

**MS2690A/MS2691A/MS2692A
and MS2830A
Signal Analyzer
Operation Manual
Phase Noise Measurement Function
Operation**

Sixth 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 this document before using the equipment.
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MS2690A/MS2691A/MS2692A and MS2830A

Signal Analyzer

Operation Manual Phase Noise Measurement Function Operation

25 April 2008 (First Edition)

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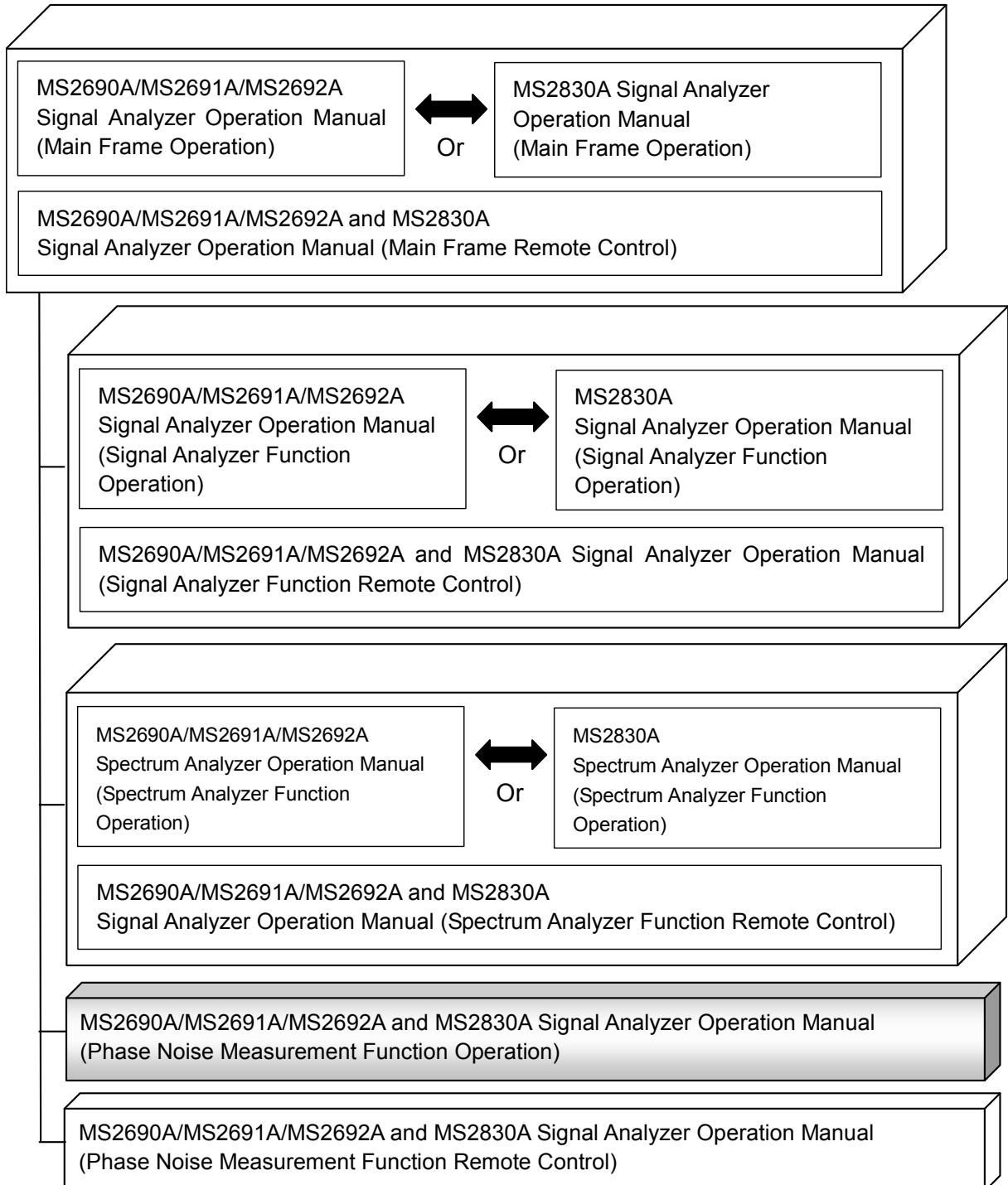
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About This Manual

■ Associated Documents

The operation manual configuration of the MS2690A/MS2691A/MS2692A and MS2830A Signal Analyzer is shown below.



- Signal Analyzer Operation Manual (Mainframe)
- Signal Analyzer Operation Manual (Mainframe Remote Control)
Description of basic operations, maintenance procedures, common functions and common remote functions of the mainframe
- Signal Analyzer Operation Manual (Signal Analyzer Function)
- Signal Analyzer Operation Manual (Signal Analyzer Function Remote Control)
Description of basic operations, common functions and common remote functions of the signal analyzer
- Signal Analyzer Operation Manual (Spectrum Analyzer Function)
- Signal Analyzer Operation Manual (Spectrum Analyzer Function Remote Control)
Description of basic operations, common functions and common remote functions of the spectrum analyzer
- Signal Analyzer Operation Manual (Phase Noise Measurement Function)
<This document>
- Signal Analyzer Operation Manual (Phase Noise Measurement Function Remote Control)
Description of basic operations, common functions and common remote functions of the Phase Noise Measurement function

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 describes an overview of the Phase Noise Measurement function.

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1.1 Overview of Phase Noise Measurement function

The MS2690/MS2691/MS2692A or MS2830A Signal Analyzer enables high-speed, high-accuracy, and simple measurements of transmission characteristics of base stations and mobile stations for various types of mobile communications.

The phase noise measurement function is provided for measuring phase noise, which is an important factor for evaluating the short-term stability of signals. With this application, the MS2690A/MS2691A/MS2692A or MS2830A can be used in various applications, including design verification, troubleshooting, and testing on production lines.

This function has following features:

- High speed, high accuracy phase noise measurement

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.

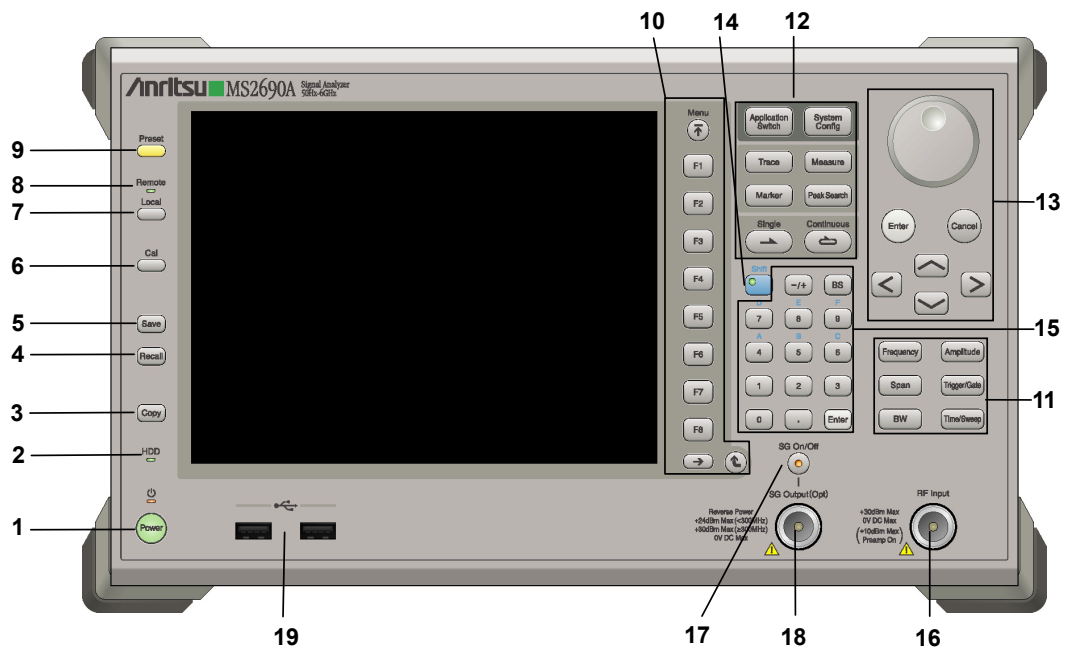


Figure 2.1.1-1 MS269x series front panel

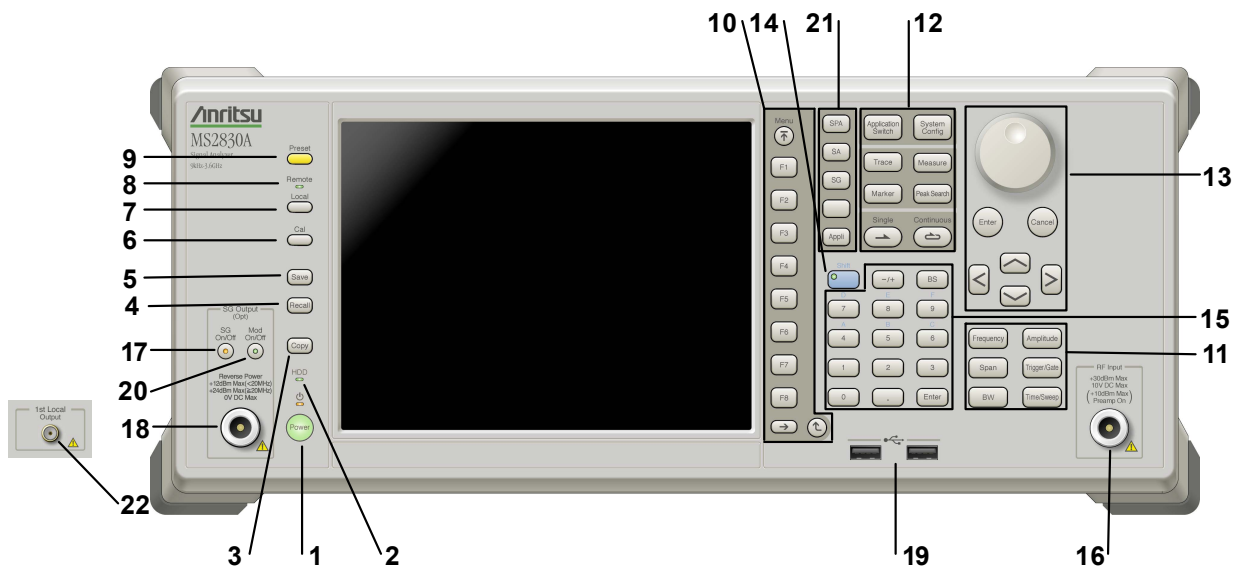
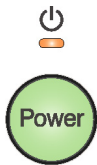








Figure 2.1.1-2 MS2830A front panel

- 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.



Local key

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



Remote lamp

Lights when in remote-control state.



Preset key


Resets parameters to initial settings.



10



Function keys

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

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

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

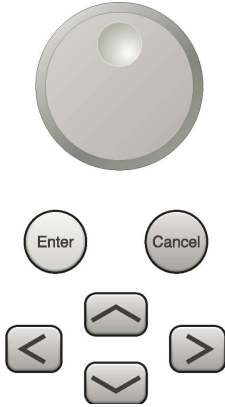
 Use when switching graph marker operation.

 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  to set the entered or selected data.

Press  to cancel input or selected data.

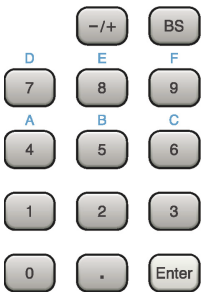
14



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



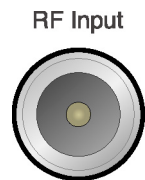
Numeric keypad

Enters numbers on parameter setup screens.

Press  to delete the last entered digit or character.

[A] to [F] can be entered by pressing keys  to  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)

18 SG Output(Opt)

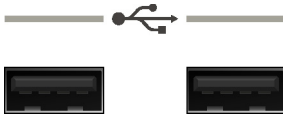


RF Output connector (when Option 020 installed)

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 Generator 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.

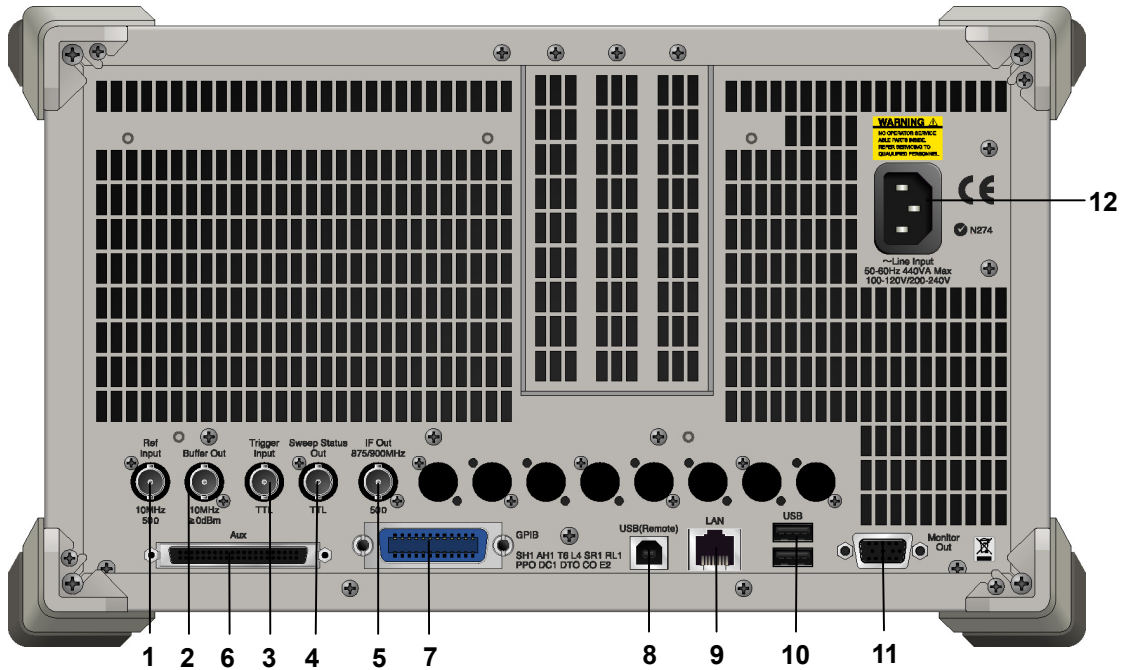


Figure 2.1.2-1 MS269x series rear panel

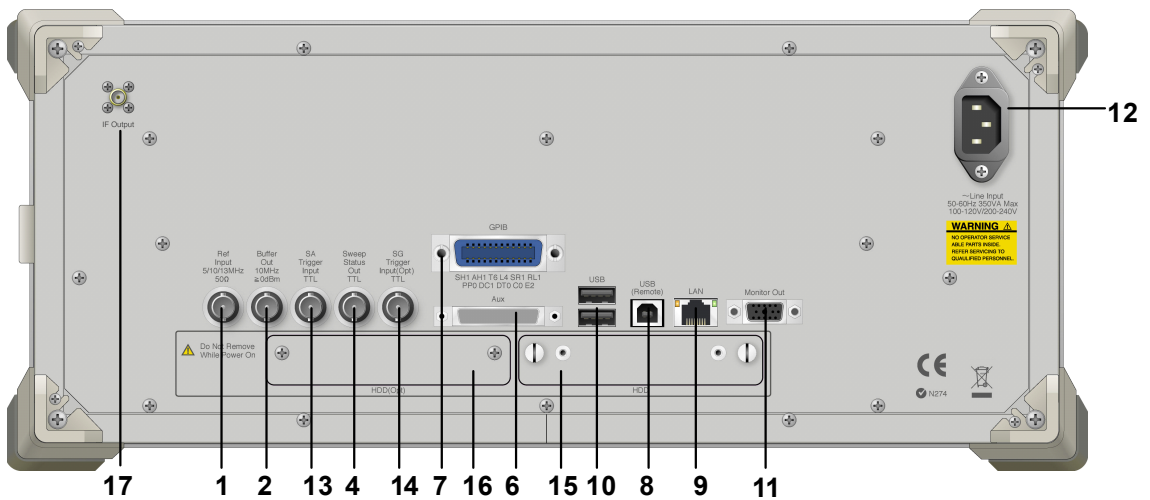






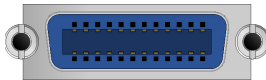











Figure 2.1.2-2 MS2830A rear panel

- | | | |
|---|---|---|
| 1 |  <p style="text-align: center;">Ref
Input</p> | <p>Ref Input connector (reference frequency signal input connector)</p> <p>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:</p> <p>MS269x series: 10 MHz/13 MHz
MS2830A: 5 MHz/10 MHz/13 MHz</p> |
| 2 |  <p style="text-align: center;">Buffer Out</p> | <p>Buffer Out connector (reference frequency signal output connector)</p> <p>Outputs the internal reference frequency signal (10 MHz). It is for synchronizing frequencies between other equipment and the MS2690A/MS2691A/MS2692A or MS2830A.</p> |
| 3 |  <p style="text-align: center;">Trigger
Input</p> | <p>Trigger Input connector (MS269x series only)</p> <p>Inputs trigger signal from external device.</p> |
| 4 |  <p style="text-align: center;">Sweep Status
Out</p> | <p>Sweep Status Out connector</p> <p>Outputs signal when internal measurement is performed or measurement data is obtained.</p> |
| 5 |  <p style="text-align: center;">IF Out
875/900MHz</p> | <p>IF Out connector (MS269x series only)</p> <p>Not used.</p> |
| 6 |  <p style="text-align: center;">Aux</p> | <p>AUX connector</p> <p>Not used.</p> |
| 7 |  <p style="text-align: center;">GP-IB</p> | <p>GP-IB connector</p> <p>For external control via GPIB.</p> |
| 8 |  <p style="text-align: center;">USB(Remote)</p> | <p>USB connector (type B)</p> <p>For external control via USB.</p> |

Chapter 2 Preparation

- 9** **LAN**
 Ethernet connector
Connects PC or Ethernet network.
- 10** **USB**

 USB connector (type A)
Used to connect a USB keyboard or mouse or the USB memory supplied.
- 11** **Monitor Out**
 Monitor Out connector
Connects external display.
- 12**

~Line Input
50-60Hz 440VA Max
100-120V/200-240V
AC inlet
Supplies power.
- 13** **SA
Trigger
Input
TTL**
 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(Opt)
TTL**
 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.

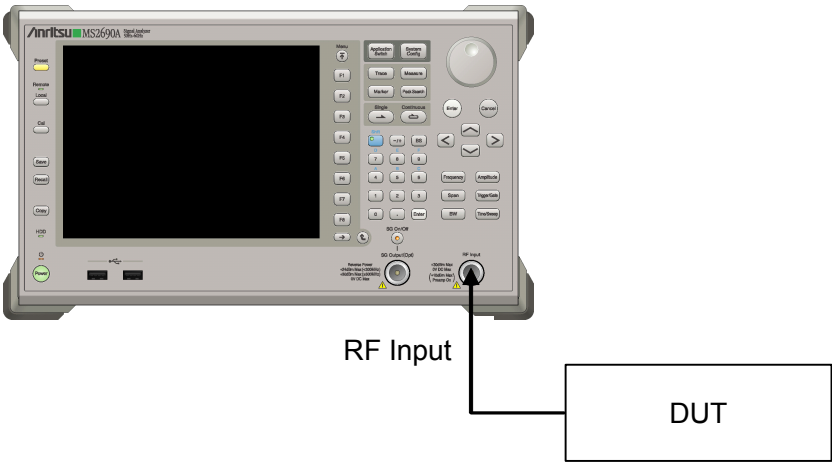


Figure 2.2-1 Signal path setup example

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

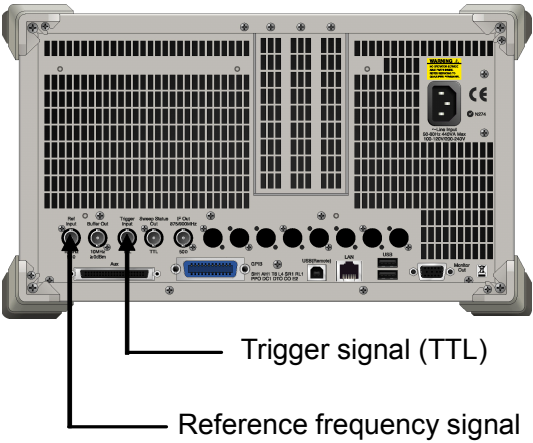


Figure 2.2-2 External signal input

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  to display the Preset function menu.
2. Press  (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  to display the Application Cal function menu.
2. Press  (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 the setting methods for the MS2690A/MS2691A/MS2692A or MS2830A.

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3.1 Basic Operation

3.1.1 Screen layout

This section describes the screen layout of the phase noise measurement function.

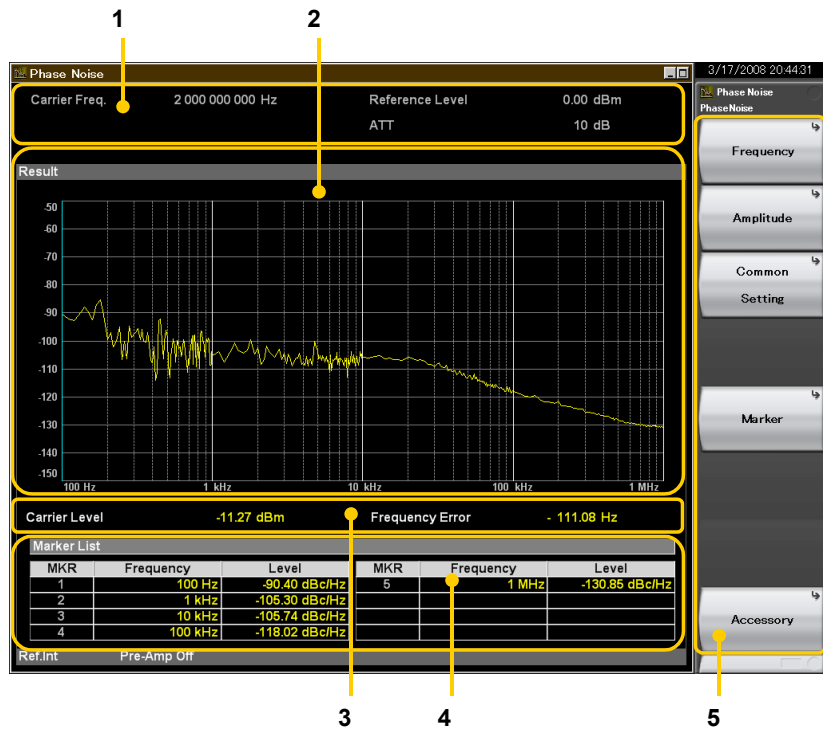


Figure 3.1.1-1 Screen Layout

1. Measurement parameter window
Displays the currently set measurement parameters.
2. Graph window
Displays the results in a log plot graph.
3. Numeric result window
Displays the numeric results.
4. Marker list window
Displays the numeric results at each marker.
5. Function menu
Displays the functions executable with function keys.

3.1.2 Function menu

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

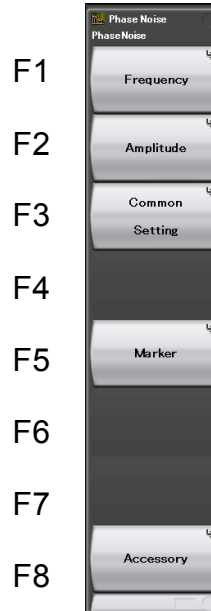







Figure 3.1.2-1 Main function menu

Table 3.1.2-1 Main function menu

Menu Display	Function
Frequency	Sets frequency  3.2 "Setting Frequency"
Amplitude	Sets level.  3.3 "Setting Level"
Common Setting	Sets common items.  3.4 "Setting Common Items"
Marker	Sets a marker.  3.5 "Setting markers"
Accessory	Sets other functions.  4.1 "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.

Single

The selected measurement items are measured only once before measurement is stopped.

<Procedure>

Press .


Continuous

The selected measurement items are measured continuously. Measurement will continue even if parameters are changed or the window display is changed. Measurement stops if other applications are selected.

<Procedure>

Press .

3.2 Setting Frequency

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

Carrier Frequency

- Summary
Sets a carrier frequency.
- Setting range
10 MHz to the upper limit, depending on the main unit

Start Offset

- Summary
Sets an offset lower limit.
- Setting range
10 Hz to 1 kHz

Stop Offset

- Summary
Sets an offset upper limit.
- Setting range
100 kHz to 10 MHz

External Mixer On/Off

- Summary
Sets High Performance Waveguide Mixer to On.
- Options
On Enables the External Mixer function.
Off Disables the External Mixer function.
- Remarks
The External Mixer function is available only when Option 044/045 is installed for MS2830A. MA2806A and MA2808A is a product designed for exclusive use with MS2830A.

Table 3.2-1 High Performance Waveguide Mixer

Model	Name	Frequency Range	Waveguide Flange
MA2806A	High Performance Waveguide Mixer (50 to 75 GHz)	50 to 75 GHz	UG385/U
MA2808A	High Performance Waveguide Mixer (60 to 90 GHz)	60 to 90 GHz	UG387/U

To set the parameters of High Performance Waveguide Mixer, use the Spectrum Analyzer function of the mainframe.

For details, refer to Chapter 8 “External Mixer” in the *MS2830A Signal Analyzer Operation Manual (Spectrum Analyzer Function Operation)*.

External Mixer Select

■ Summary

Selects the band for High Performance Waveguide Mixer.

■ Options

Band V+ High Performance	50 to 75 GHz
Band E– High Performance	60 to 90 GHz

3.3 Setting Level

Configures settings related to level. Pressing **F2** (Amplitude) on the main function menu, or pressing **Amplitude** displays the Amplitude function menu.

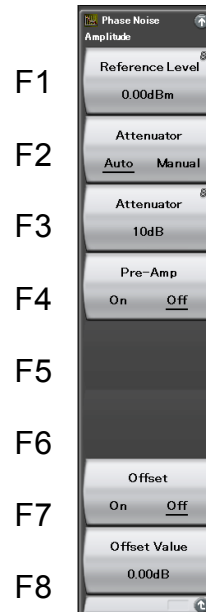









Figure 3.3-1 Amplitude function menu

Table 3.3-1 Amplitude function menu

Menu Display	Function
Reference Level	Sets reference level.  3.3.1 "Setting reference level"
Attenuator (Auto/Manual)	Selects whether to set input attenuator automatically or manually.  3.3.2 "Setting the input attenuator"
Attenuator	The input attenuator can be set.  3.3.2 "Setting the input attenuator"
Pre-Amp (On/Off)	Sets Pre-Amp function On/Off.  3.3.3 "Pre-Amp"
Scale	Sets scale.  3.3.4 "Setting scale"
Offset (On/Off)	Sets reference level offset function On/Off.  3.3.5 "Setting Reference Level Offset"
Offset Value	Sets reference level offset value.  3.3.5 "Setting Reference Level Offset"

3.3.1 Setting Reference Level

Reference Level

- Summary

Sets the input level from the target DUT.

- Setting range

For Pre-Amp: On :

(-120.00 + Offset Value) to (30.00 + Offset Value) dBm

For Pre-Amp: Off:

(-120.00 + Offset Value) to (50.00 + Offset Value) dBm

3.3.2 Setting Input Attenuator

- 1 Auto

Sets the input attenuator automatically according to the reference level setting. When a signal having the same level as the reference level is input, the input attenuator is automatically set so that the input level to the internal mixer is -10 dBm or less.

- 2 Manual setting

When measuring a minute-level signal, select Manual and set the input attenuator manually.

The setting range of the input attenuator in Manual setting is as follows.

Setting range and resolution for input attenuator

Input attenuator setting range: Refer to Table 3.3.2-1 or 3.3.2-2.

Input attenuator minimum resolution: 2 dB

Table 3.3.2-1 Input attenuator setting range (When Pre-Amp is set to Off)

Attenuator Manual	
Lower Limit	Upper Limit
Logic* ($\alpha = 0, \beta = 1, \gamma = 2$) The minimum value is 0 dB.	60 dB

Table 3.3.2-2 Setting range for input attenuator (When Pre-Amp is set to On)

Attenuator Manual	
Lower Limit	Upper Limit
Logic* ($\alpha = 20, \beta = 21, \gamma = 22$) The minimum value is 0 dB.	60 dB

*: Can be obtained as follows, according to the setting condition.

[1] When the reference level can be divided by 2:

$$\text{Attenuator (dB)} = \text{RL}^{*1+\alpha}$$

[2] Other than [1] above, and when $\text{INT}(\text{RL})^{*2}$ is an odd number:

$$\text{Attenuator (dB)} = \text{INT}(\text{RL})^{*2} + \beta$$

[3] Other than [1] above, and when $\text{INT}(\text{RL})^{*2}$ is an even number:

$$\text{Attenuator (dB)} = \text{INT}(\text{RL})^{*2+\gamma}$$

*1: Reference level (dBm)

*2: Integer part of reference level

3.3.3 Pre-Amp

Pre-Amp

■ Summary

Turns the Pre-Amp function On/Off.

■ Selection options

On Enables the Pre-Amp function.

Off Disables the Pre-Amp function.

3.3.4 Setting scale

Log Scale Line (10/16)

■ Summary

Sets the number of log scale lines.

■ Selection options

10 10 scale lines (–150 dBc/Hz to Reference Value)

16 16 scale lines (–180 dBc/Hz to Reference Value)

Reference Value

■ Summary

Sets the upper limit value of vertical graph axis.

■ Selection options

Log Scale Line: 10

–140 to –50 dBc/Hz

Log Scale Line: 16

–170 to –20 dBc/Hz

3.3.5 Setting Reference Level Offset

Offset

- Summary
Turns the Offset function On/Off.
- Selection options
 - On Enables the offset function.
 - Off Disables the offset function.

Offset Value

- Summary
Sets the level offset coefficient.
- Setting range
-99.99 to + 99.99 dB
- Setting example

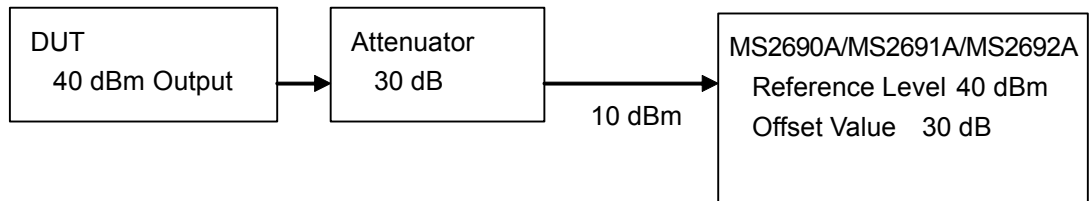



Figure 3.3.5-1 Reference Level and Offset Value setting example

3.4 Setting Common Items

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

Average

- Summary

Sets the averaging count (the number of times to repeat measurements internally per one measurement result).

- Setting range

1 to 999

3.5 Setting Markers

Configures settings related to marker. Pressing **F5** (Marker) on the main function menu or **Marker** displays the Marker function menu.

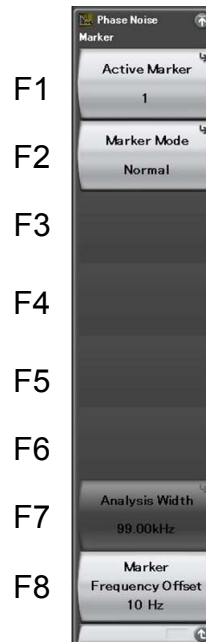






Figure 3.5-1 Marker function menu

Table 3.5-1 Marker function menu

Menu Display	Function
Active Marker	Sets the active marker.  3.5.1 “Setting Active Marker”
Marker Mode	Sets the marker mode.  3.5.2 “Setting marker mode”
Analysis Width	Sets the marker range (integral bandwidth).  3.5.2 “Setting marker mode”
Marker Frequency Offset	Sets the marker offset frequency  3.5.2 “Setting marker mode”

3.5.1 Setting Active Marker

Active Marker

- Summary
Selects the active marker.

3.5.2 Setting marker mode

Normal

- Summary
Normal marker
Displays the phase noise level with the specified frequency offset.

Integral Noise

- Summary
Calculates the Integral Noise with the specified integral bandwidth.

RMS Noise

- Summary
Calculates the RMS Noise with the specified integral bandwidth.

Jitter

- Summary
Calculates the Jitter with the specified integral bandwidth.

Residual FM

- Summary
Calculates the residual FM with the specified integral bandwidth.

Off

- Summary
Turns Off the active marker.

Marker Frequency Offset

- Summary
Sets the offset frequency of the marker.
- Resolution
 - 1 Hz (For offset frequency of 10 Hz to 100 Hz)
 - 10 Hz (For offset frequency of 100 Hz to 1 kHz)
 - 100 Hz (For offset frequency of 1 kHz to 10 kHz)
 - 1 kHz (For offset frequency of 10 kHz to 100 kHz)
 - 10 kHz (For offset frequency of 100 kHz to 1 MHz)
 - 100 kHz (For offset frequency of 1 MHz to 10 MHz)
- Remarks
Enabled for the marker mode of Normal or OFF.

Analysis Width

■ Summary

Displays the integral bandwidth (Start to Stop).

■ Setting range

1 Hz to 9999990 Hz

■ Remarks

Enabled for the marker mode of Integral Noise, RMS Noise, Jitter, or Residual FM.

The Start/Stop setting range is Start Offset to Stop Offset; however, Start < Stop

3.6 Measurement Results

Displays the measurement results of tested signals.

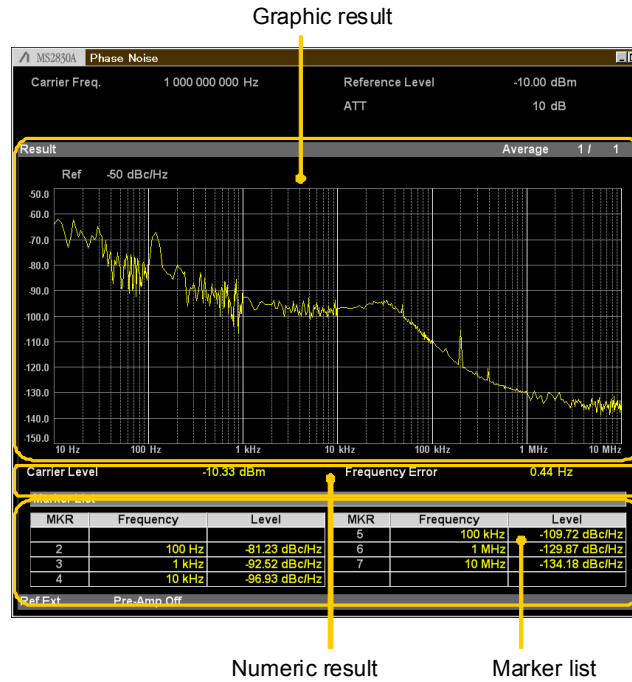


Figure 3.6-1 Marker function menu (Marker mode: Normal and OFF)

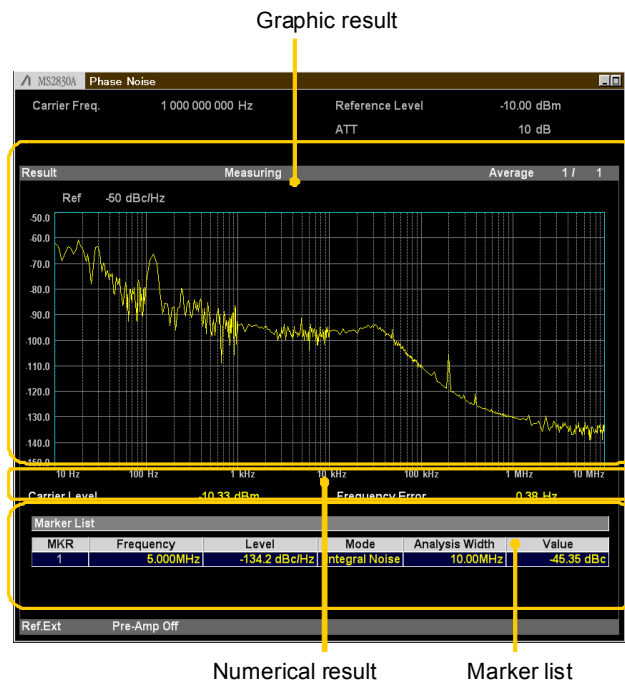


Figure 3.6-2 Marker function menu (Marker mode: Integral Noise, RMS Noise, Jitter, and Residual FM)

3.6.1 Graphical Results

Displays the single-sideband phase noise characteristics in a log frequency graph.

3.6.2 Numerical Results

Displays the numeric results.

Carrier Level

■ Summary

Displays the carrier level.

Frequency Error

■ Summary

Displays the difference between the set carrier frequency and the measured carrier frequency.

3.6.3 Marker List

For the marker mode: Normal and OFF

Lists the measurement results at each marker. The list contains the marker number, marker offset frequency, and marker phase noise level.

Table 3.6.3-1 Displayed items for marker list

Item	Description
MKR	Displays the marker number.
Frequency	Displays the marker offset frequency.
Level	Displays the marker phase noise level.

For the marker mode: Integral Noise, RMS Noise, Jitter, and Residual FM

Lists the measurement results at each marker. The list contains the marker number, offset frequency of the center of marker range, phase noise level, marker mode, integral bandwidth, and calculation result.

Table 3.6.3-2 Displayed items for marker list

Item	Description
MKR	Displays the marker number.
Frequency	Displays the offset frequency of the center of marker range.
Level	Displays the phase noise level of the offset frequency.
Mode	Displays the marker mode.
Analysis Width	Displays the integral bandwidth.
Value	Displays the calculation result of the set marker mode.

3.7 Saving Measurement Results

This section describes how to save the measurement results to internal hard disk or USB memory device.

<Procedure>

1. Press **Save** in the Phase Noise screen to display the Save menu shown in Figure 3.7-1.
2. Press **F1** (Device) to change the save destination.
3. When the Setting window is displayed, select the target drive and then press **F7** (Set) to set.
4. With the save destination set, press **F6** (Save Waveform CSV DATA).



Figure 3.7-1 Save menu

The sequential numbers suffixed to a file name are 0 to 999. No more files can be saved if the sequential numbers up to 999 are all used.

The saved files are stored in a folder according to the application. The application folders are located under the following directory in the saving target drive specified by **F1** (Device).

\\Anritsu Corporation\\Signal Analyzer\\User Data\\Trace Data\\Phase Noise

Up to 1000 files can be saved in one folder.

Chapter 4 Other Functions

This chapter describes other functions of this application.

4.1	Selecting Other Functions	4-2
4.2	Setting Title.....	4-2
4.3	Erasing Warmup Message	4-2

4.1 Selecting Other Functions


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






Table 4.1-1 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.


4.2 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 the title by repeating this operation. When the title is entered, press  (Set).
3. Press  (Title) and then select “Off” to hide the title.

4.3 Erasing Warmup Message

The warmup message , 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 A Error Message

Table A-1 Message Processing and Status

Message	Description
Out of range	The settable range is exceeded.
No file to read	There is no file that can be read.
File read error	File reading has failed.
File format error	The file format is invalid.
Empty Title Name	The title name is empty.
Empty File Name	The file name is empty.
Invalid character	-

Appendix B Default Value List

Common Parameter

Frequency		
Carrier Frequency		2.000 GHz
Start Offset		10 Hz
Stop Offset		10 MHz
Amplitude		
Reference Level		0.00 dBm
ATT		10 dB
Level Offset On/Off		Off
Level Offset Value		0.00 dB
Pre-Amp		Off
Amplitude-Scale		
Log Scale Line		10
Reference Value		-50 dBc/Hz

Phase Noise Basic Parameter

Common Setting		
Average Count		1

Marker

Marker1		
Marker		On
Marker Frequency Offset		10 Hz
Marker2		
Marker		On
Marker Frequency Offset		100 Hz
Marker3		
Marker		On
Marker Frequency Offset		1 kHz
Marker4		
Marker		On
Marker Frequency Offset		10 kHz
Marker5		
Marker		On
Marker Frequency Offset		100 kHz
Marker6		
Marker	Off	On
Marker Frequency Offset		1 MHz
Marker7		
Marker	Off	On
Marker Frequency Offset		10 MHz

Appendix B Default Value List

Marker8	Off
Marker Mode	Normal
Analysis Width	99 kHz
Marker Frequency Offset	10 Hz

Accessory

Accessory	
Title	On
Title Entry	Phase Noise

References are to section numbers.

A

Accessory	3.1.2, 5.1
AC inlet	2.1.2
Amplitude	3.3
Application key	2.1.1
Application Switch	2.3.2
AUX connector	2.1.2
Average	3.4

B

Buffer Out connector	2.1.2
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C

Calibration	2.4.2
Cal key	2.1.1
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Carrier Level	3.6.2
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E

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Erase Warm Up Message	4.3
Ethernet	2.1.1
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F

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G

GPIB	2.1.1
GPIB connector	2.1.2
Graph window	3.1.1, 3.6.1

H

Hard disk access lamp	2.1.1
HDD slot	2.1.2

I

IF Out connector	2.1.2
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L

Level	2.1.1, 2.4, 3.3
Load Application Select	2.3.1
Local key	2.1.1

M

Main function keys	2.1.1
Marker	2.1, 3.1, 3.5, 3.6
Mixer	3.2
Modulation control key	2.1.1
Monitor Out connector	2.1.2

N

Numeric keypad	2.1.1
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O

Offset	3.3
Offset Value	3.3

P

Preamplifier	3.3.3
Power switch	2.1.1
Preset	2.4.1
Preset key	2.1.1

R

Recall key	2.1.1
Ref Input connector	2.1.2
Reference frequency signal	2.1.2
Remote lamp	2.1.1
Result window	3.1.1
RF Output control key	2.1.1
RF output connector	2.1.1
RF input connector	2.1.1
Rotary knob	2.1.1

S

SA Trigger Input connector	2.1.2
Save key	2.1.1
SG Trigger Input connector	2.1.2
Shift key	2.1.1
Single	3.1.3
Sweep Status Out connector	2.1.2

T

Title	4.2
Trigger Input connector	2.1.2

U

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

W

Warmup message	4.3
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