MX269024A
CDMA2000 Forward Link
Measurement Software
Operation Manual
Operation

11th 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 document before using the equipment.**
- **Keep this manual with the equipment.**

ANRITSU CORPORATION

Document No.: M-W3201AE-11.0

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.

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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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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.

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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.

MX269024A
CDMA2000 Forward Link Measurement Software
Operation Manual Operation

20 May 2009 (First Edition)
30 September 2020 (11th 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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In addition, this warranty is valid only for the original equipment purchaser. It is not transferable if the equipment is resold.

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Revision History:

February 29th, 2020

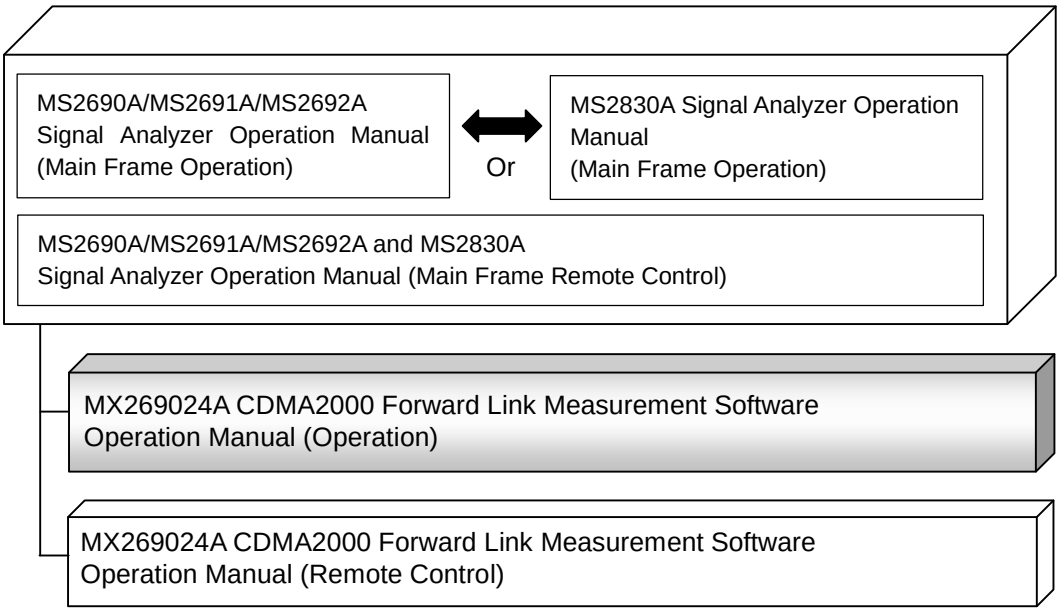
Cautions Against Computer Virus Infection

- 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 MX269024A CDMA2000 Forward Link 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.

- Forward Link Measurement Software Operation Manual (Operation) <This document>

This manual describes basic operating methods, and functions of the CDMA2000 Forward Link Measurement Software.

- CDMA2000 Forward Link Measurement Software Operation Manual (Remote Control)

This manual describes remote control of the CDMA2000 Forward Link Measurement Software.

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Chapter 1 Overview

This chapter provides an overview of the MX269024A CDMA2000 Forward Link Measurement Software and describes the product configuration.

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1.1 Product Overview

The MS2690A/MS2691A/MS2692A or MS2830A Signal Analyzer enables 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 or MS2830A is 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 MX269024A CDMA2000 Forward Link Measurement Software (hereinafter, referred to as "MX269024A") is a software option for measuring RF characteristics of CDMA2000 Forward Link specified by 3GPP2.

The MX269024A provides the following measurement features.

- Modulation accuracy measurement
- Carrier frequency measurement
- Transmitter power measurement
- Code domain measurement

MS2830A-006/106 is required to use the MX269024A on MS2830A.

1.2 Product Configuration

1.2.1 Standard configuration

Table 1.2.1-1 lists the standard configuration of the MX269024A.

Table 1.2.1-1 Standard configuration

Item	Model Name/Symbol	Product Name	Q'ty	Remarks
Application	MX269024A	CDMA2000 Forward Link Measurement Software	1	
Accessory	—	Installation CD-ROM	1	Application software, operation manual CD-ROM

1.2.2 Option

Table 1.2.2-1 lists the specifications for the MX269024A. They are sold separately.

Table 1.2.2-1 Option

Option number	Model	Remarks
MX269024A-001	All Measure Function	

1.2.3 Applicable parts

Table 1.2.3-1 lists the applicable parts for the MX269024A.

Table 1.2.3-1 Applicable parts

Model Name/Symbol	Product Name	Remarks
W3201AE	MX269024A CDMA2000 Forward Link Measurement Software Operation Manual (Operation)	English, printed version
W3202AE	MX269024A CDMA2000 Forward Link Measurement Software Operation Manual (Remote Control)	English, printed version

1.3 Specifications

Table 1.3-1 shows the specifications for the MX269024A.

Table 1.3-1 Specifications

Item	Specification
Modulation/Frequency Measurement	
Measurement frequency ranges	400 to 2700 MHz
Measurement level range	–15 to + 30 dBm (at Pre-Amp Off, or Pre-Amp not installed.) –15 to +10 dBm (at Pre-Amp On)
Carrier frequency accuracy	After CAL execution at 18 to 28°C For a signal of EVM = 1% ± (accuracy of reference crystal oscillator × carrier frequency + 10 Hz)
Residual EVM	After CAL execution at 18 to 28°C the signal measured is within the measurement level range and less than or equal to Input Level MS269x Series: <1.0% (rms) MS2830A: <1.5% (rms)
Residual Waveform Quality (ρ)	After CAL execution, at 18 to 28°C, the signal measured is within the measurement level range and less than or equal to Input Level MS269x Series: > 0.99990 MS2830A: > 0.99978
Transmitter power accuracy	After CAL execution, input attenuator ≥ 10 dB, at 18 to 28°C, the signal 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.) The transmitter power accuracy is obtained by an RSS (root summed square) error of the absolute amplitude accuracy and in-band frequency characteristics.
Code domain measurement	
Code domain power accuracy	After CAL execution at 18° to 28°C The signal measured is within the measurement level range and less than or equal to Input Level. ±0.02 dB (Code Power ≥ –10 dBc) ±0.05 dB (Code Power ≥ –20 dBc) ±0.10 dB (Code Power ≥ –30 dBc)
Adjacent Channel Power Measurement	
Measurement method	Executes the adjacent channel power measurement function of the Spectrum Analyzer or Signal Analyzer.

Table 1.3-1 Specifications (Continued)

Occupied Bandwidth Measurement	
Measurement method	Executes the occupied bandwidth measurement function of the Spectrum Analyzer or Signal Analyzer.
Channel Power Measurement	
Measurement method	Executes the channel power measurement function of the Spectrum Analyzer or Signal Analyzer.
Spectrum Emission Mask Measurement	
Measurement method	Executes the spectrum emission mask measurement function of the Spectrum Analyzer.

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.

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

2.1.1 Front panel

This section describes the front-panel keys and connectors.

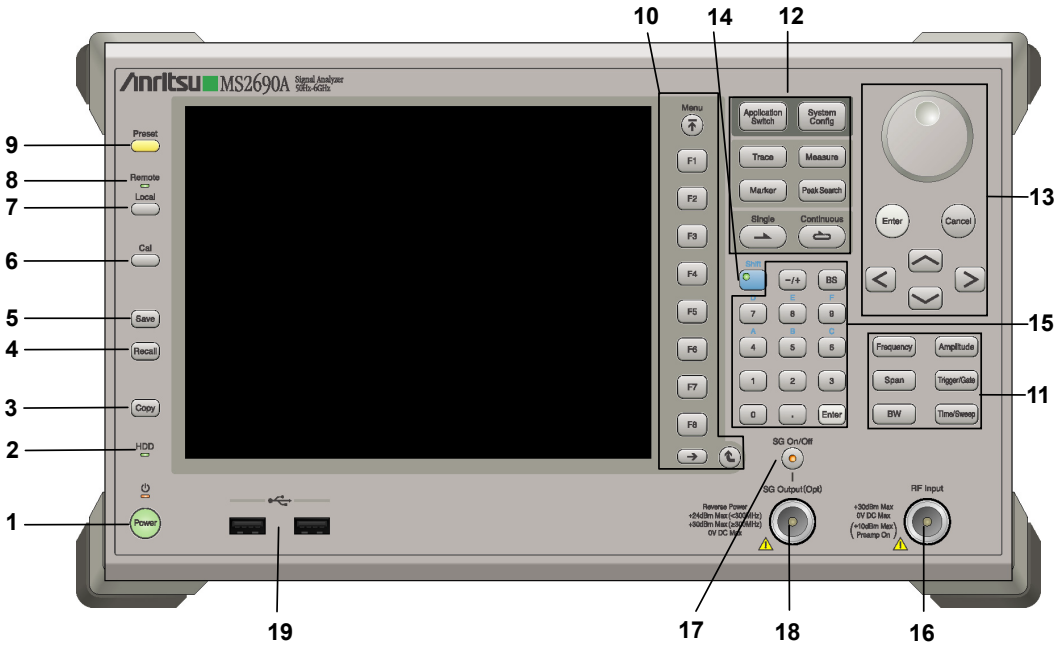


Figure 2.1.1-1 MS269x series front panel

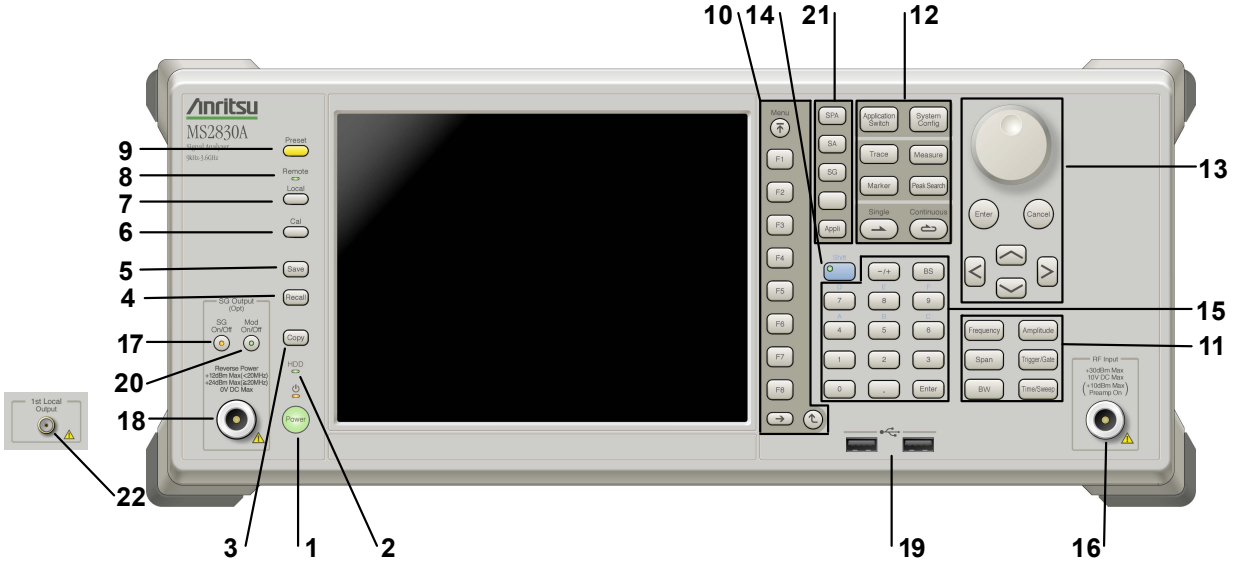


Figure 2.1.1-2 MS2830A front panel

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

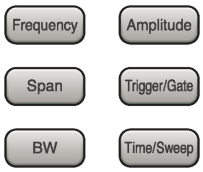
Function keys

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.

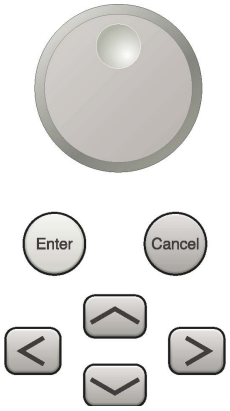
Use when switching graph marker operation.

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.

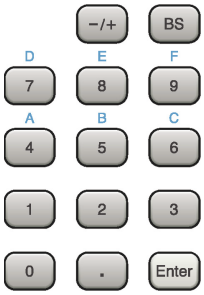
Press Cancel to cancel input or selected data.

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.

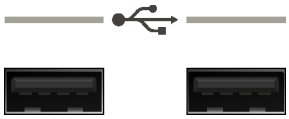
This is not available when the Option 044/045 is installed. (Only for MS2830A)

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.

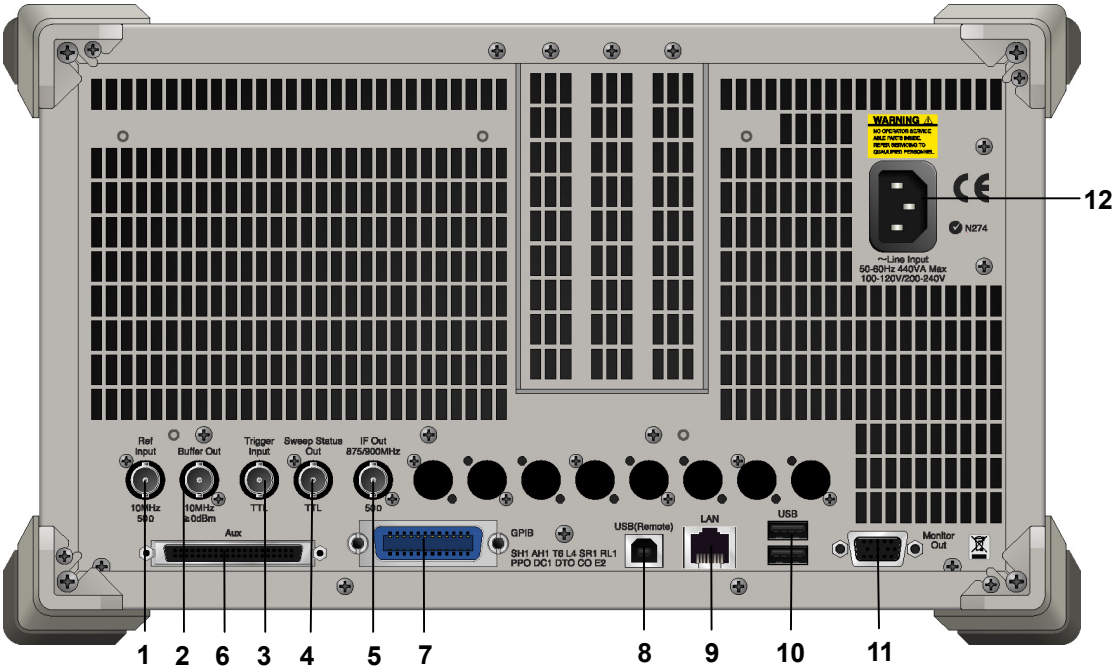


Figure 2.1.2-1 MS269x series rear panel

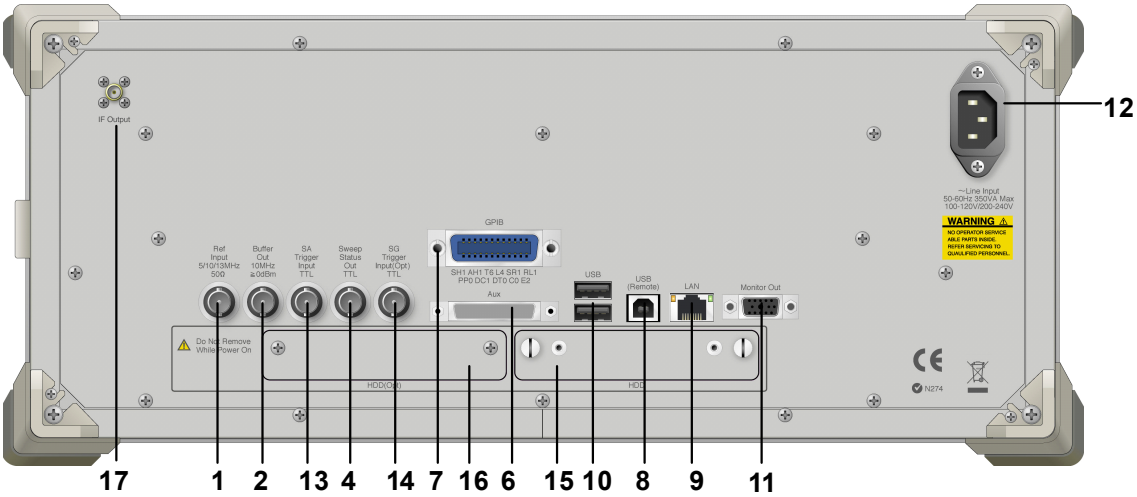
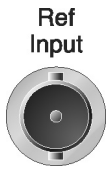


Figure 2.1.2-2 MS2830A rear panel

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:

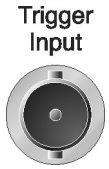
MS269x series: 10 MHz/13 MHz
MS2830A: 5 MHz/10 MHz/13 MHz

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

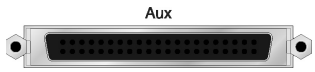
Outputs signal when internal measurement is performed or measurement data is obtained.

5

IF Out connector (MS269x series only)

Not used

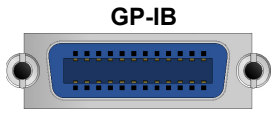
6



AUX connector

Not used

7



GPIB connector

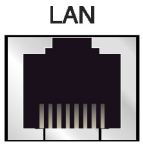
For external control via GPIB.

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.

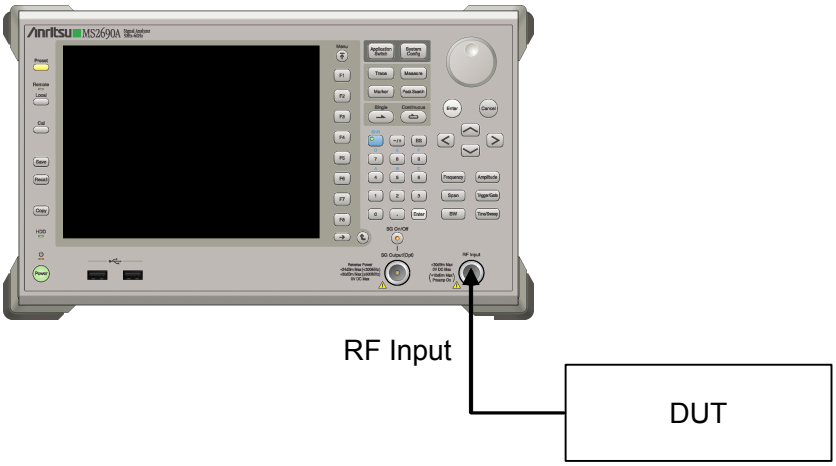


Figure 2.2-1 Signal path setup example

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

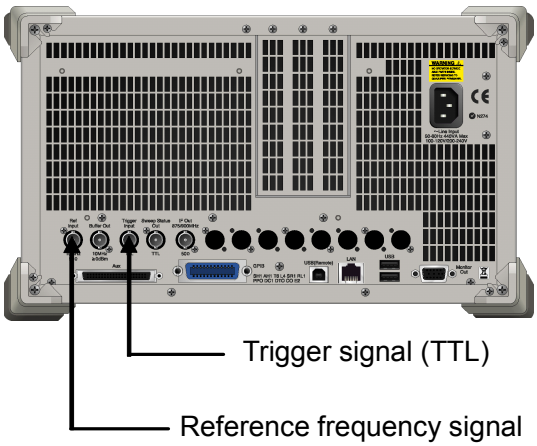


Figure 2.2-2 External signal input

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, the parameter contents and setting methods for the MX269024A.

3.1 Basic Operation 3-2
3.1.1 Screen layout 3-2
3.1.2 Function menu 3-3
3.1.3 Performing measurement 3-4
3.2 Setting Frequency 3-5
3.3 Setting Level 3-6
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3.5.1 Code Domain 3-9
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3.1 Basic Operation

Press Application Switch to display the Application Switch function menu.
Pressing the function key with the indication of (CDMA2000 Forward) displays the application screen.

3.1.1 Screen layout

This section describes the screen layout for the MX269024A.

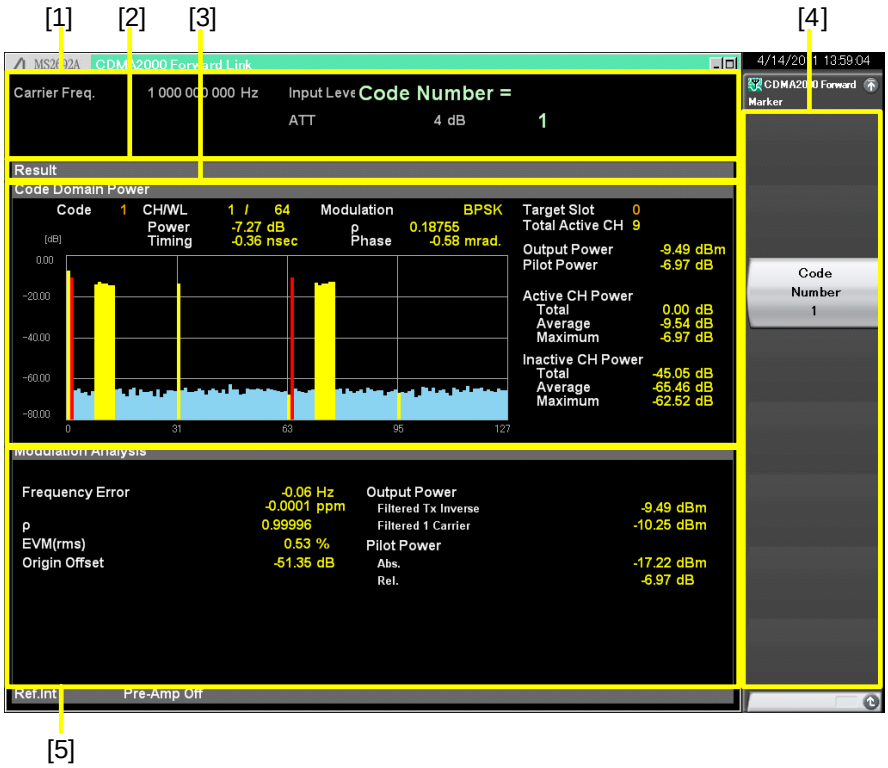

Figure 3.1.1-1 Screen Layout

[1] Measurement parameter
Displays the set parameters.

[2] Status message
Displays the status of signals.

[3] Code Domain Power window
Displays the code domain power graph for the selected slot.

[4] Function menu
Displays the functions executable with the function keys.

[5] Modulation Analysis window
Displays the modulation analysis results.

3.1.2 Function menu

This section describes the main function menu on the main screen.

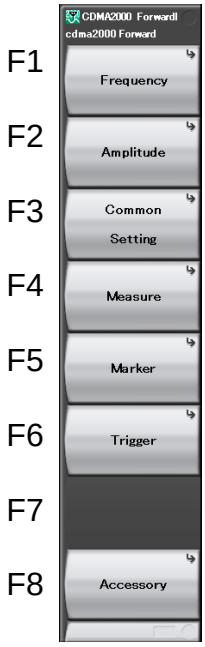

Figure 3.1.2-1 Main function menu

Table 3.1.2-1 Main function menu

Function Key	Menu Display	Function
F1	Frequency	Sets a frequency 3.2 "Setting Frequency"
F2	Amplitude	Sets level. 3.3 "Setting Level"
F3	Common Setting	Sets common items. 3.4 "Setting Common Items"
F4	Measure	Sets measurement items. 3.5 "Setting Measurement Items"
F5	Marker	Sets a marker. 3.6 "Setting Maker"
F6	Trigger	Sets a trigger. 3.7 "Setting Trigger"
F8	Accessory	Sets other functions. 5.1 "Selecting Other Functions"

3.1.3 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, respectively.

Single

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

<Procedure>

1. Press .

Continuous

The selected measurement items are continuously measured for the measurement count (Storage Count). Measurement will continue even if parameters are changed or the window display is changed. Measurement will be stopped if another application is selected or if the Replay function is executed.

<Procedure>

1. Press .

3.2 Setting Frequency

Configures settings on a frequency. Pressing the F1 (Frequency) on the main function menu displays the Frequency function menu. Pressing Frequency displays the Frequency function menu and opens the Carrier Frequency dialog box.

Table 3.2-1 Frequency function menu

Function Key	Menu Display	Function
F1	Carrier Frequency	Sets a carrier frequency Setting range 100 MHz to the upper limit of the main unit
F7	RF Spectrum	This command sets whether to reverse the input signal IQ spectrum. Setting options Norm. Measures without reversed IQ spectrum. Rvs. Measures with reversed IQ spectrum.

3.3 Setting Level

Configures settings on level. Pressing F2 (Amplitude) on the main function menu displays the Amplitude function menu. Pressing Amplitude displays the Amplitude function menu and opens the Input Level dialog box.

Table 3.3-1 Amplitude function menu

Function Key	Menu Display	Function
F1	Input Level	Sets the input level from the target DUT. Setting range For Pre-Amp: On : (–80.00 + Offset Value) to (10.00 + Offset Value) dBm For Pre-Amp: Off: (–60.00 + Offset Value) to (30.00 + Offset Value) dBm
F3	Auto Range	Adjusts input level according to input signal.
F4	Pre-Amp	Sets On/Off for the Pre-Amp function. Pre-Amp can be set only when Hardware Option 008 is installed. Selection options On Enables the Pre-Amp function. Off Disables the Pre-Amp function.
F7	Offset	Sets On/Off for the Offset function. On Enables the offset function. Off Disables the offset function.
F8	Offset Value	Sets the level offset coefficient. Setting range –99.99 to 99.99 dB Figure 3.3-1 Setting example

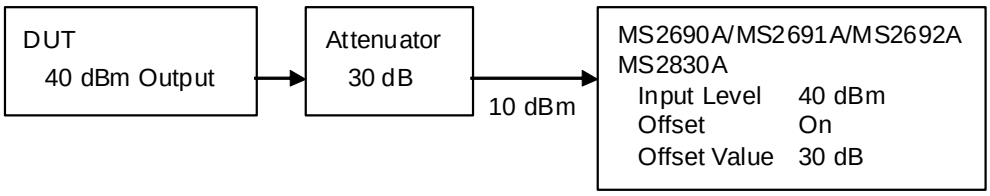

Figure 3.3-1 Setting example

3.4 Setting Common Items

This section describes the settings for the common items. Pressing F3 (Common Setting) on the main function menu displays the Common Setting function menu.

Table 3.4-1 Common Setting function menu

Function Key	Menu Display	Function
F1	Radio Configuration	Selects the radio configuration of the input signal. Setting options RC1-2 Select when measuring the Radio Configuration 1 or 2. RC3-5 Select when measuring the Radio Configuration 3, 4 or 5.
F4	PN Offset	This command sets the Offset Index of the Pilot PN Offset. The measurement result will not be affected when Trigger Switch is set to Off. Setting range 0 to 511. 3.7 “Setting Trigger”
F8	Active Code Threshold	Sets the threshold to identify the code as the active code. Setting range –80.0 to –10.0 dB

3.5 Setting Measurement Items

Sets measurement items. Pressing F4 (Measure) on the main function menu or Measure displays the Measure function menu.

Table 3.5-1 Measure function menu

Function Key	Menu Display	Function
Page 1		
F1	Code Domain	Selects code domain analysis. 3.5.1 "Code Domain"
F3	All Measure	Recalls the All Measure function menu. This function is available when the MX269024A-001 All Measure Function is installed. 3.5.6 "All Measure"
F5	ACP(FFT)	Recalls the ACP (FFT) function of the Signal Analyzer function. 3.5.2 "Adjacent Channel Power Measurement (ACP)"
F6	ACP(Swept)	Recalls the ACP (Swept) function of the Spectrum Analyzer function. 3.5.2 "Adjacent Channel Power Measurement (ACP)"
F7	OBW(FFT)	Recalls the OBW (FFT) function of the Signal Analyzer function. 3.5.3 "Occupied Bandwidth Measurement (OBW)"
F8	OBW(Swept)	Recalls the OBW (Swept) function of the Spectrum Analyzer function. 3.5.3 "Occupied Bandwidth Measurement (OBW)"
Page 2		
F3	Channel Power(FFT)	Recalls the Channel Power (FFT) function of the Signal Analyzer function. 3.5.4 "Channel Power Measurement (Channel Power)"
F4	Channel Power(Swept)	Recalls the Channel Power (Swept) function of the Spectrum Analyzer function. 3.5.4 "Channel Power Measurement (Channel Power)"
F6	Spectrum Emission Mask(Swept)	Recalls the Spectrum Emission Mask (Swept) function of the Spectrum Analyzer function. 3.5.5 "Spectrum Emission Mask Measurement (SEM)"

3.5.1 Code Domain

Selects code domain analysis. Pressing F1 (Code Domain) on the Measure function menu displays the Code Domain function menu.

The Code Domain function menu is made up of 2 pages. Press → to toggle between the pages.

Table 3.5.1-1 Code Domain function menu

Function Key	Menu Display	Function
Page 1		
F1	Analysis Time	Sets measurement position. ☞ 3.5.1.1 "Analysis Time"
F3	Code Number	Sets the code to be measured. Setting range 0 to 63 If **Radio Configuration** is **RC1-2** 0 to 127 If **Radio Configuration** is **RC3-5**
F8	Target Slot Number	Sets the slot to be measured. The numeric measurement results and a graph for the specified slot are displayed in the Code Domain Power window. Setting range 0 to (Measurement Interval–1) ☞ 3.5.1.1 "Analysis Time"
Page 2		
F1	Trace	Sets the trace. ☞ 3.5.1.2 "Trace"

3.5.1.1 Analysis Time

Sets measurement position. Pressing F1 (Analysis Time) on page 1 of the Code Domain function menu or Time/Sweep displays the Analysis Time function menu.

Table 3.5.1.1-1 Analysis Time function menu

Function Key	Menu Display	Function
F2	Measurement Interval	Sets continuous measurement period in slot. Setting range 1 to 32

3.5.1.2 Trace

Sets Trace. Pressing [F1] (Trace) on page 2 of the Code Domain function menu or [Trace] displays the Trace function menu.

Table 3.5.1.2-1 Trace function menu

Function Key	Menu Display	Function
F3	Scale	Sets vertical scale of graphical result. Setting options 20 dB Sets lower limit to –20 dB. 40 dB Sets lower limit to –40 dB. 60 dB Sets lower limit to –60 dB. 80 dB Sets lower limit to –80 dB.
F4	Storage	Recalls the Storage function menu. ☞Table 3.5.1.2-2 Storage function Menu
F8	Display Mode	Sets the horizontal axis for graph result display. Sets the code sequence of the code domain graph. This parameter is available if **Radio Configuration** is **RC3-5**. Setting options Walsh Displays the horizontal axis using Walsh codes. OVSF Displays the horizontal axis using the orthogonal tree.

Table 3.5.1.2-2 Storage function menu

Function Key	Menu Display	Function
F1	Mode	Sets the storage mode. Setting options Off Updates the data every time it measures. On Displays the average value every time it measures.
F2	Count	Sets the number of measurements. Setting range 2 to 9999

3.5.2 Adjacent Channel Power Measurement (ACP)

Recalls the ACP function of the Signal Analyzer function or Spectrum Analyzer function. Settings of Carrier Frequency, Input level, Offset, Offset Value and Pre-Amp are automatically reflected on the corresponding parameters. Recall Current Application described in Section 3.6.2 "Recalling parameters" of the "MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Function Operation)"or "MS2830A Signal Analyzer Operation Manual (Mainframe Operation)" cannot be executed when this function is being recalled.

ACP (FFT)

■ Summary

Recalls the ACP function of the Signal Analyzer function and measures the adjacent channel power for the reflected parameter settings.

ACP (Swept)

■ Summary

Recalls the ACP function of the Spectrum Analyzer function and measures the adjacent channel power for the reflected parameter settings.

3.5.3 Occupied Bandwidth Measurement (OBW)

Recalls the OBW function of the Signal Analyzer function or Spectrum Analyzer function. Settings of Carrier Frequency, Input level, Offset, Offset Value and Pre-Amp are automatically reflected on the corresponding parameters. "Recalling parameters" of the "MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Function Operation)"or "MS2830A Signal Analyzer Operation Manual (Mainframe Operation)" cannot be executed when this function is being recalled.

OBW (FFT)

■ Summary

Recalls the OBW function of the Signal Analyzer function and measures the occupied bandwidth for the reflected parameter settings.

OBW (Swept)

■ Summary

Recalls the OBW function of the Spectrum Analyzer function and measures the occupied bandwidth for the reflected parameter settings.

3.5.4 Channel Power Measurement (Channel Power)

Recalls the Channel Power function of the Signal Analyzer function or Spectrum Analyzer function. Settings of Carrier Frequency, Input level, Offset, Offset Value and Pre-Amp are automatically reflected on the corresponding parameters. Recall Current Application described in Section 3.6.2 “Recalling parameters” of the “MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Function Operation)”or “MS2830A Signal Analyzer Operation Manual (Mainframe Operation)” cannot be executed when this function is being recalled.

Channel Power (FFT)

■ Summary

Recalls the Channel Power function of the Signal Analyzer function and measures the channel power for the reflected parameter settings.

Channel Power (Swept)

■ Summary

Recalls the Channel Power function of the Spectrum Analyzer function and measures the channel power for the reflected parameter settings.

3.5.5 Spectrum Emission Mask Measurement (SEM)

Recalls the Spectrum Emission Mask function of the Spectrum Analyzer function. Settings of Carrier Frequency, Input level, Offset, Offset Value and Pre-Amp are automatically reflected on the corresponding parameters. Recall Current Application described in Section 3.6.2 “Recalling parameters” of the “MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Function Operation)”or “MS2830A Signal Analyzer Operation Manual (Mainframe Operation)” cannot be executed when this function is being recalled.

Spectrum Emission Mask (Swept)

■ Summary

Recalls the Spectrum Emission Mask function of the Signal Analyzer function and measures the spectrum emission mask for the reflected parameter settings.

3.5.6 All Measure

This feature is available when the MX269024A-001 All Measure function option is installed.

Sets the All Measure function. Pressing F3 (All Measure) at the Measure function menu displays the All Measure screen and the All Measure function menu.

This function allows the following measurements:

- Modulation Analysis
- Occupied Bandwidth (OBW)
- Spectrum Emission Mask (SEM) (Offset frequency < 4 MHz)

Table 3.5.6-1 All Measure function menu

Function Key	Menu Display	Function
F1	Modulation Analysis Setting	Recalls the Mod Analysis Setting function menu. ☞ Table 3.5.6-2 Mod Analysis Setting function menu
F2	Occupied Bandwidth Setting	Recalls the OBW Setting function menu. ☞ Table 3.5.6-4 OBW Setting function menu
F3	Spectrum Emission Mask Setting	Recalls the SEM Setting function menu. ☞ Table 3.5.6-5 SEM Setting function menu
F8	SEM Result Detail/ Main Result	Press to toggle between the SEM Result Detail and Main Result screen. ☞ 3.10 All Measure

Table 3.5.6-2 Mod Analysis Setting function menu

Function Key	Menu Display	Function
F1	Measure On Off	Enables/disables the Modulation Analysis measurement.
F2	Measurement Interval n slot	Sets the measurement interval (slot) Setting Range: 1 to 999
F3	Storage	Recalls the Storage function menu. ☞ Table 3.5.6-3 Storage function menu

Table 3.5.6-3 Storage function menu

Function Key	Menu Display	Function
F1	Mode	Sets the storage mode. Setting options Off Updates the data every time it measures. On Displays the average value every time it measures.
F2	Count	Sets the number of measurements. Setting range 2 to 99

Table 3.5.6-4 OBW Setting function menu

Function Key	Menu Display	Function
F1	Measure On Off	Enables/disables the OBW measurement.
F2	Measurement Interval n slot	Sets the measurement interval (slot) Setting Range: 1 to 999
F3	Storage	Recalls the Storage function menu. ☞ Table 3.5.6-3 Storage function menu

Table 3.5.6-5 SEM Setting function menu

Function Key	Menu Display	Function
F1	Measure On Off	Enables/disables the SEM measurement.
F2	Measurement Interval n slot	Sets the measurement interval (slot) Setting Range: 1 to 999
F3	Storage	Recalls the Storage function menu. ☞ Table 3.5.6-3 Storage function menu
F6	Result Type Peak Margin	Switches the result type between Peak and Margin for each offset level. Available Options: Peak: Displays in absolute power. Margin Displays the relative power in terms of limit line and actual value.
F8	Load Limit Parameter	Loads the Limit Parameter screen. ☞ Figure 3.5.6-1 Limit Parameter Selection Screen

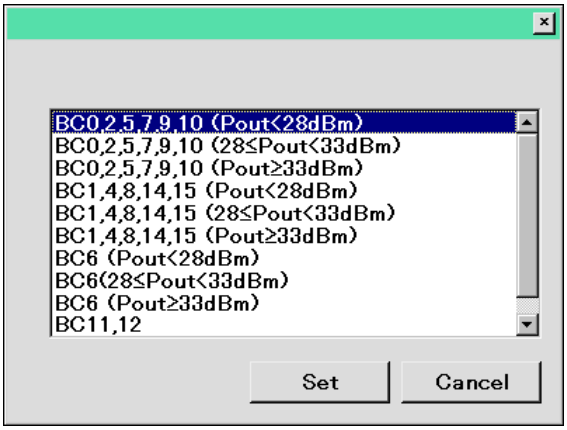

Figure 3.5.6-1 Limit Parameter Selection Screen

3.6 Setting Marker

Configures settings of a marker. Pressing F5 (Marker) on the main function menu or Marker displays the Marker function menu.

Table 3.6-1 Marker function menu

Function Key	Menu Display	Function
F3	Code Number	Sets the code to be measured. Setting range When Radio Configuration is RC1-2: 0 to 63 When Radio Configuration is RC3-5: 0 to 127

3.7 Setting Trigger

Configures settings of a trigger. Pressing F6 (Trigger) on the main function menu or Trigger/Gate displays the Trigger function menu.

Table 3.7-1 Trigger function menu

Function Key	Menu Display	Function
F1	Trigger Switch	Sets the trigger synchronization On/Off. Selection options On Enables the trigger function. Off Disables the trigger function.
F2	Trigger Source	Sets the trigger source. Selection options External Starts measurement by the trigger input from an external trigger. SG Marker Starts measurement by the timing of internal Vector Signal Generator option.
F3	Trigger Slope	Sets the trigger polarity. Selection options Rise Synchronizes with rising edge of the trigger. Fall Synchronizes with falling edge of the trigger.
F8	Trigger Delay	Sets the trigger delay. Setting range –2.0000000 to +2.0000000 s

3.8 Modulation Analysis Window

Displays EVM analysis results on the Modulation Analysis window. According to the storage mode setting, displays the analysis results of every time for Off, the average of analysis results for On. When this setting is set to On, either Average, Max, or Min value is displayed according to the analysis result. Note that the displayed EVM result is the average for the number of slots specified for **Measurement Interval**, not the analysis result of the single slot specified for **Target Number**.

Figure 3.1.1-1 Screen Layout

3.5.1.2 “Trace”

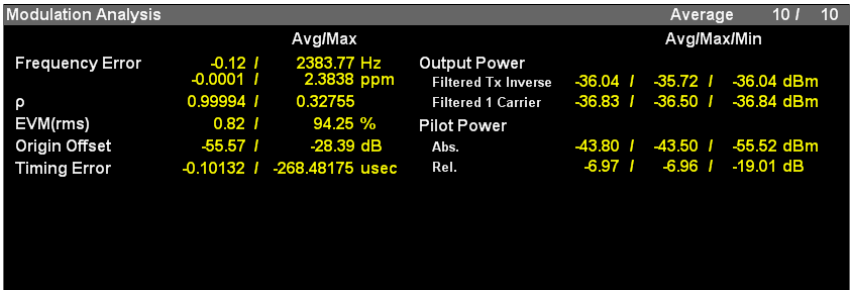

Figure 3.8-1 Modulation Analysis window

Modulation Analysis window

Displays the Modulation Analysis results.

Modulation Analysis : Average Ex: 10/10

Measured Count / Measurement Count specified with Storage

Table 3.5.1.2-2 Storage function menu

Frequency Error

Displays the average frequency error in the range set in Measurement Interval.

Table 3.5.1.1-1 Analysis Time function menu

ρ

Displays the average ρ for the range specified for **Measurement Interval**.

EVM (rms)

Displays the average EVM for the range specified for **Measurement Interval**.

Origin Offset

Displays the average origin offset in the range set in Measurement Interval.

Timing Error

Displays the difference between the index specified for **PN Offset** for the RF input and the trigger input. This is displayed if **Trigger Switch** is **On**.

☞ 3.4 "Setting Common Items"

Output Power (Filtered Tx Inverse)

Displays the average RF level for the range specified for Measurement Interval. This is the power obtained after passing through an inverse characteristics filter of the baseband filter defined in 3GPP2 C.S0024 and an equalizing filter. Measured results are the same as those for output power measurement obtained using software version 4.00.00 or earlier.

Output Power (Filtered 1 Carrier)

Displays the average RF level for the range specified for Measurement Interval. This is the power obtained after passing through a filter that has a pass band width of about 1.23 MHz.

Pilot Power (Abs.)

Displays the absolute value of the average pilot channel power for the range set by Measurement Interval.

Pilot Power (Rel.)

Displays the relative value of the average pilot channel power for the range set by Measurement Interval.

3.9 Displaying Code Domain Power Window

Code domain analysis results are displayed in the Code Domain Power window. The result of each such analysis is displayed, regardless of the storage mode. Note that the displayed result is the analysis result of the single slot specified for Target Number, not the average for the number of slots specified for **Measurement Interval**.

Figure 3.1.1-1 Screen Layout

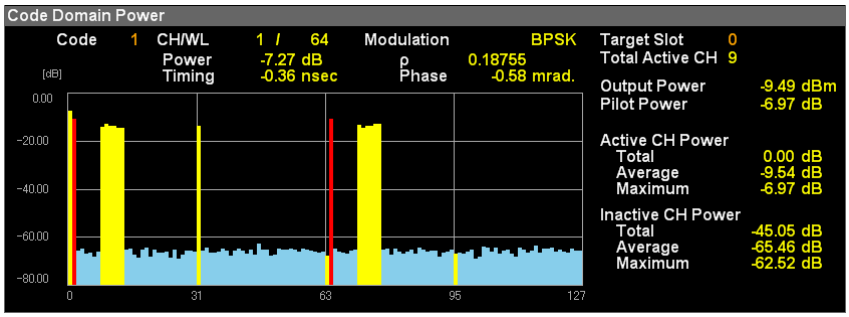

Figure 3.9-1 Code Domain Power window

3.9.1 Numerical Results

Target Slot

Displays slot number specified with Target Slot Number.

Total Active CH

Displays the number of codes judged to be active.

Output Power

Displays the average RF level. This is the power obtained after passing through an inverse characteristics filter of the baseband filter defined in 3GPP2 C.S0024 and an equalizing filter.

Pilot Power

Displays the average Pilot Channel Power.

Active CH Power

Displays the analysis results for the codes judged to be active.

Active CH Power : Total

Displays the total power for the codes judged to be active.

Active CH Power : Average

Displays the average power for the codes judged to be active.

Active CH Power : Maximum

Displays the maximum power for the codes judged to be active.

Inactive CH Power

Displays the analysis results for the codes judged to be inactive.

Inactive CH Power : Total

Displays the total power for the codes judged to be inactive.

Inactive CH Power : Average

Displays the average power for the codes judged to be inactive.

Inactive CH Power : Maximum

Displays the maximum power for the codes judged to be inactive.

3.9.2 Graphical Results

Code

Displays the code specified for **Code Number**.

CH/WL

Displays the channel and Walsh length of the code specified for **Code Number**.

Modulation

Displays the modulation mode of the code specified for **Code Number**.

Power

Displays the power of the code specified for **Code Number**.

ρ

Displays ρ of the code specified for **Code Number.**

Timing

Displays the time difference between the Pilot Channel and the code specified for **Code Number**.

Phase

Displays the phase difference between the Pilot Channel and the code specified for **Code Number**.

3.10 All Measure

This feature is available when the MX269024A-001 All Measure Function option is installed.

■All Measure screen

The All Measure screen consists of the Main Result screen and the SEM Result Detail screen.

3.10.1 Main Result Screen

At All Measure function menu, press F8 (Main Result) to display the Main Result screen.

Figure 3.10.1-1 Main Result screen

Modulation Analysis & Power Window

Displays the measurement results for Code Domain Power and Modulation Analysis.

Code Domain Power

Displays the measurement results for Code Domain Power.

Inactive CH Power

Displays the analysis results for the codes judged to be inactive.

Inactive CH Power: Total

Displays the total power for the codes judged to be inactive.

Inactive CH Power: Average

Displays the average power for the codes judged to be inactive.

Inactive CH Power: Maximum

Displays the maximum power for the codes judged to be inactive.

Modulation Analysis

Displays the Modulation Analysis results.

Modulation Analysis : Average & Max Ex: 8/ 10

Measured Count / Measurement Count specified with Storage

☞ Table 3.5.6-2 Mod Analysis Setting function menu

Modulation Analysis : Interval Ex: 0/ 20

Received Slot Count / Slot Count specified with Measurement Interval

☞ Table 3.5.6-2 Mod Analysis Setting function menu

Frequency Error

Displays the average frequency error for the range specified for Measurement Interval.

☞ Table 3.5.6-2 Mod Analysis Setting function menu

ρ

Displays the average ρ for the range specified for Measurement Interval.

EVM (rms)

Displays the average EVM for the range specified for Measurement Interval.

Origin Offset

Displays the average origin offset for the range specified for Measurement Interval.

Timing Error

Displays the difference between the index specified for PN Offset for the RF input and the trigger input. This is displayed if Trigger Switch is On.

☞ 3.4 “Setting Common Items”

Channel Power

Displays the average RF level for the range specified for Measurement Interval. This is the power (Filtered 1 Carrier) obtained after passing through a filter that has a pass band width of about 1.23 MHz.

Pilot Power (Abs.)

Displays the absolute value of the average pilot channel power for the range set by Measurement Interval.

Pilot Power (Rel.)

Displays the relative value of the average pilot channel power for the range set by Measurement Interval.

OBW window

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

OBW : Average Ex: 8/10

Measured Count / Measurement Count specified with Storage

☞ Table 3.5.6-4 OBW Setting function menu

OBW : Interval Ex: 0/ 20

Received Slot Count / Slot Count specified with Measurement Interval

☞ Table 3.5.6-4 OBW Setting function menu

OBW

Displays OBW(FFT) measured results.

SEM window

Displays the spectrum emission mask measurement results.
If a parameter that must be reloaded is changed while measurement is stopped, the measurement results return to their initial values (and "***" is displayed for Result).To update the limit line, press Single to perform measurement again.

SEM : Average Ex: 8/ 10

Measured Count / Measurement Count specified with Storage

☞ Table 3.5.6-5 SEM Setting function menu

SEM : Interval Ex: 0/ 20

Received Slot Count / Slot Count specified with Measurement Interval

☞ Table 3.5.6-5 SEM Setting function menu

Result

Displays Pass/Fail result for SEM. "PASS" is displayed if all offset values were judged to pass. Otherwise, "FAIL" is displayed.

3.10.2 SEM Result Detail Screen

At All Measure function menu, press F8 (SEM Result Detail) to display the SEM Result screen.

Figure 3.10.2-1 SEM Result Detail Screen

SEM

Displays the spectrum emission mask measurement results.
If a parameter that must be reloaded is changed while measurement is stopped, the measurement results return to their initial values (and "***" is displayed for Result).To update the limit line, press Single to perform measurement again.

SEM : Average Ex: 10/ 10

Measured Count / Measurement Count specified with Storage

☞ Table 3.5.6-5 SEM Setting function menu

SEM : Interval Ex: 0/ 20

Received Slot Count / Slot Count specified with Measurement Interval

☞ Table 3.5.6-5 SEM Setting function menu

Result

Displays Pass/Fail result for SEM. "PASS" is displayed if all offset values were judged to pass. Otherwise, "FAIL" is displayed.

Reference

Displays reference power.

Offset

Displays the frequency offset from the center frequency.

Start (MHz)

Displays the measurement start location (frequency) from the center frequency.

Stop (MHz)

Displays the measurement end location (frequency) from the center frequency.

Lower

Displays the results of the offset values on the left of Reference. If the limit line is set up, the frequency (Freq(MHz)) at which the value of (limit line – measured value) becomes minimized is displayed, as well as the level if Result Type is Peak (measured value: Peak (dBm)) or the margin if Result Type is Margin (limit line – measured value: Margin (dBm)).

Upper

Displays the results of the offset values on the right of Reference. If the limit line is set up, the frequency (Freq(MHz)) at which the value of (limit line – measured value) becomes minimized is displayed, as well as the level if Result Type is Peak (measured value: Peak (dBm)) or the margin if Result Type is Margin (limit line – measured value: Margin (dBm)).

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

(3) Setup

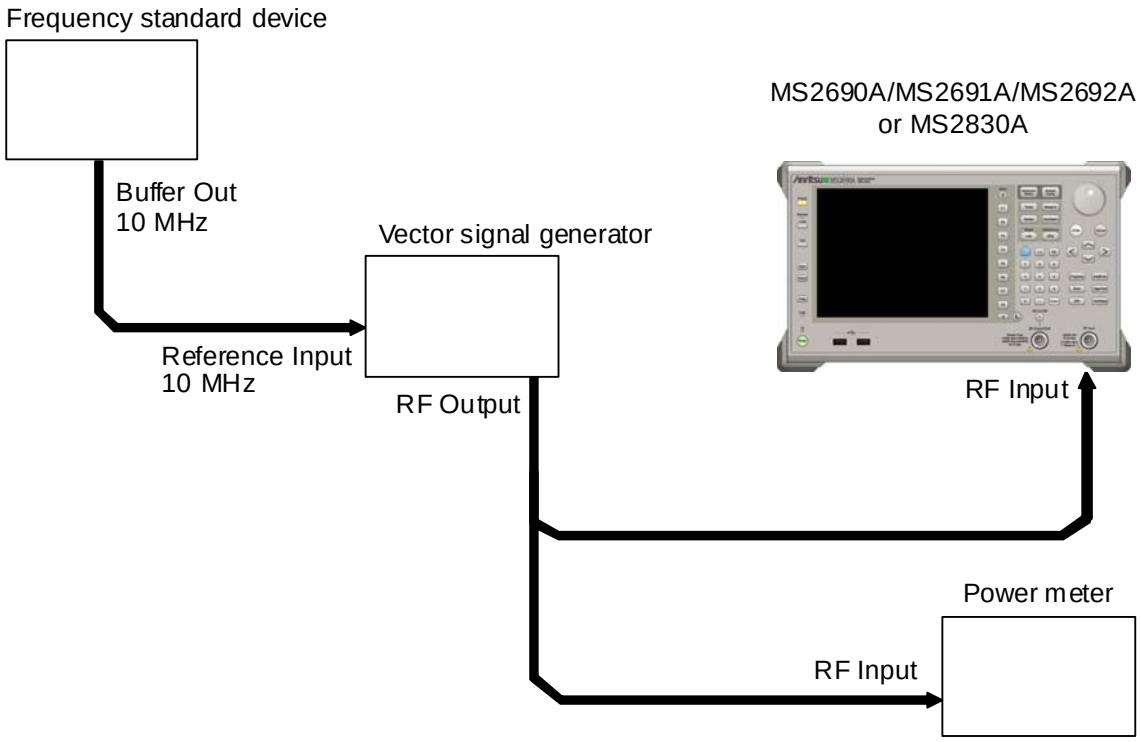

Figure 4.2.1-1 Performance test

(4) Test Procedure

1. Turn on the power switch on the front panel and then wait until the internal temperature stabilizes (approx. 1.5 hours after the temperature in the thermostatic bath stabilizes).
2. Input the 10-MHz reference signal output from the frequency standard device into the Reference Input connector of the vector signal generator.
3. Input the 10 MHz reference signal output from the signal generator to the Reference Input connector.
4. Press Preset.
5. Press F1 (Preset) to initialize.
6. Press Cal.
7. Press F1 (SIGANA All) to perform calibration.
8. Press F8 (Close).
9. Configure the Vector Signal Generator as follows; and output CDMA 2000 Forward Link Base Station Test Mode, Nominal for Main Path signal.
   If using the MG3700A as a vector signal generator, use the FWD_RC3-5_9Channel of Package CDMA2000 as waveform.
   - Frequency : 400 MHz
   - Level :–15 dBm
10. Set the main unit as follows.
    - Center Frequency :400 MHz
    - Input Level :–15 dBm
    - Radio Configuration : RC3－5
11. Input the signal output from the vector signal generator into the power meter, adjust the output level so that the power reading falls between –15 dBm ± 0.1 dB.
12. Input the signal output from the vector signal generator into the MS2690A/MS2691A/MS2692A or MS2830A.
13. 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 System Config (System Settings) after pressing F3 to display the System Settings screen. Select and set Reference Signal with cursor key, and then press F7 (Set).

14. Record the measurement result of Frequency Error (carrier frequency accuracy) and EVM (rms) (residual vector error).
15. Repeat steps 13 through 14 ten times.
16. Confirm whether the measured frequency error is within specifications.
17. Confirm that the measured EVM (rms) average results satisfy the specifications.
18. Set the frequency of the vector signal generator and MS2690A/MS2691A/MS2692A or MS2830A to 900 MHz, and repeat Steps 11 through 17.
19. Set the frequency of the vector signal generator and MS2690A/MS2691A/MS2692A or MS2830A to 2000 MHz, and repeat Steps 11 through 17.
20. Set the frequency of the vector signal generator and MS2690A/MS2691A/MS2692A or MS2830A to 2700 MHz, and repeat Steps 11 through 17.

(5) Test Result

Table 4.2.1-1 Carrier frequency accuracy

Frequency	Min. limit	Deviation (Hz)	Max. limit	Uncertainty	Pass/Fail
400 MHz	–10 Hz		+10 Hz	±1 Hz	
900 MHz					
2000 MHz					
2700 MHz					

Table 4.2.1-2 Residual EVM

Frequency	Measured value [% (rms)]	Max. limit	Uncertainty	Pass/Fail
400 MHz		MS269xA 1.0 %(rms)	MS269xA 0.1 %(rms)	
900 MHz				
2000 MHz		MS2830A 1.5 %(rms)	MS2830A 0.1 %(rms)	
2700 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.

Appendix

Appendix A Default Value List A-1

Appendix A Default Value List

Frequency	
Carrier Frequency	1.000 GHz
RF Spectrum	Norm.
Amplitude	
Input Level	–10.00 dBm
Pre-Amp	Off
Offset	Off
Offset Value	0.00 dB
Common Setting	
Radio Configuration	RC1-2
PN Offset	0 × 64chips
Active Code Threshold	–30.0 dB
Measure : Code Domain	
Analysis Time	
Measurement Interval	1 Slot
Code Number	0
Target Slot Number	0 Slot
Trace	
Scale	80 dB
Storage	
Mode	Off
Count	10
Display Mode	Walsh
Marker	
Code Number	0
Trigger	
Trigger Switch	Off
Trigger Source	External
Trigger Slope	Rise
Trigger Delay	0 s
Accessory	
Title	On, “CDMA2000 Forward Link”

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