MX269015A
TD-SCDMA Measurement Software
Operation Manual
Operation

Seventh Edition

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

ANRITSU CORPORATION

Document No.: M-W3044AE-7.0
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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.

Symbols used in manual

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

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

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

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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.
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Anritsu Corporation guarantees that this equipment was inspected at shipment and meets the published specifications.

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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.
- The warranty period is 6 months from the purchase date.
- 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.
- This warranty does not cover damage to this software caused by Acts of God, natural disasters, and misuse or mishandling by the customer.

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Anritsu affixes the CE conformity marking on the following product(s) in accordance with the Council Directive 93/68/EEC to indicate that they conform to the EMC and LVD directive of the European Union (EU).

CE marking

1. Product Model
   Software: MX269015A TD-SCDMA Measurement Software

2. Applied Directive and Standards
   When the MX269015A TD-SCDMA Measurement Software is installed in the MS2690/MS2691/MS2692A or MS2830A, the applied directive and standards of this unit conform to those of the MS2690/MS2691/MS2692A or MS2830A Main Frame.

PS: About Main Frame
   Please contact Anritsu for the latest information on the Main Frame types that the MX269015A can be used with.
C-tick Conformity Marking

Anritsu affixes the C-tick mark on the following product(s) in accordance with the regulation to indicate that they conform to the EMC framework of Australia/New Zealand.

C-tick marking

N274

1. Product Model
   Software: MX269015A TD-SCDMA Measurement Software

2. Applied Directive and Standards
   When the MX269015A TD-SCDMA Measurement Software is installed in the MS2690/MS2691/MS2692A or MS2830A, the applied directive and standards of this unit conform to those of the MS2690/MS2691/MS2692A or MS2830A Main Frame.

PS: About Main Frame
   Please contact Anritsu for the latest information on the Main Frame types that the MX269015A can be used with.
About This Manual

**Composition of Operation Manuals**

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

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

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

- **TD-SCDMA Measurement Software Operation Manual (Operation)**

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

- **TD-SCDMA Measurement Software Operation Manual (Remote Control)**

This manual describes remote control of the MX269015A TD-SCDMA Measurement Software.
Convention Used in This Manual

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

In this document,  indicates a panel key.
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Chapter 1 Overview

This chapter overviews the MX269015A TD-SCDMA Measurement Software and describes the product configuration.

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1.1 Product Overview

The MS269x Series or MS2830A Signal Analyzer supports high-speed, high-accuracy, and easy measurement of the transmission characteristics of base stations and mobile stations for various mobile communications standards. The MS269x Series or MS2830A Signal Analyzer has a high-performance signal analyzer and spectrum analyzer, with optional measurement software for modulation analysis supporting various digital modulation modes.

The MX269015A TD-SCDMA Measurement Software option (MX269015A) is for measuring the RF characteristics of 3GPP TD-SCDMA, low-chip-rate technologies (1.28 Mcps).

The MX269015A supports the following measurements.

• Modulation accuracy
• Carrier frequency
• Transmitter power

MS2830A-006/106 is required to use the MX269015A on MS2830A.
1.2 Product Configuration

1.2.1 Standard configuration

Table 1.2.1-1 lists the MX269015A standard configuration.

<table>
<thead>
<tr>
<th>Item</th>
<th>Model/Code</th>
<th>Name</th>
<th>Qty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>MX269015A</td>
<td>TD-SCDMA Measurement Software</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Accessory</td>
<td>—</td>
<td>Installation CD-ROM</td>
<td>1</td>
<td>Application software, operation manual CD-ROM</td>
</tr>
</tbody>
</table>

1.2.2 Application parts

Table 1.2.2-1 lists the MX269015A application parts.

<table>
<thead>
<tr>
<th>Model/Code</th>
<th>Name</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>W3044AE</td>
<td>MX269015A TD-SCDMA Measurement Software Operation Manual (Operation)</td>
<td>English, hard copy</td>
</tr>
<tr>
<td>W3045AE</td>
<td>MX269015A TD-SCDMA Measurement Software Operation Manual (Remote Control)</td>
<td>English, hard copy</td>
</tr>
</tbody>
</table>
1.3 Specifications

Table 1.3-1 lists the MX269015A specifications.

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

Attenuator Mode: Mechanical Atten Only

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Specifications</td>
<td></td>
</tr>
<tr>
<td>Target signals</td>
<td>Uplink and Downlink</td>
</tr>
<tr>
<td>Modulation/Frequency/Amplitude Measurement</td>
<td></td>
</tr>
<tr>
<td>Measurement frequency ranges</td>
<td>1850 to 2620 MHz</td>
</tr>
<tr>
<td>Measurement level range</td>
<td>[Modulation/Frequency Measurement]</td>
</tr>
<tr>
<td></td>
<td>MS269x Series/ MS2830A</td>
</tr>
<tr>
<td></td>
<td>−15 to +30 dBm (at Pre-Amp Off, or Pre-Amp not installed.)</td>
</tr>
<tr>
<td></td>
<td>−30 to +10 dBm (at Pre-Amp On)</td>
</tr>
<tr>
<td></td>
<td>[Amplitude Measurement]</td>
</tr>
<tr>
<td></td>
<td>MS269x Series</td>
</tr>
<tr>
<td></td>
<td>−15 to +30 dBm (at Pre-Amp Off, or Pre-Amp not installed.)</td>
</tr>
<tr>
<td></td>
<td>−30 to +10 dBm (at Pre-Amp On)</td>
</tr>
<tr>
<td></td>
<td>MS2830A</td>
</tr>
<tr>
<td></td>
<td>−15 to +30 dBm (at Pre-Amp Off, or Pre-Amp not installed.)</td>
</tr>
<tr>
<td>Carrier frequency accuracy</td>
<td>After CAL at 18 to 28°C, for 1% EVM signal</td>
</tr>
<tr>
<td></td>
<td>± (accuracy of reference crystal oscillator × carrier frequency + 20 Hz)</td>
</tr>
<tr>
<td>Residual EVM</td>
<td>After CAL at 18 to 28°C, the measured signal is within the</td>
</tr>
<tr>
<td></td>
<td>measurement level range and below the value set at Input Level.</td>
</tr>
<tr>
<td></td>
<td>MS269x Series: ≤ 1.0% (rms)</td>
</tr>
<tr>
<td></td>
<td>MS2830A: ≤ 1.2% (rms)</td>
</tr>
<tr>
<td>Code Domain Power</td>
<td>After CAL at 18 to 28°C, the measured signal is within the</td>
</tr>
<tr>
<td></td>
<td>measurement level range and below the value set at Input Level.</td>
</tr>
<tr>
<td></td>
<td>±0.18 dB (Code Power ≥ −10dBc)</td>
</tr>
<tr>
<td></td>
<td>±0.32 dB (Code Power ≥ −30dBc)</td>
</tr>
<tr>
<td>Code Domain Error</td>
<td>After CAL at 18 to 28°C, the measured signal is within the</td>
</tr>
<tr>
<td></td>
<td>measurement level range and below the value set at Input Level.</td>
</tr>
<tr>
<td></td>
<td>±1.00 dB (Code Error ≥ −40dBc)</td>
</tr>
<tr>
<td>Residual Code Domain Error</td>
<td>After CAL at 18 to 28°C, the measured signal is within the</td>
</tr>
<tr>
<td></td>
<td>measurement level range and below the value set at Input Level.</td>
</tr>
<tr>
<td></td>
<td>≤ −40 dB</td>
</tr>
</tbody>
</table>
### Transmitter power accuracy

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>After CAL, input attenuator ≥10 dB, at 18 to 28°C, the measured signal is within the measurement level range and below the value set at Input Level.</td>
<td></td>
</tr>
<tr>
<td>MS269x Series</td>
<td>±0.6 dB (at Pre-Amp Off, or Pre-Amp not installed.)</td>
</tr>
<tr>
<td>±1.1 dB (at Pre-Amp On)</td>
<td></td>
</tr>
<tr>
<td>MS2830A</td>
<td>±0.6 dB (at Pre-Amp Off, or Pre-Amp not installed.)</td>
</tr>
<tr>
<td>Transmitter power accuracy is calculated from the RSS (root sum square) error of the absolute amplitude accuracy and the in-band frequency characteristics.</td>
<td></td>
</tr>
</tbody>
</table>

### Waveform displays

<table>
<thead>
<tr>
<th>Waveform displays</th>
<th>Constellation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code Domain Power vs Code Number</td>
<td></td>
</tr>
<tr>
<td>Code Domain Error vs Code Number</td>
<td></td>
</tr>
</tbody>
</table>

### Adjacent Channel Power Measurement

| Measurement method | Executes adjacent channel power measurement function of spectrum analyzer or signal analyzer |

### Occupied Bandwidth Measurement

| Measurement method | Executes occupied bandwidth measurement function of spectrum analyzer or signal analyzer |

### Spectrum Emission Mask Measurement

| Measurement method | Executes spectrum emission mask measurement function of spectrum analyzer |

### Power vs Time

| Power vs Time | Provides measurements for Transmitter OFF Power and Time Mask This function can be used only in MS269x series. |

### Dynamic Range

<table>
<thead>
<tr>
<th>Dynamic Range</th>
<th>MS269x series</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 126 dB (nominal) (This nominal value is valid when Wide Dynamic Range is On and Noise Correction is On.)</td>
<td></td>
</tr>
</tbody>
</table>
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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Chapter 2  Preparation

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
### 2.1 Part Names

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 1 | ![Power Switch](image)  
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](image)  
Hard disk access lamp  
Lights when accessing the internal hard disk |
| 3 | ![Copy key](image)  
Copy key  
Press to capture display screen and save to file. |
| 4 | ![Recall key](image)  
Recall key  
Press to recall parameter file. |
| 5 | ![Save key](image)  
Save key  
Press to save parameter file. |
| 6 | ![Cal key](image)  
Cal key  
Press to display the Calibration menu. |
Chapter 2  Preparation

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

8  Remote lamp
Lights when in remote-control state

9  Preset key
Resets parameters to initial settings

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

Press \(\Rightarrow\) 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 \(\Rightarrow\) to go back to the previous menu. Press \(\Rightarrow\) to go back to the top menu.
2.1 Part Names

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Main function keys 1
Press to set or execute main functions. **Executable functions vary with the current application. When nothing happens with the press, it indicates that the application in use does not support the key.**

- **Frequency**
  - Press to set frequency parameters.

- **Amplitude**
  - Press to set level parameters.

- **Span**
  - No function is assigned to this key.

- **Trigger/Expr**
  - Press to set trigger parameters.

- **BW**
  - No function is assigned to this key.

- **Time/Sweep**
  - Press to set measurement item parameters.

12

Main function keys 2
Press to set or execute main functions. **Executable functions vary with the current application. When nothing happens with the press, it indicates that the application in use does not support the key.**

- **Application Switch**
  - Press to switch application.

- **System Config**
  - Press to display Configuration screen.

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

- **Measure**
  - Press to set measurement item parameters.

- **Marker**
  - Use when switching graph marker operation.

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

- **Single**
  - Press to start single measurement.

- **Continuous**
  - Press to start continuous measurements.
Chapter 2  Preparation

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 Del 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 is green.

16  RF Input connector
Inputs RF signal. This is an N type input connector.

17  RF Output Control key
Press 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)
2.1 Part Names

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.

1. Press to display the Spectrum Analyzer main screen.
2. Press to display the Signal Analyzer main screen, when Option 005/105 and 006/106 are installed.
3. Press to display the Signal Analyzer main screen, when Vector Signal Generator option is installed.
4. This is a blank key. Not used.
5. 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.
### 2.1 Part Names

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td><strong>Ref Input</strong>&lt;br&gt;Ref Input connector (reference frequency signal input connector)&lt;br&gt;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.&lt;br&gt;The following frequencies are supported:&lt;br&gt;MS269x series: 10 MHz/13 MHz&lt;br&gt;MS2830A: 5 MHz/10 MHz/13 MHz</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td><strong>Buffer Out</strong>&lt;br&gt;Buffer Out connector (reference frequency signal output connector)&lt;br&gt;Outputs the internal reference frequency signal (10 MHz). It is for synchronizing frequencies between other equipment and the MS2690A/MS2691A/MS2692A or MS2830A.</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td><strong>Trigger Input</strong>&lt;br&gt;Trigger Input connector (MS269x series only)&lt;br&gt;Inputs trigger signal from external device.</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td><strong>Sweep Status Out</strong>&lt;br&gt;Sweep Status Out connector&lt;br&gt;Outputs signal when internal measurement is performed or measurement data is obtained.</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td><strong>IF Out</strong>&lt;br&gt;IF Out connector (MS269x series only)&lt;br&gt;Not used</td>
</tr>
<tr>
<td><strong>6</strong></td>
<td><strong>AUX</strong>&lt;br&gt;AUX connector&lt;br&gt;Not used</td>
</tr>
<tr>
<td><strong>7</strong></td>
<td><strong>GP-IB</strong>&lt;br&gt;GPIB connector&lt;br&gt;For external control via GPIB.</td>
</tr>
<tr>
<td><strong>8</strong></td>
<td><strong>USB (Remote)</strong>&lt;br&gt;USB connector (type B)&lt;br&gt;For external control via USB</td>
</tr>
</tbody>
</table>
Chapter 2  Preparation

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 to display the Configuration screen.
2. Press (Application Switch Settings) to display the Application Switch Registration screen.
3. Press (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 (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 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 \[\text{Preset}\] to display the Preset function menu.
2. Press \[\text{F1}\] (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 \[\text{Cal}\] to display the Application Cal function menu.
2. Press \[\text{F1}\] (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)”. 
This chapter describes the measurement function, the parameter contents and setting methods for the MX269015A.

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  3.1.1 Screen layout ....................................... 3-2
  3.1.2 Function menu ...................................... 3-3
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3.2 Setting Frequency ........................................ 3-5
3.3 Setting Level .............................................. 3-7
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3.1 Basic Operation
3.1.1 Screen layout

This section describes the MX269015A screen layout.

![Screen Layout Image]

**Fig. 3.1.1-1 Screen Layout**

[1] Measurement parameter
Displays set parameters

[2] Status message
Displays status of signals

[3] Constellation
Displays Constellation for selected symbol

[4] Result window
Displays measurement results

[5] Function menu
Displays functions executed with function keys

[6] Graph window
Displays graph of measurement results
3.1.2 Function menu

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

![Main Function Menu]

**Fig. 3.1.2-1  Main Function Menu**

<table>
<thead>
<tr>
<th>Menu Display</th>
<th>Function</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Sets frequency</td>
<td>3.2 Setting Frequency</td>
</tr>
<tr>
<td>Amplitude</td>
<td>Sets level</td>
<td>3.3 Setting Level</td>
</tr>
<tr>
<td>Common Setting</td>
<td>Sets common items</td>
<td>3.4 Setting Common Items</td>
</tr>
<tr>
<td>Measure</td>
<td>Sets measurement items</td>
<td>3.5 Setting Measurement Items</td>
</tr>
<tr>
<td>Marker</td>
<td>Sets marker</td>
<td>3.6 Setting Marker</td>
</tr>
<tr>
<td>Trigger</td>
<td>Sets trigger</td>
<td>3.7 Setting Trigger</td>
</tr>
<tr>
<td>Accessory</td>
<td>Sets other functions</td>
<td>5.1 Selecting Other Functions</td>
</tr>
</tbody>
</table>
3.1.3 Measuring

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

**Single**
Selected measurement items are measured only for the measurement count (Storage Count) before measurement is stopped.

<Procedure>
1. Press 📊

**Continuous**
Selected measurement items are measured continuously for the measurement count (Storage Count). Measurement continues even when parameters or the window display are changed. Measurement stops when other applications are selected.

<Procedure>
1. Press 📊
3.2 Setting Frequency

Pressing (Frequency) at the main function menu displays the Frequency function menu. Pressing opens the Carrier Frequency dialog box or the Center Frequency dialog box and displays the Frequency function menu.

Carrier Frequency

- **Summary**
  Sets carrier frequency of target carrier in Carrier Frequency mode

- **Note**
  When more than one carrier is measured (Carrier Number >1), setting the carrier frequency of the target carrier automatically sets the carrier frequencies of the other carriers (at 1.6-MHz spacing) and the center frequency.

- **Setting range**
  100 MHz to the upper limit of MS269x Series or MS2830A

- **Note**
  Minimum and maximum setting ranges vary with the number of measured carriers (Carrier Number) and target carrier.

Center Frequency

- **Summary**
  Sets center frequency of multi-carriers in Center Frequency mode

- **Note**
  When more than one carrier is measured (Carrier Number >1), setting the center frequency automatically sets the carrier frequencies of all carriers (1.6-MHz spacing). Also, when only one carrier is measured (Carrier Number = 1), the center frequency is the same as the carrier frequency.

- **Setting range**
  100 MHz to the upper limit of MS269x Series or MS2830A

- **Note**
  Minimum and maximum setting ranges vary with the number of measured carriers (Carrier Number).
Chapter 3  Measurement

Frequency Mode

■ Summary

Selects Frequency mode

The Frequency mode selects whether the carrier frequency or center frequency is set.

■ Selection options

Carrier Frequency
Center Frequency
### 3.3 Setting Level

Pressing (Amplitude) at the main function menu displays the Amplitude function menu. Pressing opens the Input Level dialog box and displays the Amplitude function menu.

**Input Level**
- **Summary**
  Sets input level from target DUT
- **Setting range**
  With Pre-Amp On or Pre-Amp Mode On at Power vs Time measurement:
  \((-80.00 + \text{Offset Value})\) to \((10.00 + \text{Offset Value})\) dBm
  With Pre-Amp Off:
  \((-60.00 + \text{Offset Value})\) to \((30.00 + \text{Offset Value})\) dBm

**Pre-Amp**
- **Summary**
  Sets Pre-Amp function on/off

**Note:**
If Wide Dynamic Range is set to On at Power vs Time, the Pre-Amp function is switched forcefully to Off.

**Offset**
- **Summary**
  Sets Offset function on/off

**Offset Value**
- **Summary**
  Sets level offset coefficient
- **Setting range**
  \([-99.99 \text{ to } 99.99 \text{ dB}]\)
- **Setting example**

![Diagram of setting example](image)

**Fig. 3.3-1 Input Level and Offset Level Setting Example**
Auto Range

Summary

This function adjusts input level according to input signal.
3.4 Setting Common Items

Pressing (Common Setting) at the main function menu displays the Common Setting function menu.

![Common Setting Function Menu](image)

**Table 3.4-1 Common Setting Function Menu**

<table>
<thead>
<tr>
<th>Menu Display</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal Direction</td>
<td>Selects measured target signal direction</td>
</tr>
<tr>
<td>Scrambling Code Number</td>
<td>Sets Scrambling Code Number</td>
</tr>
<tr>
<td>K</td>
<td>Sets value of K (number of maximum users)</td>
</tr>
<tr>
<td>Target Time Slot</td>
<td>Selects analyzed Time Slot</td>
</tr>
<tr>
<td>Carrier Number</td>
<td>Sets the number of measured carriers</td>
</tr>
<tr>
<td>Target Carrier</td>
<td>Sets analyzed carrier</td>
</tr>
<tr>
<td>Active Channel Threshold</td>
<td>Sets Active Channel Threshold value</td>
</tr>
<tr>
<td>Active Slot Threshold</td>
<td>Sets Active Slot Threshold value</td>
</tr>
<tr>
<td>Auto Rate Detection</td>
<td>Selects Auto Rate detection mode</td>
</tr>
<tr>
<td>Spreading Factor</td>
<td>Sets Spreading factor</td>
</tr>
</tbody>
</table>
### Signal Direction

- **Summary**
  Selects measured target signal direction

- **Selection options**
  - UL: Analyzes Uplink input signal
  - DL: Analyzes Downlink input signal

### Scrambling Code Number

- **Summary**
  Sets Scrambling Code Number

- **Setting range**
  - 0 to 127

### K

- **Summary**
  Sets value of K (number of maximum users)

- **Setting range**
  - 2, 4, 6, 8, 10, 12, 14, 16

### Target Time Slot

- **Summary**
  Selects analyzed Time Slot

- **Selection options**
  - Time Slot 0
  - Time Slot 1
  - Time Slot 2
  - Time Slot 3
  - Time Slot 4
  - Time Slot 5
  - Time Slot 6
  - Burst: With waveform imported by measuring instrument, analyzes initial time slot

**Note**

When Target Time Slot is set to Burst, Trace Mode cannot be set to Multi Slot Power and Multi Carrier Power.

---

3.5.1.1 Trace Mode
3.4 Setting Common Items

Carrier Number

- **Summary**
  Sets number of measured carriers

- **Setting range**
  1 to 6

**Note**

In the Carrier Frequency Mode, changing Carrier Number automatically changes the center frequency (the carrier frequency of the target carrier is unchanged).

In the Center Frequency Mode, changing Carrier Number automatically changes the carrier frequencies of all carriers (the center frequency is unchanged).

The maximum carrier number depends on the frequency settings.

Target Carrier

- **Summary**
  Sets analyzed carrier

- **Setting range**
  1 to Carrier Number

**Note**

When measuring more than one carrier (Carrier Number >1), carriers are numbered 1 to N (N = set Carrier Number), with 1 as the lowest frequency carrier and N as the highest frequency carrier.

Active Channel Threshold

- **Summary**
  Sets Active Channel Threshold value

- **Setting range**
  -5.0 to −50.0 dB

**Note**

In the Code Domain Graph display, a yellow bar means the code domain power of a channel is equal to or more than the Active Channel Threshold value; a blue bar means it is less than the Active Channel Threshold value.
Active Slot Threshold

- **Summary**
  Sets Active Slot Threshold value

- **Setting range**
  −10.0 to −50.0 dB

**Note**
At the measurement results display, “***.**” means the power for that Time Slot is less than the Active Slot Threshold value.

Auto Rate Detection

- **Summary**
  Selects Auto Rate Detection mode

- **Selection options**
  On Enables Auto Rate Detection
  Off Disables Auto Rate Detection

Spreading Factor

- **Summary**
  Sets Spreading Factor value when Auto Rate Detection disabled

- **Setting range**
  1, 2, 4, 8, 16
3.5 Setting Measurement Items

Pressing (Measure) at the main function menu or displays the measure function menu.

3.5.1 Modulation Analysis

Pressing (Modulation Analysis) at the measure function menu displays the Modulation Analysis function menu.

Fig. 3.5.1-1 Modulation Analysis Function Menu

<table>
<thead>
<tr>
<th>Menu Display</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trace Mode</td>
<td>Sets type of result displayed in graph window</td>
</tr>
<tr>
<td>Storage</td>
<td>Sets storage method</td>
</tr>
<tr>
<td>Scale</td>
<td>Sets vertical scale of graph result</td>
</tr>
</tbody>
</table>
Storage

- **Summary**
  Sets storage method

- **Selection options**
  - **Mode**
    Sets storage mode
  - **Count**
    Sets measurement count

Storage: **Mode**

- **Summary**
  Sets storage mode

- **Selection options**
  - **Off**
    Updates data at every sweep
  - **Average**
    Displays average for every sweep
  - **Average & Max**
    Displays average and maximum values for every sweep

Storage: **Count**

- **Summary**
  Sets measurement count

- **Setting range**
  2 to 9999

Scale

- **Summary**
  Sets vertical scale of graph result

- **Selection options**
  - **Code Domain Power Scale**
    Sets scale for Code Domain Power
  - **Code Domain Error Scale**
    Sets scale for Code Domain Error

Scale: **Code Domain Power Scale**

- **Summary**
  Sets scale for Code Domain Power vs Code Number Display

- **Setting range**
  - 20 dB: −20 to 0 dB
  - 40 dB: −40 to 0 dB
  - 60 dB: −60 to 0 dB
  - 80 dB: −80 to 0 dB
3.5 Setting Measurement Items

Scale: Code Domain Error Scale

■ Summary
Sets scale for Code Domain Error vs Code Number Display

■ Setting range
- 20 dB  
- 40 dB  
- 60 dB  
- 80 dB

-80 to -60 dB
-80 to -40 dB
-80 to -20 dB
-80 to 0 dB

3.5.1.1 Trace Mode

Pressing (Trace Mode) at the Modulation Analysis function menu or displays the Trace Mode function menu.

Trace Mode

■ Summary
Sets type of result displayed in graph window

■ Selection options
- Code Domain Power Displays Code Domain Power vs Code number in graph window
- Code Domain Error Displays Code Domain Error vs Code number in graph window
- Multi Slot Power Displays Subframe Power, Mean, Data1, Midamble and Data2 Powers vs Slot number in table form
- Multi Carrier Power Displays all Carrier Powers vs Slot number in table form

Note
When Trace Mode is set to Multi Slot Power or Multi Carrier Power, Target Time Slot cannot be set to Burst.

3.4 Setting Common Items
3.5.2 Power vs Time

Pressing (Power vs Time) at the measure function menu displays the Power vs Time function menu.

**Note**

1. Power vs Time can be used only in the MS269x series.

2. Power vs Time can be used when Signal Direction is set to DL.

3. The power of the measured signal in the On interval is from –30 dBm to +30 dBm when Pre-Amp Mode is Off. On the other hand, when Pre-Amp Mode is On, set it from –30 dBm to +10 dBm (Peak value).

![Fig. 3.5.2-1 Power vs Time Function Menu](image-url)
### 3.5 Setting Measurement Items

#### Table 3.5.1-1 Modulation Analysis Function Menu

<table>
<thead>
<tr>
<th>Menu Display</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wide Dynamic Range</td>
<td>Sets wide dynamic range when Wide Dynamic Range is set to On, Pre-Amp is switched to Off forcefully.</td>
</tr>
<tr>
<td>Noise Correction</td>
<td>Sets whether to perform noise correction</td>
</tr>
<tr>
<td>Pre-Amp Mode</td>
<td>Sets whether to use pre-amp at Off Power measurement</td>
</tr>
<tr>
<td>Select Mask</td>
<td>Selects selection method for the Mask line</td>
</tr>
<tr>
<td>Mask Setup</td>
<td>Sets the mask</td>
</tr>
<tr>
<td>Trace</td>
<td>Selects Smoothing or Storage</td>
</tr>
</tbody>
</table>

**Wide Dynamic Range**

- **Summary**
  - Sets whether to enable or disable Wide Dynamic Range

  When Wide Dynamic Range is set to On, the measurement parameter is changed internally at the Off Power measurement to improve the measurement accuracy.

- **Selection options**
  - On: Enables
  - Off: Disables

**Note**

- When Wide Dynamic Range is set to On, Pre-Amp is switched to Off forcefully.
- When the parameter is moved to the measurement function other than Power vs Time, Wide Dynamic Range is switched to Off.

**Noise Correction**

- **Summary**
  - Sets whether to perform noise correction

- **Selection options**
  - On: Enables
  - Off: Disables
Note

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

Pre-Amp Mode

■ Summary
Sets whether to use Pre-Amp at the Off power measurement.

■ Selection options
  On  Enables
  Off  Disables

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

When the Pre-Amp mode is set to On, input the trigger.

Note:

1. When the option 008 is not enabled, the Pre-Amp menu is not displayed.

Select Mask

■ Summary
Selects selection method for the Mask line

■ Selection options
  Standard  Sets 3GPP standard mask line
  User      Sets user set mask line

Mask Setup

■ Summary
Sets the mask.
Open the window to set the mask, and then open the Mask Setup function menu.

■ Selection options
3.5 Setting Measurement Items

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load Standard Setting</td>
<td>Reflects the standard mask settings to the user mask settings.</td>
</tr>
<tr>
<td>Mask Time</td>
<td>Selects the following items: Time 1, Time 2, Time 3, Time 4, and Time 5</td>
</tr>
<tr>
<td>Mask Level</td>
<td>Selects the following items: Level 1 and Level 2</td>
</tr>
</tbody>
</table>

**Mask Setup: Load Standard Setting**
- **Summary**
  - Reflects the standard mask settings to the user mask settings.

**Mask Setup: Mask Time (DL)**
- **Summary**
  - Selects the following items: Time 1, Time 2, Time 3, Time 4, and Time 5
- **Setting range**
  - Time 1, 2, 4, 5: 0 to 100 chip
  - Time 3: 0 to 200 chip

**Mask Setup: Mask Level (DL)**
- **Summary**
  - Selects the following items: Level 1 and Level 2
- **Setting range**
  - –110 to –20

**Trace: Smoothing (On/Off)**
- **Summary**
  - Sets smoothing On or Off
- **Selection options**
  - On: Enables settings for smoothing
  - Off: Disables settings for smoothing

**Trace: Smoothing Length**
- **Summary**
  - Sets smoothing length.
- **Setting range**
  - 0.2 to 10.0

**Storage: Storage Mode (Off/Average)**
- **Summary**
  - Enables storage settings
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- Selection options
  - Off  Disables settings for storage
  - Average  Enables average storage settings

Storage: Storage Count
- Summary
  - Sets storage count

- Setting range
  - 2 to 999
3.5.3 Adjacent Channel Power Measurement (ACP)

This recalls the ACP function of the signal analyzer or spectrum analyzer functions. Settings for Carrier Frequency, Input level, Offset, Offset Value and Pre-Amp are reflected automatically in the corresponding parameters. When this function is being recalled, Recall Current Application described in Section 3.6.2 Recalling parameters of the “MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Main Frame Operation)” or “MS2830A Signal Analyzer Operation Manual (Main Frame Operation)” cannot be executed.

ACP (FFT)

Summary
Recalls ACP function of signal analyzer and measures adjacent channel power for reflected parameter settings

Note
At the signal analyzer, automatic settings for Trigger Switch, Trigger Source, Trigger Delay and Capture Length are applied based on parameters such as Target Time Slot and Trigger settings from the modulation analysis function. The user can change these settings when necessary.

ACP (Swept)

Summary
Recalls ACP function of spectrum analyzer and measures adjacent channel power for reflected parameter settings

Note
At the spectrum analyzer, automatic settings for Gate Sweep, Gate Source, Gate Delay and Gate Length are applied based on parameters such as Target Time Slot and Trigger settings from the modulation analysis function. The user can change these settings when necessary.
3.5.4 Occupied Bandwidth Measurement (OBW)

This recalls the OBW function of the signal analyzer or spectrum analyzer functions. Settings for Carrier Frequency, Input level, Offset, Offset Value and Pre-Amp are reflected automatically in the corresponding parameters. When this function is recalled, Recall Current Application described in Section 3.6.2 Recalling parameters of the “MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Main Frame Operation)” or “MS2830A Signal Analyzer Operation Manual (Main Frame Operation)” cannot be executed.

**OBW (FFT)**

- **Summary**
  
  Recalls OBW function of signal analyzer and measures occupied bandwidth for reflected parameter settings

**Note**

At the signal analyzer, automatic settings for Trigger Switch, Trigger Source, Trigger Delay and Capture Length are applied based on the parameters such as Target Time Slot and Trigger settings from the modulation analysis function. The user can change these settings when necessary.

**OBW (Swept)**

- **Summary**
  
  Recalls OBW function of spectrum analyzer and measures occupied bandwidth for reflected parameter settings

**Note**

At the spectrum analyzer, automatic settings for Gate Sweep, Gate Source, Gate Delay and Gate Length are applied based on parameters such as Target Time Slot and Trigger settings from the modulation analysis function. The user can change these settings when necessary.
### 3.5.5 Spectrum Emission Mask (SEM)

This recalls the Spectrum Emission Mask function of the spectrum analyzer. Settings for Carrier Frequency, Input level, Offset, Offset Value and Pre-Amp are reflected automatically in the corresponding parameters. When this function is recalled, Recall Current Application described in Section 3.6.2 Recalling parameters of the “MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Main Frame Operation)” or “MS2830A Signal Analyzer Operation Manual (Main Frame Operation)” cannot be executed.

**Spectrum Emission Mask (Swept)**

- **Summary**
  
  Recalls SEM function of spectrum analyzer and measures spectrum emission mask for reflected parameter settings

- **Note**
  
  At the spectrum analyzer settings, standard parameters are applied automatically. There are different standard parameters for uplink and downlink. The user can change these settings when necessary.
3.6 Setting Marker

After selecting “Modulation Analysis” or “Power vs Time”, pressing (Marker) on the main function menu or displays the corresponding Marker function menu.

3.6.1 Modulation Analysis

After selecting “Modulation Analysis”, pressing (Marker) on the main function menu or displays the Marker function menu for “Modulation Analysis”.

Marker

- **Summary**
  Sets marker function on/off

- **Selection options**
  On Enables marker function
  Off Disables marker function

**Constellation Select**

- **Summary**
  Sets operation target for rotary knob and cursor key to Constellation

**Bottom Graph Select**

- **Summary**
  Sets operation target for rotary knob and cursor key to Graph Window

**Constellation Marker Number**

- **Summary**
  Sets target of marker (Chip) while Constellation results are displayed
  - **Setting range**
    0 to 847

**Bottom Graph Marker Number**

- **Summary**
  Sets marker target while Bottom Graph results displayed
  - **Setting range**
    0 to 15 for Code Domain Power vs Code Number and Code Domain Error vs Code Number

3.6.2 Power vs Time

After selecting “Power vs Time”, pressing (Marker) on the main function menu or displays the Marker function menu for “Power vs Time”.
3.6 Setting Marker

Top Graph Marker
- Summary
  This sets the Marker value (Chip) for Top Graph
- Selection range
  0 to 6399

Note
- When pressing a right or left key, Marker is moved to the Time Slot boundary.

Bottom Graph Marker
- Summary
  This sets the Marker value (Chip) for Bottom Graph.
- Selection range
  Top Graph Marker Value – 300.0 to Top Graph Marker Value + 299.9 Unit: Chip

Top Graph Marker to Transient
- Summary
  This moves the marker displayed at Top Graph to the signal transient (on/Off boundary) determined by the Uplink-downlink Configuration, and Special Subframe Configuration settings.

Top Graph Marker to Fail
- Summary
  This moves the marker displayed at Top Graph to the fail part.

Peak Search (margin)
- Summary
  This moves the marker to the peak point of the Margin result calculated using the measurements and Mask setting for the Off section specified at Mask Setup.
  \[
  \text{Margin} = \text{Measured value (dBm/MHz)} - \text{Mask setting (dBm/MHz)}
  \]

Next Peak
- Summary
  This moves the marker to the point with the next largest margin relative to Margin of the current marker point in the measurement range.
3.7 Setting Trigger

Pressing \( \text{Trigger} \) on the main function menu or \( \text{Trigger/Gate} \) displays the Trigger function menu.

Trigger Switch
- **Summary**
  - Sets trigger synchronization on/off
- **Selection options**
  - On: Enables trigger function
  - Off: Disables trigger function

Trigger Source
- **Summary**
  - Sets trigger source
- **Selection options**
  - External: Starts measurement using external trigger input
  - SG Marker: Starts measurement using internal Vector Signal Generator timing

Trigger Slope
- **Summary**
  - Sets trigger polarity
- **Selection options**
  - Rise: Synchronizes with trigger rising edge
  - Fall: Synchronizes with trigger falling edge

Trigger Delay
- **Summary**
  - Sets trigger delay
- **Setting range**
  - \(-0.5 \text{ to } +0.5 \text{ s}\)
3.8 EVM Display

This displays EVM analysis results for Target Time Slot of target carrier. It updates and displays the analysis results at each sweep for Off mode, the average of analysis results for the storage count for Average mode, and the average and maximum value of analysis results for Average & Max Storage Mode setting.

<table>
<thead>
<tr>
<th>Target Time Slot</th>
<th>TS6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Error</td>
<td>-0.19 Hz</td>
</tr>
<tr>
<td>Mean Power</td>
<td>-46.51 dBm</td>
</tr>
<tr>
<td>EVM(rms)</td>
<td>1.67 %</td>
</tr>
<tr>
<td>EVM(peak)</td>
<td>4.32 %</td>
</tr>
<tr>
<td>Origin Offset</td>
<td>-66.40 dB</td>
</tr>
<tr>
<td>PCDE</td>
<td>-46.58 dB</td>
</tr>
</tbody>
</table>

Fig. 3.8-1 Result Window

1. **Target Time Slot**
   Displays current Target Time Slot number set in Target Time Slot

2. **Frequency Error**
   Displays frequency error in Target Time Slot of target carrier

3. **Mean Power**
   Displays average RF level of Target Time Slot of target carrier

4. **EVM (rms)**
   Displays average EVM of all chips in Target Time Slot of target carrier
5. EVM (peak)
   Displays maximum EVM of all chips in Target Time Slot of target carrier

6. chip
   Displays chip number where EVM (peak) occurred

7. Origin Offset
   Displays origin offset in Target Time Slot of target carrier

8. PCDE
   Displays Peak Code Domain Error in Target Time Slot of target carrier
3.9  Constellation Display

This displays the Constellation for chips in Target Time Slot of target carrier. The marker at the selected chip is displayed in red.

![Fig. 3.9-1 Constellation Display](image)

1. MKR chip
   Displays number of chip selected by marker
   The marker can be moved using the cursor keys or rotary knob.

2. MKR I/Q
   Displays amplitude of I/Q of chip selected by marker
   The marker can be moved using the cursor keys or rotary knob.
3.10 Code Domain Power vs Code Number Display

This displays the Code Domain Power measurement results for Target Slot of target carrier. The marker is displayed in red at the selected channel.

![Code Domain Power vs Code Number Display](image)

**Fig. 3.10-1  Code Domain Power vs Code Number Display**

1. MKR Channel/SF
   Displays the marker-selected Channel number and its Spreading factor.
   The marker can be moved using the cursor keys or rotary knob.

2. MKR Power
   Displays Code Domain Power for Code Number selected by marker

3. MKR Error
   Displays Code Domain Error for Code Number selected by marker

4. MKR Modulation
   Displays Modulation Scheme for Code Number selected by marker.
3.11 Code Domain Error vs Code Number Display

This displays the Code Domain Error measurement results for Target Slot of target carrier. The marker is displayed in red at the selected channel.

![Code Domain Error vs Code Number Display](image)

**Fig. 3.11-1  Code Domain Error vs Code Number Display**

1. MKR Channel/SF
   Displays the marker-selected Channel number and its Spreading factor. The marker can be moved using the cursor keys or rotary knob.

2. MKR Power
   Displays Code Domain Power for Code Number selected by marker

3. MKR Error
   Displays Code Domain Error for Code Number selected by marker

4. MKR Modulation
   Displays Modulation Scheme for Code Number selected by marker.
3.12 Multi Slot Power Display

This displays the Subframe Power, Mean, Data1, Midamble and Data2 Powers vs Slot number, including Downlink Pilot Time Slot (DwPTS) and Uplink Pilot Time Slot (UpPTS), in table form. Target Slot of target carrier is highlighted.

<table>
<thead>
<tr>
<th>Multi Slot Power (dBm)</th>
<th>TS0</th>
<th>DwPTS</th>
<th>UpPTS</th>
<th>TS1</th>
<th>TS2</th>
<th>TS3</th>
<th>TS4</th>
<th>TS5</th>
<th>TS6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subframe</td>
<td>-18.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>-18.21</td>
<td>18.24</td>
<td>18.21</td>
<td>-18.21</td>
<td>18.21</td>
<td>-18.21</td>
<td>18.21</td>
<td>-18.21</td>
<td>18.21</td>
</tr>
<tr>
<td>Data1</td>
<td>-18.21</td>
<td>18.21</td>
<td>18.21</td>
<td>-18.20</td>
<td>18.21</td>
<td>-18.21</td>
<td>18.20</td>
<td>-18.22</td>
<td>18.20</td>
</tr>
<tr>
<td>Midamble</td>
<td>-18.20</td>
<td>18.21</td>
<td>18.21</td>
<td>18.20</td>
<td>18.21</td>
<td>18.20</td>
<td>18.22</td>
<td>18.22</td>
<td>18.19</td>
</tr>
<tr>
<td>Data2</td>
<td>-18.21</td>
<td>18.21</td>
<td>18.21</td>
<td>18.21</td>
<td>18.22</td>
<td>18.21</td>
<td>18.22</td>
<td>18.22</td>
<td>18.22</td>
</tr>
</tbody>
</table>

**Fig. 3.12-1  Multi Slot Power Display**

1. **Multi Slot Power Result: Subframe**
   Displays average power for Subframe of target carrier

2. **Multi Slot Power Result: Mean**
   Displays mean power for each slot, including Downlink Pilot Time Slot (DwPTS) and Uplink Pilot Time Slot (UpPTS) of target carrier

3. **Multi Slot Power Result: Data1**
   Displays average power for Data part (352 chips) before Midamble for each slot of target carrier

4. **Multi Slot Power Result: Midamble**
   Displays average power for Midamble (144 chips) for each slot of target carrier

5. **Multi Slot Power Result: Data2**
   Displays average power for Data part (352 chips) after Midamble for each slot of Target carrier
3.13 Multi Carrier Power Display

This displays the average power for each slot, including Downlink Pilot Time Slot (DwPTS) and Uplink Pilot Time Slot (UpPTS), of all carriers in table form. The Target Slot and target carrier set are highlighted.

<table>
<thead>
<tr>
<th>Multi Carrier Power (dBm)</th>
<th>TS0</th>
<th>DwPTS</th>
<th>UpPTS</th>
<th>TS1</th>
<th>TS2</th>
<th>TS3</th>
<th>TS4</th>
<th>TS5</th>
<th>TS6</th>
</tr>
</thead>
</table>

**Fig. 3.13-1 Multi Carrier Power Display**

1. Multi Carrier Power Result: Carrier

Displays mean power for each slot, including Downlink Pilot Time Slot (DwPTS) and Uplink Pilot Time Slot (UpPTS), of carrier
3.14 Power vs Time Display

This displays the measurement result graphs divided between the top and button graph.

Fig. 3.14-1  Power vs Time Display

1. Time Mask
   Displays the Time Mask judgment results.

2. Off Power
   Displays the Off interval averaging power specified by the mask line.

3. On Power
   Displays the On interval averaging power.

4. TSi Power
   Displays the power values for each Time slot.

5. Top Graph (Result)
   Displays total image for subframe

6. Bottom Graph (Power vs Time)
   Displays graph near chip specified using Top Graph Marker
Chapter 4  Performance Test

This chapter describes measurement equipment, setup methods, and test procedures required for preventive maintenance of the MS269x Series or MS2830A.

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 part of preventive maintenance to prevent the MS269x Series or MS2830A performance becoming degraded.

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

- Carrier frequency accuracy
- Residual EVM

Perform critical items as preventive maintenance at regular intervals. The recommended cycle is once or twice a year.

If out-of-specification items are found, contact the Anritsu Service and Sales Office listed on the last page of the printed version of this manual, and in a separate file on the CD version.
4.2 Performance Test Items

Except when directed otherwise, warm-up the test equipment and measuring instruments for at least 30 minutes to stabilize them. In addition, achieving maximum measurement accuracy requires testing at a stable ambient temperature with minimum AC power-supply voltage fluctuations in a noise-, vibration-, and dust-free environment with low humidity.

4.2.1 Testing methods

(1) Test target standards
   - Carrier frequency accuracy
   - Residual EVM

(2) Measuring instruments
   - Vector signal generator
   - Power meter
   - 3 dB attenuator×2

(3) Setup

Fig. 4.2.1-1 Performance Test
(4) Test procedure

(a) Adjusting signal source
1. Input the 10-MHz reference signal output from the vector signal generator to the Reference Input connector of the MS269x Series or MS2830A.
2. Input the 10 MHz reference signal output from the signal generator to the Reference Input connector.
3. Output a TD-SCDMA modulation signal from the vector signal generator.
4. Input the vector signal generator output signal to the power meter and measure the power.

(b) Setting MS269x Series or MS2830A
1. Turn on the Power switch on the front panel of the MS269x Series or MS2830A and wait until the internal temperature stabilizes (about 1.5 hours after the temperature chamber stabilizes).
2. Press \( \text{Average} \) and press the menu function key displaying the TD-SCDMA character string.
3. Press \( \text{Preset} \).
4. Press \( \text{Preset} \) (Preset) to initialize.
5. Press \( \text{Cal} \).
6. Press \( \text{SIGANA All} \) (SIGANA All) to calibrate.
7. Press \( \text{Close} \) (Close).
8. Press \( \text{Imagin} \) and input the frequency output by the vector signal generator using the numeric keypad: press \( \text{Enter} \).
9. Press \( \text{Amplbst} \) and input the result of the power meter measurement using the numeric keypad: press \( \text{Enter} \).
10. Press \( \text{Data} \) and then press \( \text{Stbr} \) (Storage) and \( \text{Mod} \) (Mode) to choose Average using the cursor keys or rotary knob: press \( \text{Enter} \).
11. Press \( \text{Count} \) (Count) and input the measurement count using the numeric keypad: press \( \text{Enter} \).
12. Press \[ \text{Single} \] to measure.

When measuring the carrier frequency accuracy, select \textbf{Auto} for \textbf{Reference Signal}. When measuring the residual vector error, select \textbf{Fixed to Internal}.

Press \[ \text{System Settings} \] after pressing \[ \text{Set} \] to display the System Settings screen. Select and set Reference Signal with cursor key, and then press \[ \text{Set} \] (Set).

13. Confirm that the measured frequency (Carrier frequency accuracy) error is within the specifications.

14. Confirm that the measured EVM (rms) (Residual EVM) is within the specifications.

(5) Test results

\begin{table}[ht]
\centering
\caption{Carrier frequency measurement accuracy}
\begin{tabular}{|c|c|c|c|c|c|}
\hline
\textbf{Frequency} & \textbf{Min. limit} & \textbf{Deviation (Hz)} & \textbf{Max. limit} & \textbf{Uncertainty} & \textbf{Pass/Fail} \\
\hline
1850 MHz & MS269xA & \multicolumn{3}{c|}{\text{MS269xA}} & \text{MS269xA} \\
\hline
2010 MHz & \text{MS2830A} & \text{–20 Hz} & \text{MS2830A} & \text{+20 Hz} & \text{MS2830A} \\
\hline
2300 MHz & \text{MS269xA} & \text{–20 Hz} & \text{MS2830A} & \text{+20 Hz} & \text{MS2830A} \\
\hline
2570 MHz & \multicolumn{3}{c|}{\text{±2 Hz}} & \text{±1.8 Hz} & \\
\hline
\end{tabular}
\end{table}

\begin{table}[ht]
\centering
\caption{Residual EVM}
\begin{tabular}{|c|c|c|c|c|}
\hline
\textbf{Frequency} & \textbf{Measured value [\% (rms)]} & \textbf{Max. limit} & \textbf{Uncertainty} & \textbf{Pass/Fail} \\
\hline
1850 MHz & MS269xA & \multicolumn{3}{c|}{\text{MS269xA}} \\
\hline
2010 MHz & 1.0\% (rms) & \text{MS269xA} & \text{0.15\% (rms)} & \\
\hline
2300 MHz & \text{MS2830A} & \text{1.2\% (rms)} & \text{MS2830A} & \\
\hline
2570 MHz & \multicolumn{3}{c|}{\text{0.1\% (rms)}} & \\
\hline
\end{tabular}
\end{table}
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 (Accessory) on the main function menu displays the Accessory function menu.

<table>
<thead>
<tr>
<th>Function Keys</th>
<th>Menu Display</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>Title</td>
<td>Sets the title character string.</td>
</tr>
<tr>
<td>F2</td>
<td>Title (On/Off)</td>
<td>Displays (On) or hides (Off) the title character string.</td>
</tr>
<tr>
<td>F4</td>
<td>Erase Warm Up Message</td>
<td>Erases the warmup message display.</td>
</tr>
</tbody>
</table>

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 (Accessory) on the main function menu.
2. Press (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 (Set).
3. Press (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 (Accessory) on the main function menu.
2. Press (Erase Warm Up Message) to erase the warmup message.
Appendix

Appendix A  Error Messages.............................................  A-1
Appendix B  Initial Value List.............................................  B-1
<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out of range</td>
<td>The settable range is exceeded.</td>
</tr>
<tr>
<td>Not available in Center Frequency Mode</td>
<td>Carrier Frequency mode is not available when Center Frequency mode is set and vice versa.</td>
</tr>
<tr>
<td>Not available in Carrier Frequency Mode</td>
<td>Center Frequency mode is not available when Carrier Frequency mode is set and vice versa.</td>
</tr>
<tr>
<td>Not available in Auto Rate Detection On</td>
<td>Spreading Factor is not available when Auto Rate Detection is On.</td>
</tr>
<tr>
<td>Not available if not Code Domain</td>
<td>Target Time Slot cannot be set to Burst when Trace Mode is set to either Multi Slot Power or Multi Carrier Power.</td>
</tr>
<tr>
<td>Not available if not Code Domain Power</td>
<td>Code Domain Power Scale can not be set when Trace Mode is not set to Code Domain Power.</td>
</tr>
<tr>
<td>Not available if not Code Domain Error</td>
<td>Code Domain Error Scale can not be set when Trace Mode is not set to Code Domain Error.</td>
</tr>
<tr>
<td>Not available in Multi Slot Power</td>
<td>Marker Select and Marker Number are not available when Trace Mode is set to Multi Slot Power.</td>
</tr>
<tr>
<td>Not available in Multi Carrier Power</td>
<td>Marker Select and Marker Number are not available when Trace Mode is set to Multi Carrier Power.</td>
</tr>
<tr>
<td>Not available in Burst</td>
<td>Trace Mode cannot be set to Multi Slot Power when Target Time Slot is set to Burst.</td>
</tr>
<tr>
<td>Not available in Bottom Graph Select</td>
<td>Constellation Marker Number is not available when Bottom Graph Select is set.</td>
</tr>
<tr>
<td>Not available in Constellation Select</td>
<td>Bottom Graph Marker Number is not available when Constellation Select is set.</td>
</tr>
<tr>
<td>Not available in Power vs Time.</td>
<td>Signal Detection cannot be set to UL at Power vs Time. Also, Target Time Slot cannot be set at Power vs Time.</td>
</tr>
<tr>
<td>Not available when Signal Detection is set to UL.</td>
<td>Signal Detection cannot be set to UL at Power vs Time.</td>
</tr>
<tr>
<td>Not available when Wide Dynamic Range is set to On.</td>
<td>Pre-Amp cannot be set to On, when Wide Dynamic Range is set to On.</td>
</tr>
<tr>
<td>Not available when Wide Dynamic Range is set to Off.</td>
<td>Noise Correction cannot be set to On when Dynamic Range is set to Off.</td>
</tr>
<tr>
<td>Not available when Pre-Amp Mode is set to On.</td>
<td>Noise Correction cannot be set to On, when Noise Correction is set to On.</td>
</tr>
<tr>
<td>Not available when either Wide Dynamic Range is set to Off, or Trigger Switch is set to Off.</td>
<td>Pre-Amp Mode cannot be set to On when either Dynamic Range is set to Off, or Trigger Switch is set to Off.</td>
</tr>
</tbody>
</table>
### Appendix A  Error Messages

#### Table A-1  Error Messages (Cont’d)

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not available when Noise Correction is set to On.</td>
<td>Pre-Amp Mode cannot be set to On, when Noise Correction is set to On.</td>
</tr>
<tr>
<td>Please Load Signal Analyzer</td>
<td>The Signal Analyzer function is required to be loaded.</td>
</tr>
<tr>
<td>Please Load Spectrum Analyzer</td>
<td>The Spectrum Analyzer function is required to be loaded.</td>
</tr>
<tr>
<td>No file to read</td>
<td>There is no file that can be read.</td>
</tr>
<tr>
<td>File read error</td>
<td>File reading has failed.</td>
</tr>
<tr>
<td>File format error</td>
<td>The file format is invalid.</td>
</tr>
<tr>
<td>Invalid character</td>
<td>—</td>
</tr>
</tbody>
</table>
## Appendix B  Initial Value List

### Frequency
- **Carrier Frequency**: 2.01 GHz
- **Center Frequency**: 2.01 GHz
- **Frequency Mode**: Carrier Frequency

### Amplitude
- **Input Level**: $-10.00$ dBm
- **Pre-Amp**: Off
- **Offset**: Off
- **Offset Value**: 0.00 dB

### Common Setting
- **Signal direction**: Downlink
- **Scrambling Code Number**: 0
- **K**: 16
- **Target Time Slot**: Burst
- **Carrier Number**: 1
- **Target Carrier**: 1
- **Active Channel Threshold**: $-30.00$ dB
- **Active Slot Threshold**: $-10.00$ dB
- **Auto Rate Detection**: On
- **SF**: 16

### Modulation Analysis
- **Trace Mode**: Code Domain Power
- **Storage
  - Mode**: Off
  - Count**: 10
- **Scale
  - Code Domain Power Scale**: 60.00 dB
  - Code Domain Error Scale**: 60.00 dB
- **Marker
  - Marker**: On
  - Constellation Marker Number**: 0
  - Bottom Graph Marker Number**: 0

### Power vs Time
- **Power vs Time
  - Wide Dynamic Range**: On
  - Noise Correction**: Off
  - Pre-Amp Mode**: Off
  - Select Mask**: Standard
## Appendix B  Initial Value List

<table>
<thead>
<tr>
<th>Mask Setup</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Time1</td>
<td>8.0 chip</td>
</tr>
<tr>
<td>Time2</td>
<td>8.0 chip</td>
</tr>
<tr>
<td>Time3</td>
<td>85.0 chip</td>
</tr>
<tr>
<td>Time4</td>
<td>8.0 chip</td>
</tr>
<tr>
<td>Time5</td>
<td>8.0 chip</td>
</tr>
<tr>
<td>Level1</td>
<td>−41.3dBm</td>
</tr>
<tr>
<td>Level2</td>
<td>−80.00dBm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Smoothing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoothing</td>
<td>On</td>
</tr>
<tr>
<td>Smoothing Length</td>
<td>1.0 chip</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode</td>
<td>On</td>
</tr>
<tr>
<td>Storage Count</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marker</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Marker</td>
<td>On</td>
</tr>
<tr>
<td>Top Graph Marker Number</td>
<td>0 chip</td>
</tr>
<tr>
<td>Bottom Graph Marker Number</td>
<td>0.0 chip</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trigger</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger Switch</td>
<td>Off</td>
</tr>
<tr>
<td>Trigger Source</td>
<td>External</td>
</tr>
<tr>
<td>Trigger Slope</td>
<td>Rise</td>
</tr>
<tr>
<td>Trigger Delay</td>
<td>0 s</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessory</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>TD-SCDMA</td>
</tr>
<tr>
<td>Title</td>
<td>On</td>
</tr>
</tbody>
</table>
References are to section numbers.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Accessory 3.1.2, 5.1</td>
</tr>
<tr>
<td></td>
<td>Active Channel Threshold 3.4</td>
</tr>
<tr>
<td></td>
<td>Active Slot Threshold 3.4</td>
</tr>
<tr>
<td></td>
<td>AC inlet 2.1.2</td>
</tr>
<tr>
<td></td>
<td>ACP 3.5.2</td>
</tr>
<tr>
<td></td>
<td>Amplitude 3.1.2, 3.3</td>
</tr>
<tr>
<td></td>
<td>Application key 2.1.1</td>
</tr>
<tr>
<td></td>
<td>Application Switch 2.3.2</td>
</tr>
<tr>
<td></td>
<td>Auto Rate Detection 3.4</td>
</tr>
<tr>
<td></td>
<td>AUX connector 2.1.2</td>
</tr>
<tr>
<td>B</td>
<td>Bottom Graph Select 3.6</td>
</tr>
<tr>
<td></td>
<td>Bottom Graph Marker Number 3.6</td>
</tr>
<tr>
<td></td>
<td>Bottom Graph (Power vs Time) 3.14</td>
</tr>
<tr>
<td></td>
<td>Buffer Out connector 2.1.2</td>
</tr>
<tr>
<td>C</td>
<td>Calibrating 2.4.2</td>
</tr>
<tr>
<td></td>
<td>Cal key 2.1.1</td>
</tr>
<tr>
<td></td>
<td>Cancel key 2.1.1</td>
</tr>
<tr>
<td></td>
<td>Carrier 3.13</td>
</tr>
<tr>
<td></td>
<td>Carrier Frequency 3.2</td>
</tr>
<tr>
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