MX269013A
GSM/EDGE Measurement Software
Operation Manual
Operation

12th 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 (Mainframe: Operation), MS2830A Signal Analyzer Operation Manual (Mainframe: Operation), or MS2850A Signal Analyzer Operation Manual (Mainframe: Operation). Please also refer to them before using the equipment.**
- **Keep this manual with the equipment.**

ANRITSU CORPORATION

Document No.: M-W3100AE-12.0

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.

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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.

MX269013A
GSM/EDGE Measurement Software
Operation Manual Operation

9 May 2008 (First Edition)
30 September 2020 (12th Edition)

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- During the warranty period, Anritsu Corporation will repair or exchange this software free-of-charge if it proves defective when used as described in the operation manual.
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- The warranty period after repair or exchange will remain 6 months from the original purchase date, or 30 days from the date of repair or exchange, depending on whichever is longer.
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Anritsu may change without your approval the terms of this EULA if the changes are for the benefit of general customers, or are reasonable in light of the purpose of this EULA and circumstances of the changes. At the time of change, Anritsu will inform you of those changes and its effective date, as a general rule 45 days, in advance on its website, or in writing or by e-mail.

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1. Anritsu may terminate this EULA immediately if you violate any conditions described herein. This EULA shall also be terminated immediately by Anritsu if there is any good reason that it is deemed difficult to continue this EULA, such as your violation of Anritsu copyrights, patents, etc. or any laws and ordinances, or if it turns out that you belong to an antisocial organization or has a socially inappropriate relationship with members of such organization.
2. You and Anritsu may terminate this EULA by a written notice to the other party 30 days in advance.

Article 7. Damages

If Anritsu suffers any damages or loss, financial or otherwise, due to your violation of the terms of this EULA, Anritsu shall have the right to seek proportional damages from you.

Article 8. Responsibility after Termination

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Article 9. Negotiation for Dispute Resolution

If matters of interpretational dispute or items not covered under this EULA arise, they shall be resolved by negotiations in good faith between you and Anritsu.

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Revision History:

February 29th, 2020

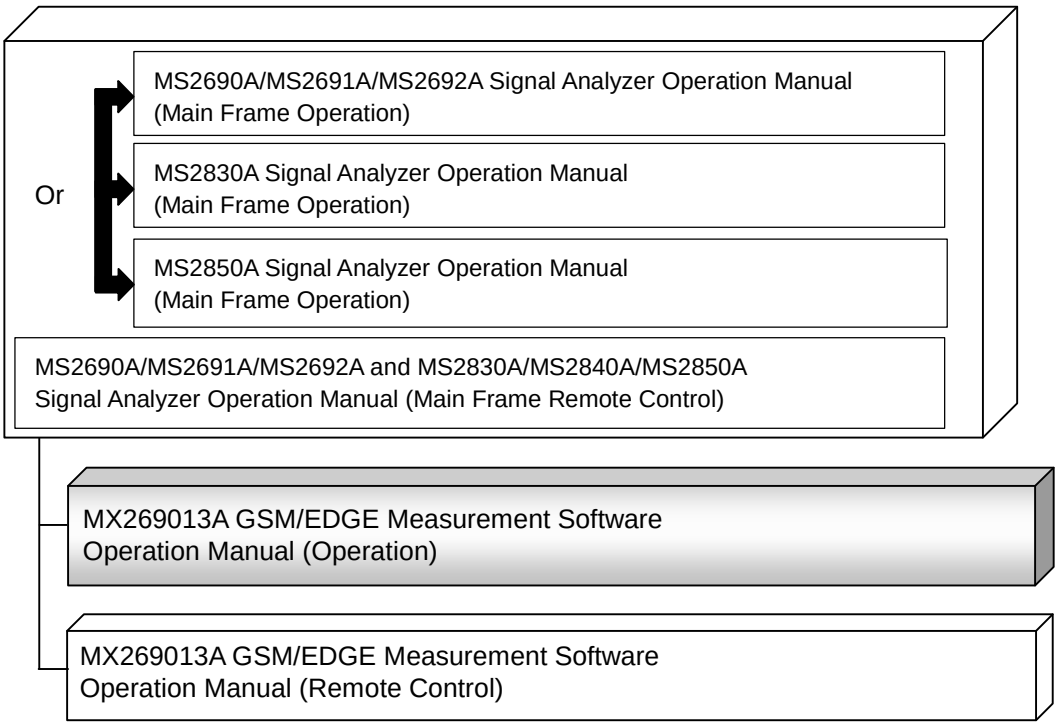
Cautions Against Computer Virus Infection

- Copying files and data
  Only files that have been provided directly from Anritsu or generated using Anritsu equipment should be copied to the instrument.
  All other required files should be transferred by means of USB flash drive or CompactFlash media after undergoing a thorough virus check.
- Adding software
  Do not download or install software that has not been specifically recommended or licensed by Anritsu.
- Network connections
  Ensure that the network has sufficient anti-virus security protection in place.
- Protection against malware (malicious software such as viruses).
  This equipment runs on Windows Operating System.
  To connect this equipment to network, the following is advised.
  - Activate Firewall.
  - Install important updates of Windows.
  - Use antivirus software.

About This Manual

■ **About this document**

This operation manual is for MX269013A GSM/EDGE Measurement Software (Operation).



■ **Related manuals**

Each related manual describes the following operations.
Refer to each operation manual for details.

Signal Analyzer Operation Manual (Mainframe Operation)
Signal Analyzer Operation Manual (Mainframe Remote Control)
These describe basic operations, maintenance procedure, common functions and common remote functions of the signal analyzer.

GSM/EDGE Measurement Software Operation Manual (Operation) [This document]

This document describes the operation of MX269013A GSM/EDGE Measurement Software. As for signal analyzer hardware and its basic functions and operation outline, refer to "MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Operation)", "MS2830A Signal Analyzer Operation Manual (Mainframe Operation)", or "MS2850A Signal Analyzer Operation Manual (Mainframe Operation)".

GSM/EDGE Measurement Software Operation Manual (Remote Control)
This document describes the remote control operation of MX269013A GSM/EDGE Measurement Software. As for signal analyzer application's basic remote control functions and its definitions of common commands, refer to "MS2690/MS2691/MS2692A and MS2830A/MS2840A/MS2850A Signal Analyzer Operation Manual (Mainframe Remote Control)".

Convention Used in This Manual

Throughout this document, the use of MS269x Series is assumed unless otherwise specified. If using MS2830A or MS2850A, change MS269xA to read MS2830A or MS2850A.

■ **Document Conventions**

	: This indicates the Signal Analyzer panel keys.
☞	: This indicates pages and sections to be referred to.
Boldface	: This indicates message that appears on the screen.
‘ ’	: This indicates reference that does not pertain to screen messages.
“ ”	: This indicates reference, or jump to other section of the manual.

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Chapter 1 Overview

This chapter provides an overview of the MX269013A GSM/EDGE Measurement Software and describes the product configuration.

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1.1 Product Outline

The MS269x Series, MS2830A, and MS2850A Signal Analyzer enables high-speed, high-accuracy, and simple measurements of transmission characteristics of base stations and mobile stations for various types of mobile communications. The MS2690A/MS2691A/MS2692A, MS2830A, and MS2850A has high-performance signal analyzer and spectrum analyzer functions as standard, with optional measurement software allowing modulation analysis functionality supporting various digital modulation modes.

The MX269013A GSM/EDGE Measurement Software (hereinafter referred to as MX269013A) is a software option for measuring the RF characteristics of GSM/EDGE specified by 3GPP.

The MX269013A supports the following measurements.

- Modulation accuracy
- Carrier frequency
- Transmitter power

MS2830A-006/106 is required to use the MX269013A on MS2830A.

1.2 Product Composition

1.2.1 Standard Composition

Table 1.2.1-1 lists the standard configuration of the MX269013A.

Table 1.2.1-1 Standard Composition

Item	Model Name/Symbol	Name	Quantity	Remarks
Application	MX269013A	GSM/EDGE Measurement Software	1	
Accessories	–	Installation CD-ROM	1	Application software, Operation manual CD-ROM

1.2.2 Options

Table 1.2.2-1 lists the options for the MX269013A.

Table 1.2.2-1 Optional software

Model	Name	Remarks
MX269013A-001	EDGE Evolution Measurement Software	

1.2.3 Application Parts

Table 1.2.3-1 lists the application parts for the MX269013A.

Table 1.2.3-1 Application Parts

Model Name/Symbol	Name	Remarks
W3100AE	MX269013A GSM/EDGE Measurement Software Operation Manual (Operation)	English, Printed Version
W3101AE	MX269013A GSM/EDGE Measurement Software Operation Manual (Remote Control)	English, Printed Version

1.3 Specifications

Table 1.3-1 lists the specifications for the MX269013A.

When MS2830A or MS2850A is used, this software's specification is specified by the condition below, unless otherwise noted.

Attenuator Mode: Mechanical Atten Only

Table 1.3-1 Specifications

Item	Specification
Target signal	GSM/EDGE Downlink and Uplink signals Supports Normal Burst, and GMSK, AQPSK(Downlink Only) and 8PSK for Continuous modulation methods
Measurement frequency range	400 to 2000 MHz
Measurement level range	–15 to +30 dBm (at Pre-Amp Off, or Pre-Amp not installed.) –30 to +10 dBm (at Pre-Amp On)
Modulation accuracy	
Carrier frequency measurement accuracy	After CAL execution between 18 and 28°C For a signal of EVM = 1% MS269x Series: ± (accuracy of reference crystal oscillator x carrier frequency + 5 Hz) MS2830A: ± (accuracy of reference crystal oscillator x carrier frequency + 8 Hz) MS2850A: ± (accuracy of reference crystal oscillator x carrier frequency + 8 Hz)
Residual EVM (8PSK/AQPSK)	After CAL execution between 18 and 28°C The signal measured is within the measurement level range and less than or equal to Input Level. MS269x Series: ≤ 0.6% (rms) MS2830A: ≤ 1.0% (rms) MS2850A: ≤ 1.0% (rms)
Residual Phase Error (GMSK)	After CAL execution between 18 and 28°C The signal measured is within the measurement level range and less than or equal to Input Level. MS269x Series: ≤ 0.5 degree (rms) MS2830A ≤ 0.7 degree (rms) MS2850A ≤ 0.7 degree (rms)
Waveform display	Constellation, Phase Error vs Symbol, EVM vs Symbol (8PSK/AQPSK), Magnitude Error vs Symbol (8PSK/AQPSK)

Table 1.3-1 Specifications (Cont'd)

Item	Specification
Amplitude Measurement	
Transmitter power accuracy	After CAL execution at 18 to 28°C, input attenuator ≥ 10 dB, The input signal to be measured is within the measurement level range and less than or equal to Input Level. MS269x Series ±0.6 dB (at Pre-Amp Off, or Pre-Amp not installed.) ±1.1 dB (at Pre-Amp On) MS2830A: ±0.6 dB (at Pre-Amp Off, or Pre-Amp not installed.) MS2850A: ±0.6 dB (at Pre-Amp Off, or Pre-Amp not installed.) Transmitter power accuracy is calculated from the RSS (root sum of squares) error of the absolute amplitude accuracy and the in-band frequency characteristics of the MX269013A.
Waveform display	Rise, Fall, Slot, Frame
Output RF Spectrum	
	After CAL execution at 18 to 28°C, input attenuator ≥ 10 dB, 0 to +30 dBm input signal (at Pre-Amp Off, or Pre-Amp not installed), 400 to 2000 MHz carrier frequency,at 5-pole filter
Modulation part: measurement points	±100 kHz, ±200 kHz, ±250 kHz, ±400 kHz, ±600 kHz, ±800 kHz, ±1000 kHz, ±1200 kHz, ±1400 kHz, ±1600 kHz, ±1800 kHz, ±3000 kHz, ±6000 kHz
Modulation part: measurement range	MS269x Series: <–41 dB (100 kHz offset) <–66 dB (200 kHz offset) <–74 dB (250 kHz offset) <–79 dB (400 kHz offset) <–80 dB (<1200 kHz offset) <–83 dB (<1800 kHz offset) <–80 dB (≥1800 kHz offset)
Switching part: measurement points	±400 kHz, ±600 kHz, ±1200 kHz, ±1800 kHz
Switching part: measurement range	MS269x Series: <–71 dB (400 kHz offset) <–72 dB (600 kHz offset) <–75 dB (1200 kHz offset) <–75 dB (1800 kHz offset)

Table 1.3-2 lists the specifications for the EDGE Evolution measurement software.

Table 1.3-2 Specifications

Item	Specification
Target signal	EDGE Evolution Downlink and Uplink signals Supports Normal Burst, QPSK,16QAM,and 32QAM for Continuous, and QPSK,16QAM,and 32QAM for Higher Symbol Rate Burst modulation methods
Measurement frequency range	400 to 2000 MHz
Measurement level range	–15 to +30 dBm (at Pre-Amp Off, or Pre-Amp not installed.) –30 to +10 dBm (at Pre-Amp On)
Carrier frequency measurement accuracy	After CAL execution between 18 and 28°C For a signal of EVM = 1% MS269x Series: ± (accuracy of reference frequency x carrier frequency + 5 Hz) MS2830A: ± (accuracy of reference frequency x carrier frequency + 8 Hz) MS2850A: ± (accuracy of reference frequency x carrier frequency + 8 Hz)
Residual EVM	After CAL execution between 18 and 28°C The signal measured is within the measurement level range and less than or equal to Input Level. MS269x Series: ≤ 0.6% (rms) MS2830A: ≤ 1.0% (rms) MS2850A: ≤ 1.0% (rms)
Waveform display	Constellation, Phase Error vs Symbol, EVM vs Symbol, Magnitude Error vs Symbol
Amplitude Measurement	
Transmitter power measurement accuracy	After CAL execution at 18 to 28°C, input attenuator ≥ 10 dB, The signal to be measured is within the measurement level range and less than or equal to Input Level. MS269x Series: ±0.6 dB (at Pre-Amp Off, or Pre-Amp not installed.) ±1.1 dB (at Pre-Amp On) MS2830A: ±0.6 dB (at Pre-Amp Off, or Pre-Amp not installed.) MS2850A: ±0.6 dB (at Pre-Amp Off, or Pre-Amp not installed.) Transmitter power measurement accuracy is calculated from the RSS (root sum of squares) error of the absolute amplitude accuracy and the in-band frequency characteristics of the MX269013A.
Waveform display	Rise, Fall, Slot, Frame

Table 1.3-2 Specifications (Cont'd)

Item	Specification
Output RF Spectrum	
	After CAL execution at 18 to 28°C, input attenuator ≥ 10 dB, 0 to +30 dBm input signal (at Pre-Amp Off, or Pre-Amp not installed), 400 to 2000 MHz carrier frequency, at 5-pole filter
Modulation part: measurement points	±100 kHz, ±200 kHz, ±250 kHz, ±400 kHz, ±600 kHz, ±800 kHz, ±1000 kHz, ±1200 kHz, ±1400 kHz, ±1600 kHz, ±1800 kHz, ±3000 kHz, ±6000 kHz
Modulation part: measurement range	MS269x Series: <–41 dB (100 kHz offset) <–66 dB (200 kHz offset) <–74 dB (250 kHz offset) <–79 dB (400 kHz offset) <–80 dB (<1200 kHz offset) <–83 dB (<1800 kHz offset) <–80 dB (≥1800 kHz offset)
Switching part: measurement points	±400 kHz, ±600 kHz, ±1200 kHz, ±1800 kHz
Switching part: measurement range	MS269x Series: <–71 dB (400 kHz offset) <–72 dB (600 kHz offset) <–75 dB (1200 kHz offset) <–75 dB (1800 kHz offset)

Chapter 2 Preparation

This chapter describes the preparations required for using the application you are using. Refer to the *MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Operation)*, *MS2830A Signal Analyzer Operation Manual (Mainframe Operation)* or *MS2850A Signal Analyzer Operation Manual (Mainframe Operation)* for common features not included in this manual.

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2.1 Part Names

This section describes the panel keys for operating the instrument and connectors used to connect external devices. For general points of caution, refer to the *MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Operation)*, *MS2830A Signal Analyzer Operation Manual (Mainframe Operation)* or *MS2850A Signal Analyzer Operation Manual (Mainframe Operation)*.

2.1.1 Front panel

This section describes the front-panel keys and connectors.

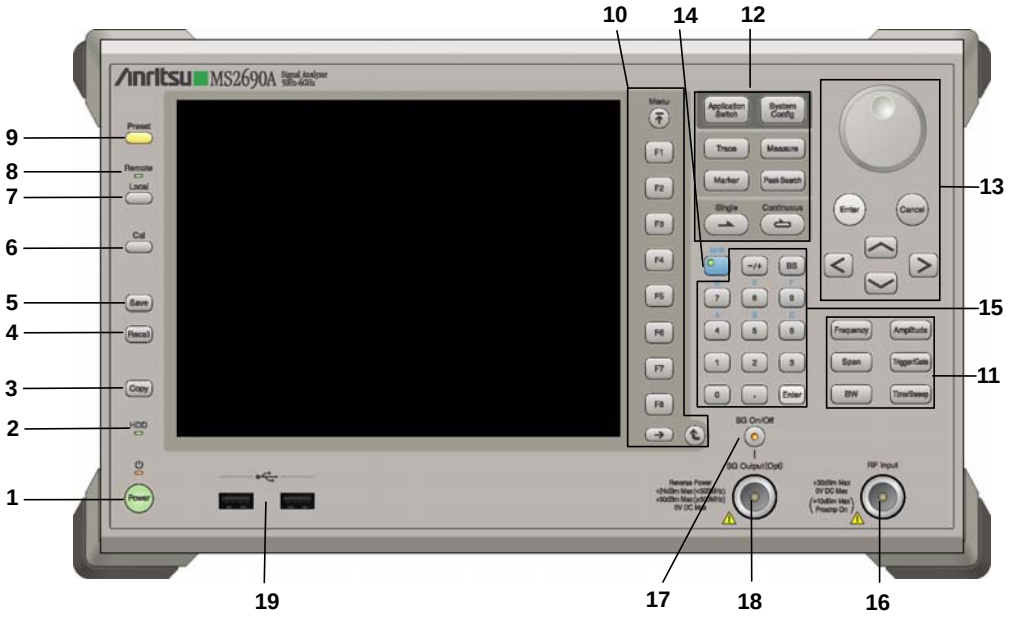


Figure 2.1.1-1 MS269x series front panel

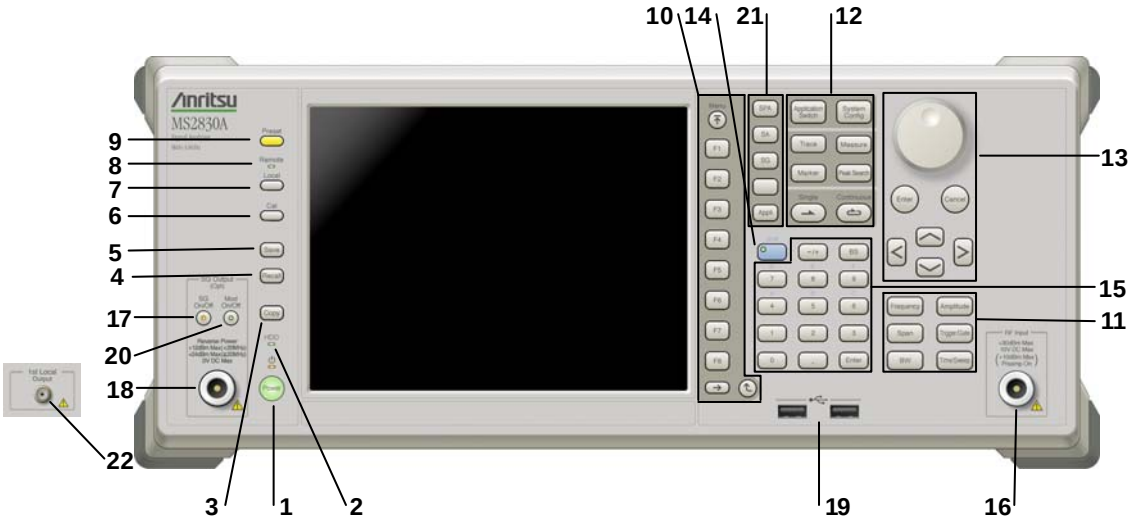


Figure 2.1.1-2 MS2830A/MS2850A front panel (MS2830A Example)

1

Power Switch

Press to switch between the standby state (AC power supplied) and power-on state. The Power lamp lights orange at Standby and green at Power On. Press the power switch for about 2 seconds.

2

Hard disk access lamp (MS269x series, MS2830A)

Lights up when the internal hard disk is accessed.

SSD access lamp (MS2850A)

Lights up when the internal SSD is accessed .

3

Copy key

Press to capture display screen and save to file.

4

Recall key

Press to recall parameter file.

5

Save key

Press to save parameter file.

6

Cal key

Press to display the Calibration menu.

7

Local key

Press to return to local operation from remote control via GPIB, Ethernet, or USB (B), and enable panel settings.

8

Remote lamp

Lights when in remote-control state.

9

Preset key

Resets parameters to initial settings.

10

Function keys

Selects or configures function menu displayed on the right of the screen. The function menu is provided in multiple pages and layers.

Press to fetch next function menu page. The current page number is displayed at the bottom of the function menu, as in “1 of 2”.

Sub-menus may be displayed when a function menu is pressed. Press to go back to the previous menu. Press Menu to go back to the top menu.

11

Main function keys 1

Press to set or execute main functions.

Executable functions vary with the current application. When nothing happens with the press, it indicates that the application in use does not support the key.

Frequency Press to set frequency parameters.

Amplitude Press to set level parameters.

Span No function is assigned to this key.

Trigger/Gate Press to set trigger parameters.

BW No function is assigned to this key.

Time/Sweep Press to set measurement item parameters.

12

Main function keys 2

Press to set or execute main functions.

Executable functions vary with the current application. When nothing happens with the press, it indicates that the application in use does not support the key.

Application Switch Press to switch application.

System Config Press to display Configuration screen.

Trace Press to set the trace items or to switch the operation window.

Measure Press to set measurement item parameters.

Marker Use when switching graph marker operation.

Peak Search Press to set parameters related to the peak search function.

Single Press to start single measurement.

Continuous Press to start continuous measurements.

13

Rotary knob/Cursor key/Enter key/Cancel key

The rotary knob and cursor keys select display items or change settings.

Press Enter to set the entered or selected data.

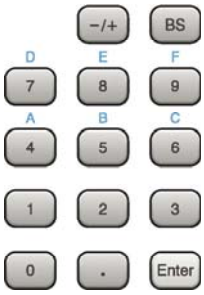
Press Cancel to cancel input or selected data.

14

Shift key

Operates keys with functions in blue characters on panel. Press the Shift key so the key lamp is green and then press the target key.

15



Numeric keypad

Enters numbers on parameter setup screens.

Press BS to delete the last entered digit or character.

[A] to [F] can be entered by pressing keys 4 to 9 while the Shift key lamp Shift is green.

16

RF Input connector

Inputs RF signal. This is an N type input connector.
For the MS2830A with the MS2830A-045 and the MS2850A, a K type input connector is installed.

17

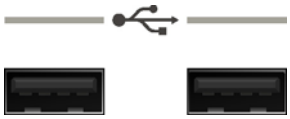
RF Output Control key (when MS269xA-020/120, MS2830A-020/120/021/121 is installed)

Press SG On/Off to switch on/off the modulation of RF signal when the Vector Signal Generator option is installed. The RF output control key lamp lights orange when the RF signal output is set to On.
This cannot be installed on the MS2830A with the MS2830A-044/045, or on the MS2850A.

18 SG Output(Opt)

RF Output connector (when MS269xA-020/120, MS2830A-020/120/021/121 installed)
Outputs RF signal, when the Vector Signal Generator option is installed.
This is an N type output connector.
This cannot be installed on the MS2830A with the MS2830A-044/045, or on the MS2850A

19



USB connector (type A)
Connect the accessory USB keyboard, mouse or USB memory.

20 Mod On/Off

Modulation control key (when MS2830A-020/120/021/121 installed)
Press to switch on/off the modulation of RF signal when the Vector Signal Generator option is installed. The lamp on the key lights up in green in the modulation On state.
This cannot be installed on the MS2830A with the MS2830A-044/045, or on the MS2850A.

21

Application key (MS2830A, MS2850A)
Press to switch between applications.

Press to display the Spectrum Analyzer main screen.

Press to display the Signal Analyzer main screen, when MS2830A-005/105/007/006/106/009/109/077/078 or MS2850A are installed.

Press to display the Signal Generator main screen, when Vector Signal Generator option is installed. (MS2830A only)

This is a blank key. Not used. (MS2830A only)

Displays the main screen of the application that is selected using the Application Switch (Auto), or displays that of the pre-selected application (Manual).
For details, refer to 3.5.4 “Changing application layout” in *MS2830A Signal Analyzer Operation Manual (Mainframe Operation) or MS2850A Signal Analyzer Operation Manual (Mainframe Operation)*.

22

1st Local Output connector (MS2830A), (MS2850A: Future extensions)
This is installed with the MS2830A-044/045.
Supplies local signal and bias current to the external mixer, and receives the IF signal with its frequency converted.

2.1.2 Rear panel

This section describes the rear-panel connectors.

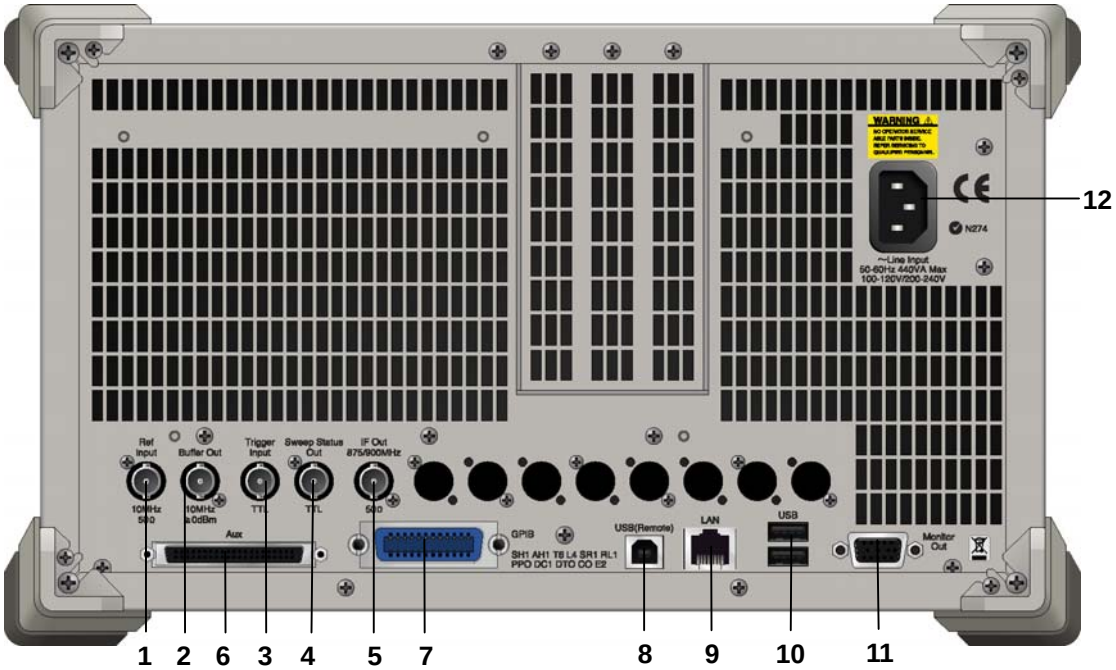


Figure 2.1.2-1 MS269x series rear panel

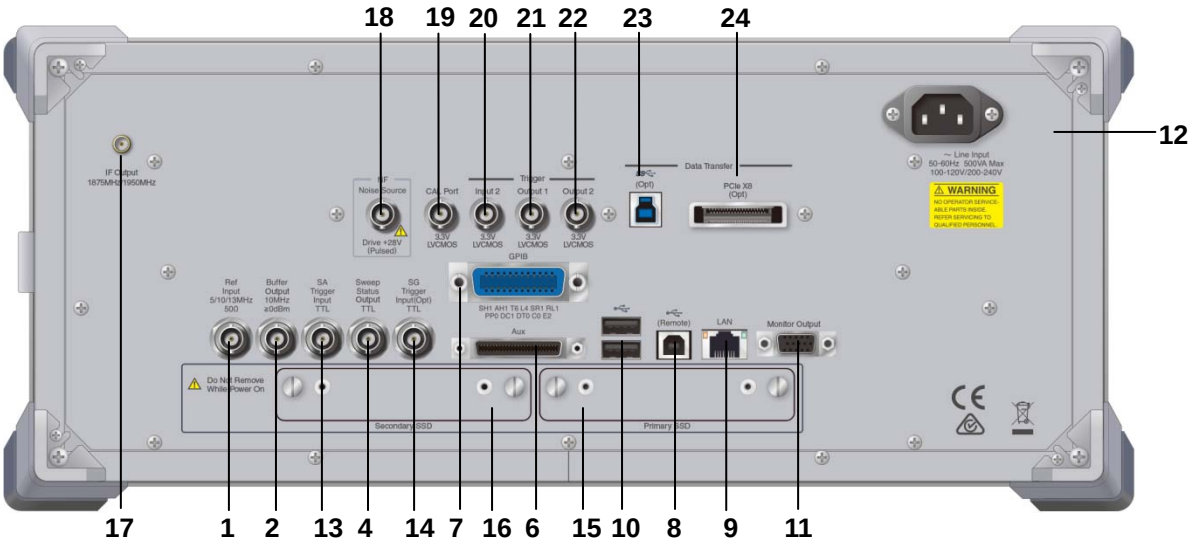


Figure 2.1.2-2 MS2830A/MS2850A rear panel (MS2850A Example)

1

Ref Input connector (reference frequency signal input connector)

Inputs external reference frequency signal. It is for inputting reference frequency signals with higher accuracy than the instrument's internal reference signal, or for synchronizing the frequency of the MS2690A/MS2691A/MS2692A or MS2830A, MS2850A to that of other equipment. The following frequencies are supported:

MS269x series:	10 MHz/13 MHz
MS2830A, MS2850A:	5 MHz/10 MHz/13 MHz

2

Buffer Out connector (reference frequency signal output connector)

Outputs the internal reference frequency signal (10 MHz). It is for synchronizing frequencies between other equipment and the MS2690A/MS2691A/MS2692A or MS2830A, MS2850A.

3

Trigger Input connector (MS269x series only)

Inputs trigger signal from external device.

4

Sweep Status Out connector

Outputs signal when internal measurement is performed or measurement data is obtained.

5

IF Out connector (MS269x series only)

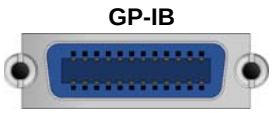
Not used.

6

AUX connector

Not used.

7



GPIB connector

For external control via GPIB.

8 USB(Remote)

USB connector (type B)
For external control via USB.

9 LAN

Ethernet connector
Connects PC or Ethernet network.

10 USB

USB connector (type A)
Used to connect a USB keyboard or mouse or the USB memory supplied.

11 **Monitor Out**

Monitor Out connector
Connects external display.

12

AC inlet
Supplies power.

13

SA Trigger Input connector (MS2830A, MS2850A)
This is a BNC connector for inputting external trigger signal (TTL) for SPA and SA applications.

14

SG Trigger Input connector (MS2830A)
This is a BNC connector for inputting external trigger signal (TTL) for Vector Signal Generator option.

15	**HDD** or **Primary HDD/SSD**	HDD slot (MS2830A) SSD slot (MS2850A)	This is a standard HDD slot. This is a standard SSD slot.
16	**HDD(Opt)** or **Secondary HDD/SSD**	HDD slot for Option (MS2830A) SSD slot (MS2850A)	This is a HDD slot for the options. This is a SSD slot for the options.

17

IF output connector (MS2830A, MS2850A)
This is installed with the MS2830A-044/045 or on the MS2850A.
Monitor output of the internal IF signal.

18

Noise Source connector
Supply (+28 V) of the Noise Source Drive.
This is available when the Option 017/117 is installed.

19

CAL Port connector (Future extensions) (MS2850A)

20

Trigger Input 2 connector (MS2850A)
Input the trigger signal (3.3 V LVCMOS) for SPA and SA applications.

21

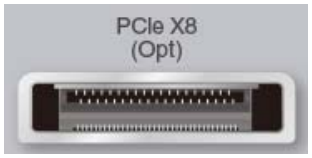
Trigger Output 1 connector (MS2850A)
Output the trigger signal (3.3 V LVCMOS).

22

Trigger Output 2 connector (MS2850A)
Output the trigger signal (3.3 V LVCMOS).

23

USB 3.0 connector (Future extensions) (MS2850A)

24 

PCIe X8 connector (Future extensions) (MS2850A)

2.2 Signal Path Setup

As shown in Figure 2.2-1, connect the instrument and the DUT using an RF cable, so that the signal to be tested is input to the RF Input connector. To prevent an excessive level signal from being input, do not input the signal before setting the input level using this application.

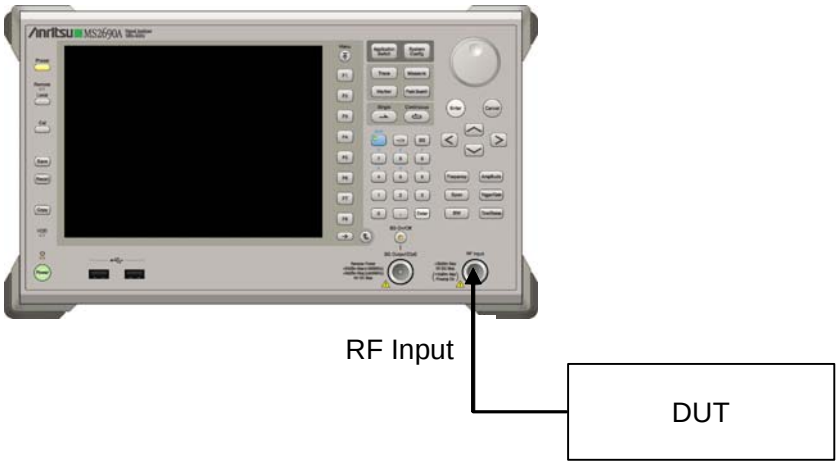


Figure 2.2-1 Signal path setup example

Set the reference signal and/or trigger signal paths from external sources, as required.

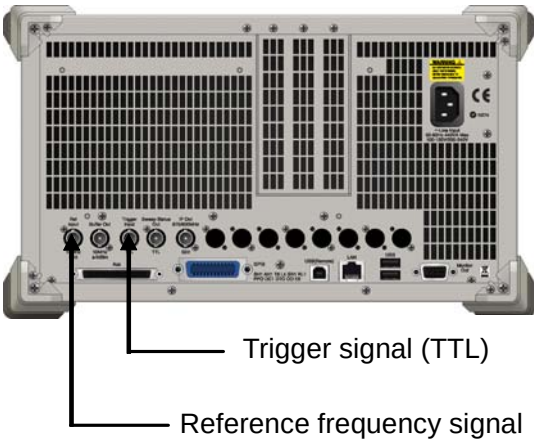


Figure 2.2-2 External signal input

2.3 Application Startup and Selection

To use this application, it is necessary to load (start up) and select the application.

2.3.1 Launching application

The application startup procedure is described below.

Note:

The XXX indicates the application name currently in use.

<Procedure>

1. Press [System Config] to display the Configuration screen.
2. Press [F4] (Application Switch Settings) to display the Application Switch Registration screen.
3. Press [F1] (Load Application Select), and move the cursor to "XXX" in the **Unloaded Applications** list.
   If "XXX" is displayed in the **Loaded Applications** list, this means that the application is already loaded.
   If "XXX" appears in neither the **Loaded Applications** nor **Unloaded Applications** list, this means that the application has not been installed.
4. Press [F7] (Set) to load the application. If "XXX" is displayed in the **Loaded Applications** list, this means that the application is already loaded.

2.3.2 Selecting application

The selection procedure is described below.

<Procedure>

1. Press [Application Switch] to display the Application Switch menu.
2. Press the menu function key displaying "XXX".

The application can also be selected with mouse, by clicking "XXX" on the task bar.

2.4 Initialization and Calibration

This section describes the parameter settings and the preparations required before starting measurement.

2.4.1 Initialization

After selecting this application, first perform initialization. Initialization returns the settable parameters to their default value in order to clear the measurement status and measurement results.

Note:

When another software application is switched to or this application is unloaded (ended), the application keeps the parameter settings at that time. The parameter values that were last set will be applied when this application is selected next time.

The initialization procedure is as follows.

<Procedure>

1. Press Preset to display the Preset function menu.
2. Press F1 (Preset).

2.4.2 Calibration

Perform calibration before performing measurement. Calibration sets the level accuracy frequency characteristics for the input level to flat, and adjusts level accuracy deviation caused by internal temperature fluctuations. Calibration should be performed when first performing measurement after turning on power, or if beginning measurement when there is a difference in ambient temperature from the last time calibration was performed.

<Procedure>

1. Press Cal to display the Application Cal function menu.
2. Press F1 (SIGANA All).

For details on calibration functionality only executable with this instrument, refer to the *MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Operation), MS2830A Signal Analyzer Operation Manual (Mainframe Operation)*or *MS2850A Signal Analyzer Operation Manual (Mainframe Operation)*.

Chapter 3 Measurement

This chapter describes the measurement function, the parameter contents and the setting methods for the MX269013A.

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3.1 Basic Operation

3.1.1 Screen Layout

This section describes the screen layout of the MX269013A.

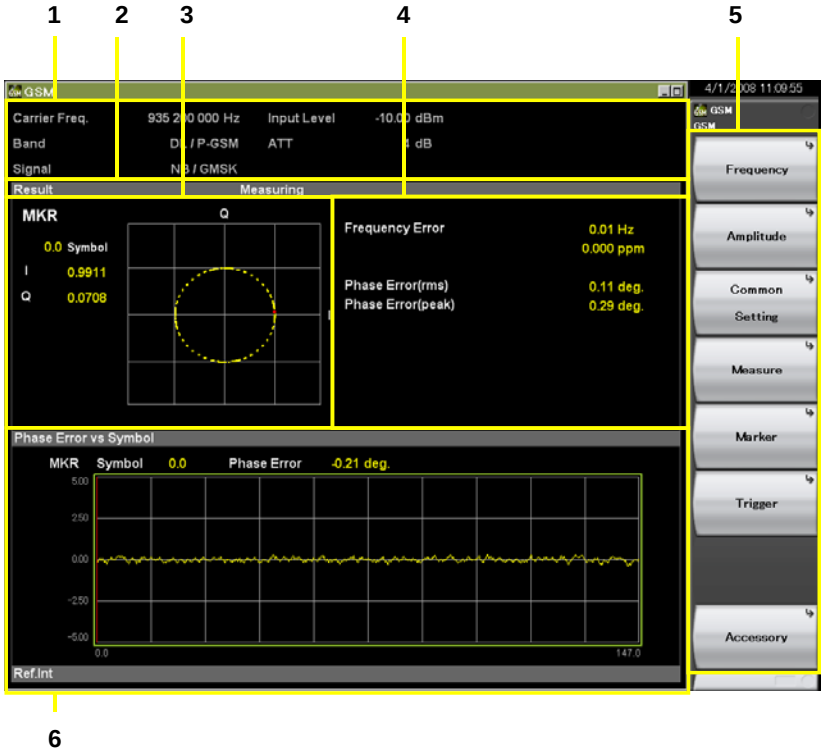

Figure 3.1.1-1 Screen Layout (Modulation Analysis)

1. **Measurement parameters**
   Displays configured parameters.

2. **Status message**
   Displays signal status.

3. **Upper Graph window**
   Displays a graph of measurement results.

4. **Result window**
   Displays the numeric results.

5. **Function menu**
   Displays the functions executable with function keys.

6. **Bottom Graph window**
   Displays a graph of measurement results.

3.1.2 Performing Measurement

There are two measurement modes: single and continuous. Measurement is performed once in the single measurement mode, and continuously in the continuous measurement mode.

■ Single measurement

The selected measurement items are measured only for the measurement count (Storage Count) before measurement is stopped.

1. Press Single.

When a Single measurement is completed, this application completes measurement for the selected measurement screen and stops operation. When changing to another measurement screen in this condition, the results for this measurement are displayed.

■ Continuous measurement

Updates the measurement results after each measurement.
Press Single to end continuous measurement.

Measurement will continue even if parameters are changed or the window display is changed. Measurement stops if other applications are selected.

1. Press Continuous.

3.2 Setting Frequency (Carrier Frequency)

This sets carrier frequency of measurement target.

3.2.1 Setting ARFCN

When setting ARFCN, the value matching the Band and RF signal settings is set as the carrier frequency.

> ***Note:*** Absolute Radio Frequency Channel Number (ARFCN)
> The carrier frequency is set using the Band and ARFCN settings.
> ☞3.4.2 Setting Frequency Band (Band)

■ Procedure

1. Press **Frequency** on the main function menu to display the Frequency function menu.
2. Press **ARFCN** to open the **ARFCN** dialog box.
3. Input the **ARFCN** value.
4. Press **Set** to input the input value.

■ Setting Options

If ARFCN is out of range, the carrier frequency is changed to the specified default value for the band.

Table 3.2.1-1 ARFCN Setting Range

Band	Setting Range	Default
P-GSM	1 to 124	1
E-GSM	0 to 124, 975 to 1023	0
R-GSM	0 to 124, 955 to 1023	0
GSM450	259 to 293	259
GSM480	306 to 340	306
GSM750	438 to 511	438
GSM850	128 to 511	128
DCS1800	512 to 885	512
PCS1900	512 to 810	512

> ***Note:*** The ARFCN setting range varies according to the Band setting.
> ☞3.4.2 Setting Frequency Band (Band)

3.2.2 Setting Carrier Frequency (Carrier Frequency)

■ Procedure

1. Open the **Carrier Frequency** dialog box.
   Open the dialog box as shown below.
   - Pressing **Frequency** > **Carrier Frequency** on the main function menu opens the **Carrier Frequency** dialog box.
   - Pressing [Frequency] on the front panel displays the Frequency function menu and opens the **Carrier Frequency** dialog box.
2. Input the carrier frequency of measurement target.
3. Press either a unit button (**GHz**, **MHz**, **kHz**, **Hz**) for the input carrier frequency, or the **Set** button to set the input value.
4. When setting the carrier frequency, the carrier frequency input at the measurement parameters is displayed.

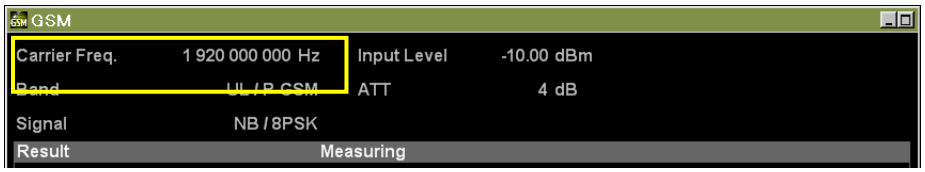

Figure 3.2.2-1 Carrier Frequency Setting Example

■ Setting Options

The range of settable carrier frequencies differs according to the equipment model on which this application is running.

Range: 10 MHz to the upper limit of the main unit

3.3 Setting Input Level (Amplitude)

This section describes how to configure input level parameters of signal to be measured.

⚠ CAUTION

Do not input signals with excessive power to the RF Input, because it does not have an over-power protection circuits. Input of out-of-specification signal power or impression of DC voltage risks damaging internal parts.

Refer to "MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Operation)", "MS2830A Signal Analyzer Operation Manual (Mainframe Operation)", or "MS2850A Signal Analyzer Operation Manual (Mainframe Operation)" for details.

☞ 2.2.2 Input Level and Reverse Power (When Vector Signal Generator is Installed) to RF Input

3.3.1 Setting Input Level

This sets the input level of measurement target.

■ Procedure

1. Open the **Input Level** dialog box.
   Open the dialog box as shown below.
   - Pressing **Amplitude** > **Input Level** on the main function menu opens the **Input Level** dialog box.
   - Pressing [Amplitude] on the front panel displays the Amplitude function menu and opens the **Input Level** dialog box.
2. Set the input level of measurement target.
3. Press either the **dBm** units button for the input signal, or the **Set** button to set the input value.
4. When setting the input level, the input level is displayed in the measurement parameters.

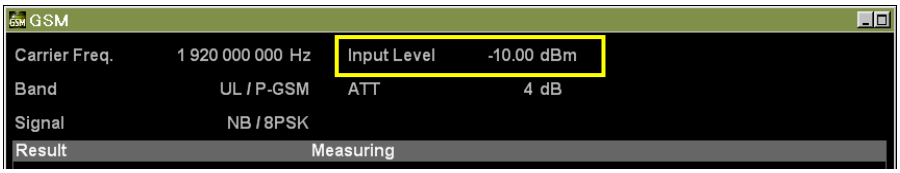

Figure 3.3.1-1 Input Level Setting Example

■ Setting Range

The range of settable input levels differs according to the Offset and Pre-Amp settings.

☞3.3.2 Amplifying Input Level (Pre-Amp)
☞3.3.3 Correcting Input Level (Offset)

Table 3.3.1-1 Input Level Range

Offset Setting	Off		On	
Pre-Amp Setting	**Off**	**On**	**Off**	**On**
Minimum Value	–60.00 dBm	–80.00 dBm	–60.00 dBm + Offset Value	–80.00 dBm + Offset Value
Maximum Value	30.00 dBm	10.00 dBm	30.00 dBm + Offset Value	10.00 dBm + Offset Value

3.3.2 Amplifying Input Level (Pre-Amp)

The input level amplification is set using the MS2690A/MS2691A/MS2692A-008/108 6 GHz Preamplifier, MS2830A-008/108 Preamplifier, or MS2850A-068/168 Preamplifier (hereinafter referred to as "Option 008").

> ***Note:*** Pre-Amp can be set only when Option 008 is installed.

■ Procedure

1. Enable or disable the function by pressing **Amplitude** > **Pre-Amp** on the main function menu.
2. When **Pre-Amp** is set, the Option 008 amplification value is reflected at ATT of the measurement parameters and the Pre-Amp On/Off status is displayed at the bottom of the screen.

■ Setting Options

Table 3.3.2-1 Pre-Amp Options

Settings	Description
On	Enables Option 008 functions and improves level sensitivity up
Off	Disables Option 008 functions

3.3.3 Correcting Input Level (Offset)

This is used to correct the input level of the DUT signal when it is attenuated by the customer's attenuator, cables, etc.

> ***Note:*** The correction set at Correction at the System Config. Screen is used irrespective of this setting.
> For details, refer to the "MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual", "MS2830A Signal Analyzer Operation Manual", or "MS2850A Signal Analyzer Operation Manual".

■ Procedure

1. Enable or disable the function by pressing **Amplitude** > **Offset** on the main function menu.

> ***Note:*** When On (correct input level) is selected, specify the input level correction offset.
> ☞ 3.3.4 Setting Input Level Correction (Offset Value)

2. When Offset is set, the set Offset Value is reflected in Offset of the measurement parameters.

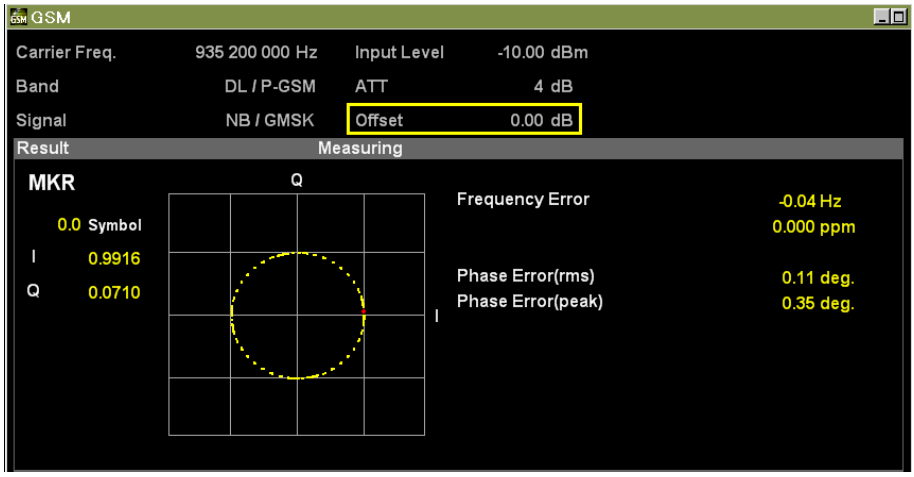

Figure 3.3.3-1 Sample Offset Setting

■ Setting Options

Table 3.3.3-1 Offset Options

Settings	Description
On	Enables Offset function and corrects input level
Off	Disables the offset function.

3.3.4 Setting Input Level Correction (Offset Value)

This is used to set the input level of the signal attenuated by the customer's attenuator, cable, etc.

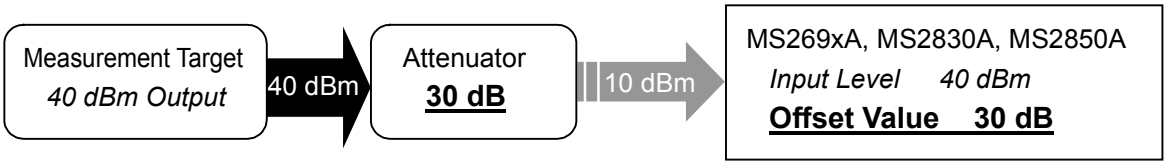

Figure 3.3.4-1 Outline of Input Level and Offset Value Settings

■ Procedure

1. Press **Amplitude** at the main function menu and press **Offset Value** to display the current Offset Value in the measurement parameters.
2. Press the numeric keypads and input the correction offset value in the **Offset Value** dialog box.

> ***Note:*** When the numeric keypads are pressed, the **Offset Value** dialog box opens automatically.

3. Press either the **dB** units button or **Set** to set the input value.
4. When the Offset Value is set, it is reflected in Offset in the measurement parameters.

■ Setting Options

Table 3.3.4-1 Offset Value Options

Settings	Description
Maximum Value	99.99 dB
Minimum Value	–99.99 dB

3.3.5 Auto configuration of input level (Auto Range)

This function adjusts input level according to input signal.

■ Procedure

1. This function optimizes Carrier Frequency and Pre-Amp according to the input signal.
2. Press **Amplitude** at the main function menu and press **Auto Range** to adjust the Input Level according to input signal.

3.3.6 Changing lower limit for attenuator (Lowest ATT Setting)

The lower limit for the attenuator, which is automatically adjusted according to the Input Level setting, can be changed manually. This is required if an external attenuator is used and the level of the signal input to the measuring instrument becomes less than the measurement level range.

■ Procedure

1. Press **Amplitude** on the main function menu, and then press **Lowest ATT Setting** to select 4 dB or 0 dB.
2. When **Offset** is set, the set **Offset Value** is applied to the **Offset** measurement parameter.

■ Setting Options

Table 3.3.6-1 Lowest ATT Setting Options

Settings	Setting Description
4 dB	Set the lower limit for ATT to 4 dB.
0 dB	Set the lower limit for ATT to 0 dB.

3.4 Setting Common Items (Common Setting)

This section explains how to set common items.

3.4.1 Setting Input Signal Direction (Signal Direction)

This sets the input signal from the measurement target as either a downlink or uplink signal.

■ Procedure

1. Press **Common Setting** on the main function menu to display the **Common Setting** function menu.
2. Press **Signal Direction** to switch to DL or UL.

■ Setting Options

Table 3.4.1-1 Signal Direction Setting Options

Settings	Description
DL	Select this for downlink input signal.
UL	Select this for uplink input signal.

3.4.2 Setting Frequency Band (Band)

This sets the frequency band of measurement target.

■ Procedure

1. Press **Common Setting** on the main function menu to display the **Common Setting** function menu.
2. Press **Band** to display the **Band** dialog box.
3. Select the frequency band and press **Set**.

■ Setting Options

Table 3.4.2-1 Band Setting Options

Settings	Description
P-GSM	Displays standard for Primary GSM 900 band
E-GSM	Displays Extend GSM 900 band
R-GSM	Displays Railway GSM 900 band
GSM 450	Displays GSM 450 band
GSM 480	Displays GSM 480 band
GSM 750	Displays GSM 750 band
GSM 850	Displays GSM 850 band
DCS 1800	Displays DCS 1800 band
PCS 1900	Displays PCS 1900 band

3.4.3 Setting Burst Type (RF Signal)

This is used to set the burst type of the input signal.

Higher Symbol Rate Burst can be selected when Software Option 001 is enabled.

■ Procedure

1. Press **Common Setting** on the main function menu to display the **Common Setting** function menu.
2. Press **RF Signal** to display the **RF Signal** function menu.
3. Select the burst type.

■ Setting Options

Table 3.4.3-1 Burst Setting Range

Settings	Description
Normal Burst	Analyzes input signal as Normal Burst
Higher Symbol Rate Burst	Analyzes input signal as Higher Symbol Rate Burst
Continuous	Analyzes input signal as Continuous

3.4.4 Setting Modulation Method (Modulation)

This is used to set the modulation method of the input signal.

QPSK/16QAM/32QAM can be selected when Software Option 001 is enabled.

■ Procedure

1. Press **Common Setting** on the main function menu to display the **Common Setting** function menu.
2. Press **Modulation** to display the **Modulation** function menu.
3. Select the modulation method.

> ***Note:*** The setting range differs according to the RF Signal setting.
> ☞3.4.3 Setting Burst Type (RF Signal)

■ Setting options

RF Signal setting: Normal Burst/Continuous

Table 3.4.4-1 Modulation Setting Options

Settings	Description
GMSK	Analyzes input signal as GMSK modulation signal (GSM signal)
8PSK	Analyzes input signal as 8PSK modulation signal (EGPRS signal)
QPSK	Analyzes input signal as QPSK modulation signal (EGPRS2 signal)
16QAM	Analyzes input signal as 16QAM modulation signal (EGPRS2 signal)
32QAM	Analyzes input signal as 32QAM modulation signal (EGPRS2 signal)
AQPSK	Analyzes input signal as AQPSK modulation signal (VAMOS signal) Available only when DL is selected under Signal Direction.

RF Signal setting: Higher Symbol Rate Burst

Table 3.4.4-2 Modulation Setting Options

Settings	Description
QPSK	Analyses input signal as QPSK modulation signal (EGPRS2 signal)
16QAM	Analyses input signal as 16QAM modulation signal (EGPRS2 signal)
32QAM	Analyses input signal as 32QAM modulation signal (EGPRS2 signal)

3.4.5 Setting Sync Detection Method (Burst Sync)

This is used to set the DUT signal sync detection method.

■ Procedure

1. Press **Common Setting** on the main function menu to display the **Common Setting** function menu.
2. Press **Burst Sync** to display the **Burst Sync** dialog box.
3. Select the sync detection method and press the **Set** key.

■ Setting options

Table 3.4.5-1 Setting Options of Sync Detection Method

Settings	Description
Auto	Automatically detects first slot including any of TSC0 to TSC7 as start position
TSC0	Detects first slot including TSC0 as start position
TSC1	Detects first slot including TSC1 as start position
TSC2	Detects first slot including TSC2 as start position
TSC3	Detects first slot including TSC3 as start position
TSC4	Detects first slot including TSC4 as start position
TSC5	Detects first slot including TSC5 as start position
TSC6	Detects first slot including TSC6 as start position
TSC7	Detects first slot including TSC7 as start position

Notes:

- This setting is applied only when the RF Signal setting is set to either Normal Burst or Higher Symbol Rate Burst.
  ☞ 3.4.3 Setting Burst Type (RF Signal)
- When the modulation method is set to AQPSK, this setting specifies TSC number of VAMOS sub-channel A. TSC of VAMOS sub-channel B is ignored.

3.4.6 Setting Level Threshold (Active Slot Threshold)

This is used to set the slot detection level threshold value from the Input Level.

> ***Note:*** When using multislots, this is applied to detection of the head slot.

■ Procedure

1. Press **Common Setting** on the main function menu to display the **Common Setting** function menu.
2. Press **Active Slot Threshold** to display the **Active Slot Threshold** dialog box.
3. Set the active slot threshold, and then press **Set**.

■ Setting options

Table 3.4.6-1 Active Slot Threshold Setting Options

Item	Settings
Maximum Value	–10.0 dB
Minimum Value	–40.0 dB

3.4.7 Setting Slot Position (Measurement Offset)

This sets the position of the measured target burst slot, on which trigger input point is based (frame header), in slot units.

> ***Note:*** This setting is only enabled when Trigger Synchronization is set.
>
> ☞ 3.8 Setting Trigger (Trigger)

■ Procedure

1. Press **Common Setting** on the main function menu to display the **Common Setting** function menu.
2. Press **Measurement Offset** to display the **Measurement Offset** dialog box.
3. Set the slot count, and then press **Set**.

■ Setting options

Table 3.4.7-1 Measurement Offset Setting Options

Item	Settings
Maximum Value	7 slots
Minimum Value	0 slots

3.4.8 Setting Rotation Phase (Symbol Rotation)

This is used to set the symbol rotation phase.

> ***Note:*** This setting can only be set when Normal Burst is selected at RF Signal, and QPSK is selected at Modulation.
> ☞3.4.3 Setting Burst Type (RF Signal)
> ☞3.4.4 Setting Modulation Method (Modulation)

■ Procedure

1. Press **Common Setting** on the main function menu to display the **Common Setting** function menu.
2. Press **Symbol Rotation** to display the **Symbol Rotation** dialog box.
3. Set the rotation phase and press **Set**.

■ Setting options

Table 3.4.8-1 Symbol Rotation Setting Options

Settings	Description
π/2	Synchronizes to QPSK π/2 rotated phase
π/4	Synchronizes to QPSK π/4 rotated phase
3π/8	Synchronizes to QPSK 3π/8 rotated phase

3.4.9 Setting BTS Type (BTS Type)

This sets the BTS type for the measurement target. This parameter is referenced when the Standard template mask is used.

> ***Note:*** Base Transceiver Station (BTS)
> Available only when DL is selected under Signal Direction.
> ☞3.4.1 Setting Input Signal Direction (Signal Direction)

■ Procedure

1. Press **Common Setting** on the main function menu to display the **Common Setting** function menu.
2. Press → to display page 2 of the **Common Setting** function menu.
3. Press **BTS Type** to display the **BTS Type** function menu.
4. Select the BTS type.

> ***Note:*** The setting range differs according to the frequency band setting.
> ☞3.4.2 Setting Frequency Band (Band)

■ Setting options

Frequency band setting: GSM 450/GSM 480

Table 3.4.9-1 BTS Setting Options

Settings	Description
Normal BTS	Displays Normal BTS

Frequency band setting: Other than above

Table 3.4.9-2 BTS Setting Options

Settings	Description
Normal BTS	Set Normal BTS
Micro1 BTS	Sets Micro BTS (M1)
Micro2 BTS	Sets Micro BTS (M2)
Micro3 BTS	Sets Micro BTS (M3)
Pico BTS	Sets Pico BTS

3.4.10 Setting BTS Power Level (BTS Power Level)

This sets the BTS power level for the measurement target. This parameter is referenced when the Standard template mask is used.

> ***Note:*** Available only when DL is selected under Signal Direction.
> ☞3.4.1 Setting Input Signal Direction (Signal Direction)

■ Procedure

1. Press **Common Setting** on the main function menu to display the **Common Setting** function menu.
2. Press → to display page 2 of the **Common Setting** function menu.
3. Press **BTS Power Level** to display the **BTS Power Level** dialog box.
4. Set the BTS power level, and then press **Set**.

> ***Note:*** The setting range differs according to the frequency band and BTS type settings.
> ☞3.4.2 Setting Frequency Band (Band)
> ☞3.4.9 Setting BTS Type (BTS Type)

■ Setting options

Table 3.4.10-1 BTS Power Level Setting Options

BTS Type	Frequency Band	Settings (dBm)
Normal BTS	Not Specified	34 to 46
Micro1 BTS	P-GSM, E-GSM, R-GSM GSM750, GSM850	19 to 24
	DCS1800, PCS1900	27 to 32
Micro2 BTS	P-GSM, E-GSM, R-GSM GSM750, GSM850	14 to 19
	DCS1800, PCS1900	22 to 27
Micro3 BTS	P-GSM, E-GSM,R-GSM GSM750, GSM850	9 to 14
	DCS1800, PCS1900	17 to 22
Pico BTS	P-GSM, E-GSM,R-GSM GSM750, GSM850	13 to 20
	DCS1800, PCS1900	16 to 23

3.4.11 Setting SCPIR (SCPIR)

This sets the SCPIR for the measurement target. This parameter is referenced when synchronizing the input signal.

> ***Note:*** Subchannel Power Imbalance Ratio (SCPIR)
> ***Note:*** Available only when AQPSK is selected under Modulation Method.
> ☞3.4.4 Setting Modulation Method (Modulation)

■ Procedure

1. Press **Common Setting** on the main function menu to display the **Common Setting** function menu.
2. Press → to display page 2 of the **Common Setting** function menu.
3. Press **SCPIR** to display the **SCPIR** dialog box.
4. Set the SCPIR, and then press **Set**.

■ Setting options

Table 3.4.11-1 SCPIR Setting Options

Settings	Description
Maximum Value	10.00 dB
Minimum Value	–10.00 dB
Default	0.00 dB

3.4.12 Setting Pulse Shaping Filter (Pulse Shaping)

This sets the type of Pulse Shaping filter applied to the DUT signal.

> ***Note:*** This setting can only be set when UL (Uplink) is selected at Signal Direction and RF Signal is set to Higher Symbol Rate Burst.
>
> ☞3.4.1 Setting Input Signal Direction (Signal Direction)
> ☞3.4.3 Setting Burst Type (RF Signal)

■ Procedure

1. Press **Common Setting** on the main function menu to display the **Common Setting** function menu.
2. Press → to display page 2 of the **Common Setting** function menu.
3. Press **Pulse Shaping**, and switch to **Narrow** or **Wide**.

■ Setting Options

Table 3.4.12-1 Pules Shaping Setting Options

Settings	Description
Narrow	Sets to narrow-band filter
Wide	Sets to wideband filter

3.4.13 Setting Power Control Level (Power Control Level)

This sets the MS power control levels for the measurement target. This parameter is referenced when the Standard template mask is used.

> ***Note:*** Available only when UL is selected under Signal Direction.
> ☞3.4.1 Setting Input Signal Direction (Signal Direction)

■ Procedure

1. Press **Common Setting** on the main function menu to display the **Common Setting** function menu.
2. Press → to display page 2 of the **Common Setting** function menu.
3. Press **Power Control Level** to display the **Power Control Level** dialog box.
4. Set the power control level, and then press **Set**.

■ Setting Options

Table 3.4.13-1 Power Control Level Setting Options

Item	Settings
Maximum Value	31
Minimum Value	0

■ Setting Parameter

Table 3.4.13-2 Power Control Level Setting Parameter

Frequency Band	Settings	Description
P-GSM E-GSM R-GSM GSM 450 GSM 480 GSM 750 GSM 850	0 to 2	39 dBm
	3	37 dBm
	4	35 dBm
	5	33 dBm
	6	31 dBm
	7	29 dBm
	8	27 dBm
	9	25 dBm
	10	23 dBm
	11	21 dBm
	12	19 dBm
	13	17 dBm
	14	15 dBm
	15	13 dBm
	16	11 dBm
	17	9 dBm
	18	7 dBm
	19 to 31	5 dBm

■ Setting Parameter

Table 3.4.13-3 Power Control Level Setting Parameter

Frequency Band	Settings	Description
DCS 1800	0	30 dBm
	1	28 dBm
	2	26 dBm
	3	24 dBm
	4	22 dBm
	5	20 dBm
	6	18 dBm
	7	16 dBm
	8	14 dBm
	9	12 dBm
	10	10 dBm
	11	8 dBm
	12	6 dBm
	13	4 dBm
	14	2 dBm
	15 to 28	0 dBm
	29	36 dBm
	30	42 dBm
	31	32 dBm

■ Setting Parameter

Table 3.4.13-4 Power Control Level Setting Parameter

Frequency Band	Settings	Description
PCS 1900	0	30 dBm
	1	28 dBm
	2	26 dBm
	3	24 dBm
	4	22 dBm
	5	20 dBm
	6	18 dBm
	7	16 dBm
	8	14 dBm
	9	12 dBm
	10	10 dBm
	11	8 dBm
	12	6 dBm
	13	4 dBm
	14	2 dBm
	15	0 dBm
	30	33 dBm
	31	32 dBm

3.5 Setting Measurement Items (Measure)

3.5.1 Modulation Analysis (Modulation Analysis)

This sets the modulation analysis.

3.5.1.1 Setting Averaging Display Method (Storage Mode)

This sets the averaging display method.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Modulation Analysis** to display the **Modulation Analysis** function menu.
3. On the **Modulation Analysis** function menu, press **Trace** to display the **Trace** function menu.
4. Press **Storage** to display the **Storage** function menu.
5. Press **Mode** to display the **Mode** dialog box.
6. Set the display mode, and then press **Set**.
7. The Storage Mode setting is reflected in the Result windows.

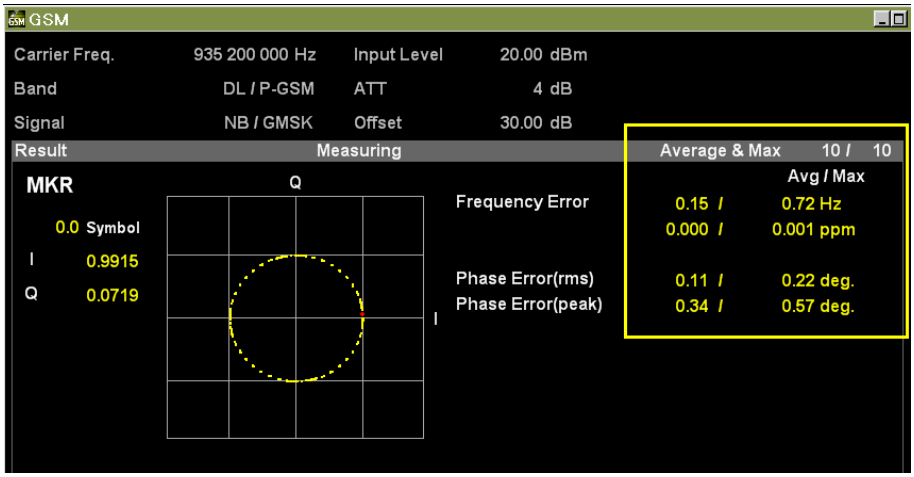

Figure 3.5.1.1-1 Storage Mode Setting Sample

■ Setting Options

Table 3.5.1.1-1 Storage Mode Setting Options

Settings	Description
Off	Displays the numerical results in a single measurement.
Average	Displays the average for specified number of measurements.
Average & Max	Displays the average and maximum for specified number of measurements.

3.5.1.2 Setting Average Storage Count (Storage Count)

This sets average storage count.

> ***Note:*** This is enabled only when Average or Average & Max is selected at Storage Mode.
> ☞3.5.1.1 Setting Averaging Display Method (Storage Mode)

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Modulation Analysis** to display the **Modulation Analysis** function menu.
3. Press **Trace** to display the **Trace** function menu.
4. Press **Storage** to display the **Storage** function menu.
5. Press **Count** to display the **Storage Count** dialog box.
6. Input the average storage count, and then press **Set**.
7. The Storage Count setting is reflected in the Result window.

■ Setting Options

Table 3.5.1.2-1 Storage Count Setting Options

Item	Settings
Maximum Value	9999
Minimum Value	2

3.5.1.3 Setting Averaging Calculation Method (Average Type)

This sets the Origin Offset averaging calculation method.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Modulation Analysis** to display the **Modulation Analysis** function menu.
3. Press **Trace** to display the **Trace** function menu.
4. Press **Storage** to display the **Storage** function menu.
5. Press **Average Type** and switch to **Pwr** or **Log-Pwr**.

■ Setting Options

Table 3.5.1.3-1 Average Type Setting Options

Settings	Description
Pwr	Performs RMS averaging
Log-Pwr	Performs log base 10 mean averaging

Note: This setting can only be set when parameter other than GMSK is selected at Modulation.

☞ 3.4.4 Setting Modulation Method (Modulation)

3.5.1.4 Setting Measurement Results (Trace Mode)

Selects a graphical result in the Bottom Graph window.

■ Procedure

1. Press **Trace** (Trace) to display the **Trace** function menu.
2. Press **Trace Mode** to display the **Trace Mode** function menu.
3. Select the measurement results display contents.
4. The Trace Mode settings are displayed at the bottom of the graph.

Figure 3.5.1.4-1 Trace Mode Setting Sample

■ Setting Options

Modulation: GMSK

Table 3.5.1.4-1 Trace Mode Setting Options

Settings	Description
Phase Error vs Symbol	Displays phase error values for each Symbol at bottom of graph window

Modulation: 8PSK/QPSK/16QAM/32QAM/AQPSK

Table 3.5.1.4-2 Trace Mode Setting Options

Settings	Description
EVM vs Symbol	Displays EVM value for each Symbol at bottom of graph window
Mag. Error vs Symbol	Displays Amplitude Error for each Symbol at bottom of graph window
Phase Error vs Symbol	Displays Phase Error for each Symbol ay bottom of graph window

3.5.1.5 Setting Graph Vertical Axis Scale (Scale)

Sets vertical scale for the graphical result in the Bottom Graph window.

■ Procedure

1. Press **Trace** (Trace) to display the **Trace** function menu.
2. Press **Scale** and select the graph vertical scale.
3. The Scale setting is reflected at the bottom of the graph window.

Figure 3.5.1.5-1 Scale Setting Sample

■ Setting Options

Table 3.5.1.5-1 Scale Setting Options

Graph	Settings	Description
EVM vs Symbol	5%, 10%, **20%, 50%**	Select EVM vs Symbol graph scale upper limit. Lower limit fixed at 0%.
Mag. Error vs Symbol	±5%, ±10%, ±20%, **±50%**	Select Mag Error vs Symbol graph scale upper and lower limits based on 0.
Phase Error vs Symbol	±5 degree ±10 degree ±20 degree ±50 degree	Phase Error vs Symbol Selects upper limit of scale based on 0 degrees

3.5.1.6 Setting Correction On/Off (Droop)

This is used to set whether or not to perform Droop correction at EVM calculation.

> ***Note:*** Droop correction can only be set when Modulation of Common settings is set to GMSK.
> ☞ 3.4.4 Setting Modulation Method (Modulation)

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Modulation Analysis** to display the **Modulation Analysis** function menu.
3. Enable or disable by pressing **Droop**.

■ Setting Options

Table 3.5.1.6-1 Droop Setting Options

Settings	Description
On	Enables Droop correction at EVM calculation
Off	Disables Droop correction at EVM calculation

3.5.2 Output Spectrum Measurement (Output RF Spectrum)

This sets output spectrum measurement.

3.5.2.1 Setting Averaging Display Method (Storage Mode)

This sets the averaging display method.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Output RF Spectrum** to display the **Output RF Spectrum** function menu.
3. Press **Trace** to display the **Trace** function menu.
4. Press **Storage** to display the **Storage** function menu.
5. Press **Mode** to display the **Mode** dialog box.
6. Set the display mode, and then press **Set**.

■ Setting Options

Table 3.5.2.1-1 Storage Mode Setting Options

Settings	Description
Off	This does not display Average.
On	This displays Average.

3.5.2.2 Setting Average Storage Count (Storage Count)

This sets average storage count.

> ***Note:*** Available only when On is selected in Storage Mode.
> ☞ 3.5.2.1 Setting Averaging Display Method (Storage Mode)

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Output RF Spectrum** to display the **Output RF Spectrum** function menu.
3. Press **Trace** to display the **Trace** function menu.
4. Press **Storage** to display the **Storage** function menu.
5. Press **Count** to display the **Storage Count** dialog box.
6. Input the average storage count, and then press **Set**.

■ Setting options

Table 3.5.2.2-1 Storage Count Setting Options

Item	Settings
Maximum Value	9999
Minimum Value	2

3.5.2.3 Setting Measurement Results Type (Trace Mode)

This sets the type of measurement results displayed on the screen.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Output RF Spectrum** to display the **Output RF Spectrum** function menu.
3. Press **Trace** to display the **Trace** function menu.
4. Press **Trace Mode** to display the **Trace Mode** function menu.
5. Select the type of measurement results.

■ Setting Options

Table 3.5.2.3-1 Trace Mode Setting Options

Settings	Description
Modulation	Displays burst signal modulation part as graph
Switching	Displays burst signal transient value (peak) as graph
Numeric	Displays all numeric results of Modulation and Switching

3.5.2.4 Setting Graph Vertical Axis Units (Unit)

This sets the units of the graph vertical axis.

> ***Note:*** This setting is only enabled when Modulation or Switching is selected at Trace Mode.
> ☞ 3.5.2.3 Setting Measurement Results Type (Trace Mode)

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Output RF Spectrum** to display the **Output RF Spectrum** function menu.
3. Press **Trace** to display the **Trace** function menu.
4. Press **Unit**, and switch to **dB** or **dBm**.

■ Setting Options

Table 3.5.2.4-1 Unit Setting Options

Settings	Description
dB	Displays vertical axis in dB units
dBm	Displays vertical axis in dBm units

3.5.2.5 Setting Template Mask Type (Select Mask)

This sets the Template Mask applied to Output RF Spectrum measurement.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Output RF Spectrum** to display the **Output RF Spectrum** function menu.
3. Press **Select Mask**, and switch to **Standard** or **User**.

■ Setting Options

Table 3.5.2.5-1 Select Mask Setting Options

Settings	Description
Standard	Uses mask defined by standards according to set parameters
User	Uses user-defined mask (Mask Setup – User)

3.5.2.6 Setting Template Mask Type (Select Table)

This sets the type of template mask displayed in the Mask Setup window.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Output RF Spectrum** to display the **Output RF Spectrum** function menu.
3. Press **Mask Setup** to display the **Mask Setup** function menu.
4. Select the template mask type.

■ Setting Options

Table 3.5.2.6-1 Select Table Setting Options

Settings	Description
Select Table Modulation	Set for Modulation displaying and editing
Select Table Switching	Set for Switching displaying and editing

3.5.2.7 Setting User Mask (Limit Setup-Modulation)

This sets the user template mask settings applied to Modulation measurement of Output RF Spectrum measurement.

> ***Note:*** Mask user settings are not initialized by Preset.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Output RF Spectrum** to display the **Output RF Spectrum** function menu.
3. Press **Mask Setup** to display the **Mask Setup** dialog box.
4. Input REL Limit value, and press the unit button **dB**.
5. Input ABS Limit value, and press the unit button **dBm**.
6. Select the Fail Logic setting.
7. Press **Set** to input the input value.

> ***Note:*** The default display for the **Mask Setup** dialog box is Modulation.

■ Setting Options

Table 3.5.2.7-1 REL Limit Setting Options

Item	Settings
Maximum Value	99.99 dB
Minimum Value	–99.99 dB

Table 3.5.2.7-2 ABS Limit Setting Options

Item	Settings
Maximum Value	99.99 dBm
Minimum Value	–99.99 dBm

Table 3.5.2.7-3 Fail Logic Setting Options

Settings	Description
ABS	Conducts Pass/Fail judgment using the ABS Limit [dBm] setting.
REL	Conducts Pass/Fail judgment using the REL Limit [dB] setting.
ABS or REL	Evaluated as Pass when either of ABS Limit(dBm) or REL Limit(dB) drops below standard value
Off	Disables Pass/Fail evaluation

3.5.2.8 Setting User Mask (Limit Setup-Modulation)

This sets the user template mask settings applied to Switching measurement of Output RF Spectrum measurement.

> ***Note:*** Mask user settings are not initialized by Preset.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Output RF Spectrum** to display the **Output RF Spectrum** function menu.
3. Press **Mask Setup** to display the **Mask Setup** dialog box.
4. Press **Select Table Switching** to switch the display.
5. Input REL Limit value, and press the unit button **dB**.
6. Input ABS Limit value, and press the unit button **dBm**.
7. Select the Fail Logic setting.
8. Press **Set** to input the input value.

> ***Note:*** The default display for the **Mask Setup** dialog box is Modulation.

■ Setting Options

Table 3.5.2.8-1 REL Limit Setting Options

Item	Settings
Maximum Value	99.99 dB
Minimum Value	–99.99 dB

Table 3.5.2.8-2 ABS Limit Setting Options

Item	Settings
Maximum Value	99.99 dBm
Minimum Value	–99.99 dBm

Table 3.5.2.8-3 Fail Logic Setting Options

Settings	Description
ABS	Conducts Pass/Fail judgment using the ABS Limit [dBm] setting.
REL	Conducts Pass/Fail judgment using the REL Limit [dB] setting.
ABS or REL	Evaluated as Pass when either of ABS Limit (dBm) or REL Limit (dB) drops below standard value
Off	Disables Pass/Fail evaluation

3.5.2.9 Changing Mask Settings Defined in Standards (Mask Setup-Load Standard Setting)

This reads the mask setting defined in the standard into the user setting mask value.

This operation is executed for both the Modulation and Switching settings.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Output RF Spectrum** to display the **Output RF Spectrum** function menu.
3. Press **Mask Setup** to display the **Mask Setup** dialog box.
4. Press **Load Standard Setting** to change the settings of the mask defined in the standards according to the parameter settings.
5 Press **Set** to enter the input value.

3.5.2.10 Setting RBW used for 1800-kHz offset measurement (1800kHz Offset RBW)

The RBW used for measuring the power with a 1800 kHz frequency offset during spectrum due to modulation measurement can be set.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Output RF Spectrum** to display the **Output RF Spectrum** function menu.
3. Press **1800kHz Offset RBW**, and then specify 30 kHz or 100 kHz.

■ Setting options

Table 3.5.2.10-1 1800kHz Offset RBW Setting Options

Setting	Description
30 kHz	Uses 30-kHz RBW for measuring the power with a frequency offset of 1,800 kHz.
100 kHz	Uses 100-kHz RBW for measuring the power with a frequency offset of 1,800 kHz.

3.5.2.11 Noise Cancel

This sets whether to perform Noise Cancel at the Output RF Spectrum measurement.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Output RF Spectrum** to display the **Output RF Spectrum** function menu.
3. Press **Trace** to display the **Trace** function menu.
4. Press **Noise Cancel** to switch to **On** or **Off**.

■ Setting options

Table 3.5.2.11-1 Setting Range of Noise Cancel

Setting	Description
On	Sets Noise Cancel.
Off	Does not set Noise Cancel.

3.5.2.12 Reference mode for switching

This sets Reference Power for the Switching measurement in the Output RF Spectrum measurement.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Output RF Spectrum** to display the **Output RF Spectrum** function menu.
3. Press Reference mode for switching and switch to rms or peak.

■ Setting options

Table 3.5.2.12-1 Setting Range of Reference mode for switching

Setting	Description
rms	Sets the power measured at Detection=RMS to the Reference Power at the Output RF Spectrum measurement.
peak	Sets the power measured at Detection=Peak to the Reference Power at the Output RF Spectrum measurement.

3.5.3 Power vs Time Measurement (Power vs Time)

This sets the power output versus time measurement.

3.5.3.1 Setting Averaging Display Method (Storage Mode)

This sets the averaging display method.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Power vs Time** to display the **Power vs Time** function menu.
3. Press **Trace** to display the **Trace** function menu.
4. Press **Storage** to display the **Storage** function menu.
5. Press **Mode** to display the **Mode** dialog box.
6. Set the display mode, and then press **Set**.

■ Setting options

Table 3.5.3.1-1 Storage Mode Setting Options

Settings	Description
Off	Average not displayed
On	Average displayed

3.5.3.2 Setting Average Storage Count (Storage Count)

This sets the average storage count.

> ***Note:*** This setting is only enabled when On is selected at Storage Mode.
> ☞3.5.3.1 Setting Averaging Display Method (Storage Mode)

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Power vs Time** to display the **Power vs Time** function menu.
3. Press **Trace** to display the **Trace** function menu.
4. Press **Storage** to display the **Storage** function menu.
5. Press **Count** to display the **Storage Count** dialog box.
6. Input the average storage count, and then press **Set**.

■ Setting Options

Table 3.5.3.2-1 Storage Count Setting Options

Item	Settings
Maximum Value	9999
Minimum Value	2

3.5.3.3 Setting Averaging Calculation Method (Average Type)

This sets the type of averaging calculation method.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Power vs Time** to display the **Power vs Time** function menu.
3. Press **Trace** to display the **Trace** function menu.
4. Press **Storage** to display the **Storage** function menu.
5. Press **Average Type** and switch to **Pwr** or **Log-Pwr**.

■ Setting Options

Table 3.5.3.3-1 Average Type Setting Options

Settings	Description
Pwr	Performs RMS averaging
Log-Pwr	Performs log base 10 mean averaging

3.5.3.4 Setting Measurement Results Type (Trace Mode)

This sets the type of results displayed on the screen.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Power vs Time** to display the **Power vs Time** function menu.
3. Press **Trace** to display the **Trace** function menu.
4. Press **Trace Mode** to display the **Trace Mode** function menu.
5. Select the type of measurement results.

■ Setting Options

Table 3.5.3.4-1 Trace Mode Setting Options

Settings	Description
Rise and Fall	Displays Slot Rise and Fall
Slot	Displays all Slot segments
Frame	Displays 1 Frame

3.5.3.5 Setting Graph Vertical Axis Units (Unit)

This sets the units of the graph vertical axis.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Power vs Time** to display the **Power vs Time** function menu.
3. Press **Trace** to display the **Trace** function menu.
4. Press **Unit**, and switch to **dB** or **dBm**.

■ Setting Options

Table 3.5.3.5-1 Unit Setting Options

Settings	Description
dB	Displays vertical axis in dB units
dBm	Displays vertical axis in dBm units

3.5.3.6 Setting Measurement Displayed on Graph (Display Item)

This sets the type of measurement results displayed on the graph.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Power vs Time** to display the **Power vs Time** function menu.
3. Press **Trace** to display the **Trace** function menu.
4. Press **Display Item**, and switch to **Average** or **All**.

■ Setting Options

Table 3.5.3.6-1 Display Item Setting Options

Settings	Description
Average	Displays average for each point
All	Displays average, min., and max. for each point

3.5.3.7 Setting Slot (Slot)

This sets the displayed Slot.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Power vs Time** to display the **Power vs Time** function menu.
3. Press **Trace** to display the **Trace** function menu.
4. Press **Slot** to display the **Slot** dialog box.
5. Input the slot number, and then press **Set**.

■ Setting Options

Table 3.5.3.7-1 Slot Setting Options

Item	Settings
Maximum Value	7
Minimum Value	0

3.5.3.8 Setting Upper Limit Line Segment Separator (Mask Setup-Upper Limit-Time Point/Segment)

This sets the Upper Limit Line Segment separator.

> ***Note:*** This is determined according to RF Signal/Modulation/Band when the default Signal Direction is Downlink.
> This is determined according to RF Signal/Modulation/Pulse Shaping when the Signal Direction is Uplink.
> However, the mask setting value is not initialized by Preset.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Power vs Time** to display the **Power vs Time** function menu.
3. Press **Mask Setup** to display the **Power vs Time Mask Setup** dialog box.
4. Switch to **Rise Upper Limits** or **Fall Upper Limits** on the **Mask Setup** function menu.
5. Input Time Point value, and press the unit button **µs**.
6. Press **Set** to input the input value.

> ***Note:*** The default **Power vs Time Mask Setup** dialog box is Rise Upper Limits.

■ Setting Options

Table 3.5.3.8-1 Time Point Setting Options (at Rise Upper Limits)

Item	Settings
Maximum Value	48.0 µs
Minimum Value	–48.0 µs

Table 3.5.3.8-2 Time Point Setting Options (at Fall Upper Limits)

Item	Settings
Maximum Value	48.0 µs
Minimum Value	–48.0 µs

> ***Note:*** This is not available as a user setting option because Rise Upper Limits t(0)/t(7)/t(8),and Fall Upper Limits t(2)/t(3)/ t(10) are fixed defaults.

3.5.3.9 Setting Upper Limit Line Upper Limit and Evaluation Standard (Mask Setup-Upper Limit-Limit Setup)

This sets the upper limit and evaluation standard for the Upper Limit Line.

> ***Note:*** Mask user settings are not initialized by Preset.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Power vs Time** to display the **Power vs Time** function menu.
3. Press **Mask Setup** to display the **Power vs Time Mask Setup** dialog box.
4. Switch to **Rise Upper Limits** or **Fall Upper Limits** on the **Mask Setup** function menu.
5. Input REL Limit value, and press the unit button **dB**.
6. Input ABS Limit value, and press the unit button **dBm**.
7. Select the Fail Logic setting.
8. Press **Set** to input the input value.

> ***Note:*** The default **Power vs Time Mask Setup** dialog box display is Rise Upper Limits.

■ Setting Options

Table 3.5.3.9-1 REL Limit Setting Options

Item	Settings
Maximum Value	99.99 dB
Minimum Value	–99.99 dB

Table 3.5.3.9-2 ABS Limit Setting Options

Item	Settings
Maximum Value	99.99 dBm
Minimum Value	–99.99 dBm

Table 3.5.3.9-3 Fail Logic Setting Options

Settings	Description
ABS	Performs Pass/Fail evaluation using ABS Limit [dBm] setting
REL	Performs Pass/Fail judgment using REL Limit [dB] setting
ABS or REL	Evaluates as Pass if either ABS Limit (dBm) or REL Limit (dB) less than standard value
Off	Disables Pass/Fail evaluation

3.5.3.10 Setting Lower Limit Line Segment Separator (Mask Setup-Lower Limit-Time Point/Segment)

This sets the Lower Limit Line Segment separator.

> ***Note:*** Mask user settings are not initialized by Preset.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Power vs Time** to display the **Power vs Time** function menu.
3. Press **Mask Setup** to display the **Power vs Time Mask Setup** dialog box.
4. Switch to **Rise Upper Limits** or **Fall Upper Limits** on the **Mask Setup** function menu.
5. Input Time Point value, and press the unit button **µs**.
6. Press **Set** to input the input value.

> ***Note:*** The default **Power vs Time Mask Setup** dialog box is Rise Upper Limits.

■ Setting Options

Table 3.5.3.10-1 Time Point Setting Options (at Rise Lower Limits)

Item	Settings
Maximum Value	8.0 µs
Minimum Value	–8.0 µs

Table 3.5.3.10-2 Time Point Setting Options (at Fall Lower Limits)

Item	Settings
Maximum Value	8.0 µs
Minimum Value	–8.0 µs

3.5.3.11 Setting Lower Limit Line Lower Limit and Evaluation Standard (Mask Setup-Lower Limit-Limit Setup)

This sets the lower limit and evaluation standard for the Lower Limit Line.

> ***Note:*** Mask user settings are not initialized by Preset.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Power vs Time** on the **Measure** function menu to display the **Power vs Time** function menu.
3. Press **Mask Setup** to display the **Power vs Time Mask Setup** dialog box.
4. Switch to **Rise Upper Limits** or **Fall Upper Limits** on the **Mask Setup** function menu.
5. Input REL Limit value, and press the unit button **dB**.
6. Input ABS Limit value, and press the unit button **dBm**.
7. Select the Fail Logic setting.
8. Press **Set** to input the input value.

> ***Note:*** The default **Power vs Time Mask Setup** dialog box is Rise Upper Limits.

■ Setting Options

Table 3.5.3.11-1 REL Limit Setting Options

Item	Settings
Maximum Value	99.99 dB
Minimum Value	–99.99 dB

Table 3.5.3.11-2 ABS Limit Setting Options

Item	Settings
Maximum Value	99.99 dBm
Minimum Value	–99.99 dBm

Table 3.5.3.11-3 Fail Logic Setting Options

Settings	Description
ABS	Performs Pass/Fail evaluation using ABS Limit [dBm] setting
REL	Conducts Pass/Fail judgment using the REL Limit [dB] setting.
ABS or REL	Evaluates as Pass if either ABS Limit (dBm) or REL Limit (dB) less than standard value
Off	This does not conduct Pass/Fail judgment.

3.5.3.12 Changing Settings of Standard Mask (Mask Setup-Load Standard Setting)

This changes the settings of the standard mask.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Power vs Time** to display the **Power vs Time** function menu.
3. Press **Mask Setup** to display the **Mask Setup** dialog box.
4. When **Load Standard Setting** is pressed, the settings of the standard mask are changed according to the current parameter settings.

3.5.3.13 Setting Type of Template Mask (Select Mask)

This sets the type of template mask used at Power vs Time measurement.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Power vs Time** to display the **Power vs Time** function menu.
3. Press **Select Mask**, and switch to **Standard** or **User**.

■ Setting Options

Table 3.5.3.13-1 Select Mask Setting Options

Settings	Description
Standard	Uses standard mask determined by current settings of related parameters
User	Uses user-defined mask (Mask Setup-User)

3.5.3.14 Setting filter type (Filter Type)

The filter type used for Power vs Time measurement can be set.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **Filter Type**, and then select 5pole or Gaussian.

■ Setting Options

Table 3.5.3.14-1 Filter Type Setting Options

Setting	Description
5pole	Set the filter type to 5pole.
Gaussian	Set the filter type to Gaussian.

3.5.3.15 Setting filter bandwidth (BW)

The filter bandwidth used for Power vs Time measurement can be set. The bandwidth is defined by a 3-dB attenuation point.

■ Procedure

1. Press **Measure** on the main function menu to display the **Measure** function menu.
2. Press **BW**, and then select the filter bandwidth.

■ Setting Options

Table 3.5.3.15-1 BW Setting Options

Setting	Description
300kHz	Set the filter bandwidth to 300 kHz.
500kHz	Set the filter bandwidth to 500 kHz.
1MHz	Set the filter bandwidth to 1 MHz. This is only available if the filter type is Gaussian.

3.6 Setting Marker (Marker)

This sets the marker parameters.

3.6.1 Modulation Analysis (Modulation Analysis)

This sets the parameters related to markers displayed when performing Modulation Analysis as a Measurement item (Measure).

☞3.5.1 Modulation Analysis (Modulation Analysis)

3.6.1.1 Displaying/Not Displaying Markers (Marker)

This selects whether or not to display markers at the top and bottom of the graph window.

■ Procedure

1. Press **Marker** on the main function menu to display the **Marker** function menu.
2. Enable or disable by pressing **Marker**.

■ Setting Options

Table 3.6.1.1-1 Marker Setting Options

Settings	Description
On	Enables marker function
Off	Disables marker function

3.6.1.2 Setting Graph (Marker Select)

This selects the target graph for the marker settings.

■ Procedure

1. Press **Marker** on the main function menu to display the **Marker** function menu.
2. Select **Constellation Select** or **Bottom Graph Select**.

■ Setting Options

Table 3.6.1.2-1 Marker Select Setting Options

Settings	Description
Constellation Select	Sets marker target to top graph window
Bottom Graph Select	Sets marker target to bottom graph window

3.6.1.3 Setting Marker Position in Top Graph Window (Constellation Symbol)

This sets the position of marker displayed in the top graph window.

■ Procedure

1. Press **Marker** on the main function menu to display the **Marker** function menu.
2. Select **Constellation Select**.
3. Press the numeric keypads and input the marker position in the **Constellation Marker Number** dialog box.

   Note: The **Constellation Marker Number** dialog box is displayed automatically when the numeric keypads are pressed.

4. Press **Set** to input the input value.

■ Setting Options

Modulation: GMSK

Table 3.6.1.3-1 Constellation Symbol Setting Options

Item	Settings
Maximum Value	147 Symbol
Minimum Value	0 Symbol

Modulation: 8PSK, QPSK, 16QAM, 32QAM, AQPSK
RF Signal: Normal Burst, Continuous

Table 3.6.1.3-2 Constellation Symbol Setting Options

Item	Settings
Maximum Value	144 Symbol
Minimum Value	3 Symbol

Modulation: QPSK, 16QAM, 32QAM
RF Signal: Higher Symbol Rate

Table 3.6.1.3-3 Constellation Symbol Setting Options

Item	Settings
Maximum Value	172 Symbol
Minimum Value	4 Symbol

3.6.1.4 Setting Marker Position in Bottom Graph Window (Bottom Graph Symbol)

This sets the position of the marker displayed in the bottom graph window.

■ Procedure

1. Press **Marker** on the main function menu to display the **Marker** function menu.
2. Select **Bottom Graph Select**.
3. Using the numeric keypad, input the marker position in the **Bottom Graph Marker Number** dialog box.

   Note: The **Bottom Graph Marker Number** dialog box is displayed automatically when the numeric keypads are pressed.

4. Press **Set** to input the input value.

■ Setting Options

Modulation: GMSK

Table 3.6.1.4-1 Bottom Graph Symbol Setting Options

Item	Settings
Maximum Value	147 Symbol
Minimum Value	0 Symbol

Modulation: 8PSK, QPSK, 16QAM, 32QAM, AQPSK
RF Signal: Normal Burst, Continuous

Table 3.6.1.4-2 Constellation Symbol Setting Options

Item	Settings
Maximum Value	144 Symbol
Minimum Value	3 Symbol

Modulation: QPSK, 16QAM, 32QAM
RF Signal: Higher Symbol Rate

Table 3.6.1.4-3 Constellation Symbol Setting Options

Item	Settings
Maximum Value	172 Symbol
Minimum Value	4 Symbol

3.6.2 Output RF Spectrum

This sets parameters related to the marker displayed at Output Spectrum of the Measurement item (Measure).

☞3.5.2 Output RF Spectrum

3.6.2.1 Displaying/Not Displaying Marker (Marker)

This selects whether or not to display markers of the graph window. Markers are displayed only when the Trace mode is Modulation or Switching.

☞ 3.5.2.3 Setting Measurement Results Type (Trace Mode)

■ Procedure

1. Press **Marker** on the main function menu to display the **Marker** function menu.
2. Enable or disable by pressing **Marker**.

■ Setting Options

Table 3.6.2.1-1 Marker Setting Options

Settings	Description
On	Enables marker function
Off	Disables marker function

3.6.2.2 Setting Graph Marker Position (Offset Frequency)

This sets the position of markers in the graph results display.

> ***Note:*** This setting is disabled when Numeric is selected at Trace Mode.
> ☞ 3.5.2.3 Setting Measurement Results Type (Trace Mode)

■ Procedure

1. Press **Marker** on the main function menu to display the **Marker** function menu.
2. Select **Offset Frequency** on the **Marker** function menu.
3. Set the marker position using the rotary knob or the numeric keypad.

■ Setting options

Output RF Spectrum Trace Mode setting: Modulation

Table 3.6.2.2-1 Offset Frequency Setting Options

Item	Settings
Maximum Value	6000
Minimum Value	–6000
Settable range	–6000, –3000, –1800, –1600, –1400, –1200, –1000, –800, –600, –400, –250, –200, –100, 0, 100, 200, 250, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 3000, 6000

Output RF Spectrum Trace Mode setting: Switching

Table 3.6.2.2-2 Offset Frequency Setting Options

Item	Settings
Maximum Value	1800
Minimum Value	–1800
Settable range	–1800, –1200, –600, –400, 0, 400, 600, 1200, 1800

3.6.3 Power vs Time

This sets the parameters related to markers displayed at Power vs Time of the Measurement items (Measure).

☞3.5.3 Setting Power vs Time (Power vs Time)

3.6.3.1 Displaying/Not Displaying Markers (Marker)

This selects whether or not to display markers at the top and bottom of the graph window.

■ Procedure

1. Press **Marker** on the main function menu to display the **Marker** function menu.
2. Enable or disable by pressing **Marker**.

■ Setting Options

Table 3.6.3.1-1 Marker Setting Options

Settings	Description
On	Enables marker function
Off	Disables marker function

3.6.3.2 Setting Graph (Rise Select / Fall Select)

This selects the graph for the marker settings.

> ***Note:*** This setting is only enabled when Rise and Fall is selected at Trace Mode of Power vs Time.
> ☞ 3.5.3.4 Setting Measurement Results Type (Trace Mode)

■ Procedure

1. Press **Marker** on the main function menu to display the **Marker** function menu.
2. Select **Rise Select** or **Fall Select**.

■ Setting Options

Table 3.6.3.2-1 Marker Select Setting Options

Settings	Description
Rise Select	Sets Rise graph as marker target
Fall Select	Sets Fall graph as marker target

3.6.3.3 Setting Graph Marker Position (Point)

This sets the position of the marker in the graph results display.

■ Procedure

1. Press **Marker** on the main function menu to display the **Marker** function menu.
2. Select **Marker Number** in the **Marker** function menu.
3. Set the marker position using the rotary knob or the numeric keypad.

■ Setting Options

Trace Mode: Rise and Fall
RF Signal: Normal Burst or Continuous

Table 3.6.3.3-1 Point Setting Options

Item	Settings
Maximum Value	Rise: (13 + Slot setting × 156.25) symbol
	Fall: (13 + Slot setting × 156.25 + 147) symbol
Minimum Value	Rise: (–13 + Slot setting × 156.25) symbol
	Fall: (–13 + Slot setting × 156.25 + 147) symbol

Trace Mode: Rise and Fall
RF Signal: Higher Symbol Rate Burst

Table 3.6.3.3-2 Point Setting Options

Item	Settings
Maximum Value	Rise: (13 + Slot setting × 187.5) symbol
	Fall: (13 + Slot setting × 187.5 + 176) symbol
Minimum Value	Rise: (–13 + Slot setting × 187.5) symbol
	Fall: (–13 + Slot setting × 187.5 + 176) symbol

Trace Mode: Slot
RF Signal: Normal Burst or Continuous

Table 3.6.3.3-3 Point Setting Options

Item	Settings
Maximum Value	(18 + Slot setting × 156.25 + 147) symbol
Minimum Value	(–18 + Slot setting × 156.25) symbol

Trace Mode: Slot
RF Signal: Higher Symbol Rate Burst

Table 3.6.3.3-4 Point Setting Options

Item	Settings
Maximum Value	(18 + Slot setting × 187.5 + 176) symbol
Minimum Value	(–18 + Slot setting × 187.5) symbol

Trace Mode: Frame
RF Signal: Normal Burst or Continuous

Table 3.6.3.3-5 Point Setting Options

Item	Settings
Maximum Value	(8.75 + 8 × 156.25) symbol
Minimum Value	–18 symbol

Trace Mode: Frame
RF Signal: Higher Symbol Rate Burst

Table 3.6.3.3-6 Point Setting Options

Item	Settings
Maximum Value	(10.5 + 8 × 187.5) symbol
Minimum Value	–21.6 symbol

3.7 Measurement Results

3.7.1 Modulation Analysis

3.7.1.1 Numerical Results

The measured numeric results are displayed in the Result window based on the set storage mode. At Off, the results for one measurement are displayed. At Average, the average of the specified number of measurements is displayed. At Average & Max., the average and maximum value of the results for the specified number of measurements is displayed.

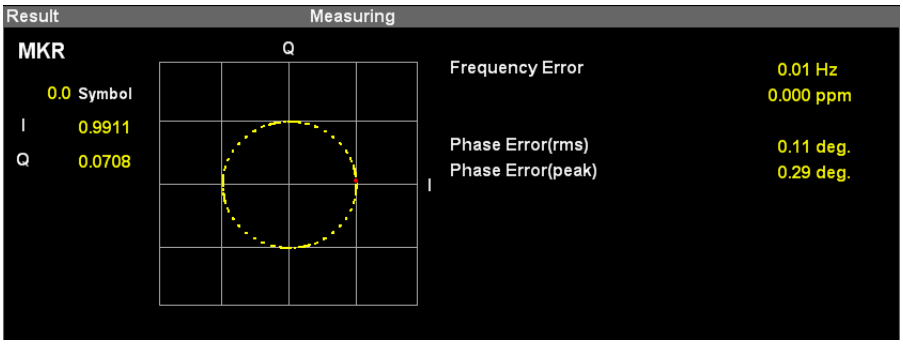

Figure 3.7.1.1-1 Result Window (for GMSK)

Table 3.7.1.1-1 Result Window Contents (for GMS Modulation)

Item	Description
Frequency Error	Displays frequency error of analyzed signal in Hz and ppm units
Phase Error (rms)	Displays phase error between input signal and ideal signal as RMS value
Phase Error (peak)	Displays peak phase error between input signal and ideal signal

Table 3.7.1.1-2 Result Window Contents (other than GMSK Modulation)

Item	Description
Frequency Error	Displays frequency error of analyzed signal in Hz and ppm units
EVM (rms)	Displays input signal EVM as RMS value
EVM (peak)	Displays peak EVM value of input signal
Magnitude Error (rms)	Displays amplitude error between input signal and ideal signal as RMS value
Phase Error (rms)	Displays phase error between input signal and ideal signal as RMS value
Origin Offset	Displays Origin Offset of input signal
95th percentile	Displays 95th percentile of input signal
Droop	Displays the Droop value of the analysis signal in dB and nepers/s.

3.7.1.2 Graphical Results

3.7.1.2.1 IQ Constellation

This displays the constellation of all specified symbols in the graph window (top). The IQ at the marker-selected chip is displayed in red.

Table 3.7.1.2.1-1 IQ Constellation Display Description

Settings	Description
MKR Symbol	Displays marker position specified by Constellation Marker Number ☞3.6.1.3 Setting Marker Position in Top Graph Window (Constellation Symbol)
I/Q	Displays I and Q phase data for marker position specified by Constellation Marker Number

Note: The above marker and marker information are displayed only when marker display is On.
☞3.6.1.1 Displaying/Not Displaying (Marker)

3.7.1.2.2 EVM vs Symbol

This displays the symbol value for the marker position specified by Bottom Graph Marker Number.

☞3.6.1.4 Setting Marker Position in Bottom Graph Window (Bottom Graph Symbol)

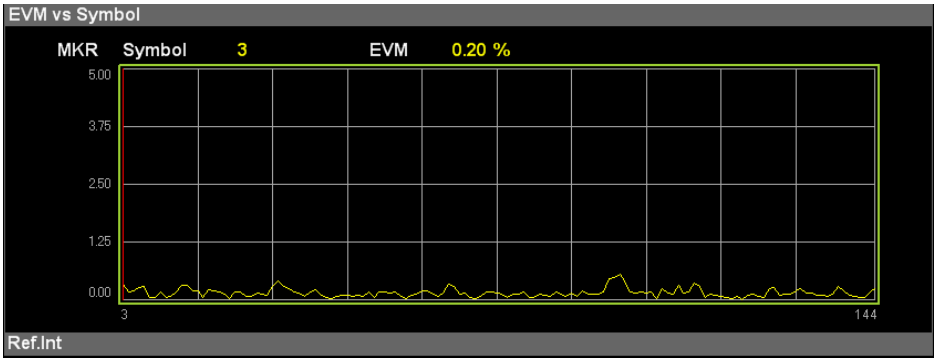

Figure 3.7.1.2.2-1 EVM vs Symbol Display

Table 3.7.1.2.2-1 EVM vs Symbol Description

Settings	Description
MKR Symbol	Displays symbol value for marker position specified by Bottom Graph Marker Number ☞3.6.1.4 Setting Marker Position in Bottom Graph Window (Bottom Graph Symbol)
EVM	Displays EVM for marker position specified by Bottom Graph Marker Number

Note: This display is disabled when GMSK is set at the Modulation settings.
The above marker and marker information are displayed only when marker display is On.
☞3.6.1.1 Displaying/Not Displaying (Marker)

3.7.1.2.3 Magnitude Error vs Symbol

This displays the symbol value for the marker position specified by Bottom Graph Marker Number.

☞3.6.1.4 Setting Marker Position in Bottom Graph Window (Bottom Graph Symbol)

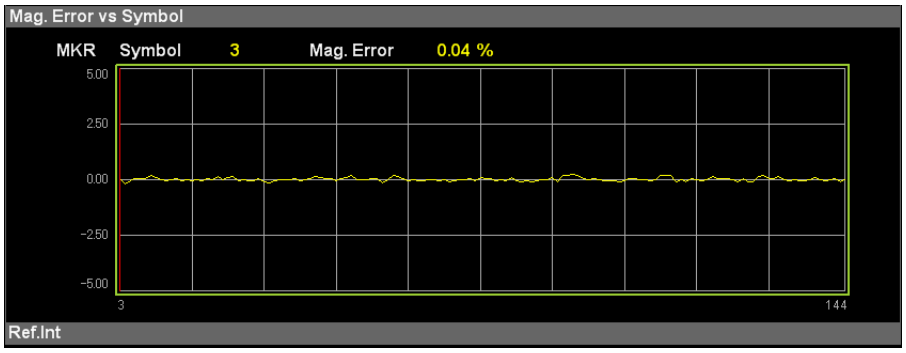

Figure 3.7.1.2.3-1 Magnitude Error vs Chip Display

Table 3.7.1.2.3-1 Magnitude Error vs Symbol Description

Settings	Description
MKR Symbol	Displays symbol value for marker position specified by Bottom Graph Marker Number ☞3.6.1.4 Setting Marker Position in Bottom Graph Window (Bottom Graph Symbol)
Mag. Error	Displays amplitude (magnitude) error for marker position specified by Bottom Graph Marker Number

Note: This display is disabled when GMSK is set at the Modulation settings.
The above marker and marker information are displayed only when marker display is On.
☞3.6.1.1 Displaying/Not Displaying (Marker)

3.7.1.2.4 Phase Error vs Symbol

This displays the symbol value for the marker position specified by Bottom Graph Marker Number.

☞3.6.1.4 Setting Marker Position in Bottom Graph Window (Bottom Graph Symbol)

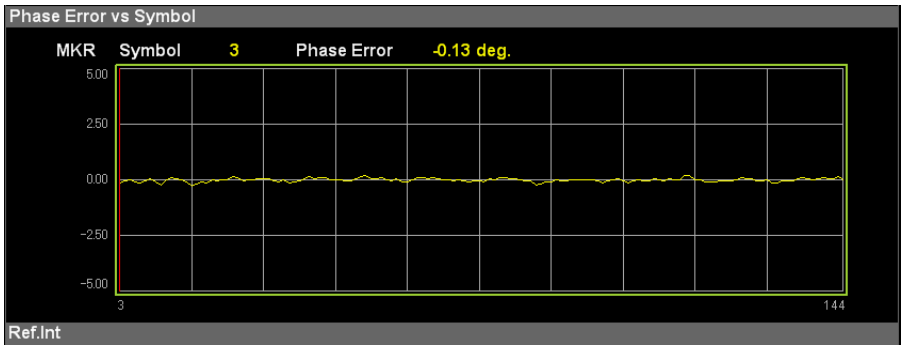

Figure 3.7.1.2.4-1 Phase Error vs Symbol Display

Table 3.7.1.2.4-1 Phase Error vs Symbol Description

Settings	Description
MKR Symbol	Displays symbol value for marker position specified by Bottom Graph Marker Number ☞3.6.1.4 Setting Marker Position in Bottom Graph Window (Bottom Graph Symbol)
Phase Error	Displays phase error for marker position specified by Bottom Graph Marker Number

Note: The above marker and marker information are displayed only when marker display is On.
☞3.6.1.1 Displaying/Not Displaying (Marker)

3.7.2 Output RF Spectrum

3.7.2.1 Modulation

Displays Spectrum due to Modulation measurement result at specified Offset Frequency from Carrier Frequency in a graph. The blue lines indicate the threshold level specified by Mask Setup-Limit Setup-Modulation. The yellow bars indicate the Offset Power. When the Offset Power exceeds the threshold level specified by Mask Setup-Limit Setup-Modulation, the bar is displayed in red. Markers are indicated as red inverted triangles on the top of the bars.

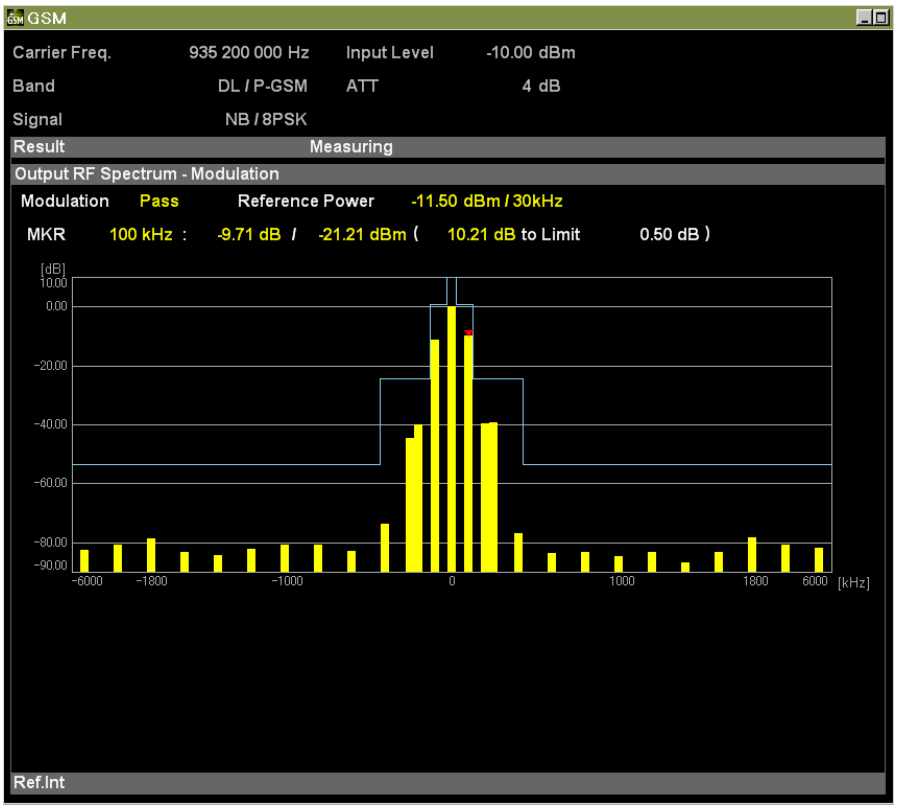

Figure 3.7.2.1-1 Modulation Results Display

Table 3.7.2.1-1 Modulation Results Display Contents

Item	Description
Reference Power	Displays 30 kHz reference Carrier Power at Modulation measurement
Pass/Fail	Displays all evaluation results for each Offset Modulation at Modulation measurement
MKR	Displays Marker Position value, Offset Power at Marker Position, and level difference from threshold value and evaluation result

3.7.2.2 Switching

Displays measurement result for Spectrum due to Switching from carrier frequency to specified offset frequency as graph. The blue lines indicate the threshold level specified by Mask Setup-Limit Setup-Switching. The yellow bars indicate the Offset Power. When the Offset Power exceeds the threshold level specified by Mask Setup-Limit Setup-Switching, the bar is displayed in red. Markers are indicated as red inverted triangles on the top of the bars.

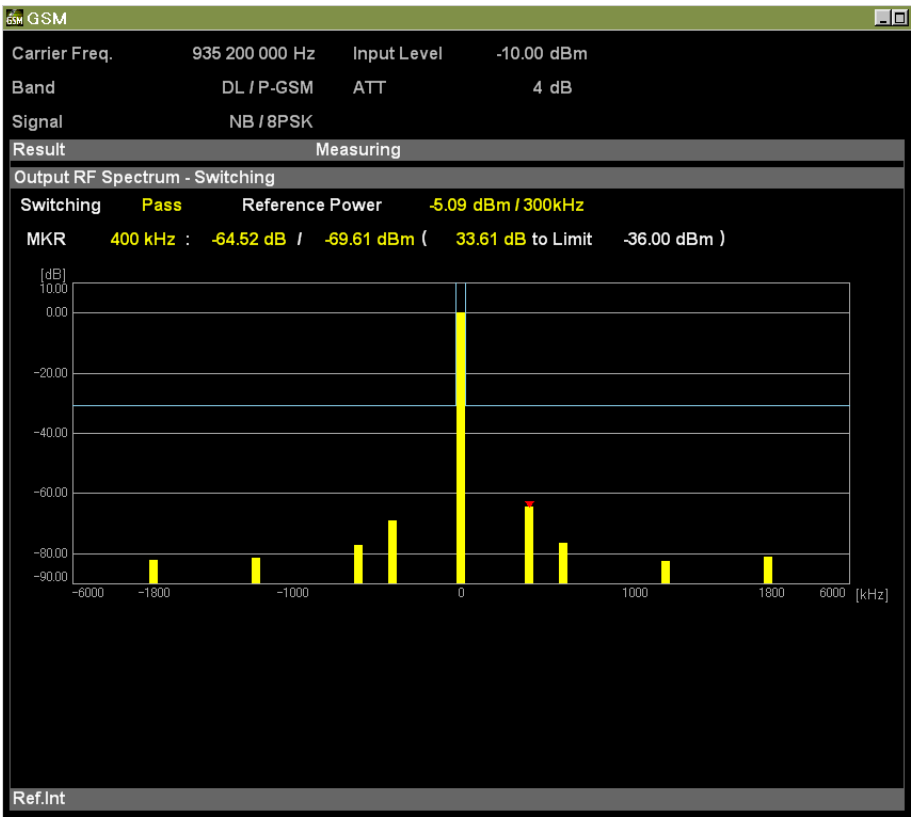

Figure 3.7.2.2-1 Switching Results Display

Table 3.7.2.2-1 Switching Results Display Contents

Item	Description
Reference Power	Displays reference power filtered in 300 kHz bandwidth at Switching measurement
Pass/Fail	Displays all evaluation results for each Offset Modulation at Switching measurement
MKR	Displays Marker Position value, Offset Power at Marker Position, and level difference from threshold value and evaluation result

3.7.3 Power vs Time

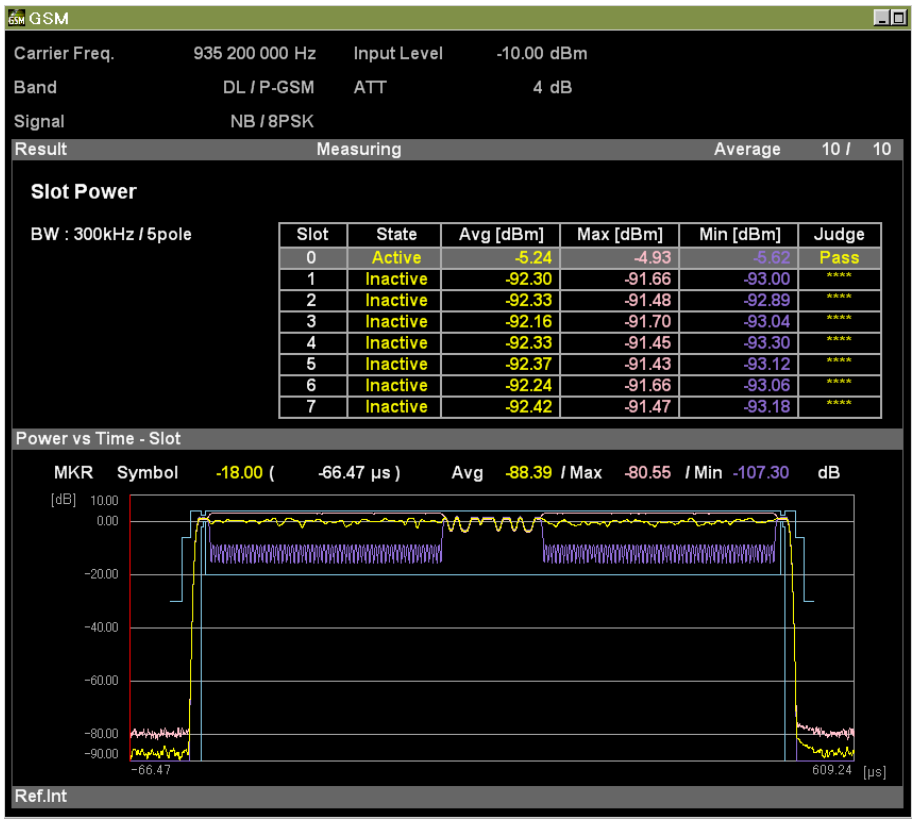

Figure 3.7.3-1 Power vs Time Measurement Display

Table 3.7.3-1 Power vs Time Measurement Display Contents

Item	Description
Slot Power	Displays power for 8 consecutive slots from measurement target head slot
Slot Status	Displays Active/Inactive status for 8 consecutive slots from measurement target head slot
Symbol Power Graph	Displays Symbol Power results as graph
Symbol Power – Slot Pass/Fail	Displays mask evaluation result for Symbol Power at each measurement target slot (8 slots)
Symbol Power – Limit Line (Segment)	Displays mask evaluation result for Symbol Power in mask 1 Segment
Marker Position	Displays Marker Position value as both symbol and µs units
Marker Result	Displays Symbol Power at Marker Position
Time Offset	Displays time difference between trigger detection position and head slot position (only when Trigger Switch set to On)

3.8 Setting Trigger (Trigger)

Perform the trigger-related settings.

3.8.1 Reflecting Trigger Signal in Measurement (Trigger Switch)

This sets the trigger synchronization On/Off.

■ Procedure

1. Press **Trigger** on the main function menu to display the **Trigger** function menu.
2. Turn the function On/Off by pressing **Trigger Switch**.

■ Setting Options

Table 3.8.1-1 Trigger Switch Setting Options

Settings	Description
On	Starts measurement using trigger signal
Off	Performs normal measurement (without trigger sync)

3.8.2 Selecting Trigger Source

Sets the trigger source.

> ***Note:*** SG Marker can only be set when the Vector Signal Generator Option is installed.

■ Procedure

1. Press **Trigger** on the main function menu to display the **Trigger** function menu.
2. Press **Trigger Source** to display the **Trigger Source** function menu.
3. Select the trigger source.
4. When selecting the trigger source, the trigger source selected at the measurement parameters is displayed.

■ Setting Options

Table 3.8.2-1 Trigger Source Setting Options

Settings	Description
External*1	Measurement starts with external trigger signal input.
External 2*2	Measurement starts with external trigger 2 signal input.
SG Marker	Starts measurement at timing of trigger output from built-in Vector Signal Generator option

*1: External 1 is displayed only for MS2850A.
*2: External 2 is selectable only for MS2850A.

3.8.3 Setting Trigger Edge (Trigger Slope)

This sets the triggering edge (rise or fall).

■ Procedure

1. Press **Trigger** on the main function menu to display the **Trigger** function menu.
2. Switch to **Rise** or **Fall** by pressing **Trigger Slope**.

■ Setting Options

Table 3.8.3-1 Trigger Slope Options

Settings	Description
Rise	Synchronizes with trigger rising edge
Fall	Synchronizes with trigger falling edge

Note: Even if the Trigger Switch setting is Off, it is switched to On automatically when Trigger Slope is set.

3.8.4 Setting Trigger Delay Time (Trigger Delay)

This sets the delay time from the trigger input until capture is started.

■ Procedure

1. Press **Trigger** on the main function menu to display the **Trigger** function menu.
2 Press **Trigger Delay** to display the **Trigger Delay** dialog box.
3 Input the trigger delay.
4. Press the input carrier frequency units button (**s**, **ms**, **µs**, or **ns**) to set the input value.
5. When setting the trigger delay, the trigger delay input at the measurement parameters is displayed.

■ Setting Options

Table 3.8.4-1 Trigger Delay Setting Options

Item	Settings (s)
Maximum Value	**+2 s**
Minimum Value	–2 s

Chapter 4 Performance Test

This chapter describes measurement devices, setup methods, and performance test procedures required for performing performance tests as preventive maintenance.

4.1 Overview of Performance Test 4-2
4.1.1 Performance Test 4-2
4.2 Performance Test Items 4-3
4.2.1 Testing Methods 4-3

4.1 Overview of Performance Test

4.1.1 Performance Test

Performance tests are performed as part of preventive maintenance in order to prevent the performance degradation before it occurs.

Use performance tests when necessary for acceptance inspection, routine inspection and performance verification after repairs. Perform periodic preventive maintenance of important items. Perform the following tests at acceptance inspection, routine inspection, and performance inspection after repairs.

- Carrier frequency accuracy
- Residual EVM, Residual phase error

Perform items deemed critical at regular intervals as preventive maintenance. A cycle for routine tests of once or twice a year is recommended.

If items that do not meet the required level are detected during performance testing, contact an Anritsu Service and Sales office. Contact information can be found on the last page of the printed version of this manual, and is available in a separate file on the CD version.

4.2 Performance Test Items

Warm up the device to be tested and the measuring instruments for at least 30 minutes except if specified otherwise, in order to stabilize them sufficiently before running performance tests. Maximum measurement accuracy requires, in addition to the above, conducting performance tests under ambient temperatures and with little AC power supply voltage fluctuations, as well as the absence of noise, vibrations, dust, humidity and other problems.

4.2.1 Testing Methods

■ Test target standards

- Carrier frequency accuracy
- Residual EVM or Residual phase error

■ Measuring instrument for tests

- Vector signal generator
- Frequency standard device
- Power meter

■ Setup

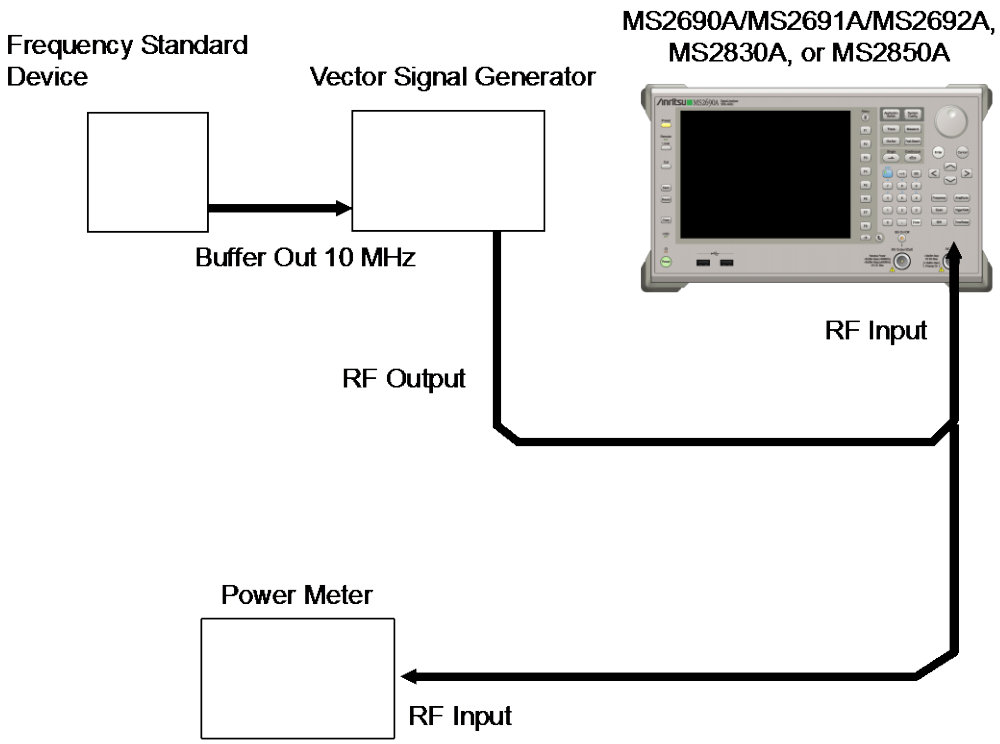

Figure 4.2.1-1 Performance test

■ Test procedure

(a) Signal source adjustment

1. Input the 10 MHz reference signal output from the frequency standard device into the Reference Input connector of the vector signal generator.
2. Input the 10 MHz reference signal output from the signal generator to the Reference Input connector.
3. Output an 8PSK modulation signal from the vector signal generator (continuous wave with no power-off segments).
4. Input the vector signal generator output signal into the power meter and measure the power.

(b) Setting up the main unit

1. Turn on the power switch on the front panel and then wait until the internal temperature stabilizes (approximately 1.5 hours after the temperature in the thermostatic bath stabilizes).
2. Press Application Switch to display the Application Switch menu. Press the menu function key displaying the character string **GSM**
3. Press Preset to display the Preset menu.
4. Press **Preset**
5. Press Cal to display Cal function menu
6. Press **SIGANA All** to calibrate.
7. Press **Close** to return to the function menu.
8. Match the setting of this application to those in Table 4.2.1-1.

Table 4.2.1-1 Application Settings

Parameter	Settings
Carrier Frequency	Output frequency from vector signal generator
Input Level	Power meter measurement results
RF Signal	Normal Burst However, Continuous when signal does not include TSC
Modulation	8PSK (matching input signal)
Burst Sync	Auto
Measure	Modulation Analysis

9. Press [Single] to measure.

   When measuring the carrier frequency accuracy, select **Auto** for **Reference Signal**. When measuring the residual vector error, select **Fixed to Internal**.

   Press [F3] (System Settings) after pressing [System Config] to display the System Settings screen. Select and set Reference Signal with cursor key, and then press [F7] (Set).

10. Confirm whether the measured Frequency Error (carrier frequency accuracy) and EVM(rms) (residual vector error) value is within specifications.

11. Measure the GMSK modulation signal in the same way. When the modulation method is GMSK, set the Modulation parameter to GMSK and check that the Frequency Error (carrier frequency accuracy) and Phase Error (rms) (residual phase error) values are within specifications.

■ Test Results

1 Carrier frequency measurement accuracy

Modulation	Frequency	Min. limit	Deviation (Hz)	Max. limit	Uncertainty	Pass/Fail
GMSK	935.2 MHz	MS269xA −5 Hz MS2830A −8 Hz MS2850A −8 Hz		MS269xA +5 Hz MS2830A +8 Hz MS2850A +8 Hz	MS269xA ±1 Hz MS2830A +1 Hz MS2850A +1 Hz	
	460.6 MHz					
	1930.2 MHz					
8PSK	935.2 MHz					
	460.6 MHz					
	1930.2 MHz					
AQPSK	935.2 MHz					
	460.6 MHz					
	1930.2 MHz					
32QAM*1	935.2 MHz					
	460.6 MHz					
	1930.2 MHz					

2 Residual Phase Error (GMSK)

Frequency	Measured value [° (rms)]	Max. limit	Uncertainty	Pass/Fail
935.2 MHz		MS269xA 0.5° (rms) MS2830A 0.7° (rms) MS2850A 0.7° (rms)	MS269xA 0.1° (rms) MS2830A 0.1° (rms) MS2850A 0.1° (rms)	
460.6 MHz				
1930.2 MHz				

3 Residual Vector Error (8PSK, AQPSK, 32QAM)

Modulation	Frequency	Measured value [% (rms)]	Max. limit	Uncertainty	Pass/Fail
8PSK	935.2 MHz		MS269xA 0.6% (rms)	MS269xA 0.1% (rms)	
	460.6 MHz		MS2830A 1.0% (rms)	MS2830A 0.1% (rms)	
	1930.2 MHz		MS2850A 1.0% (rms)	MS2850A 0.1% (rms)	
AQPSK	935.2 MHz		MS269xA 0.6% (rms)	MS269xA 0.1% (rms)	
	460.6 MHz		MS2830A 1.0% (rms)	MS2830A 0.1% (rms)	
	1930.2 MHz		MS2850A 1.0% (rms)	MS2850A 0.1% (rms)	
32QAM*1	935.2 MHz		MS269xA 0.6% (rms)	MS269xA 0.1% (rms)	
	460.6 MHz		MS2830A 1.0% (rms)	MS2830A 0.1% (rms)	
	1930.2 MHz		MS2850A 1.0% (rms)	MS2850A 0.1% (rms)	

*1: When option 001/101 (EDGE Evolution Measurement Software) is installed.

Chapter 5 Other Functions

This chapter describes other functions of this application.

5.1 Selecting Other Functions 5-2
5.2 Setting Title 5-2
5.3 Erasing Warmup Message 5-2

5.1 Selecting Other Functions

Pressing F8 (Accessory) on the main function menu displays the Accessory function menu.

Table 5.1-1 Accessory function menu

Function Keys	Menu Display	Function
F1	Title	Sets the title character string.
F2	Title (On/Off)	Displays (On) or hides (Off) the title character string.
F4	Erase Warm Up Message	Erases the warmup message display.

5.2 Setting Title

A title of up to 32 characters can be displayed on the screen. (Character strings of up to 17 characters can be displayed on a function menu. The maximum number of characters to be displayed on the top of the function menu varies according to character string.)

<Procedure>

1. Press F8 (Accessory) on the main function menu.
2. Press F1 (Title) to display the character string input screen. Select a character using the rotary knob, and enter it by pressing Enter. Enter the title by repeating this operation. When the title is entered, press F7 (Set).
3. Press F2 (Title) and then select "Off " to hide the title.

5.3 Erasing Warmup Message

The warmup message (Warm Up), which is displayed upon power-on and indicates that the level and frequency are not stable, can be deleted.

<Procedure>

1. Press F8 (Accessory) on the main function menu.
2. Press F4 (Erase Warm Up Message) to erase the warmup message.

Table A-1 Error Messages

Messages	Description
Out of range	–
Downlink unavailable	–
Uplink unavailable	–
GSM450 or GSM480 unavailable	Operation is disabled when the frequency band is either GSM450 or GSM480.
GMSK unavailable	Operation is disabled when the modulation method is GMSK.
Not available if not QPSK.	Operation is disabled when the modulation method is not QPSK.
Not available if not Normal Burst.	Operation is disabled when the burst type is not Normal Burst.
Not available if not Normal Burst or Higher Symbol Rate Burst.	Operation is disabled when the burst type is not Normal Burst or Higher Symbol Rate Burst.
Not available if not Higher Rate Burst.	Operation is disabled when the burst type is not Higher Rate Burst.
Not available if not RF Burst.	Operation is disabled when the sync detection method is not RF Burst.
Not available in Numeric.	Operation is disabled when the output spectrum measurement result display is Numeric.
Not available in Constellation Select.	Operation is disabled when the marker setting target is Constellation.
Not available in Bottom Graph Select.	Operation is disabled when the marker setting target is Bottom Graph Window.
Not available in Trigger Off.	Operation is disabled when Trigger Sync is Off.
Not available in Slot or Frame trace.	Operation is disabled when the trace mode is Slot or Frame.
Not available if not software option 001.	Operation is disabled without software option 001.
File read error	–
File format error	–
Cannot find device	–
Invalid character	–

Appendix B Default Values

List of common parameters

Frequency	
ARFCN	
P-GSM	1
E-GSM	0
R-GSM	0
GSM450	259
GSM480	306
GSM750	438
GSM850	128
DCS1800	512
PCS1900	512
Carrier Frequency	935.2 MHz
Amplitude	
Input Level	–10.00 dBm
Pre-Amp	Off
Level Offset On/Off	Off
Level Offset Value	0.00 dB
Trigger	
Trigger Switch	Off
Trigger Source	External
Trigger Slope	Rise
Trigger Delay	0 s

GSM/EDGE Basic Parameters

Common Setting	
Signal Direction	DL
Band	P-GSM
RF Signal	Normal Burst [NB]
Modulation	GMSK
Burst Sync	Auto
Active Slot Threshold	–40.0 dB
Measurement Offset	0 Slot
Symbol Rotation	π/2
BTS Type	Normal BTS
BTS Power Level	46 dBm
SCPIR	0.0 dB
Pulse Shaping	Narrow
Power Control Level	0

Modulation Analysis

Trace Mode	Phase Error vs Symbol
Scale	
EVM vs Symbol	5%
Mag Error vs Symbol	±5%
Phase Error vs Symbol	±5 degree
Storage	
Mode	Off
Count	10
Average Type	Power
Droop	On
Marker	
Marker	On
Constellation Marker Number	0 Symbol
Bottom Graph Marker Number	0 Symbol

Output RF Spectrum

Trace Mode	Numeric
Storage	
Mode	Off
Count	10
Unit	dB
Select Mask	Standard
Marker	
Marker	On
Offset Frequency	0 kHz

Power vs Time

Trace Mode	Slot
Slot	0 Slot
Storage	
Mode	Off
Count	10
Average Type	Power
Unit	dB
Display Item	All
Select Mask	Standard
Marker	
Marker	On
Point	0 Symbol

Accessory

Accessory		
	Title	On
	Title Entry	GSM

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