MX269030A
W-CDMA BS Measurement Software
Operation Manual
Operation

10th 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) or MS2830A Signal Analyzer Operation Manual (Mainframe Operation). Please also refer to it before using the equipment.
- Keep this manual with the equipment.

ANRITSU CORPORATION

Document No.: M-W2860AE-10.0

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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.

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

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Safety Symbols Used on Equipment and in Manual

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

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

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

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

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

These indicate that the marked part should be recycled.

MX269030A
W-CDMA BS Measurement Software
Operation Manual Operation

8 May 2007 (First Edition)
30 September 2020 (10th Edition)

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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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Revision History:

February 29th, 2020

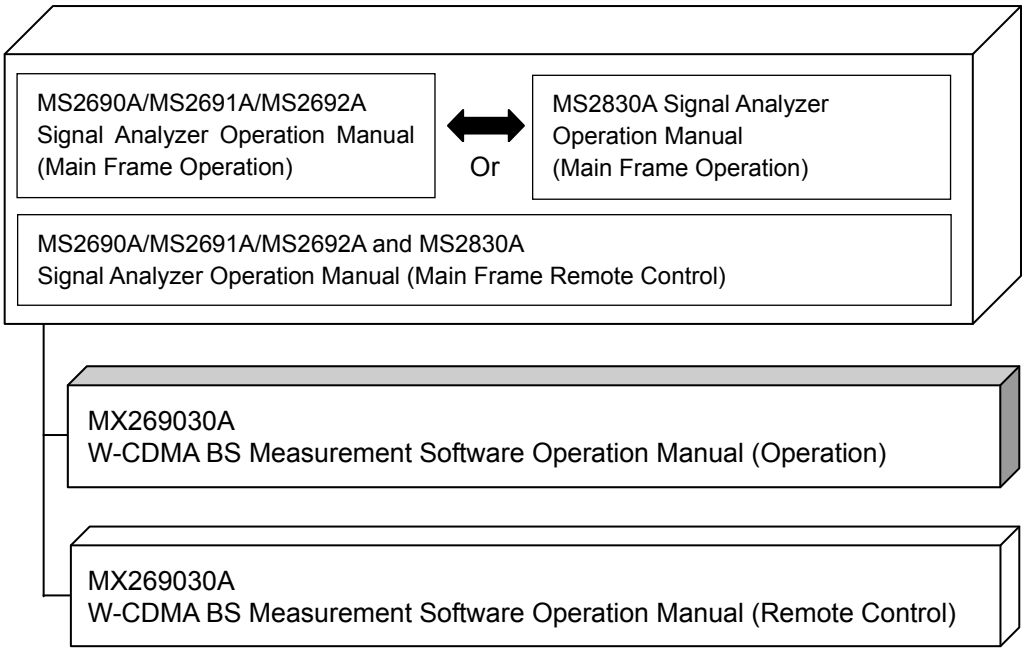
Cautions Against Computer Virus Infection

- 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

■ **Composition of Operation Manuals**

The operation manuals for the MX269030A W-CDMA BS Measurement Software are comprised as shown in the figure below.



- Signal Analyzer Operation Manual (Mainframe Operation)
- Signal Analyzer Operation Manual (Mainframe Remote Control)

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

- W-CDMA BS Measurement Software Operation Manual (Operation)
  <This document>
- W-CDMA BS Measurement Software Operation Manual (Remote Control)

These manuals describe basic operating methods, functions, and remote control of the W-CDMA BS Measurement Software.

Table of Contents

About This Manual I

Chapter 1 Overview 1-1

1.1 Product Overview 1-2
1.2 Product Configuration 1-3
1.3 Specifications 1-4

Chapter 2 Preparation 2-1

2.1 Part Names 2-2
2.2 Signal Path Setup 2-11
2.3 Application Startup and Selection 2-12
2.4 Initialization and Calibration 2-13

Chapter 3 Measurement 3-1

3.1 Screen Layout 3-2
3.2 Basic Operation 3-3
3.3 Result window 3-6
3.4 Parameter Window 3-17

Chapter 4 Performance Test 4-1

4.1 Overview of Performance Test 4-2
4.2 Performance Test Items 4-3

Chapter 5 Other Functions 5-1

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

Index Index-1

IV.

Chapter 1 Overview

This chapter provides an overview of the MX269030A W-CDMA BS Measurement Software and describes the product configuration.

1.1 Product Overview 1-2
1.2 Product Configuration 1-3
1.2.1 Standard configuration 1-3
1.2.2 Applicable parts 1-3
1.3 Specifications 1-4

1.1 Product Overview

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

The MX269030A W-CDMA BS Measurement Software (hereinafter, referred to as "MX269030A") is a software option for measuring RF characteristics of W-CDMA base stations.

The MX269030A provides the following measurement features.

- Error vector magnitude measurement
- Carrier frequency measurement
- Peak code domain error measurement
- Code domain power measurement
- CPICH power measurement
- Transmitter power measurement
- Occupied bandwidth measurement
- Adjacent channel leakage power ratio measurement
- Spectrum emission mask measurement

1.2 Product Configuration

1.2.1 Standard configuration

Table 1.2.1-1 lists the standard configuration of the MX269030A.

Table 1.2.1-1 Standard configuration

Item	Model Name/Symbol	Product Name	Q'ty	Remarks
Application	MX269030A	W-CDMA BS Measurement Software	1	
Accessories	–	Installation CD-ROM	1	Application software, operation manual CD-ROM

1.2.2 Applicable parts

Table 1.2.2-1 lists the applicable parts for the MX269030A.

Table 1.2.1-1 Applicable parts

Model Name/Symbol	Product Name	Remarks
W2860AE	MX269030A W-CDMA BS Measurement Software Operation Manual (Operation)	English, printed version
W2861AE	MX269030A W-CDMA BS Measurement Software Operation Manual (Remote Control)	English, printed version

1.3 Specifications

Table 1.3-1 shows the specifications for the MX269030A.

Nominal values are not guaranteed.

When MS2830A 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
Common Specifications	
Frequency range	400 MHz to 3 GHz
Settable input level range	–24 to +30 dBm
Modulation/Frequency Measurement	
Carrier frequency accuracy	Input level range: Input Level to Input Level –10 dB (Input Level ≥–4 dBm) For 1-wave multiplexed signals with EVM = 1% MS269x Series: ±(accuracy of reference crystal oscillator × carrier frequency + 4 Hz) MS2830A: ±(accuracy of reference crystal oscillator × carrier frequency + 6 Hz)
Residual EVM	Input level range: Input Level to Input Level –10 dB (Input Level ≥–4 dBm) For 64 DPCH multiplexed signals conforming to 3GPP TS25.141 TestModel1 MS269x Series: ≤ 1.0% (rms) MS2830A: ≤ 1.3% (rms)
Code domain power relative value accuracy	Input level range: Input Level to Input Level –10 dB (Input Level ≥–4 dBm) For signals conforming to 3GPP TS25.141 TestModel2 MS269x Series: ±0.02 dB (Code Domain Power ≥ –10 dB) ±0.10 dB (Code Domain Power ≥ –30 dB) MS2830A: ±0.02 dB (Code Domain Power ≥ –10 dB) ±0.15 dB (Code Domain Power ≥ –30 dB)
Residual code domain error	Input level range: Input Level to Input Level –10 dB (Input Level ≥–4 dBm) For signals conforming to 3GPP TS25.141 TestModel3 MS269x Series: ≤ –50 dB MS2830A: ≤ –47 dB

Table 1.3-1 Specifications (Continued)

Item	Specification
Code domain error accuracy	Input level range: Input Level to Input Level –10 dB (Input Level ≥–4 dBm) For signals conforming to 3GPP TS25.141 TestModel3, with code domain error of –40 dBc MS269x Series: ±0.75 dB MS2830A: ±0.79 dB
Amplitude Measurement	
Transmitter power accuracy	After CAL execution, 18 to 28°C, for signals with the input level range of Input Level to Input Level –10 dB (Input Level ≥–4 dBm) ±0.6 dB The transmitter power accuracy is calculated from an RSS (root summed square) error of the RF frequency characteristics, linear error, resolution bandwidth switching error, and input attenuator switching error.
Occupied Bandwidth Measurement	
Measurement method	Attained with 99% method on spectrum waveforms attained by FFT calculation.
Adjacent Channel Leakage Power Measurement	
Measurement method	Performs RRC filter processing (α = 0.22) on spectrum waveforms attained by FFT calculation.
Dynamic range	18° to 28°C, for single carrier, and Input Level ≥–4 dBm: MS269x Series: –65 dB (5 MHz offset) –66 dB (10 MHz offset) MS2830A: –64 dB (5 MHz offset), Nominal –65 dB (10 MHz offset), Nominal
Spectrum Emission Mask Measurement	
Dynamic range	18° to 28°C, for single carrier, and Input Level ≥–4 dBm: MS269x Series: –78 dB/30 kHz (≥ 2.515 MHz offset) MS2830A: –77 dB/30 kHz (≥ 2.515 MHz offset), Nominal

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)” or “MS2830A Signal Analyzer Operation Manual (Mainframe Operation)” for common features not included in this manual.

2.1 Part Names 2-2
2.1.1 Front panel 2-2
2.1.2 Rear panel 2-8
2.2 Signal Path Setup 2-11
2.3 Application Startup and Selection 2-12
2.3.1 Launching application 2-12
2.3.2 Selecting application 2-12
2.4 Initialization and Calibration 2-13
2.4.1 Initialization 2-13
2.4.2 Calibration 2-13

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)" or "MS2830A Signal Analyzer Operation Manual (Mainframe Operation)".

2.1.1 Front panel

This section describes the front-panel keys and connectors.

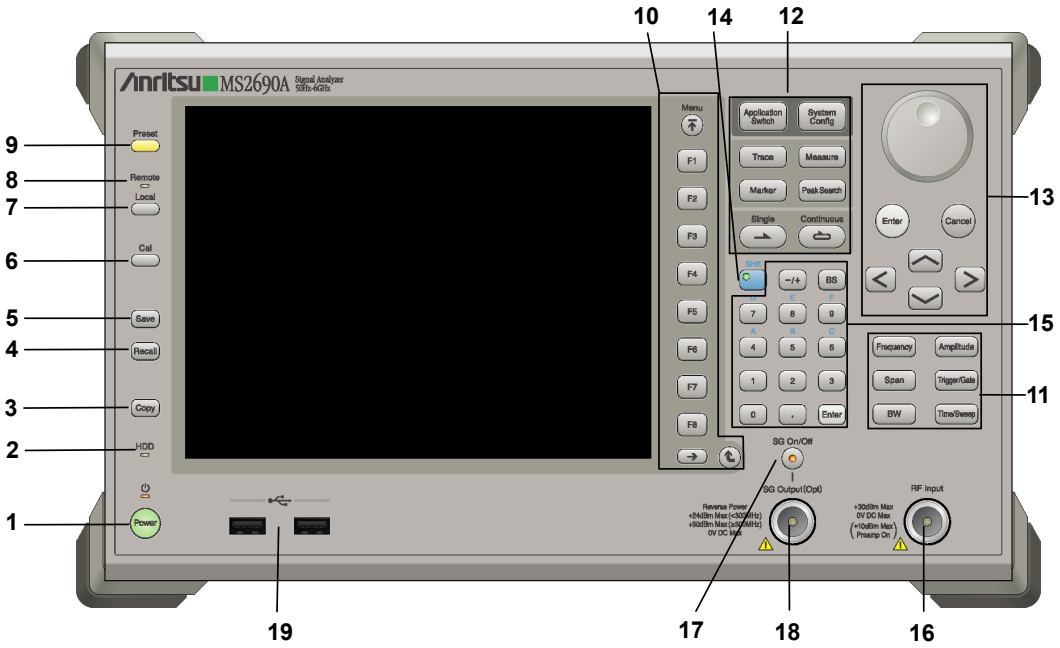


Figure 2.1.1-1 MS269x series front panel

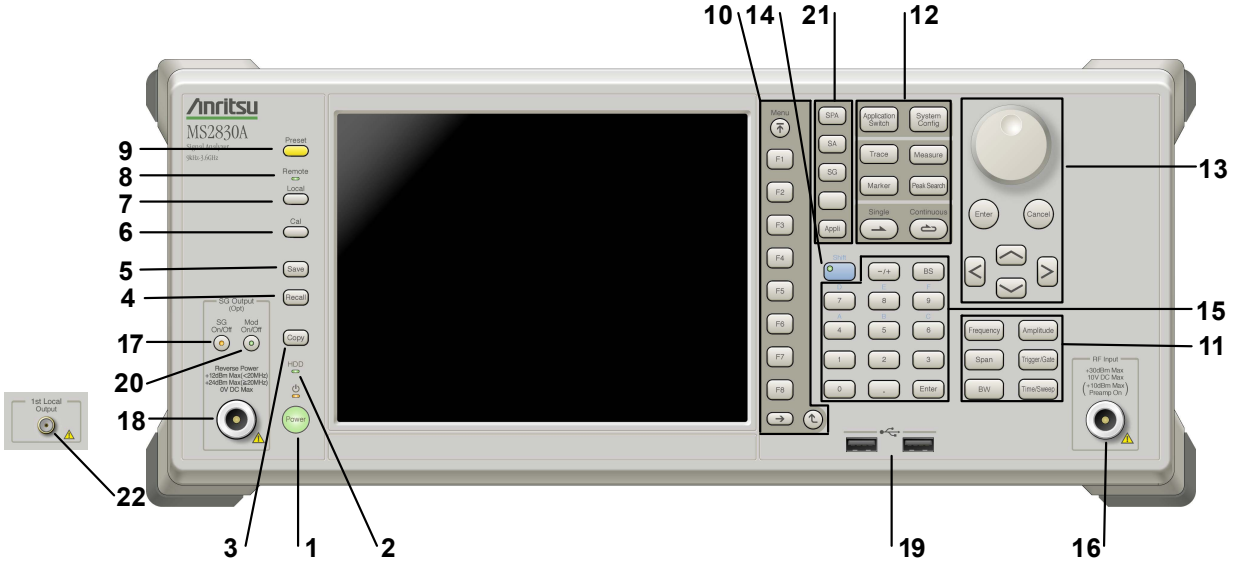


Figure 2.1.1-2 MS2830A front panel

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

Lights when accessing the internal hard disk

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

Local key

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

8 Remote

Remote lamp

Lights when in remote-control state

9 Preset

Preset key

Resets parameters to initial settings

10

Menu

F1

F2

F3

F4

F5

F6

F7

F8

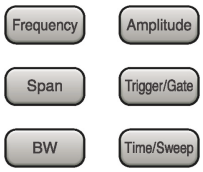
Function keys

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.

Press to set frequency parameters.

Press to set level parameters.

No function is assigned to this key.

Press to set trigger parameters.

No function is assigned to this key.

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.

Press to switch application.

Press to display Configuration screen.

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

Press to set measurement item parameters.

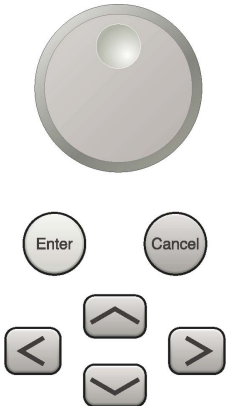
Use when switching graph marker operation.

Press to set parameters related to the peak search function.

Press to start single measurement.

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.

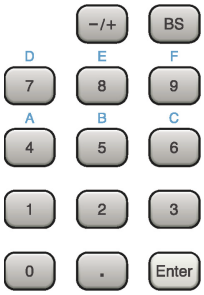
Press Cancel to cancel input or selected data.

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.

17

RF Output Control key

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.

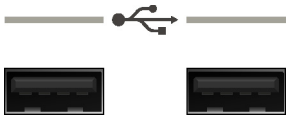
This is not available when the Option 044/045 is installed. (Only for MS2830A)

18

RF Output connector (when Option 020 installed)

Outputs RF signal, when the Vector Signal Generator option is installed.
This is an N type output connector.
This is not available when the Option 044/045 is installed. (Only for MS2830A)

19



USB connector (type A)

Connect the accessory USB keyboard, mouse or USB memory.

20

Modulation control key (MS2830A only)

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 is not available when the Option 044/045 is installed.

21

Application key (MS2830A only)

Press to switch between applications.

Press to display the Spectrum Analyzer main screen.

Press to display the Signal Analyzer main screen, when Option 005/105 and 006/106 are installed.

Press to display the Signal Analyzer main screen, when Vector Signal Generator option is installed.

This is a blank key. Not used.

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)".

22

1st Local Output connector (Only for MS2830A)

This is available when the Option 044/045 is installed.
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.

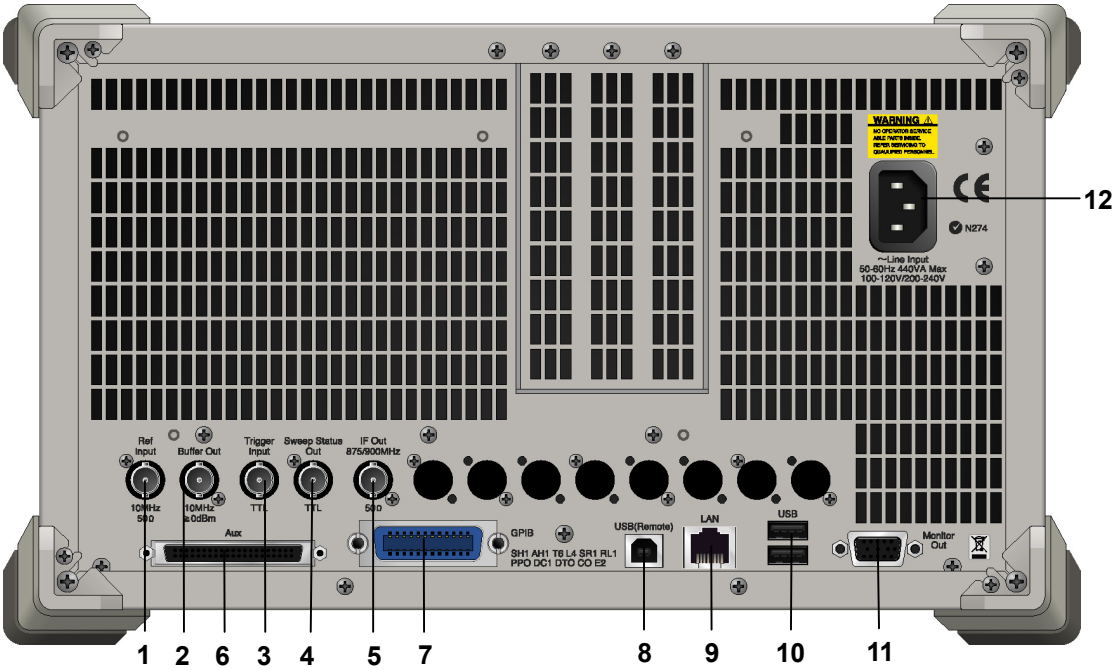


Figure 2.1.2-1 MS269x series rear panel

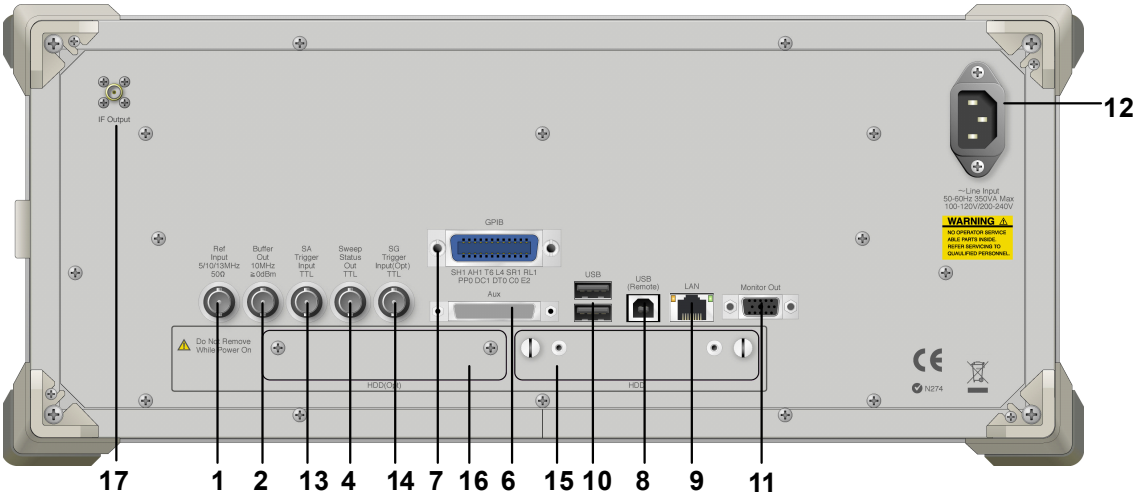
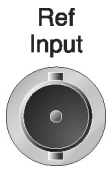


Figure 2.1.2-2 MS2830A rear panel

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 to that of other equipment. The following frequencies are supported:

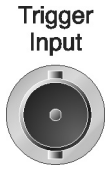
MS269x series: 10 MHz/13 MHz
MS2830A: 5 MHz/10 MHz/13 MHz

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.

3



Trigger Input connector (MS269x series only)

Inputs trigger signal from external device.

4

Sweep Status Out connector

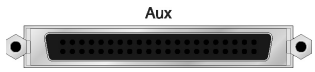
Outputs signal when internal measurement is performed or measurement data is obtained.

5

IF Out connector (MS269x series only)

Not used

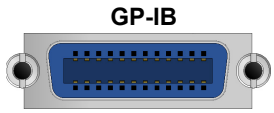
6



AUX connector

Not used

7



GPIB connector

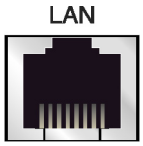
For external control via GPIB.

8

USB connector (type B)

For external control via USB

9



Ethernet connector

Connects PC or Ethernet network.

10

USB connector (type A)

Used to connect a USB keyboard or mouse or the USB memory supplied.

11

Monitor Out connector

Connects external display

12

AC inlet

Supplies power

13

SA Trigger Input connector (MS2830A only)

This is a BNC connector for inputting external trigger signal (TTL) for SPA and SA applications.

14

SG Trigger Input connector (MS2830A only)

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

15 HDD

HDD slot (MS2830A only)

This is a standard hard disk slot.

16 HDD(Opt)

HDD slot for Option (MS2830A only)

This is a hard disk slot for the options.

17

IF output connector (Only for MS2830A)

Monitor output of the internal IF signal.

This is available when the Option 044/045 is installed.

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.

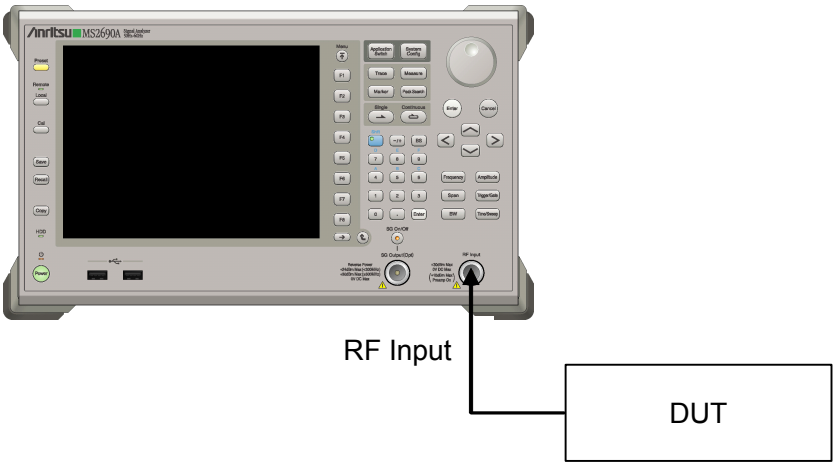


Figure 2.2-1 Signal path setup example

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

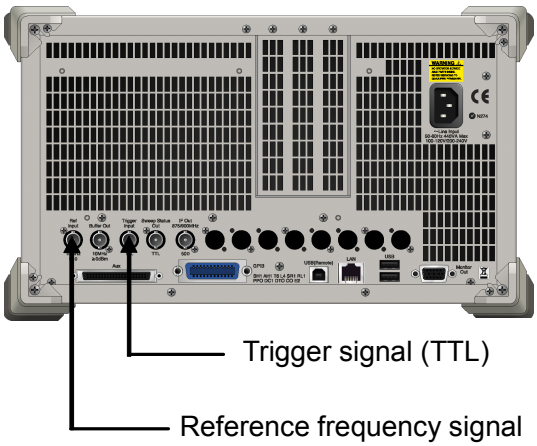


Figure 2.2-2 External signal input

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)” or “MS2830A Signal Analyzer Operation Manual (Mainframe Operation)”.

Chapter 3 Measurement

This chapter describes the measurement function, and the parameter contents and setting methods for the MX269030A.

3.1 Screen Layout 3-2
3.2 Basic Operation 3-3
3.2.1 Switching operation window 3-3
3.2.2 Settings parameters 3-4
3.2.3 Performing measurement 3-4
3.2.4 Executing Adjust Range 3-5
3.2.5 Executing SG Synchronize 3-5
3.3 Result window 3-6
3.3.1 Function menu 3-8
3.3.2 Modulation analysis measurement results 3-10
3.3.3 Constellation graph display 3-12
3.3.4 Code Domain Power waveform display 3-12
3.3.5 Occupied bandwidth measurement results 3-15
3.3.6 Spectrum emission mask measurement results 3-16
3.3.7 Adjacent channel leakage power ratio measurement results 3-16
3.4 Parameter Window 3-17
3.4.1 Function menu 3-18
3.4.2 Common parameters 3-19
3.4.3 Modulation analysis parameters 3-22
3.4.4 Occupied bandwidth parameters 3-26
3.4.5 Spectrum emission mask parameters 3-27
3.4.6 Adjacent channel leakage power ratio parameters 3-31

3.1 Screen Layout

This section explains the screen layout for the MX269030A.

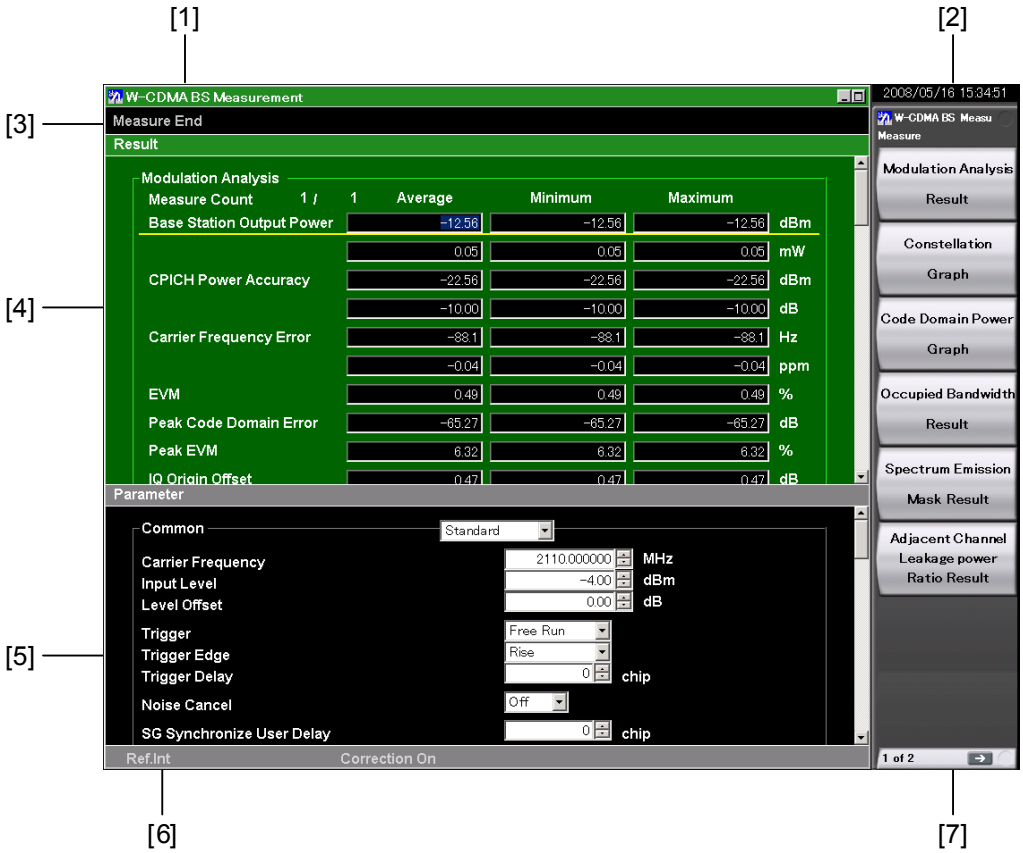


Figure 3.1-1 Screen Layout

[1] Title

Displays the title.

[2] Date and time

Displays the current date and time.

[3] Status message

Displays the status of the MX269030A and measurement.

[4] Result window

Displays the latest measurement results.

[5] Parameter window

For setting measurement parameters.

[6] Reference clock message

Displays the status of the reference clock.

[7] Function menu

Displays the functions executable with the function keys.

3.2 Basic Operation

This section describes the basic operation of the MX269030A.

3.2.1 Switching operation window

Pressing Trace switches the window. Select a window applicable to the desired operation. A marker will be displayed in the selected window; use the rotary knob or the step keys to move the marker and scroll the window.

Table 3.2.1-1 lists the selectable windows.

Table 3.2.1-1 Selectable windows

Window Name	Function
Result	Displays measurement results.
Parameter	Used to set measurement parameters.

The window display size can be changed with the following procedure.

<Procedure>

1. Press Menu.
2. Press → to display page 2 of the Function menu.
3. Press F1 (Window Size).
4. Select the window to display.

Table 3.2.1-2 Window selection

Menu Display	Function
Result	Displays only the Result window.
Result and Parameter	Displays the Result window and Parameter window.
Parameter	Displays only the Parameter window.

3.2.2 Settings parameters

Measurement parameters can be set in the Parameter window. Select parameters with the marker using the rotary knob or step keys and configure settings using the numeric keypad, Enter, Cancel, and so forth.

Certain panel keys have shortcut keys for selecting parameters. Pressing the following keys automatically activates the Parameter window and moves the marker to the specified parameter.

Table 3.2.2-1 Shortcut keys

Key	Specified Parameter
Frequency	Carrier Frequency
Amplitude	Input Level
Trigger/Gate	Trigger

3.2.3 Performing measurement

There are two measurement modes: Single and Continuous. Measurement is performed once in Single measurement mode, and in Continuous measurement mode, measurements are performed continuously.

<u>Single</u>

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

<Procedure>

1. Press Single.

<u>Continuous</u>

The selected measurement items are continuously measured for the average count (Measure Count). Measurement will continue even if parameters are changed or the window display is changed. Measurement will be stopped if the Adjust Range function is executed or other applications are selected.

<Procedure>

1. Press Continuous.

3.2.4 Executing Adjust Range

Adjust Range is a function that automatically sets the RF attenuator based on the level of the input signal.
This is an effective measure when the level of the input signal is unknown.

<Procedure>

1. Press Menu.
2. Press → to display page 2 of the Function menu.
3. Press F3 (Adjust Range).

3.2.5 Executing SG Synchronize

SG Synchronize is a function to synchronize the input signal of the Vector Signal Generator option with TTI cycle.

Note:

This function can be set only when the Vector Signal Generator option is installed.

It sets a parameter to analyze an input signal and synchronize with TTI cycle to Vector Signal Generator option. The parameters of Vector Signal Generator option which this function automatically sets are trigger setting, trigger type, and delay. Refer to the "MS2690A/MS2691A/MS2692A Signal Analyzer Option 020: Vector Signal Generator Operation Manual (Operation)" or "MS2830A Signal Analyzer Vector Signal Generator Operation Manual (Operation)" for setting a signal to input.

<Procedure>

1. Enter a waveform pattern, frequency, output level, etc. to set the signal output of the Vector Signal Generator option.
2. Set any value to SG Synchronize User Delay in Common Parameter.
3. Press Menu.
4. Press → to display page 2 of the Function menu.
5. Press F4 (SG Synchronize).

3.3 Result window

This is a window for displaying measurement results.

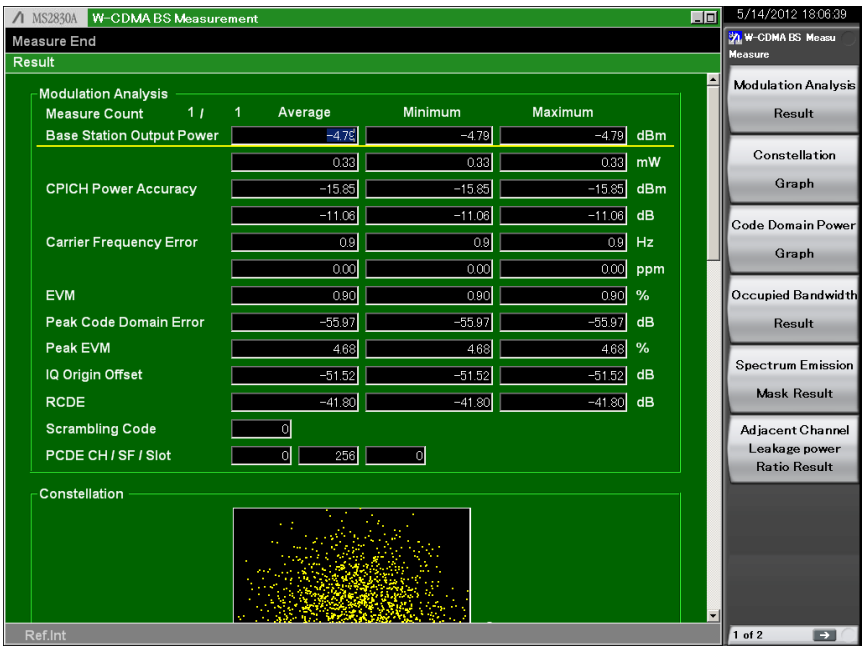


Figure 3.3-1 Result Window

Modulation Analysis

Measurement results for modulation analysis are displayed in this field. The measurement items are: Base Station Output Power, CPICH Power Accuracy, Carrier Frequency Error, EVM (Error Vector Magnitude), and Peak Code Domain Error.

Constellation Graph

Measurement results for modulation analysis are displayed in this field. It is a Constellation Graph display.

Code Domain Power Graph

Measurement results for modulation analysis are displayed in this field. It is a Code Domain Power waveform display.

Occupied Bandwidth

Measurement results for occupied bandwidth using FFT calculation are displayed in this field.

Spectrum Emission Mask

Measurement results for spectrum emission mask using FFT calculation are displayed in this field.

Adjacent Channel Leakage power Ratio

Measurement results for adjacent channel leakage power ratio using FFT calculation are displayed in this field.

3.3.1 Function menu

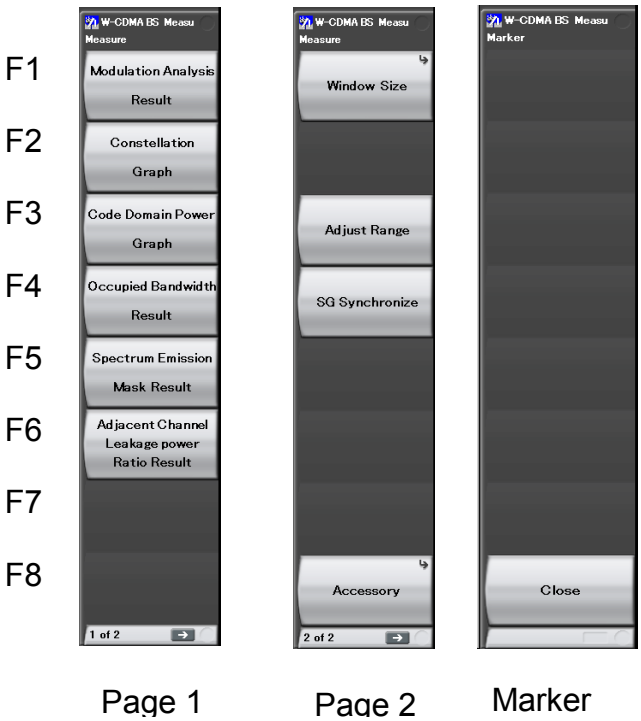


Figure 3.3.1-1 Result function menu

Table 3.3.1-1 Result function menu

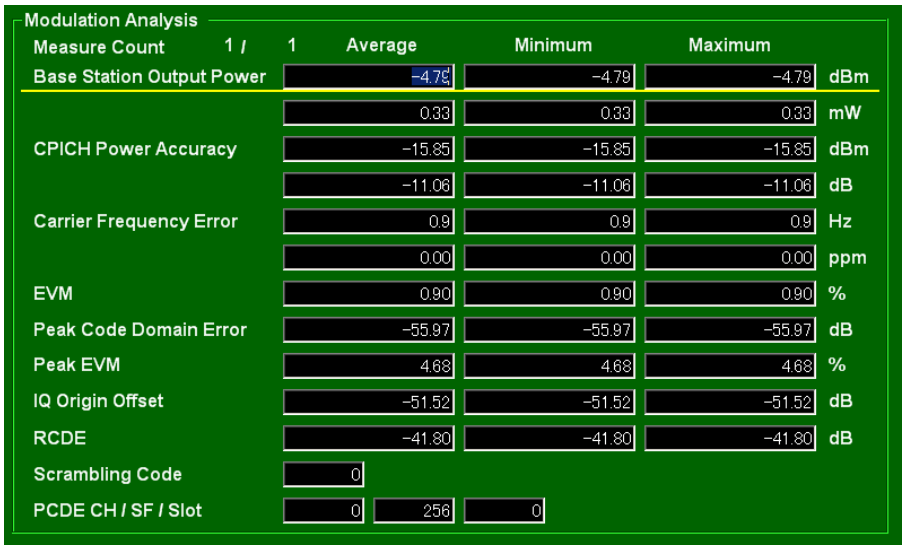
Menu Display	Function
Modulation Analysis Result	Displays the modulation analysis measurement results. 3.3.2 “Modulation analysis measurement results”
Constellation Graph	Displays Constellation Graph of the measured result for Modulation Analysis. 3.3.3 “Constellation Graph”
Code Domain Power Graph	Displays Code Domain Power waveform of the measured result for Modulation Analysis. 3.3.4 “Code Domain Power waveform display”
Occupied Bandwidth Result	Displays the occupied bandwidth measurement results. 3.3.5 “Occupied bandwidth measurement results”
Spectrum Emission Mask Result	Displays the spectrum emission mask measurement results. 3.3.6 “Spectrum emission mask measurement results”
Adjacent Channel Leakage power Ratio Result	Displays the adjacent channel leakage power ratio measurement results. 3.3.7 “Adjacent channel leakage power ratio measurement results”
Window Size	Selects the window size. 3.2.1 “Switching operation window”

Table 3.3.1-1 Result function menu (Cont'd)

Menu Display	Function
Adjust Range	Executes the function for automatically setting the RF attenuator based on the level of the input signal. ☞ 3.2.4 "Executing Adjust Range"
SG Synchronize	Analyzes the input signal and sets the parameter to synchronize with TTI cycle to the Vector Signal Generator Option ☞ 3.2.5 "Executing SG Synchronize"
Accessory	Sets other functions. ☞ 5.1 "Selecting Other Functions"
Close	Cancels the Marker operation status. ☞ 3.3.4 "Code Domain Power waveform display"

3.3.2 Modulation analysis measurement results

The modulation analysis measurement results are displayed in the Modulation Analysis field.



Modulation Analysis

Measure Count	1 /	1	Average	Minimum	Maximum	
Base Station Output Power			-4.79	-4.79	-4.79	dBm
			0.33	0.33	0.33	mW
CPICH Power Accuracy			-15.85	-15.85	-15.85	dBm
			-11.06	-11.06	-11.06	dB
Carrier Frequency Error			0.9	0.9	0.9	Hz
			0.00	0.00	0.00	ppm
EVM			0.90	0.90	0.90	%
Peak Code Domain Error			-55.97	-55.97	-55.97	dB
Peak EVM			4.68	4.68	4.68	%
IQ Origin Offset			-51.52	-51.52	-51.52	dB
RCDE			-41.80	-41.80	-41.80	dB
Scrambling Code			0			
PCDE CH / SF / Slot			0	256	0	

Figure 3.3.2-1 Modulation analysis measurement results

Base Station Output Power

This is the measurement result of the transmitter power.

CPICH Power Accuracy

This is the measurement result of the CPICH power. The relative value is the ratio of the CPICH power to the transmitter power.

Carrier Frequency Error

This is the measurement result of the carrier frequency error.

EVM

This is the measurement result of the error vector magnitude (EVM). It is given as an rms value.

Peak Code Domain Error

This is the measurement result of the peak code domain error.

Peak EVM

This is the measurement result of the peak EVM.

IQ Origin Offset

This is the measurement result of the IQ origin offset.

RCDE

This is the measurement result of the Relative Code Domain Error.

Scrambling Code

This is the scrambling code used in the analysis.

PCDE CH / SF / Slot

This is the Channelization Code number (CH), Spreading Factor (SF), and slot number of the peak code domain error.

3.3.3 Constellation graph display

Constellation graph of the Modulation Analysis measurement results is displayed.

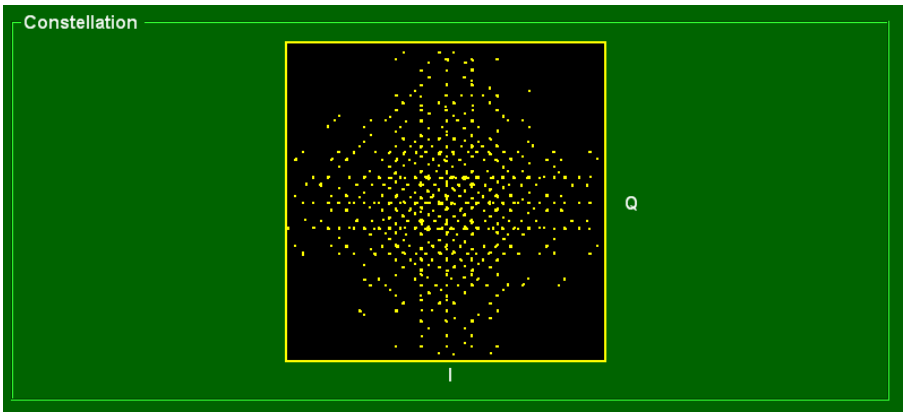


Figure 3.3.3-1 Constellation graph

3.3.4 Code Domain Power waveform display

Code Domain Power waveform is displayed by the Modulation Analysis measurement results.
The horizontal axis shows the Channelization Code number of the spreading factor 256, and the vertical axis shows the relative power which each code ingredient to all transmission power has. If judged to be Inactive, which means that there is no signal, the waveform is displayed in the code number of the spreading factor 256. If judged to be Active, which means that there is a signal, the waveform is displayed in the width decided by the spreading factor.

Press Enter to move the marker in the graph, after selecting the graph with the rotary knob or cursor key.
Press Cancel to cancel the operation status of the marker in the graph.

Marker is used as a shortcut key. Pressing Marker makes the Result window active, the marker moves to Code Domain Power waveform and it makes the marker possible to operate.

The results can be identified by the displayed colors.

Table 3.3.4-1 Code Domain Power waveform display

Color	Contents
Light blue	Result of Active Channel
Gray	Result of Inactive Channel
Red	Result of Marker Position

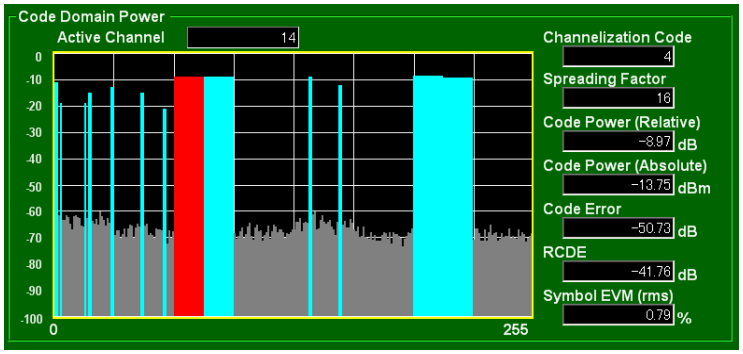


Figure 3.3.4-1 Code Domain Power measurement result

Marker operation in graph

You can move the marker in the graph using the rotary knob or cursor key. The right/left rotary knob or cursor key moves the marker by one step.

The up/down cursor keys move the marker by one step only in Active Channel.

Active Channel

Displays the code number which is Active on the Code Domain Power waveform.

Channelization Code

Displays the number of the code which the marker specifies on the Code Domain Power waveform.

Spreading Factor

Displays the spreading factor which the marker specifies on Code Domain Power waveform.

Code Power (Relative)

Displays the relative power value of the code specified by the marker on the Code Domain Power waveform, in dB units.

Code Power (Absolute)

Displays the absolute power value of the code specified by the marker on the Code Domain Power waveform, in dBm units.

Code Error

Displays the code domain error value of the code specified by the marker on the Code Domain Power waveform, in dB units.

RCDE

Displays the Relative code domain error value of the code specified by the marker on the Code Domain Power waveform, in dB units.

Symbol EVM

Displays the Symbol EVM (rms) of the code specified by the marker on the Code Domain Power waveform, in percentage (%).

3.3.5 Occupied bandwidth measurement results

The occupied bandwidth measurement results are displayed in the Occupied Bandwidth field.

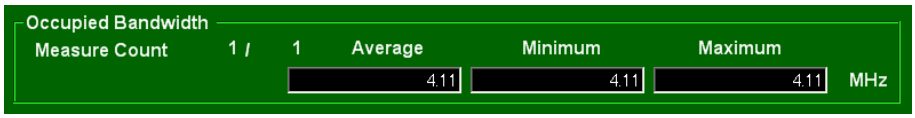


Figure 3.3.5-1 Occupied bandwidth measurement results

Occupied Bandwidth

This is the measurement result of the occupied bandwidth.

3.3.6 Spectrum emission mask measurement results

The spectrum emission mask measurement results are displayed in the Spectrum Emission Mask field.

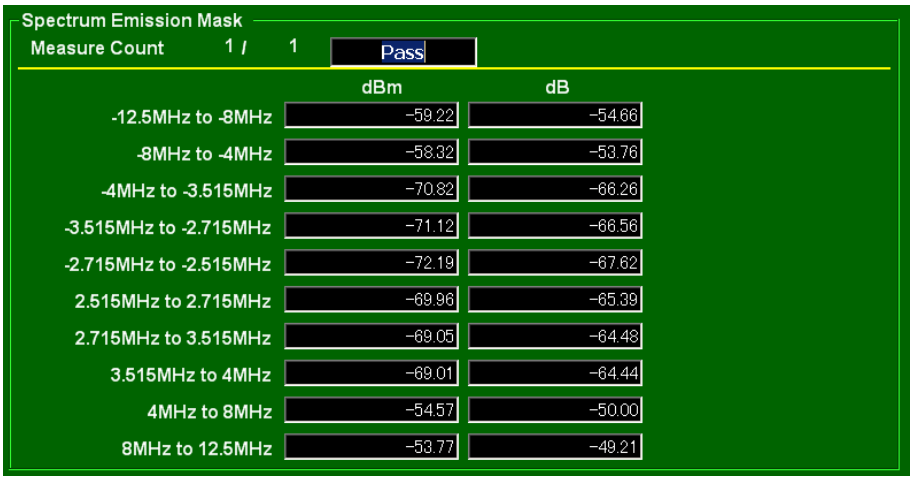


Figure 3.3.6-1 Spectrum emission mask measurement results

Pass/Fail

This is the judgment template result for all frequency bands. If all measurement points are a lower level than the template, the result is "Pass."

Measurement results for each frequency band

This displays the lowest value in relation to the template. The relative value is in relation to the template.

3.3.7 Adjacent channel leakage power ratio measurement results

The adjacent channel leakage power ratio measurement results are displayed in the Adjacent Channel Leakage power Ratio field.

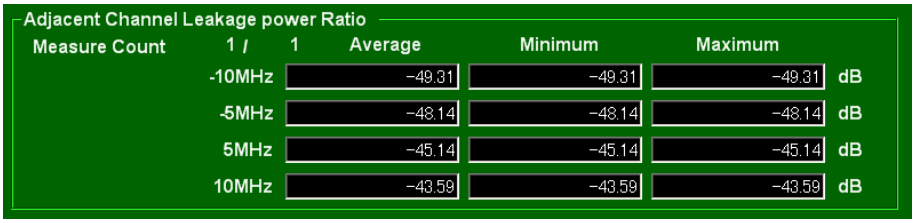


Figure 3.3.7-1 Adjacent channel leakage power ratio measurement results

Measurement results for each frequency band

This displays values in relation to the transmitter power.

3.4 Parameter Window

This is a window for setting measurement parameters.

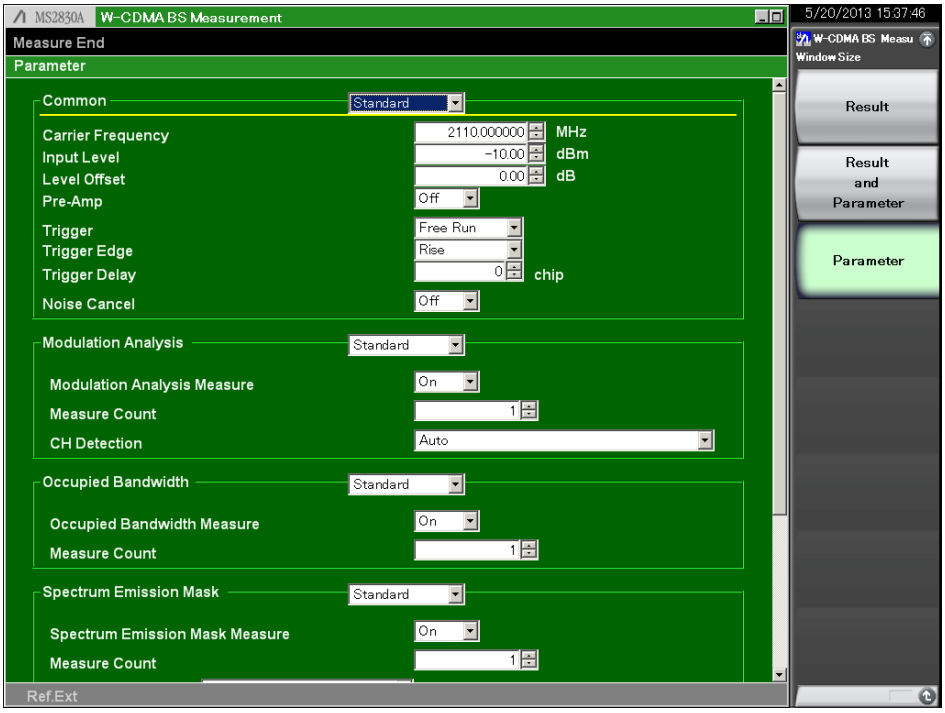


Figure 3.4-1 Parameter window

3.4.1 Function menu

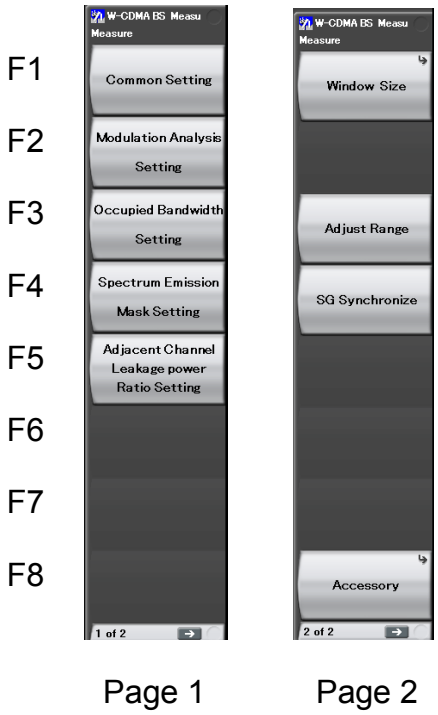


Figure 3.4.1-1 Parameter function menu

Table 3.4.1-1 Parameter function menu

Menu Display	Function
Common Setting	Sets common parameters for all tests. ☞ 3.4.2 “Common parameters”
Modulation Analysis Setting	Sets modulation analysis parameters. ☞ 3.4.3 “Modulation analysis parameters”
Occupied Bandwidth Setting	Sets occupied bandwidth parameters. ☞ 3.4.4 “Occupied bandwidth parameters”
Spectrum Emission Mask Setting	Sets spectrum emission mask parameters. ☞ 3.4.5 “Spectrum emission mask parameters”
Adjacent Channel Leakage power Ratio Setting	Sets adjacent channel leakage power ratio parameters. ☞ 3.4.6 “Adjacent channel leakage power ratio parameters”
Window Size	Selects the window size. ☞ 3.2.1 “Switching operation window”
Adjust Range	Executes the function for automatically setting the RF attenuator based on the level of the input signal. ☞ 3.2.4 “Executing Adjust Range”
Accessory	Sets other functions. ☞ 5.1 “Selecting Other Functions”

3.4.2 Common parameters

These are common parameters for various measurement items.

Common Item List

■ Summary

Enables/disables the display of common parameters.

■ Selection options

Non Display: Does not display the common parameters.
Standard: Displays the common parameters.

Carrier Frequency

■ Summary

Sets the carrier frequency.

■ Setting range

MS269x Series 50 MHz to 6 GHz
MS2830A 50 MHz to 3.6 GHz (MS2830A-040)
50 MHz to 6 GHz (MS2830A-041/043/044/045)

Input Level

■ Summary

Sets the input level from the target DUT.

■ Setting range

For Pre-Amp Off:
(–24.00 + Level Offset) to (30.00 + Level Offset) dBm
For Pre-Amp On:
(–44.00 + Level Offset) to (10.00 + Level Offset) dBm

Level Offset

■ Summary

Sets the level offset coefficient.

■ Setting range

–99.99 to 99.99 dB

■ Setting example

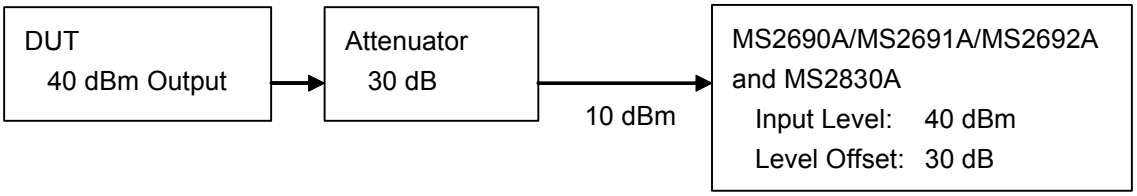


Figure 3.4.2-1 Input level and offset level setting example

Trigger

■ Summary

Sets the trigger mode.

■ Selection options

Free Run:	Starts measurement based on the internal timing of the MS2690A/MS2691A/MS2692A and MS2830A.
External:	Starts measurement based on the trigger signal input via the external trigger port.

Trigger Edge

■ Summary

Sets the trigger signal detection method.

■ Selection options

Rise:	Synchronizes with the rising of the trigger signal.
Fall:	Synchronizes with the falling of the trigger signal.

Trigger Delay

■ Summary

Sets the offset time between the trigger detection time and measurement start time.

■ Setting range

–3840000 to 3840000 chips

■ Details

The MS2690A/MS2691A/MS2692A and MS2830A performs synchronization using SCH and the scrambling code to determine the measurement target frame.

Example:	Trigger	External
	Trigger Edge	Rise
	Trigger Delay	40000 chips
	Measure Count	10

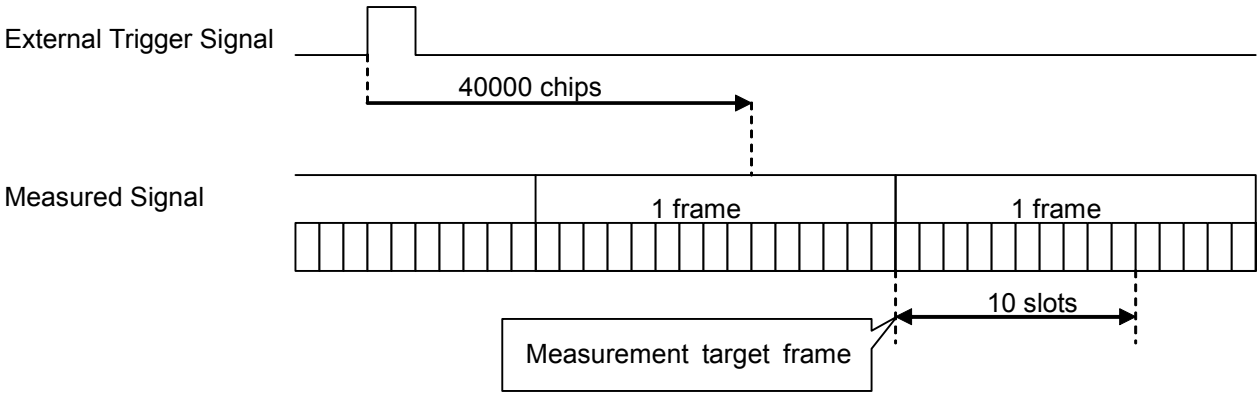


Figure 3.4.2-2 Timing of external trigger signal and measured signal

Noise Cancel

■ Summary

Sets Noise Cancel function On/Off.

■ Selection options

On:	Enables the Noise Cancel function.
Off:	Disables the Noise Cancel function.

■ Details

If the Noise Cancel function is enabled, the internal noise is measured when the measurement starts and it is deducted from the measurement result.

The measurement items for the Noise Cancel function are Occupied Bandwidth measurement, Spectrum Emission Mask measurement, and Adjacent Channel Leakage power Ratio measurement.

Note:

If the input signal level is high, make sure that the internal noise may not be measured properly.

SG Synchronize User Delay

■ Summary

Sets TTI cycle of the input signal and Offset time of the output signal start time.

■ Selection options

0 to 307,200 chips

Note:

This function can be set only when the Vector Signal Generator option is installed.

Pre-Amp

■ Summary

Sets Pre-Amp function On/Off.

■ Selection options

On:	Enables the Pre-Amp function.
Off:	Disables the Pre-Amp function.

Note:

Pre-Amp can be set only when Pre-Amp Option is installed.

3.4.3 Modulation analysis parameters

These are modulation analysis measurement parameters.

Modulation Analysis Item List

■ Summary

Enables/disables the display of modulation analysis parameters.

■ Selection options

Non Display:	Does not display the modulation analysis parameters.
Standard:	Displays the basic parameters from among all modulation analysis parameters.
Detail:	Displays all the modulation analysis parameters.

Modulation Analysis Measure

■ Summary

Sets whether modulation analysis measurement is performed.

■ Selection options

On:	Measures modulation analysis.
Off:	Does not measure modulation analysis.

Measure Count

■ Summary

Sets the modulation analysis measurement count. When measured only once, the measurement target is 1 slot = approx. 667 μs.

■ Setting range

1 to 3000

CH Detection

■ Summary

Sets the active channel detection method.

■ Selection options

Auto: Detects the active channel from the input signal.

Specify Test Model: Specifies a test model from those below. The channel configuration of the specified test model is regarded as the active channel.

- Test Model1 16DPCH
- Test Model1 32DPCH
- Test Model1 64DPCH
- Test Model1 4DPCH
- Test Model1 8DPCH
- Test Model2
- Test Model3 16DPCH
- Test Model3 32DPCH
- Test Model3 4DPCH
- Test Model3 8DPCH
- Test Model4
- Test Model4 include CPICH
- Test Model5 6DPCH 2HS-PDSCH
- Test Model5 14DPCH 4HS-PDSCH
- Test Model5 30DPCH 8HS-PDSCH
- Test Model5 4DPCH 4HS-PDSCH
- Test Model6 30DPCH 8HS-PDSCH
- Test Model6 4DPCH 4HS-PDSCH

DTX Setup

■ Summary

Sets the function for correcting the PICH transmission OFF interval.

■ Selection options

ON: Enables the PICH Channelization Code and PICH Timing Offset parameters.

OFF: Disables the PICH Channelization Code and PICH Timing Offset parameters.

PICH Channelization Code

■ Summary

Sets the PICH channelization code number. This parameter is enabled when DTX Setup is set to ON.

■ Setting range

0 to 255

PICH Timing Offset

■ Summary

Sets the PICH timing offset. This parameter is enabled when DTX Setup is set to ON.

■ Setting range

0 to 149 (Unit: 256 chips)

Constellation Graph View

■ Summary

Sets whether to display a Constellation graph of the Modulation Analysis measurement results.

■ Selection options

On:	Displays Constellation graph.
Off:	Does not display Constellation graph.

Note:

This function can be set only when Modulation Analysis Measure is set to On.

Code Domain Power Graph View

■ Summary

Sets whether to display a Code Domain Power waveform of the Modulation Analysis measurement results.

■ Selection options

On:	Displays Code Domain Power waveform.
Off:	Does not display Code Domain Power waveform.

Note:

This function can be set only when Modulation Analysis Measure is set to On.

Scrambling Code Sync

■ Summary

Sets the Scrambling Code specification method.

■ Selection options

AUTO	Detects Scrambling Code automatically.
User Define	Specifies Scrambling Code explicitly.

Scrambling Code

■ Summary

Sets Scrambling Code. This parameter is enabled when Scrambling Code Sync is set to User Define.

Scrambling Code consists of Primary Scrambling Code (PSC: 0 to 511) and Secondary Scrambling Code (SSC: 0 to 15). Use the following expression to set the Scrambling Code.

$$\text{Scrambling Code} = \text{PSC} \times 16 + \text{SSC}$$

■ Setting range

0 to 1FFF (In hexadecimal)

3.4.4 Occupied bandwidth parameters

These are occupied bandwidth measurement parameters.

Occupied Bandwidth Item List

■ Summary

Enables/disables the display of occupied bandwidth parameters.

■ Selection options

Non Display:	Does not display the occupied bandwidth parameters.
Standard:	Displays the occupied bandwidth parameters.

Occupied Bandwidth Measure

■ Summary

Sets whether to perform occupied bandwidth measurement.

■ Selection options

On:	Measures the occupied bandwidth.
Off:	Does not measure the occupied bandwidth.

Measure Count

■ Summary

Sets the occupied bandwidth measurement count.

■ Setting range

1 to 3000

3.4.5 Spectrum emission mask parameters

These are spectrum emission mask measurement parameters.

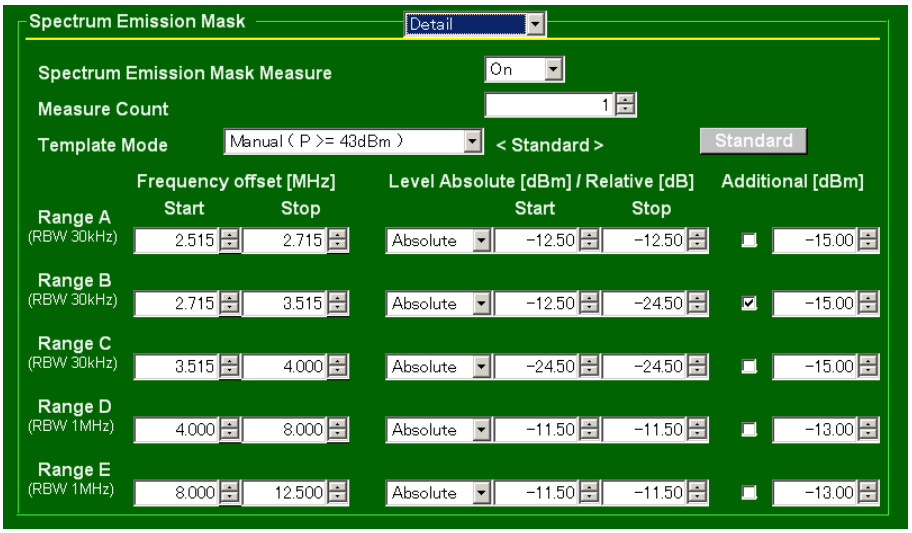


Figure 3.4.5-1 Spectrum Emission Mask measurement parameter

Spectrum Emission Mask Item List

■ Summary

Enables/disables the display of spectrum emission mask parameters.

■ Selection options

Non Display:	Does not display the spectrum emission mask parameters.
Standard:	Displays only the basic parameters of the Spectrum Emission Mask parameters.
Details:	Displays all Spectrum Emission Mask parameters.

Spectrum Emission Mask Measure

■ Summary

Sets whether to perform spectrum emission mask measurement.

■ Selection options

On:	Measures spectrum emission mask.
Off:	Does not measure spectrum emission mask.

Measure Count

■ Summary

Sets the spectrum emission mask measurement count.

■ Setting range

1 to 3000

Template Mode

■ Summary

Sets the template of Spectrum Emission Mask.

■ Selection options

Auto: Automatically selects and sets a table from transmission power of the center frequency band which has measured the template mask.

Auto (Additional): Automatically selects and sets a table from transmission power of the center frequency band which has measured the template mask. Uses Additional in making the template mask.

Manual (P ≥43 dBm): Sets the initial value based on the specification of 3GPP TS25.141 (Table P ≥43 dBm). Users can change to any template mask.

Manual (39 ≤P <43 dBm): Sets the initial value based on the specification of 3GPP TS25.141(Table 39 ≤ P <43 dBm). Users can change to any template mask.

Manual (31 ≤ P < 39 dBm): Sets the initial value based on the specification of 3GPP TS25.141 (Table 31 ≤ P < 39 dBm). Users can change to any template mask.

Manual (P <31 dBm): Sets the initial value based on the specification of 3GPP TS25.141 (Table P < 31 dBm). Users can change to any template mask.

■ Details

If Auto is selected, you cannot change the setting of Range A to E. If Manual is selected, you can change the setting of Range A to E.

If Manual is selected, <Standard> and Standard button will be displayed beside the selected item. If you change the initial value in the setting of Range A to E, <Standard> display will be changed to <Changed>.

Standard button

■ Summary

Initializes the template mask of Spectrum Emission Mask using the selected Template Mode.

It is displayed only when Template Mode is set to Manual.

Range A to E Frequency offset Start

■ Summary

Sets the frequency offset start of the template Range A to E of Spectrum Emission Mask.

■ Setting range

Range A to C:	2.500 to 4.000 [MHz]
Range D, E:	4.000 to 12.500 [MHz]

Range A to E Frequency offset Stop

■ Summary

Sets the frequency offset stop of the template Range A to E of Spectrum Emission Mask.

■ Setting range

Range A to C:	2.500 to 4.000 [MHz]
Range D and E:	4.000 to 12.500 [MHz]

Range A to E Level Mode

■ Summary

Sets the judgment level type of the template Range A to E of Spectrum Emission Mask.

■ Setting range

Absolute:	Sets a mask level in an absolute value.
Relative:	Sets a mask level in a relative value.

Range A to E Level Absolute Start / Stop

■ Summary

Sets the level of the template Range A to E of Spectrum Emission Mask in an absolute value.

■ Setting range

Range A to E:	–999.99 to 999.99 [dBm]

Range A to E Level Relative Start / Stop

■ Summary

Sets the level of the template Range A to E of Spectrum Emission Mask in a relative value.

■ Setting range

Range A to E: –99.99 to 99.99 [dB]

Range A to E Additional

■ Summary

Sets whether to use “Additional” on the template of Spectrum Emission Mask.

■ Selection options

When selected: Uses “Additional”.
When cleared: Does not use “Additional”.

Range A to E Additional Level

■ Summary

Sets the Additional level of the template Range A to E of Spectrum Emission Mask in an absolute value.

If the Additional check box is selected, the Additional level is used for judgment.

■ Selection options

Range A to E: –999.99 to 999.99 [dBm]

3.4.6 Adjacent channel leakage power ratio parameters

These are the adjacent channel leakage power ratio measurement parameters.

Adjacent Channel Leakage power Ratio Item List

■ Summary

Enables/disables the display of adjacent channel leakage power ratio parameters.

■ Selection options

Non Display:	Does not display adjacent channel leakage power ratio parameters.
Standard:	Displays adjacent channel leakage power ratio parameters.

Adjacent Channel Leakage power Ratio Measure

■ Summary

Sets whether to perform adjacent channel leakage power ratio measurement.

■ Selection options

On:	Measures the adjacent channel leakage power ratio.
Off:	Does not measure the adjacent channel leakage power ratio.

Measure Count

■ Summary

Sets the adjacent channel leakage power ratio measurement count.

■ Setting range

1 to 3000

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 required for acceptance inspection, routine inspection and performance verification after repairs. Perform items deemed critical at regular intervals as preventive maintenance. Perform the following performance tests for acceptance inspection, routine inspection and performance verification after repairs.

- Carrier frequency accuracy
- Residual EVM

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

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 subject testing device and measuring instruments for at least 30 minutes except where directed, in order to stabilize them sufficiently before running performance tests. Demonstrating maximum measurement accuracy requires, in addition to the above, conducting performance tests under ambient temperatures, little AC power supply voltage fluctuations, as well as the absence of noise, vibrations, dust, humidity or other problems.

4.2.1 Testing methods

(1) Test target standards

- Carrier frequency accuracy
- Residual EVM

(2) Measuring instrument for tests

- Vector signal generator option
- Frequency standard device — Unnecessary if signal source has sufficient frequency accuracy
- Power meter — Unnecessary if signal source has sufficient transmitter power accuracy

(3) Setup

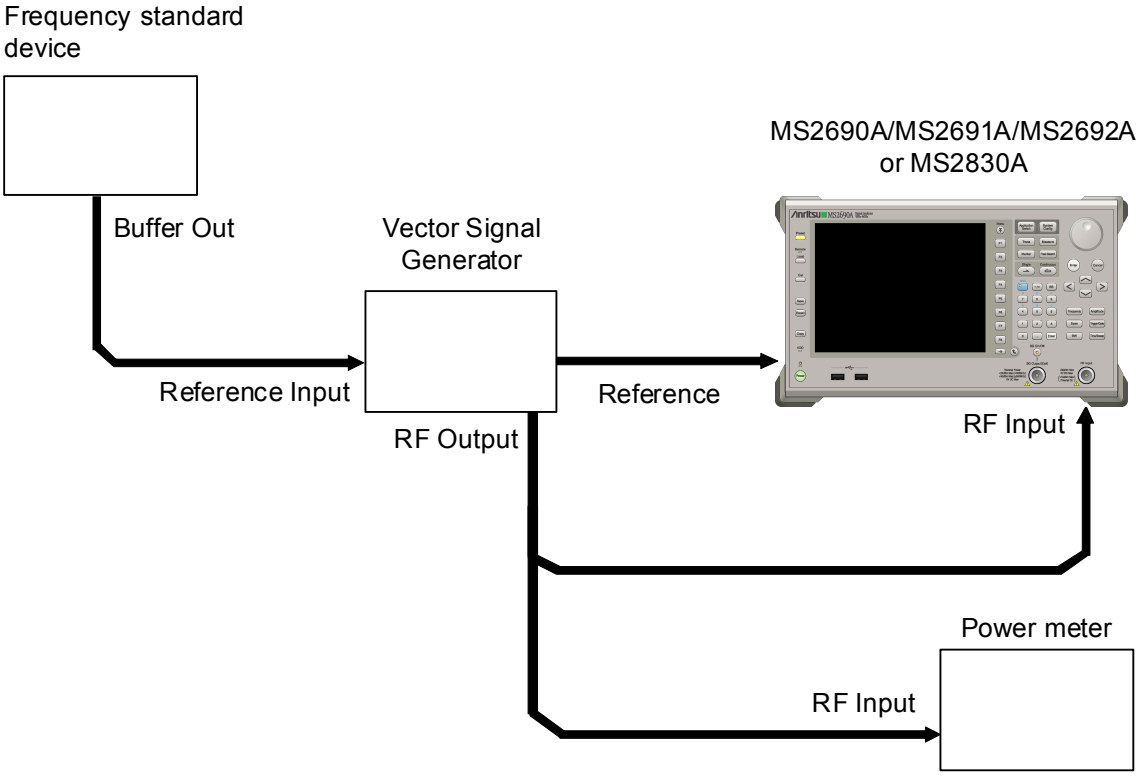


Figure 4.2.1-1 Performance test

(4) Test procedure

(a) Signal source adjustment

1. Input the reference signal output from the frequency standard device into the Reference Input connector of the vector signal generator option.
2. Input the 10 MHz reference signal output from the signal generator to the Reference Input connector.
3. Output a W-CDMA modulation signal from the vector signal generator option.
4. Input the vector signal generator option output signal into the power meter and measure the power.

(b) Main unit settings

1. Turn On the power switch on the front panel then wait until the internal temperature stabilizes (approx. 1.5 hours after the temperature in the thermostatic bath stabilizes).
2. Press [Application Switch], then press the menu function key displaying the character string "W-CDMA BS."
3. Press [Preset].
4. Press [F1] (Preset) to perform initialization.
5. Press [Cal].
6. Press [F1] (SIGANA All) to perform calibration.
7. Press [Frequency], enter the frequency output by the vector signal generator option using the numeric keypad, then press [Enter].
8. Press [Amplitude], enter the power meter measurement result using the numeric keypad, then press [Enter].
9. Move the marker to the modulation analysis parameter "Measure Count" using the rotary knob, enter the measurement count using the numeric keypad, then press [Enter].

10. Press Single to perform measurement.
    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).

11. Confirm whether the measured carrier frequency error (carrier frequency accuracy) is within specifications.
12. Confirm whether the measured EVM (residual vector error) value is within specifications.

(5) Test results

4.2.1-1 Carrier frequency accuracy (MS269x Series)

Frequency	Min. limit	Deviation (Hz)	Max. limit	Uncertainty	Pass/Fail
400 MHz	–4 Hz		+4 Hz	±1 Hz	
2000 MHz					
3000 MHz					

4.2.1-2 Carrier frequency accuracy (MS2830A)

Frequency	Min. limit	Deviation (Hz)	Max. limit	Uncertainty	Pass/Fail
400 MHz	–6 Hz		+6 Hz	±0.7 Hz	
2000 MHz					
3000 MHz					

4.2.1-3 Residual vector error (MS269x Series)

Frequency	Measured value [% (rms)]	Max. limit	Uncertainty	Pass/Fail
400 MHz		1.0%(rms)	0.1%(rms)	
2000 MHz				
3000 MHz				

4.2.1-4 Residual vector error (MS2830A)

Frequency	Measured value [% (rms)]	Max. limit	Uncertainty	Pass/Fail
400 MHz		1.3%(rms)	0.1%(rms)	
2000 MHz				
3000 MHz				

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.

References are to section numbers.

Symbol and Numbers

1

1st Local Output connector 2.1.1

A

Accessory 3.3.1, 3.4.1, 5.1
AC inlet 2.1.2
Adjacent Channel Leakage power Ratio Result 3.3.1
Adjacent Channel Leakage power Ratio Setting 3.4.1
Adjust Range 3.2.4, 3.3.1, 3.4.1
Application key 2.1.1
Application Switch 2.3.2
AUX connector 2.1.2

B

Buffer Out connector 2.1.2

C

Cal key 2.1.1
Calibration 2.4.2
Cancel key 2.1.1
Common Setting 3.4.1
Continuous 3.2.3
Copy key 2.1.1
Cursor key 2.1.1

D

Date and time 3.1

E

Enter key 2.1.1
Erase Warm Up Message 5.3
Ethernet 2.1.1
Ethernet connector 2.1.2

F

FFT 3.3
Function keys 2.1.1
Function menu 3.1

G

GPIB 2.1.1
GPIB connector 2.1.2

H

Hard disk access lamp 2.1.1
HDD slot 2.1.2

I

IF Out connector 2.1.2
IF output connector 2.1.2

L

Load Application Select 2.3.1
Local key 2.1.1

M

Main function keys 2.1.1
Measure Count 3.2.3
Modulation Analysis Result 3.3.1
Modulation Analysis Setting 3.4.1
Modulation control key 2.1.1
Monitor Out connector 2.1.2

N

Numeric keypad 2.1.1

O

Occupied Bandwidth Result 3.3.1
Occupied Bandwidth Setting 3.4.1

P

Parameter 3.2.1
Parameter window 3.1, 3.4
Power Switch 2.1.1
Preset 2.4.1
Preset key 2.1.1

R

Recall key 2.1.1
Ref Input connector 2.1.2
Reference clock 3.1
Reference frequency signal 2.1.2
Remote lamp 2.1.1
Result 3.2.1
Result and Parameter 3.2.1
Result window 3.1, 3.3
RF input connector 2.1.1
RF output connector 2.1.1
RF output control key 2.1.1
Rotary knob 2.1.1

S

Save key 2.1.1
SA Trigger Input connector 2.1.2
SG Trigger Input connector 2.1.2
Shift key 2.1.1
Single 3.2.3
Spectrum Emission Mask Result 3.3.1
Spectrum Emission Mask Setting 3.4.1
Status message 3.1
Sweep Status Out connector 2.1.2

T

Title 3.1, 5.2
Trigger Input connector 2.1.2
Trigger signal 2.1

U

USB 2.1.1, 2.1.2
USB connector (type A) 2.1.1, 2.1.2
USB connector (type B) 2.1.2

W

Window Size 3.2.1, 3.3.1, 3.4.1