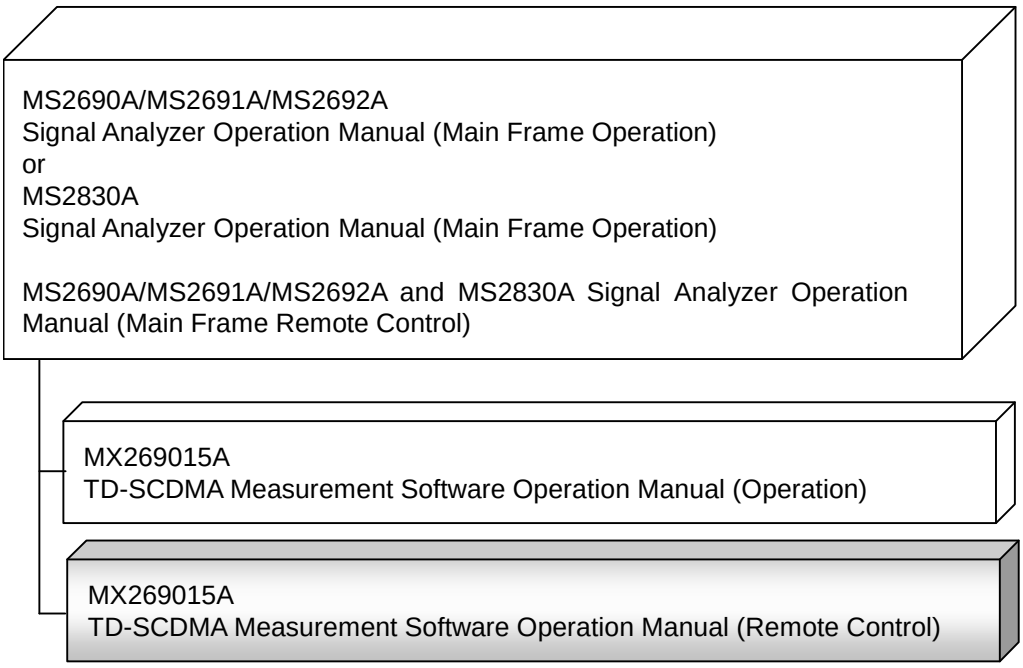
About This Manual

■ **Composition of Operation Manuals**

The operation manuals for the MX269015A TD-SCDMA Measurement Software are comprised as shown in the figure below.



- Signal Analyzer Operation Manual (Main Frame Operation)
- Signal Analyzer Operation Manual (Main Frame Remote Control)

These manuals describe basic operating methods, maintenance procedures, common functions, and common remote control of the signal analyzer Main Frame.

- TD-SCDMA Measurement Software Operation Manual (Operation)

This manual describes basic operating methods and functions of the MX269015A TD-SCDMA Measurement Software.

- TD-SCDMA Measurement Software Operation Manual (Remote Control) <This document>

This manual describes remote control of the MX269015A TD-SCDMA Measurement Software.

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IV.

Chapter 1 Overview

This chapter overviews remote control operation of the MX269015A TD-SCDMA Measurement Software (hereafter, "this application").

1.1 Overview

This application can be controlled from an external controller (PC) by remote control commands using the MS269x Series or MS2830A Signal Analyzer (hereafter "this instrument").

Remote control commands for this application are in the SCPI format defined by the SCPI Consortium.

1.1.1 Interface

This instrument has GPIB, Ethernet, and USB interfaces for remote control. Only one interface can be used at a time.

The interface is determined automatically when a command is received at the start of communication. The interface enters the remote state when a remote command is detected from the external controller (PC). At remote-interface operation, the front panel Remote lamp lights; the lamp is off at local-interface operation.

Refer to the "MS2690A/MS2691A/MS2692A and MS2830A Signal Analyzer Operation Manual (Main Frame Remote Control)" for more details about remote control and interface setting.

1.1.2 Controlled Application

Two kinds of remote control commands can be used with this instrument: commands that are common to all applications (hereafter common commands), and other commands unique to a specific application. Common commands can be executed at any time and do not depend on the currently controlled application. However, when a command unique to a specific application is executed at another application, the command is not executed and an error occurs.

1.2 Basic Control Flow

This part explains the basic remote control command programming for measuring a TD-SCDMA signal.

Figure 1.2-1 shows the control flow for a basic test. Note the parameter settings for the measurement, type of measurement function, and measurement execution order (although the measurement order can change).

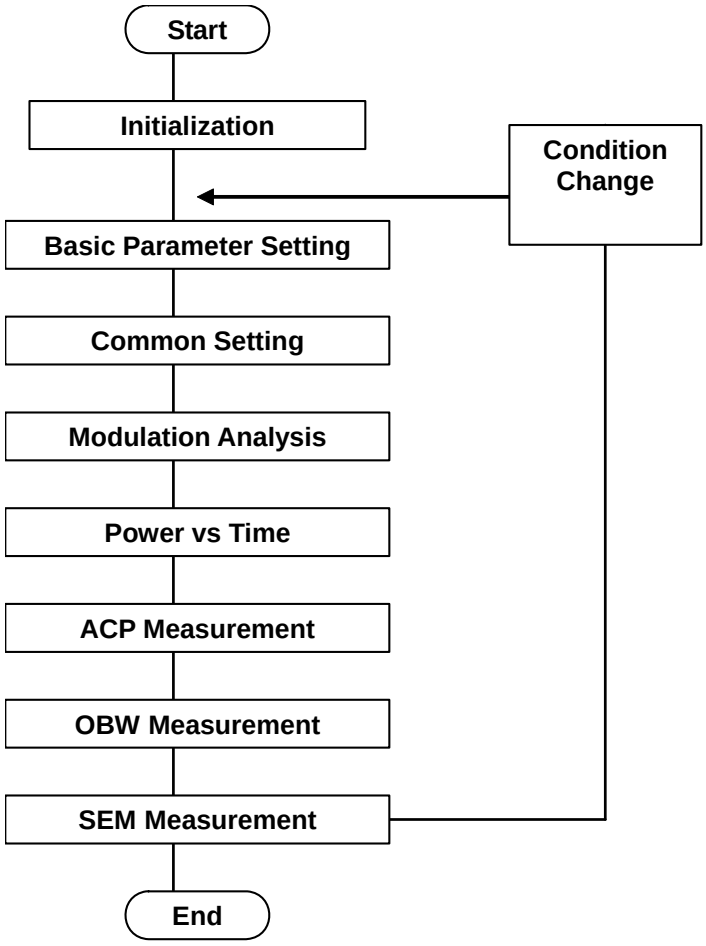


Fig. 1.2-1 Basic Test Flow

(1) Initialization

The communication interface is initialized and the parameters are initialized at the application start.

☞ 1.2.1 Initialization

(2) Basic Parameter Setting

The carrier frequency, input level and all other measurement parameters are set.

☞ 1.2.2 Basic Parameter Settings

(3) Common Setting

Common parameters for the executed modulation analysis function are set. These parameters include signal direction, scrambling code number, maximum user, target slot number, carrier number, target carrier, active channel threshold, active slot threshold, auto rate detection and spreading factor.

☞ 1.2.3 Common Settings

(4) Modulation Analysis

This application executes modulation analysis. The modulation analysis function is selected first. The trace mode, storage mode, etc., are set next and the measurement results are read.

☞ 1.2.4 Modulation Analysis

(5) Power vs Time Measurement

This application executes Power vs Time measurement. The Power vs Time measurement function is selected first. The wide dynamic range, storage mode, etc., are set next and the measurement results are read.

☞ 1.2.5 Power vs Time Measurement

(6) ACP/OBW/SEM Measurement

This executes the spectrum analyzer and signal analyzer functions. The basic parameters for these functions are set by this application. Measurement results are read by selecting the application and parameters, such as trigger mode, storage mode, BW analysis, trace mode, sweeping, etc.

☞ 1.2.6 ACP Measurement

☞ 1.2.7 OBW Measurement

☞ 1.2.8 SEM Measurement

1.2.1 Initialization

At initialization, this instrument and application are prepared for use. Initialization includes the following steps.

(1) Initialization of Communication Interface
The remote control interface to be used is initialized so sending and receiving of commands can start. Refer to the "MS2690A/MS2691A/MS2692A and MS2830A Signal Analyzer Operation Manual (Main Frame Remote Control)" for details about the remote control interface.

(2) Setting Language Mode and Response Format
The language mode and response format used to communicate are set. Refer to the "MS2690A/MS2691A/MS2692A and MS2830A Signal Analyzer Operation Manual (Main Frame Remote Control)" for details about the language mode and response format.

(3) Starting Application
The application is started. The signal analyzer and spectrum analyzer applications should be loaded too.

(4) Selecting Application
The target application is selected.

(5) Initialization
All parameters and states are reset at initialization.

(6) Setting Measurement Mode

After initialization, the measurement mode is continuous measurement. To select single measurement, switch to the single measurement mode.

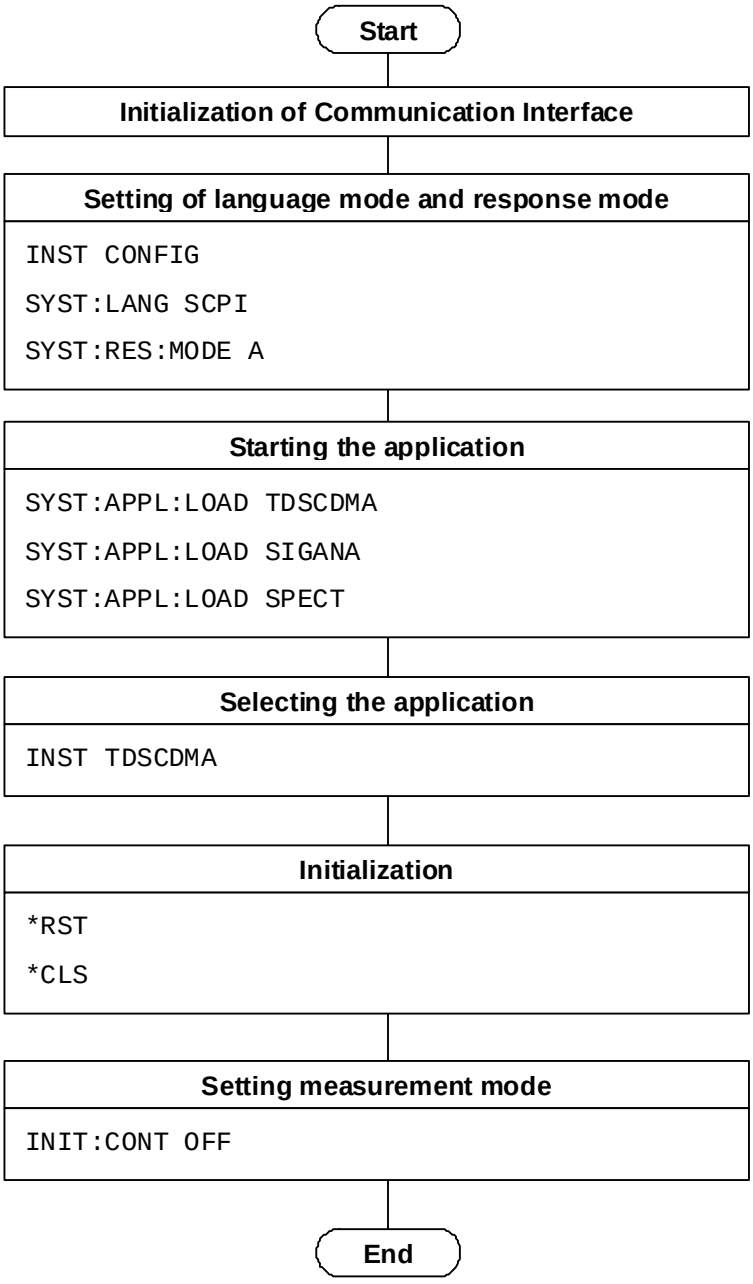


Fig. 1.2.1-1 Initialization Flow and Command Example

1.2.2 Basic Parameter Settings

Parameters that are common to all applications such as carrier frequency and input level are set. These parameters are applied to this application, and the signal analyzer and spectrum analyzer applications. The basic parameters include:

(1) Frequency

(2) Input Level (Reference Level/Attenuator)

(3) Level Offset

(4) Pre-Amp (Option)

(5) Trigger (Gate)

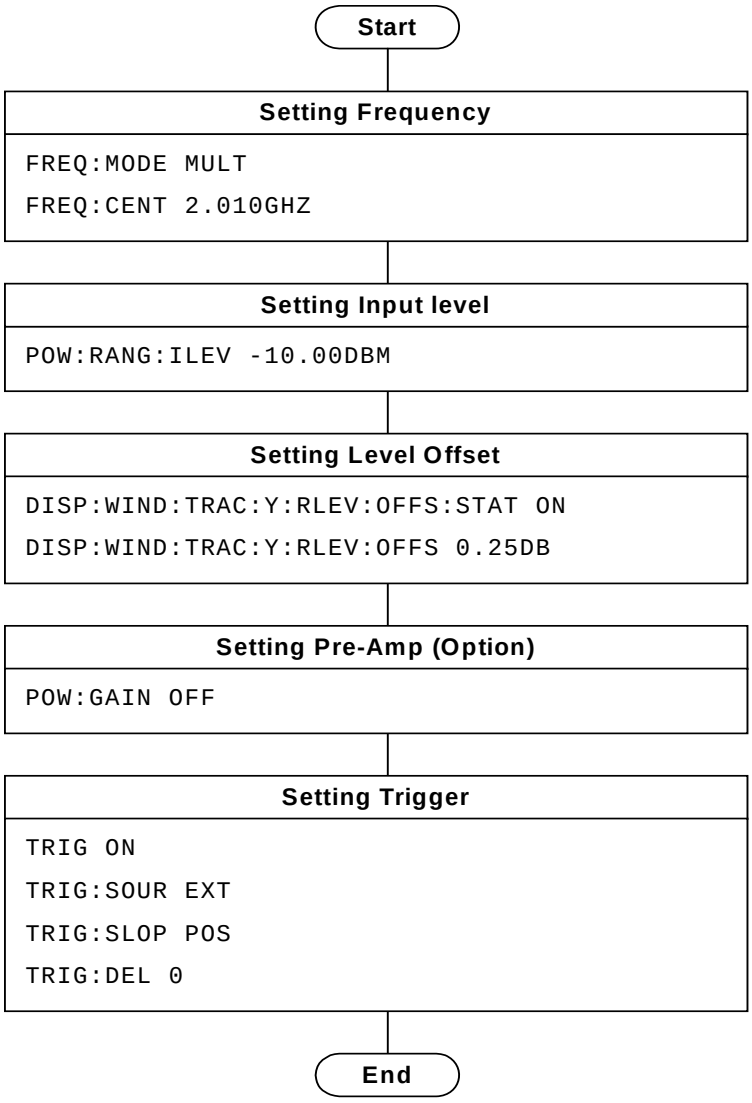


Fig. 1.2.2-1 Flow of Basic Parameter Setting and Command Example

1.2.3 Common Settings

Common parameters for this application are set. There are no restrictions on the setting order unless otherwise specified.

(1) Signal Direction

(2) Scrambling Code Number

(3) Maximum User

(4) Target Slot Number

(5) Carrier Number

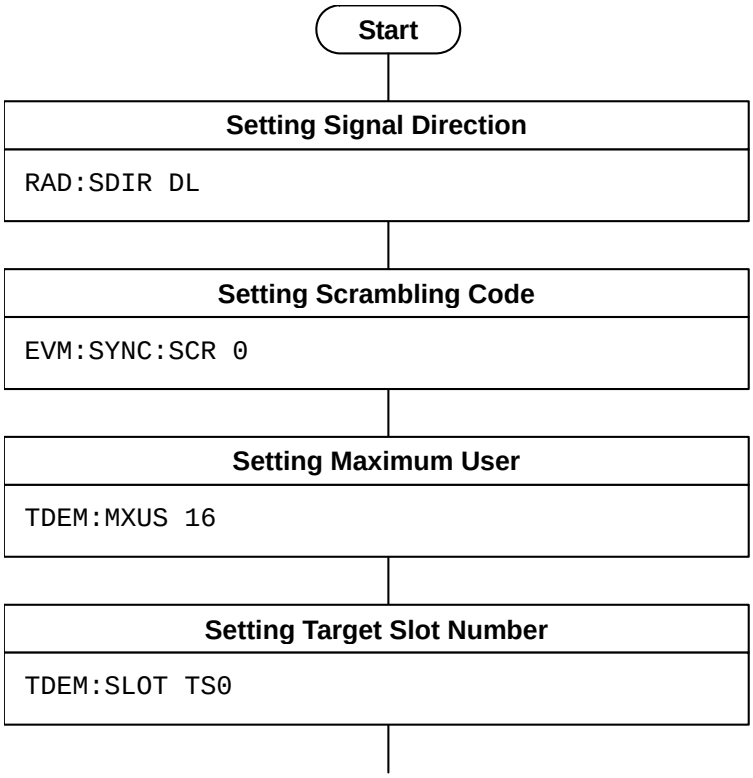
(6) Target Carrier

(7) Active Channel Threshold

(8) Active Slot Threshold

(9) Auto Rate Detection

(10) Spreading Factor



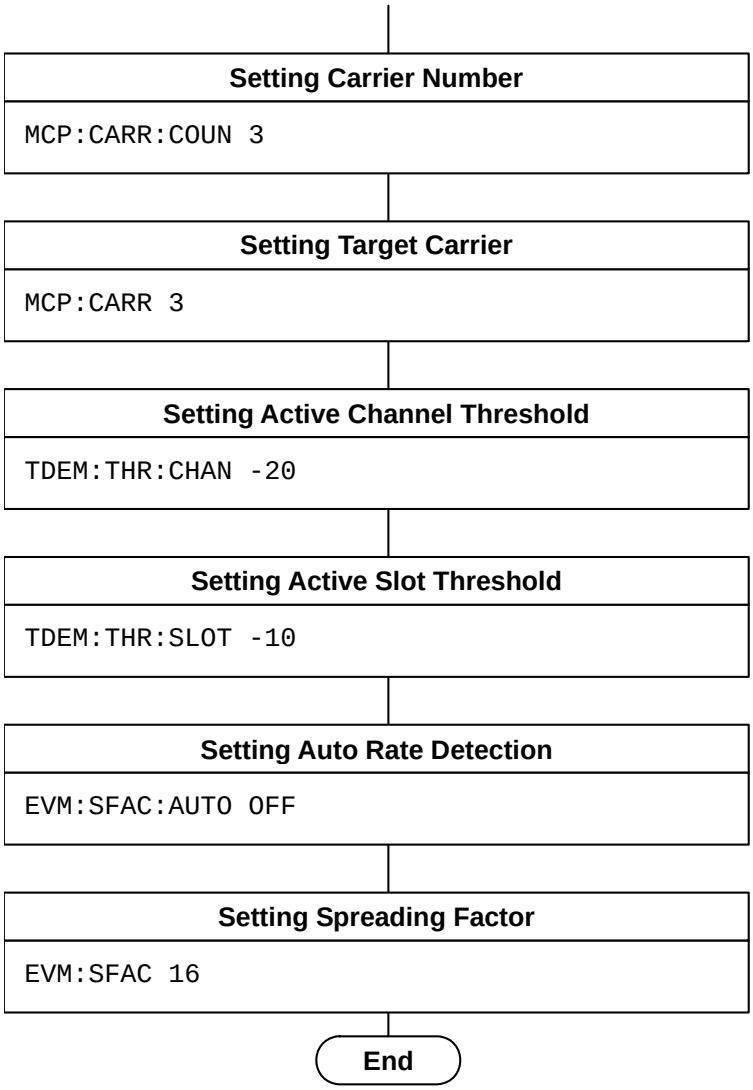


Fig. 1.2.3-1 Flow of Setting Common Parameters and Command Example

1.2.4 Modulation Analysis

This executes the Modulation analysis function as follows:

(1) Selecting measurement function

(2) Setting measurement parameters
This applies only to modulation analysis.

(a) Averaging

(3) Measuring and reading results

(4) Setting display contents
This step is unnecessary when results are read by remote control. These remote control commands display results on the screen as at manual operation.

(a) Trace Mode

(b) Scale

(c) Marker

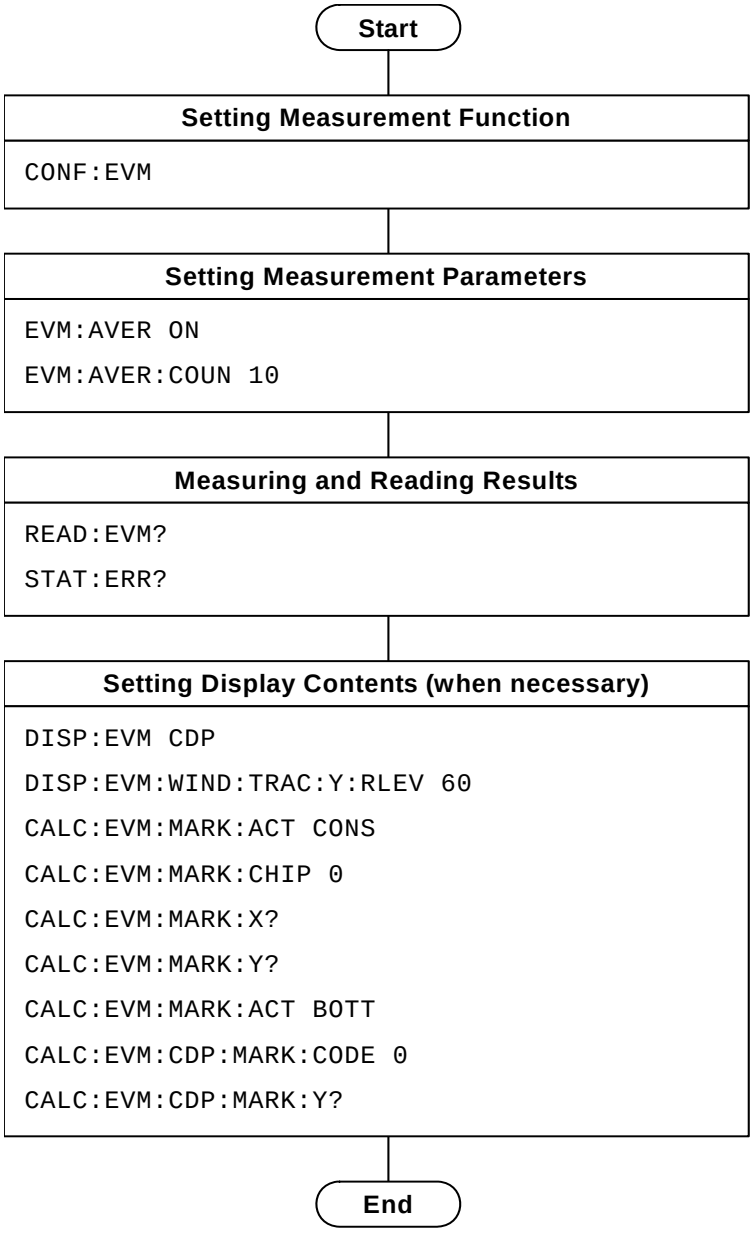


Fig. 1.2.4-1 Flow of Modulation Measurement and Command Example

1.2.5 Power vs Time Measurement

The Power vs Time measurement is executed in the following order:

(1) Selecting measurement function

(2) Setting measurement parameters
The following parameters are only applied to Power vs Time measurement:

(a) Wide Dynamic Range

(b) Noise Correction

(c) Pre-Amp Mode

(d) Select Mask

(e) Mask Setup

(f) Smoothing

(g) Storage

(3) Measuring and reading measurement results

(4) Setting the display content
This setting is required for displaying measurement results on the screen, in a manner similar to the manual operation, although it is not necessary when only reading out measured results through remote control.

(a) Marker

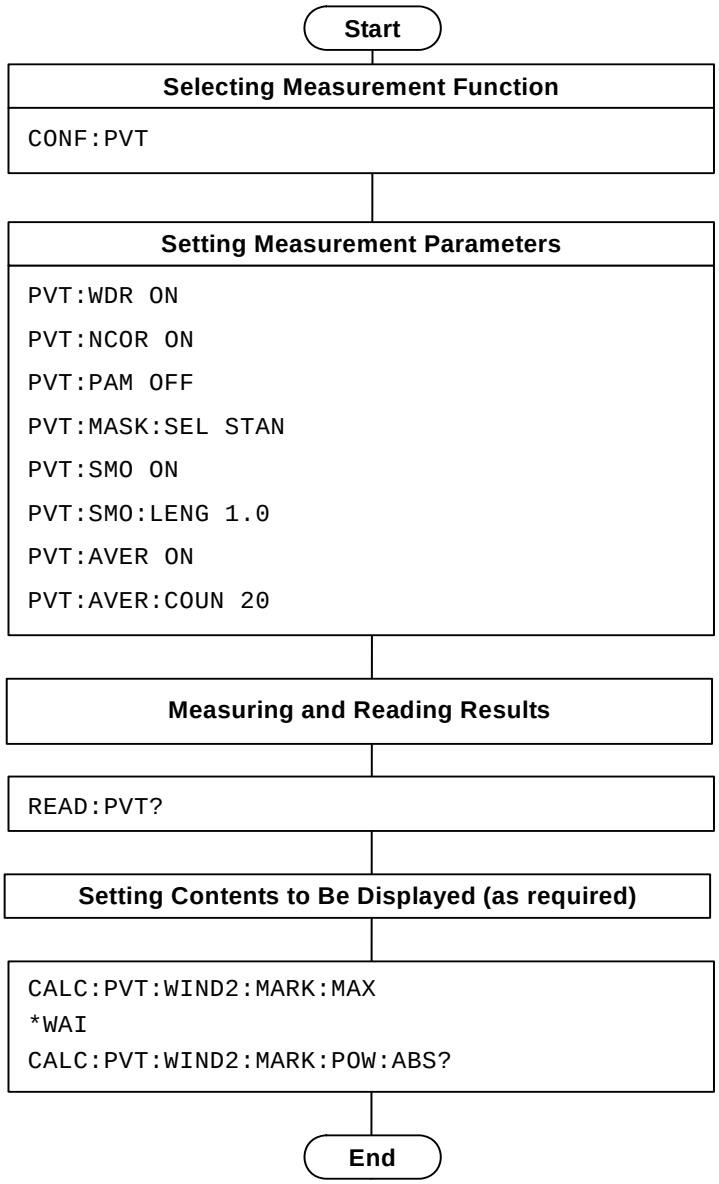


Figure 1.2.5-1 Flow of Power vs Time Measurement and Command Example

Note:

1. When Wide Dynamic Range is changed to On, Pre-Amp is switched to Off automatically.
2. Noise Correction and Pre-Amp Mode can be set when Wide Dynamic Range is On.
3. Both Noise Correction and Pre-Amp Mode cannot be set to On at the same time.
4. Pre-Amp Mode can be set when Trigger Switch is On.

1.2.6 ACP (Adjacent Channel Power) Measurement

This measures Adjacent Channel Power using the spectrum analyzer or signal analyzer.

(1) Selecting application and measurement function
The application to execute ACP measurement is selected from the signal analyzer or spectrum analyzer. The application changes to the selected application when the ACP measurement function is executed. The values of the basic parameters are passed to the selected application.

(2) Setting measurement parameters
The following are parameters applied only to the specific selected application.

(a) Trigger Delay (signal analyzer)

Gate Length and Gate Delay (spectrum analyzer)

(b) Time Length/Filter Type/Storage (signal analyzer)

Sweep Time/Filter Type/Storage (spectrum analyzer)

(3) Measuring and reading results

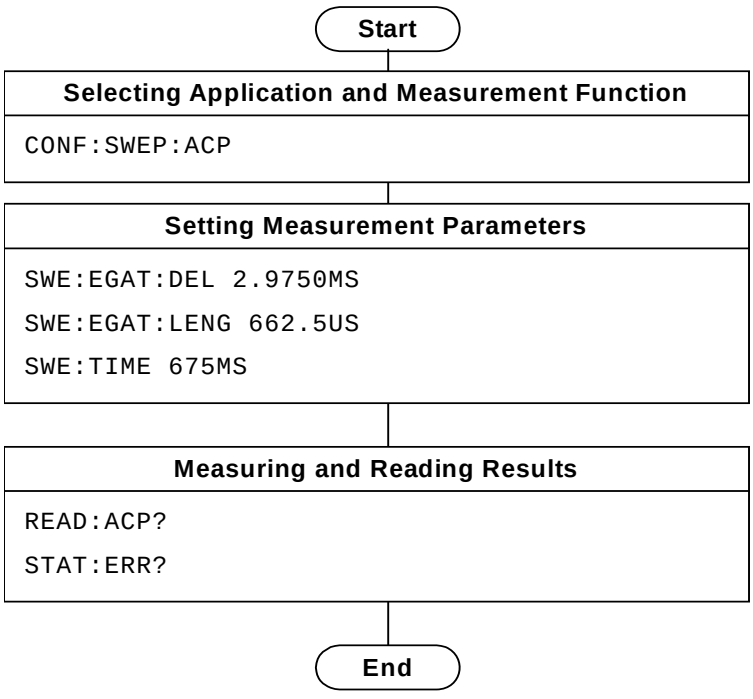


Fig. 1.2.6-1 Flow of ACP Measurement using Spectrum Analyzer and Command Example

1.2.7 OBW (Occupied Bandwidth) Measurement

This measures Occupied Bandwidth using the spectrum analyzer or signal analyzer.

(1) Selecting application and measurement function

The application to execute OBW measurement is selected from either the signal analyzer or spectrum analyzer. The application changes to the selected application when the OBW measurement function is executed. The values of the basic parameters are passed to the selected application.

(2) Setting measurement parameters
The following parameters apply only to the specific application selected.

(a) Trigger Delay (signal analyzer)

Gate Length and Gate Delay (spectrum analyzer)

(b) Time Length/Filter Type/Storage (signal analyzer)

Sweep Time/Filter Type/Storage (spectrum analyzer)

(3) Measuring and reading results

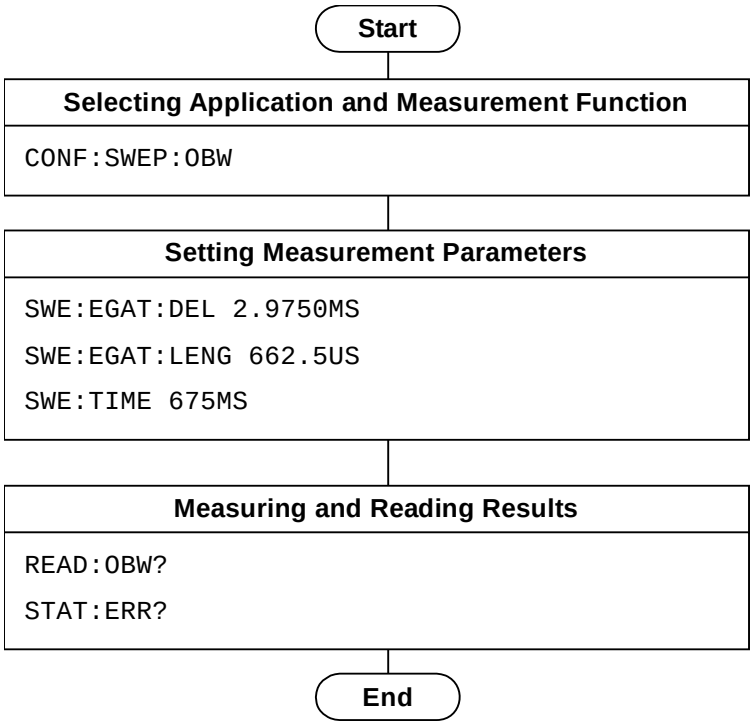


Fig. 1.2.7-1 Flow of OBW Measurement using Spectrum Analyzer and Command Example

1.2.8 SEM (Spectrum Emission Mask) Measurement

This measures Spectrum Emission Mask using the spectrum analyzer.

(1) Selecting spectrum analyzer application to perform SEM measurement

The application changes to the spectrum analyzer application when the SEM measurement function is executed. The values of the basic parameters are passed to the spectrum analyzer application.

(2) Setting measurement parameters

The following are parameters applied only to the specific selected application.

(a) Gate Length and Gate Delay

(b) Sweep Time/Filter Type/Storage

(3) Measuring and reading results

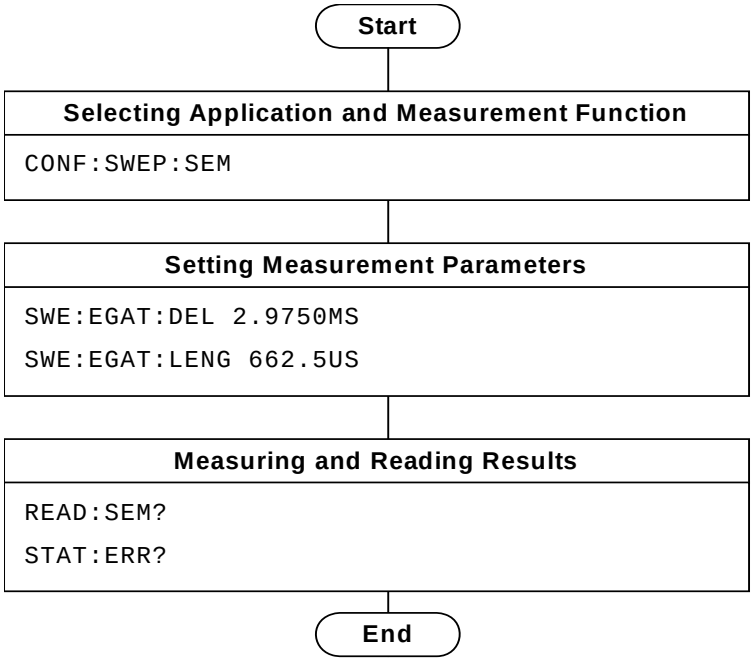


Fig. 1.2.8-1 Flow of SEM Measurement using Spectrum Analyzer and Command Example

1.2.9 Switching Between Signal Analyzer and Spectrum Analyzer

The two methods for switching between the signal analyzer and spectrum analyzer by remote control are as follows:

Note:

For MS2830A: To switch to signal analyzer, the analysis bandwidth option 31.25 MHz or greater is required.

(1) Execute CONFigure[:FFT|SWEPt]:<measure>.
Basic parameters such as carrier frequency, and input level (reference level) are reflected at the selected application. Note that the template is set automatically according to the application state. There are no restrictions on control of the selected application.

Moreover, the signal analyzer and spectrum analyzer can be switched using CONFigure:FFT|SWEPt:<measure>. In this case, the basic parameters such as the carrier frequency, input level (reference level), template, etc. are reflected.

Changes to basic parameters, such as carrier frequency and input level (reference level), etc., at the signal analyzer or spectrum analyzer are reflected when control is returned to this application using CONFigure:<measure >.

With this method, the program execution time is shorter than method (2) because there is no need to set basic measurement parameters at each measurement function.

(2) Execute INSTrument[:SELect] SIGANA|SPECT.
Using this method, neither the parameter nor template is reflected.

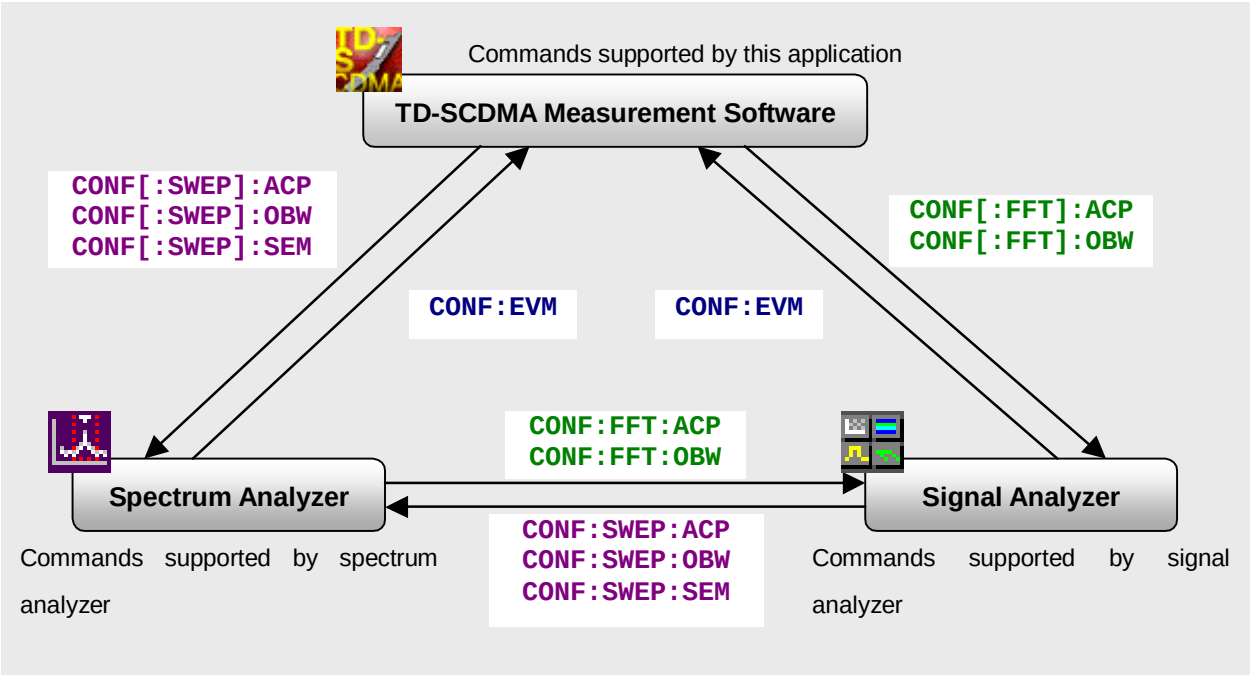


Fig. 1.2.9-1 Switching Measurement between Applications

1.3 Using Native Mode

To control this application using the native format, use the following commands to switch to native mode from SCPI format.

The following switching rules apply.

Switching Rules

1. A numeric parameter in the program header of the SCPI command is moved to the beginning of the argument and is omitted for commands that only take one kind of value.
2. When two or more nodes can be selected, the first one is used.
3. Omissible hierarchy is omitted.
4. All long-form notations are converted to short form.
5. The first ":" is omitted.

Example 1
`:CALCulate:MARKer[1]|2[:SET]:CENTer`
is switched to native form.

1. A numeric parameter in the program header is moved to the start of the argument.
   `:CALCulate:MARKer[1]|2[:SET]:CENTer`

   `:CALCulate:MARKer[:SET]:CENTer <integer>`
   (The argument <integer> represents the numeric value 1 or 2.)

2. Omissible hierarchy is omitted.
   `:CALCulate:MARKer[:SET]:CENTer <integer>`

   `:CALCulate:MARKer:CENTer <integer>`

3. All long-form notations are converted to short form.
   `:CALCulate:MARKer:CENTer <integer>`

   `:CALC:MARK:CENT <integer>`

4. The first ":" is omitted.
   `:CALC:MARK:CENT <integer>`

5. CALC:MARK:CENT <integer>

1.4 Character Programs Available for Setting Numeric Program Data

The following character programs can be used for setting numeric program data (numeric parameter) and are applicable only when using the SCPI mode.

(1) `DEFault`

When `DEFault` is specified for numeric program data, the initial value is set for the target parameter.

(2) `MINimum`

When `MINimum` is specified for numeric program data, the minimum value is set for the target parameter.

(3) `MAXimum`

When `MAXimum` is specified for numeric program data, the maximum value is set for the target parameter.

In this application, `DEFault`, `MINimum`, and `MAXimum` can be used for the following parameters.

`<freq>`

`<real>`

`<integer>`

`<time>`

Chapter 2 SCPI Device Message Details

This chapter details the SCPI remote control commands for executing application functions. Refer to the "MS2690A/MS2691A/MS2692A and MS2830A Signal Analyzer Operation Manual (Main Frame Remote Control)" for details of IEEE488.2 common device messages and application common device messages.

2.1 Starting and Selecting Application

The device messages for initialization and selection of this application are listed in Table 2.1-1.

Table 2.1-1 Starting and Selecting Application

Function	Device Message
Load Application	:SYSTem:APPLication:LOAD TDSCDMA
Unload Application	:SYSTem:APPLication:UNLoad TDSCDMA
Application Switch	:INSTrument[:SELect] TDSCDMA
	:INSTrument[:SELect]?
Application Status	:INSTrument:SYSTem TDSCDMA,[ACTive]|INACtive|MINimum
	:INSTrument:SYSTem? TDSCDMA
Initialization	:INSTrument:DEFault
	:SYSTem:PRESet

2.1.1 Starting Application

:SYSTem:APPLication:LOAD TDSCDMA

Load Application

Function

Loads application

Command

```
:SYSTem:APPLication:LOAD TDSCDMA
```

Details

This command loads installed application and registers it in application switch menu

Usage Example

To load application

```
SYST:APPL:LOAD TDSCDMA
```

:SYSTem:APPLication:UNLoad TDSCDMA

Unload Application

Function

Unloads application

Command

```
:SYSTem:APPLication:UNLoad TDSCDMA
```

Details

This command unloads application and removes from application switch menu.

Usage Example

To unload this application

```
SYST:APPL:UNL TDSCDMA
```

2.1.2 Selecting Application

:INSTrument[:SELect] TDSCDMA

Application Switch

Function

Selects controlled application

Command

```
:INSTrument[:SELect] TDSCDMA
```

Details

This command switches controlled application.

Usage Example

To switches controlled object to this application

```
INST TDSCDMA
```

:INSTrument[:SELect]?

Application Switch Query

Function

Queries current controlled application

Query

```
:INSTrument[:SELect]?
```

Response

```
<apl_name>
```

Parameter

<apl_name>	Application Name
TDSCDMA	MX269015A TD-SCDMA Measurement software
SIGANA	Signal Analyzer
SPECT	Spectrum Analyzer
CONFIG	Config

Usage Example

To query controlled application

```
INST?
> TDSCDMA
```

:INSTrument:SYSTem TDSCDMA,[ACTive]|INACtive|MINimum

Application Status

Function

Sets application window state

Command

```
:INSTrument:SYSTem TDSCDMA,<window>
```

Parameter

`<window>`	Application Window State
`ACTive`	Operable (window displayed in foreground)
`INACtive`	Inoperable
`MINimum`	Minimized window
When omitted	Set to ACTive

Details

This command switches the controlled application.

Usage Example

To sets application window to active

```
INST:SYST TDSCDMA,ACT
```

:INSTrument:SYSTem? TDSCDMA

Application Status Query

Function

Queries application window state

Query

```
:INSTrument:SYSTem? TDSCDMA
```

Response

```
<status>,<window>
```

Parameter

<status>	Application State
CURR	Application running and current controlled object
RUN	Application running but not current controlled object
IDLE	Application loaded but not running currently
UNL	Application not loaded
<window>	Application Window State
ACT	Operable (window displayed in foreground)
INAC	Inoperable
MIN	Minimized window
NON	Not displayed

Usage Example

To query the application window state

```
INST:SYST? TDSCDMA
> CURR,ACT
```

2.1.3 Initializing

:INSTrument:DEFault

Preset Current Application

Function

Sets application initial settings

Command

```
:INSTrument:DEFault
```

Usage Example

To set application initial settings

```
INST:DEF
```

Related Command

This related command operates on the same parameter.

```
:SYSTem:PRESet
```

:SYSTem:PRESet

Preset Current Application

Function

Sets application initial settings

Command

```
:SYSTem:PRESet
```

Usage Example

Sets application initial settings

```
SYST:PRES
```

Related Command

This related command operates on the same parameter.

```
:INSTrument:DEFault
```

2.2 Setting Basic Parameters

This section describes the device messages for parameter settings for frequency, amplitude, and other basic parameters.

Table 2.2-1 Device Messages for Setting Basic Parameters

Function	Device Message
Center Frequency	[:SENSe]:FREQuency:CENTer <freq>
	[:SENSe]:FREQuency:CENTer?
	[:SENSe]:FREQuency:MODE CARRier|MULTi
	[:SENSe]:FREQuency:MODE?
Amplitude	[:SENSe]:POWer[:RF]:RANGe:ILEVel <real>
	[:SENSe]:POWer[:RF]:RANGe:ILEVel?
	[:SENSe]:POWer[:RF]:RANGe[:UPPer] <real>
	[:SENSe]:POWer[:RF]:RANGe[:UPPer]?
Reference Level (Remote only)	:DISPlay:WINDow[1]:TRACe:Y:[SCALe]:RLEVel <real>
	:DISPlay:WINDow[1]:TRACe:Y:[SCALe]:RLEVel?
Level Offset	:DISPlay:WINDow[1]:TRACe:Y:[SCALe]:RLEVel:OFFSet <real>
	:DISPlay:WINDow[1]:TRACe:Y:[SCALe]:RLEVel:OFFSet?
Level Offset State	:DISPlay:WINDow[1]:TRACe:Y:[SCALe]:RLEVel:OFFSet:STATe ON|OFF|1|0
	:DISPlay:WINDow[1]:TRACe:Y:[SCALe]:RLEVel:OFFSet:STATe?
Auto Range	[:SENSe]:POWer[:RF]:RANGe:AUTO ONCE
Pre-Amp State	[:SENSe]:POWer[:RF]:GAIN[:STATe] ON|OFF|1|0
	[:SENSe]:POWer[:RF]:GAIN[:STATe]?

2.2.1 Frequency

[:SENSe]:FREQuency:CENTer <freq>

Center (Carrier) Frequency for Target Carrier / Center Frequency for Multi Carrier.

Function

Sets center (carrier) frequency of target carrier in carrier frequency mode, or center frequency of multiple carriers in center frequency mode

Command

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

Parameter

`<freq>`		Carrier/Center Frequency
	Range	100 MHz to the upper limit of the instrument
	Resolution	1 Hz
	Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ Without a suffix code, the input value is assumed to be in Hz.
	Initial Value	2.01 GHz

Details

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set carrier frequency to 2 GHz

```
FREQ:CENT 2GHZ
```

[:SENSe]:FREQuency:CENTer?

Carrier/Center Frequency Query

Function

Queries carrier/center frequency

Command

```
[:SENSe]:FREQuency:CENTer?
```

Response

```
<freq>
```

Parameter

<freq>	Carrier/Center Frequency
Range	100 MHz to the upper limit of the instrument
Resolution	1 Hz
	The returned value is in Hz.

Usage Example

To query carrier/center frequency

```
FREQ:CENT?
> 2000000000
```

[:SENSe]:FREQuency:MODE CARRier|MULTi

Frequency Mode

Function

Selects how to set center frequency
Either the center (carrier) frequency of the target carrier (Carrier Frequency Mode), or the center frequency of multiple carriers (Center Frequency Mode) is set.

Command

```
[:SENSe]:FREQuency:MODE <mode>
```

Parameter

<mode>	Frequency Setting Mode
CARRier	Carrier Frequency Mode: Sets center (carrier) frequency of target carrier (default)
MULTi	Center Frequency Mode: Sets center frequency of multiple carriers

Usage Example

To set frequency mode to Center Frequency Mode

```
FREQ:MODE MULT
```

[:SENSe]:FREQuency:MODE?

Frequency Mode Query

Function

Queries frequency mode setting

Query

```
[:SENSe]:FREQuency:MODE?
```

Response

```
<mode>
```

Parameter

<mode>	Frequency Mode Setting
CARR	Carrier Frequency Mode: Sets center (carrier) frequency of target carrier (default)
MULT	Center Frequency Mode: Sets center frequency of multiple carriers

Usage Example

To query frequency mode

```
FREQ:MODE?
> CARR
```

2.2.2 Amplitude

[:SENSe]:POWer[:RF]:RANGe:ILEVel <real>

Input Level

Function

Sets RF level of input signal

Command

```
[:SENSe]:POWer[:RF]:RANGe:ILEVel <real>
```

Parameter

<real>		Input Level
	Range	–60 to +30 dBm
	At Pre-Amp On or Pre-Amp Mode On	
		–80 to +10 dBm
	Resolution	0.01 dB
	Suffix Code	DBM, DM
		Without a suffix code, the input value is assumed to be in dBm.
	Initial Value	–10 dBm

Details

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set input level to –15.00 dBm

```
POW:RANG:ILEV -15.00DBM
```

Related Command

This related command operates on the same parameter.

```
[:SENSe]:POWer[:RF]:RANGe[:UPPer] <real>
```

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

Input Level Query

Function

Queries RF level of input signal

Command

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

Parameter

`<real>`		Input Level
	Range	–60 to +30 dBm
	At Pre-Amp On or Pre-Amp Mode On	
		–80 to +10 dBm
	Resolution	0.01 dB
		The returned value is in dBm.

Usage Example

To query input level

```
POW:RANG:ILEV?
> -15.00
```

Related Command

This related command operates on the same parameter.

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

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

Input Level

Function

Sets input level

Command

```
[:SENSe]:POWer[:RF]:RANGe[:UPPer] <real>
```

Parameter

<real>		Input Level
	Range	–60 to +30 dBm
	At Pre-Amp On or Pre-Amp Mode On	
		–80 to +10 dBm
	Resolution	0.01 dB
	Suffix Code	DBM, DM
		Without a suffix code, the input value is assumed to be in dBm.
	Initial Value	–10 dBm

Details

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set input level to 0 dBm

```
POW:RANG 0
```

Related Command

This related command operates on the same parameter.

```
[:SENSe]:POWer[:RF]:RANGe:ILEVel <real>
```

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

Input Level Query

Function

Queries input level

Query

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

Response

```
<real>
```

Parameter

`<real>`		Input Level
	Range	–60 to +30 dBm
	At Pre-Amp On or Pre-Amp Mode On	
		–80 to +10 dBm
	Resolution	0.01 dB

Usage Example

To query input level

```
POW:RANG?
> 0.00
```

Related Command

This related command operates on the same parameter.

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

:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>

Reference Level (Peak Power Level)

Function

Sets internal reference level (peak power level)

Command

```
:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>
```

Parameter

`<real>`		Input Level
	Range	–43 to +47 dBm
	At Pre-Amp On or Pre-Amp Mode On	
		–63 to +27dBm
	Resolution	0.01 dB
	Suffix Code	DBM, DM
		Without a suffix code, the input value is assumed to be in dBm.
	Initial value	7 dBm

Details

Reference Level indicates the peak level of the input signal using the internal parameter not displayed on the screen calculated automatically for Input Level.

When the SEM, OBW and ACP measurement functions are called, the value of this Reference Level is applied to these measurement functions. When the value of the Input Level is changed, the Reference Level is also changed.

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set internal reference level to 0 dBm

```
DISP:WIND:TRAC:Y:RLEV 0
```

:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?

Reference Level (Peak Power Level) Query

Function

Queries internal reference level (peak power level)

Query

```
:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
```

Response

```
<real>
```

Parameter

`<real>`		Internal Reference Level
	Range	–43 to +47 dBm
	At Pre-Amp On or Pre-Amp Mode On	
		–63 to +27 dBm
	Resolution	0.01 dB

Usage Example

To query internal reference level

```
DISP:WIND:TRAC:Y:RLEV?
> 0.00
```

:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet <real>

Level Offset Value

Function

Sets level offset value

Command

```
:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet <real>
```

Parameter

`<real>`		Level Offset Value
	Range	–99.99 to +99.99 dB
	Resolution	0.01 dB
	Suffix Code	DB Without a suffix code, the input value is assumed to be in dB.
	Initial Value	0 dB

Usage Example

To set level offset to 10 dB

```
DISP:WIND:TRAC:Y:RLEV:OFFS 10
```

:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet?

Level Offset Value Query

Function

Queries level offset value

Query

```
:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet?
```

Response

```
<real>
```

Parameter

<real>	Level Offset Value
Range	–99.99 to +99.99 dB
Resolution	0.01 dB
	The returned value is in dB.

Usage Example

To query level offset

```
DISP:WIND:TRAC:Y:RLEV:OFFS?
> 10.00
```

:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet:STATe ON|OFF|1|0

Level Offset Mode

Function

Sets level offset function ON or OFF

Command

```
:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet:STATe
<switch>
```

Parameter

<switch>	Level Offset Function
ON|1	Sets level offset function to ON
OFF|0	Sets level offset function to OFF (default)

Usage Example

To set level offset function to ON

```
DISP:WIND:TRAC:Y:RLEV:OFFS:STAT ON
```

:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet:STATe?

Level Offset Mode Query

Function

Queries whether level offset function ON or OFF

Query

```
:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet:STATe?
```

Response

```
<switch>
```

Parameter

`<switch>`	Level Offset Function
`1`	Level offset function ON
`0`	Level offset function OFF

Usage Example

To query level offset function

```
DISP:WIND:TRAC:Y:RLEV:OFFS:STAT?
> 1
```

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

Auto Range

Function

This command adjusts input level according to input signal.

Command

```
[:SENSe]:POWer[:RF]:RANGe:AUTO ONCE
```

Details

This command is not available when the Replay function is executed.

Usage Example

To auto-adjust the level.

```
POW:RANG:AUTO ONCE
```

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

Pre-Amp

Function

Sets Pre-Amp function ON or OFF

Command

```
[:SENSe]:POWer[:RF]:GAIN[:STATe] <switch>
```

Parameter

`<switch>`	Pre-Amp Function
`ON|1`	Pre-Amp ON
`OFF|0`	Pre-Amp OFF (default)

Details

When the Pre-Amp option (Option-008) is not installed, Pre-Amp is always set to OFF and this command is disabled.
This cannot be set when Wide Dynamic Range is On.

Usage Example

To set Pre-Amp to ON

```
POW:GAIN ON
```

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

Pre-Amp Query

Function

Queries Pre-Amp function ON or OFF

Query

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

Response

```
<switch>
```

Parameter

<switch>	Pre-Amp Function
1	Pre-Amp ON
0	Pre-Amp OFF

Details

When the Pre-Amp option (Option-008) is not installed, Pre-Amp is always set to OFF and this command is disabled.

Usage Example

To query the state of Pre-Amp function

```
POW:GAIN?
> 1
```

2.3 Common Settings

Table 2.3-1 lists the device messages for setting common parameters. These parameters are applied to modulation and code domain analysis.

Table 2.3-1 Device Messages for Setting Common Parameters

Function	Device Message
Signal Direction	[:SENSe]:RADio:SDIRection UL|DL
	[:SENSe]:RADio:SDIRection?
Scrambling Code	[:SENSe]:EVM:SYNC:SCRamble <integer>
	[:SENSe]:EVM:SYNC:SCRamble?
	[:SENSe]:TDEMod:SCODe <integer>
	[:SENSe]:TDEMod:SCODe?
Maximum Users	[:SENSe]:TDEMod:MXUSer[:BURSt]|:TS[0]|1|2|3|4|5|6|<integer>
	[:SENSe]:TDEMod:MXUSer[:BURst]|:TS[0]|1|2|3|4|5|6|?
Target Slot Number	[:SENSe]:TDEMod:SLOT TS0|TS1|TS2|TS3|TS4|TS5|TS6|BURSt
	[:SENSe]:TDEMod:SLOT?
Carrier Number	[:SENSe]:MCPower:CARRier:COUNt <integer>
	[:SENSe]:MCPower:CARRier:COUNt?
Target Carrier	[:SENSe]:MCPower:CARRier <integer>
	[:SENSe]:MCPower:CARRier?
Active Channel Threshold	:CALCulate:EVM:ASET:THReshold <real>
	:CALCulate:EVM:ASET:THReshold?
	[:SENSe]:TDEMod:THReshold:CHANnel <real>
	[:SENSe]:TDEMod:THReshold:CHANnel?
Active Slot Threshold	[:SENSe]:TDEMod:THReshold:SLOT <real>
	[:SENSe]:TDEMod:THReshold:SLOT?
	[:SENSe]:SYNC:BURSt:STHReshold <real>
	[:SENSe]:SYNC:BURSt:STHReshold?
Auto Rate Detection	[:SENSe]:EVM:SFACtor:AUTO ON|OFF|1|0
	[:SENSe]:EVM:SFACtor:AUTO?
Spreading Factor	[:SENSe]:EVM:SFACtor <factor>
	[:SENSe]:EVM:SFACtor?

2.3.1 Signal Direction

[:SENSe]:RADio:SDIRection UL|DL

Signal Direction

Function

Sets measured signal direction

Command

```
[:SENSe]:RADio:SDIRection UL|DL
```

Parameter

<switch>	Signal Direction
UL	Uplink
DL	Downlink (default)

Details

This command differs from panel operation because measurement does not start at command execution.
This cannot be set when Power vs Time is set.

Usage Example

To set signal direction to Uplink

```
RAD:SDIR UL
```

[:SENSe]:RADio:SDIRection?

Signal Direction Query

Function

Queries signal direction

Query

```
[:SENSe]:RADio:SDIRection?
```

Response

```
<switch>
```

Parameter

<switch>	Signal Direction
UL	Uplink
DL	Downlink (default)

Usage Example

To query signal direction

```
RAD:SDIR?
> UL
```

2.3.2 Scrambling Code

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

Scrambling Code

Function

Sets scrambling code number

Command

```
[:SENSe]:EVM:SYNC:SCRamble <integer>
```

Parameter

<integer>	Scrambling Code Number
Range	0 to 127
Resolution	1
Initial Value	0

Details

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set scrambling code number to 0

```
EVM:SYNC:SCR 0
```

Related Command

This related command operates on the same parameter.

```
[:SENSe]TDEMod:SCODe <integer>
```

[:SENSe]:EVM:SYNC:SCRamble?

Scrambling Code Query

Function

Queries scrambling code number

Query

```
[:SENSe]:EVM:SYNC:SCRamble?
```

Response

```
<integer>
```

Parameter

`<integer>`	Scrambling Code Number
Range	0 to 127
Resolution	1

Usage Example

To query scrambling code number

```
EVM:SYNC:SCR?
> 0
```

Related Command

This related command operates on the same parameter.

```
[:SENSe]TDEMod:SCODe?
```

[:SENSe]:TDEMod:SCODe <integer>

Scrambling Code Number

Function

Sets scrambling code number

Command

```
[:SENSe]TDEMod:SCODe <integer>
```

Parameter

<integer>	Scrambling Code Number
Range	0 to 127
Resolution	1
Initial Value	0

Details

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set scrambling code number to 0

```
TDEM:SCOD 0
```

Related Command

This related command operates on the same parameter.

```
[:SENSe]:EVM:SYNC:SCRamble <integer>
```

[:SENSe]:TDEMod:SCODe?

Scrambling Code Number Query

Function

Queries scrambling code number

Query

```
[:SENSe]TDEMod:SCODe?
```

Response

```
<integer>
```

Parameter

`<integer>`	Scrambling Code Number
Range	0 to 127
Resolution	1

Usage Example

To query scrambling code number

```
TDEM:SCOD?
> 0
```

Related Command

This related command operates on the same parameter.

```
[:SENSe]:EVM:SYNC:SCRamble?
```

2.3.3 Maximum Users

[:SENSe]:TDEMod:MXUSer[:BURSt]|:TS[0]|1|2|3|4|5|6| <integer>

K (Max User)

Function

Sets value of K (Max user)

Command

```
[:SENSe]TDEMod:MXUSer[:BURSt]|:TS[0]|1|2|3|4|5|6
<integer>
```

Parameter

<integer>	K
Range	2 to 16 (even integer)
Resolution	2

Details

The value of K (Max Users) is common to all time slots.
This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set K (Max Users) to 2

```
TDEM:MXUS 2
```

[:SENSe]:TDEMod:MXUSer[:BURSt]|:TS[0]|1|2|3|4|5|6|?

K (Max User) Query

Function

Queries value of K (Max Users)

Query

```
[:SENSe]TDEMod:MXUSer[:BURSt]|:TS[0]|1|2|3|4|5|6?
```

Response

```
<integer>
```

Parameter

`<integer>`		K
	Range	2 to 16 (even integer)
	Resolution	2

Details

The value of K (Max Users) is common to all time slots.

Usage Example

To query value of K

```
TDEM:MXUS?
> 2
```

2.3.4 Target Time Slot

[:SENSe]:TDEMod:SLOT TS0|TS1|TS2|TS3|TS4|TS5|TS6|BURSt

Target Time Slot

Function

Sets target time slot

Command

```
[:SENSe]TDEMod:SLOT <target>
```

Parameter

<target>	Target Time Slot
TS0	Time Slot 0
TS1	Time Slot 1
TS2	Time Slot 2
TS3	Time Slot 3
TS4	Time Slot 4
TS5	Time Slot 5
TS6	Time Slot 6
BURSt	TD-SCDMA Burst

Details

This cannot be set when Power vs Time is set.

Usage Example

To set target time slot to Time Slot 0

```
TDEM:SLOT TS0
```

[:SENSe]:TDEMod:SLOT?

Target Time Slot Query

Function

Queries target time slot

Query

```
[:SENSe]TDEMod:SLOT?
```

Response

```
<target>
```

Parameter

<target>	Target Time Slot
TS0	Time Slot 0
TS1	Time Slot 1
TS2	Time Slot 2
TS3	Time Slot 3
TS4	Time Slot 4
TS5	Time Slot 5
TS6	Time Slot 6
BURS	TD-SCDMA Burst

Usage Example

To query target time slot

```
TDEM:SLOT?
> TS0
```

2.3.5 Carrier Number

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

Carrier Number

Function

Sets number of carriers at multiple-carrier measurement

Command

```
[:SENSe]MCPower:CARRier:COUNt <integer>
```

Parameter

<integer>	Number of Carriers
Range	1 to 6
Resolution	1

Details

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set the number of carriers to 3

```
MCP:CARR:COUN 3
```

[:SENSe]:MCPower:CARRier:COUNt?

Carrier Number Query

Function

Queries number of carriers in multi-carrier measurement

Query

```
[:SENSe]:MCPower:CARRier:COUNt?
```

Response

```
<integer>
```

Paramter

<integer>	Number of Carriers
Range	1 to 6
Resolution	1

Usage Example

To query the number of carriers

```
MCP:CARR:COUN?
> 3
```

2.3.6 Target Carrier

[:SENSe]:MCPower:CARRier <target>

Target Carrier

Function

Sets target carrier for modulation analysis

Command

```
[:SENSe]:MCPower:CARRier <target>
```

Parameter

<target>	Target Carrier
1	Carrier 1
2	Carrier 2
3	Carrier 3
4	Carrier 4
5	Carrier 5
6	Carrier 6

Details

The target carrier setting range depends on the set number of carriers (Carrier Number).

Usage Example

To set target carrier to Carrier 3

```
MCP:CARR 3
```

[:SENSe]:MCPower:CARRier?

Target Carrier Query

Functions

Queries target carrier

Query

```
[:SENSe]:MCPower:CARRier?
```

Response

```
<target>
```

Parameter

<target>	Target Carrier
1	Carrier 1
2	Carrier 2
3	Carrier 3
4	Carrier 4
5	Carrier 5
6	Carrier 6

Usage Example

To query target carrier

```
MCP:CARR?
> 3
```

2.3.7 Active Channel Threshold

:CALCulate:EVM:ASET:THReshold <real>

Active Code Threshold

Function

Sets active channel threshold value

Command

```
:CALCulate:EVM:ASET:THReshold <real>
```

Parameter

<real>	Threshold
Range	–50.0 to –5.0 dB
Resolution	0.1 dB
Initial Value	–30.0 dB
Suffix Code	DB Without a suffix code, the input value is assumed to be in dB units.

Details

This is different from panel operation because measurement does not start at command execution.

Usage Example

To set active channel threshold to –20.0 dB

```
CALC:EVM:ASET:THR -20
```

Related Command

This related command operates on the same parameter.

```
[:SENSe]:TDEMod:THReshold:CHANnel <real>
```

:CALCulate:EVM:ASET:THReshold?

Active Code Threshold Query

Function

Queries active channel threshold value

Query

```
:CALCulate:EVM:ASET:THReshold?
```

Response

```
<real>
```

Parameter

`<real>`		Threshold
	Range	–50.0 to –5.0 dB
	Resolution	0.1 dB
	Initial Value	–30.0 dB
	Suffix Code	DB Without a suffix code, the input value is assumed to be in dB units.

Usage Example

To query active channel threshold value

```
CALC:EVM:ASET:THR?
```

Related Command

This related command operates on the same parameter.

```
[:SENSe]:TDEMod:THReshold:CHANnel?
```

[:SENSe]:TDEMod:THReshold:CHANnel <real>

Threshold Level for Code Channel

Function

Sets active channel threshold value

Command

```
[:SENSe]:TDEMod:THReshold:CHANnel <real>
```

Parameter

<real>	Threshold
Range	–50.0 to –5.0 dB
Resolution	0.1 dB
Initial Value	–30.0 dB
Suffix Code	DB Without a suffix code, the input value is assumed to be in dB units.

Details

This is different from panel operation because measurement does not start at command execution.

Usage Example

To set channel threshold to –10.0 dB

```
TDEM:THR:CHAN -10.0
```

Related Command

This related command operates on the same parameter.

```
:CALCulate:EVM:ASET:THReshold <real>
```

[:SENSe]:TDEMod:THReshold:CHANnel?

Threshold Level for Code Channel Query

Function

Queries active channel threshold value

Query

```
[:SENSe]:TDEMod:THReshold:CHANnel?
```

Response

```
<real>
```

Parameter

`<real>`		Threshold
	Range	–50.0 to –5.0 dB
	Resolution	0.1 dB
	Initial Value	–30.0 dB
	Suffix Code	DB Without a suffix code, the input value is assumed to be in dB units.

Usage Example

To query active channel threshold value

```
TDEM:THR:CHAN?
> -10.0
```

Related Command

This related command operates on the same parameter.

```
:CALCulate:EVM:ASET:THReshold?
```

2.3.8 Active Slot Threshold

[:SENSe]:TDEMod:THReshold:SLOT <real>

Threshold Level for Time Slot

Function

Sets active slot threshold level of time slot burst

Command

```
[:SENSe]:TDEMod:THReshold:SLOT <real>
```

Parameter

<real>	Threshold
Range	–50.0 to –10.0 dB
Resolution	0.1 dB
Initial Value	–10 dB
Suffix Code	DB Without a suffix code, the input value is assumed to be in dB units.

Details

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set active slot threshold to –10.0 dB

```
TDEM:THR:SLOT -10.0
```

Related Command

This related command operates on the same parameter.

```
[:SENSe]:SYNC:BURSt:STHReshold <real>
```

[:SENSe]:TDEMod:THReshold:SLOT?

Threshold Level for Time Slot Query

Function

Queries active slot threshold level of time slot Burst

Query

```
[:SENSe]:TDEMod:THReshold:SLOT?
```

Response

```
<real>
```

Parameter

`<real>`		Threshold
	Range	–50.0 to –10.0 dB
	Resolution	0.1 dB
	Initial Value	–10 dB
	Suffix Code	DB Without a suffix code, the input value is assumed to be in dB units.

Usage Example

To query active slot threshold level of time slot Burst

```
TDEM:THR:SLOT?
> -10.0
```

Related Command

This related command operates on the same parameter

```
[:SENSe]:SYNC:BURSt:STHReshold?
```

[:SENSe]:SYNC:BURSt:STHReshold <real>

Threshold Level for Time Slot

Function

Sets active slot threshold level of time slot burst

Command

```
[:SENSe]:SYNC:BURSt:STHReshold <real>
```

Parameter

<real>		Threshold
	Range	–50.0 to –10.0 dB
	Resolution	0.1 dB
	Initial Value	–10 dB
	Suffix Code	DB Without a suffix code, the input value is assumed to be in dB units.

Details

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set active slot threshold to –10.0 dB

```
SYNC:BURS:STHR -10.0
```

Related Command

This related command operates on the same parameter.

```
[:SENSe]:TDEMod:THReshold:SLOT <real>
```

[:SENSe]:SYNC:BURSt:STHReshold?

Threshold Level for Time Slot

Function

Queries active slot threshold level of time slot burst

Query

```
[:SENSe]:SYNC:BURSt:STHReshold?
```

Response

```
<real >
```

Parameter

<real>		Threshold
	Range	–50.0 to –10.0 dB
	Resolution	0.1 dB
	Initial Value	–10 dB
	Suffix Code	DB Without a suffix code, the input value is assumed to be in dB units.

Usage Example

To query active slot threshold level of time slot burst

```
SYNC:BURS:STHR?
> -10.0
```

Related Command

This related command operates on the same parameter.

```
[:SENSe]:TDEMod:THReshold:SLOT?
```

2.3.9 Auto Rate Detection

[:SENSe]:EVM:SFACtor:AUTO ON|OFF|1|0

Auto Spreading Factor

Function

Sets auto spreading factor detection mode to ON or OFF

Command

```
[:SENSe]:EVM:SFACtor:AUTO <switch>
```

Parameter

`<switch>`	Auto Spreading Factor Detection
`ON|1`	Auto Spreading Factor Detection ON (default)
`OFF|0`	Auto Spreading Factor Detection OFF

Details

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set auto spreading factor detection to ON

```
EVM:SFAC:AUTO ON
```

[:SENSe]:EVM:SFACtor:AUTO?

Auto Spreading Factor Query

Function

Queries auto spreading factor detection mode

Query

```
[:SENSe]:EVM:SFACtor:AUTO?
```

Response

```
<switch>
```

Parameter

`<switch>`	Auto Spreading Factor Detection
`1`	Auto Spreading Factor Detection ON (default)
`0`	Auto Spreading Factor Detection OFF

Usage Example

To query auto spreading factor detection mode

```
EVM:SFAC:AUTO?
> ON
```

2.3.10 Spreading Factor

[:SENSe]:EVM:SFACtor <factor>

Spreading Factor

Function

Sets spreading factor

Command

```
[:SENSe]:EVM:SFACtor <factor>
```

Parameter

<factor>		Spreading Factor
	Range	1, 2, 4, 8, 16

Display

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set spreading factor to 16

```
EVM:SFAC 16
```

[:SENSe]:EVM:SFACtor?

Spreading Factor Query

Function

Queries spreading factor

Query

```
[:SENSe]:EVM:SFACtor?
```

Response

```
<factor>
```

Parameter

<factor>		Spreading Factor
	Range	1, 2, 4, 8, 16

Usage Example

To query spreading factor

```
EVM:SFAC?
> 16
```

2.4 Utility Functions

Table 2.4-1 lists device messages for settings of utility functions.

Table 2.4-1 Device Messages for Settings of Utility Functions

Function	Device Message
Delete Warm Up Message	:DISPlay:ANNotation:WUP:ERASe
Display Title	:DISPlay:ANNotation:TITLe[:STATe] ON|OFF|1|0
	:DISPlay:ANNotation:TITLe[:STATe]?
Title Entry	:DISPlay:ANNotation:TITLe:DATA <string>
	:DISPlay:ANNotation:TITLe:DATA?

2.4.1 Delete Warm Up Message

:DISPlay:ANNotation:WUP:ERASe

Delete Warm Up Message

Function

Deletes warm up message at start

Command

```
:DISPlay:ANNotation:WUP:ERASe
```

Usage Example

To delete warm up message

```
DISP:ANN:WUP:ERAS
```

2.4.2 Display Title

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

Display Title

Function

Sets title display state to On or Off

Command

```
:DISPlay:ANNotation:TITLe[:STATe] <switch>
```

Parameter

`<switch>`	Title Display
`ON|1`	Displays Title (default)
`OFF|0`	Hides Title

Usage Example

To display title:

```
DISP:ANN:TITL ON
```

:DISPlay:ANNotation:TITLe[:STATe]?

Display Title Query

Function

Queries state for title display

Query

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

Response

```
<switch>
```

Parameter

`<switch>`	Title Display
`ON|1`	Displays Title (default)
`OFF|0`	Hides Title

Usage Example

To query state for title display

```
DISP:ANN:TITL?
> 1
```

2.4.3 Title Entry

:DISPlay:ANNotation:TITLe:DATA <string>

Title Entry

Function

Sets title character string

Command

```
:DISPlay:ANNotation:TITLe:DATA <string>
```

Parameter

<string>	The title character string may be up to 32 characters and enclosed in single ('') or double ("") quotation marks.

Usage Example

To set title character string

```
DISP:ANN:TITL:DATA 'TEST'
```

:DISPlay:ANNotation:TITLe:DATA?

Title Entry Query

Function

Queries title character string

Query

```
:DISPlay:ANNotation:TITLe:DATA?
```

Response

```
<string>
```

Usage Example

To query title character string

```
DISP:ANN:TITL:DATA?
> TEST
```

2.5 Common Measurement Functions

Table 2.5-1 lists the message devices for executing and setting parameters for common measurement functions.

Table 2.5-1 Common Measurement Functions

Function	Device Message
Continuous Measurement	:INITiate:CONTinuous OFF|ON|0|1
	:INITiate:CONTinuous?
	:INITiate:MODE:CONTinuous
Single Measurement	:INITiate:MODE:SINGle
Initiate	:INITiate[:IMMediate]
Configure	:CONFigure?
Trigger State	:TRIGger[:SEQuence][:STATe] ON|OFF|1|0
	:TRIGger[:SEQuence][:STATe]?
Trigger Source	:TRIGger[:SEQuence]:SOURce EXTernal[1]|IMMediate|SG
	:TRIGger[:SEQuence]:SOURce?
	:TRIGger:EVM:SOURce EXTernal[1]|IMMediate|SG
	:TRIGger:EVM:SOURce?
Trigger Slope	:TRIGger[:SEQuence]:SLOPe POSitive|NEGative
	:TRIGger[:SEQuence]:SLOPe?
Trigger Delay	:TRIGger[:SEQuence]:DELay <time>
	:TRIGger[:SEQuence]:DELay?

Note

The trigger settings are common to all measurement functions of this application.

Also, when a trigger is set using the signal analyzer, this setting applies to the signal analyzer measurement functions. The same condition applies to the spectrum analyzer.

However, to avoid application of trigger settings not intended for a particular function, set the trigger for each measurement function, which hardly delays processing time.

2.5.1 Measurement and Control

:INITiate:CONTinuous OFF|ON|0|1

Continuous Measurement

Function

Switches measurement mode between Single and Continuous

Command

```
:INITiate:CONTinuous <switch>
```

Parameter

<switch>	Measurement Mode
0|OFF	Single Measurement
1|ON	Continuous Measurement (default)

Details

When the measurement mode is On, the Continuous Measurement starts. On the other hand, when the measurement mode is Off, the measurement does not start due to the single measurement mode selected.

Usage Example

To set mode to Continuous Measurement

```
INIT:CONT ON
```

:INITiate:CONTinuous?

Continuous Measurement Query

Function

Queries measurement mode

Query

```
:INITiate:CONTinuous?
```

Response

```
<switch>
```

Parameter

<switch>	Capture Mode
0	Single Measurement
1	Continuous Measurement

Usage Example

To query measurement mode

```
INIT:CONT?
> 0
```

:INITiate:MODE:SINGle

Single Measurement

Functions

Starts measurement in Single Measurement mode

Command

```
:INITiate:MODE:SINGle
```

Usage Example

To start measurement in Single Measurement mode

```
INIT:MODE:SING
```

:INITiate:MODE:CONTinuous

Continuous Measurement

Function

Starts measurement in Continuous Measurement mode

Command

```
:INITiate:MODE:CONTinuous
```

Usage Example

To start measurement in Continuous Measurement mode

```
INIT:MODE:CONT
```

:INITiate[:IMMediate]

Initiate

Function

Starts measurement using current mode

Command

```
:INITiate[:IMMediate]
```

Usage Example

To start measurement

```
INIT
```

:CONFigure?

Configure Query

Function

Queries current mode

Query

```
:CONFigure?
```

Response

```
<mode>
```

Parameter

`<mode>`	Measurement Function
`EVM`	Modulation Analysis
`ACP`	ACP Measurement
`SEM`	SEM Measurement
`OBW`	`OBW Measurement`

Usage Example

To query current measurement mode

```
CONF?
```

2.5.2 Trigger Switch

:TRIGger[:SEQuence][:STATe] OFF|ON|0|1

Trigger Switch

Function

Sets trigger switch to On or Off

Command

```
:TRIGger[:SEQuence][:STATe] <switch>
```

Parameter

<switch>		Triggering
	OFF|0	No Triggering (default)
	ON|1	Triggering

Details

This command differs from panel operation because the measurement does not start at command execution.

Usage Example

To set trigger switch to On

```
TRIG ON
```

:TRIGger[:SEQuence][:STATe]?

Trigger Switch Query

Function

Queries trigger switch state

Query

```
:TRIGger[:SEQuence][:STATe]?
```

Response

```
<switch>
```

Parameter

<switch>		Trigger State
	0	No Triggering
	1	Triggering Required

Usage Example

To query Trigger switch

```
TRIG?
> 0
```

2.5.3 Trigger Source

:TRIGger[:SEQuence]:SOURce EXTernal[1]|IMMediate|SG

Trigger Source

Function

Sets trigger signal source

Command

```
:TRIGger[:SEQuence]:SOURce <source>
```

Parameter

<source>	Trigger Source
EXTernal[1]	External Input
IMMediate	Free Run
SG	SG Marker

Details

The SG marker trigger source is only enabled when the Vector Signal Generator option is installed. This command differs from panel operation because measurement does not start at command execution.

Usage Example

Sets trigger source to external input

```
TRIG:SOUR EXT
```

Related Command

This related command operates on the same parameter.

```
:TRIGger:EVM:SOURce EXTernal[1]|IMMediate|SG
```

:TRIGger[:SEQuence]:SOURce?

Trigger Source Query

Function

Queries trigger signal source

Query

```
:TRIGger[:SEQuence]:SOURce?
```

Response

```
<source>
```

Parameter

<source>	Trigger Source
EXT	External Input
IMM	Free Run
SG	SG Marker

Details

The SG marker trigger source is only enabled when the Vector Signal Generator option is installed. This command differs from panel operation because the measurement does not start at command execution.

Usage Example

To query trigger source

```
TRIG:SOUR?
> EXT
```

Related Command

This related command operates on the same parameter.

```
:TRIGger:EVM:SOURce?
```

:TRIGger:EVM:SOURce EXTernal[1]|IMMediate|SG

Trigger Source

Function

Sets trigger signal source

Refer to:

`TRIGger[:SEQuence]:SOURce <source>`

Related Command

This related command operates on the same parameter.
`:TRIGger[:SEQuence]:SOURce EXTernal[1]|IMMediate|SG`

:TRIGger:EVM:SOURce?

Trigger Source Query

Function

Queries trigger signal source

Refer to:

`TRIGger[:SEQuence]:SOURce?`

Related Command

This related command operates on the same parameter.
`:TRIGger[:SEQuence]:SOURce?`

2.5.4 Trigger Slope

:TRIGger[:SEQuence]:SLOPe POSitive|NEGative

Trigger Slope

Function

Sets trigger detection (rising/falling edge)

Command

```
:TRIGger[:SEQuence]:SLOPe <mode>
```

Parameter

<mode>	Trigger Detection
POSitive	Rising Edge Detection (default)
NEGative	Falling Edge Detection

Details

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set trigger detection to rising edge

```
TRIG:SLOP POS
```

:TRIGger[:SEQuence]:SLOPe?

Trigger Slope Query

Function

Queries trigger detection (rising/falling edge)

Query

```
:TRIGger[:SEQuence]:SLOPe?
```

Response

```
<mode>
```

Parameter

<mode>	Trigger Detection
POS	Rising Edge Detection (default)
NEG	Falling Edge Detection

Usage Example

To query trigger detection

```
TRIG:SLOP?
> POS
```

2.5.5 Trigger Delay

:TRIGger[:SEQuence]:DELay <time>

Trigger Delay

Function

Sets delay from trigger to start of capture

Command

```
:TRIGger[:SEQuence]:DELay <time>
```

Parameter

`<time>`		Delay time from trigger to start of capture
	Range	–0.5 to 0.5 seconds
	Resolution	50 nanoseconds
	Suffix Code	NS, US, MS, S Without a suffix code, the input value is assumed to be in seconds.
	Initial Value	0 seconds

Details

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set trigger delay to 20 milliseconds

```
TRIG:DEL 20MS
```

:TRIGger[:SEQuence]:DELay?

Trigger Delay Query

Function

Queries delay from trigger to start of capture

Query

```
:TRIGger[:SEQuence]:DELay?
```

Response

```
<time>
```

Parameter

`<time>`		Delay from trigger to start of capture
	Range	–0.5 to 0.5 seconds
	Resolution	50 nanoseconds
		The returned value is in seconds.

Usage Example

To query Trigger delay

```
TRIG:DEL?
> 0.02000000
```

2.6 ACP/OBW/SEM Measurement Functions

Table 2.6-1 lists the device messages to call the Adjacent Channel Power (ACP), Occupied Bandwidth (OBW), and Spectrum Emission Mask (SEM) measurement functions. The spectrum analyzer and signal analyzer applications must be preloaded.

See the "MS2690A/MS2691A/MS2692A and MS2830A Signal Analyzer Operation Manual (Main Frame Remote Control)" for the Query commands used after these functions are called.

Table 2.6-1 Device Messages for ACP, OBW and SEM Functions

Function	Device Message
Configure – ACP	`:CONFigure[:FFT|:SWEPt]:ACP`
Configure – OBW	`:CONFigure[:FFT|:SWEPt]:OBWidth`
Configure – SEM	`:CONFigure[:SWEPt]:SEM`
Using application for ACP	`[:SENSe]:ACPower:INSTrument[:SELect] FFT|SWEPt`
	`[:SENSe]:ACPower:INSTrument[:SELect]?`
Using application for OBW	`[:SENSe]:OBWidth:INSTrument[:SELect] FFT|SWEPt`
	`[:SENSe]:OBWidth:INSTrument[:SELect]?`

:CONFigure[:FFT|:SWEPt]:ACP

Adjacent Channel Power Configure

Function

Selects adjacent channel power (ACP) measurement function

If FFT|SWEPt is omitted, the measurement mode set previously by the [:SENSe]:ACPower:INSTrument[:SELect] command is used.

Command

```
:CONFigure[:FFT|:SWEPt]:ACP
```

Details

No measurement is made.
For MS2830A: To perform FFT measurement using the Signal Analyzer function with this command, the analysis bandwidth option 31.25 MHz or greater is required in all cases.

Usage Example

To select ACP function of spectrum analyzer

```
CONF:SWEP:ACP
```

:CONFigure[:FFT|:SWEPt]:OBWidth

Occupied Bandwidth Configure

Function

Selects occupied bandwidth (OBW) measurement function.

If FFT|SWEPt is omitted, the measurement mode set previously by the [:SENSe]:OBWidth:INSTrument[:SELect] command is used.

Command

```
:CONFigure[:FFT|:SWEPt]:OBWidth
```

Details

No measurement is made.
For MS2830A: To perform FFT measurement using the Signal Analyzer function with this command, the analysis bandwidth option 31.25 MHz or greater is required in all cases.

Usage Example

To select OBW function of spectrum analyzer

```
CONF:SWEP:OBW
```

:CONFigure[:SWEPt]:SEM

Spectrum Emission Mask Configure

Function

Selects spectrum emission mask (SEM) measurement function of spectrum analyzer

Command

```
:CONFigure[:SWEPt]:SEM
```

Usage Example

To select SEM measurement function of spectrum analyzer

```
CONF:SWEP:SEM
```

[:SENSe]:ACPower:INSTrument[:SELect] FFT|SWEPt

Measurement Method for ACP

Function

Sets measurement mode when :CONFigure:ACP is executed

Command

```
[:SENSe]:ACPower:INSTrument[:SELect] <mode>
```

Parameter

`<mode>`	Measurement Mode
`FFT`	Signal Analyzer Function
`SWEPt`	Spectrum Analyzer Function (default)

Details

FFT can be set with MS2830A, however, to execute with CONFigure command, the analysis bandwidth option 31.25 MHz or greater is required.

Usage Example

To use signal analyzer when ACP function executed

```
ACP:INST SWEP
```

[:SENSe]:ACPower:INSTrument[:SELect]?

Measurement Method for ACP Query

Function

Queries measurement mode when `:CONFigure:ACP` is executed

Command

```
[:SENSe]:ACPower:INSTrument[:SELect]?
```

Response

```
<mode>
```

Parameter

`<mode>`	Measurement Mode
`FFT`	Signal Analyzer Function
`SWEP`	Spectrum Analyzer Function (default)

Details

FFT can be set with MS2830A, however, to execute with CONFigure command, the analysis bandwidth option 31.25 MHz or greater is required.

Usage Example

To query measurement mode for ACP

```
ACP:INST?
> FFT
```

[:SENSe]:OBWidth:INSTrument[:SELect] FFT|SWEPt

Measurement Method for OBW

Function

Sets measurement mode when :CONFigure:OBWidth is executed

Command

```
[:SENSe]:OBWidth:INSTrument[:SELect] <mode>
```

Parameter

<mode>	Measurement mode
FFT	Signal Analyzer Function
SWEPt	Spectrum Analyzer Function (default)

Details

FFT can be set with MS2830A, however, to execute with CONFigure command, the analysis bandwidth option 31.25 MHz or greater is required.

Usage Example

To use signal analyzer when OBW function executed

```
OBW:INST SWEP
```

[:SENSe]:OBWidth:INSTrument[:SELect]?

Measurement Method for OBW

Function

Queries measurement mode when :CONFigure:OBWidth is executed

Command

```
[:SENSe]:OBWidth:INSTrument[:SELect]?
```

Response

<mode>

Parameter

<mode>	Measurement Mode
FFT	Signal Analyzer Function
SWEP	Spectrum Analyzer Function (default)

Details

FFT can be set with MS2830A, however, to execute with CONFigure command, the analysis bandwidth option 31.25 MHz or greater is required.

Usage Example

To query measurement mode for OBW

```
OBW:INST?
> FFT
```

2.7 Modulation Analysis Function

This section describes the device messages for the modulation analysis function of this application.

Table 2.7-1 lists the execution and query commands for modulation analysis.

Table 2.7-1 Devices Messages at Executing Modulation Analysis and Reading Results

Function	Device Message
Configure	:CONFigure:EVM
Initiate	:INITiate:EVM
Fetch	:FETCh:EVM[n]?
Read/Measure	:READ:EVM[n]?
	:MEASure:EVM[n]?

Table 2.7-2 lists the response for parameter n in Table 2.7-1.

Table 2.7-2 Response for Modulation Analysis Result

n	Result Mode	Response
1 or at omission	A	Measurement results are returned, starting from TS0 of Carrier 1, in the following order separated by a comma (,). <6*7*16> When target time slot is Burst <16> 1. RMS EVM (Average)(float) [%] 2. RMS EVM (Max)(float) [%] 3. Peak EVM (Average)(float) [%] 4. Peak EVM (Max)(float) [%] 5. Chip number at peak EVM (Off)(int) [chip] 6. Peak CDE (Average)(float) [dB] 7. Peak CDE (Max)(float) [dB] 8. Frequency Error (Average)(float) [Hz] (Returns 999999999999 when unable to perform measurement) 9. Frequency Error (Max)(float) [Hz] (Returns 999999999999 when unable to perform measurement) 10. I/Q Origin Offset (Average)(float) [dB] 11. I/Q Origin Offset (Max)(float) [dB] 12. SF of Peak CDE (Max)(int) [NA] 13. Channel of Peak CDE (Max)(int) [NA] 14. Number of Active Channel (Off)(int) [NA] 15. Mean Power (Average)(float) [dBm] 16. Mean Power (Max)(float) [dBm]

Table 2.7-2 Response for Modulation Analysis Result (Cont'd)

n	Result Mode	Response
1 or at omission	B	Measurement results for the target slot of the target carrier are returned in the following order separated by a comma (,). <34> 1. –999.0 2. –999.0 3. RMS EVM (Average) (float) [%] 4. RMS EVM (Max) (float) [%] 5. Peak EVM (Average) (float) [%] 6. Peak EVM (Max) (float) [%] 7. –999.0 8. –999.0 9. –999.0 10. –999.0 11. –999.0 12. –999.0 13. –999.0 14. –999.0 15. Peak CDE (Average) (float) [dB] 16. Peak CDE (Max) (float) [dB] 17. –999.0 18. –999.0 19. Frequency Error (Average) (float) [Hz] (Returns 999999999999 when unable to perform measurement) 20. Frequency Error (Max) (float) [Hz] (Returns 999999999999 when unable to perform measurement) 21. I/Q Origin Offset (Average) (float) [dB] 22. I/Q Origin Offset (Max) (float) [dB] 23. –999.0 24. –999.0 25. –999.0 26. –999.0 27. –999.0 28. –999.0 29. SF of Peak CDE (Max) (int) [NA]

Table 2.7-2 Response for Modulation Analysis Result (Cont'd)

n	Result Mode	Response
1 or at omission	B	30. Channel of Peak CDE (Max) (int) [NA] 31. –999.0 32. –999.0 33. –999.0 34. Mean Power (Average) (float) [dBm]
8	A	Code Length Vector (Off) (int) [NA] <6*7*16> Code domain measurement results of each time slot are separated into 16 fields and are returned separated by commas (,). Results, in this case SF values (2,4,8,16), are returned starting from TS0 of Carrier 1. (When target time slot is Burst <16>) (Example) {2, 2, 2, 2, 2, 2, 2, 2, 4, 4, 4, 4, 16, 16, 8, 8, …}
	B	Code Length Vector (Off) (int) [NA] <16> Code domain measurement results for the target slot of the target carrier are separated into 16 fields and are returned separated by commas (,). SF values (2,4,8,16) are returned. (Example) {2, 2, 2, 2, 2, 2, 2, 2, 4, 4, 4, 4, 16, 16, 8, 8}
9	A	Active Flag Vector (Off) (int) [NA] <6*7*16> Code domain measurement results of each time slot are separated into 16 fields and are returned separated by commas (,). Results, in this case Active Channels, are returned starting from TS0 of Carrier 1. (When target time slot is Burst <16>) (Example) {1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 1, 0, 1, 1, …}
	B	Active Flag Vector (Off)(int) [NA] <16> Code domain measurement results for the target slot of the target carrier are separated into 16 fields and are returned separated by commas (,). Active channels are returned. (Example) {1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 1, 0, 1, 1}

Table 2.7-2 Response for Modulation Analysis Result (Cont'd)

n	Result Mode	Response
11	A	Code Domain Power (Off) (float) [dB] <6*7*16> Code domain measurement results of each time slot are separated into 16 fields and are returned separated by commas (,). Results, in this case Code Domain Power, are returned starting from TS0 of Carrier 1. (When target time slot is Burst <16>) (Example) {P1, P1, P1, P1, P1, P1, P1, P1, –999.0, –999.0, –999.0, –999.0, P2, –999.0, P3, P3, …}
	B	Code Domain Power (Off) (float) [dB] <16> Code domain measurement results for the target slot of the target carrier are separated into 16 fields and are returned separated by commas (,). Code domain powers are returned. (Example) {P1, P1, P1, P1, P1, P1, P1, P1, –999.0, –999.0, –999.0, –999.0, P2, –999.0, P3, P3}
12	A	Code Domain Error (Off) (float) [dB] <6*7*16> Code domain measurement results of each time slot are separated into 16 fields and are returned separated by commas (,). Results, in this case Code Domain Error, are returned starting from TS0 of Carrier 1. (When target time slot is Burst <16>) (Example) {E1, E1, E1, E1, E1, E1, E1, E1, –999.0, –999.0, –999.0, –999.0, E2, –999.0, E3, E3, …}
	B	Code Domain Error (Off) (float) [dB] <16> Code domain measurement results for the target slot of the target carrier are separated into 16 fields and are returned separated by commas (,). Code Domain Errors are returned. (Example) {E1, E1, E1, E1, E1, E1, E1, E1, –999.0, –999.0, –999.0, –999.0, E2, –999.0, E3, E3}
13	A	Multi Slot Mean Power (Average, Max) (float) [dBm] <2*6*9> Mean power results, starting from TS0 of Carrier 1, are returned separated by commas (,). TS0, DwPTS, UpPTS, TS1, TS2, TS3, TS4, TS5, TS6, …
	B	Multi Slot Mean Power (Average) (float) [dBm] <9> Mean power results for the target slot of the target carrier are returned separated by commas (,). TS0, DwPTS, UpPTS, TS1, TS2, TS3, TS4, TS5, TS6

Table 2.7-2 Response for Modulation Analysis Result (Cont'd)

n	Result Mode	Response
14	A	Multi Slot Midamble Power (Average, Max) (float) [dBm] <2*6*9> Midamble power results, starting from TS0 of Carrier 1, are returned separated by commas (,). TS0, DwPTS, UpPTS, TS1, TS2, TS3, TS4, TS5, TS6, … Mean powers are returned for DwPTS and UpPTS.
	B	Multi Slot Midamble Power (Average) (float) [dBm] <9> Midamble power results for the target carrier are returned separated by commas (,). TS0, DwPTS, UpPTS, TS1, TS2, TS3, TS4, TS5, TS6 Mean Powers are returned for DwPTS and UpPTS.
15	A	Multi Slot Data1 Power (Average, Max)(float) [dBm] <2*6*9> Data1 power results, starting from TS0 of Carrier 1, are returned separated by commas (,). TS0, DwPTS, UpPTS, TS1, TS2, TS3, TS4, TS5, TS6, … Mean powers are returned for DwPTS and UpPTS.
15	B	Multi Slot Data1 Power (Average)(float) [dBm] <9> Data1 power results for the target carrier are returned separated by commas (,). TS0, DwPTS, UpPTS, TS1, TS2, TS3, TS4, TS5, TS6 Mean powers are returned for DwPTS and UpPTS.
16	A	Multi Slot Data2 Power (Average, Max)(float) [dBm] <2*6*9> Data2 power results, starting from TS0 of Carrier 1, are returned separated by commas (,). TS0, DwPTS, UpPTS, TS1, TS2, TS3, TS4, TS5, TS6, … Mean powers are returned for DwPTS and UpPTS.
	B	Multi Slot Data2 Power (Average)(float) [dBm] <9> Data2 power results for the target carrier are returned separated by commas (,). TS0, DwPTS, UpPTS, TS1, TS2, TS3, TS4, TS5, TS6 Mean powers are returned for DwPTS and UpPTS.

Table 2.7-2 Response for Modulation Analysis Result (Cont'd)

n	Result Mode	Response
19	A	Time Slot Active Flag (Off)(int) [NA] <6*9> Active time slot results, starting from Carrier 1, are returned separated by commas (,). TS0, DwPTS, UpPTS, TS1, TS2, TS3, TS4, TS5, TS6, … (Example) {1, 1, 0, 0, 0, 0, 1, 1, 1, …}
	B	Time Slot Active Flag (Off)(int) [NA] <9> Active time slot results for the target carrier are returned separated by commas (,). TS0, DwPTS, UpPTS, TS1, TS2, TS3, TS4, TS5, TS6 (Example) {1, 1, 0, 0, 0, 0, 1, 1, 1,}
20	A/B	Multi Carrier Power (Average, Max)(float) [dBm] <2*6*9> Mean powers of the time slots of the six carriers are returned separated by commas (,). If there is no carrier, the power of the time slots returns –999.0
21	A/B	Subframe Total Power (Average, Max) (float) [dBm] <2*6> The subframe total power of the six carriers are returned separated by commas (,). –999.0 is returned when there are no measurement results.

For details of the Result Mode, see SYSTem:RESult:MODE in the Main Frame Remote Control Manual.

Table 2.7-3 lists the commands for setting modulation analysis parameters.

Table 2.7-3 Device Messages for Setting Modulation Analysis Parameters

Function	Device Message
Trace Mode	:DISPlay:EVM:VIEW[:SELect] CDP|CDE|MSLot|MCPower
	:DISPlay:EVM:VIEW[:SELect]?
Storage Mode	[:SENSe]:EVM:AVERage[:STATe] OFF|ON|AMAXimum|0|1|2
	[:SENSe]:EVM:AVERage[:STATe]?
Storage Count	[:SENSe]:EVM:AVERage:COUNt <integer>
	[:SENSe]:EVM:AVERage:COUNt?

Table 2.7-4 lists marker settings and query commands for a marker position on the Constellation Diagram.

Table 2.7-4 Device Messages for Modulation Analysis Marker

Function	Device Message
Marker – On/Off	:CALCulate:MARKer[:STATe] ON|OFF|1|0
	:CALCulate:MARKer[:STATe]?
Active Trace	:CALCulate:EVM:MARKer:ACTive CONStellation|BOTTom
	:CALCulate:EVM:MARKer:ACTive?
Constellation – Chip Number	:CALCulate:EVM:MARKer:CHIP <integer>
	:CALCulate:EVM:MARKer:CHIP?
Marker X-axis Value	:CALCulate:EVM:MARKer:X?
Marker Y-axis Value	:CALCulate:EVM:MARKer:Y?

Table 2.7-5 lists the commands for setting the vertical scale of the Code Domain Graph.

Table 2.7-5 Device Messages for Setting Scale of Code Domain Graph

Function	Device Message
Scale – CDP	:DISPlay:EVM:WINDow[1]:TRACe:Y[:SCALe]:RLEVel 20|40|60|80
	:DISPlay:EVM:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
Scale – CDE	:DISPlay:EVM:WINDow2:TRACe:Y[:SCALe]:RLEVel 20|40|60|80
	:DISPlay:EVM:WINDow2:TRACe:Y[:SCALe]:RLEVel?

Table 2.7-6 lists marker settings and query commands for a marker position on the Code Domain Graph.

Table 2.7-6 Device Messages for Code Domain Graph Marker

Function	Device Message
Marker Position	:CALCulate:EVM:CDPower:MARKer:CODE <integer>
	:CALCulate:EVM:CDPower:MARKer:CODE?
Marker Channel	:CALCulate:EVM:CDPower:MARKer:X:CHANnel?
Marker Spreading Factor	:CALCulate:EVM:CDPower:MARKer:X:SFACtor?
Marker Moodulation Scheme	:CALCulate:EVM:CDPower:MARKer:X:MODulation?
Marker Y-axis Value – CDP or CDE Level	:CALCulate:EVM:CDPower:MARKer:Y?

2.7.1 Measure

:CONFigure:EVM

Modulation Analysis

Function

Sets measurement mode to modulation analysis

Command

```
:CONFigure:EVM
```

Details

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set measurement mode to modulation analysis

```
CONF:EVM
```

:INITiate:EVM

Modulation Analysis Initiate

Function

Starts modulation analysis

Command

```
:INITiate:EVM
```

Usage Example

To start modulation analysis

```
INIT:EVM
```

:FETCh:EVM[n]?

Modulation Analysis Read Fetch

Function

Reads modulation analysis results from modulation analysis display

Query

```
:FETCh:EVM[n]?
```

Response

See Table 2.7-2.

Details

This command returns –999.0 when unable to perform measurement.
This command outputs modulation analysis measurement results from the last measurement. It only outputs the measurement result and does not execute any measurement function itself. Use the READ command to execute measurement and output the result simultaneously.

:READ:EVM[n]?

Modulation Analysis Read

Function

Performs modulation analysis and outputs results

Related Command

The following command operates on the same parameter.

```
:MEASure:EVM[n]?
```

:MEASure:EVM[n]?

Modulation Analysis Measure

Function

Performs modulation analysis and outputs results

Related Command

The following command operates on the same parameter.

```
:READ:EVM[n]?
```

2.7.2 Trace Mode

:DISPlay:EVM[:VIEW][:SELect] CDP|CDE|MSLot|MCPower

Trace Mode/Constellation Select/Code Domain Graph Select

Function

Sets modulation analysis trace mode

Command

```
:DISPlay:EVM[:VIEW][:SELect] <mode>
```

Parameter

<mode>	Trace Mode
CDP	Code Domain Power (default)
CDE	Code Domain Error
MSLot	Multi Slot Power
MCPower	Multi Carrier Power

Details

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set trace mode to Multi Slot Power

```
DISP:EVM MSL
```

:DISPlay:EVM[:VIEW][:SELect]?

Trace Mode/Constellation Select/Code Domain Graph Select Query

Function

Queries modulation analysis trace mode

Query

```
:DISPlay:EVM[:VIEW][:SELect]?
```

Response

```
<mode>
```

Parameter

`<mode>`	Trace Mode
`CDP`	Code Domain Power
`CDE`	Code Domain Error
`MSL`	Multi Slot Power
`MCP`	Multi Carrier Power

Usage Example

To query trace mode

```
DISP:EVM?
> MSL
```

2.7.3 Storage Mode

[:SENSe]:EVM:AVERage[:STATe] OFF|ON|AMAXimum|0|1|2

Storage Mode for Modulation Analysis

Function

Sets modulation analysis results display method

Command

```
[:SENSe]:EVM:AVERage[:STATe] <mode>
```

Parameter

<mode>	Display Method
OFF|0	Normal (Default) Displays results once every measurement
ON|1	Average Results averaged for interval specified in Average Count and then displayed
AMAXimum|2	Average & Max Results averaged for interval specified in Average Count and then displayed with Maximum result values

Details

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set result display method to Average

```
EVM:AVER ON
```

[:SENSe]:EVM:AVERage[:STATe]?

Storage Mode for Modulation Analysis Query

Function

Queries modulation analysis results display method

Query

```
[:SENSe]:EVM:AVERage[:STATe]?
```

Response

```
<mode>
```

Parameter

<mode>	Display Method
0	Normal (Default) Displays results once every measurement
1	Average Results averaged for interval specified in Average Count and then displayed
2	Average & Max Results averaged for interval specified in Average Count and then displayed with Maximum result values

Usage Example

To query display method

```
EVM:AVER?
> ON
```

2.7.4 Storage Count

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

Average Count for Modulation Analysis

Function

Sets averaging interval when Storage Mode set to Average or Average & Max.

Command

```
[:SENSe]:EVM:AVERage:COUNt <integer>
```

Parameter

<integer>		Storage Count (Averaging interval)
	Range	2 to 9999

Details

This command differs from panel operation because measurement does not start at command execution.

Usage Example

To set Storage Count (averaging interval) to 50

```
EVM:AVER:COUN 50
```

[:SENSe]:EVM:AVERage:COUNt?

Average Count for Modulation Analysis Query

Function

Queries averaging interval when Storage Mode set to Average or Average & Max.

Query

```
[:SENSe]:EVM:AVERage:COUNt?
```

Response

```
<integer>
```

Parameter

`<integer>`		Storage Count (Averaging interval)
	Range	2 to 9999

Usage Example

To query Storage Count

```
EVM:AVER:COUN?
> 50
```

2.7.5 Marker – ON/OFF

:CALCulate:MARKer[:STATe] ON|OFF|1|0

Marker On/Off

Function

Sets marker On or Off

Command

```
:CALCulate:MARKer[:STATe] <mode>
```

Parameter

<mode>		Marker ON/OFF
	ON|1	Positions marker at entry state (default)
	OFF|0	Does not display marker and releases position

Usage Example

To display marker

```
CALC:MARK ON
```

:CALCulate:MARKer[:STATe]?

Marker On/Off Query

Function

Queries marker state

Query

```
:CALCulate:EVM:MARKer[:STATe]?
```

Response

```
<mode>
```

Parameter

<mode>		Marker On/Off
	1	Positions marker at entry state (default)
	0	Does not display marker and releases position

Usage Example

To query marker state

```
CALC:MARK?
> 1
```

2.7.6 Active Trace

:CALCulate:EVM:MARKer:ACTive CONStellation|BOTTom

Constellation Select/Bottom Graph Select

Function

Sets marker operation graph

Command

```
:CALCulate:EVM:MARKer:ACTive CONStellation|BOTTom
```

Parameter

<switch>	Marker
CONStellation	Constellation Select (default)
BOTTom	Bottom Graph Select

Usage Example

To set marker on Constellation Diagram

```
CALC:EVM:MARK:ACT CONS
```

:CALCulate:EVM:MARKer:ACTive?

Constellation Select/Bottom Graph Select Query

Function

Queries marker operation graph

Query

```
:CALCulate:EVM:MARKer:ACTive
```

Response

```
<mode>
```

Parameter

<mode>	Active Trace
CONS	Constellation Select
BOTT	Bottom Graph Select

Usage Example

To query marker operation graph (Active Trace)

```
CALC:CDP:MARK:ACT?
> CONS
```

2.7.7 Constellation Chip Number

:CALCulate:EVM:MARKer:CHIP <integer>

Marker Position for Constellation

Function

Sets marker position on Constellation Diagram during modulation analysis

Command

```
:CALCulate:EVM:MARKer:CHIP <integer>
```

Parameter

<integer>		Chip Position
	Range	0 to 847 Chip
	Initial Value	Graph left end (0)
	Resolution	1
	Suffix Code	None

Usage Example

To set marker position to Chip number 60

```
CALC:EVM:MARK:CHIP 60
```

:CALCulate:EVM:MARKer:CHIP?

Marker Position for Constellation Query

Function

Queries marker position on Constellation Diagram during modulation analysis

Query

```
:CALCulate:EVM:MARKer:CHIP?
```

Response

```
<integer>
```

Parameter

`<integer>`		Chip Position
	Range	0 to 847 Chip
	Initial Value	Graph left end (0)
	Resolution	1
	Suffix Code	None

Usage Example

To query marker position

```
CALC:EVM:MARK:CHIP?
> 60
```

2.7.8 Marker X-axis Value

:CALCulate:EVM:MARKer:X?

Marker Level for Constellation – Query

Function

Queries X coordinate value (I value) at marker position on Constellation Diagram

When the marker display is off, the character string "NAN" is returned.

Query

```
:CALCulate:EVM:MARKer:X?
```

Response

```
<real>
```

Parameter

<real>	X coordinate (I value) at marker position on Constellation Diagram

Usage Example

To query X coordinate value at marker position on Constellation Diagram

```
CALC:EVM:MARK:X?
> 0.1234
```

2.7.9 Marker Y-axis Value

:CALCulate:EVM:MARKer:Y?

Marker Level for Constellation – Query

Function

Queries Y coordinate value (Q value) at marker position on Constellation Diagram

When the marker display is off, the character string "NAN" is returned.

Query

```
:CALCulate:EVM:MARKer:Y?
```

Response

```
<real>
```

Parameter

`<real>`	Y coordinate (Q value) at marker position on Constellation Diagram

Usage Example

To query Y coordinate value at marker position on Constellation Diagram

```
CALC:EVM:MARK:Y?
> 0.1234
```

2.7.10 Scale – Code Domain Power

:DISPlay:EVM[:VIEW]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel 20|40|60|80

Vertical Scale of Code Domain Power

Function

Sets vertical scale of Code Domain Power Trace display

Command

```
:DISPlay:EVM[:VIEW]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
<rel_ampl>
```

Parameter

<rel_ampl>	CDP Range
20	–20 to 0 dB
40	–40 to 0 dB
60	–60 to 0 dB (default)
80	–80 to 0 dB

Usage Example

To set Code Domain Power Display range from –40 to 0 dB

```
DISP:EVM:WIND:TRAC:Y:RLEV 40
```

:DISPlay:EVM[:VIEW]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?

Vertical Scale of Code Domain Power Query

Function

Queries vertical scale of Code Domain Power Trace display

Query

```
:DISPlay:EVM[:VIEW]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
```

Response

```
<rel_ampl>
```

Parameter

<rel_ampl>	CDP Range
20	–20 to 0 dB
40	–40 to 0 dB
60	–60 to 0 dB (default)
80	–80 to 0 dB

Usage Example

To query vertical scale of Code Domain Power Trace display

```
DISP:EVM:WIND:TRAC:Y:RLEV?
> 40
```

2.7.11 Scale – Code Domain Error

:DISPlay:EVM[:VIEW]:WINDow2:TRACe:Y[:SCALe]:RLEVel 20|40|60|80

Vertical Scale of Code Domain Error

Function

Sets vertical scale of Code Domain Error Trace display

Command

```
:DISPlay:EVM[:VIEW]:WINDow2:TRACe:Y[:SCALe]:RLEVel
<rel_ampl>
```

Parameter

<rel_ampl>	CDE Range
20	–80 to –60 dB
40	–80 to –40 dB
60	–80 to –20 dB (default)
80	–80 to 0 dB

Usage Example

To set Code Domain Error Display range from –80 to –40 dB

```
DISP:EVM:WIND2:TRAC:Y:RLEV 40
```

:DISPlay:EVM[:VIEW]:WINDow2:TRACe:Y[:SCALe]:RLEVel?

Vertical Scale of Code Domain Error Query

Function

Queries vertical scale of Code Domain Error Trace display

Query

```
:DISPlay:EVM[:VIEW]:WINDow2:TRACe:Y[:SCALe]:RLEVel?
```

Response

```
<rel_ampl>
```

Parameter

<rel_ampl>	CDE Range
20	–80 to –60 dB
40	–80 to –40 dB
60	–80 to –20 dB (default)
80	–80 to 0 dB

Usage Example

To query vertical scale of Code Domain Error Trace display

```
DISP:EVM:WIND2:TRAC:Y:RLEV?
> 40
```

2.7.12 Marker Position

:CALCulate:EVM:CDPower:MARKer:CODE <integer>

Marker Position for Code Domain

Function

Sets marker position on Code Domain Trace display

Command

```
:CALCulate:EVM:CDPower:MARKer:CODE <integer>
```

Parameter

<integer>	Marker Position
Range	0 to (SF–1)
Initial Value	0
Resolution	1
Suffix Code	None

Usage Example

To set marker to starting code of Code Domain Trace display

```
CALC:EVM:CDP:MARK:CODE 0
```

:CALCulate:EVM:CDPower:MARKer:CODE?

Marker Position for Code Domain Query

Function

Queries marker position on Code Domain Trace display

Query

```
:CALCulate:EVM:CDPower:MARKer:CODE?
```

Response

```
<integer>
```

Parameter

<integer>	Marker Position
Range	0 to (SF–1)
Initial Value	0
Resolution	1
Suffix Code	None

Usage Example

To query marker position on Code Domain Trace display

```
CALC:EVM:CDP:MARK:CODE?
> 0
```

2.7.13 Marker Channel

:CALCulate:EVM:CDPower:MARKer:X:CHANnel?

Marker Channel for Code Domain Query

Function

Queries channel number of current marker position on Code Domain Trace display

Query

```
:CALCulate:EVM:CDPower:MARKer:X:CHANnel?
```

Response

```
<integer>
```

Parameter

`<integer>`	Channel
Range	1 to SF
Resolution	1
Suffix Code	None

Usage Example

To query channel number of marker position on Code Domain Trace display

```
CALC:EVM:CDP:MARK:X:CHAN?
> 1
```

2.7.14 Marker Spreading Factor

:CALCulate:EVM:CDPower:MARKer:X:SFACtor?

Marker Spreading Factor for Code Domain Query

Function

Queries SF of current marker position on Code Domain Trace display

Query

```
:CALCulate:EVM:CDPower:MARKer:X:SFACtor?
```

Response

```
<integer>
```

Parameter

`<integer>`		Marker Position
	Range	1, 2, 4, 8, 16
	Resolution	1
	Suffix Code	None

Usage Example

To query SF of marker position on Code Domain Trace display

```
CALC:EVM:CDP:MARK:X:SFAC?
> 16
```

2.7.15 Marker Modulation

:CALCulate:EVM:CDPower:MARKer:X:MODulation?

Marker Modulation for Code Domain Query

Function

Queries Modulation Scheme of current marker position on Code Domain Trace display

Query

```
:CALCulate:EVM:CDPower:MARKer:X:MODulation?
```

Response

```
<mode>
```

Parameter

`<mode>`	Modulation
`QPSK`	QPSK
`16Q`	16QAM
`16QP`	16QAM&QPSK
`NONE`	None(Inactive)

Usage Example

To query the Modulation scheme of marker position on Code Domain Trace display

```
CALC:EVM:CDP:MARK:X:MOD?
> QPSK
```

2.7.16 Marker Y-axis Value – CDP or CDE Level

:CALCulate:EVM:CDPower:MARKer:Y?

Marker Level for Code Domain

Function

Queries CDP or CDE at marker position on Code Domain Trace display

Query

```
:CALCulate:EVM:CDPower:MARKer:Y?
```

Response

```
<real>
```

Parameter

<real>		Marker Level/Error
	Resolution	0.01 dB

Usage Example

To query CDP or CDE at marker position 1

```
CALC:EVM:CDP:MARK:CODE 1
CALC:EVM:CDP:MARK:Y?
> -10.62
```

2.8 Power vs Time Function

This section describes the device messages for the Power vs Time function of this application.

Table 2.8-1 lists the execution and query commands for Power vs Time.

Table 2.8-1 Devices Messages at Executing Power vs Time and Reading Results

Function	Device Message
Configure	:CONFigure:PVT
Initiate	:INITiate:PVT
Fetch	:FETCh:PVT[n]?
Read/Measure	:READ:PVT[n]?
	:MEASure:PVT[n]?

Table 2.8-2 lists the response for parameter n in Table 2.8-1.

Table 2.8-2 Response for Power vs Time Result

n	Result Mode	Response
1 or at omission	A	Measurement results are returned in the following order separated by a comma (,). 1.Time Mask judgement 2. Off power [dBm] 3. On Power [dBm] 4. –999.0 5. TS0 time slot power [dBm] 6. DwPTS time slot power [dBm] 7. UpPTS time slot power [dBm] 8. TS1 time slot power [dBm] 9. TS2 time slot power [dBm] 10. TS3 time slot power [dBm] 11. TS4 time slot power [dBm] 12. TS5 time slot power [dBm] 13. TS6 time slot power [dBm] 14. to 40. –999.0

Table 2.8-3 lists the commands for setting Power vs Time parameters.

Table 2.8-3 Device Messages for Setting Modulation Analysis Parameters

Function	Device Message
Wide Dynamic Range	[:SENSe]:PVTime:WDRange OFF|ON|0|1
	[:SENSe]:PVTime:WDRange?
Noise Correction	[:SENSe]:PVTime:NCORrection OFF|ON|0|1
	[:SENSe]:PVTime:NCORrection?
Pre-Amp Mode	[:SENSe]:PVTime:PAMode OFF|ON|0|1
	[:SENSe]:PVTime:PAMode?
Select Mask	[:SENSe]:PVTime:MASK:SELect STANdard|USER
	[:SENSe]:PVTime:MASK:SELect?

Table 2.8-3 Device Messages for Setting Modulation Analysis Parameters

Function	Device Message
Mask Setup	[:SENSe]:PVTime:MASK:LIST:DL:TIME <time_1>,<time_2>,<time_3>,<time_4>,<time_5>
	[:SENSe]:PVTime:MASK:LIST:DL:TIME
	[:SENSe]:PVTime:MASK:LIST:DL:LIMit:ABSolute <level_1>,<level_2>
	[:SENSe]:PVTime:MASK:LIST:DL:LIMit:ABSolute
Load Standard Setting	[:SENSe]:PVTime:MASK:LSSetting
Smoothing Mode	[:SENSe]:PVTime:SMOothing[:STATe] OFF|ON|0|1
	[:SENSe]:PVTime:SMOothing[:STATe]?
Smoothing Length	[:SENSe]:PVTime:SMOothing:LENGth <chip>
	[:SENSe]:PVTime:SMOothing:LENGth?
Storage Mode	[:SENSe]:PVTime:AVERage[:STATe] OFF|ON|0|1
	[:SENSe]:PVTime:AVERage[:STATe]?
Storage Count	[:SENSe]:PVTime:AVERage:COUNt <integer>
	[:SENSe]:PVTime:AVERage:COUNt?

Table 2.8-4 lists marker settings and query commands for a marker position on the Code Domain Power vs Code Number.

Table 2.8-4 Device Messages for Modulation Analysis Marker

Function	Device Message
Marker	:CALCulate:EVM:CDPower:MARKer:X:MODulation?
Marker – ON/OFF	:CALCulate:PVTime:MARKer[:STATe] OFF|ON|0|1
	:CALCulate:PVTime:MARKer[:STATe]?
Top Graph Chip Number	:CALCulate:PVTime:WINDow[1]:MARKer:CHIP <integer>
	:CALCulate:PVTime:WINDow[1]:MARKer :CHIP?
Top Graph Marker TSi	:CALCulate:PVTime:WINDow[1]:MARKer:TSI?
Top Graph Marker to Transient	:CALCulate:PVTime:WINDow[1]:MARKer:TRANsient
Top Graph Marker to Fail	:CALCulate:PVTime:WINDow[1]:MARKer:FAIL
Bottom Graph Chip Number	:CALCulate:PVTime:WINDow2:MARKer:CHIP <chip>
	:CALCulate:PVTime:WINDow2:MARKer:CHIP?
Bottom Graph Marker Value	:CALCulate:PVTime:WINDow2:MARKer:POWer:ABSolute?
	:CALCulate:PVTime:WINDow2:MARKer:JUDGe?
	:CALCulate:PVTime:WINDow2:MARKer:TSI?
Peak Search	:CALCulate:PVTime:WINDow2:MARKer:MAXimum
	:CALCulate:PVTime:WINDow2:MARKer:MAXimum:NEXT

2.8.1 Measure

:CONFigure:PVT

Power vs Time

Function

Sets measurement mode to Power vs Time

Command

```
:CONFigure:PVT
```

Details

This command differs from the panel operation because the measurement does not start at command execution.

This command can be used when Signal Direction is set to DL.

Usage Example

To set measurement mode to Power vs Time

```
CONF:PVT
```

:INITiate:PVT

Power vs Time Initiate

Function

Starts Power vs Time

Command

```
:INITiate:PVT
```

Usage Example

To start Power vs Time

```
INIT:PVT
```

:FETCh:PVT[n]?

Power vs Time Read Fetch

Function

Queries Power vs Time results from Power vs Time display

Query

```
:FETCh:PVT[n]?
```

Response

See Table 2.8-2.

Details

–999.0 is returned when the measurement cannot be performed

This command outputs Power vs Time measurement results from the last measurement. It only outputs the measurement results and does not execute any measurement function itself. Use the READ command to execute measurement and output the result simultaneously.

:READ:PVT[n]?

Power vs Time Read

Function

Performs Power vs Time and outputs results

Related Command

The following command operates on the same parameter.

`:MEASure:PVT[n]?`

:MEASure:PVT[n]?

Power vs Time Measure

Function

Performs Power vs Time and outputs results

Related Command

The following command operates on the same parameter.

`:READ:PVT[n]?`

2.8.2 Wide Dynamic Range

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

Wide Dynamic Range

Function

Set Dynamic Range ON or OFF

Command

`[:SENSe]:PVTime:WDRange <switch>`

Parameter

<switch>

ON|1	Wide Dynamic Range On
OFF|0	Wide Dynamic Range Off

Details

When Wide Dynamic Range is On, Pre-Amp is changed to Off.

Usage Example

To set Wide Dynamic Range to On

```
PVT:WDR ON
```

[:SENSe]:PVTime:WDRange?

Function

Queries Wide Dynamic Range settings

Query

```
[:SENSe]:PVTime:WDRange?
```

Response

<switch>

Parameter

<switch>

0 Wide Dynamic Rang OFF

1 Wide Dynamic Rang ON

Usage Example

To query Wide Dynamic Range setting

```
PVT:WDR?
> 1
```


2.8.3 Noise Correction

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

Noise Correction

Function

Sets Noise Correction ON or OFF

Command

[:SENSe]:PVTime:NCORrection <switch>

Parameter

<switch>

OFF|0 Noise Correction OFF

ON|1 Noise Correction ON

Details

This command cannot be set when Wide Dynamic Range is Off.
Also, this command cannot be set when Pre-Amp Mode is On.

Usage Example

To set Noise Correction to On:

```
PVT:NCOR ON
```

[:SENSe]:PVTime:NCORrection?

Noise Correction Query

Function

Queries Noise Correction settings

Query

```
[:SENSe]:PVTime:NCORrection?
```

Response

```
<switch>
```

Parameter

<switch>

0 Noise Correction Off

1 Noise Correction On

Usage Example

To query Noise Correction settings

```
PVT:NCOR?
> 1
```

2.8.4 Pre-Amp Mode

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

Pre-Amp Mode

Function

Sets Pre-Amp Mode On or Off.

When Pre-Amp Mode is On, Pre-Amp is set to On or Off at On Power or Off Power measurement, respectively.

Command

```
[:SENSe]:PVTime:PAMode <switch>
```

Parameter

<switch>

ON|1	Sets Pre-Amp Mode to On
OFF|0	Sets Pre-Amp Mode to Off

Details

Pre-Amp Mode can be set when Wide Dynamic Range is set to On and Trigger Switch is set to On.
When Wide Dynamic Range is set to Off, the Pre-Amp Mode menu is displayed in gray and this function is enabled.
Both Pre-Amp Mode and Noise Correction cannot be set to On at the same time.

When Pre-Amp Mode is On, it is required to input the trigger.

When Pre-Amp Mode is On, input the +10 dBm or less signal level.
When the Pre-Amp option (Option-008) is not installed, Pre-Amp is always set to Off, and this command is enabled.

Usage Example

To set Pre-Amp Mode to On

```
PVT:PAM ON
```

[:SENSe]:PVTime:PAMode?

Function

Queries Pre-Amp Mode settings

Query

```
[:SENSe]:PVTime:WDRange?
```

Response

```
<switch>
```

Parameter

<switch>

0 Wide Dynamic Rang OFF

1 Wide Dynamic Rang ON

Usage Example

To query Wide Dynamic Range settings:

```
PVT:WDR?
> 1
```

2.8.5 Select Mask

[:SENSe]:PVTime:MASK:SELect STANdard|USER

Select Mask

Function

Selects Mask for judgement

Command

```
[:SENSe]:PVTime:MASK:SELect STANdard|USER
```

Parameter

<mode>

STANdard Uses standard Mask

USER Uses User defined Mask

Usage Example

To set User defined Mask:

```
PVT:MASK:SEL USER
```

[:SENSe]:PVTime:MASK:SELect?

Select Mask Query

Function

Queries mask for judgement

Query

```
[:SENSe]:PVTime:MASK:SELect?
```

Response

```
<mode>
```

Parameter

<mode>

STAN	Selects standard Mask
USER	Selects User defined Mask

Usage Example

To query user selected Mask setting:

```
PVT:MASK:SEL?
> USER
```

2.8.6 Mask Setup - Time

[:SENSe]:PVTime:MASK:LIST:DL:TIME <time_1>,<time_2>,<time_3>,<time_4>,<time_5>

Mask Setup - Time

Function

Sets time for User Mask

Command

```
[:SENSe]:PVTime:MASK:LIST:DL:TIME
<time_1>,<time_2>,<time_3>,<time_4>,<time_5>
```

Parameter

<time_n>
Range(n=1,2,4,5) 0.0 to 100.0
Range(n=3) 0.0 to 200.0
Resolution 0.1
Unit chip

Usage Example

To set Mask Time to 1.0, 2.0, 3.0, 4.0, 5.0

```
PVT:MASK:LIST:DL:TIME 1.0,2.0,3.0,4.0,5.0
```

[:SENSe]:PVTime:MASK:LIST:DL:TIME?

Mask Setup - Time Query

Function

Queries Time for User Mask

Query

```
[:SENSe]:PVTime:MASK:LIST:DL:TIME?
```

Response

```
<time_1>,<time_2>,<time_3>,<time_4>,<time_5>
```

Parameter

<time_n>
Resolution 0.1
Unit Chip

Usage Example

To query Mask Time settings

```
PVT:MASK:LIST:DL:TIME ?
> 1.0,2.0,3.0,4.0,5.0
```

2.8.7 Mask Setup - Level

[:SENSe]:PVTime:MASK:LIST:DL:LIMit:ABSolute <level_1>,<level_2>

Mask Setup - Level

Function

Sets Level for User Mask

Command

```
[:SENSe]:PVTime:MASK:LIST:DL:LIMit:ABSolute
<level_1>,<level_2>
```

Parameter

<level_n>
Range –20.00 to –110.00
Resolution 0.01
Unit dBm

Usage Example

To set Mask Level from -42.0 to -82.0

```
PVT:MASK:LIST:DL:LIM:ABS -42.0,-82.0
```

[:SENSe]:PVTime:MASK:LIST:DL:LIMit:ABSolute?

Mask Setup - Level Query

Function

Queries Level for User Mask

Query

```
[:SENSe]:PVTime:MASK:LIST:DL:LIMit:ABSolute?
```

Response

```
<level_1>,<level_2>
```

Parameter

<level_n>
Range: –20.0 to –110.0
Resolution: 0.01
Unit: dBm

Usage Example

To query level for User Mask

```
PVT:MASK:LIST:DL:LIM:ABS?
> -42.00,-82.00
```

2.8.8 Load Standard Setting

[:SENSe]:PVTime:MASK:LSSetting

Load Standard Setting

Function

Copies Standard Mask settings to User Mask

Command

```
[:SENSe]:PVTime:MASK:LSSetting
```

Usage Example

To set standard setting to User Mask

```
PVT:MASK:LSS
```

2.8.9 Smoothing Mode

[:SENSe]:PVTime:SMOothing[:STATe] OFF|ON|0|1

Smoothing Mode

Function

Sets Smoothing On or Off.

Command

```
[:SENSe]:PVTime:SMOothing[:STATe] OFF|ON|0|1
```

Parameter

<mode>

0|OFF	Sets Smoothing to Off
1|ON:	Sets Smoothing to On

Usage Example

To set Smoothing to On

```
PVT:SMO ON
```

[:SENSe]:PVTime:SMOothing[:STATe]?

Smoothing Query

Function

Queries Smoothing settings

Query

```
[:SENSe]:PVTime:SMOothing[:STATe]?
```

Response

<mode>

0 Sets smoothing to Off

1 Sets smoothing to On

Usage Example

To query Smoothing Off

```
PVT:SMO?
>0
```

2.8.10 Smoothing Length

[:SENSe]:PVTime:SMOothing:LENGth <chip>

Smoothing Length

Function

Sets Smoothing length

Command

```
[:SENSe]:PVTime:SMOothing:LENGth <chip>
```

Parameter

<chip>

Range 0.2 to 10.0

Resolution 0.1

Initial value 1.0

Unit:chip

Usage Example

To set Smoothing length to 2.0

```
PVT:SMO:LENG 2.0
```

[:SENSe]:PVTime:SMOothing:LENGth?

Smoothing Length Query

Function

Queries Smoothing setting length

Query

```
[:SENSe]:PVTime:SMOothing:LENGth?
```

Response

<Chip>
Resolution 0.1
Unit chip

Usage Example

To query Smoothing length

```
PVT:SMO:LENG?
> 2.0
```

2.8.11 Storage Mode

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

Storage Mode for Power vs Time

Function

Sets Storage mode

Command

```
[:SENSe]:PVTime:AVERage[:STATe] <mode>
```

Parameter

<mode>

0|OFF	Sets storage mode to Off
1|ON	Sets storage mode to Average

Usage Example

To set Storage mode to On

```
PVT:AVER ON
```

[:SENSe]:PVTime:AVERage[:STATe]?

Storage Mode for Power vs Time Query

Function

Queries Storage mode settings

Query

```
[:SENSe]:PVTime:AVERage[:STATe]?
```

Response

<mode>

0	Sets storage mode to Off
1	Sets storage mode to Average

Usage Example

To query Storage mode

```
PVT:AVER?
> 1
```

2.8.12 Storage Count

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

Average Count for Power vs Time

Function

Sets Storage count

Command

```
[:SENSe]:PVTime:AVERage:COUNt <integer>
```

Parameter

<integer>

Range		2 to 999
Initial value		10
Resolution		1
Unit	None	

Usage Example

To set Storage count to 20

```
PVT:AVER:COUN 20
```

[:SENSe]:PVTime:AVERage:COUNt?

Average Count for Power vs Time Query

Function

Queries Storage count

Query

```
[:SENSe]:PVTime:AVERage:COUNt?
```

Response

<integer>

Resolution	1

Usage Example

To query Storage count

```
PVT:AVER:COUN?
>20
```

2.8.13 Marker – ON/OFF

:CALCulate:PVTime:MARKer[:STATe] OFF|ON|0|1

Marker On/Off for Power vs Time

Function

Sets Marker ON or OFF

Command

```
:CALCulate:PVTime:MARKer[:STATe] <switch>
```

Parameter

<switch>

OFF|0	Marker OFF
ON|1	Marker ON

Usage Example

To display marker:

```
CALC:PVT:MARK ON
```

:CALCulate:PVTime:MARKer[:STATe]?

Marker On/Off for Power vs Time Query

Function

Queries Marker settings

Query

```
:CALCulate:PVTime:MARKer[:STATe]?
```

Response

<switch>

0	Marker OFF
1	Marker ON

Usage Example

To query marker state

```
CALC:PVT:MARK?
> 1
```

2.8.14 Top Graph Chip Number

:CALCulate:PVTime:WINDow[1]:MARKer:CHIP <integer>

Marker Position for Top Graph

Function

Sets Top Graph Marker

Command

```
:CALCulate:PVTime:WINDow[1]:MARKer:CHIP
```

Parameter

<integer>
Range: 0 to 6399
Resolution: 1
Unit: Chip

Usage Example

To set Top Graph Marker to 1100 chip

```
CALC:PVT:WIND:MARK:CHIP 1100
```

:CALCulate:PVTime:WINDow[1]:MARKer :CHIP?

Marker Position for Top Graph - Query

Function

Queries position for Top Graph Marker

Query

```
:CALCulate:PVTime:WINDow[1]:MARKer:CHIP?
```

Response

<chip>
Resolution : 1
Unit : Chip

Usage Example

To query the position for Top Graph Marker

```
CALC:PVT:WIND:MARK:CHIP?
> 1100
```

2.8.15 Top Graph Marker TSi

:CALCulate:PVTime:WINDow[1]:MARKer:TSI?

Top Graph Marker TSi

Function

Queries TSi for Top Graph Marker position

Query

```
:CALCulate:PVTime:WINDow[1]:MARKer:TSI?
```

Response

<TSi>

TS0	TS0 for Top Graph Marker position
DWPT	DwPTS for Top Graph Marker position
GP	GP for Top Graph Marker position
UPPT	UpPTS for Top Graph Marker position
TS1	TS1 for Top Graph Marker position
TS2	TS2 for Top Graph Marker position
TS3	TS3 for Top Graph Marker position
TS4	TS4 for Top Graph Marker position
TS5	TS5 for Top Graph Marker position
TS6	TS6 for Top Graph Marker position

Usage Example

To query TSi for Top Graph Marker position

```
CALC:PVT:WIND:MARK:TSI?
> UPPT
```

2.8.16 Top Graph Marker to Transient

:CALCulate:PVTime:WINDow[1]:MARKer:TRANsient

Top Graph Marker Position move to Transient

Function

Moves Marker to next Transient

Command

```
:CALCulate:PVTime:WINDow[1]:MARKer:TRAnsient
```

Usage Example

To move Top Graph Marker to Transient

```
CALC:PVT:WIND:MARK:TRAN
```

2.8.17 Top Graph Marker to Fail

:CALCulate:PVTime:WINDow[1]:MARKer:FAIL

Top Graph Marker Position move to Fail

Function

Moves Marker to next Fail

Command

```
:CALCulate:PVTime:WINDow[1]:MARKer:FAIL
```

Usage Example

To move Top Graph Marker to Fail

```
CALC:PVT:WIND:MARK:FAIL
```

2.8.18 Bottom Graph Chip Number

:CALCulate:PVTime:WINDow2:MARKer:CHIP <chip>

Bottom Graph Marker

Function

Sets Bottom Graph Marker position

Command

```
:CALCulate:PVTime:WINDow2:MARKer:CHIP <chip>
```

Parameter

<chip>
Range (Top Graph Marker value –300) to (Top Graph Marker value + 299.9)
Resolution 0.1
Unit Chip

Usage Example

To set Bottom Graph Marker position to 3600.0 chip

```
CALC:PVT:WIND2:MARK:CHIP 3600.0
```

:CALCulate:PVTime:WINDow2:MARKer:CHIP?

Bottom Graph Marker Query

Function

Queries Bottom Graph Marker position

Query

```
:CALCulate:PVTime:WINDow2:MARKer:CHIP?
```

Response

```
<chip>
```

Parameter

<chip>
Resolution 0.1
Unit Chip

Usage Example

To query Bottom Graph Marker position

```
CALC:PVT:WIND2:MARK:CHIP?
> 3600.0
```

2.8.19 Bottom Graph Marker Value

:CALCulate:PVTime:WINDow2:MARKer:POWer:ABSolute?

Bottom Graph Marker Power

Function

Queries Power values for Bottom Graph Marker position

Query

```
:CALCulate:PVTime:WINDow2:MARKer:POWer:ABSolute?
```

Response

```
<power>
```

Parameter

<power>

Resolution	0.01
Unit	dBm

Usage Example

To query power values for Bottom Graph Marker position

```
CALC:PVT:WIND2:MARK:POW:ABS?
> -83.00
```

:CALCulate:PVTime:WINDow2:MARKer:JUDGe?

Bottom Graph Marker Judge

Function

Queries Pass/Fail judgement results for Bottom Graph Marker position

Query

```
:CALCulate:PVTime:WINDow2:MARKer:JUDGe?
```

Response

```
<judge>
```

Parameter

<judge>

0	Pass
1	Fail

Usage Example

To query Bottom Graph Marker JUDGe

```
CALC:PVT:WIND2:MARK:JUDG?
> 0
```

:CALCulate:PVTime:WINDow2:MARKer:TSI?

Bottom Graph Marker TSi

Function

Queries TSi position for Bottom Graph Marker

Query

```
:CALCulate:PVTime:WINDow2:MARKer:TSI?
```

Response

<TSi>

TS0	TS0 for Top Graph Marker position
DWPT	DwPTS for Top Graph Marker position
GP	GP for Top Graph Marker position
UPPT	UpPTS for Top Graph Marker position
TS1	TS1 for Top Graph Marker position
TS2	TS2 for Top Graph Marker position
TS3	TS3 for Top Graph Marker position
TS4	TS4 for Top Graph Marker position
TS5	TS5 for Top Graph Marker position
TS6	TS6 for Top Graph Marker position

Usage Example

To query TSi for Bottom Graph Marker position

```
CALC:PVT:WIND2:MARK:TSI?
> TS3
```

2.8.20 Peak Search

:CALCulate:PVTime:WINDow2:MARKer:MAXimum

Peak Search

Function

Finds the point with the maximum difference between the Bottom Graph Mask value and measured value and moves the marker to that point.

Command

```
:CALCulate:PVTime:WINDow2:MARKer:MAXimum
```

Details

To query the measurement results after executing this command, use the *WAI command to control synchronization

Usage Example

To move the marker to the maximum level point and query the marker value

```
 CALC:PVT:WIND2:MARK:MAX
 *WAI
 CALC:PVT:WIND2:MARK:POW:ABS?
> -83.00
```

:CALCulate:PVTime:WINDow2:MARKer:MAXimum:NEXT

Next Peak Search

Function

Moves Marker to next peak

Command

```
:CALCulate:PVTime:WINDow2:MARKer:MAXimum:NEXT
```

Details

To query the measurement results after executing this command, use the *WAI command to control synchronization

Usage Example

To move Top Graph Marker to Fail:

```
CALC:PVT:WIND2:MARK:MAX:NEXT
*WAI
CALC:PVT:WIND2:MARK:POW:ABS?
> -84.00
```

Chapter 3 SCPI Status Register

This chapter explains the SCPI commands used to read the state of the application and the status register.

3.1 Reading Measurement Status

:STATus:ERRor?

Measurement Status Error Query

Function

Queries measurement error

Query

```
:STATus:ERRor?
```

Response

```
<status>
```

Parameter

`<status>`	Measurement Status

Value = bit0 + bit1 + bit2 + bit3 + bit4 + bit5 + bit6
+ bit7 + bit8 + bit9 + bit10 + bit11 + bit12 + bit13 + bit14 + bit15

bit0: $2^0 = 1$	No measurement
bit1: $2^1 = 2$	Level Over
bit2: $2^2 = 4$	Signal Abnormal
bit3: $2^3 = 8$	(Not Used)
bit4: $2^4 = 16$	(Not Used)
bit5: $2^5 = 32$	(Not Used)
bit6: $2^6 = 64$	(Not Used)
bit7: $2^7 = 128$	(Not Used)
bit8: $2^8 = 256$	(Not Used)
bit9: $2^9 = 512$	(Not Used)
bit10: $2^{10} = 1024$	(Not Used)
bit11: $2^{11} = 2048$	(Not Used)
bit12: $2^{12} = 4096$	(Not Used)
bit13: $2^{13} = 8192$	(Not Used)
bit14: $2^{14} = 16384$	(Not Used)
bit15: $2^{15} = 32768$	(Not Used)
Range	0 to 65535

Details

0 is returned at normal termination

Usage Example

Queries measurement error

```
:STAT:ERR?
> 0
```

:SYSTem:ERRor?

System Error Query

Function

Queries error number

Query

```
:SYSTem:ERRor?
```

Response

```
<status>
```

Parameter

`<status>` Error Number

Table 3.1-1 Error Number and Description

Number	Display	Description
–222	Out-of-range	The settable range is exceeded.
–221	Unavailable in Center Frequency Mode	The Carrier Frequency Mode is unavailable when the Center Frequency Mode is set and *vice versa*.
–221	Unavailable in Carrier Frequency Mode	The Center Frequency Mode is unavailable when the Carrier Frequency Mode is set and *vice versa*.
–221	Unavailable at Auto Detection On	Spreading Factor is unavailable when Auto Detection is on.
–221	Only available for Code Domain	The target time slot cannot be set to Burst when Trace Mode is set to either Multi Slot Power or Multi Carrier Power.
–221	Only available for Code Domain Power	Code Domain Power Scale can only be set when Trace Mode is set to Code Domain Power.
–221	Only available for Code Domain Error	Code Domain Error Scale can only be set when Trace Mode is set to Code Domain Error.
–221	Unavailable at Multi Slot Power	Marker Select and Marker Number are unavailable when Trace Mode is set to Multi Slot Power.
–221	Unavailable at Multi Carrier Power	Marker Select and Marker Number are unavailable when Trace Mode is set to Multi Carrier Power.
–221	Unavailable at Burst	Trace Mode cannot be set to Multi Slot Power when Target Time Slot is set to Burst.
–221	Unavailable at Burst	Trace Mode cannot be set to Multi Carrier Power when Target Time Slot is set to Burst.
–221	Unavailable at Bottom Graph Select	Constellation Marker Number is unavailable when Bottom Graph Select is set.

Table 3.1-1 Error Number and Description (Cont'd)

Number	Display	Description
–221	Unavailable at Constellation Select	Bottom Graph Marker Number is unavailable when Constellation Select is set.
–200	Load signal analyzer	The Signal Analyzer function must be loaded.
–200	Load spectrum analyzer	The Spectrum Analyzer function must be loaded.
–256	No file to read	There is no file to read.
–250	File read error	The file cannot be read.
–200	File format error	The file format is invalid.

Details

0 is returned at normal termination.

Usage Example

Reads error number

```
:SYST:ERR?
> 0
```

3.2 STATus:QUEStionable Register

The hierarchical structure of the QUEStionable Status register is described in Figures 3.2-1 and 3.2-2, and Tables 3.2-1 and 3.2-2.

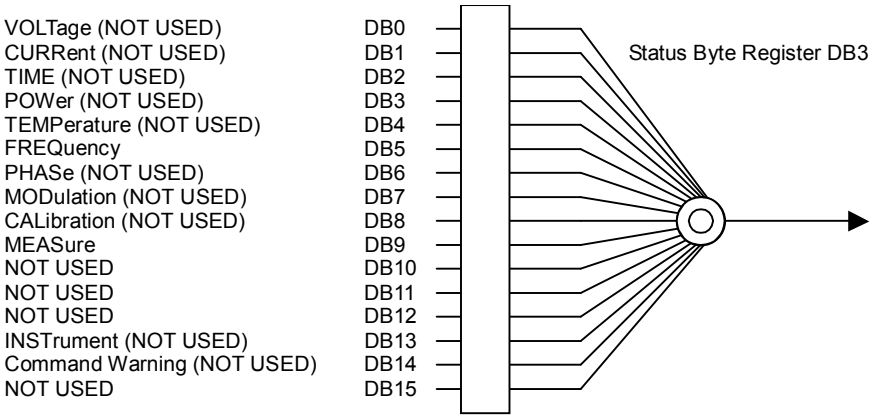


Fig. 3.2-1 QUEStionable Status Register

Table 3.2-1 Bit Definition of QUEStionable Status Register

Bit	Definition
DB5	Reference Clock Unlock
DB9	QUEStionable Measure Register Summary

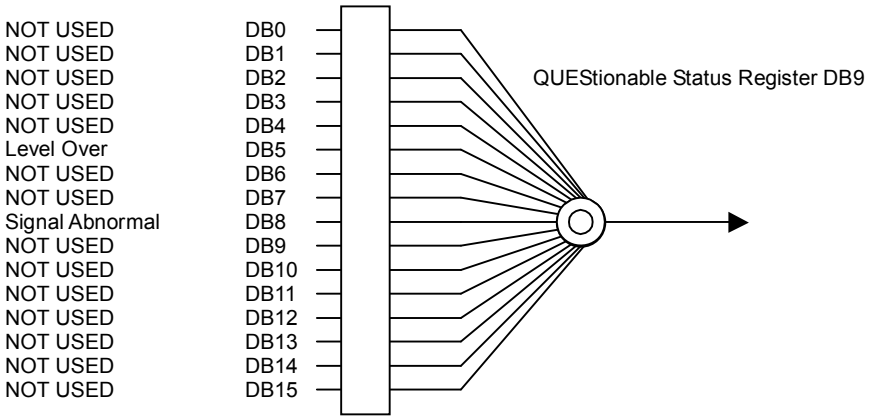


Fig. 3.2-2 QUEStionable Measure Register

Table 3.2-2 Bit Definition of QUEStionable Measure Register

Bit	Definition
DB5	Level Over
DB8	Signal Abnormal

Table 3.2-3 lists the device messages for the QUEStionable Status register.

Table 3.2-3 Device Messages for QUEStionable Status Register

Function	Device Message
Questionable Status Register Event	:STATus:QUEStionable[:EVENt]?
Questionable Status Register Condition	:STATus:QUEStionable:CONDition?
Questionable Status Register Enable	:STATus:QUEStionable:ENABle <integer>
	:STATus:QUEStionable:ENABle?
Questionable Status Register Negative Transition	:STATus:QUEStionable:NTRansition <integer>
	:STATus:QUEStionable:NTRansition?
Questionable Status Register Positive Transition	:STATus:QUEStionable:PTRansition <integer>
	:STATus:QUEStionable:PTRansition?
Questionable Measure Register Event	:STATus:QUEStionable:MEASure[:EVENt]?
Questionable Measure Register Condition	:STATus:QUEStionable:MEASure:CONDition?
Questionable Measure Register Enable	:STATus:QUEStionable:MEASure:ENABle <integer>
	:STATus:QUEStionable:MEASure:ENABle?
Questionable Measure Register Negative Transition	:STATus:QUEStionable:MEASure:NTRansition <integer>
	:STATus:QUEStionable:MEASure:NTRansition?
Questionable Measure Register Positive Transition	:STATus:QUEStionable:MEASure:PTRansition <integer>
	:STATus:QUEStionable:MEASure:PTRansition?

:STATus:QUEStionable[:EVENt]?

Questionable Status Register Event

Function

Reads Event register of QUEStionable Status register

Query

```
:STATus:QUEStionable[:EVENt]?
```

Response

```
<integer>
```

Parameter

`<integer>`		Bit Sum Total of Event Register
	Resolution	1
	Range	0 to 65535

Usage Example

Reads event register of QUEStionable Status register

```
:STAT:QUES?
> 0
```

:STATus:QUEStionable:CONDition?

Questionable Status Register Condition

Function

Reads Condition register of QUEStionable Status register

Query

```
:STATus:QUEStionable:CONDition?
```

Response

```
<integer>
```

Parameter

`<integer>`		Bit Sum Total of Condition Register
	Resolution	1
	Range	0 to 65535

Usage Example

Reads Condition register of QUEStionable Status register

```
:STAT:QUES:COND?
> 0
```

:STATus:QUEStionable:ENABle <integer>

Questionable Status Register Enable

Function

Sets Event Enable register of QUEStionable Status register

Command

```
:STATus:QUEStionable:ENABle <integer>
```

Parameter

<integer>		Bit Sum Total of Event Enable Register
	Resolution	1
	Range	0 to 65535

Usage Example

Sets value of Event Enable register of QUEStionable Status register to 16

```
:STAT:QUES:ENAB 16
```

:STATus:QUEStionable:ENABle?

Questionable Status Register Enable Query

Function

Reads Event Enable register of QUEStionable Status register

Query

```
:STATus:QUEStionable:ENABle?
```

Response

```
<integer>
```

Parameter

<integer>		Bit Sum Total of Event Enable Register
	Resolution	1
	Range	0 to 65535

Usage Example

Reads Event Enable register of QUEStionable Status register

```
:STAT:QUES:ENAB?
> 16
```

:STATus:QUEStionable:NTRansition <integer>

Questionable Status Register Negative Transition

Function

Sets transition filter (Negative Transition) of QUEStionable Status register

Command

```
:STATus:QUEStionable:NTRansition <integer>
```

Parameter

<integer>		Bit Sum Total of Transition Filter (Negative Transition)
	Resolution	1
	Range	0 to 65535

Usage Example

Sets transition filter (Negative Transition) of QUEStionable Status register to 16

```
:STAT:QUES:NTR 16
```

:STATus:QUEStionable:NTRansition?

Questionable Status Register Negative Transition Query

Function

Queries transition filter (Negative Transition) of QUEStionable Status register

Query

```
:STATus:QUEStionable:NTRansition?
```

Response

```
<integer>
```

Parameter

<integer>		Bit Sum Total of Transition Filter (Negative Transition)
	Resolution	1
	Range	0 to 65535

Usage Example

Queries transition filter (Negative Transition) of QUEStionable Status register

```
:STAT:QUES:NTR?
> 16
```

:STATus:QUEStionable:PTRansition <integer>

Questionable Status Register Positive Transition

Function

Sets transition filter (Positive Transition) of QUEStionable Status register

Command

```
:STATus:QUEStionable:PTRansition <integer>
```

Parameter

<integer>		Bit Sum Total of Transition Filter (Positive Transition)
	Resolution	1
	Range	0 to 65535

Usage Example

Sets transition filter (Positive Transition) of QUEStionable Status register to 16

```
:STAT:QUES:PTR 16
```

:STATus:QUEStionable:PTRansition?

Questionable Status Register Positive Transition Query

Function

Queries transition filter (Positive Transition) of QUEStionable Status register

Query

```
:STATus:QUEStionable:PTRansition?
```

Response

```
<integer>
```

Parameter

<integer>		Bit Sum Total of Transition Filter (Positive Transition)
	Resolution	1
	Range	0 to 65535

Usage Example

Queries transition filter (Positive Transition) of QUEStionable Status register

```
:STAT:QUES:PTR?
> 16
```

:STATus:QUEStionable:MEASure[:EVENt]?

Questionable Measure Register Event

Function

Reads Event register of QUEStionable Measure register

Query

```
:STATus:QUEStionable[:EVENt]?
```

Response

```
<integer>
```

Parameter

`<integer>`		Bit Sum Total of Event Register
	Resolution	1
	Range	0 to 65535

Usage Example

Reads Event register of QUEStionable Measure register

```
:STAT:QUES?
> 0
```

:STATus:QUEStionable:MEASure:CONDition?

Questionable Measure Register Condition

Function

Reads Condition register of QUEStionable Measure register

Query

```
:STATus:QUEStionable:CONDition?
```

Response

```
<integer>
```

Parameter

`<integer>`		Bit Sum Total of Condition Register
	Resolution	1
	Range	0 to 65535

Usage Example

Reads Condition register of QUEStionable Measure register

```
:STAT:QUES:COND?
> 0
```

:STATus:QUEStionable:MEASure:ENABle <integer>

Questionable Measure Register Enable

Function

Sets Event Enable register of QUEStionable Measure register

Command

```
:STATus:QUEStionable:ENABle <integer>
```

Parameter

`<integer>`		Bit Sum Total of Event Enable Register
	Resolution	1
	Range	0 to 65535

Usage Example

Sets value of Event Enable register of QUEStionable Measure register to 16

```
:STAT:QUES:ENAB 16
```

:STATus:QUEStionable:MEASure:ENABle?

Questionable Measure Register Enable Query

Function

Reads Event Enable register of QUEStionable Measure register

Query

```
:STATus:QUEStionable:ENABle?
```

Response

```
<integer>
```

Parameter

`<integer>`		Bit Sum Total of Event Enable Register
	Resolution	1
	Range	0 to 65535

Usage Example

Reads Event Enable register of QUEStionable Measure register

```
:STAT:QUES:ENAB?
> 16
```

:STATus:QUEStionable:MEASure:NTRansition <integer>

Questionable Measure Register Negative Transition

Function

Sets transition filter (Negative Transition) of QUEStionable Measure register

Command

```
:STATus:QUEStionable:NTRansition <integer>
```

Parameter

<integer>		Bit Sum Total of Transition Filter (Negative Transition)
	Resolution	1
	Range	0 to 65535

Usage Example

Sets transition filter (Negative Transition) of QUEStionable Measure register to 16

```
:STAT:QUES:NTR 16
```

:STATus:QUEStionable:MEASure:NTRansition?

Questionable Measure Register Negative Transition Query

Function

Queries transition filter (Negative Transition) of QUEStionable Measure register

Query

```
:STATus:QUEStionable:NTRansition?
```

Response

```
<integer>
```

Parameter

<integer>		Bit Sum Total of Transition Filter (Negative Transition)
	Resolution	1
	Range	0 to 65535

Usage Example

Queries transition filter (Negative Transition) of QUEStionable Measure register

```
:STAT:QUES:NTR?
> 16
```

:STATus:QUEStionable:MEASure:PTRansition <integer>

Questionable Measure Register Positive Transition

Function

Sets transition filter (Positive Transition) of QUEStionable Measure register

Command

```
:STATus:QUEStionable:PTRansition <integer>
```

Parameter

`<integer>`		Bit Sum Total of Transition Filter (Positive Transition)
	Resolution	1
	Range	0 to 65535

Usage Example

Sets transition filter (Positive Transition) of QUEStionable Measure register to 16

```
:STAT:QUES:PTR 16
```

:STATus:QUEStionable:MEASure:PTRansition?

Questionable Measure Register Positive Transition Query

Function

Queries transition filter (Positive Transition) of QUEStionable Measure register

Query

```
:STATus:QUEStionable:PTRansition?
```

Response

```
<integer>
```

Parameter

`<integer>`		Bit Sum Total of Transition Filter (Positive Transition)
	Resolution	1
	Range	0 to 65535

Usage Example

Queries transition filter (Positive Transition) of QUEStionable Measure register

```
:STAT:QUES:PTR?
> 16
```

3.3 STATus:OPERation Register

The hierarchical structure of the OPERation Status register is described in Figure 3.3-1 and Table 3.3-1.

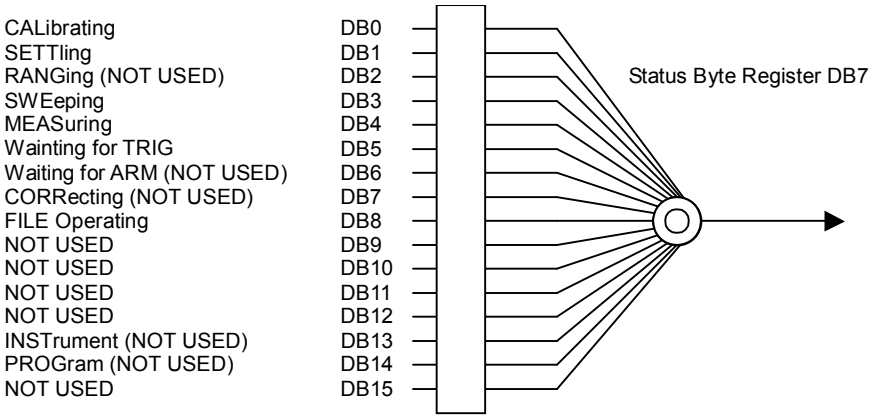


Fig. 3.3-1 OPERation Status Register

Table 3.3-1 Bit Definition for OPERation Status Register

Bit	Definition
DB0	CAL Executed
DB1	Warm-up displayed
DB4	Capture executed (Always 1 at Continuous measurement)
DB5	Waiting for trigger signal
DB8	Operating on file

Table 3.3-2 lists the device messages for the OPERation status register.

Table 3.3-2 Device Messages for OPERation Status Register

Function	Device Message
Operation Status Register Event	:STATus:OPERation[:EVENt]?
Operation Status Register Condition	:STATus:OPERation:CONDition?
Operation Status Register Enable	:STATus:OPERation:ENABle <integer>
	:STATus:OPERation:ENABle?
Operation Status Register Negative Transition	:STATus:OPERation:NTRansition <integer>
	:STATus:OPERation:NTRansition?
Operation Status Register Positive Transition	:STATus:OPERation:PTRansition <integer>
	:STATus:OPERation:PTRansition?

:STATus:OPERation[:EVENt]?

Operation Status Register Event

Function

Reads Event register of OPERation Status register

Query

```
:STATus:OPERation[:EVENt]?
```

Response

```
<integer>
```

Parameter

<integer>		Bit Sum Total of Event Register
	Resolution	1
	Range	0 to 65535

Usage Example

Reads Event register of OPERation Status register

```
:STAT:OPER?
> 0
```

:STATus:OPERation:CONDition?

Operation Status Register Condition

Function

Reads Event register of OPERation Condition register

Query

```
:STATus:OPERation:CONDition?
```

Response

```
<integer>
```

Parameter

<integer>		Bit Sum Total of Condition Register
	Resolution	1
	Range	0 to 65535

Usage Example

Reads Event register of OPERation Condition register

```
:STAT:OPER:COND?
> 0
```

:STATus:OPERation:ENABle <integer>

Operation Status Register Enable

Function

Sets Event Enable register of OPERation Status register

Command

```
:STATus:OPERation:ENABle <integer>
```

Parameter

<integer>		Bit Sum Total of Event Enable Register
	Resolution	1
	Range	0 to 65535

Usage Example

Sets Event Enable register of OPERation Status register to 16

```
:STAT:OPER:ENAB 16
```

:STATus:OPERation:ENABle?

Operation Status Register Enable Query

Function

Reads Event Enable register of OPERation Status register

Query

```
:STATus:OPERation:ENABle?
```

Response

```
<integer>
```

Parameter

<integer>		Bit Sum Total of Event Enable Register
	Resolution	1
	Range	0 to 65535

Usage Example

Reads Event Enable register of OPERation Status register

```
:STAT:OPER:ENAB?
> 16
```

:STATus:OPERation:NTRansition <integer>

Operation Status Register Negative Transition

Function

Sets transition filter (Negative Transition) of OPERation Status register

Command

```
:STATus:OPERation:NTRansition <integer>
```

Parameter

<integer>		Bit Sum Total of Transition Filter (Negative Transition)
	Resolution	1
	Range	0 to 65535

Usage Example

Sets transition filter (Negative Transition) of OPERation Status register to 16

```
:STAT:OPER:NTR 16
```

:STATus:OPERation:NTRansition?

Operation Status Register Negative Transition Query

Function

Reads transition filter (Negative Transition) of OPERation Status register

Query

```
:STATus:OPERation:NTRansition?
```

Response

```
<integer>
```

Parameter

<integer>		Bit Sum Total of Transition Filter (Negative Transition)
	Resolution	1
	Range	0 to 65535

Usage Example

Reads transition filter (Negative Transition) of OPERation Status register

```
:STAT:OPER:NTR?
> 16
```

:STATus:OPERation:PTRansition <integer>

Operation Status Register Positive Transition

Function

Sets transition filter (Positive Transition) of OPERation Status register

Command

```
:STATus:OPERation:PTRansition <integer>
```

Parameter

<integer>		Bit Sum Total of Transition Filter (Positive Transition)
	Resolution	1
	Range	0 to 65535

Usage Example

Sets transition filter (Positive Transition) of OPERation Status register to 16

```
:STAT:OPER:PTR 16
```

:STATus:OPERation:PTRansition?

Operation Status Register Positive Transition Query

Function

Reads transition filter (Positive Transition) of OPERation Status register

Query

```
:STATus:OPERation:PTRansition?
```

Response

```
<integer>
```

Parameter

<integer>		Bit Sum Total of Transition Filter (Positive Transition)
	Resolution	1
	Range	0 to 65535

Usage Example

Reads transition filter (Positive Transition) of OPERation Status register

```
:STAT:OPER:PTR?
> 16
```