Caution

Do not exceed the operating input power, voltage, and current level and signal type appropriate for the instrument being used, refer to your instrument's Function Reference.

Electrostatic discharge(ESD) can damage the highly sensitive microcircuits in your instrument. ESD damage is most likely to occur as the test fixtures are being connected or disconnected. Protect them from ESD damage by wearing a grounding strap that provides a high resistance path to ground. Alternatively, ground yourself to discharge any static charge built-up by touching the outer shell of any grounded instrument chassis before touching the test port connectors.

Safety Summary

When you notice any of the unusual conditions listed below, immediately terminate operation and disconnect the power cable.
Contact your local Agilent Technologies sales representative or authorized service company for repair of the instrument. If you continue to operate without repairing the instrument, there is a potential fire or shock hazard for the operator.

- Instrument operates abnormally.
- Instrument emits abnormal noise, smell, smoke or a spark-like light during operation.
- Instrument generates high temperature or electrical shock during operation.
- Power cable, plug, or receptacle on instrument is damaged.
- Foreign substance or liquid has fallen into the instrument.

Herstellerbescheinigung

GERÄUSCHEMISSION

LpA < 70 dB
am Arbeitsplatz
normaler Betrieb
nach DIN 45635 T. 19

Manufacturer's Declaration

ACOUSTIC NOISE EMISSION

LpA < 70 dB
operator position
normal operation
per ISO 7779

Regulatory compliance information

This product complies with the essential requirements of the following applicable European Directives, and carries the CE marking accordingly:

The Low Voltage Directive 73/23/EEC, amended by 93/68/EEC
The EMC Directive 89/336/EEC, amended by 93/68/EEC

To obtain Declaration of Conformity, please contact your local Agilent Technologies sales office, agent or distributor.

Safety notice supplement

- This equipment complies with EN/IEC61010-1:2001.
- This equipment is MEASUREMENT CATEGORY I (CAT I). Do not use for CAT II, III, or IV.
- Do not connect the measuring terminals to mains.
- This equipment is POLLUTION DEGREE 2, INDOOR USE product.
- This equipment is tested with stand-alone condition or with the combination with the accessories supplied by Agilent Technologies against the requirement of the standards described in the Declaration of Conformity. If it is used as a system component, compliance of related regulations and safety requirements are to be confirmed by the builder of the system.

Agilent E5052A Signal Source Analyzer

User's Guide

Third Edition

FIRMWARE REVISIONS

This manual applies directly to instruments that have the firmware revision 1.50.
For additional information about firmware revisions, see Appendix A.

Agilent Technologies

Agilent Part No. E5052-90020

February 2005

Printed in Japan

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Manual Printing History

The manual's printing date and part number indicate its current edition. The printing date changes when a new edition is printed (minor corrections and updates that are incorporated at reprint do not cause the date to change). The manual part number changes when extensive technical changes are incorporated.

August 2004	First Edition (part number: E5052-90000)
October 2004	Second Edition (part number: E5052-90010, changes for firmeware version 1.10)
February 2005	Third Edition (part number: E5052-90020, changes for firmeware version 1.50)

Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific WARNINGS elsewhere in this manual may impair the protection provided by the equipment. Such noncompliance would also violate safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies assumes no liability for the customer's failure to comply with these precautions.

NOTE The E5052A complies with INSTALLATION CATEGORY II as well as POLLUTION DEGREE 2 in IEC61010-1. The E5052A is an INDOOR USE product.

NOTE The LEDs in the E5052A are Class 1 in accordance with IEC60825-1, CLASS 1 LED PRODUCT

NOTE This equipment is MEASUREMENT CATEGORY I (CAT I). Do not use for CAT II, III, or IV.

NOTE This equipment is tested with stand-alone condition or with the combination with the accessories supplied by Agilent Technologies against the requirement of the standards described in the Declaration of Conformity. If it is used as a system component, compliance of related regulations and safety requirements are to be confirmed by the builder of the system.

- Ground the Instrument

  To avoid electric shock, the instrument chassis and cabinet must be grounded with the supplied power cable's grounding prong.

- DO NOT Operate in an Explosive Atmosphere

  Do not operate the instrument in the presence of inflammable gasses or fumes. Operation of any electrical instrument in such an environment clearly constitutes a safety hazard.

- Keep Away from Live Circuits

  Operators must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltage levels may remain even after the power cable has been disconnected. To avoid injuries, always disconnect the power and discharge circuits before touching them.

- DO NOT Service or Adjust the Instrument Alone

  Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

- DO NOT Substitute Parts or Modify the Instrument

  To avoid the danger of introducing additional hazards, do not install substitute parts or perform unauthorized modifications to the instrument. Return the instrument to an Agilent Technologies Sales and Service Office for service and repair to ensure that

safety features are maintained in operational condition.

- Dangerous Procedure Warnings

  Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

WARNING **Dangerous voltage levels, capable of causing death, are present in this instrument. Use extreme caution when handling, testing, and adjusting this instrument.**

- Do not connect the measuring terminals to mains.

Safety Symbols

General definitions of safety symbols used on the instrument or in manuals are listed below.

Instruction Manual symbol: the product is marked with this symbol when it is necessary for the user to refer to the instrument manual.

Alternating current.

Direct current.

On (Supply).

Off (Supply).

In-position of push-button switch.

Out-position of push-button switch.

A chassis terminal; a connection to the instrument's chassis, which includes all exposed metal structure.

Stand-by.

WARNING **This warning sign denotes a hazard. It calls attention to a procedure, practice, or condition that, if not correctly performed or adhered to, could result in injury or death to personnel.**

CAUTION This Caution sign denotes a hazard. It calls attention to a procedure, practice, or condition that, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the instrument.

NOTE This Note sign denotes important information. It calls attention to a procedure, practice, or condition that is essential for the user to understand.

Certification

Agilent Technologies certifies that this product met its published specifications at the time of shipment from the factory. Agilent Technologies further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by the Institution’s calibration facility or by the calibration facilities of other International Standards Organization members.

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Assistance

Product maintenance agreements and other customer assistance agreements are available for Agilent Technologies products.

For any assistance, contact your nearest Agilent Technologies Sales and Service Office. Addresses are provided at the back of this manual.

Typeface Conventions

Sample (bold)	Boldface type is used when a term is defined or emphasis.
Sample (Italic)	Italic type is used for emphasis.
Sample key	Indicates a hardkey (key on the front panel or external keyboard) labeled “Sample.” “key” may be omitted.
Sample menu/button/box	Indicates a menu/button/box on the screen labeled “Sample” which can be selected/executed by clicking. “menu,” “button,” or “box” may be omitted.
Sample block/toolbar	Indicates a block (group of hardkeys) or a toolbar (setup toolbar) labeled “Sample.”
Sample 1 - **Sample 2** - **Sample 3**	Indicates a sequential operation of **Sample 1**, **Sample 2**, and **Sample 3** (menu, button, or box). “-” may be omitted.

Documentation Map

The following manuals are available for the Agilent E5052A.

- ***User's Guide*** **(Part Number E5052-900x0, attached to Option ABA)**

  This manual describes most of the basic information needed to use the E5052A. It provides a function overview, detailed operation procedure for each function (from preparation for measurement to analysis of measurement results), measurement examples, specifications, and supplemental information. For programming guidance on performing automatic measurement with the E5052A, please see the *Programming Manual*.

- ***Programmer's Guide*** **(Part Number E5052-900x1, attached to Option ABA)**

  This manual provides programming information for performing automatic measurement with the E5052A. It includes an outline of remote control, procedures for detecting measurement start (trigger) and end (sweep end), application programming examples, a command reference, and related information.

- ***VBA Programmer's Guide*** **(Part Number E5052-900x2, attached to Option ABA)**

  This manual describes programming information for performing automatic measurement with internal controller. It includes an outline of VBA programming, some sample programming examples, a COM object reference, and related information.

NOTE The number position shown by "x" in the part numbers above indicates the edition number.

VBA Macro

The Agilent folder (D:\Agilent) on the hard disk of the E5052A contains the VBA macros (VBA Projects) used in this manual.

The customer shall have the personal, non-transferable rights to use, copy, or modify the VBA macros for the customer's internal operations.

The customer shall use the VBA macros solely and exclusively for their own purposes and shall not license, lease, market, or distribute the VBA macros or modification of any part thereof.

Agilent Technologies shall not be liable for any infringement of any patent, trademark, copyright, or other proprietary right by the VBA macros or their use. Agilent Technologies does not warrant that the VBA macros are free from infringements of such rights of third parties. However, Agilent Technologies will not knowingly infringe or deliver software that infringes the patent, trademark, copyright, or other proprietary right of a third party.

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1 Precautions

This chapter describes cautions that must be observed in operating the E5052A.

Software Installed

The Windows operating system installed in this machine is customized for more effective operation, and has different functions that are not part of the Windows operating system for ordinary PCs (personal computers).
Therefore, do not attempt to use the system in ways other than those described in this manual or to install Windows-based software (including anti-virus software) for ordinary PCs as doing so may cause malfunctions.

Also note the followings.

- Do not update the Windows operating system installed in this machine to the Windows operating system for ordinary PCs. Doing so will cause malfunctions.
- Do not attempt to update VBA (Visual Basic for Applications) software installed in this machine to its equivalent developed for ordinary PCs. Doing so will cause malfunctions.
- Do not allow any computer virus to infect the system. This machine has no virus check function nor anti-virus software installed.

Agilent Technologies will not be held liable for any failure or damage arising from negligence regarding these prohibitions and warnings.

NOTE

If the pre-installed software is damaged somehow, resulting in errant behavior by the machine, perform a system recovery. For further details of system recovery, refer to “System Recovery” on page 201.

Before contacting us

If you encounter the following problems during startup or operation of the E5052A, in which initial registration of the Windows 2000 Operating System has been properly performed, execute system recovery and update the firmware version. As for the system recovery procedure, refer to “System Recovery” on page 201.

The system starts up, but the normal measurement screen does not appear

- The system automatically shuts down immediately after the startup, or the startup process stops.
- The measurement screen appears, but "Power on test fail" or "Calibration data lost" is displayed in the instrument message/warning area against a red background in the lower-left part of the screen. The system enters the service mode. (The instrument status bar in the lower-right displays SVC in red).

Unstable Operation

- The system hangs up while the instrument is controlled from VBA or external PCs.
- The blue screen appears and the system hangs up.
- The response is much slower than usual.

When execution of system recovery does not result in normal operation, a failure may have occurred. Contact Agilent Technology’s Customer Contact listed at the end of this guide or the company from which you bought the device.

For other problems, refer to “Troubleshooting” on page 240.

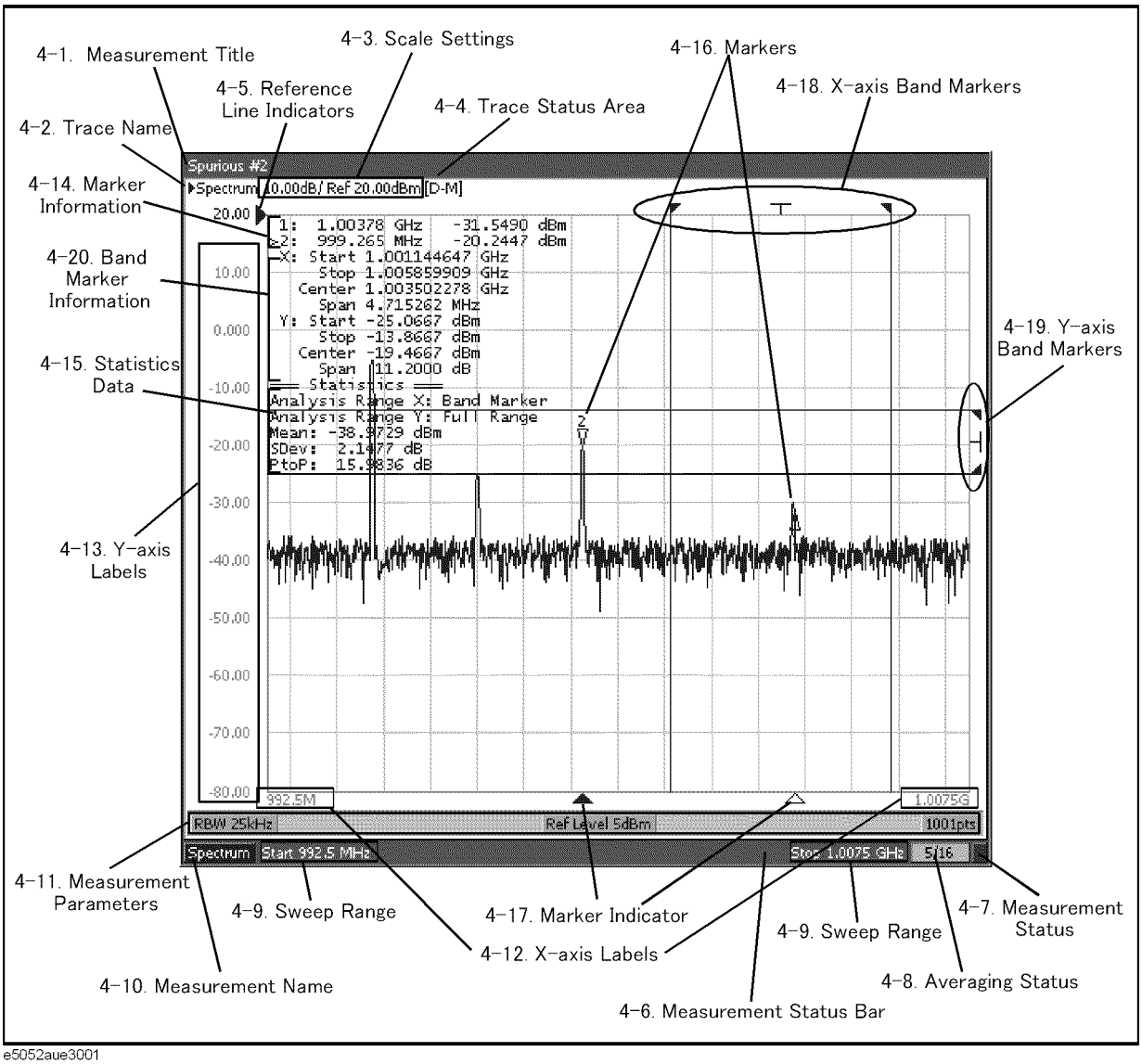
2 Overview of Functions

This chapter describes the functions of the E5052A that can be accessed from the front panel, LCD screen, and rear panel.

Front Panel: Names and Functions of Parts

This section describes the names and functions of the parts on the front panel of the E5052A. For more about the functions displayed on the LCD screen, see “LCD Screen: Names and Functions of Parts” on page 32. For more about the functions of softkeys, see Appendix D, “Softkey Functions,” on page 279.

Figure 2-1 Front Panel



e5052aue3001

1. Standby Switch

Used for choosing between power-on (|) and standby (⏻) states of the E5052A.

NOTE

To turn off the power of the E5052A, be sure to follow the steps described below.

1. First, press the standby switch or send a shutdown command from the external controller to activate the shutdown process (the processing of software and hardware necessary to turn off the power supply). This will put the E5052A into the standby state.
2. Next, if necessary, turn off the power supply to the “8. Power Cable Receptacle (to LINE)” on page 46 on the rear panel.

Under normal use, never directly interrupt the power supply to the power cable receptacle on the rear panel when the power supply is on. Always keep the “7. Line Switch (Always ON)” on page 45 at (|). Never turn it off (◯).
If you directly interrupt the power supply to the power cable receptacle when the power supply is on, or turn off the “7. Line Switch (Always ON)” on page 45, the shutdown process will not work. This could damage the E5052A’s software and hardware and lead to device failure.

Turning on the power supply after a faulty shutdown may cause the system to start up in a condition called “safe mode.” If this occurs, first shut down the system to put it into the standby state and then turn on the power supply again to start up the system in normal mode.

See also Chapter 3, “Installation,” for further information on power on/off.

2. LCD Screen

A 10.4-inch touch screen TFT color LCD used for displaying traces, scales, settings, softkeys, etc. The touch screen LCD allows you to manipulate softkeys by touching the LCD screen directly with a finger. For more about the LCD screen, see “LCD Screen: Names and Functions of Parts” on page 32.

NOTE

Do not press the surface of the LCD screen (both standard and touch screen types) with a sharp object (e.g., a nail, pen, or screwdriver). Pressing the surface with a sharp-pointed object can damage the LCD screen surface or cause the screen to fail.

NOTE

Occasionally, a few pixels may appear on the screen as a fixed point of blue, green or red. Please note that this is not a failure and does not affect the performance of your product.

3. WINDOW/TRACE Block

A group of keys for selecting active measurement windows and active traces. For more about the concepts of measurement windows and traces, see “4. Measurement Window” on page 39.

Table 2-1

Window Next Key	Pressing this key causes the active measurement window to switch over to the next higher window number of four measurement windows. It is possible to define sweep range and other parameters of an active measurement window. To change the settings of a window, use this key to first activate the window.
Window Max Key	Switches over between normal and maximum display of the active measurement window. In normal display, all four measurement windows (both active and non-active) are displayed in split views on the screen. In maximum display, only the active measurement window is displayed over the entire area, without showing non-active measurement windows. You can also switch over between the normal and maximum windows by double-clicking the measurement window frame. Measurements are also carried out on the non-active measurement windows that are not displayed.
Trace Next Key	Switches over the active trace to the next one. (Each time the key is pressed the active trace steps up from the trace with the designated number to the one with a higher number.) An active trace is one for which the measurement parameters are defined. To change the settings for a trace, use this key to first make the trace active.
Trace Max Key	Switches over between normal and maximum display of the active trace within the measurement window. In normal display, all traces are displayed in split views on the measurement window. In maximum display, only the active trace is displayed over the entire area, without showing non-active traces. To maximize the active trace, you can also double-click the area inside the measurement window (excluding the frame). Measurements are also carried out on the non-active traces that are not displayed.

4. MEASUREMENT Block

A group of keys used mainly for setting up measurements on the E5052A.

Table 2-2

Meas/View Key	Displays the “Measurement View Menu” in the right part of the screen. Manipulating the “Measurement View Menu” enables you to select any active measurement window. Active measurement windows are also selectable in maximum display. In this case, the measurement window in maximum display will switch over to the one you have selected.
Input Key	Displays the “Input Menu” in the right part of the screen. Manipulating the “Input Menu” enables you to select any port for the measurement signal input.
Scale Key	Displays the “Scale Menu” in the right part of the screen. Manipulating the “Scale Menu” enables you to specify the scale for displaying a trace (magnitude per division, value of the reference line, etc.) for each trace.
Format Key	Displays the “Format Menu” in the right part of the screen. Manipulating the “Format Menu” enables you to specify the data format (data transformation and graph formats) for each trace.
Trace/View Key	Displays the “Trace View Menu” in the right part of the screen. Manipulating the “Trace View Menu” enables you to specify the data smoothing, data saving on memory, title of trace, etc. for each trace.
Display Key	Displays the “Display Menu” in the right part of the screen. Manipulating the “Display Menu” enables you to specify the screen title display, digit of the y-axis value, marker position, etc. for each active measurement window.
Avg/BW Key	Displays the “Average Menu” in the right part of the screen. Manipulating the “Average Menu” enables you to specify enabling/disabling and number of times for averaging, etc. For spectrum measurements only, you can specify the bandwidth of resolution.
Attn Key	Displays the “Attenuator Menu” in the right part of the screen. Manipulating the “Attenuator Menu” enables you to change the setting of the input signal attenuator.

5. CONTROL Block

A group of keys for defining the values of the DC output port and sweeps as well as trigger settings.

Table 2-3

Start/Center Key	Displays the data input bar in the upper part of the screen by which you can specify the start value of the sweep range for the active measurement trace or the time offset value for the transient measurement. Also displays the menu in the right part of the screen that allows you to specify the sweep range. You can use the following menus: • Phase noise measurement “Start Menu” • Spectrum measurement “Start/Center Menu” • Frequency power measurement “Start/Center Menu” • Transient measurement “Time Offset Menu”
Stop/Span Key	Displays the data input bar in the upper part of the screen by which you can specify the stop value of the sweep range for the active measurement trace or the span value for the transient measurement. Also displays the menu in the right part of the screen that allows you to specify the sweep range. You can use the following menus: • Phase noise measurement “Stop Menu” • Spectrum measurement “Stop/Span Menu” • Frequency power measurement “Stop/Span Menu” • Transient measurement “Span Menu” In these menus, the titles are different from those at the start, but the function of the softkey is the same.
DC Control Key	Displays the “DC Control Voltage Menu” by which you can specify the values of control voltage output for the DC CONTROL port.
DC Power Key	Displays the “DC Power Voltage Menu” by which you can specify the values of power voltage output for the DC power port.
Setup Key	Displays the “Setup Menu” in the right part of the screen. Manipulating the “Setup Menu” enables you to specify the frequency range, IF Gain, input level, etc. required for individual measurements.
Trigger Key	Displays the “Trigger Menu” in the right part of the screen. Manipulating the “Trigger Menu” enables you to specify the trigger mode and trigger source and obtain triggers. Specify the trigger mode for each measurement window.

6. Floppy Disk Drive

A device to use for storing to and reading from a floppy disk the setup state of the E5052A, measurement data, calibration data, data on images displayed on the LCD screen, VBA (Visual Basic for Applications) programs, etc. The floppy disk drive is compatible with a 3.5-inch, 1.44-MB DOS (Disk Operating System) formatted floppy disk.

A floppy disk access lamp is provided at the lower left of the floppy disk drive opening. When the floppy disk drive is accessing a disk (for reading or writing), this lamp is lit green.

A disk eject button is provided at the lower right of the floppy disk drive opening. Pressing this button ejects the inserted floppy disk.

NOTE

Insert a floppy disk into the floppy disk drive opening **rightside up** in the direction of the arrow marked on the disk.

Do not press the disk eject button while the floppy disk access lamp is on. Trying to forcefully pull the floppy disk out while the lamp is on may damage the floppy disk or disk drive.

7. NAVIGATION Block

The keys and knob in the NAVIGATION block are used to navigate between softkey menus or selected (highlighted) areas in a dialog box and to change numeric values in the data entry area by stepping up or down. When selecting one of two or more objects (softkey menus, data entry areas, etc.) to manipulate with the NAVIGATION block keys displayed on the screen, first press the Focus key in the “8. ENTRY Block” on page 28 to select the object to be manipulated (focus on the object) and then manipulate the NAVIGATION block keys (knob) to move your selection (highlighted object) or change numeric values.

In the following, you will see how the NAVIGATION block keys work in both the softkey menu and the data entry area. For more on manipulating tables and dialog boxes, refer to the manipulation procedure for each of those functions.

Operation in softkey menu (softkey menu is selected)

When the focus is on the softkey menu (the menu title area in the uppermost part is displayed in blue), the NAVIGATION block keys work as described below.

Table 2-4

Knob (turned clockwise or counterclockwise)	Moves the softkey selection (highlighted display) up or down.
Key	Moves the softkey selection (highlighted display) up or down.
Key	Displays the softkey menu one layer above.
Key	Displays the softkey menu one layer below.
Knob (pressed) or Enter key	Executes the function of the selected softkey.

After pressing the data entry softkey, the focus automatically moves to the data entry area.

Operation in data entry area (data entry area is selected)

When the focus is on the data entry area (the data entry bar is displayed in blue), the NAVIGATION block keys work as described below.

Table 2-5

Knob (turned clockwise or counterclockwise)	Increases or decreases the numeric value in the data entry area in small steps.
Keys	Increases or decreases the numeric value in the data entry area in large steps.

Table 2-5

Keys	Moves the cursor (|) in the data entry area laterally back and forth. Use it together with the “8. ENTRY Block” keys to change data one character at a time.
Knob (pressed) or key	Finishes the entry in the data entry area and moves the focus to the softkey menu.

8. ENTRY Block

A group of keys used for entering numeric data.

Table 2-6

[0] [1] [2] . . . [9] [·] Keys (numeric keys)	Type numeric characters and a decimal point at the position of the cursor in the data entry area.
[+/-] Key	Alternately changes the sign (+, –) of the numeric value in the data entry area.
[G/n] [M/μ] [k/m] [x1] Keys	Adds a prefix to the numeric data typed by using the numeric key and [+/-] and then enters that data. One of the two prefixes written on the surface of the key is automatically selected depending on the parameter to be entered. [x1] is entered without a prefix being given.
Softkey On/Off [Entry Off] Key	Turns off the data entry bar if it is displayed. If the dialog box is displayed, cancels the entry and close the dialog box. If the data entry bar and dialog box are not displayed, turns the softkey menu display on/off.
[Back Space] Key	Deletes the character to the left of the cursor (|) in the data entry area. When two or more characters in the data entry area are selected (highlighted), deletes all the characters selected.
[Focus] Key	Changes the selection (focus) between the objects to be manipulated by the keys for “7. NAVIGATION Block” on page 26 and “8. ENTRY Block” on page 28. “7. NAVIGATION Block”: The objects to be manipulated by the “8. ENTRY Block” keys include softkey menus, data entry areas, tables (e.g., segment tables, limit tables, and marker tables), and dialog boxes. When two or more of these are displayed on the screen and need selecting, use this key to change the selection (focus) between the objects to be manipulated. When a softkey menu is selected, the menu name area at the top of the menu is displayed in blue. When a data entry area is selected, the data entry bar is displayed in blue. When a table is selected, the frame of the table window is displayed in light gray. While a dialog box is displayed, the focus is fixed on the dialog box and cannot be changed.

9. INSTR STATE Block

A group of keys related to the macro function, store and call function, control/management function, and the presetting of the E5052A (returning it to the preset state).

Table 2-7

Macro Setup Key	Displays the “Macro Setup Menu” in the right part of the screen. Manipulating the “Macro Setup Menu” enables you to start up the VBA editor, or create, call, or store a VBA project.
Macro Run Key	Executes a VBA procedure called “main” that has a VBA module named Module1.
Macro Break Key	Stops the VBA procedure being executed.
Save/Recall Key	Displays the “Save/Recall Menu” in the right part of the screen. Manipulating the “Save/Recall Menu” enables you to store to or read from the internal hard disk or floppy disk the setup conditions and trace data of the analyzer.
Capture System Key	First, temporarily saves the data for the image displayed on the LCD screen at the moment the key is pressed to the internal memory (clipboard). Immediately afterwards, it displays the “System Menu” on the right side of the screen. Manipulating the “System Menu” enables you to define the setup for the control and management of the analyzer. Using the **Dump Screen Image** key enables you to store the image data in the clipboard to a file on the internal hard disk or a floppy disk. Also, using the **Print** key in the System menu enables you to print the image data in the clipboard to a printer.
Preset Key	Displays the “Preset Menu” on the right side of the screen. Pressing **Factory** enables you to return the analyzer to the initial setup state. For the initial setup for each of the functions, see Appendix C, “List of Default Values,” on page 253. Pressing **User** recalls the Autorec.sta in the F drive.

10. MKR/ANALYSIS Block

A group of keys used for analyzing the measurement results by using the markers. For functions of the keys in the MKR/ANALYSIS block, see Chapter 2 “Overview of Functions” in the User’s Guide.

Table 2-8

Marker Key	Displays the “Marker Menu” on the right side of the screen. Manipulating the “Marker Menu” enables you to turn the markers on/off and to move them by entering stimulus values. You can place up to 6 markers on each trace.
Marker Search Key	Displays the “Marker Search Menu” on the right side of the screen. Manipulating the “Marker Search Menu” enables you to move a marker to a specific point (maximum, minimum, peak, and a point with a target value) on a trace. You can also find and display the bandwidth parameters (up to six).
Marker → Key	Displays the “Marker To Menu” in the right part of the screen. Manipulating the “Marker To Menu” enables you to specify the marker sweep range and coupling of markers within a measurement and to display statistics data on traces.
Analysis Key	Displays the “Analysis Menu” on the right side of the screen. Manipulating the “Analysis Menu” enables you to use the analytical functions.

11. DUT Interface

A port used to connect the DUT. It has a DC CONTROL port, DC POWER port, BASEBAND IN[*1] port, and RF port. The connector type of each port is given below.

RF port: 50 Ω, N-type, female connector

DC CONTROL port, DC POWER port, base band port: BNC, female connector

CAUTION

Do not apply a DC voltage or current to the individual ports of the DUT interface. Applying a DC voltage or current may lead to device failure. In particular, there is the risk of the capacitor remaining charged. Connect the measurement sample (DUT) to the port (or the test fixture, cables, etc. connected to the port) after the analyzer has been completely discharged.

The individual ports comply with Installation Category I of IEC 61010-1 and Measurement Category I of IEC 61010-1.

*1. The BASEBAND IN is not supported by the firmware version 1.50. This port is reserved for future enhancement.

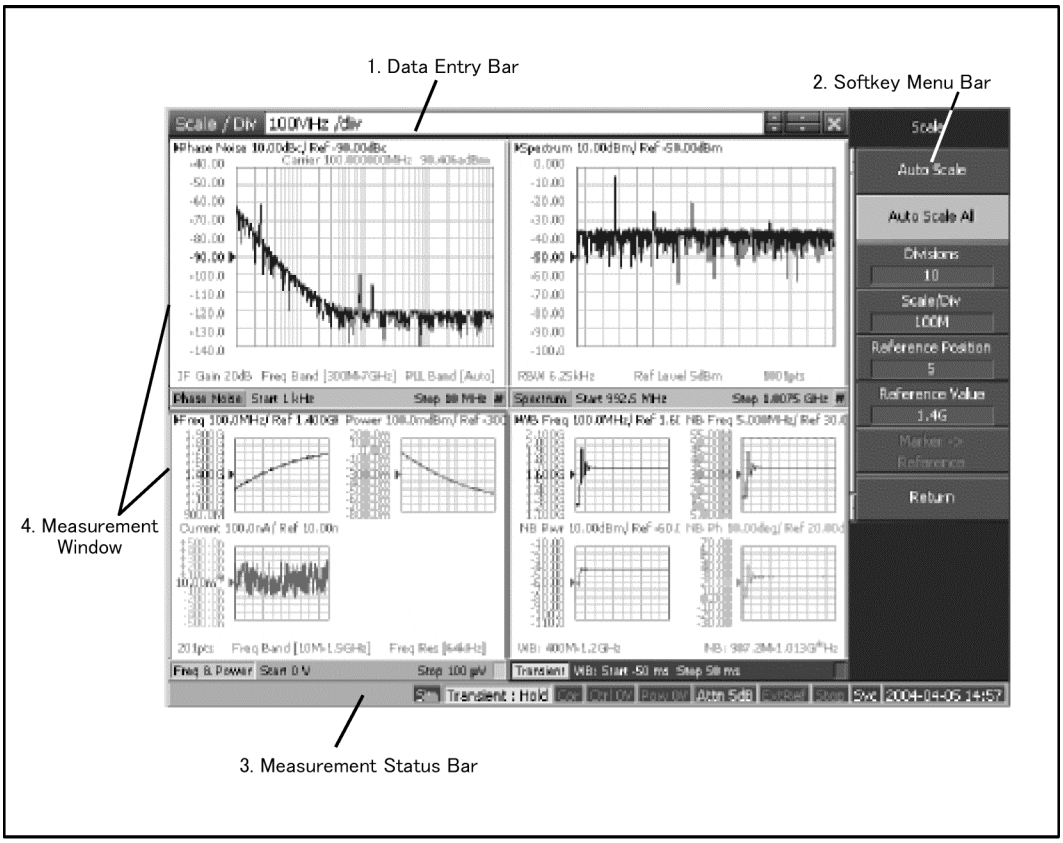
12. OPTIONAL RF Ports

For the firmware version 1.00, these ports are already connected and ready to operate; the user does not have to connect them.

LCD Screen: Names and Functions of Parts

This section describes the names and functions of the parts on the E5052A's LCD screen.

Figure 2-2 Screen Display

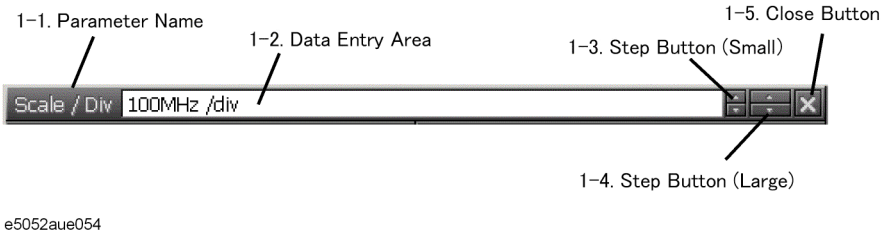


e5052aue053

1. Data Entry Bar

Used to enter numeric data into the E5052A. Press a hardkey or softkey to enter data, and the data entry bar will appear at the top of the screen. To assign a title to a measurement window, the entry bar also allows you to enter letters and symbols by using the front panel keys or mouse.

Figure 2-3 **Data Entry Bar**



NOTE

To manipulate the data entry bar with the front panel keys, it has to be selected as the object to manipulate (focus placed on it). When the focus is placed on the data entry bar, the entire bar is displayed in blue. Pressing or clicking on Focus of "8. ENTRY Block" on page 28 enables you to move the focus to the desired object.

1-1. Parameter Name

Displays the name of the parameter for which data will be entered.

1-2. Data Entry Area

When the data entry bar is displayed for the first time, the current settings are displayed on it. You can change numeric values by typing from the keyboard or in the ENTRY block on the front panel.

1-3. Step Button (Small)

Increases or decreases the numeric value in the data entry area in small steps. Use the mouse to manipulate these buttons.

1-4. Step Button (Large)

Increases or decreases the numeric value in the data entry area in large steps. Use the mouse to manipulate these buttons.

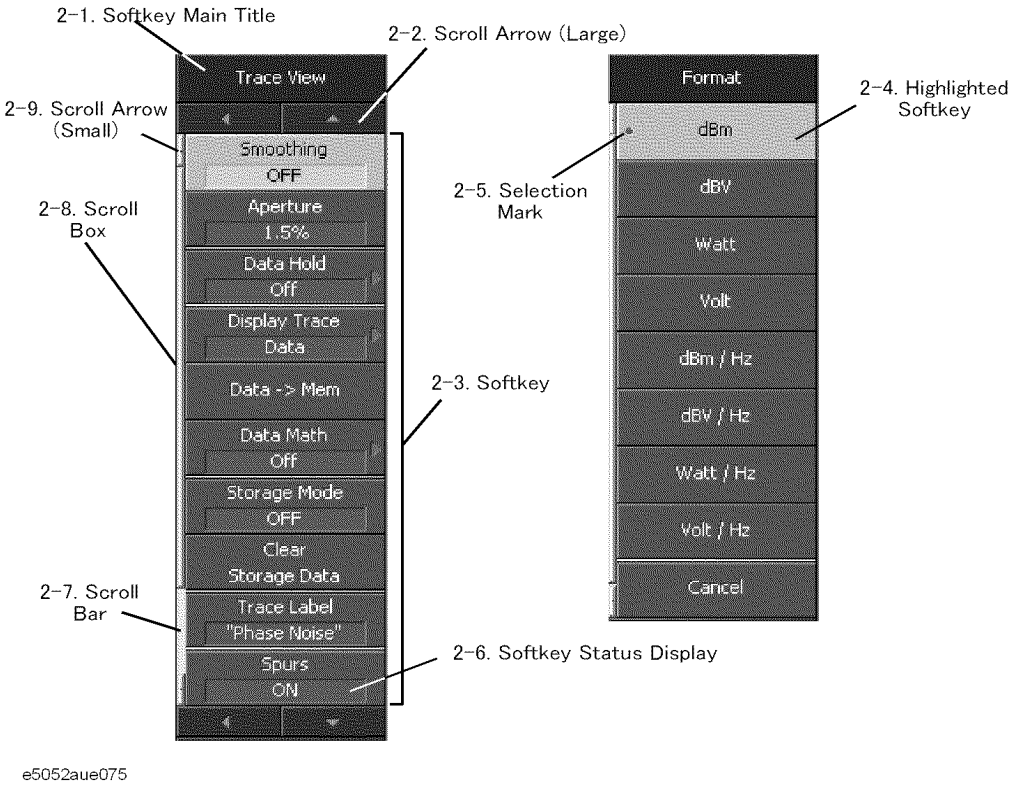
1-5. Close Button

Closes the data entry area (turns off the display). Use the mouse to manipulate this button.

2. Softkey Menu Bar

A group of keys on the screen called up by the hardkeys or menu bars. You can manipulate these keys by using the NAVIGATION block keys on the front panel, the mouse, or the keyboard. You can perform manipulations by directly touching the screen with your finger instead of using a mouse.

Figure 2-4 Softkey Menu Bar



NOTE To manipulate a menu bar, it has to be selected as the object to manipulate (focus placed on it). When the focus is placed on a menu bar, any of the softkeys may be highlighted. An example of the focus not being placed on the menu bar is when it's on the data entry bar.

2-1. Softkey Menu Title

The title of the softkey menu is displayed here. Double-clicking on this part of the menu bar displays the top layer of softkeys.

2-2. Scroll Arrow (Large)

When the softkeys in a menu overflow the screen, using this key enables you to scroll the menu page by page. There are four scroll arrows: two for up and down and two for returning to the top menu (at top and bottom). Use the mouse to manipulate these buttons.

2-3. Softkeys

These are the actual keys you can use to perform setup. A ▶ displayed to the right of a softkey indicates that pressing that softkey will display the lower layer of softkeys.

2-4. Highlighted Softkey

Pressing and on the front panel or pressing Enter on the keyboard causes the highlighted (selected) softkey to be executed. You can change which softkey in the menu is highlighted by turning or pressing on the front panel or by pressing ↑ ↓ on the keyboard.

Pressing the key on the front panel or the ← key on the keyboard brings up the upper level softkey menu, and pressing the key on the front panel or the → key on the keyboard brings up the lower level softkey menu.

2-5. Selection Mark

Shows which softkey function is currently selected.

2-6. Softkey Status Display

Displays the setup status of that softkey.

2-7. Scroll Bar

When the softkeys in a menu overflow the screen, clicking on the blank part of this scroll bar enables you to scroll the softkey menu up or down.

2-8. Scroll Box

You can scroll the softkey menu up or down by using the mouse to select and drag the scroll box (pressing the button on the object to be moved and then releasing the button at the desired location). The length and position of the scroll box indicate the length and position of the currently displayed part of the softkey menu relative to the entire menu.

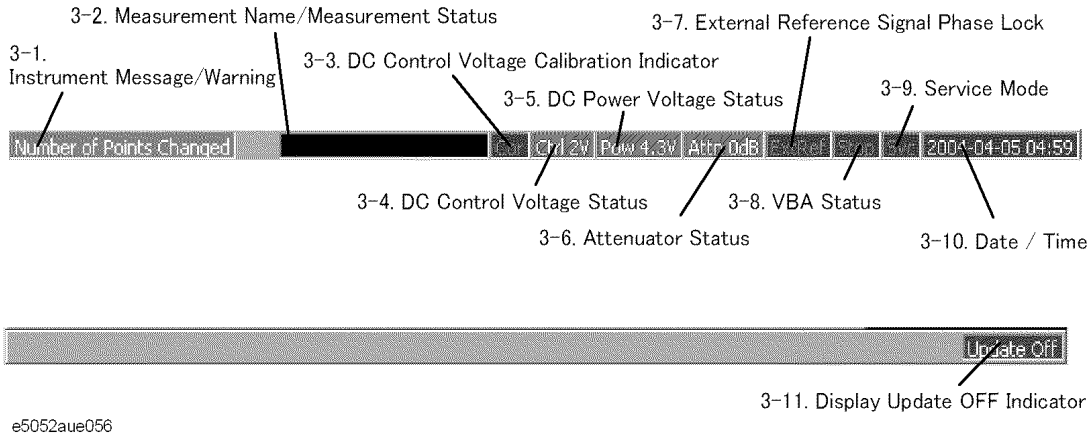
2-9. Scroll Arrow (Small)

Using this button, you can scroll the menu one softkey at a time. Both upward and downward scroll arrows are available. Use the mouse to manipulate these buttons.

3. Instrument Status Bar

This graphical bar displays the status of the entire instrument.

Figure 2-5 Instrument Status Bar



3-1. Instrument Message/Warning

Displays instrument messages and warnings. Instrument messages are displayed in gray and warnings in red. For the meanings of the instrument messages and warnings, see Appendix B, “Troubleshooting,” on page 239.

3-2. Measurement Name/Measurement Status

Displays the measurement name and measurement status of the E5052A. Each measurement status is described below.

Table 2-9

Hold	A holding state is maintained for measurement (idling).
Man	The trigger source is set to “Manual” and waiting for trigger.
Ext	The trigger source is set to “External” and waiting for trigger.
Bus	The trigger source is set to “Bus” and waiting for trigger.
NVideo[*1]	The trigger source is set to “Narrow Video” and waiting for trigger.
WVideo[*1]	The trigger source is set to “Wide Video” and waiting for trigger.
Meas	A measurement is in progress.

*1. You can select "Narrow Video" or "Wide Video" for the transient measurement only.

3-3. DC Control Voltage Calibration Indicator

When the DC control voltage calibration is enabled, it is displayed in blue. When disabled, it is displayed in grey.

3-4. DC Control Voltage Status

When the DC control voltage signal output is turned on, the specified voltage is displayed.

3-5. DC Power Voltage Status

When the DC power voltage signal output is turned on, the specified voltage is displayed.

3-6. Attenuator Status

The specified attenuator value is displayed.

3-7. External Reference Signal Phase Lock

When the frequency reference signal is input to the "10. External Reference Signal Input Connector (Ref In)" on page 46 on the rear panel and the measurement signal of the E5052A is phase-locked to the reference signal, **ExtRef** is displayed in blue.

Table 2-10

ExtRef (displayed in blue)	Measurement signal is phase-locked to external reference signal.
ExtRef (displayed in gray)	Measurement signal is not phase-locked to external reference signal.

NOTE

When the phase lock function is not operated improperly, "**Unlock**" is displayed in red.

Even when "9. High Stability Frequency Reference Output Connector (Ref Oven)" on page 46 and "10. External Reference Signal Input Connector (Ref In)" on page 46 are interconnected, the measurement signal may not be phase-locked immediately after powered on under a cool-temperature environment (i.e. the display of "ExtRef" does not change from grey to blue). In this case, wait a few minutes until the instrument warms-up and "ExtRef" is displayed in blue.

3-8. VBA Status

Indicates the current status of the VBA program running on the E5052A.

Table 2-11

Run	VBA program is currently running.
Stop	VBA program has stopped.

3-9. Service Mode

Indicates the service mode status.

Table 2-12

SVC (displayed in red)	An abnormal condition has been detected inside the E5052A. The unit may be damaged. Notify the Customer Contact listed at the end of this brochure or the distributor from whom the unit was purchased.
SVC (displayed in gray)	The E5052A is in normal mode.

3-10. Date / Time

Displays the date and time generated by the internal clock. The display format is as follows:

Table 2-13

YYYY-MM-DD HH:MM	**YYYY**: Year (AD) **MM**: Month **DD**: Day **HH:MM**: Time (0:00 to 23:59)

You can turn the date and time display on/off by manipulating the keys: System - **Misc Setup** - **Clock Setup** - **Show Clock**.

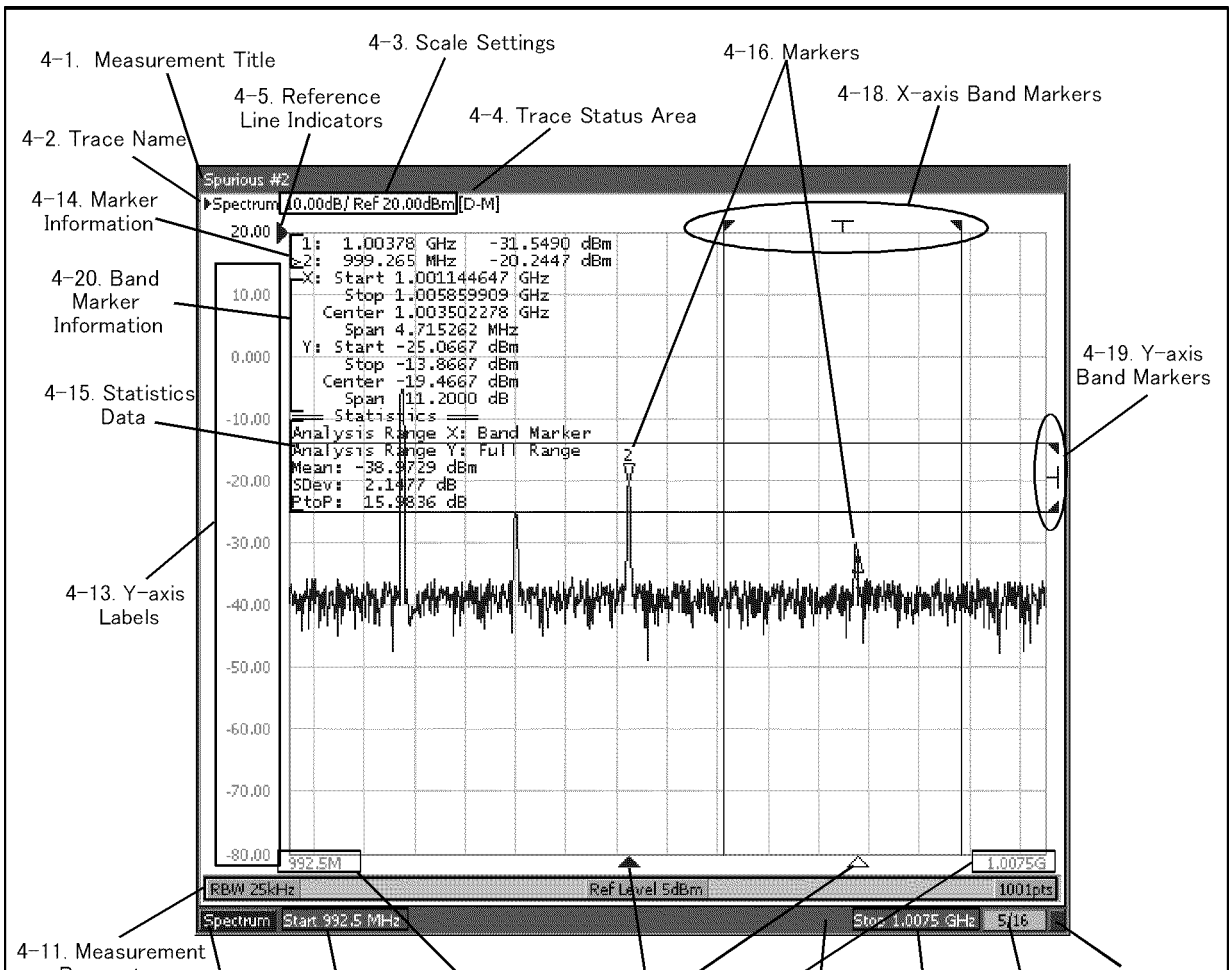
3-11. Display Update OFF Indicator

When you have turned off updating of information displayed on the LCD screen, this indicator is displayed.

4. Measurement Window

This provides windows for displaying traces. Because a measurement corresponds to a window, it is called a measurement window. When the outer frame of a measurement window is displayed in light gray, the measurement is active (the measurement for which setup is being performed). Figure 2-2 on page 32 shows that the transient measurement is active (lower-right window). To make a measurement active, use Window Next . Clicking inside a measurement window will also make it active. Figure 2-6 shows a spectrum measurement displayed in maximum screen by using Window Max .

Figure 2-6 Measurement Window



4-1. Measurement Title

You can assign a title to each channel and have the title displayed in the bar. To set up the measurement title, enter a title in [Display] - **Edit Title Label** and then toggle on/off the title display by using [Display] - **Title Label** .

4-2. Trace Name

The names of the traces on the measurement are displayed here. ▶ to the left of the trace name indicates the active trace (the trace for which setup is being performed). To switch over the active trace, use [Trace Next].. Clicking the graph of the trace will also activate the trace.

4-3. Scale Settings

The scale setting for each trace is displayed here. This example shows that “0.00dB/” corresponds to 10 dB per division. “Ref -50.00.000dB” shows that the value of the reference line is -50 dB. To specify the scale settings, use each softkey that can be displayed by pressing the [Scale] hardkey.

4-4. Trace Status Area

The setup for each trace is displayed here.

Table 2-14 Trace Status Display

Classification	Contents inside the [ ]	Meaning
Turning on/off traces	Nothing	Data trace: ON, Memory trace: OFF
	M	Data trace: OFF, Memory trace: ON
	D&M	Data trace: ON, Memory trace: ON
	off	Data trace: OFF, Memory trace: OFF
Performing data math: Refer to the indication in parentheses when the memory trace is turned on.	**D+M** (**D+M&M**)	Execution of Data+Mem math
	D–M (**D-M&M**)	Execution of Data–Mem math
	D*M (**D*M&M**)	Execution of Data*Mem math
	D/M (**D/M&M**)	Execution of Data/Mem math
Smoothing	**Smo**	Smoothing: ON

4-5. Reference Line Indicators

These indicate the position of the reference line for the Y-axis scale in the rectangular display format. There is an indicator to the right of the scale (▶). To enter a numeric value for the position of the reference line, open the data entry bar using the keys: [Scale] - **Reference Position**. You can also move the position of the reference line by placing the mouse pointer on the reference line indicator (the pointer changes from ↖ to ↕ .), moving the indicator vertically with the left mouse button kept pressed, and then releasing the button at the desired location (i.e., a drag-and-drop operation).

4-6. Measurement Status Bar

The status of each measurement is displayed here (see parts 4-7 through 4-10).

4-7. Measurement Status

Displays the update status of traces on the measurement.

Table 2-15

#	Invalid traces. The measurement conditions have changed, but the traces on the measurement window currently displayed have not been updated to match the new conditions.
(not displayed)	Valid traces.

4-8. Averaging Status

Displays the averaging factor and averaging count when averaging is turned on.

Table 2-16

n/m (displayed in blue)	Averaging: ON (m: averaging factor; n: averaging count)
(not displayed)	Averaging: OFF

4-9. Sweep Range

Indicates the sweep range by using the start/stop or center/span. This varies depending on the given parameters or measurements.

4-10. Measurement Name

Indicates the measurement name.

4-11. Measurement Parameters

Indicates the parameters specified to perform a measurement sweep at the bottom of each measurement screen. The content may vary depending on the measurement.

4-12. X-axis Labels

X-axis divisions in the rectangular display format. To hide the divisions, select "OFF" in **-Y # of Digits**. (The display/nondisplay of the X-axis divisions interlocks with that of the Y-axis divisions.)

4-13. Y-axis Labels

Y-axis divisions in the rectangular display format. The value of the reference line (the division line indicated by ▶) can be entered numerically by opening the data entry bar using the keys: Scale - **Reference Value**. You can change values of the reference line in one division intervals by placing the mouse pointer in the area of the graticule label (the pointer changes from ↖ to ↕), moving the pointer vertically with the left mouse button pressed, and then releasing the button at the desired location. By using Display - **Y # of Digits**, you can select the display format of the graticule label from three options: 4 digits, 12digis, and “not displayed.”

4-14. Marker Information

The marker information is displayed in a list. It shows the marker number, marker x-axis value, and marker measurement value from left to right. For the active marker (the one for which setup and analysis are being performed), > is displayed to the left of the marker number. For the reference marker, △ is displayed instead of the marker number.

4-15. Statistics Data

Turning on the statistics data function displays statistics data here. For more about the statistics data function, see “Determining the Mean, Standard Deviation, and Peak-to-Peak of the Trace” on page 153.

4-16. Markers

The markers used for reading values on a trace. Up to six markers can be displayed for each trace.

Table 2-17

n ▽	Active marker (ready for setup and analysis)
△ n	Non-active marker

Here, “n” denotes a marker number. For the reference marker, however, nothing is displayed at the location of n. Clicking the marker or one of the “4-17. Marker Indicators” makes the marker active.

4-17. Marker Indicators

These indicate the positions of markers on the x-axis.

Table 2-18

▲	Active marker indicator
△	Non-active marker indicator

You can also move a marker to the desired position by placing the mouse pointer on the marker indicator or the position of the marker itself (the pointer changes from ↖ to ◂▸), moving the indicator vertically with the left mouse button pressed, and then releasing the button at the desired location.

4-18. X-axis Bandmarkers

By turning on the x-axis band marker function, the x-axis band marker is displayed in a specified position.

Table 2-19

◤	Indicator of start value of x-axis band marker
◥	Indicator of stop value of x-axis band marker
⊤	Indicator of center value of x-axis band marker

You can also move a marker to the desired position by placing the mouse pointer on the marker indicator or the position of the marker itself (the pointer changes from ↖ to ↔), moving the indicator vertically with the left mouse button pressed, and then releasing the button at the desired location.

4-19. Y-axis Bandmarkers

By turning on the y-axis band marker function, the y-axis band marker is displayed in a specified position

Table 2-20

◥	Indicator of start value of y-axis band marker
◢	Indicator of stop value of y-axis band marker
⊣	Indicator of center value of y-axis band marker

You can also move a marker to the desired position by placing the mouse pointer on the marker indicator or the position of the marker itself (the pointer changes from ↖ to ↕), moving the indicator up or down with the left mouse button pressed, and then releasing the button at the desired location.

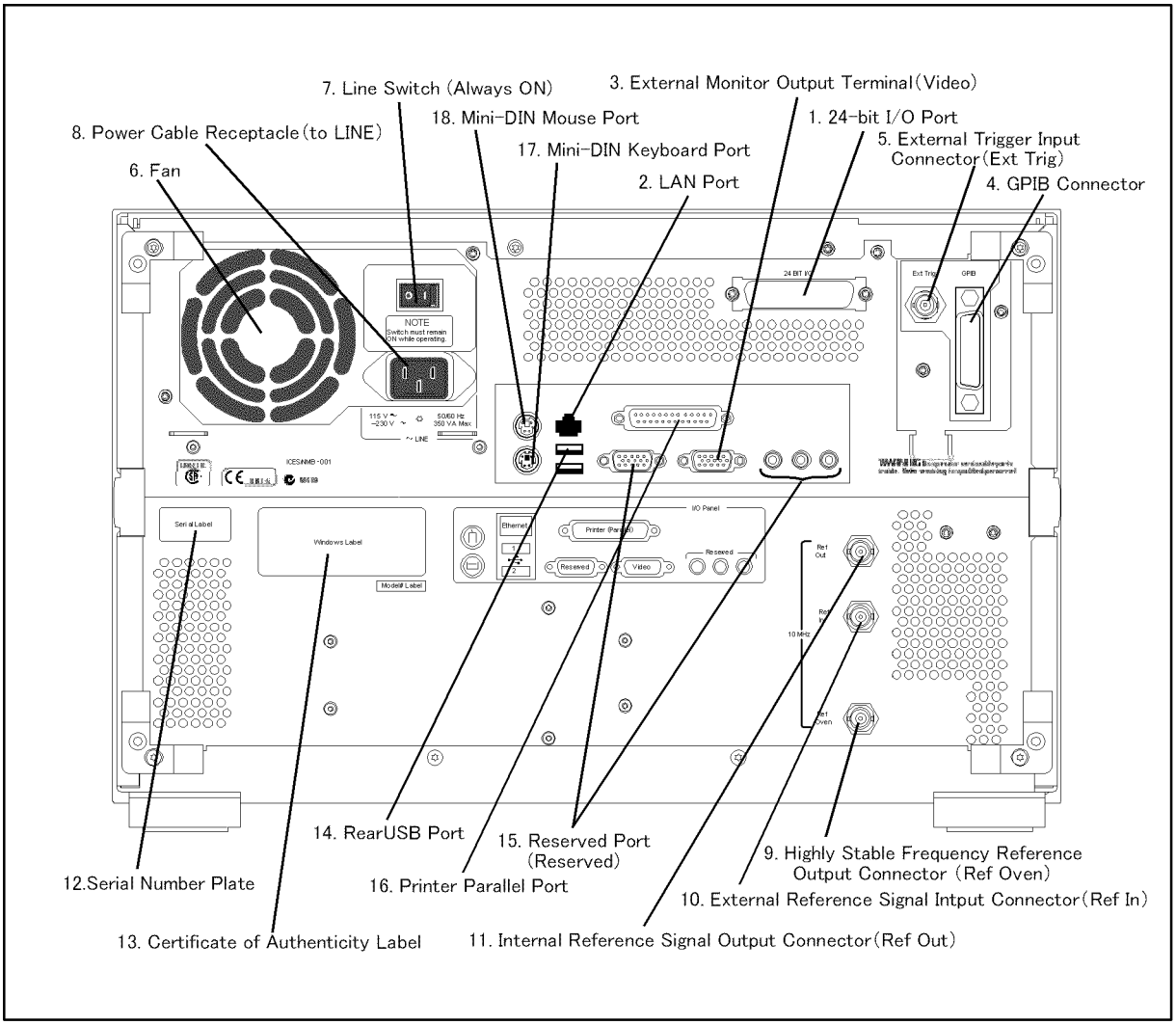
4-20. Bandmarker information

Turning on the x-axis or y-axis band marker function will display the corresponding band marker information on a list in the order of start, stop, center and span.

Rear Panel: Names and Functions of Parts

This section describes the names and functions of the parts on the rear panel of the E5052A.

Figure 2-7 Rear Panel



e5052aue033

1. 24-bit I/O Port

The terminal to which an automatic machine (handler) used on a production line is connected. For more about using the 24-bit I/O port, see the Programmer's Guide.

Connector type: 36-pin Ribbon (centronics) connector

2. LAN Port

A terminal for connecting the E5052A to a LAN (Local Area Network). Connecting this instrument to a LAN enables you to access the hard disk drive of the instrument from an external PC or to control this instrument by using SICL-LAN or telnet.

Connector type: 8-pin RJ-45 connector
Base standard: 10Base-T/100Base-TX Ethernet (automatic data rate selection)

3. External Monitor Output Terminal (Video)

The terminal to which an external color monitor (display device) is connected. By connecting the color monitor to this terminal, the same information shown on the LCD screen of the main body can be displayed on an external color monitor.

Connector type: 15-pin VGA connector, female

4. GPIB Connector

General Purpose Interface Bus (GPIB). The connection of an external controller and other devices through this connector allows you to configure an automatic measurement system. For more on automatic measurement systems via GPIB, see the *Programmer's Guide*.

5. External Trigger Input Connector (Ext Trig)

External trigger signals are input through this connector, which detects the downward transition from the HIGH state in TTL signals as the trigger signal. To use this connector to generate a trigger, you must set the trigger source to the "external" side (key operation: Trigger - Source - External).

Connector type: BNC connector, female

6. Fan

The cooling fan for controlling the temperature inside the E5052A. This fan exhausts heated air from inside the analyzer to the outside.

7. Line Switch (Always ON)

Always keep this switch on (|).

CAUTION **Do not use this switch to turn off (○) the mains. Doing so may cause the analyzer to fail.** For more information, see the description of the "1. Standby Switch" on page 21.

8. Power Cable Receptacle (to LINE)

The receptacle (outlet) to which the power cable is connected.

NOTE

To feed power, use the included three-prong power cable with a ground conductor.

The plug attached to the power cable (on the power outlet side or device side of the cable) serves as the disconnecting device (device that cuts off power supply) of the E5052A. When the power supply must be cut off to avoid danger such as electric shock, pull out the power cable plug (on the power outlet side or device side of the cable). The procedure for turning off the mains in normal use is given in “1. Standby Switch” on page 21.

For more about the power supply, see Chapter 3, “Installation,”.

9. High Stability Frequency Reference Output Connector (Ref Oven)

A connector from which the reference signals are output.

Connector type: BNC connector, female
Output signal (Nominal): 10 MHz, +0 dBm ±3 dB

10. External Reference Signal Input Connector (Ref In)

The reference signal input connector for phase-locking the measurement signal from the E5052A to the external frequency reference signal. Inputting the reference signal via this connector improves the accuracy and stability of the frequency of the measurement signal from the E5052A.

Connector type: BNC connector, female
Intput signal (Nominal): 10 MHz ±10 ppm, +0 dBm ±3 dB

NOTE

When the frequency reference signal is input to this connector, the measurement signal from the E5052A is automatically phase-locked to the reference signal. When an input signal is not present, the frequency reference signal inside the E5052A is automatically used. The **ExtRef** on the instrument status bar is displayed in blue when the system is phase-locked to the external reference signal and in gray when it is not phase-locked.

11. Internal Reference Signal Output Connector (Ref Out)

A connector for outputting the internal frequency reference signal from the E5052A. By connecting this output connector to the external reference signal input connector of another device, the device can be phase-locked to the internal reference signal of the E5052A and used under this condition.

Connector type: BNC connector, female
Output signal (Nominal): 10 MHz ±10 ppm, + 0dBm ±3 dB
Output impedance (Nominal): 50 Ω

12. Serial Number Plate

The seal showing the serial number of the product.

13. Certificate of Authenticity Label

The label showing the information of the “Certificate of Authenticity.”

14. Rear USB port

A USB (Universal Serial Bus) port (number of ports: 2) specifically for a USB/GPIB interface or a printer.

15. Reserved Port (Reserved)

Using these two ports is not allowed. No connections.

16. Printer Parallel Port

The 25-pin parallel port for printer connection. Connecting a designated printer to this port allows screen information on the E5052A to be printed. For more on printing, see “Printing Screen Image” on page 175.

17. Mini-DIN Keyboard Port

The port to which a mini-DIN type keyboard is connected. The keyboard can be used to edit VBA programs inside the E5052A or to enter file names. Since the arrow keys and numeric keys on the keyboard work in the same way as the arrow keys and numeric keys on the front panel of the E5052A, you can use it instead of front panel operation.

NOTE Be sure to only use a keyboard designated for use with this instrument. Using a keyboard other than those designated may cause erroneous input.

18. Mini-DIN Mouse Port

The port to which a mini-DIN type mouse is connected. Using a mouse enables you to more efficiently perform the operations of menu bars, softkeys, and dialog boxes as well as selecting an active channel or an active trace. The mouse also enables you to move a marker or the scale reference line by using drag-and-drop operations.

NOTE Be sure to only use a mouse designated for use with this instrument. Using a mouse other than those designated may cause erroneous input.

3 Installation

This chapter provides information on how to set up the Agilent E5052A signal source analyzer and on daily maintenance.

Contents of this Chapter

- ❏ Checking the Shipment on page 51

  After you receive the analyzer, check all of the items in the packing container.

- ❏ Environmental Requirements on page 54

  Describes the system requirements needed to install the E5052A and how to secure space for heat radiation.

- ❏ Installing Front Handles/Rack Mounting Flanges on page 57

  Shows how to mount the front handles used to transport the E5052A and how to install the flanges needed to install it in a rack.

- ❏ Connecting the Accessories on page 60

  Provides information for connecting the mouse, keyboard, and LAN cable to the E5052A.

- ❏ Power Supply and Blown Fuses on page 63

  Shows how to check the power supply as well as how to check and connect the power cable. This section also explains how to handle a blown fuse.

- ❏ Starting the E5052A on page 66

  Describes turning on/off of the Power switch and cutting off the power supply.

- ❏ Initial Registration of E5052A on page 68

  Describes initial registration of the Windows 2000 operating system.

- ❏ Setting the Internal Clock on page 71

  Explains how to set the internal clock.

- ❏ Daily Maintenance on page 73

  Describes the required daily maintenance for the E5052A.

Checking the Shipment

After you receive the analyzer, inspect the contents during unpacking according to the following procedure.

WARNING **When unpacking the analyzer, if an external surface of the analyzer (such as the cover, front/rear panel, LCD screen, power switch, and port connectors) appears to have been damaged during transport, do not turn on the power switch. In an extreme case, this my result in your getting an electric shock.**

Step 1. Check that the packing box or shock-absorbing material used to package the analyzer has not been damaged.

NOTE If the packing box or shock-absorbing material has been damaged, leave the packing box and shock-absorbing material as is until other inspections are made as follows:

Step 2. Check the packaged items supplied with the analyzer for any damage or defect.

Step 3. By referring to Table 3-1 and Figure 3-1, check that all packaged items supplied with the analyzer have been provided as per the specified options.

Step 4. After checking, if one of the following applies, contact your nearest Agilent Technologies sales and service office.

1. The packing box or shock-absorbing material used to package the analyzer has been damaged or the shock-absorbing material shows evidence where extreme force has been applied.
2. A packaged item supplied with the analyzer has mechanical damage or defects.
3. An item that should be packaged with the analyzer is missing.
4. A fault has been detected in the subsequent operation check of the analyzer.

If an abnormality is detected in Step 1, contact the company that transported the analyzer as well as your nearest Agilent Technologies sales and service office. For inspection by the transport company, save the packing box, shock-absorbing material, and packaged items as you received them.

Table 3-1 Items Packaged with the E5052A

Name	Agilent Product/ Part Number	Qty
Standard Accessories		
❑ E5052A	E5052A	1
❑ Power cable*1	-	1
❑ CD-ROM (of the manual)*2	E5052-9050x	1
❑ CD-ROM (of the Agilent IO Libraries Suite)	E2094-60003	1
❑ System recovery disk	E5052-16000	1
❑ BNC adaptor	1250-1859	1
Options		
❑ Keyboard (Option 810)	-	1
❑ Mouse (Option 820)	-	1
❑ Manual (Option ABA)*3		
• User's Guide	E5052-900x0	1
• Programmer's Guide	E5052-900x1	1
• VBA Programmer's Guide	E5052-900x2	1
❑ Handle Kit (Option 1CN)*4	5063-9230	1
❑ Rack Mount Kit Without Handles (Option 1CM)*4	5063-9217	1
❑ Rack Mount Kit With Handles (Option 1CP)*4	5063-9224	1

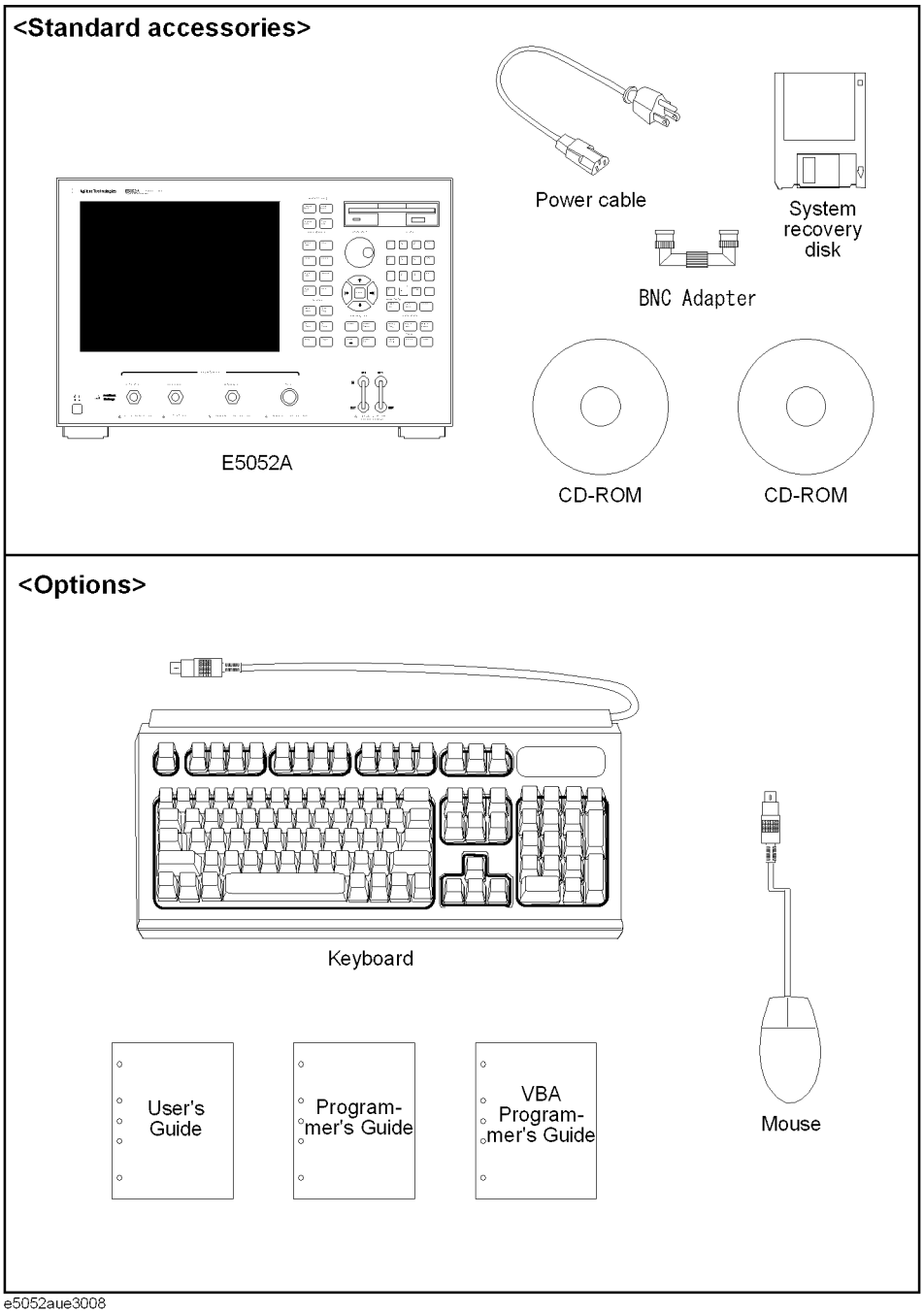
*1. This accessory varies from country to country. For an illustration of the power cable options, see Figure 3-8.

*2. The CD-ROM contains the same information as in the *User's Guide, Programmer's Guide, VBA Programmer's Guide*. The "xx" in the part number is a number that is incremented each time a revision is made, with "00" regarded as the first edition. The network analyzer will always be supplied with the latest versions of these items.

*3. The "x" in the part number of the Manual is a number that is incremented each time a revision is made, with "0" regarded as the first edition. The network analyzer will always be supplied with the latest versions of these items.

*4. This accessory is not shown in Figure 3-1. For details, see Table 3-4 on page 57.

Figure 3-1 E5052A accessories



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Environmental Requirements

Set up the E5052A in a location where the following environmental requirements are met.

Operating environment

Ensure that the operating environment meets the following requirements.

Temperature	10°C to 40°C
Temperature range at measurement	23°C ±5°C (<1°C deviation from temperature while performing error-correction)
Humidity	20% to 80% at wet bulb temperature <+29 °C (non-condensation)
Altitude	0 to 2,000 m (0 to 6,561 feet)
Vibration	0.5 G maximum, 5 Hz to 500 Hz

NOTE The above environmental requirements are **not** intended for the specifications and measurement accuracy of the analyzer but for the operating environment of the analyzer.

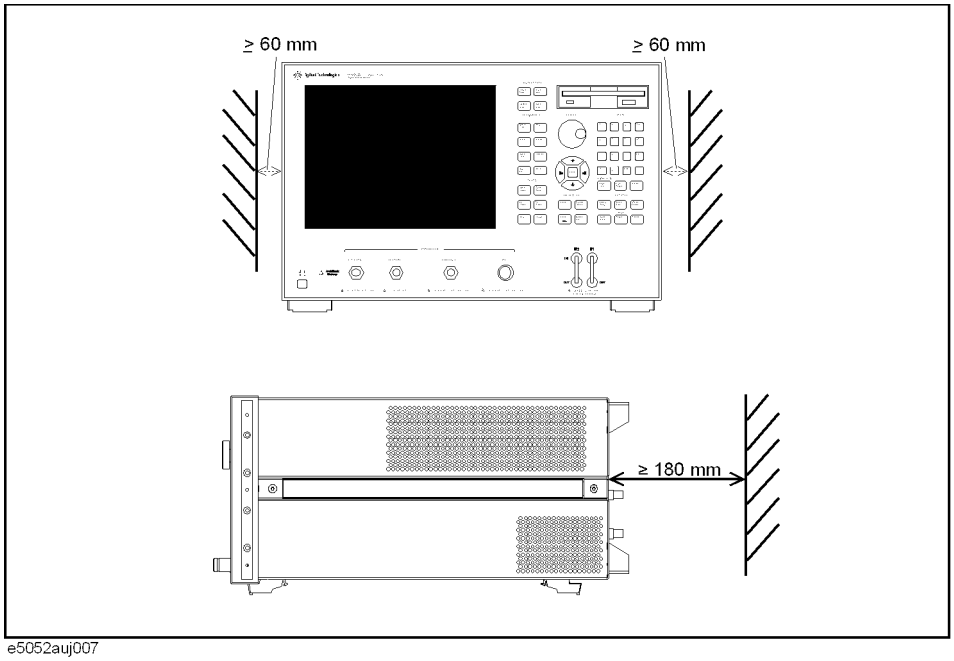
Ventilation requirements

To ensure compliance with safety requirements, as well as the specifications and measurement accuracy of the analyzer, you must maintain an environmental temperature that is within the specified range by providing appropriate cooling clearance around the analyzer (or, for the rackmount type, by forced air-cooling inside the rack housing). For more information on the environmental temperature needed to satisfy the specifications and measurement accuracy of the analyzer, see the Chapter 8, “Specifications and Supplemental Information.”

When the environmental temperature around the analyzer is kept within the temperature range of the operating environment specification (see the section on “Operating environment” on page 54), the analyzer conforms to the requirements of the safety standard. Furthermore, under that temperature requirement, the analyzer still conforms to the requirements of the safety standard even when the analyzer is placed with the following cooling clearance:

	Requirement
Back	≥180 mm
Sides	≥60 mm (both right and left)

Figure 3-2 **Ventilation space needed for installation**



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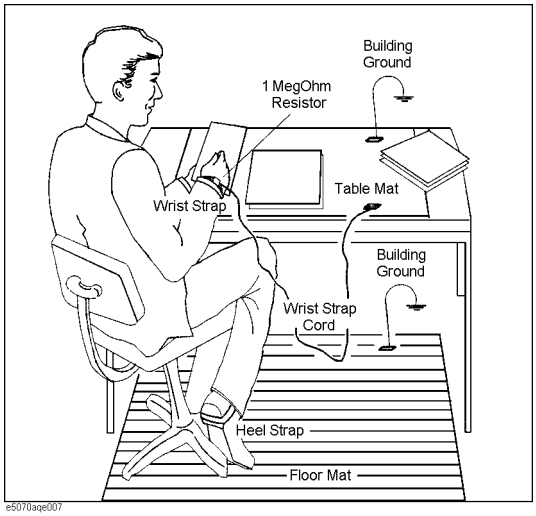
Protection against electrostatic discharge (ESD)

Set up a static-free workstation to protect the electronic components against damage by electrostatic discharge (ESD) as shown in Figure 3-3. Table 3-2 shows the accessories available to provide protection against ESD.

Table 3-2 **Accessories available to provide anti-ESD protection**

Name	Agilent Part Number
Static-control table mat and earth ground wire	9300-0797
Wrist-strap cord	9300-0980
Wrist-strap	9300-1383
Heel-straps	9300-1169

Figure 3-3 **Example of static-free workstation**



Ensuring adequate free space around analyzer for immediate disconnection of power cable in case of emergency

As described in “Disconnection from supply source” on page 67, the power supply is disconnected by removing the power cable’s connector plug from either the AC outlet or the E5052A unit. When installing the E5052A, ensure that there is sufficient free space around the unit to permit quick disconnection of the plug (from AC outlet or E5052A unit) in case of emergency.

Installing Front Handles/Rack Mounting Flanges

The E5052A can be installed on a workbench or in a rack. This section describes how to install the front handles (Option 1CN) used for transporting the instrument and how to install the analyzer in an equipment rack as part of a measurement system (Option 1CM: without handles, Option 1CP: with handles).

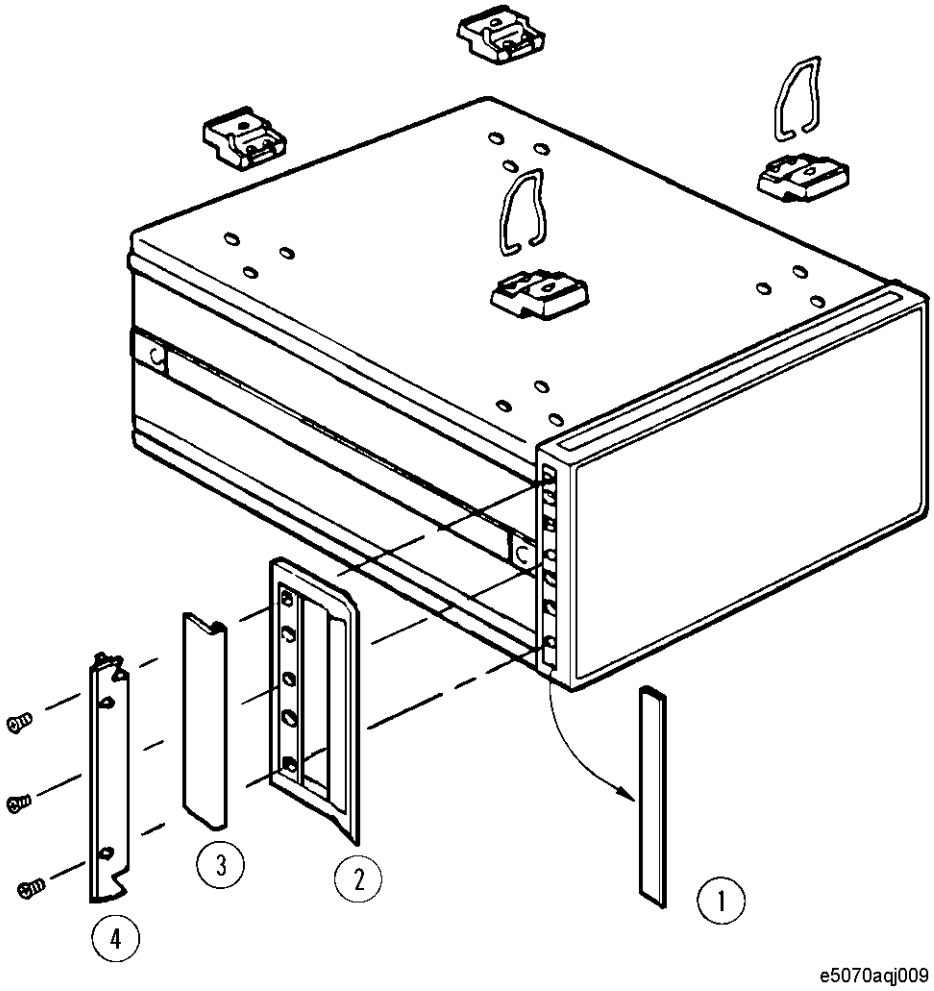
Table 3-3 Agilent E5052A handles/rack mounting options

Option	Name	Agilent Part Number
1CN	Handle Kit	5063-9230
1CM	Rack-mount Kit	5063-9217
1CP	Rack-mount and Handle Kit	5063-9224

Table 3-4 Contents of each option

Option	Contents	Quantity
1CN	Front Handles	2
	Screws	6
	Trim Strips	2
1CM	Rack-mounting flanges (locking side plate)	2
	Screws	6
1CP	Rack-mounting flanges (locking side plate)	2
	Front Handles	2
	Screws	8

Figure 3-4 **Installing front handle/rack-mount kits**



How to install the handle kit (Option 1CN)

The handle kit is used for transport and relocation of the E5052A. While referring to Figure 3-4, install the handle kit by following these steps.

Step 1. Remove the adhesive-backed trim strip (1) from each side of the outer frame of the E5052A front panel.

Step 2. Use the provided screws to mount the front handles (2) on each side of the E5052A front panel frame.

Step 3. Attach the provided modified trim strip (3) to each front handle in order to cover the front panel locking screws.

WARNING **If the installed front handle becomes damaged, replace it with a new one immediately. A damaged handle can break while moving or lifting the instrument and cause personal injury or damage to the instrument.**

How to install the rack-mount kit (Option 1CM)

The rack-mount kit includes two flanges (locking side plates) for mounting the E5052A on a rack (482.6 mm/19 inches), conforming to the EIA Standard. While referring to Figure 3-4, install the rack-mount kit by following these steps.

Step 1. Remove the adhesive-backed trim strip (1) from each side of the outer frame of the E5052A front panel.

Step 2. Use the provided screws to mount a rack-mounting flange (4) on each side of the E5052A front panel frame.

Step 3. Remove the four bottom feet of the E5052A (lift the bar marked TAB on the inner side of the foot and slide the foot toward the bar).

Step 4. Mount the E5052A on the rack.

How to install the rack-mount and handle kit (Option 1CP)

The rack-mount and handle kit includes both the rack-mounting flanges (locking side plates) and front handles. While referring to Figure 3-4, install the rack-mount kit by following these steps.

Step 1. Remove the adhesive-backed trim strip (1) from each side of the outer frame of the E5052A front panel.

Step 2. Use the provided screws to mount a front handle (2) and rack-mounting flange (4) on each side of the E5052A front panel frame.

CAUTION **Be sure to use both the front handles and the rack-mounting flanges at the same time. Do not attempt to install flanges or handles separately with the hardware provided, since this risks serious electrical damage to the instrument.**

Step 3. Remove the four bottom feet of the E5052A (lift the bar marked TAB on the inner side of the foot and slide the foot toward the bar).

Step 4. Mount the E5052A on the rack.

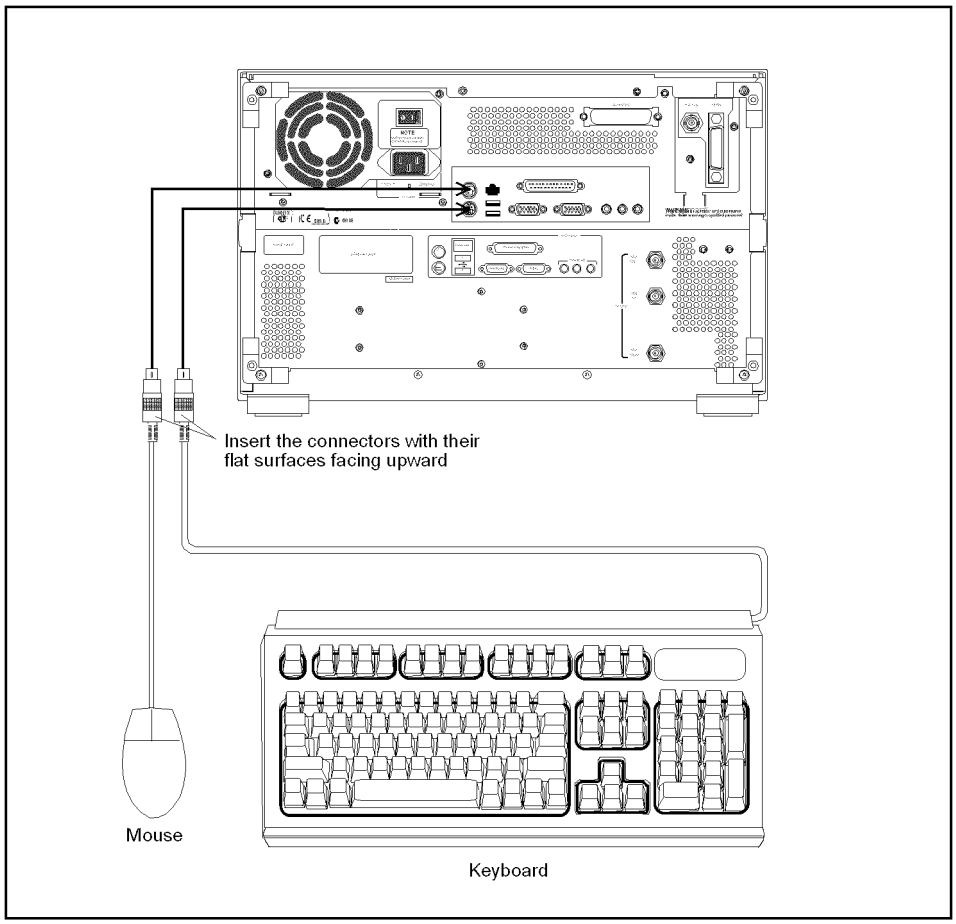
Connecting the Accessories

The E5052A allows you to connect a variety of accessories using the USB ports on the front panel or each of the ports on the rear panel.

Connecting the mouse and keyboard

As shown in Figure 3-5, connect the mouse and keyboard to the mini-DIN mouse port and mini-DIN keyboard port, respectively, before turning ON the power.

Figure 3-5 **Connecting mouse and keyboard**



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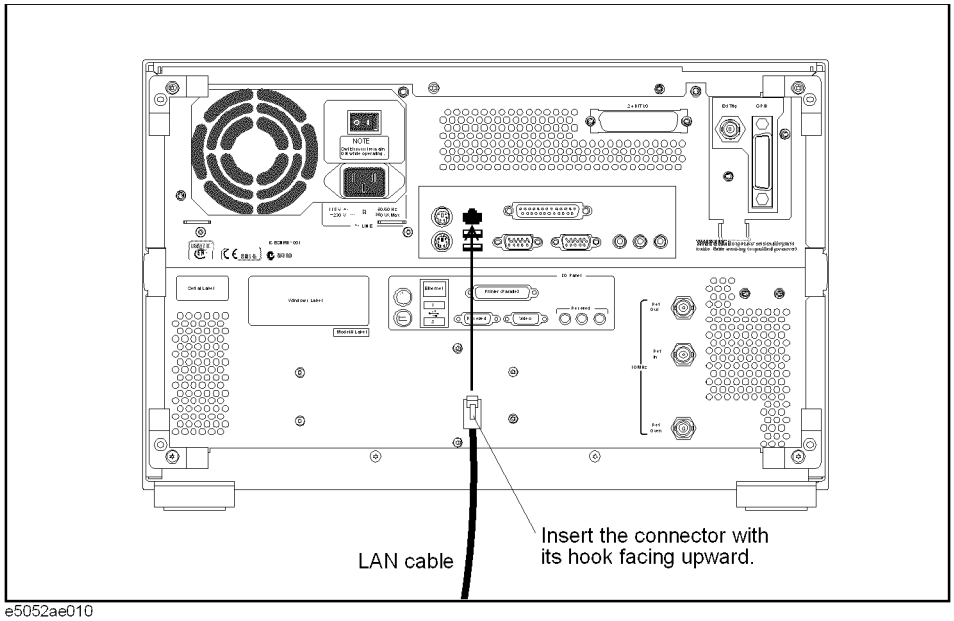
Connecting a LAN cable

When using a LAN (local area network), follow the procedure below to connect the E5052A to the LAN.

Step 1. By referring to the Chapter 6, “Setting and Using the Control and Management Functions,” on page 179, set up the E5052A LAN.

Step 2. As shown in Figure 3-6, connect a LAN cable to the LAN port on the rear panel of the E5052A.

Figure 3-6 **Connecting LAN cable**



NOTE

When connecting the E5052A to a LAN for use, consult the network administrator about the proper LAN settings.

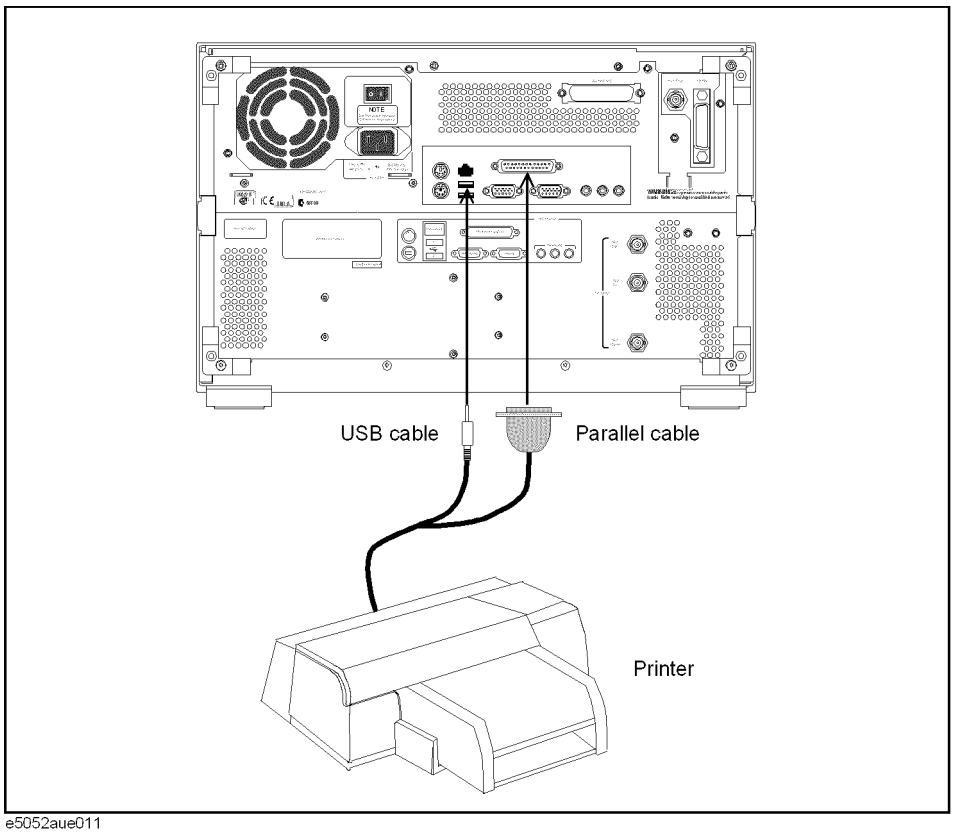
Do not connect a LAN cable until the proper LAN settings have been made. Connecting the E5052A to a LAN with improper settings may cause a problem in the network.

Connecting a printer

When using a compatible printer, connect it to the printer parallel port or USB (Universal Serial Bus) port on the rear panel of the E5052A as shown in Figure 3-7.

For a list of printers that work with the E5052A in its factory-shipped condition, see the Chapter 5, “Data Analysis and Result Output.”

Figure 3-7 Connecting a printer



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Power Supply and Blown Fuses

Before turning on the E5052A power, check the following important items.

Verification of the power supply

Confirm that the power supplied to the E5052A meets the following requirements:

	Requirement
Voltage	90 to 132 VAC or 198 to 264 VAC *1
Frequency	47 to 63 Hz
Maximum power consumption	500 VA

*1. Switched automatically by the E5052A in conformity to the voltage used.

Verification and connection of power cable

The three-wire power cable attached to the E5052A has one wire serving as a ground. Using this power cable allows the E5052A to be grounded, thereby protecting you against electrical shock from the power outlet.

Step 1. Confirm that the power cable is not damaged.

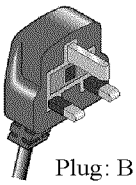
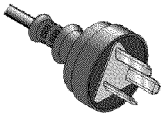
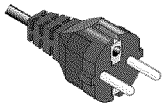
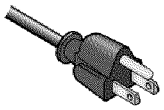
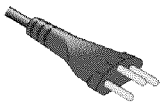
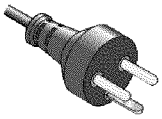
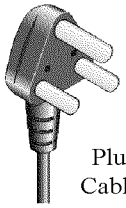
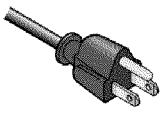
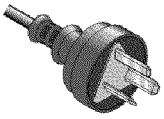
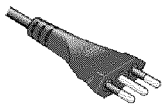
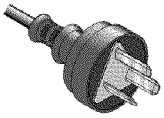
WARNING **NEVER use a power cable showing any sign of damage. Faulty cables can cause electrical shock.**

Step 2. Use the supplied cable to connect between the power cable receptacle (Figure 3-9 on page 67) on the rear panel of the E5052A and a three-wire power outlet, with the grounding prong firmly connected in the ground slot.

WARNING **Use the supplied power cable with grounding wire to securely ground the E5052A.**

Figure 3-8 shows the power cable options.

Figure 3-8 **Power cable options**

OPTION 900 United Kingdom  Plug: BS 1363/A, 250V, 10A Cable: 8120-1351, 8120-8705	OPTION 901 Australia/New Zealand  Plug: AS 3112, 250V, 10A Cable: 8120-1369
OPTION 902 Continental Europe  Plug: CEE 7 Standard Sheet VII, 250V, 10A Cable: 8120-1689	OPTION 903 U.S./Canada  Plug: NEMA 5-15P, 125V, 10A Cable: 8120-1378
OPTION 904 U.S./Canada Plug: NEMA 6-15P, 250V, 6A Cable: 8120-0698	OPTION 906 Switzerland  Plug: SEV Type 12, 250V, 10A Cable: 8120-2104
OPTION 912 Denmark  Plug: SR 107-2-D, 250V, 10A Cable: 8120-2956	OPTION 917 India/Republic of S. Africa  Plug: IEC 83-B1, 250V, 10A Cable: 8120-4211
OPTION 918 Japan  Plug: JIS C 8303, 125V, 12A Cable: 8120-4753	OPTION 920 Argentina  Plug: Argentine Resolution 63, Annex IV, 250V, 10A Cable: 8120-6870
OPTION 921 Chile  Plug: CEI 23-16, 250V, 10A Cable: 8120-6978	OPTION 922 China  Plug: GB 1002, 250V, 10A Cable: 8120-8376
NOTE: Each option number includes a 'family' of cords and connectors of various materials and plug body configurations (straight, 90° etc.).	

power_e

Blown fuses

If the fuse appears to have blown during operation, this instrument may be subject to failure and must be repaired. Ship the E5052A to the nearest Agilent Technologies Service Center according to the section on “Considerations When Shipping to a Service Center Due to Breakdown or Other Problems” on page 74

WARNING **Do NOT replace the fuse yourself; doing this may expose you to dangerous electrical shock.**

Starting the E5052A

This section explains how to turn on/off the E5052A power, how to cut off the power supply in an emergency, and how to set the internal clock.

Turning the Power ON and OFF

Perform the following steps to turn the power ON or OFF.

Turning the Power ON

Step 1. If the standby switch (⏻) in the lower-left part of the front panel is in the depressed (▭) position, press it to put it in the popped-up position (▯).

Step 2. Press the standby switch to put it in the depressed position (▭).

This operation turns ON the power, and the E5052A starts the self-test.

Step 3. Confirm that the self-test indicates normal operation.

Normal operation is confirmed by the self-test if no error message appears.

Turning the Power OFF

Step 1. Use either of the following methods to turn the power OFF.

- Press the standby switch (⏻) in the lower-left part of the front panel (now in the depressed (▭) position) to put it in the popped-up (▯) position.
- Send the shutdown command from an external controller.

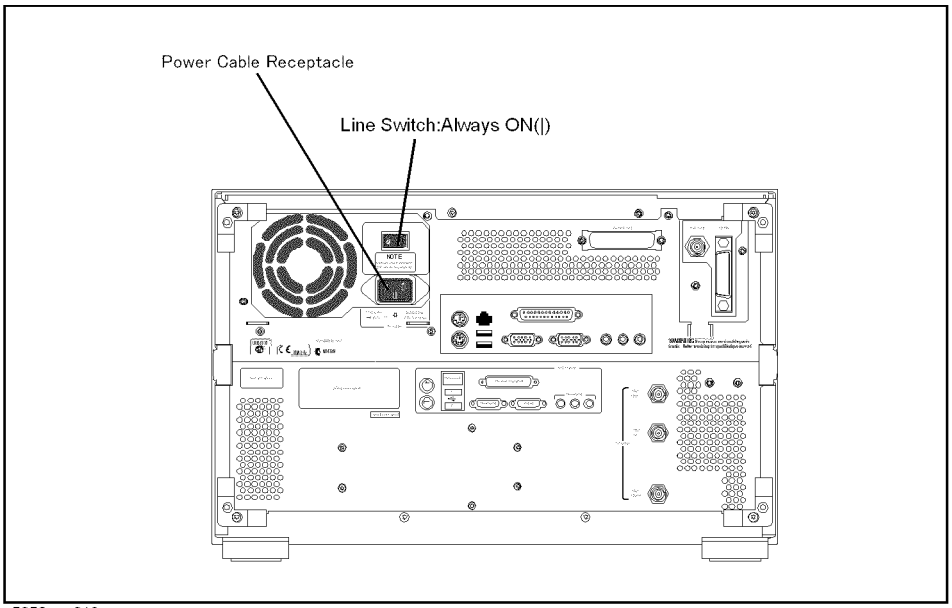
These operations will start the E5052A shutdown process (required software and hardware processes for turning the power off), and the power will turn OFF after a few seconds.

NOTE

Under normal circumstances, always press the standby switch (⏻), or send the shutdown command from an external controller, to execute the E5052A shutdown process. **Never cut off the power supply directly by disconnecting the power cable plug from the rear panel of the unit.**

If the power supply is cut off directly by disconnecting the power cable plug from the instrument or the AC outlet, the shutdown process is not carried out and there is a risk of damage to the E5052A's software or hardware.

Figure 3-9 **Line switch (Always ON) and power cable receptacle**



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Disconnection from supply source

The power supply of the E5052A is cut off by disconnecting the plug of the power cable (on either AC outlet side or E5052A side). When it is necessary to disconnect the power supply in order to avoid shock hazards, etc., pull out the power cable plug from either the AC outlet side or the E5052A side.

NOTE

To allow this to be done smoothly, be sure to follow the guidelines in “Ensuring adequate free space around analyzer for immediate disconnection of power cable in case of emergency” on page 56.

When turning the power OFF under normal circumstances, always follow the methods described in “Turning the Power OFF” on page 66.

Initial Registration of E5052A

When you start up the E5052A for the first time or after executing system recovery, you need to perform the initial registration of the Windows 2000 operating system used in the E5052A.

NOTE You cannot use the front panel keys during the initial registration of the E5052A, so be sure to connect the mouse and keyboard before turning on the power.

NOTE If you perform the following procedure incorrectly, a message appears asking whether to return to the previous registration screen and perform the registration again. In this case, follow the instruction to return to the previous registration screen.

Step 1. Turns on the E5052A.

Step 2. The Windows 2000 Professional Setup Wizard appears. Click the **Next >** button (Figure 3-10).

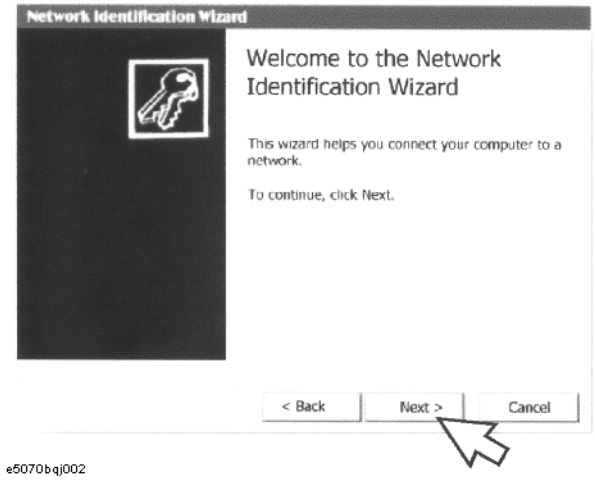
Figure 3-10 Windows 2000 Professional Setup Wizard

Step 3. In the Windows 2000 Professional Setup dialog box, select the **I accept this agreement** box and click the **Next >**button (Figure 3-11). Then, the Windows 2000 operating system restarts automatically.

Figure 3-11 **Windows 2000 Professional Setup dialog box**

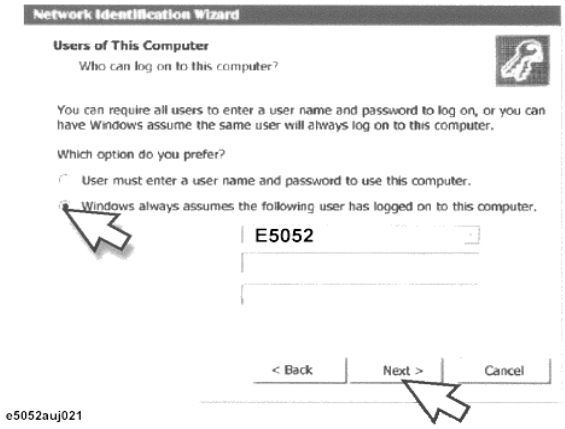
Step 4. The Network Identification Wizard appears. Click the **Next >** button (Figure 3-12).

Figure 3-12 **Network Identification Wizard**



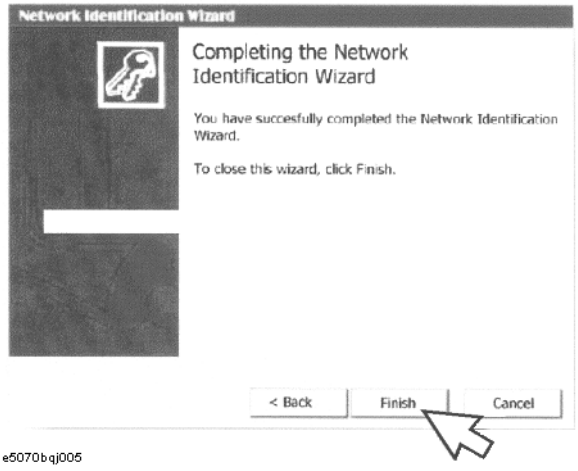
Step 5. In the Network Identification Wizard dialog box (1/2), select the **Windows always assumes the following user has logged on to this computer** box and check that **E5052** is in the **User Name** box. If not, type in **E5052**. Then type in **E5052** both in **Password box and Confirm password box.** Click the **Next>** button (Figure 3-13).

Figure 3-13 **Network Identification Wizard dialog box (1/2)**



Step 6. In the Network Identification Wizard dialog box (2/2), click the **Finish** button to finish the initial registration of the E5052A (Figure 3-14). Then, the measurement display of the E5052A appears.

Figure 3-14 **Network Identification Wizard dialog box (2/2)**



Setting the Internal Clock

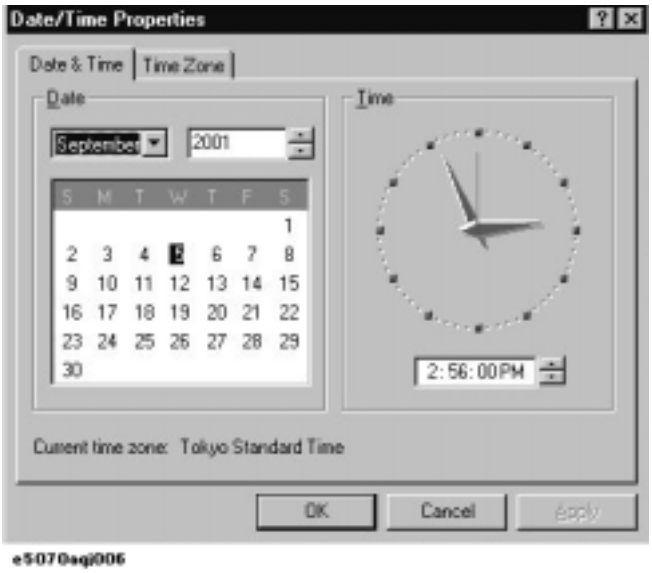
You can set the date/time displayed at the lower right of the screen. When you save data in the storage unit, for example, the settings of the internal clock will be used for the saved file's information. The following describes the setting procedure by using the keys on the front panel.

NOTE After turning on the instrument's power for the first time after delivery, be sure to set the internal clock.

Setting the Date/Time

Step 1. Press the [System] key in the INSTR STATE block. Press the [↓]or [↑] key to move the focus to the Misc Setup button and then press the [Enter] or [→] key. Press the [↓]or [↑] key to move the focus to the Clock Setup button and then press the [Enter] or [→] key. Place the focus on the Set Date and Time button and press the [Enter] key. The Date/Time Properties dialog box will appear (Figure 3-15).

Figure 3-15 Date/Time Properties dialog box ("Date & Time" tab)



Step 2. Turn the rotary knob ( ) on the front panel to place the focus on the **Date & Time** tab and then press the **[→]** key to move the focus to the **Time Zone** tab (Figure 3-16).

Figure 3-16 **Date/Time Properties dialog box (“Time Zone” tab)**

Step 3. Turn the rotary knob ( ) on the front panel to place the focus on the **Time Zone** box and press the **[←]/[→]** or **[↓]/[↑]** key to select the time zone.

NOTE

When you select a time zone having daylight savings time (‘summer time’), the **Automatically adjust clock for daylight saving changes** box becomes selectable. To set automatic adjustment to daylight savings time to ON, turn the rotary knob ( ) to place the focus on the **Automatically adjust clock for daylight saving changes** box and press the rotary knob ( ) to display the √ mark (Figure 3-16).

Step 4. Turn the rotary knob ( ) on the front panel to place the focus on the **Time Zone** tab and press the **[←]** key to move the focus to the **Date & Time** tab.

Step 5. By referring to Figure 3-15, turn the rotary knob ( ) on the front panel to place the focus on the desired item. Press the **[←]/[→]** or **[↓]/[↑]** keys to set each item.

Step 6. Turn the rotary knob ( ) on the front panel to place the focus on the **OK** button and then press the **[Enter]** key.

Turning the Date/Time display ON and OFF

The Date/Time is displayed within the instrument status bar at the lower right of the display screen.

Step 1. Press the **[System]** key in the INSTR STATE block. Press the **[↓]**or **[↑]** key to move the focus to the **Misc Setup** button and then press the **[Enter]** or **[→]** key. Press the **[↓]** or **[↑]** key, move the focus to the **Clock Setup** button, and press the **[Enter]** or **[→]**key. Place the focus on the **Show Clock** button and press the **[Enter]** key to set the date/time display to on/off.

Daily Maintenance

This section provides the maintenance information for the E5052A and describes the self-test function, which checks the instrument for failure. This section also provides information required for shipping the E5052A due to breakdown or other problems.

Cleaning method

To clean the surface of the E5052A, wipe the surface gently with a dry cloth or soft cloth dampened with water and wrung dry. Never attempt to clean the inside of the instrument.

WARNING **To avoid electric shock, always disconnect the power cord of the E5052A from the power outlet when cleaning.**

NOTE To clean a touch-screen LCD, do not wet the cloth with water.

Occasionally, a few pixels may appear on the screen as a fixed point of blue, green or red. Please note that this is not a failure and does not affect the performance of your product.

Maintaining connectors/ports on test port (DUT interface)

Each port on the front panel of the E5052A has an N-type connector (female) and a BNC connector (female). In the RF band, soil or damage on the connector or cable will affect the measurements. The following describes how to handle and maintain these N-type connectors and BNC connectors.

- The connectors should always be kept clean and away from dirt.
- To prevent electrostatic discharge (ESD), do not touch the contact face of the connector.
- Never attempt to use a damaged or nicked connector.
- When cleaning, blow air onto the connector. Never attempt to use abrasives such as emery paper.

NOTE The RF port on the front panel of the E5052A is a 50 Ω-based N-type connector (female). Note that connecting a connector with different impedance can damage the connectors.

Self-test When Turning on the Power

When the power is turned on, the E5052A automatically performs a self-test. If any error is detected by the self-test at power-on, the error message “Power on test fail” appears in the instrument status bar. This causes the E5052A to enter the service mode. If your E5052A is in the service mode, ship it to the nearest Agilent Technologies Service Center by referring to the section on “Considerations When Shipping to a Service Center Due to Breakdown or Other Problems” on page 74.

Considerations When Shipping to a Service Center Due to Breakdown or Other Problems

When shipping the E5052A to an Agilent Technologies Service Center because of breakdown or other problems, for re-shipment use the packing box and shock-absorbing material used to package the analyzer, or static-protective package in place of them. To find your nearest Agilent Technologies Service Center, contact the Agilent Technologies Customer Center displayed at the end of the Manual.

NOTE **Occasionally, a few pixels may appear on the screen as a fixed point of blue, green or red. Please note that this is not a failure and does not affect the performance of your product.**

4 Basic Measurement Using E5052A

This chapter describes the basic measurement procedures of the DUT using the E5052A.The description is mainly based on the manual measurement method.

The E5052A has a measurement screen for each measurement target; and the target you can measure may vary depending on the screen. Select measurement screens according to your intended use.

Frequency/Power Measurement in Frequency/Power Measurement Mode

Overview of frequency/power measurement

For frequency/power measurements, the E5052A measures the corresponding frequency, power and power supply DC current by sweeping the specified range of the DC control/power given to the DUT.

The E5052A's frequency/power measurement window has three measurement trace screens: RF power measurement trace, frequency measurement trace, and power supply DC current measurement trace. By using the individual trace screen, you can measure RF power, frequency and power supply DC current corresponding to the DC control/power of the DUT.

The following sections explain how to use the E5052A to make these basic measurements.

About analyzer mode and tester mode

The frequency/power measurement has two modes: analyzer mode, which analyzes input signals for a specific period of time, and tester mode, which performs measurement on the spot without DC bias sweeping.

In analyzer mode, an individual change in frequency, RF power or power supply DC current of the input signals for a defined period of time will be shown in a graph and analyzed by using the marker or analysis function.

In tester mode, the frequency, RF power or power supply DC current of the input signals will be measured on the spot. You can confirm each numeric value by viewing the screen.

Selecting Analyzer Mode or Tester Mode

Step 1. You can select either analyzer mode or tester mode by pressing the Trigger-**Mode** key. Analyzer mode is selected by default.

The basic settings and their examples described in the following sections assume signal analysis using the analyzer mode.

NOTE **Analyzer mode is not available when option 011 is installed.**

Figure 4-1 Example of tester mode screen

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Setting trace layout

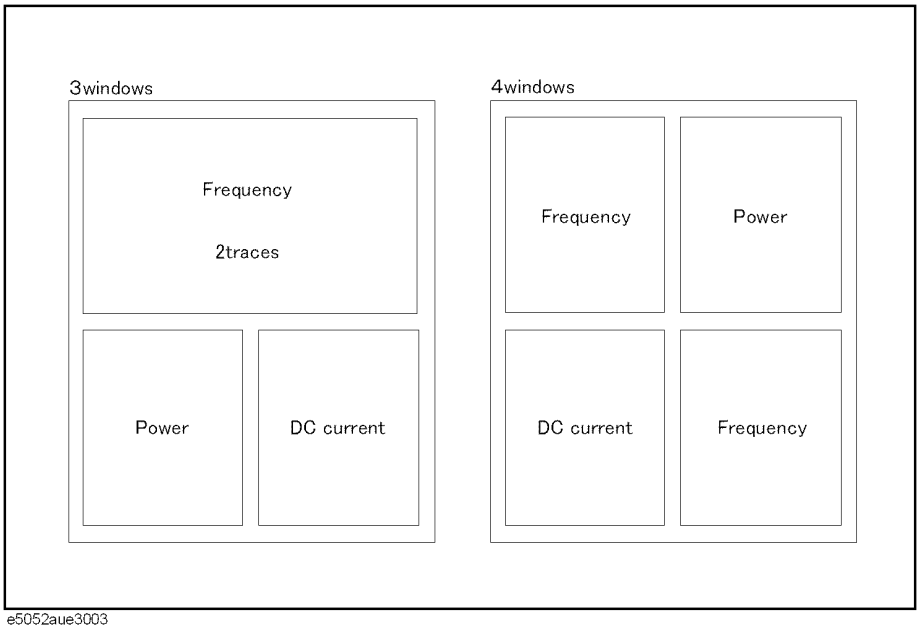
In frequency/power measurement mode, four traces will be displayed at the same time. The four traces consist of two traces in frequency measurement (the unit is Hz and Hz/V), a trace in RF power measurement (the unit is dBm) and a trace in power supply DC current measurement (the unit is mA).

You can select the trace layout from three- or four-division mode. In each trace layout, data will be assigned as Figure 4-2, “Trace layout.” In the four-division mode, the upper-left trace is frequency in Hz unit and the lower-right trace is frequency in Hz/V unit. Refer to “Setting Frequency Format and Sensitivity Aperture” on page 86 for selecting the unit (data format).

Step 1. Press Display-**Allocate** key.

Step 2. Press the desired softkey to select the trace layout.

Figure 4-2 Trace layout



Common settings in RF power, frequency and power supply DC current measurement

The following section describes the common setting steps to measure RF power, frequency and power supply DC current corresponding to the DUT's DC control/power by using the E5052A's frequency/power measurement window.

Selecting Measurement Window

Step 1. Press Meas/View - **Freq & Power** to select the frequency/power measurement window.

NOTE

You can maximize the frequency/power measurement window by pressing Window Max key while the window is selected. You can bring up the original size when you press the Window Max key once again.

You can select the next trace by pressing the Trace Next key and maximize the target trace by pressing the Trace Max key. The frequency/power window will come back when you press the Trace Max key once again.

Specifying Sweep Range

Step 1. Press Setup - **Sweep Parameter**.

Step 2. Selecting from the softkey menu list, you can define a sweep operation to be performed for either DC control or DC power. Select **Control Voltage** for DC control and **Power Voltage** for DC power.

Step 3. Press Start/Center (Stop/Span) - **DC Control**(**Power**)**Start**.

Step 4. Enter the sweep start value in the data entry field that appears in the upper part of the screen.

Step 5. Press Start/Center (Stop/Span) - **DC Control**(**Power**)**Stop**.

Step 6. Enter the sweep stop value in the data entry field that appears in the upper part of the screen.

NOTE

Otherwise, press Start/Center (Stop/Span) - **DC Control**(**Power**)**Center** to enter the sweep center value in the data entry field that appears in the upper part of the screen and then press **DC Control**(**Power**) **Span** to enter the sweep span value in the same way.

The same softkey will be displayed by pressing either Start/Center or Stop/Span. You can make the same settings by using either of the two keys.

Setting Frequency Band, Frequency Resolution, Number of Measurement Points and Delay

Step 1. Press Setup - **Freq Band** to switch over to the appropriate frequency band. The available

frequency bands are as follows:

Table 4-1 Frequency Band

Frequency Band
10 MHz - 1.5 GHz
300 MHz -7 GHz

Step 2. Press Setup - **Freq Resolution**.

Step 3. Select the appropriate frequency resolution from the softkey menu list.The available frequency resolutions are as follows:

Table 4-2 Frequency Resolution List

Frequency Resolution
10 Hz
1 kHz
64 kHz

Step 4. Press Setup - **Points**.

Step 5. Enter the number of measurement points in the data entry field that appears in the upper part of the screen.

Step 6. Press Setup - **Points Delay**.

Step 7. Enter the measurement delay in the data entry field that appears in the upper part of the screen.

About DC voltage setting and protection

You can specify the DC power/control that will be applied to the DUT. Refer to “Setting DC power/DC control and protection” on page 82 for the setting procedure.

Setting Average Function

Follow the steps below to use the averaging function.

Step 1. Press Avg/BW - **Avg Factor**.

Step 2. Enter the number of times for averaging in the data entry field that appears in the upper part of the screen.

Step 3. Press Avg/BW - **Averaging** to turn on the averaging function.

Setting Trigger

Step 1. Press Trigger - **Source**.

Step 2. Select the trigger source from the softkey menu list. The available options are as follows.

Internal is selected by default.

Table 4-3 Trigger Source List

Softkey	Overview
Internal	Sets trigger source to internal continuous trigger signal
External*1	Sets trigger source to external trigger input connector
Manual	Sets trigger source to manual operation
Bus	Sets trigger source to the bus; the trigger signal is issued by the trigger command via GPIB interface or LAN.

*1. If External is selected for the trigger source, the trigger signal must be provided by an external instrument. Refer to “Setting External Trigger” on page 115 for the setting procedure.

Step 3. Press Trigger - **Trigger to Freq & Power** to send a trigger to the frequency/power measurement. By default, **Continuous** is selected for sweep.

NOTE

The E5052A has four measurement functions: phase noise measurement, spectrum monitor measurement, frequency/power measurement, and transient measurement. Because individual measurements differ in their characteristics from one another, each of the E5052A’s trigger is used exclusively for a single measurement.

In other words, only one measurement function can be triggered at a time, and only it can perform measurement at that time.

Setting DC power/DC control and protection

You can set the DC power or the DC control that is applied by the E5052A to the DUT not only to protect the DUT but also to perform stable measurements.

The E5052A allows you to set the maximum and minimum allowance levels of DC power/control that are applied to the DUT. This prevents excessive voltage from being applied to the DUT.

Follow the steps below to set the DC voltage for the DC control measurement.

Setting DC Power

Step 1. Press DC Power - **Max Pwr Voltage Limit**.

Step 2. Enter the maximum allowance voltage of DC power in the data entry field that appears in the upper part of the screen.

Step 3. Press DC Power - **Min Pwr Voltage Limit**.

Step 4. Enter the minimum allowance voltage of DC power in the data entry field that appears in the upper part of the screen.

Step 5. Press DC Power - **DC Power Delay**.

Step 6. Enter the delay for the DC power, in cases where it is changed, in the data entry field that appears in the upper part of the screen.

Step 7. Press DC Power - **DC Power Voltage**.

Step 8. Enter DC power in the data entry field that appears in the upper part of the screen.

Setting DC Control

Step 1. Press DC Control - **Max Ctrl Voltage Limit**.

Step 2. Enter the maximum allowance voltage of DC control in the data entry field that appears in the upper part of the screen.

Step 3. Press DC Control - **Min Ctrl Voltage Limit**.

Step 4. Enter the minimum allowance voltage of DC control in the data entry field that appears in the upper part of the screen.

Step 5. Press DC Control - **DC Control Delay**.

Step 6. Enter the delay for the DC control, in cases where it is changed, in the data entry field that appears in the upper part of the screen.

Step 7. Press DC Control - **DC Control Voltage**.

Step 8. Enter DC control in the data entry field that appears in the upper part of the screen.

To use the DC control calibration function, press DC Control - **Control Voltage Cal** to turn this function on. By pressing DC Control - **Execute Control Voltage Cal**, you can perform DC control calibration once.

NOTE You must perform this calibration every time you power on the instrument, since the DC control calibration is cleared when the power is turned off.

Applying DC Power/DC Control to DUT

Step 1. Press DC Power - **DC Power Output** to turn on the DC power output.

Step 2. Press DC Control - **DC Control Output** to turn on the DC control output.

About Auto Frequency Control Function

If this function is turned on, the E5052A will adjust the control voltage automatically so that the output signal frequency from the DUT may keep the specified value. For the setting procedure, refer to the “Auto Frequency Control Function” on page 129.

About DC control voltage delay, DC power delay and point delay

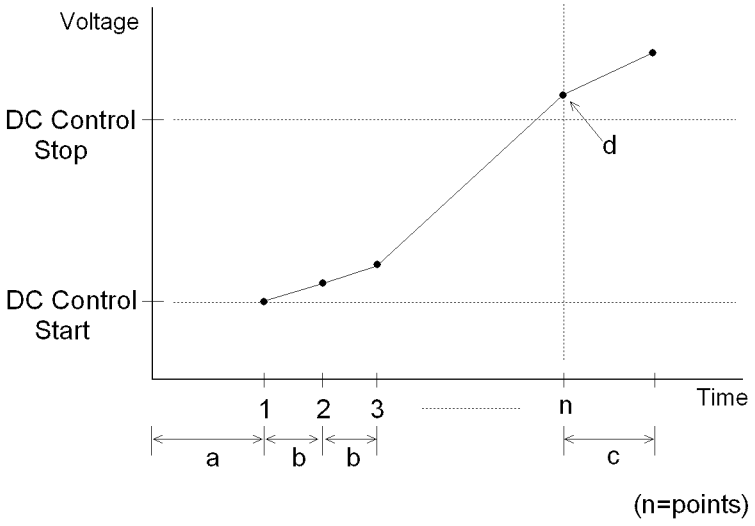
This section describes the point delay for DC control delay, DC power delay, and common settings, which were mentioned in the previous sections. This is not a part of the setting procedures, so for more on settings you can skip this section and proceed to “Confirming the result of RF power measurement” on page 89.

About delay while DC control is selected for sweep parameter

The following section describes how to set up DC control delay and point delay. For better understanding of each delay, “a,” “b” and “c” and the measurement point “d” used in the description below, refer to Figure 4-3, “Delay while DC control is selected for sweep parameter,”.

- “a” signifies the delay until measurement of the first point starts.This delay is equal to the addition of the setting times of DC control delay and point delay.
- “b” signifies the individual delay between respective measurement points. The setting times of point delay is set as this delay.
- “c” signifies the time that elapses when the last measurement point (“d”) of the sweep is different from the setting value of DC control. The setting time of the DC control delay is set as this delay, after DC control is output.

Figure 4-3 **Delay while DC control is selected for sweep parameter**



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NOTE If the output voltage falls 0 V or exceeds 20 V, the setting time of DC control delay will be set as the delay, after the voltage is output.

About delay while DC power is selected for sweep parameter

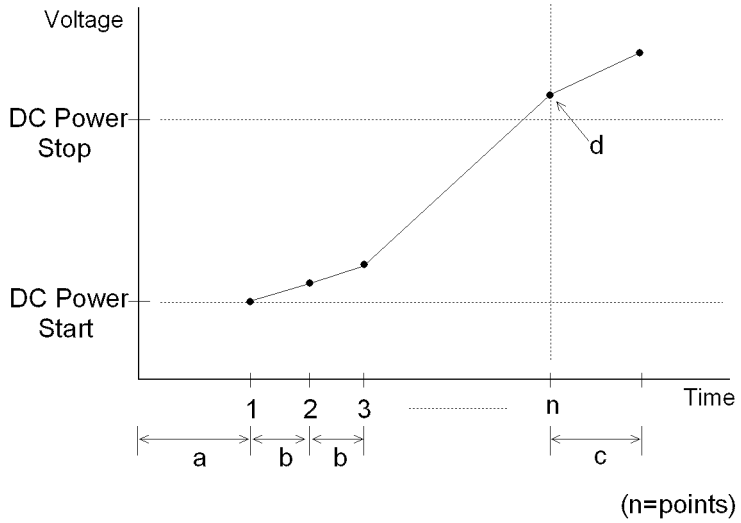
The following section describes how to set up DC power delay and point delay. For better understanding of each delay, “a,” “b” and “c” and the measurement point “d” used in the description, refer to Figure 4-4, “Delay while DC power is selected for sweep parameter,”.

- “a” signifies the delay until the measurement of the first point starts. This delay is equal

to the addition of the setting times of DC power delay and point delay.

- "b" signifies the individual delay between respective measurement points. The setting times of point delay is set as this delay.
- "c" signifies the time that elapses when the last measurement point ("d") of the sweep is different from the setting value of DC power voltage. The setting time of DC power delay will be set as this delay, after DC power voltage is output.

Figure 4-4 **Delay while DC power is selected for sweep parameter**



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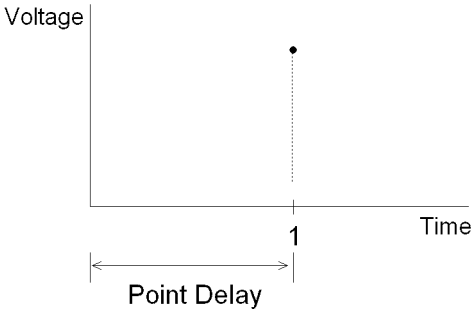
About delay in tester mode

In the tester mode, measurement is made for only one measurement point.The delay for the measurement point can be set by using a point delay setting. Refer to Figure 4-5, "Delay in tester mode,".

Figure 4-5 **Delay in tester mode**



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Confirming the result of frequency measurement

The following section describes the procedure used to confirm the measurement results of frequencies corresponding to the DUT's DC control/power by using the E5052A's frequency/power measurement window.

Selecting Trace

Step 1. Press the [Trace Next] key to select the frequency measurement trace.

NOTE If you want to maximize the screen, press the [Trace Max] key.

Setting Frequency Format and Sensitivity Aperture

You can select the unit (frequency format) used in the frequency trace screen and set the sensitivity aperture.

Step 1. Press [Format] - **Frequency Format**.

Step 2. Select an appropriate frequency format from the softkey menu list. The available options are as follows.

Table 4-4 Format list

Softkey	Overview
Hz	Displays the measurement frequency data.
Hz/V	Displays the data obtained from measurement frequency differentiated by the DC control voltage.
ΔHz	Displays the difference subtracted from the reference frequency.
%	Displays the difference subtracted from the reference frequency in per cent.
ppm	Displays the difference subtracted from the reference frequency in ppm.

Step 3. Press [Format] - **Sensitivity Aperture**. (This setting will be used when "Hz/V" is selected for the frequency format.)

Step 4. Enter the sensitivity aperture value in the data entry field that appears in the upper part of the screen. The unit is %.

Step 5. Press [Format] - **Frequency Reference**. (This setting will be used when either "ΔHz", "%","ppm" is selected for the frequency format.)

Step 6. Enter the frequency reference value in the data entry field that appears in the upper part of the screen. The unit is Hz.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

Step 1. Press [Scale] - **Divisions**.

Step 2. Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.

Step 3. Press Scale - **Reference Position**.

Step 4. Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen.

The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (max scale).

Step 5. Press Scale - **Reference Value**.

Step 6. Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit varies depending on the frequency format setting.

Step 7. Press Scale - **Scale/Div**.

Step 8. Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit varies depending on the frequency format setting.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of measurement trace automatically.

Step 1. Press Scale - **Auto Scale**.

NOTE If you want the scale setting to be performed automatically for all three measurement traces (RF power, frequency and power supply DC current), press Scale - **Auto Scale All**.

Setting Attenuator

When an input level is very high, a message may appear to prompt you to adjust the attenuator. In this case, follow the steps below to adjust the attenuator.

Step 1. Press Attn - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurement or the characteristics of the DUT. Adjust the attenuator so that the input level of the RF port may approximate this range.

Setting Smoothing

You can use the smoothing function to reduce the trace noise. Follow the steps below.

Step 1. Press Trace/View - **Aperture**.

Step 2. Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.

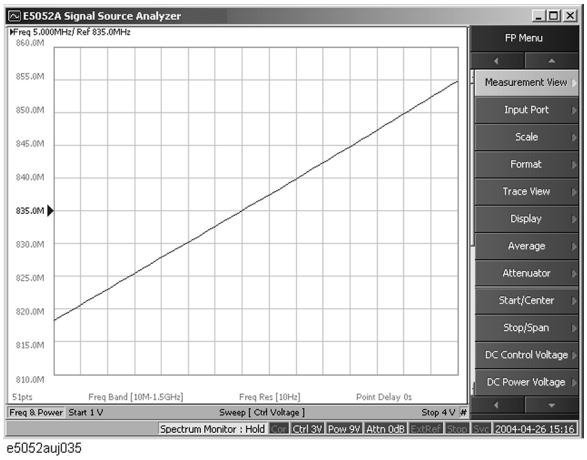
Step 3. Press Trace/View - **Smoothing** to turn on the smoothing function.

Confirming Measurement Points by Markers

Step 1. Press Marker to display marker 1 on the screen.

Step 2. Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press Marker - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Figure 4-6 Example of measurement screen (frequency characteristics)



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NOTE By taking into account the transient of DC control/power prior to the sweep, the instrument will start the sweep after the time specified in DC Control(DC Power) **Voltage - DC Control**(**Power**) **Delay** has elapsed. This delay time is not included in the sweep time, and it only applies to the first measurement point.

Confirming the result of RF power measurement

The following section describes the procedure to confirm the measurement results of RF power corresponding to the DUT's DC control/power by using the E5052A's frequency/power measurement window.

Selecting Trace

Step 1. Press [Trace Next] key to select the RF power measurement trace.

NOTE If you want to maximize the screen, press the [Trace Max] key.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

Step 1. Press [Scale] - **Divisions**.

Step 2. Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.

Step 3. Press [Scale] - **Reference Position**.

Step 4. Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen.

The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (max scale).

Step 5. Press [Scale] - **Reference Value**.

Step 6. Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit is dBm.

Step 7. Press [Scale] - **Scale/Div**.

Step 8. Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit is dB/Div.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of the measurement trace automatically.

Step 1. Press [Scale] - **Auto Scale**.

NOTE If you want the scale setting to be performed automatically for all three measurement traces (RF power, frequency and power supply DC current), press [Scale] - **Auto Scale All**.

Setting Attenuator

When an input level is very high, a message may appear to prompt you to adjust the attenuator.In this case, follow the steps below to adjust the attenuator.

Step 1. Press [Attn] - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurement or the characteristics of the DUT. Adjust the attenuator so that the input level of the RF port approximates this range.

Setting Smoothing

You can use the smoothing function to reduce the trace noise. Follow the steps below.

Step 1. Press [Trace/View] - **Aperture**.

Step 2. Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.

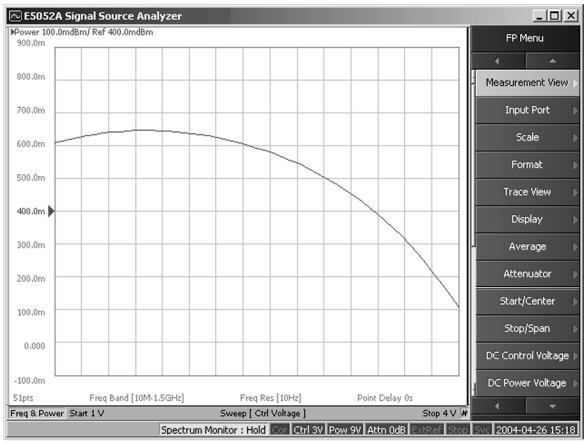
Step 3. Press [Trace/View] - **Smoothing** to turn on the smoothing function.

Confirming Measurement Points by Markers

Step 1. Press [Marker] to display marker 1 on the screen.

Step 2. Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press [Marker] - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Figure 4-7 Example of measurement screen (RF power characteristics)



e5052auj034

NOTE By taking into account the transient of DC control/power prior to the sweep, the instrument will start the sweep after the time specified in [DC Control]([DC Power]) - **DC Control**(**Power**) **Delay** has elapsed. This delay time is not included in the sweep time, and it only applies to the first measurement point.

Confirming the result of power supply DC current measurement

The following section describes the procedure used to confirm the measurement results of the power supply DC current corresponding to the DUT's DC control/power by using the E5052A's frequency/power measurement window.

Selecting Trace

Step 1. Press the Trace Next key to select the power supply DC current measurement trace.

NOTE If you want to maximize the screen, press the Trace Max key.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

Step 1. Press Scale - **Divisions**.

Step 2. Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.

Step 3. Press Scale - **Reference Position**.

Step 4. Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen.

The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (maximum scale).

Step 5. Press Scale - **Reference Value**.

Step 6. Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit is A.

Step 7. Press Scale - **Scale/Div**.

Step 8. Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit is A/Div.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of the measurement trace automatically.

Step 1. Press Scale - **Auto Scale**.

NOTE If you want the scale setting to be performed automatically for all three measurement traces (RF power, frequency and power supply DC current), press Scale - **Auto Scale All**.

Setting Attenuator

When the input level is very high, a message may appear to prompt you to adjust the attenuator. In this case, follow the steps below to adjust the attenuator.

Step 1. Press Attn - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurement or the characteristics of the DUT. Adjust the attenuator so that the input level of the RF port approximates this range.

Setting Smoothing

You can use the smoothing function to reduce the trace noise. Follow the steps below.

Step 1. Press [Trace/View] - **Aperture**.

Step 2. Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.

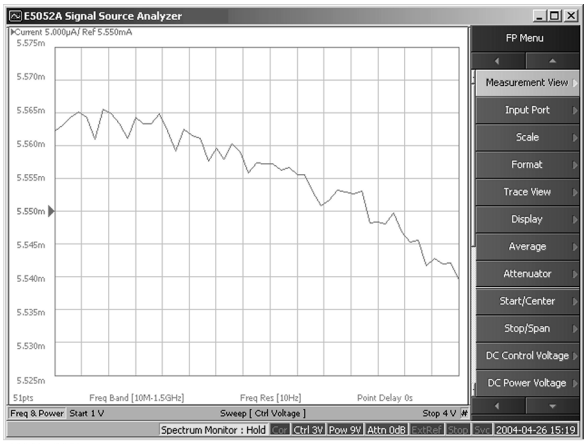
Step 3. Press [Trace/View] - **Smoothing** to turn on the smoothing function.

Confirming Measurement Points by Markers

Step 1. Press [Marker] to display marker 1 on the screen.

Step 2. Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press [Marker] - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Figure 4-8 Example of measurement screen (power supply DC current characteristics)



e5052auj036

NOTE By taking into account the transient of DC control/power prior to the sweep, the instrument will start the sweep after the time specified in [DC Control]([DC Power]) **Voltage - DC Control**(**Power**) **Delay** has elapsed. This delay time is not included in the sweep time, and it only applies to the first measurement point.

Phase Noise Measurement in Phase Noise Measurement Mode

Overview of phase noise measurement

This function locks on the DUT's output signal and measures the phase of the signal in the specified sweep range.

The following section describes the basic measurement method of the DUT's phase noise corresponding to the offset frequency from the carrier by using the E5052A's phase noise measurement window.

Setting phase noise measurement

Follow the steps below to measure the phase noise by using the E5052A's phase noise measurement window.

Selecting Measurement Window

Step 1. Press [Meas/View] - **Phase Noise** to select the phase noise measurement window.

NOTE You can maximize the frequency/power measurement window by pressing the [Window Max] key while the window is selected. You can return to the original size when you press the [Window Max] key once again.

Specifying the Sweep Range for Offset Frequency

Step 1. Press [Start/Center]([Stop/Span]) - **Start**.

Step 2. Select the sweep start value from the softkey menu list.

You can select the value from the options: 1 Hz, 10 Hz, 100 Hz or 1 kHz.

Step 3. Press [Start/Center]([Stop/Span]) - **Stop**.

Step 4. Select the sweep stop value from the softkey menu list.

You can select the value from the options: 100 kHz, 1 MHz, 5 MHz, 10 MHz or 40 MHz.

NOTE The number of measurement points varies depending on the setting value for the sweep range.

Table 4-5 Correlation Table for Measurement Points and Sweep Range

Start/Stop	100 kHz	1 MHz	5 MHz	10 MHz	40 MHz
1 Hz	646	775	865	904	982
10 Hz	517	646	736	775	853
100 Hz	388	517	607	646	724

Table 4-5 **Correlation Table for Measurement Points and Sweep Range**

Start/Stop	100 kHz	1 MHz	5 MHz	10 MHz	40 MHz
1 kHz	259	388	478	517	595

NOTE For phase noise measurement, you cannot use the center value or span value for log sweep.

Selecting Measurement Quality

Step 1. Press Setup - **Measurement Quality**.

Step 2. Select the appropriate quality level from the softkey menu list. The available options are Normal and Fast.

NOTE To obtain the outline of the measurement data, select "Fast " for the quality level. If you need more precise frequency resolution, select "Normal " for the quality level.

Selecting Carrier Frequency Band

Step 1. Press Setup - **Frequency Band**.

Step 2. Select the appropriate frequency band that contains the target carrier signal from the softkey menu list. The range of each frequency band is listed in the following table.

Table 4-6 **List of Carrier Frequency Bands**

Carrier Frequency band
10 M - 41 MHz
39 M -101 MHz
99 MHz - 1.5 GHz
300 MHz -7 GHz

Optimizing LO phase noise characteristics

The measurement uncertainty increases when the DUT's phase noise is close to the LO's phase noise. In that case, LO phase noise characteristics can be selected either L(f) < 150 kHz or L(f) > 150 kHz for optimizing the phase noise measurement accuracy.

Step 1. Press Setup - **LO PhNoise Optimize**.

Step 2. Select LO phase noise optimization.

Table 4-7 **List of LO phase noise characteristics**

Softkey	Overview
L(f) for > 150 kHz	Lowering LO SSB phase noise at > 150 kHz offset frequency

Table 4-7 List of LO phase noise characteristics

Softkey	Overview
L(f) for < 150 kHz	Lowering LO SSB phase noise at < 150 kHz offset frequency

NOTE Refer to the “Phase Noise Measurement” on page 211 in the Chapter 8, “Specifications and Supplemental Information.”

Setting Average Function and Correlation Number

Follow the steps below to use the averaging function.

Step 1. Press Avg/BW - **Avg Factor**.

Step 2. Enter the number of times for averaging in the data entry field that appears in the upper part of the screen.

Step 3. Press Avg/BW - **Averaging** to turn on the averaging function.

Step 4. Press Avg/BW - **Correlation**.

Step 5. Enter the value of the correlation number in the data entry field that appears in the upper part of the screen.

NOTE

If it takes more than one second for one sweep of phase noise measurement, you will see a "|" character rotates on the measurement status, which indicates the measurement is in progress.

And if it takes more than two seconds for one sweep, under the conditions that the number of correlation is set to more than two, you will see the progress bar in the left of the measurement status.

About DC Voltage Setting and Protection

You can specify DC power/control that is applied to DUT. Refer to “Setting DC power/DC control and protection” on page 82 for the setting procedure.

About Auto Frequency Control Function

If this function is turned on, the E5052A will adjust the control voltage automatically so that the output signal frequency from the DUT may keep the specified value. For the setting procedure, refer to the “Auto Frequency Control Function” on page 129.

Setting Trigger

Step 1. Press Trigger - **Source**.

Step 2. Select the trigger source from the softkey menu list. The available options are as follows. Internal is selected by default.

Table 4-8 Trigger Source List

Softkey	Overview
Internal	Sets trigger source to internal continuous trigger
External*1	Sets trigger source to external trigger input connector
Manual	Sets trigger source to manual operation
Bus	Sets trigger source to the bus; the trigger signal is issued by the trigger command via GPIB interface or LAN.

*1. If External is selected for the trigger source, the trigger signal must be provided by an external instrument. Refer to “Setting External Trigger” on page 115 for the setting procedure.

Step 3. Press Trigger - **Trigger to Phase Noise** to send a trigger to the phase noise measurement. By default, **Continuous** is selected for sweep.

NOTE

The E5052A has four measurement function: phase noise measurement, spectrum monitor measurement, frequency/power measurement, and transient measurement. Because individual measurements differ in their characteristics from one another, the E5052A’s each trigger is used exclusively for a single measurement function.

In other words, only one measurement function can be triggered at a time, and only this function can perform measurement at this time.

Confirming the result of phase noise measurement

Follow the steps below to confirm the results of the DUT's phase noise measurement by using the E5052A's phase noise measurement window.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

Step 1. Press Scale - **Divisions**.

Step 2. Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.

Step 3. Press Scale - **Reference Position**.

Step 4. Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen.

The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (maximum scale).

Step 5. Press Scale - **Reference Value**.

Step 6. Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit is dBc/Hz.

Step 7. Press Scale - **Scale/Div**.

Step 8. Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit is dB/Div.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of measurement trace automatically.

Step 1. Press Scale - **Auto Scale**.

Setting IF Gain

"IF over flow" error may be displayed when phase noise is distorted. In this case, follow the steps below to adjust the IF Gain value.

Step 1. Press Setup - **IF Gain**.

Step 2. Enter the IF Gain value in the data entry field that appears in the upper part of the screen.

You can select the value from the options: 0 dB, 10 dB, 20 dB, 30 dB, 40 dB or 50 dB.

NOTE When either "Phase lock loop unlocked" or "IF A/D overflow" error message is displayed, choose an appropriate IF Gain value indicated as the table below (Table 4-9).

Table 4-9 IF Gain selection table

DUT type	IF Gain
Frequency drifting sources (Free-run VCO, etc)	0, 10 dB
Frequency locked sources (PLL Synthesizer, etc)	20, 30, 40, 50 dB

Setting Attenuator

In case when an input level is very high, a message may appear to prompt you to adjust the attenuator. In this case, follow the steps below to adjust the attenuator.

Step 1. Press Attn - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurement or the characteristics of the DUT. Adjust the attenuator so that the input level of the RF port approximates this range.

Setting Smoothing

You can use the smoothing function to reduce the trace noise. Follow the steps below.

Step 1. Press Trace/View - **Aperture**.

Step 2. Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.

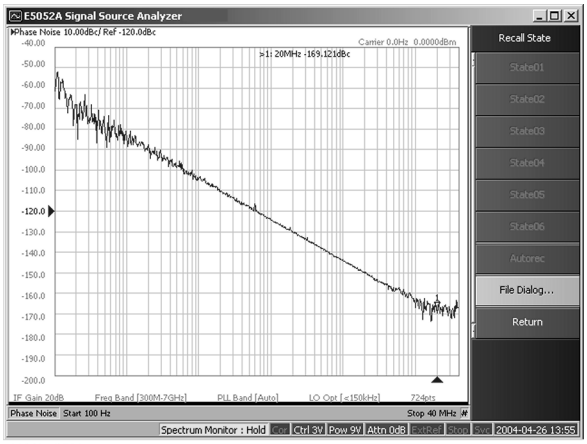
Step 3. Press Trace/View - **Smoothing** to turn on the smoothing function.

Confirming Measurement Points by Markers

Step 1. Press Marker to display marker 1 on the screen.

Step 2. Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press Marker - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Figure 4-9 **Example of measurement screen (phase noise - offset frequency characteristics)**



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NOTE In this measurement, you cannot specify the sweep time. It will be determined automatically based on the selection of the offset frequency sweep range and the carrier frequency band.

Confirming Integral Phase Noise, Jitter and Residual FM

Step 1. Specify the noise integration range by using the band marker. For further detail, refer to “Searching in the specified range” on page 141. You do not have to use the band marker to integrate the entire range.

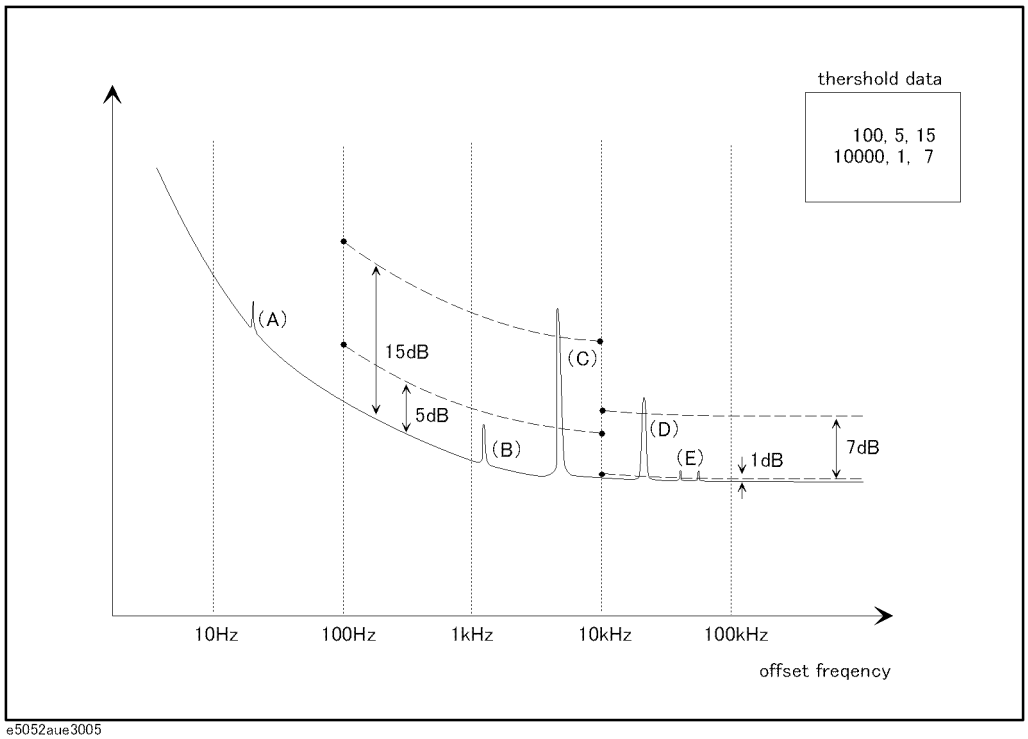
Step 2. Press Marker - **Analysis Type**.

Step 3. Press **Integral**. In the upper right part of the screen, you will see the Integral Phase Noise value [dBc], the RMS Noise value [rad, deg], the RMS Jitter value [sec] and Residual FM value [Hzrms].

Confirming Spurious

The E5052A obtains a reference waveform based on the moving average of the phase noise measurement results, and regards any data as spurious that may vary significantly from the reference waveform.

Figure 4-10 Sprious judgment



e5052aue3005

You can view the measurement points regarded as spurious in power (dBc). You can also provide any user-defined threshold for determining spurious.

Sprious judgment

(A), (E) For measurement values falling in the range for which no threshold is specified, or between the upper and lower thresholds, the E5052A determines whether or not they are spurious based on its own determination criteria.

(B) The E5052A considers the spurious smaller than the lower threshold as non-spurious regardless of its own determination criteria.

(C), (D) The E5052A considers the spurious greater than the upper threshold as spurious regardless of its own determination criteria.

Step 1. To specify the threshold for spurious, you must define the threshold table in advance. Define the threshold data in the following format, and then save it in the CSV format (with the extension of *.csv).

freq_from, threshold_min, threshold_max
freq_from, threshold_min, threshold_max
:

freq_from, threshold_min, threshold_max

Parameter	Overview
freq_from	Setting the start point of the threshold for spurious. You can not specify the end point. If the next start point and upper/lower threshold values are not specified, this threshold is valid until the stop frequency.
threshold_min	Lower threshold value
threshold_max	Upper threshold value

NOTE

One line represents one segmen, and you can specify up to 50 segments in the threshold table.

If the upper threshold is smaller than the lower threshold, the former will take precedence.

You can comment out the line by placing “#” at the beginning of the line.

Step 2. Press Trace/View - **Spurious**.

Step 3. Press **Import Threshold table** to import the threshold data file that you defined in advance.

Step 4. Press **Power (dBc)**. The data regarded as spurious is displayed in blue. You can view the stimulus and response values for each peak of spurious in a text file by pressing **Spurious List** now.

By Pressing **Omit**, the data regarded as spurious is replaced by the reference waveform that the E5052A calculated. By pressing **Normalized(dBc)**, the data displayed is back to the phase noise data.

NOTE

By pressing **Clear Threshold Table**, the threshold table is cleared and set to the initial value, 0, 2, 30.

Spectrum Monitor Measurement in Spectrum Monitor Measurement Mode

Overview of spectrum monitor measurement

You can measure the spectrum of a specified range by sweeping the DUT's output signals and approximate frequency range.

The following section describes the basic measurement method of spectrum monitor measurement by using the E5052A's spectrum monitor measurement window.

Setting spectrum monitor measurement

Follow the steps below to set up the measurement by using the E5052A's phase spectrum monitor measurement window.

Selecting Measurement Window

Step 1. Press [Meas/View] - **Spectrum Monitor**.

NOTE You can maximize the frequency/power measurement window by pressing the [Window Max] key while the window is selected. You can return to the original size when you press the [Window Max] key once again.

Specifying Frequency Sweep Range

Step 1. Press [Start/Center] ([Stop/Span]) - **Start**.

Step 2. Enter the sweep start value in the data entry field that appears in the upper part of the screen.

Step 3. Press [Start/Center] ([Stop/Span]) - **Stop**.

Step 4. Enter the sweep stop value in the data entry field that appears in the upper part of the screen.

NOTE Otherwise, press [Start/Center] ([Stop/Span]) - **Center** to enter the sweep center value in the data entry field that appears in the upper part of the screen and then press **Span** to enter the sweep span value in the same way.

The same softkey will be displayed by pressing either [Start/Center] or [Stop/Span]. You can make the same settings by using either of the two keys.

Specifying the Maximum Input Level of Input Signal

Follow the steps below to enter the maximum level value of the measurement signals that are input from the RF port.For more information, refer to the Chapter 8, "Specifications and Supplemental Information," on page 209.

Step 1. Press [Setup] - **Reference Level**.

Step 2. Enter the maximum input level in the data entry field that appears in the upper part of the screen.

Setting Average Function

Follow the steps below to use the averaging function.

Step 1. Press Avg/BW - **Avg Factor**.

Step 2. Enter the number of times for averaging in the data entry field that appears in the upper part of the screen.

Step 3. Press Avg/BW - **Averaging Type** to select the averaging type.You can choose either Log-Pwr Avg or Pwr Avg(RMS).

Step 4. Press Avg/BW - **Averaging** to turn on the averaging function.

Specifying Measurement Resolution Bandwidth

Step 1. Press Avg/BW - **RBW**.

Step 2. Enter the RBW value in the data entry field that appears in the upper part of the screen.

You can select the value from the options: 100 kHz, 25 kHz, 6.25 kHz, 1.56 kHz, 391 Hz, 97.7 Hz, 24.4 Hz, 6.1 Hz, or 1.53 Hz.

About DC voltage setting and protection

You can specify DC power/control that is applied to the DUT. Refer to “Setting DC power/DC control and protection” on page 82 for the setting procedure.

About Auto Frequency Control Function

If this function is turned on, the E5052A will adjust the control voltage automatically so that the output signal frequency from the DUT may keep the specified value. For the setting procedure, refer to the “Auto Frequency Control Function” on page 129.

Setting Trigger

Step 1. Press Trigger - **Source**.

Step 2. Select the trigger source from the softkey menu list. The available options are as follows. Internal is selected by default.

Table 4-10 Trigger Source List

Softkey	Overview
Internal	Sets trigger source to internal continuous trigger
External*1	Sets trigger source to external trigger input connector
Manual	Sets trigger source to manual operation
Bus	Sets trigger source to the bus; the trigger signal is issued by the trigger command via GPIB interface or LAN.

*1. If External is selected for the trigger source, the trigger signal must be provided by an external instrument. Refer to “Setting External Trigger” on page 115 for the setting procedure.

Step 3. Press Trigger - **Trigger to Spectrum Monitor** to deliver a trigger to the spectrum monitor measurement. By default, **Continuous** is selected for sweep.

NOTE

The E5052A has four measurement functions: phase noise measurement, spectrum monitor measurement, frequency/power measurement and transient measurement. Because individual measurements differ in characteristics from one another, each of the E5052A’s triggers is used exclusively for a single measurement function.

In other words, only one measurement function can be triggered at a time, and only this function can perform measurement at this time.

Confirming the result of spectrum monitor measurement

Follow the steps below to confirm the results of the DUT's spectrum monitor measurement by using the E5052A's spectrum monitor measurement window.

Moving Carrier Frequency to the Center

Step 1. Press [Marker] to display marker 1 on the screen.

Step 2. Press [Marker Search] - **Peak** - **Search Peak** to move marker 1 to the position of carrier frequency.

Step 3. Press [Marker →] - **Marker->Center** to move the frequency in which the carrier resides to the center of the sweep range.

Moving harmonic Frequency to the Center

Step 1. Press [Start/Center] ([Stop/Span])- **Carrier to** to move the frequency at which the carrier resides to the center of the sweep range.

Step 2. Press [Marker Search] - **Carrier x1 -> Center** to move the frequency at which the first harmonic resides, to the center of the sweep range. Pressing **Carrier x2 -> Center** or **Carrier x3 -> Center** moves the frequency at which the second or the third harmonic respectively resides, to the center of the sweep range.

To move the frequency in which an n-order harmonic resides to the center of the sweep range, press **Harmonic #** and enter the number corresponding to n, and then press **Carrier x# -> Center**.

NOTE "No Singal Found" may error occur when the attenuator setting is not appropriate. Refer to "Error Messages" for more detail explanation.

Setting Format and Detector Mode

You can select the unit (format) used in the spectrum monitor measurement trace screen and switch to the detector mode.

NOTE The E5052A displays the measurement value at the specified point; actually, it sweeps (measures) with the resolution determined by the RBW. The detector captures all of the signals not only at the display point but also between individual display points. If there are more measurement points than display points, you must select the detector mode so that each display point is converted from the individual value of multiple measurement points.

In the "Positive" mode, the E5052A displays the maximum value (peak) of the measurement values between the display points. In the "Sample" mode, the E5052A displays the measurement value at the nearest measurement point to the display point.

Step 1. Press [Format] - **Format**.

Step 2. Select the appropriate format from the softkey menu list. The available options are as

follows.

Table 4-11 Format List

Format	
dBm	dBm / Hz
dBV	dBV / Hz
Watt	Watt / Hz
Volt	Volt / Hz

Step 3. Press Format - **Detector Mode**.

Step 4. Select the appropriate detector mode from the softkey menu list. You can choose either Positive or Sample. Positive is selected by default.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

Step 1. Press Scale - **Divisions**.

Step 2. Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.

Step 3. Press Scale - **Reference Position**.

Step 4. Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen.

The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (maximum scale).

Step 5. Press Scale - **Reference Value**.

Step 6. Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit varies depending on the format setting.

Step 7. Press Scale - **Scale/Div**.

Step 8. Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit varies depending on the format setting.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of the measurement trace automatically.

Step 1. Press Scale - **Auto Scale**.

Setting Attenuator

When the input level is very high, a message may appear to prompt you to adjust the attenuator. In this case, follow the steps below to adjust the attenuator.

Step 1. Press Attn - **Input Attenuator** to enter the attenuator value in the data entry field that

appears in the upper part of the screen.

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurement or the characteristics of the DUT. Adjust the attenuator so that the input level of the RF port approximates this range.

Setting Smoothing

You can use the smoothing function to reduce the trace noise. Follow the steps below.

Step 1. Press Trace/View - **Aperture**.

Step 2. Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.

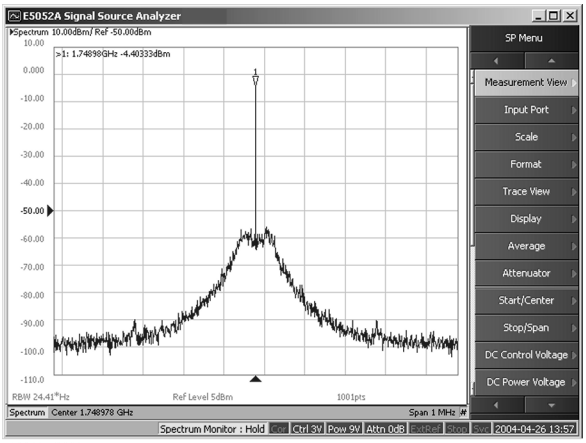
Step 3. Press Trace/View - **Smoothing** to turn on the smoothing function.

Confirming Measurement Points by Markers

Step 1. Press Marker to display marker 1 on the screen.

Step 2. Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press Marker - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Figure 4-11 Example of measurement screen (spectrum)



e5052auj038

NOTE In this measurement, you cannot specify the sweep time. It will be determined automatically based on the frequency sweep range and measurement resolution bandwidth.

Transient Measurement in Transient Measurement Mode

Overview of transient measurement

You can measure the frequency, power and phase of the DUT along the time axis. The frequency can be measured by using two instruments of different frequency resolutions. Each frequency resolution has its own x-axis.

The E5052A's transient measurement window has four measurement trace screens to perform transient measurement of frequency (Wide Band/Narrow Band), power and phase. You can use each trace screen to measure the variation in frequency, power or phase after you have changed the output settings of the DUT.

The following section describes the basic measurement method of the variations in the DUT's frequency, power and phase by using the E5052A's transient measurement window.

Common settings for transient measurement

Follow the steps below for the common settings to perform transient measurements of frequency, power or phase by using the E5052A's transient measurement window.

Selecting Measurement Screen

Step 1. Press [Meas/View] - **Transient** to select the transient measurement window.

NOTE

You can maximize the transient measurement window by pressing the [Window Max] key while the window is selected. You can return to the original size when you press the [Window Max] key once again.

You can select the next trace by pressing the [Trace Next] key and maximize the target trace by pressing the [Trace Max] key. The transient window will come back when you press the [Trace Max] key once again.

Specifying Target Frequency

Step 1. Press [Setup] - **Target Freq**.

Step 2. Enter the target frequency in the data entry field that appears in the upper part of the screen.

Specifying Frequency Range

Step 1. Press [Setup] - **Freq Range** to select the frequency range.

You can select either 1.6 MHz, 25.6 MHz, or 200 kHz. When the target frequency is set to less than 200 MHz, 1.6 MHz or 200 kHz is available.

Specifying Frequency Band of Input Signal

Step 1. Press Setup - **Wide Freq Range**.

Step 2. Select the frequency band (Wide Band) from the softkey menu list. The available options are as follows.

Table 4-12 Frequency Band List (Wide Band)

Frequency Band	
50 M -150 MHz	1 G - 3 GHz
100 M -300 MHz	1.2 G -3.6 GHz
200 M -600 MHz	1.4 G -4.2 GHz
300 M -900 MHz	1.6 G -4.8 GHz
400 MHz -1.2 GHz	1.8 G -5.4 GHz
500 MHz - 1.5 GHz	2 G -6 GHz
600 MHz -1.8 GHz	2.2 G -6.6 GHz
800 MHz -2.4 GHz	2.4 G -7.2 GHz

NOTE The Target Frequency setting and the Frequency Range setting are specified for Narrow Band, and the Frequency Band of Input Signal setting is specified for Wide Band.

Specifying the Maximum Input Level of Input Signal

Follow the steps below to enter the maximum level value of the measurement signals that are input from the RF port. For more information, refer to the Chapter 8, “Specifications and Supplemental Information,” on page 209.

Step 1. Press Setup - **Max Input Level**.

Step 2. Enter the maximum input level in the data entry field that appears in the upper part of the screen.

Specifying Sweep Start Time, Sweep Time and Reference Position for Frequency Transient (Wide Band) Measurement Trace

Step 1. Press the Trace Next key to select the measurement trace for the frequency transient (Wide Band). You can confirm which trace is selected by viewing the cursor, which is displayed to the left of the trace title.

NOTE You can also click on the trace of the frequency transient (Wide Band) for confirmation.

Step 2. Press Start/Center - **Wide Ref Position**.

Step 3. Select the sweep reference position from the softkey menu list.

You can select any of the three options: Left, Center or Right.

Step 4. Press Start/Center - **Wide Span**.

Step 5. Enter the sweep time value in the data entry field that appears in the upper part of the screen. The allowable input value may vary depending on the scale value, target frequency or frequency range of the measurement trace.

Step 6. Press Start/Center - **Wide Time Offset**.

Step 7. Enter the sweep offset value in the data entry field that appears in the upper part of the screen.

NOTE The function of **Time Offset** on the softkey is same as that of the Start/Center key.

Specifying Sweep Start Time, Sweep Time and Reference Position for Frequency Transient (Narrow Band) Measurement Trace, Power Transient Measurement Trace and Phase Transient Measurement Trace

Step 1. Press the Trace Next key to select the measurement trace for the frequency transient (Narrow Band). You can confirm which trace is selected by viewing the cursor which is displayed to the left of the trace title.

NOTE You can also click on the trace of the frequency transient (Narrow Band) for confirmation.

The procedure for specifying the sweep start time, sweep time and reference position for frequency transient (Narrow Band) measurement trace is also applicable to the measurement trace of power transient and phase transient.

You can also specify the sweep start time, sweep time, and reference position for the frequency transient (Narrow Band) measurement trace by selecting the measurement trace of the power transient or phase transient.

Step 2. Press Start/Center - **Narrow Ref Position**.

Step 3. Select the sweep reference position from the softkey menu list.

You can select any of the three options: Left, Center or Right.

Step 4. Press Start/Center - **Narrow Span**.

Step 5. Enter the sweep time value in the data entry field that appears in the upper part of the screen. The allowable input value may vary depending on the scale value, target frequency, or frequency range of the measurement trace.

Step 6. Press Start/Center - **Narrow Time Offset**.

Step 7. Enter the sweep offset value in the data entry field that appears in the upper part of the screen.

NOTE The function of **Time Offset** on the softkey is the same as that of the Start/Center key.

You can apply the setting values of sweep start time, sweep time, and reference position for the frequency transient (Wide Band) measurement trace to the frequency transient (Narrow Band) by pressing Start/Center - **Wide Setings -> Narrow**.

Setting Average Function

Follow the steps below to use the averaging function.

Step 1. Press Avg/BW - **Avg Factor**.

Step 2. Enter the number of times for averaging in the data entry field that appears in the upper part of the screen.

Step 3. Avg/BW - Press **Averaging** to turn on the averaging function.

About DC Voltage Setting and Protection

You can specify DC power/control that will be applied to the DUT. Refer to “Setting DC power/DC control and protection” on page 82 for the setting procedure.

Setting Trigger

Step 1. Press Trigger - **Source**.

Step 2. Select the trigger source from the softkey menu list. The available options are as follows. Internal is selected by default.

Table 4-13 Trigger Source List

Softkey	Overview
Internal	Sets trigger source to internal continuous trigger
External*1	Sets trigger source to external trigger input connector
Manual	Sets trigger source to manual operation
Bus	Sets trigger source to the bus; the trigger signal is issued by the trigger command via GPIB interface or LAN.
Wide Video*2	Sets trigger source to Wide Video
Narrow Video*2	Sets trigger source to Narrow Video

*1. If External is selected for the trigger source, the trigger signal must be provided by an external instrument. Refer to “Setting External Trigger” on page 115 for the setting procedure.

*2. When you select either Wide Video or Narrow Video for the trigger source, you must set up the video trigger. Refer to “Setting video trigger” on page 114 for the setting procedure.

Step 3. Press Trigger - **Trigger to Transient** to send a trigger to the transient measurement. By default, **Continuous** is selected for sweep.

NOTE

The E5052A has four measurement functions: phase noise measurement, spectrum monitor measurement, frequency/power measurement, and transient measurement. Because individual measurements differ in characteristics from one another, each of the E5052A’s trigger is used exclusively for a single measurement function.

In other words, only one measurement function can be triggered at a time, and only this

function can perform measurement at this time.

Setting video trigger

You must set up the video trigger when you select either **Wide Video** or **Narrow Video** for the trigger source. You do not have to set up the video trigger when you select other trigger sources.

Follow the steps below to set up the video trigger for the transient measurement.

Setting Video Trigger (Wide Band)

Step 1. Press Setup - **Video Trigger** - **Wide Freq**.

Step 2. Enter the center frequency of the video trigger in the data entry field that appears in the upper part of the screen.

NOTE The setting is enabled when you select **Wide Video** from the trigger source options.

Setting Video Trigger (Narrow Band)

Step 1. Press Setup - **Video Trigger** - **Narrow Freq**.

Step 2. Enter the center frequency of the video trigger in the data entry field that appears in the upper part of the screen.

Step 3. Press Setup - **Video Trigger** - **Minimum Power Level**.

Step 4. Enter the minimum power level of the video trigger in the data entry field that appears in the upper part of the screen.

NOTE The setting is enabled when you select **Narrow Video** from the trigger source options.

Setting External Trigger

When the trigger source is set to External, the input signal is regarded as the start trigger of measurement, which is transmitted to the external trigger input connector (Ext Trig) from the external instruments. When the connector detects more than 20 us of pulse transition upward or downward, a measurement starts. A TTL compatible signal is used as the trigger signal.

Follow the steps below to set up the external trigger.

Connecting to the External Trigger Input Connector

Connect the trigger output connector of the external instrument to the E5052A's EXT TRIG connector on the rear panel.

Selecting Trigger Source

Step 1. Press Trigger - **Source**.

Step 2. Select **External** from the softkey menu list.

Step 3. Press Trigger - **Ext Trig Polarity** to select the polarity of the external trigger. You can select either **Positive** (upward) or **Negative** (downward).

Confirming the result of frequency transient (Wide Band) measurement

Follow the steps below to confirm the results of the DUT's frequency transient (Wide Band) measurement, using the E5052A's transient measurement window.

Selecting Frequency Transient (Wide Band) Measurement Trace

Step 1. Press the Trace Next key to select the measurement trace for the frequency transient (Wide Band). You can confirm which trace is selected by viewing the cursor displayed to the left of the trace title.

NOTE You can also click on the measurement trace of the frequency transient (Wide Band) for confirmation.

Setting Frequency Format and Sensitivity Aperture

You can select the unit (frequency format) used in the frequency trace screen and set the sensitivity aperture.

Step 1. Press Format - **Frequency Format**.

Step 2. Select an appropriate frequency format from the softkey menu list. The available options are as follows. The initial setting is "Hz".

Table 4-14 Format list

Softkey	Overview
Hz	Displays the measurement frequency data.
ΔHz	Displays the difference subtracted from reference frequency.
%	Displays the difference subtracted from reference frequency in per cent.
ppm	Displays the difference subtracted from reference frequency in ppm.

Step 3. Press Format - **Frequency Reference**. (This setting will be used when either "ΔHz", "%","ppm" is selected for the frequency format.)

Step 4. Enter the frequency reference value in the data entry field that appears in the upper part of the screen. The unit is Hz.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

Step 1. Press Scale - **Divisions**.

Step 2. Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.

Step 3. Press Scale - **Reference Position**.

Step 4. Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen.

The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (maximum scale).

Step 5. Press Scale - **Reference Value**.

Step 6. Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit is Hz.

Step 7. Press Scale - **Scale/Div**.

Step 8. Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit is Hz/Div.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of the measurement trace automatically.

Step 1. Press Scale - **Auto Scale**.

NOTE If you want the scale setting to be performed automatically for all four measurement traces (frequency transient (Wide Band and Narrow Band), power transient and phase transient), press Scale - **Auto Scale All**.

Setting Attenuator

When the input level is very high, a message may appear to prompt you to adjust the attenuator. In this case, follow the steps below to adjust the attenuator.

Step 1. Press [Attn] - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurements or the characteristics of the DUT. Adjust the attenuator so that the input level of the RF port approximates this range.

Setting Smoothing

You can use the smoothing function to reduce the trace noise. Follow the steps below.

Step 1. Press [Trace/View] - **Aperture**.

Step 2. Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.

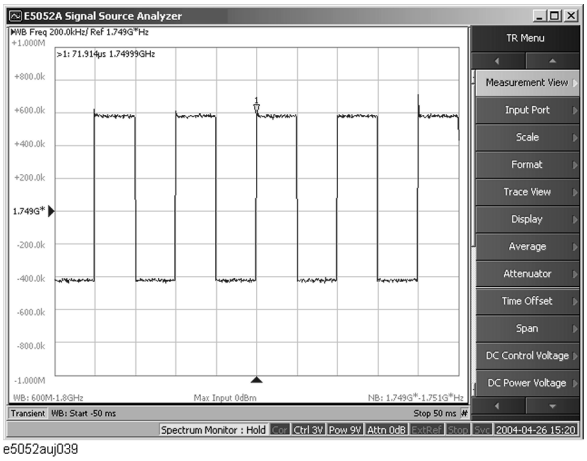
Step 3. Press [Trace/View] - **Smoothing** to turn on the smoothing function.

Confirming Measurement Points by Markers

Step 1. Press [Marker] to display marker 1 on the screen.

Step 2. Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press [Marker] - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Figure 4-12 Example of measurement screen (frequency transient wide band)



e5052auj039

Confirming the result of frequency transient (Narrow Band) measurement

Follow the steps below to confirm the results of the DUT's frequency transient (Narrow Band) measurement by using the E5052A's transient measurement window.

Selecting Frequency Transient (Narrow Band) Measurement Trace

Step 1. Press the Trace Next key to select the measurement trace for the frequency transient (Narrow Band). You can confirm which trace is selected by viewing the cursor which is displayed in the left to the trace title.

NOTE You can also click on the measurement trace of the frequency transient (Narrow Band) for confirmation.

Setting Frequency Format and Sensitivity Aperture

You can select the unit (frequency format) used in the frequency trace screen and set the sensitivity aperture.

Step 1. Press Format - **Frequency Format**.

Step 2. Select an appropriate frequency format from the softkey menu list. The available options are as follows. The initial setting is "Hz".

Table 4-15 Format list

Softkey	Overview
Hz	Displays the measurement frequency data.
ΔHz	Displays the difference subtracted from reference frequency.
%	Displays the difference subtracted from reference frequency in per cent.
ppm	Displays the difference subtracted from reference frequency in ppm.

Step 3. Press Format - **Frequency Reference**. (This setting will be used when either "ΔHz", "%","ppm" is selected for the frequency format.)

Step 4. Enter the frequency reference value in the data entry field that appears in the upper part of the screen. The unit is Hz.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

Step 1. Press Scale - **Divisions**.

Step 2. Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.

Step 3. Press Scale - **Reference Position**.

Step 4. Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen. The position of the scale reference line must be specified by any of the

numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (maximum scale).

Step 5. Press Scale - **Reference Value**.

Step 6. Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit is Hz.

Step 7. Press Scale - **Scale/Div**.

Step 8. Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit is Hz/Div.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of the measurement trace automatically.

Step 1. Press Scale - **Auto Scale**.

NOTE If you want the scale setting to be performed automatically for all four measurement traces (frequency transient (Wide Band and Narrow Band), power transient and phase transient), press Scale - **Auto Scale All**.

Setting Attenuator

When the input level is very high, a message may appear to prompt you to adjust the attenuator. In this case, follow the steps below to adjust the attenuator.

Step 1. Press [Attn] - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurements or the characteristics of DUT. Adjust the attenuator so that the input level of the RF port approximates this range.

Setting Smoothing

You can use the smoothing function to reduce the trace noise. Follow the steps below.

Step 1. Press [Trace/View] - **Aperture**.

Step 2. Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.

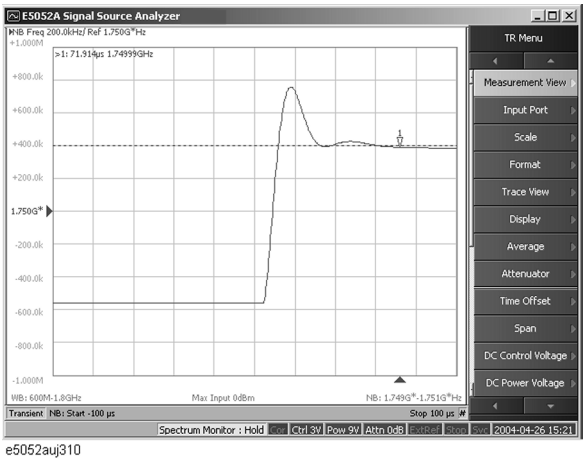
Step 3. Press [Trace/View] - **Smoothing** to turn on the smoothing function.

Confirming Measurement Points by Markers

Step 1. Press [Marker] to display marker 1 on the screen.

Step 2. Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press [Marker] - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Figure 4-13 Example of measurement screen (frequency transient narrow band)



e5052auj310

Confirming the result of power transient measurement

Follow the steps below to confirm the results of the DUT's power transient measurement by using the E5052A's transient measurement window.

Selecting Power Transient Measurement Trace

Step 1. Press the Trace Next key to select the power transient measurement trace.You can confirm which trace is selected by viewing the cursor that is displayed to the left of the trace title.

NOTE You can also click on the measurement trace of the power transient for confirmation.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

Step 1. Press Scale - **Divisions**.

Step 2. Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.

Step 3. Press Scale - **Reference Position**.

Step 4. Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen.

The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (maximum scale).

Step 5. Press Scale - **Reference Value**.

Step 6. Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit is dBm.

Step 7. Press Scale - **Scale/Div**.

Step 8. Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit is dB/Div.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of the measurement trace automatically.

Step 1. Press Scale - **Auto Scale**.

NOTE If you want the scale setting to be performed automatically for all four measurement traces (frequency transient (Wide Band and Narrow Band), power transient and phase transient), press Scale - **Auto Scale All**.

Setting Attenuator

When the input level is very high, a message may appear to prompt you to adjust the attenuator.In this case, follow the steps below to adjust the attenuator.

Step 1. Press [Attn] - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurement or the characteristics of the DUT. Adjust the attenuator so that the input level of the RF port approximates this range.

Setting Smoothing

You can use the smoothing function to reduce the trace noise. Follow the steps below.

Step 1. Press [Trace/View] - **Aperture**.

Step 2. Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.

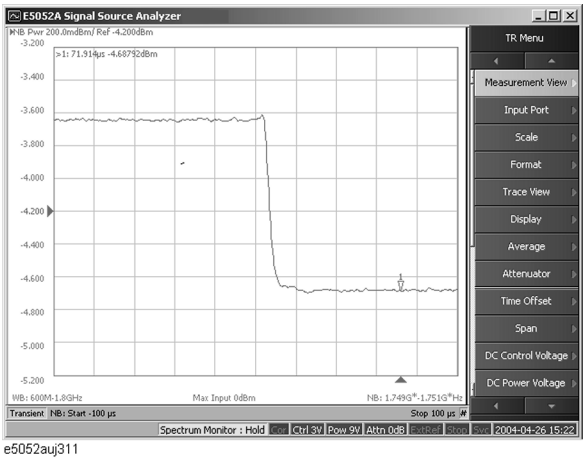
Step 3. Press [Trace/View] - **Smoothing** to turn on the smoothing function.

Confirming Measurement Points by Markers

Step 1. Press [Marker] to display marker 1 on the screen.

Step 2. Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press [Marker] - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Figure 4-14 Example of measurement screen (power transient)



e5052auj311

Confirming the phase transient measurement

Follow the steps below to confirm the results of the DUT's phase transient measurement by using the E5052A's transient measurement window.

Selecting Phase Transient Trace

Step 1. Press the Trace Next key to select the phase transient measurement trace. You can confirm which measurement trace is selected by viewing the cursor that is displayed to the left of the trace title.

NOTE You can also click on the phase transient measurement trace for confirmation.

Using the phase reference frequency

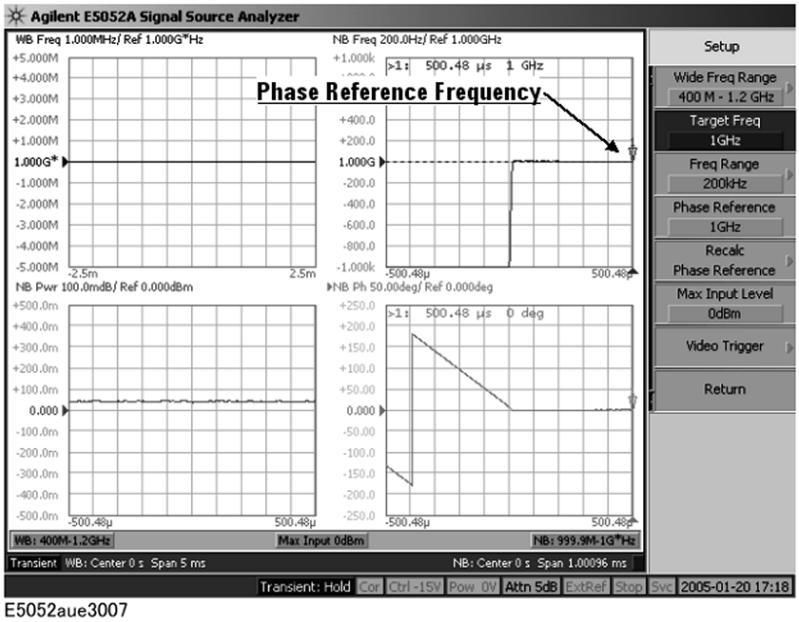
The instrument calculates the phase deviation from the right end of measurement point to the start measurement point based on the frequency data over time on the narrowband (NB) freq trace. The phase reference function sets the reference value of frequency to calculate the phase transient.

In case the final frequency (locked frequency) of the DUT settles to the target frequency, the phase reference frequency should be equal to the target frequency. If the final frequency settles to the different frequency from the target frequency, use the actual frequency measured at the right end of measurement point as set the phase reference frequency. Then the phase data over time starts from zero at the right end of the measurement point, and the phase data maintains as long as the measured frequency stays at the phase reference frequency.

Step 1. Press Setup - **Phase Reference**.

Step 2. Enter the phase reference value, then measure the phase transient data again.

Figure 4-15 Defining the phase reference frequency



E5052aue3007

NOTE The **Marker -> Phase Reference** function automatically sets the phase reference frequency based on the actual frequency data where the active marker is located at the frequency over time trace.

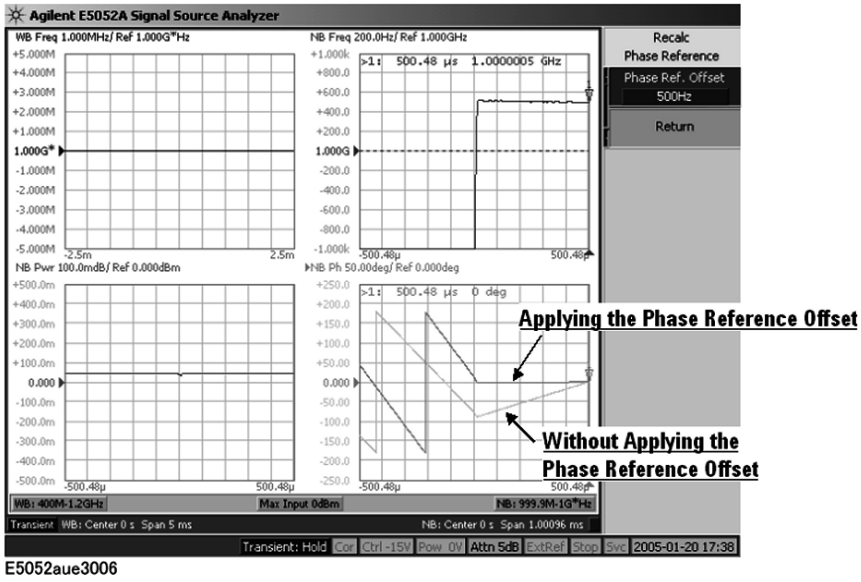
Using the phase offset frequency when adjusting the phase baseline manually

In case that the actual measured frequency is different from the phase reference frequency you set, the recalc phase reference function also allows you to adjust the baseline of the phase transient data manually after a single measurement.

Step 1. Press Setup - **Recalc Phase Reference**.

Step 2. Press **Phase Ref. Offset** to enter the offset frequency value relative to the phase reference frequency, then the baseline of the phase transient data will be adjusted..

Figure 4-16 **Using the Recalculating Phase Data Function to Adjust the Baseline of Phase Transient**



E5052aue3006

Setting Phase Unit and Wrap Phase

You can select the unit (phase unit) used in the phase transient measurement trace screen and specify the wrap phase.

Step 1. Press Format - **Phase Unit**.

Step 2. Select the appropriate format from the softkey menu list. You can select any of the three options: Deg, Rad or Grad.

Step 3. Press Format - **Wrap Phase** to turn on/off the wrap phase function.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

Step 1. Press Scale - **Divisions**.

Step 2. Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.

Step 3. Press Scale - **Reference Position**.

Step 4. Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen.

The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (maximum scale).

Step 5. Press Scale - **Reference Value**.

Step 6. Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit varies depending on the format setting.

Step 7. Press Scale - **Scale/Div**.

Step 8. Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit varies depending on the format setting.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of the measurement trace automatically.

Step 1. Press Scale - **Auto Scale**.

NOTE If you want the scale setting to be performed automatically for all four measurement traces (frequency transient (Wide Band and Narrow Band), power transient and phase transient), press Scale - **Auto Scale All**.

Setting Attenuator

When the input level is very high, a message may appear to prompt you to adjust the attenuator. In this case, follow the steps below to adjust the attenuator.

Step 1. Press Attn - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurement or the characteristics of the DUT. Adjust the attenuator so that the input level of the RF port approximates this range.

Setting Smoothing

You can use the smoothing function to reduce the trace noise. Follow the steps below.

Step 1. Press Trace/View - **Aperture**.

Step 2. Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.

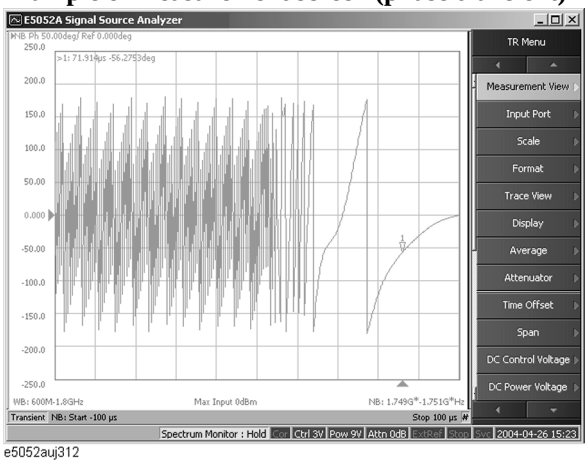
Step 3. Press Trace/View - **Smoothing** to turn on the smoothing function.

Confirming Measurement Points by Markers

Step 1. Press Marker to display marker 1 on the screen.

Step 2. Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press Marker - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Figure 4-17 Example of measurement screen (phase transient)



e5052auj312

Auto Frequency Control Function

The automatic frequency controll (AFC) function can quickly set and maintain the DUT output frequency to the target frequency you want. It does this by controlling the internal DC control voltage and using the measurement results obtained by its internal frequency counter. The DC control voltage has to be turned on to use the AFC function.

The AFC status appeares in the lower right corner of the measurement screen. Each background color indicates the respective AFC function.

Blue	The function is enabled.
Grey	The function is disabled. Check if the DC Control Output is turned off.

NOTE The AFC starts immediately before the measurement. During a single measurement, the DC control voltage is maintained. Therefore, the DC control voltage will not be changed even if the actual output frequency from the DUT drifts during the measurement. Be sure to take this into consideration for the long time measurement, for example, by using the correlation function in the phase noise measurement.

Procedures for Setting Auto Frequency Control

Step 1. Press DC Control - **Auto Freq Control**.

Step 2. Press **Min Ctrl Voltage Limit**.

Step 3. Enter the minimum allowance voltage for DC control to be used for the Auto Frequency Control function, in the data entry field that appears in the upper part of the screen.

NOTE Comparing the value entered here with the value specified in **Min Ctrl Voltage Limit** under the DC Control menu, the E5052A will choose a higher value to apply the limit.

Step 4. Press **Max Ctrl Voltage Limit**.

Step 5. Enter the maximum allowance voltage for DC control to be used for the Auto Frequency Control function, in the data entry field that appears in the upper part of the screen.

NOTE Comparing the value entered here with the value specified in **Max Ctrl Voltage Limit** under the DC Control menu, the E5052A will choose a lower value to apply the limit.

Step 6. Press **Frequency Band**.

Step 7. Select an appropriate frequency band that contains the target carrier signal, from the softkey menu list. The frequency bands include 10MHz-1.5GHz and 300MHz-7GHz.

Step 8. Press **Target**.

Step 9. Enter the target frequency of the output from the DUT in the data entry field that appears in the upper part of the screen. The unit is [Hz].

NOTE If the target frequency outranges the selected frequency band, the frequency band will be automatically altered so that the target frequency is within the band.

Step 10. Press **Tolerance**.

Step 11. Enter the tolerance (an allowable range of difference between the target frequency and the actual frequency output from the DUT) in the data entry field that appears in the upper part of the screen. The unit is [Hz].

Step 12. Press **Sensitivity**.

Step 13. Enter an approximate control sensitivity of the DUT in the data entry field that appears in the upper part of the screen. The unit is [Hz/V].

Step 14. Press **Max Iteration**.

Step 15. Enter the maximum number of times to perform repetitive measurements and calculation (control -voltage setting loop) for determining the optimum control voltage, in the data entry field that appears in the upper part of the screen.

Step 16. Press **AFC Status**.

Step 17. Select the status of the Auto Frequency Control function from the softkey menu list.

OFF[*1]	The Auto Frequency Control will not be performed.
ON[*1]	The Auto Frequency Control will be performed prior to each sweep.
Immediate	The Auto Frequency Control will be performed only once. If the status is changed this during sweep, the sweep will be interrupted and Auto Frequency Control will be performed.

*1. Frequency/Power measurement mode in analyzer mode and Transient measurement mode doesn't have the ON/OFF status, but has the Immediate status only.

NOTE The Auto Frequency Control can not be aborted during an operation.

NOTE The wait time specified in DC Control - **DC control Delay** is also applied for repetitive measurements to obtain the optimum control voltage during the execution of the Auto Frequency Control function.

5 Data Analysis and Result Output

This chapter describes the analysis function of the E5052A, how to use the saving/recalling function, and the concept and method of screen information printing..

Analyzing Data on the Trace Using the Marker

About marker functions

The marker can be used in the following ways:

- Reading a measured value as numerical data (as an absolute value or a relative value from the reference point)
- Moving the marker to a specific point on the trace (marker search)
- Using the value of the marker to change the stimulus (sweep range) and scale (value of the reference line)

For more information, refer to “Searching for Positions that Match Specified Criteria” on page 140.

For the procedure used to change the sweep range and scale by using the marker, refer to “Specifying the sweep range by using the marker” on page 135.

The E5052A is capable of displaying up to 6 markers on each trace. Each marker has a stimulus value (the value on the X-axis) and a response value (the value on the Y-axis).

Reading values on the trace

You can read the value of a marker displayed on the trace.

You can set the marker for the selected measurement window.

The marker response value is always in the same data format as that of the Y-axis.

Operational Procedure

Step 1. Press Trace Next or Trace Max to activate the trace on which you want to use the marker.

Step 2. Press Marker.

NOTE At this point, marker 1 is turned on and becomes active (you can operate the marker). When using marker 1, you can omit Step 3.

Step 3. Select a marker and turn it on. The softkey used to turn on a marker is used to activate that marker.

Table 5-1

Softkey	Function
Marker 1	Turns on marker 1, which has been turned off; activates marker 1
Marker 2	Turns on marker 2, which has been turned off; activates marker 2
Marker 3	Turns on marker 3, which has been turned off; activates marker 3
Marker 4	Turns on marker 4, which has been turned off; activates marker 4
Marker 5	Turns on marker 5, which has been turned off; activates marker 5
Marker 6	Turns on marker 6, which has been turned off; activates marker 6

Step 4. Change the marker value in the entry area. This operation enables you to move the marker to a point on the desired trace.

The marker value in the entry area can be changed by one of the following methods.

NOTE To change the value in the entry area, the figure in the box should be highlighted. If the figure is not highlighted, press the softkey for the marker you are using (**marker 1** to **marker 6**) or Focus to highlight the figure.

- Enter a numeric value using the ENTRY block key on the front panel.
- Turn the rotary knob ( ) on the front panel.
- Press the up or down arrow key ( ) on the front panel.
- Using the mouse, click one of the buttons (▲ ▼) on the right side of the entry area.

You can move the marker by dragging and dropping either one of the marker position pointers above or below the graph (▲) (pressing the button on the object to be moved and releasing the button on the destination). You can also move a marker itself by dragging and dropping it.

Step 5. When using other markers, repeat Step 3 and Step 4.

Step 6. Read the marker stimulus value and marker response value displayed in the upper part of the trace screen.

Step 7. To turn off marker(s), press the **Clear Marker Menu** and then press one of the softkeys as follows:

Table 5-2

Softkey	Function
All OFF	Turns off all markers on active trace
Marker 1 to **Marker 6**	Turns off one of markers 1 through 6 on active trace

Changing the display position of marker value

You can change the display position of the marker value on the graph.

Operational Procedure

Step 1. Press [Trace Next] or [Trace Max] to activate the trace on which you want to use the marker.

Step 2. Press [Display].

Step 3. Press **Marker Information** to change the display position.

Table 5-3

Softkey	Function
Left	Displays marker value in upper-left part of graph
Right	Displays marker value in upper-right part of graph

You can also view the marker values in a list. For more information, refer to “Listing all marker values in all displayed traces” on page 139.

Specifying the sweep range by using the marker

You can copy the active marker value to the position of start, stop or center.

NOTE If multiple markers are present on the active trace, only the active marker can be moved.

NOTE This function is not available for the transient measurement.

Operational Procedure

Step 1. Press [Trace Next] or [Trace Max] to activate the trace on which you want to use the marker.

Step 2. Press [Marker →].

Step 3. Press the corresponding softkey to specify the sweep range.

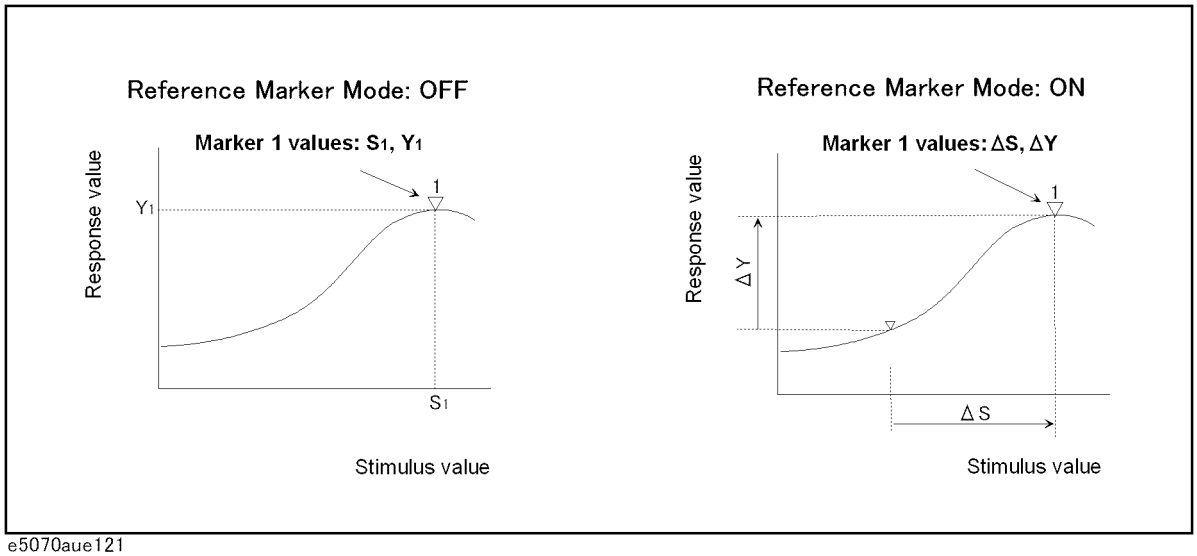
Table 5-4

Softkey	Function
Marker to Start	Changes start value to be equal to stimulus value of active marker on current active trace
Marker to Stop	Changes stop value to be equal to stimulus value of active marker on current active trace
Marker to Center	Changes center value to be equal to stimulus value of active marker on current active trace

Reading a relative value from the reference point on the trace

You can convert the marker reading to a relative value from the reference point.

Figure 5-1 Reference marker mode



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Operational Procedure

Step 1. Press Trace Next or Trace Max to activate the trace on which you want to use the marker.

Step 2. Press Marker.

Step 3. Press **More functions** .

Step 4. Press **Ref Marker** to specify the reference marker (Marker 1 through 6).

By default, marker 1 is set as the reference marker.

Step 5. Press **Ref Marker Mode** to turn on the reference mode.

Activate the reference marker if it is not active.

With the reference mode turned on, the stimulus values and response values are indicated in relative values referred to by the position of the reference marker.

NOTE While the reference marker mode is turned on, you cannot view the relative value from the reference point unless the delta marker mode is set to ‘ON’.

Step 6. Following Step 4 in “Reading values on the trace” on page 133, place the reference marker on the point to be used as the reference.

Step 7. Following Step 3 to Step 4 in “Reading values on the trace” on page 133, place markers 1 through 6 on the desired points to read the values.

To use the list view of the marker values, refer to “Listing all marker values in all displayed traces” on page 139.

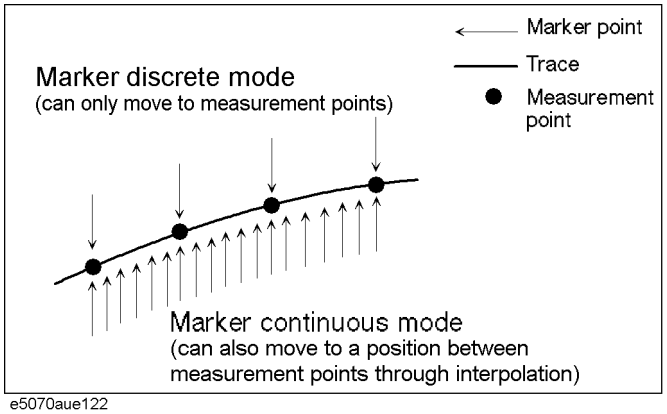
Reading only the actual measurement point/Reading the value interpolated between measurement points

The point on the trace on which a marker can be placed differs depending on how the discrete marker mode is set up.

Table 5-5

Turning on discrete mode (Discrete ON)	A marker moves only between actual measurement points. When a specific marker stimulus value is specified as a numerical value, the marker is placed at the measurement point closest to the specified value. A marker that is placed between interpolated points with the discrete mode off automatically moves to the nearest measurement point when the discrete mode turns on.
Turning off discrete mode (Discrete OFF)	The marker can move from one actual measurement point to another. Because it is interpolated, it can also move in the space between measurement points.

Figure 5-2 Marker discrete mode



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Operational Procedure

Step 1. Press Trace Next or Trace Max to activate the trace on which you want to use the marker.

Step 2. Press Marker.

Step 3. Press **More functions**.

Step 4. Press **Discrete** to turn the discrete mode on or off.

Setting up markers for each trace/Setting up markers for coupled operations between traces

Markers can be set up and moved either in a coupled operation for all traces in a channel or independently for each trace.

You can set up marker coupling for frequency/power measurement, transient measurement and the user window.

Figure 5-3 Marker Coupling

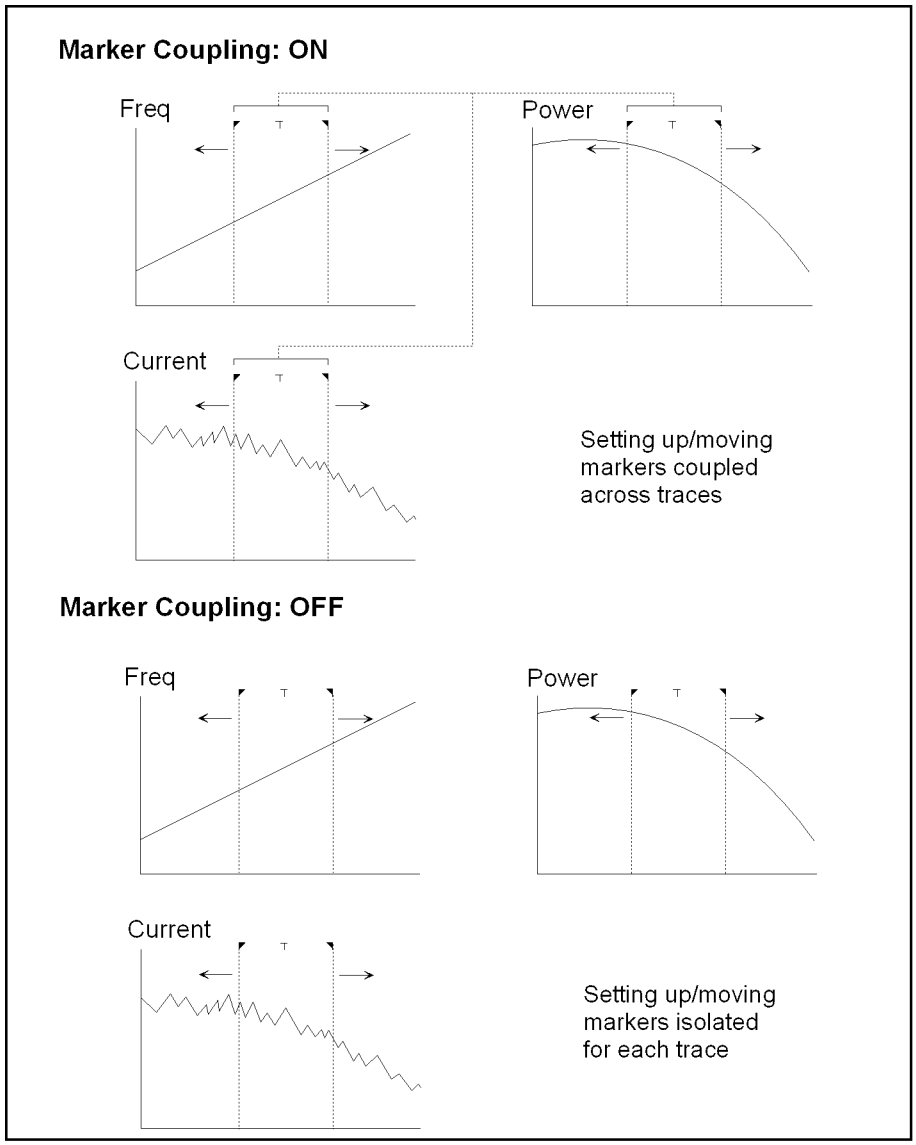


Table 5-6

Marker Couple is on (Couple ON)	Markers are set up and moved in coupled operation on all traces in a channel.
Marker Couple is off (Couple OFF)	Markers are set up and moved independently for each trace.

Operational Procedure

Step 1. Press Trace Next or Trace Max to activate the trace on which you want to use the marker.

Step 2. Press Marker.

Step 3. Press **Couple** to turn the marker coupling on or off.

NOTE For the transient measurement, both the marker coupling (Couple) and the marker discrete mode are turned on, where the active marker on the active trace operates in the discrete mode; however, the other subsequent markers are not always on the measurement point, since they are coupled with the value.

Listing all marker values in all displayed traces

You can list all of the marker values for all traces on the marker list display.

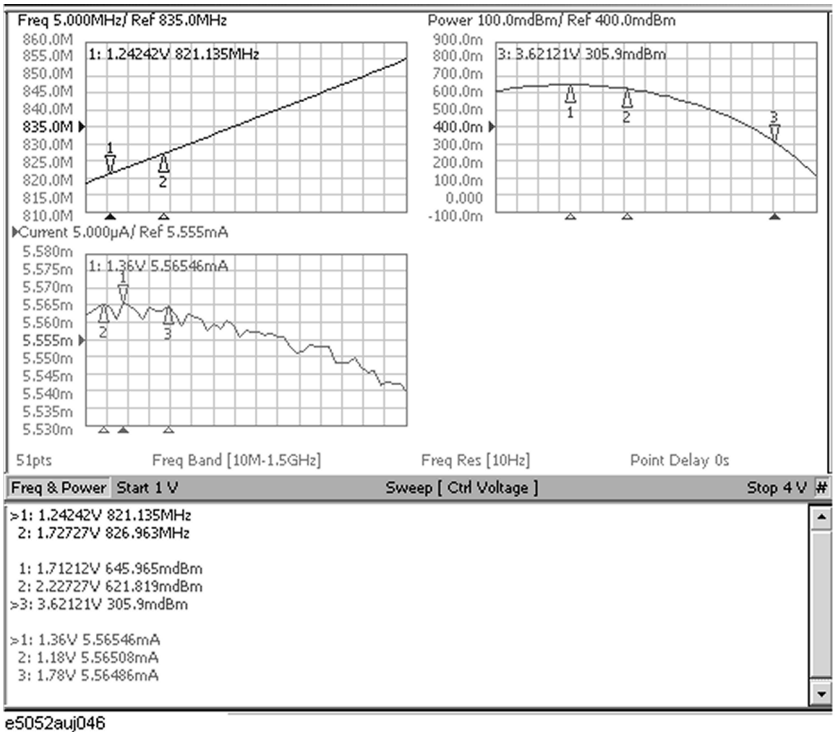
Operational Procedure

Step 1. Press Marker.

Step 2. Press **Marker List** to turn on the marker list display.

The marker list is displayed in the lower part of the screen (Figure 5-4).

Figure 5-4 Turning on the marker list



Searching for Positions that Match Specified Criteria

You can search for a position that matches your specified criteria by using the Marker Search feature.

Marker Search allows you to search for a position that matches the following criteria.

- ❏ Maximum value
- ❏ Minimum value
- ❏ Target (a point that has a target measurement value)
  - Target nearest to marker position
  - Target nearest to left-hand side of marker position
  - Target nearest to right-hand side of marker position
- ❏ Peak
  - Maximum peak (for a positive peak), minimum peak (for a negative peak)
  - Peak nearest to left-hand side of marker position
  - Peak nearest to right-hand side of marker position

Setting search range (Bandmarkers)

The Marker Search feature allows you to set part of the sweep range as the search target (Bandmarker feature) as well as the entire search range.

Procedure to Set Search Range

Step 1. Press [Trace Next] or [Trace Max] to activate the trace on which you want to use the marker.

Step 2. Press [Marker Fctn] (or press [Marker Search]).

Step 3. To set the search range for the X-axis, turn on **Bandmarker X**.

Step 4. Set the search range using **X start**, **X stop**, **X center** and **X span**.

Each value for the search range can be changed by one of the following methods.

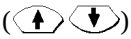
- Enter a numeric value using the ENTRY block key on the front panel.
- Turn the rotary knob ( ) on the front panel.
- Press the up or down arrow key ( ) on the front panel.
- Using the mouse, click one of the buttons (▲▼) on the right side of the entry area.

You can move the search range by dragging and dropping either one of the bandmarker position pointers (◤ ⊤ ◥) above the graph (pressing the button on the object to be moved and releasing the button on the destination). You can also drag and drop the start/stop line of the search range.

Step 5. To set the search range for the Y-axis, turn on **Bandmarker Y**.

Step 6. Set the search range using **Y start**, **Y stop**, **Y center** and **Y span**.

Each value for the search range can be changed by one of the following methods.

- Enter a numeric value using the ENTRY block key on the front panel.
- Turn the rotary knob ( ) on the front panel.
- Press the up or down arrow key () on the front panel.
- Using the mouse, click one of the buttons (▲▼) on the right side of the entry area.

You can move the search range by dragging and dropping either one of the bandmarker position pointers (◢ ⊣ ◥) above the graph (pressing the button on the object to be moved and releasing the button on the destination). You can also drag and drop the start/stop line of the search range.

Searching in the specified range

Procedure to Set Search Range

Step 1. Press Trace Next or Trace Max to activate the trace on which you want to use the marker.

Step 2. Press Marker Search.

Step 3. To perform the partial search for the stimulus value (x-axis), press **Search Range(X)** to select Bandmarker.

Step 4. To perform the partial search for the response value (y-axis), press **Search Range(Y)** to select Bandmarker.

Table 5-7

Fullspan Search (Full Range)	All data on the trace are specified as the search target.
Left search (Bandmarker)	Partial data on the trace are specified as the search target.

Setting up bandmarker for each trace/Setting up markers for coupled operations between traces

The bandmarkers can be set up and moved either in coupled operation for all traces in a channel or independently for each trace.

You can set up bandmarker coupling for frequency/power measurement, transient measurement and the user window.

Figure 5-5 **Bandmarker Coupling**

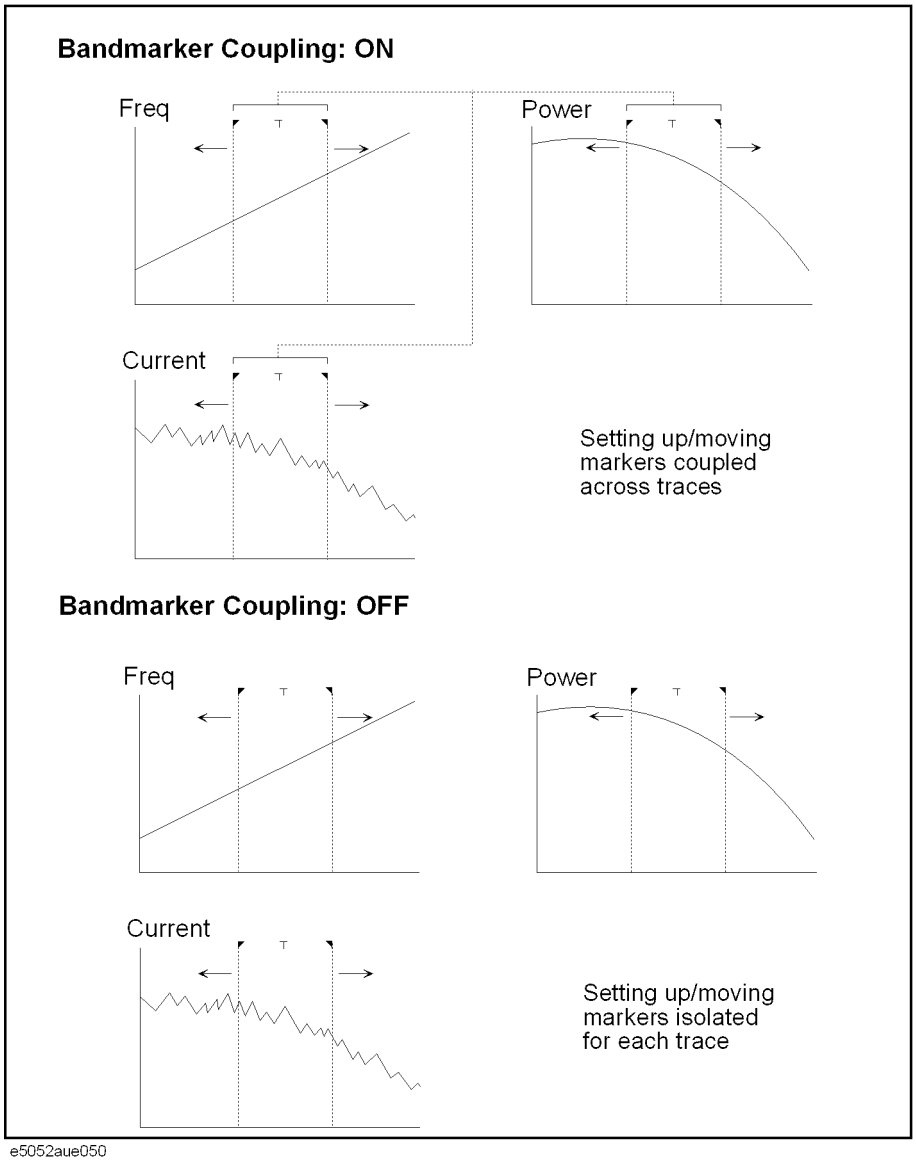


Table 5-8

Bandmarker Couple is on (Couple ON)	Bandmarkers are set up and moved in coupled operation on all traces in a channel.

Table 5-8

Bandmarker Couple is off (Couple OFF)	Bandmarkers are set up and moved independently for each trace.

Operational Procedure

Step 1. Press Trace Next or Trace Max to activate the trace on which you want to use the marker.

Step 2. Press Marker Fctn (or press Marker Search).

Step 3. Now you can set up the bandmarker. For more information, refer to “Setting search range (Bandmarkers)” on page 140.

Step 4. Press **Couple** to turn the marker coupling on or off.

NOTE You cannot turn on the bandmarker coupling for the x-axis.

Automatically executing a search each time a sweep is done (search tracking)

Search tracking is a function that sets a search to be repeated every time a sweep is done. This function facilitates the observation of measurement results, such as the maximum value of traces.

Operational Procedure

Step 1. Press Trace Next or Trace Max to activate the trace on which search tracking is set up.

Step 2. Press Marker Search.

Step 3. Press **Tracking** and specify the parameters of the search tracking function.

Table 5-9

Off	Turns off search tracking function
Maximum value	Specifies the maximum value for search tracking function
Minimum value	Specifies the minimum value for search tracking function
Peak	Specifies the peak for search tracking function
Target	Specifies the target for search tracking function

Searching for the maximum and minimum measured values

You can search for the maximum or minimum measured value on the trace and move a marker to that point (Figure 5-6).

Figure 5-6 **Searching for the maximum and minimum measured values**

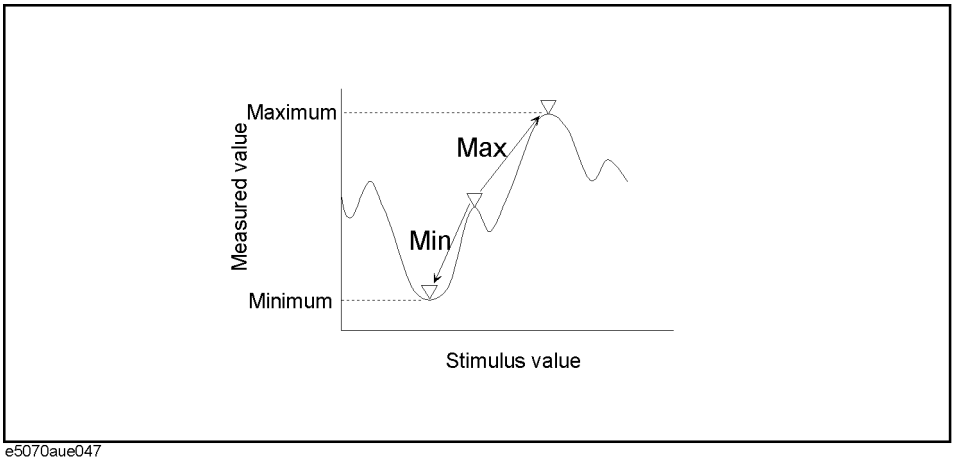


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Table 5-10

Search for maximum (Max)	Moves active marker to point on trace where measured value is greatest
Search for minimum (Min)	Moves active marker to point on the trace where measured value is lowest

Operational Procedure

Step 1. Following Step 1 to Step 3 in “Reading values on the trace” on page 133, activate the marker you will use to search for the maximum and minimum values.

Step 2. Press Marker Search.

Step 3. Press the corresponding softkey to move the marker to the maximum or minimum measured value.

Table 5-11

Softkey	Function
Search Max	Performs a search for the maximum value
Search Min	Performs a search for the minimum value

Searching for the target value (target search)

The target search function enables you to move the marker to the point that has the target measured value.

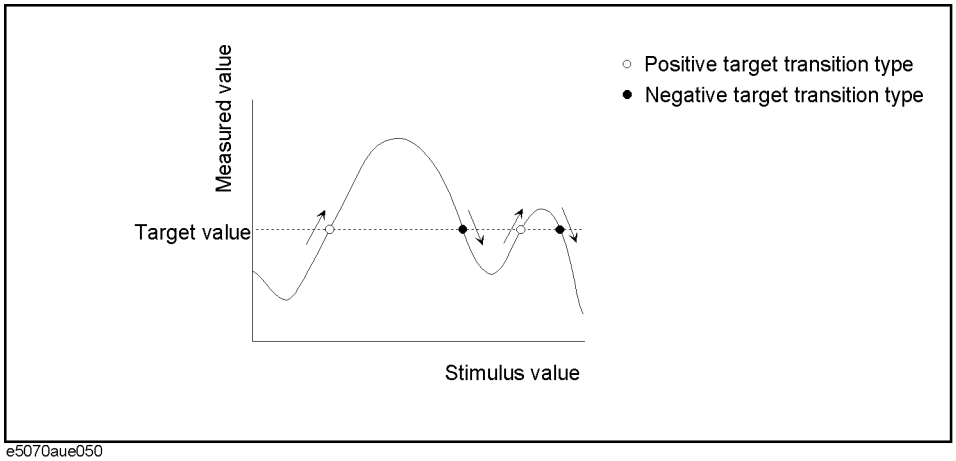
Target and transition types

A target is a point that has a specific measurement value on the trace. Targets can be divided into the two groups shown below depending on their transition type.

Table 5-12

Transition type: positive (Positive)	When the value of the target is larger than the measurement value that immediately precedes it (on the left side)
Transition type: negative (Negative)	When the value of the target is smaller than the measurement value that immediately precedes it (on the left side)

Figure 5-7 **Target and transition types**



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About the target search function

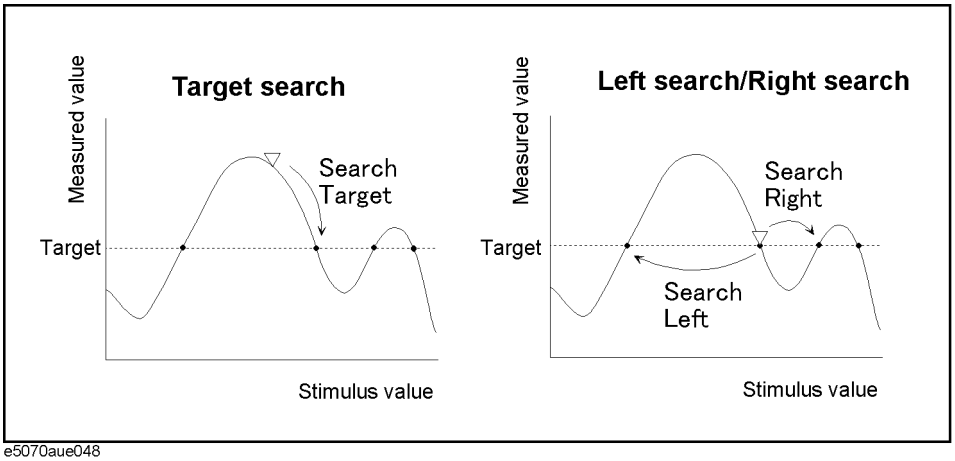
The target search is a function that searches for a target that matches the pre-defined target value and transition type(s) (positive, negative, or both positive and negative) and then moves the marker to the target being searched.

The following three methods are available for executing the target search:

Table 5-13

Search target (Search Target}	The marker moves to the peak with maximum response value if the peak polarity is Positive or Both or to the peak with minimum response value if the peak polarity is Negative.
Left search (Search Left)	Executes search from current marker position to the smaller stimulus values and moves marker to first target encountered
Right search (Search Right)	Executes search from current marker position to the larger stimulus values and moves marker to first target encountered

Figure 5-8 **Target search (when transition type is set to “both positive and negative”)**



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Operational Procedure

Step 1. Following Step 1 through Step 3 in “Reading values on the trace” on page 133, activate a marker you are using for the target search.

Step 2. Press Marker Search.

Step 3. Press **Target**.

Step 4. Press **Target Value** and enter a target value in the entry box that appears.

The marker target search will be executed based on the newly set target value and the transition type defined.

Step 5. Press **Target Transition**.

Step 6. Select a transition type.

Table 5-14

Softkey	Function
Positive	Selects positive as transition type
Negative	Selects negative as transition type
Both	Selects both positive and negative as transition type

The marker target search will be executed based on the definitions of the currently set target value and the newly set transition type. Each marker is allowed to have the peak excursion value and the peak polarity individually.

Step 7. Press the corresponding softkey to move the marker to the target.

Table 5-15

Softkey	Function
Search Target	Executes target search
Search Left	Executes left search
Search Right	Executes right search

Searching for the Peak

The peak search function enables you to move the marker to the peak on the trace.

Definitions of peaks

A peak is a measurement point whose value is greater or smaller than the adjoining measurement points on its right and left sides. Peaks are classified into the following types depending on the difference in magnitude from the measurement points on either side of it.

Table 5-16

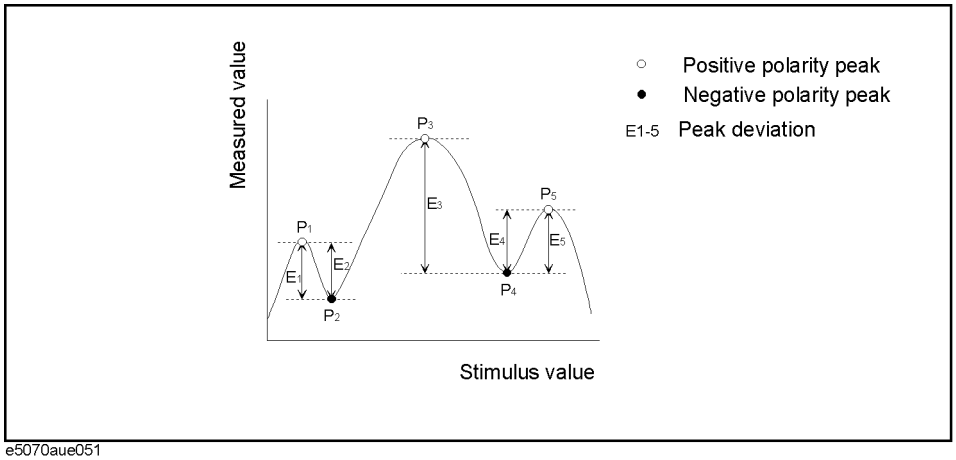
Positive peak (Positive)	A peak whose measurement value is greater than those of the measurement points on either side of it (peak polarity: positive)
Negative peak (Negative)	A peak whose measurement value is smaller value than those of measurement points on either side of it (peak polarity: negative)

About the peak search function

The peak search is a function that searches for a peak that matches a pre-defined lower limit for the peak excursion value and peak polarity (positive or negative) and then moves the marker to this peak.

The peak excursion is the smaller of the differences in measurement values from the adjoining peaks of the opposite polarity.

Figure 5-9 Positive peak, negative peak and peak excursion



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The following four methods are available for executing the peak search:

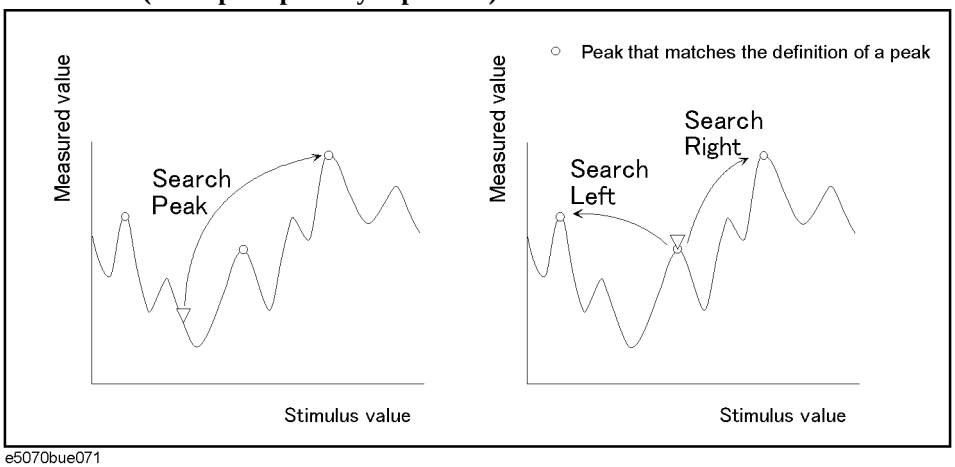
Table 5-17

Search peak (Search Peak)	Moves marker to the maximum peak when peak polarity is **Positive** or **Both**; moves marker to the minimum peak when peak polarity is **Negative**
Search all peaks (Search Peak All)	Moves marker to the maximum peak when peak polarity is **Positive** or **Both**; moves marker to the minimum peak when peak polarity is **Negative**

Table 5-17

Search left (Search Left)	Executes search from current marker position to the smaller stimulus values and moves marker to the first peak encountered
Search right (Search Right)	Executes search from current marker position to the larger stimulus values and moves marker to the first peak encountered

Figure 5-10 **Peak search (when peak polarity is positive)**



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Operational Procedure

Step 1. Following Step 1 through Step 3 in "Reading values on the trace" on page 133, activate a marker you are using for the peak search.

Step 2. Press Marker Search.

Step 3. Press **Peak**.

Step 4. Press **Peak Excursion** and enter the lower limit for the peak excursion value.

The marker peak search will be executed based on the definitions of the newly set lower limit for the peak excursion value and the currently set peak polarity.

Step 5. Press **Peak Polarity**.

Step 6. Select a peak polarity.

Table 5-18

Softkey	Function
Positive	Selects Positive as the peak polarity
Negative	Selects Negative as the peak polarity
Both	Selects Both Positive and Negative as the peak polarity

The marker peak search will be executed based on the definitions of the currently set lower limit for the peak excursion value and the newly set peak polarity. Each marker is allowed to have the peak excursion value and the peak polarity individually.

Step 7. Press the corresponding softkey to move the marker to the peak.

Table 5-19

Softkey	Function
Search Peak	Executes peak search
Search Left	Executes left search
Search Right	Executes right search

Searching for multiple peaks

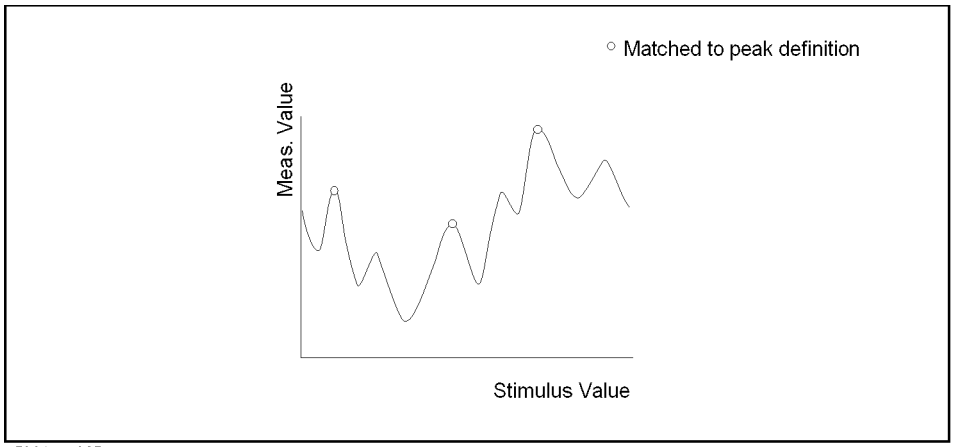
The multi-peak search function enables you to display markers on multiple peaks on traces.

About peak search all functions (Peak Search All)

The peak-search-all is a function that searches for peaks that match a pre-defined lower limit for the peak excursion value and peak polarity (positive or negative) and then displays the markers on these peaks. Up to 6 markers can be displayed.

The peak excursion is the smaller of the differences in measurement values from the adjoining peaks of the opposite polarity.

Figure 5-11 **Peak search all (when peak polarity is positive)**



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Operational Procedure

Step 1. Following Step 1 through Step 3 in “Reading values on the trace” on page 133, display the multiple markers you are using for the peak search.

NOTE The peak search is executed as many times as the number of markers displayed (up to 6).

Step 2. Press Marker Search.

Step 3. Press **Peak**.

Step 4. Press **Peak Excursion** and enter the lower limit for the peak excursion value.

This sets the multiple peak searches to be executed based on the definitions of the newly set lower limit for the peak excursion value and the currently set peak polarity.

Step 5. Press **Peak Polarity**.

Step 6. Select a peak polarity.

Table 5-20

Softkey	Function
Positive	Selects Positive as the peak polarity.
Negative	Selects Negative as the peak polarity

Table 5-20

Softkey	Function
Both	Selects Both Positive and Negative as the peak polarity

This sets the multiple peak searches to be executed based on the definitions of the currently set lower limit for the peak excursion value and the newly set peak polarity.

Step 7. Press **Search Peak All** to move the marker to the peak.

Determining the Mean, Standard Deviation, and Peak-to-Peak of the Trace

You can easily determine the statistics data for the trace between marker 1 and marker 2 (mean, standard deviation, and peak-to-peak). Figure 5-12 and Table 5-21 show the definitions for the statistics data elements.

Figure 5-12 **Parameters used for calculating statistics data**

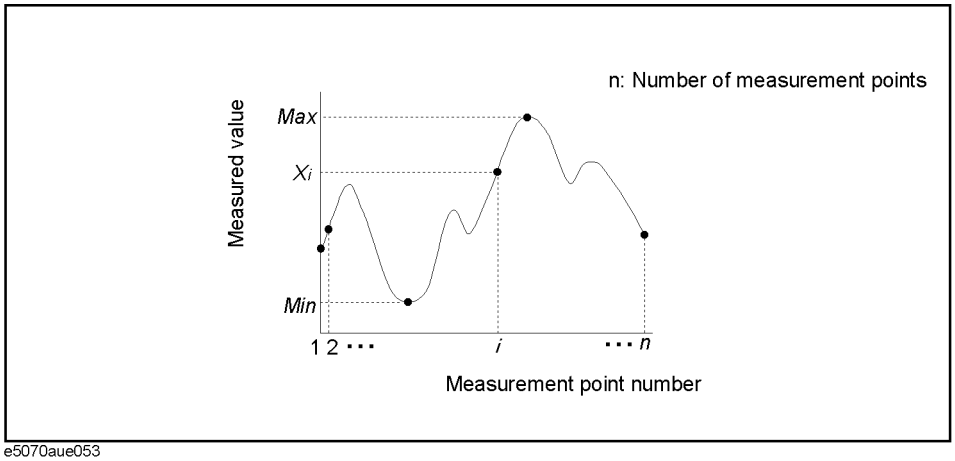

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Table 5-21 **Definitions of Statistics Data**

Statistics data element	Definition
Average (**Mean**)	$\frac{\sum_{i=1}^{n} x_i}{n}$ (in: number of points; xi: i measured value at the i-th measurement point)
Standard deviation (**SDev**)	$\sqrt{\frac{\sum_{i=1}^{n} \langle x_i - mean \rangle^2}{n-1}}$ (n: number of points; xi: measured value at the i-th measurement point; mean: mean)
Peak-to-Peak (**PtoP**)	$Max - Min$ (Max: greatest measured value; Min: smallest measured value)

Specifying the Range for Statistical Data

Step 1. Press Trace Next or Trace Max to activate the trace for which you want to obtain statistical data.

Step 2. Press Marker Fctn.

Step 3. Specify the range (x/y-axis) from which you want to obtain statistical data.

Table 5-22

Full Range (Fullscale)	Statistical data are obtained from all traces
Bandmarker (Bandmarker)	Statistical data are obtained from within bandmarker

To set up the bandmarker, refer to “Setting search range (Bandmarkers)” on page 140.

Displaying Statistical Data

Step 1. Press Trace Next or Trace Max to activate the trace for which you want to obtain statistical data.

Step 2. Press Marker Fctn.

Step 3. Specify the range (x/y-axis) from which you want to obtain statistical data. For more information, refer to “Specifying the Range for Statistical Data” on page 154.

Step 4. Set the **Analysis Type** to **Statistics**.

NOTE Turning on the marker list displays statistics data in a list. To display the marker list, refer to “Listing all marker values in all displayed traces” on page 139.

Comparing Traces/Performing Data Math

Each of the traces for which measured data are displayed is provided with an additional trace, called a memory trace, that temporarily stores the measured data. You can use the memory trace to compare traces on the screen or to perform data math between the memory trace and measured data.

The following data math operations are available:

Table 5-23

Data / Memory	Divides measured data by the data in the memory trace; this function can be used to evaluate the ratio of two traces (e.g., evaluating gain or attenuation).
Data * Memory	Multiplies measured data by a memory trace
Data – Memory	Subtracts a memory trace from measured data.
Data + Memory	Adds measured data and data in the memory trace

Operational Procedure

Step 1. Press Trace Next or Trace Max to activate the trace that you want to save in the memory.

Step 2. Press Trace/View.

Step 3. Press **Data** → **Mem** to store the measured data in memory.

Step 4. Press **Data Math**.

Step 5. Select the data math operation to perform.

Table 5-24

Softkey	Function
OFF	Turns off data math functions (Do not perform data math)
Data / Mem	Divides measured data by the memory trace and stores result in the data trace
Data * Mem	Multiplies the data trace by the memory trace and stores result in the data trace
Data – Mem	Subtracts the memory trace from data trace and stores result in the data trace
Data + Mem	Add the data trace and memory trace and store the result in the data trace

Step 6. Press **Display Trace**.

Step 7. Select the type of data to display on the screen.

Table 5-25

Softkey	Function
Data	Displays only data trace on the screen
Mem	Displays only memory trace stored by **Data** → **Mem** operation on the screen
Data & Mem	Displays data trace and memory trace on the screen (You can now easily compare the data trace and memory trace on the screen.)
Off	Turns off display of the trace

Step 8. Apply the trigger to make measurements.

Comparing Measurement Results in the User Window

Up to eight measurement data can be retained in a user window. You may want to copy the multiple data that were measured with different settings to the user window so that you can compare them on a same screen.

Copy traces to User Window

Step 1. Press Trace Next or Trace Max to activate the trace you want to copy.

Step 2. Press Trace/View.

NOTE Note that you are viewing the sweep range of the active trace in the user window.

Press **Copy to USER**

Step 3. From **Copy to USER1** to **Copy to USER8**, select user window trace of the copy destination.

Step 4. Press Meas/View - **User** to select the user window.

Table 5-26

Softkey	Function
OFF	Turns off data math functions (Do not perform data math)
Data / Mem	Divides measured data by the memory trace and stores result in the data trace
Data * Mem	Multiplies the data trace by the memory trace and stores result in the data trace
Data – Mem	Subtracts the memory trace from data trace and stores result in the data trace
Data + Mem	Add the data trace and memory trace and store the result in the data trace

Step 5. Press **Display Trace**.

Step 6. Select the type of data to display on the screen.

Table 5-27

Softkey	Function
Data	Displays only data trace on the screen
Mem	Displays only memory trace stored by **Data** → **Mem** operation on the screen
Data & Mem	Displays data trace and memory trace on the screen (You can now easily compare the data trace and memory trace on the screen.)
Off	Turns off display of the trace

Step 7. Apply the trigger to make measurements.

Limit Test

The limit test feature allows you to set the limit line for each trace and then perform the pass/fail judgment for the measurement result.

Concept of limit test

The limit test is a function to perform pass/fail judgment based on the limit line you set.

In the limit test, if the upper limit or lower limit indicated by the limit line is not exceeded, the judgment result is pass; if it is exceeded, the judgment result is fail for all measurement points on the trace. Measurement points in a stimulus range with no limit line are judged as pass.

NOTE The targets of the pass/fail judgment are measurement points only. Parts interpolated between measurement points are not judged.

You define the limit line by specifying the stimulus value (Begin Stimulus) and response value (Begin Response) of the begin point, the stimulus value (End Stimulus) and response value (End Response) of the end point. For more information, refer to “Defining the limit line” on page 161.

When the limit test is on, measurement points that fail are displayed in red on the screen and the measurement’s pass/fail judgment result based on the results of individual measurement points (fail if one or more measurement points on the trace fail) is also displayed. For more information, refer to “Displaying judgment result of limit test” on page 160.

In addition to viewing the screen, you can check the judgment result of the limit test by the following methods.

- Using the status register (for more information, refer to the *Programmer's Guide*).
- 24-bit I/O(for more information, refer to the *Programmer's Guide*).

Displaying judgment result of limit test

Measurement points determined as "Fail" will be displayed red on the screen. The determination result of a measurement can be displayed in the following two methods:

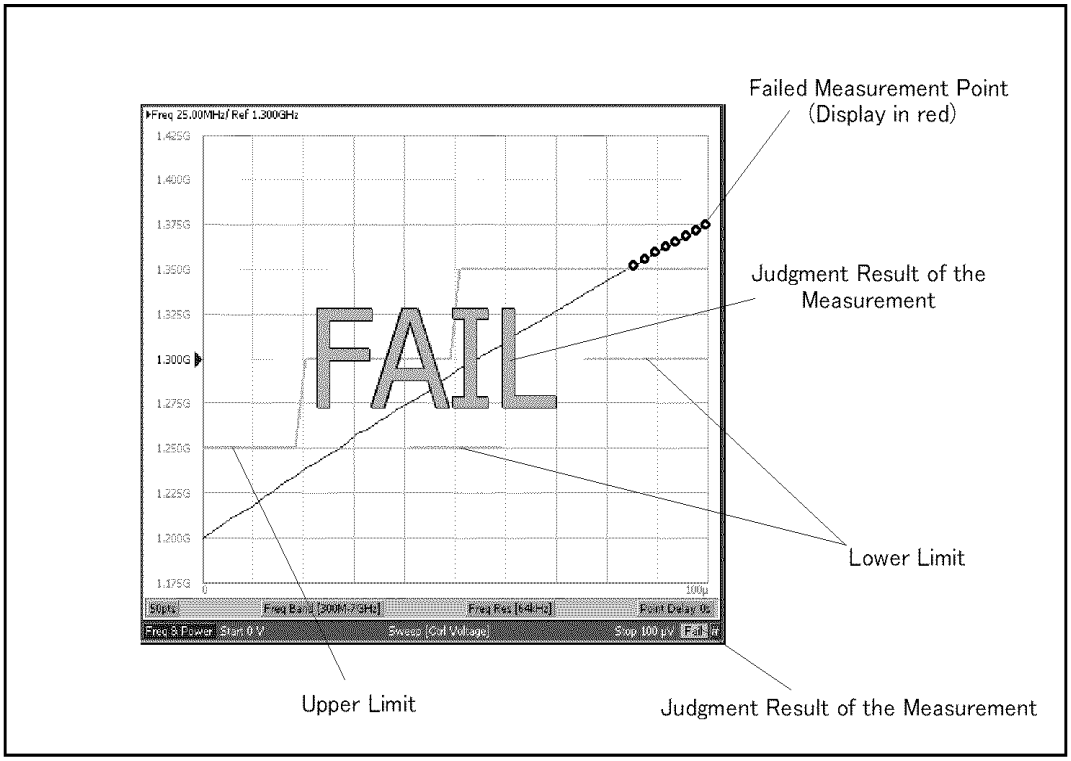
- Either "Pass" or "Fail" is displayed in the lower-right part of the measurement window. The result can be seen whenever the limit test is turned on.
- "Fail" can be displayed in the center of the measurement window. You can specify display/hide by following the steps below.

Step 1. Press Display

Step 2. Press **Limit Test** to display the limit test menu.

Step 3. Press **Fail Sign**. Each press toggles between on/off.

Figure 5-13 Limit test result



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NOTE In the tester mode during the frequency/power measurement mode, either "Pass" or "Fail" is displayed in the lower and the upper right part of the measurement window. Measurement data determined as "Fail" will be shown in red.

Turning On or Off the Beeper in Limit Test

Turn on the warning beeper if you want to sound an alarm when a measurement is determined as "Fail" in the limit test. Refer to the “Setting the Beeper (Built-in Speaker)” on page 195 to turn on or off the warning beeper.

Defining the limit line

You must define the limit lines before you can use the limit test function. The upper and lower limit lines can be retained for each trace, and up to 100 limit lines (segments) can be defined in each limit line.

Defining a segment

Follow the steps below to define the segments.

Step 1. Create upper and lower values for limit lines in the following format, and then save them in the CSV format (with the *.csv extension).

x_start, y_start, x_stop, y_stop
x_start, y_start, x_stop, y_stop
:
x_start, y_start, x_stop, y_stop

Parameter	Overview
x_start	the starting point for the stimulus value on the limit line
y_start	the ending point for the stimulus value on the limit line
x_stop	the starting point for the response value on the limit line
y_stop	the ending point for the response value on the limit line

NOTE Save the upper limit values together into one file, and the lower limit values into another.

One line represents one segment. Even when specifying 0 for the stimulus range, you must provide both the start and the stop values.

For the tester mode during the frequency/power measurement mode, the response value corresponding to a stimulus value of 0 will be used as the limit value.

Step 2. Activate the trace to which you want to apply the limit test function.

Step 3. Press Display - **Limit Test** to display the Limit Test menu.

Step 4. Press **Import Upper Limit Line.../Import Lower Limit Line...** to open the file with the *.csv extension, which contains the predefined upper/lower values.

NOTE In order to edit the predefined upper/lower values file and reflect it to the limit test, you must once again open the file by pressing **Import Upper Limit Line.../Import Lower Limit Line...**.

NOTE You can specify the limit lines so that they may overlap other limit lines as you like. If you set limit lines on which stimulus ranges overlap one another, the measurement points within the range will have multiple limit values. In that case, the limit value to be used for the limit test will be as follows:

- If multiple upper limit values exist within the same range, the lowest value will be used as the upper limit value.

- If multiple lower limit values exist within the same range, the highest value will be used as the lower limit value.

Turning On or Off the Limit Test

You can set the limit test on/off for each trace individually. Follow the steps below to set the limit test to on/off.

Operational procedure

The following steps describe how to save/call the limit table. Use the external keyboard and mouse for the operations listed below.

Step 1. Activate the trace to which you want to apply the limit test function.

Step 2. Press Display - **Limit Test** to display the Limit Test menu.

Step 3. Press **Limit Test** and turn on the Limit Test. You can also display the limit lines on the screen by turning on the **Limit Line**.

NOTE In tester mode during the frequency/power measurement, the limit values can be turned on or off with the **Limit Line** softkey.

Initializing the limit Lines

The following operations initialize the limit lines.

- At power-on
- When presetting
- When **Delete Upper Limit Line/Delete Lower Limit Line** is pressed in the Limit Test menu

File Saving and Loading the Instrument Status Settings

You can save the state of the instrument as a file in a hard disk, floppy disk, etc. and recall the file for later use. You can choose one of the two options below for file saving.

Table 5-28 **Content to be Saved**

Type	Content to be saved and used
State Only (State Only)	You can saves the E5052A's state settings*1 and recall them later to set up the instrument to the same state as previously used.
State and Data	You can saves the E5052A's state settings*1 and trace (formatted data arraysand formatted memory arrays) and recall them later to set up the instrument to the same state as previously used. Here, the trace can also be recalled and displayed on the screen.

*1. For the content of saving, refer to Appendix C, "List of Default Values.".

NOTE Irrespective of the selected measurement window, all of the state settings and settings/data are saved or recalled.

NOTE If an incompatible file is recalled, the settings will be preset due to error.

Compatibility of files related to saving and recalling

Table 5-29 **Compatibility of files**

		Recalling	
		Standard	Option 011
Saving	Standard	Yes	Yes*1
	Option 011	Yes	Y

*1. If files saved with the standard model contain data trace, "state & data", having not-allowed parameters such as start offset frequency downto 1 Hz, they cannot be recalled with the option 011. In case that files contain instument settings only, "state only", which is not available for the option 011, that parameters is automatically set to the initial settings of the option 011.

Table 5-30 Parameters to be set to the initial values when recalling files saved with the imcompatible values between the options

Parameter	Value saved with the standard model	Value will be changed when recalling with the option 011
Phase noise - Correlation	Other than 1	1
Phase noise - IF Gain	Other than 10 (dB)	10 (dB)
Phase noise -- Start offset frequency*1	“Analyzer mode”	“Tester mode”
Freqeuncy & power - Trigger mode*2	1 (Hz)	10 (Hz)

*1. The phase noise trace data is not recalled AND warning message as “Incompatible recall file” is displayed, when files saved as “state & data” AND contain 1 Hz start offset frequency.
*2. A warning message as “Imcompatible recall file” is displayed.

Table 5-31 Compatibility between different firmware revisions

			Recalling			
			Newer revision		Older revision	
			Standard	Option 011	Standard	Option 011
Saving	Newer Revision	Standard	Yes	Yes*1	Yes*1	Yes*1
		Option 011	Yes	Yes	Yes*1	Yes*1
	Older Revision	Standard	Yes	Yes*1	Yes	Yes*1
		Option 011	Yes	Yes	Yes	Yes

*1. “Incompatible recall file” warning message may be displayed when files saved with older firmware revision is recalled with the newer one. In this case, the parameters which are incompatilbe with the older firmware revision are igonored when recalling.

Table 5-32 Content to be Saved

Type	Content to be saved and used
State Only (State Only)	You can saves the E5052A’s state settings*1 and recall them later to set up the instrument to the same state as previously used.
State and Data	You can saves the E5052A’s state settings*1 and trace (formatted data arraysand formatted memory arrays) and recall them later to set up the instrument to the same state as previously used. Here, the trace can also be recalled and displayed on the screen.

*1. For the content of saving, refer to Appendix C, “List of Default Values.”.

Saving Procedure

Selecting Content To Be Saved

NOTE The following steps affect both file saving and memory saving of the instrument state.

Step 1. Press Save/Recall.

Step 2. Press **Save State**.

Step 3. Press **Save Type**.

Step 4. Press the softkey corresponding to the content of the instrument's state you want to save.

Table 5-33

Softkey	Function
State Only	Selects "State Only" to save only the state settings of the E5052A
State & Data	Selects "State and Data" to save the state settings and the trace of the E5052A

Saving Data

Follow the steps below to save the internal data of the E5052A.

Step 1. Press Save/Recall.

Step 2. Press **Save State**.

Step 3. When you save the state using the defined file on drive F (State01.sta - State06.sta, Autorec.sta):

Press **State01** - **State06** or **Autorec**.

NOTE Irrespective of the selected measurement window, all of the state settings and settings/data are saved.

NOTE A:\Autorec.sta (floppy disk) and F:\Autorec.sta (F drive) can be recalled automatically whenever the E5052A is powered on. If both A:\Autorec.sta and F:\Autorec.sta exist, the former is called. To disable the auto recall function, remove Autorec.sta.

NOTE If the file already exists, the "*" mark will appear to the right of the softkey label. If you specified overwrite of the existing file, it will be copied with the name "backup.sta", and then the original file will be overwritten.

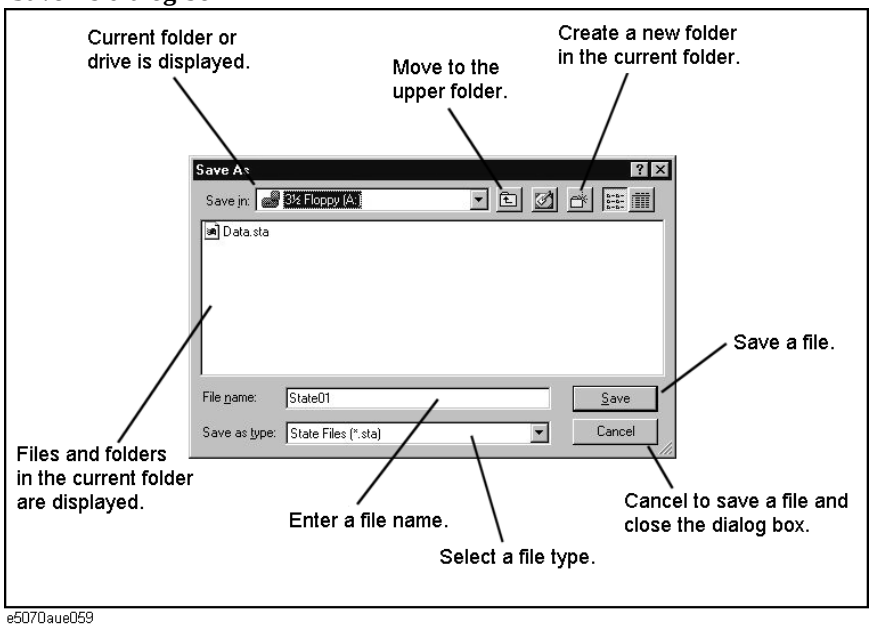
When you save the state with any file name (including files on the floppy disk):

1. Press **File Dialog...** to open the dialog box. This operation should be done with the external keyboard and/or mouse. Figure 5-14 shows the user interface elements in the "Save As" dialog box.

2. Specify any folder, and enter the file name.

3. Press **Save**.

Figure 5-14 **Save As dialog box**



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The E5052A provides the following drives to save/recall files. Select a drive in the **Save In** area of the dialog box (Figure 5-14).

Table 5-34

Drive name	Description
3.5” Floppy[A:]	Uses a floppy disk drive*1 for saving/recalling the file .
[F:]	Uses a hard disk (F) drive for saving/recalling the file.

*1. Use a 1.44-MB floppy disk formatted in DOS when you use the E5052A's built-in floppy disk drive.

NOTE Do not change any content (i.e. folders or files) in the drives other than A and F. Doing this may cause serious damage to the E5052A’s functions and performance.

NOTE **Do not press the disk eject button while the floppy disk access lamp is on.** Trying to forcefully pull the floppy disk out while the lamp is on may damage the floppy disk or disk drive.

Recalling Procedure

NOTE In recalling the file in which the trace is saved (**State & Data** is specified for saving the content), the trigger sources are recalled and trigger mode is automatically set to 'HOLD'.

Step 1. Press Save/Recall.

Step 2. Press **Recall State**.

Step 3. When you recall State01.sta - State06.sta - Autorec.sta:

Press **State01** - **State06** or **Autorec**.

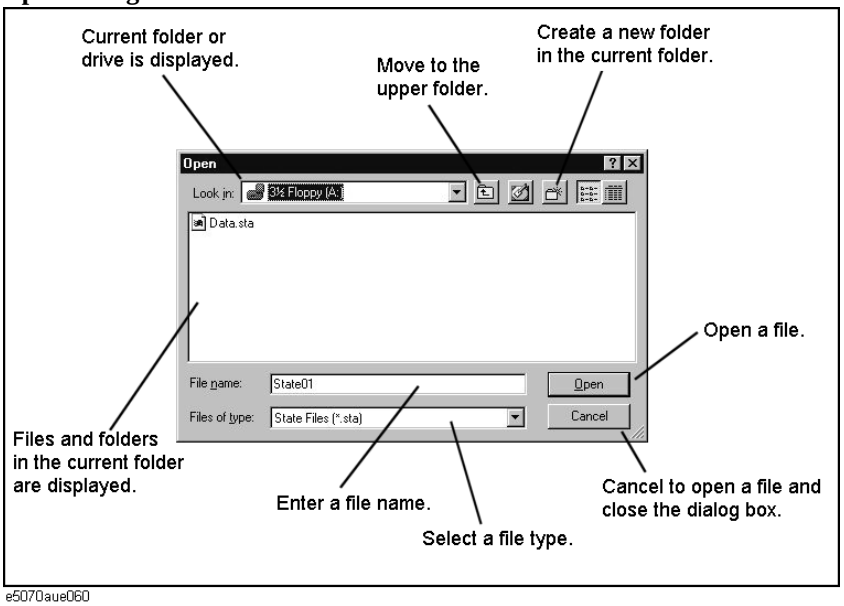
When you recall any file:

1. Press **File Dialog...** to open the Open dialog box. This operation should be conducted using the external keyboard and/or mouse. The Figure 5-15 shows the user interface elements on the "Open" dialog box.
2. Specify the folder that contains the file, and then select the file. Press **Open** to recall the saved internal data.

NOTE Irrespective of the selected measurement window, all of the state settings and settings/data are recalled.

NOTE **Do not press the disk eject button while the floppy disk access lamp is on.** Trying to forcefully pull the floppy disk out while the lamp is on may damage the floppy disk or disk drive.

Figure 5-15 Open dialog box



Recall Procedure Using “Recall by File Name” Feature

You can use the recall feature with the **Recall by File Name** softkey for files you have named freely and saved in the **F:\State** folder. This function lets you recall a file you have named freely and saved by simple softkey operation, eliminating annoying operation using the Open dialog box.

NOTE

Although there is no limit to the number of files saved in a folder, only up to 50 files are displayed on the softkeys. If more than 50 files are saved in a folder, they are sorted in the order of numbers 0 to 9 and alphabetic characters A to Z and the first 50 files are displayed as softkeys.

Although there is no limit to the number of characters of a file name, only up to 12 characters are displayed on the softkey. If a file name exceeds 12 characters, the first 12 characters are displayed on the softkey and the remaining characters are omitted and replaced with "...".

Note that different files may be displayed on softkeys with the same name or a saved file is not displayed on any softkey because of the above limitations.

Step 1. Press Save/Recall.

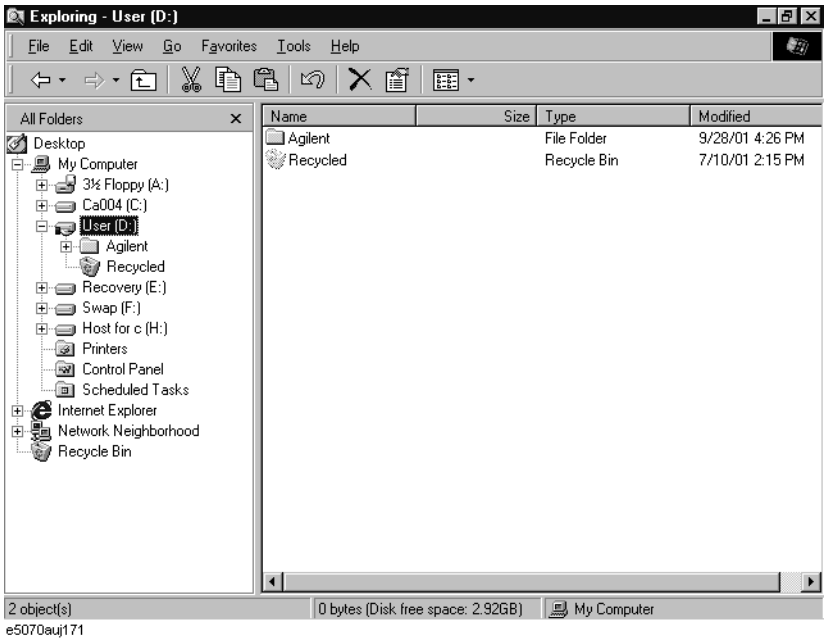
Step 2. Press **Recall by File Name**.

Step 3. Files that have been named and saved in the F:\State folder are displayed on softkeys. Press the key for the file you want to recall.

Managing Files/Folders

You can manage the files and folders by using Windows® Explorer, which provides such standard operations as copy, move, remove, change name, and format floppy disk.

Figure 5-16 **Windows Explorer**



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CAUTION **Do not change any content (i.e. folders or files) of the drives other than A and F: This may cause serious damage to the E5052A's functions and performance.**

Running Windows Explorer

Step 1. Press Save/Recall.

Step 2. Press **Explorer...** to open Windows Explorer.

Copying Files/Folders

Step 1. In Windows Explorer, select any source file or folder for copying.

Step 2. On the menu bar, select **Edit** - **Copy**.

Step 3. Open the target folder for copying.

Step 4. On the menu bar, select **Edit** - **Paste**.

Moving Files/Folders

Step 1. In Windows Explorer, select the file or folder of origin.

Step 2. On the menu bar, select **Edit** - **Cut**.

Step 3. Open the destination folder.

Step 4. On the menu bar, select **Edit** - **Paste**.

Removing Files/Folders

Step 1. In Windows Explorer, select the file or folder to be removed.

Step 2. On the menu bar, select **File** - **Delete**.

Changing the Name of File/Folder

Step 1. In Windows Explorer, select the file or folder for which you want to change name.

Step 2. On the menu bar, select **File** - **Rename**.

Step 3. Type the new name for the file or folder and then press Enter on the keyboard.

Formatting the Floppy Disk

NOTE Formatting the disk removes all of the files and folders currently on it.

Step 1. Insert the floppy disk you want to format into the floppy disk drive of the E5052A.

Step 2. Right-click the mouse on the A: drive in Windows Explorer.

Step 3. Select **Format...** from the shortcut menu that appears.

Step 4. Follow the instructions in the dialog box to format the floppy disk.

Saving a Trace on a File

Saving Trace Data on a File

You can save the trace data of the E5052A's active trace in the CSV format (with the extension of "*.csv") to recall them for later use on the PC application software.

The trace data are saved in the following format:

Example 5-1 **Example of saved trace data (phase noise measurement)**

```
Offset Frequency (Hz),Phase Noise (dBc/Hz)
+1.00000000000e+002,-6.11082572643e+001
+1.01800975118e+002,-6.14881381403e+001
+1.03634385350e+002,-5.77826152313e+001
+1.05500814844e+002,-5.81658293608e+001
```

The first line is a header indicating the trace data items that are output from the second line onward.

From the second line, the trace data are output at an amount equivalent to the number of frequency points.

Operational Procedure

Follow the steps below to save the trace data of the E5052A.

Step 1. Press [Trace Next] or [Trace Max] to activate the trace on which you want to save the trace data.

Step 2. Press [Save/Recall] to open the Save/Recall menu.

Step 3. Press **Save Data Trace** to open the "Save As" dialog box. This operation should be conducted using the external keyboard and/or mouse. For information on the Save As dialog box, refer to the description of Figure 5-14, "Save As dialog box," on page 167. Here, the CSV Files (with the extension of *.csv) are selected for the file type.

Step 4. Specify the destination folder for saving, enter file name, and then press **Save** to save the file.

NOTE You cannot recall the trace data while using the Save Data/Memory Trace menu.

NOTE **Do not press the disk eject button while the floppy disk access lamp is on.** Trying to forcefully pull the floppy disk out while the lamp is on may damage the floppy disk or disk drive.

Saving Trace Memory

You can save the trace memory of the E5052A's active trace in the CSV format (with the extension of ".csv") to recall them for later use on the PC application software.

The trace memory is saved in the following format:

Example 5-2 **Example of saved trace memory (phase noise measurement)**

```
Offset Frequency (Hz),Phase Noise (dBc/Hz)
+1.00000000000e+002,-6.11082572643e+001
+1.01800975118e+002,-6.14881381403e+001
+1.03634385350e+002,-5.77826152313e+001
+1.05500814844e+002,-5.81658293608e+001
```

The first line is a header indicating the trace memory items that are output from the second line onward.

From the second line, the trace memory is output at an amount equivalent to the number of frequency points.

Operational Procedure

Follow the steps below to save the trace memory of the E5052A.

Step 1. Press Trace Next or Trace Max to activate the trace on which you want to save the trace memory.

Step 2. Press Save/Recall to open the Save/Recall menu.

Step 3. Press **Save Memory Trace** to open the "Save As" dialog box. This operation should be done with the external keyboard and/or mouse. For information on the Save As dialog box, refer to the description of Figure 5-14, "Save As dialog box," on page 167. Here, the CSV Files (with the extension of *.csv) are selected for the file type.

Step 4. Specify the destination folder for saving, enter the file name, and then press **Save** to save the file.

NOTE You cannot recall the trace memory while using the Save Data/Memory Trace menu.

NOTE **Do not press the disk eject button while the floppy disk access lamp is on.** Trying to forcefully pull the floppy disk out while the lamp is on may damage the floppy disk or disk drive.

Saving Display Screen

You can save the E5052A's screen image on a file in the bitmap or PNG format. The saved file can be recalled for later use with PC application software.

Operational Procedure

Follow the steps below to save the screen image on a file.

Step 1. Display the screen that you want to save on a file.

Step 2. Press System to display the system menu. Use the following softkey from the System munu.

Table 5-35

Softkey	Function
Dump Screen Image	Saves the screen information on a file

NOTE The image displayed on the screen just before pressing Capture System is saved in the file. For more information, refer to "Images you can print/save" on page 176.

Step 3. Press **Dump Screen Image** to open the "Save As" dialog box. For information on the Save As dialog box, refer to the description for Figure 5-14, "Save As dialog box," on page 167. In this case, either Bitmap Files (with the extension of *.bmp) or Portable Network Graphics (with the extension of *.png) is selected as the file type.

Step 4. Select the file type.

Step 5. Specify the folder in which you want to save the file and enter the file name. Press **Save** to save the screen image of the E5052A in a file.

Printing Screen Image

Connect your printer to the E5052A's printer parallel port on the rear panel or to the USB port to print screen images from the E5052A.

Supported printers

Agilent's Internet website provides the latest information on available printer types and drivers compatible with the E5052A.

Visit us at the following site.

http://www.agilent.com/find/ctdkobe_printers

Installing the printer driver

You must install the appropriate driver on the E5052A to use newly supported printers after you have purchased the E5052A.

Obtain a driver that is dedicated to the E5052A prepared by the Agilent Technologies. You can download printer drivers from the Agilent Technologies product promotion web site.

For information on obtaining printer drivers, contact Agilent Technologies. For inquiries, see the Customer Contact list at the end of this manual or go to the online assistance homepage at "http://www.agilent.com/find/assist".

To install drivers, refer to the instructions supplied with the drivers.

Images you can print/save

You can print/save the images that are stored in the clipboard. However, unless images are stored on the clipboard, the current screen image will be printed/saved.

Storing Images in Clipboard

The Capture System key provides a screen capture function as well. In other words, the image displayed on the screen just before pressing Capture System is saved on the clipboard.

NOTE The images stored on the clipboard are cleared after executing print/save operations.

Printing procedure

Preparing the Printing

Follow the steps below to prepare for printing.

Step 1. Power off the E5052A.

Step 2. Power on the printer and then connect it to the E5052A.

NOTE Do not connect unsupported printers to the E5052A.

Step 3. Power on the E5052A.

Step 4. Press System.

Step 5. Press **Printer Setup** to open the “Printers” window. Select the printer you want to use and set it up by referring to the instruction manual for the printer.

Step 6. The Printers window will close.

Printing

Follow the steps below to print the screen image.

Step 1. Display the screen that you want to print out.

Step 2. Press Capture System to save the current screen image on the clipboard.

Step 3. As required, press **Invert Image** to toggle the selection of printing either in the displays's actual colors or in the image's inversed colors. (This can save much ink by, for example, printing with a white rather than black background.)

Step 4. Press **Print** to start printing.

Pressing **Abort Printing** during the printing operation stops the printing.

NOTE If you start printing before the printer is ready (e.g. not powered on yet), the Printers Folder dialog box may be displayed as shown in Figure 5-17. In this case, press **Cancel** to close the Printers Folder dialog box and retry the operation after the printer is ready.

Figure 5-17 Printers Folder dialog box

6 Setting and Using the Control and Management Functions

This chapter explains how to set and use the control and management functions that are not directly linked with measurement or analysis.

Setting the GPIB

This section describes how to set the interface necessary to use the GPIB (General Purpose Interface Bus) of the E5052A. For information on the concept and concrete implementation of auto measurement using GPIB, refer to the *Programmers Guide.*

Setting talker/listener GPIB address of E5052A

When controlling the E5052A using GPIB commands from an external controller connected to the GPIB connector, you need to set the talker/listener GPIB address of the E5052A.

Follow these steps to make this setting:

Step 1. Press System.

Step 2. Press **Misc Setup**.

Step 3. Press **GPIB Setup**.

Step 4. Press **Talker/Listener Address**.

Step 5. Enter the address using the ENTRY block keys on the front panel.

Setting system controller (USB/GPIB interface)

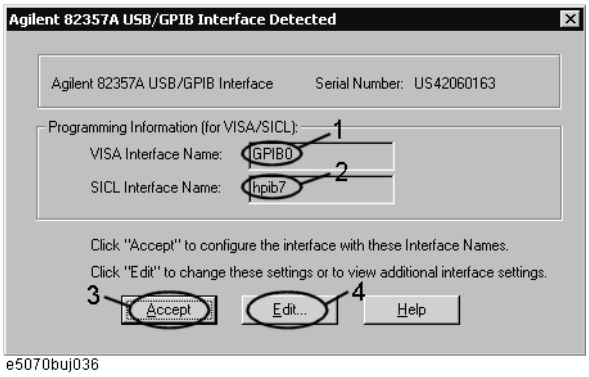
When controlling an external device from the E5052A, connect the USB port of the E5052A and the GPIB port of the external device through the USB/GPIB interface.

Follow these steps to set the USB/GPIB interface:

Step 1. Connect the USB port of the E5052A to the USB/GPIB interface. The USB/GPIB Interface Detected dialog box (Figure 6-1) appears.

NOTE Do not connect two or more USB/GPIB interfaces.

Figure 6-1 USB/GPIB Interface Detected dialog box

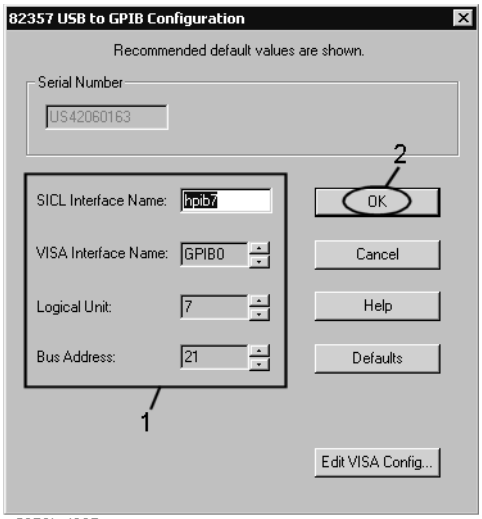


Step 2. Confirm that VISA Interface Name is set to GPIB0 (1 in Figure 6-1) and that the SICL

Interface Name is set to hpib7 (2 in Figure 6-1) and then click the **Accept** button (3 in Figure 6-1). If the setting is correct, the procedure is complete. If the setting is different, click the **Edit** button (4 in Figure 6-1).

Step 3. The USB to GPIB Configuration dialog box (Figure 6-2) appears. Make the settings as shown in the thick-lined box (1 in Figure 6-2) and then click the **OK** button (2 in Figure 6-2).

Figure 6-2 USB to GPIB Configuration dialog box



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If you need to check/change the settings of the USB/GPIB interface after connecting the USB/GPIB interface, follow these steps:

Step 1. Press System.

Step 2. Press **Misc Setup**.

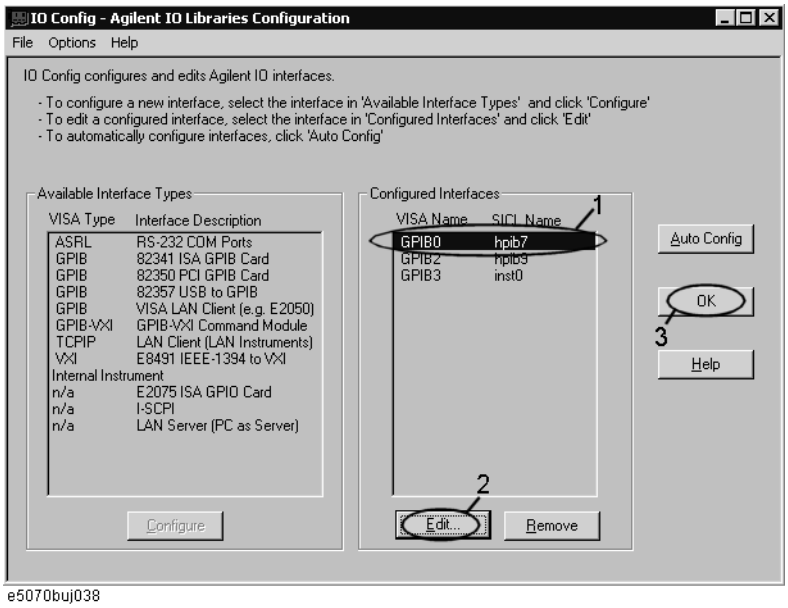
Step 3. Press **GPIB Setup**.

Step 4. Press **System Controller Configuration**.

Step 5. The IO Config dialog box (Figure 6-3) appears. Select (highlight) **GPIB0 hpib7** (1 in Figure 6-3) and then click the **Edit** button (2 in Figure 6-3).

NOTE In the IO Config dialog box, do not click buttons other than those specified here and do not change any other settings because doing so may cause serious damage to the functions of the E5052A.

Figure 6-3 **IO Config dialog box**



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Step 6. The USB to GPIB Configuration dialog box (Figure 6-2) appears. Check/change the setting of the USB/GPIB interface and then click the **OK** button (2 in Figure 6-2).

Step 7. In the USB to GPIB Configuration dialog box, click the **OK** button (3 in Figure 6-3).

Setting the Mouse

The user can change the setup for the mouse connected to the E5052A and the movement of the pointer.

Setup steps

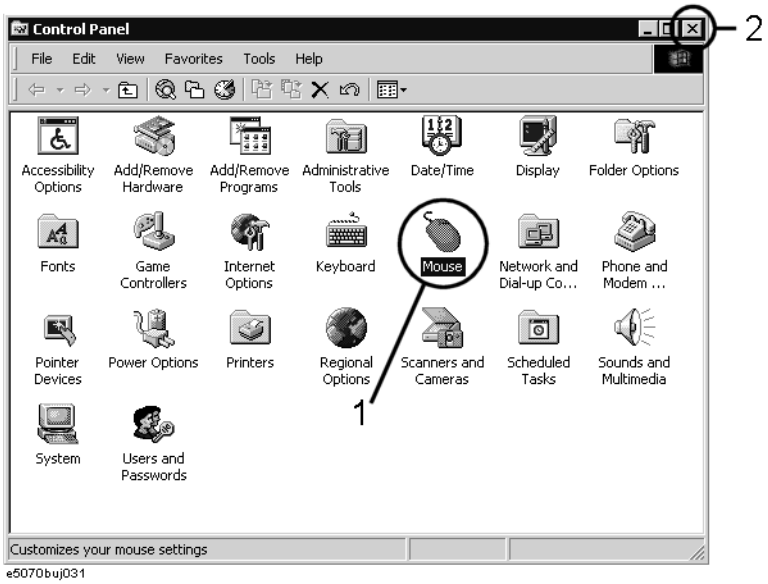
NOTE Be sure to use a mouse and a keyboard for mouse setup operations.

Step 1. Press System.

Step 2. Press **Misc Setup**.

Step 3. Press **Control Panel** to open the Control Panel window.

Figure 6-4 Control Panel window



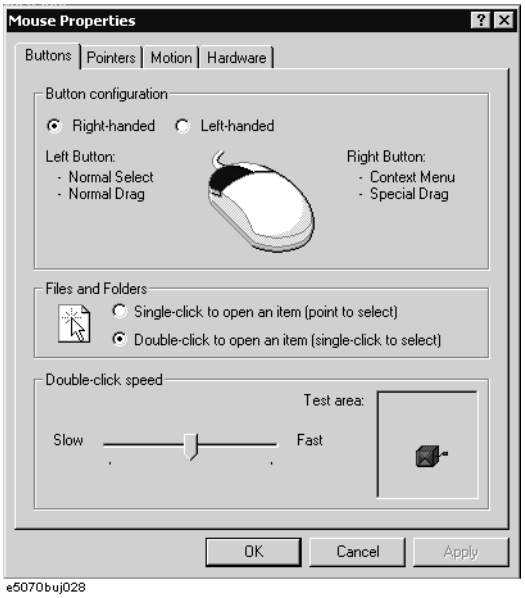
Step 4. Double-click the **Mouse** icon (1 in Figure 6-4) in the Control Panel window.

NOTE Do not click icons other than those specified here and do not change other settings because doing so may cause serious damage to the functions of the E5052A.

Step 5. The Mouse Properties dialog box (Figure 6-5) is displayed.

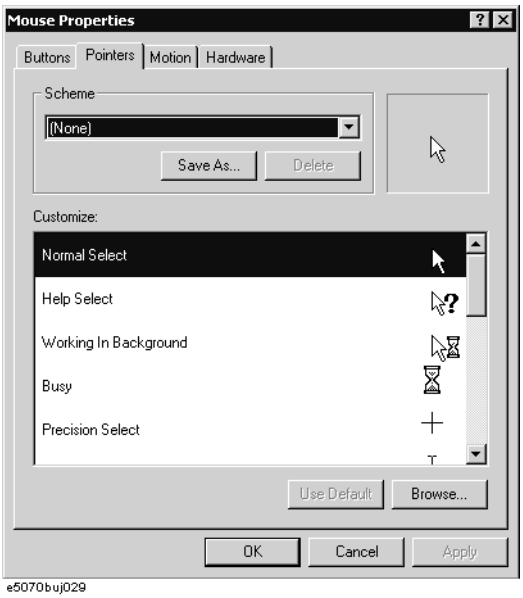
Define the setup for a right-handed/left-handed person in the **Buttons configuration** area. Define the setup for double-click speed in the **Double-click speed** area.

Figure 6-5 **Mouse Properties Dialog Box (Buttons tab)**



Step 6. Click the **Pointers** tab (Figure 6-6).

Figure 6-6 **Mouse Properties dialog box (Pointers tab)**

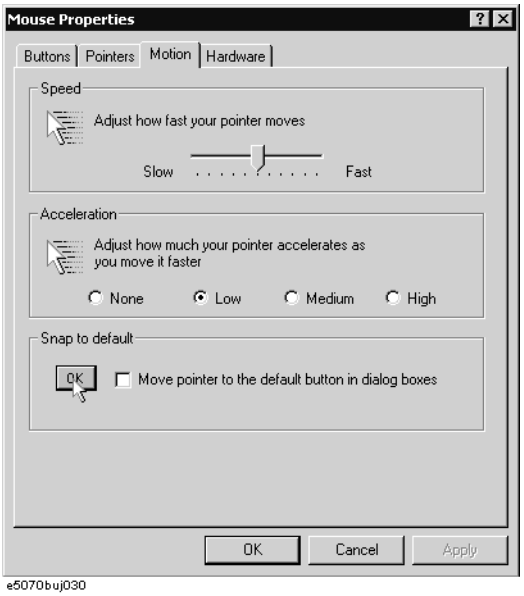


Step 7. Enter a registration name into the **Scheme** box and specify the shapes of pointers for the registration name in the box below.

To create a registration name, click the **Save As...** button. Enter the registration name into the **Save Scheme** dialog box that appears, and click the **OK** button.

Step 8. Click the **Motion** tab (Figure 6-7).

Figure 6-7 **Mouse Properties Dialog Box (Motion tab)**



Step 9. Specify the pointer speed in the **Pointer speed** area and the pointer trail in the **Pointer trail** area.

Step 10. Click the **OK** button.

Step 11. Click the × button (2 in Figure 6-4) at the corner of the Control Panel window to close the window.

Configuring the Network

NOTE When you use the E5052A by connecting it to your LAN, consult your network administrator in order to make the LAN settings correctly.

This section describes how to set the following basic items necessary to connect the E5052A to a LAN (Local Area Network).

❏ "Enabling/disabling network" on page 186

❏ "Setting IP address" on page 187

❏ "Specifying computer name" on page 189

If you need detailed network settings, consult your network administrator and perform operations in the same way as for a PC using Windows 2000®.

Enabling/disabling network

You can enable/disable the network connection function of the E5052A.

Follow these steps to enable/disable the network connection function.

Step 1. Use the LAN cable to connect the E5052A to the LAN.

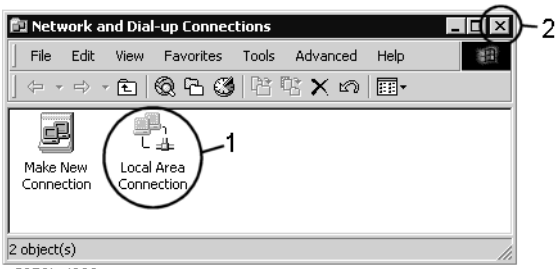
Step 2. Press System.

Step 3. Press **Misc Setup**.

Step 4. Press **Network Setup**.

Step 5. Press **Network Configuration** to open the Network and Dial-up Connections window (Figure 6-8).

Figure 6-8 Network and Dial-up Connections window



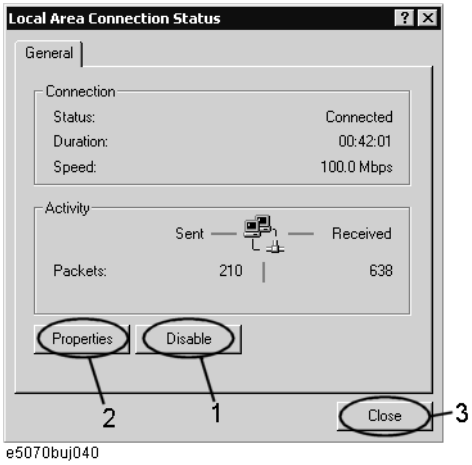
Step 6. When switching from disable to enable:

Double-click the Local Area Connection icon (1 in Figure 6-8) in the Network and Dial-up connections window to enable the network connection function.

When switching from enable to disable:

Double-click the Local Area Connection icon (1 in Figure 6-8) in the Network and Dial-up Connections window. The Local Area Connection Status dialog box (Figure 6-9) appears. Click the **Disable** button (1 in Figure 6-9) to disable the network connection function.

Figure 6-9 Local Area Connection Status dialog box



Step 7. Click the × button (2 in Figure 6-8) at the upper right of the Network and Dial-up Connections window to close the window.

Setting IP address

Follow these steps to set the IP address:

Step 1. Press System.

Step 2. Press **Misc Setup**.

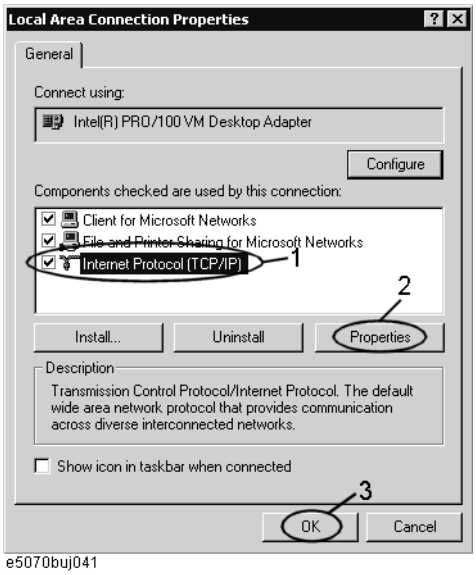
Step 3. Press **Network Setup**.

Step 4. Press **Network Configuration**.

Step 5. Double-click the Local Area Connection icon (1 in Figure 6-8) in the Network and Dial-up Connections window. The Local Area Connection Status dialog box (Figure 6-9) appears. Click the **Properties** button (2 in Figure 6-9).

Step 6. The Local Area Connection Properties dialog box (Figure 6-10) appears. Select (highlight) **Internet Protocol (TCP/IP)** (1 in Figure 6-10) and then click the **Properties** button (2 in Figure 6-10).

Figure 6-10 Local Area Connection Properties dialog box



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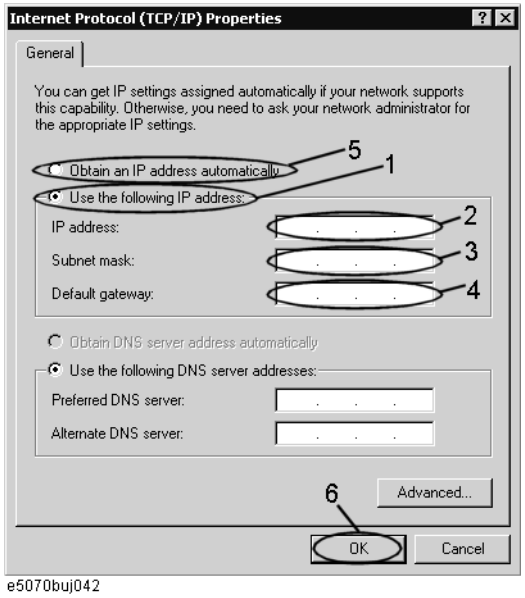
Step 7. The Internet Protocol (TCP/IP) Properties dialog box (Figure 6-11) appears. Click (select) **Use the following IP address** (1 in Figure 6-11) and then enter the IP address (2 in Figure 6-11), the subnet mask (3 in Figure 6-11), and the gateway address (4 in Figure 6-11).

If the IP address can be obtained automatically (if a DHCP server can be used), click (select) **Obtain an IP address automatically** (5 in Figure 6-11).

Figure 6-11 Internet Protocol (TCP/IP) Properties dialog box



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Step 8. In the Internet Protocol (TCP/IP) Properties dialog box, click the **OK** button (6 in Figure 6-11).

Step 9. In the Local Area Connection Properties dialog box, click the **OK** button (3 in Figure 6-10).

Step 10. In the Local Area Connection Status dialog box, click the **Close** button (3 in Figure 6-9).

Step 11. Click the × button (2 in Figure 6-8) at the upper right of the Network and Dial-up Connections window to close the window.

Specifying computer name

Follow these steps to specify the computer name:

Step 1. Press System.

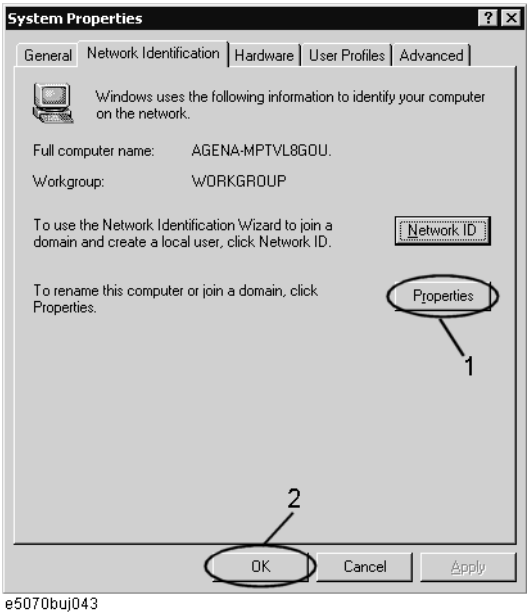
Step 2. Press **Misc Setup**.

Step 3. Press **Network Setup**.

Step 4. Press **Network Identification**.

Step 5. The System Properties dialog box (Figure 6-12) appears. Click the **Properties** button (1 in Figure 6-12).

Figure 6-12 System Properties dialog box



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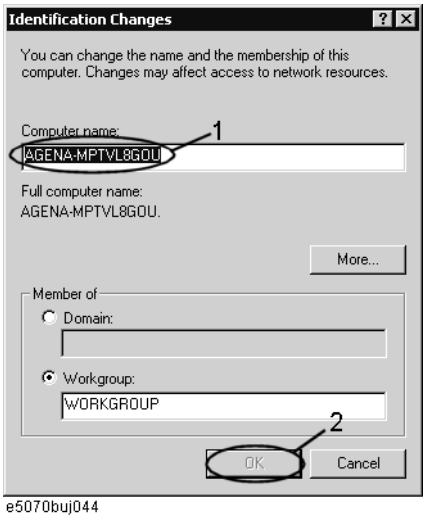
Step 6. The Identification Changes dialog box (Figure 6-13) appears. Enter the computer name in the **Computer Name** box (1 in Figure 6-13).

Figure 6-13 **Identification Changes dialog box**



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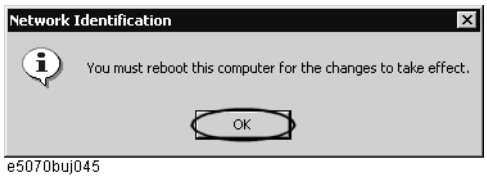
Step 7. The Network Identification dialog box (Figure 6-14) appears. Click the **OK** button.

Figure 6-14 **Network Identification dialog box**



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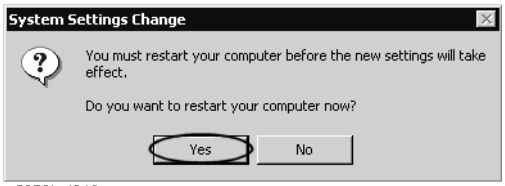
Step 8. In the Identification Changes dialog box, click the **OK** button (2 in Figure 6-13).

Step 9. In the System Properties dialog box, click the **OK** button (2 in Figure 6-12).

Step 10. The System Settings Change dialog box (Figure 6-15) appears. Click the **Yes** button to restart the E5052A.

Figure 6-15 **System Settings Change dialog box**



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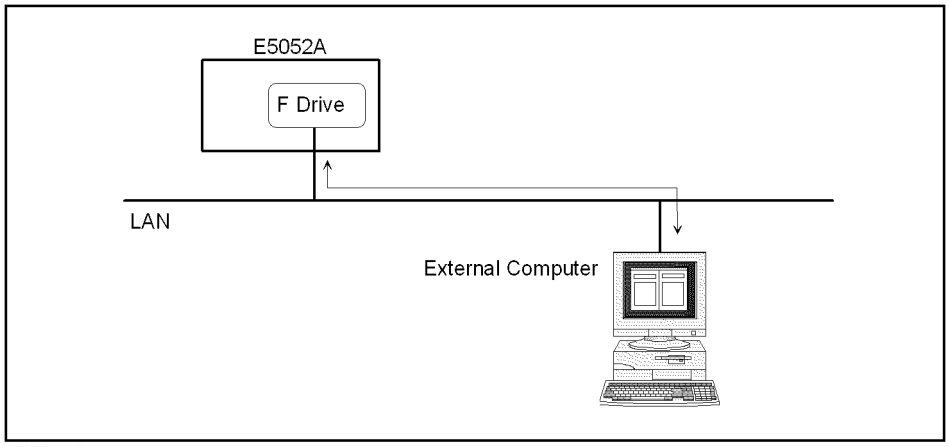
NOTE The changed settings do not take effect until the E5052A is restarted.

Accessing Hard Disk of E5052A from External PC

If you connect the E5052A to a LAN, you can access the hard disk (F drive) in the E5052A as a network drive from an external PC connected to the same LAN.

NOTE See "Connecting Hard Disk (Shared Folder) of External PC" in Chapter 6, "Application Programs" in *VBA Programmer's Guide* for information on accessing the hard disk of the external PC connected to the same LAN from the E5052A.

Figure 6-16 Accessing drive F of E5052A from external PC



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Enabling access from an external PC

This section shows the simplest procedure to enable access from an external PC.

NOTE It is recommended that you use settings with relatively high security; please consult your network administrator.

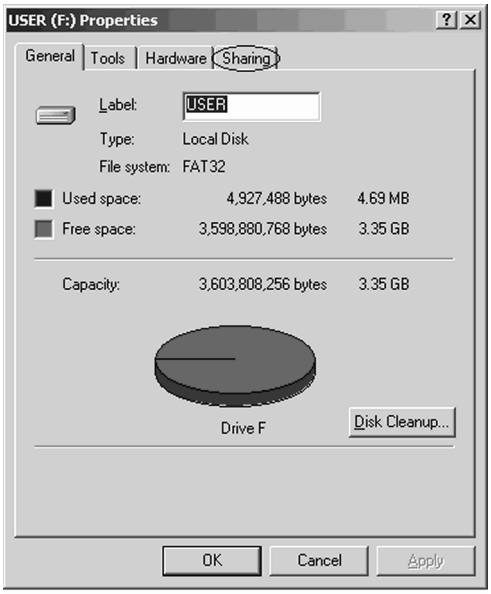
Step 1. Press Save/Recall.

Step 2. Press **Explorer...**.

Step 3. Windows Explorer (Refer to the Figure 5-16 on page 170) opens. Select (highlight) **USER (F:)** and then click **Properties** in the File menu.

Step 4. The USERS(F:) Properties dialog box (Figure 6-17) appears. Select the **Sharing** tab.

Figure 6-17 USERS(F:) Properties dialog box (General tab)



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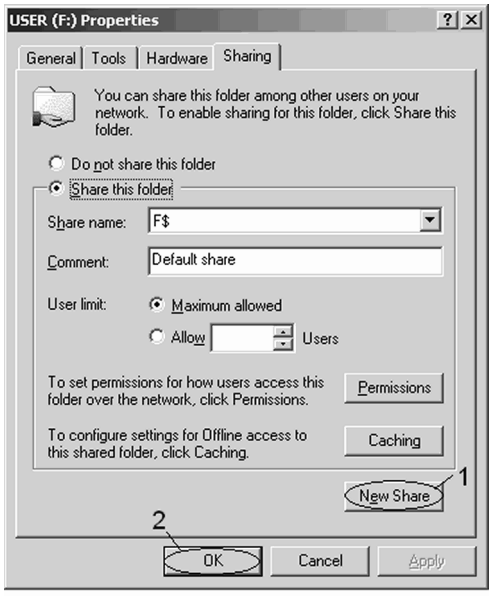
Step 5. Click the **New Share** button (1 in Figure 6-18).

Figure 6-18 USERS(F:) Properties dialog box (Sharing tab)



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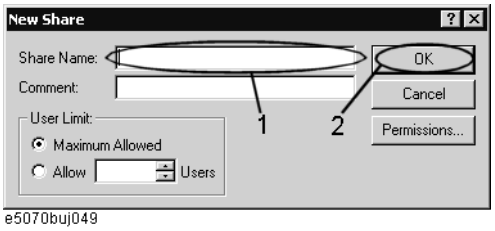
Step 6. The New Share dialog box (Figure 6-19) appears. Enter the share name (name used when accessed from the external PC) in the **Share Name** box (1 in Figure 6-19) and click the **OK** button (2 in Figure 6-19).

Figure 6-19 **New Share dialog box**



Step 7. In the USERS(F:) Properties dialog box, click the **OK** button (2 in Figure 6-18).

Accessing hard disk of E5052A from external PC

This section explains the procedure for accessing the hard disk (F drive) in the E5052A from the external PC, which has been made possible by first following the procedure described in “Enabling access from an external PC” on page 191. In our example below, we use Windows NT ®.

NOTE For information on network connections, see your PC’s operation manual.

Step 1. From the Start menu, click Programs - Windows Explorer to start Explorer.

Step 2. From Explorer's menu, click **Tools - Map Network Drive...**.

Step 3. The Map Network Drive dialog box appears. Select an appropriate drive, enter **\\C_NAME\S_NAME** as the network path, and then click the **OK** button.

C_NAME in the network path is the computer name of the E5052A, and **S_NAME** is the share name of the F drive. For information on how to set the computer name, refer to “Specifying computer name” on page 189; for information on how to set the share name, refer to “Enabling access from an external PC” on page 191.

Step 4. The dialog box used to enter the user name and the password appears. Enter an appropriate user name and password and then click the **OK** button.

The user name and password differ depending on the setting made when enabling access from the external PC. When you have set them according to “Enabling access from an external PC” on page 191, you can make connection using the user name, **E5052**, without the password.

Locking the Front Keys, Keyboard, and Mouse (Touch Screen)

You can lock (disable) the front keys, keyboard, and mouse (touch screen). This feature prevents erroneous operation caused by inadvertently touching any of these devices.

Locking the front keys, keyboard, and mouse

Step 1. Press System.

Step 2. Press **Misc Setup**.

Step 3. Press **Key Lock**.

Step 4. Press the corresponding key to switch the lock on/off.

Softkey	Function
Front Panel & Keyboard Lock	Switches the lock for the front panel keys and keyboard on/off.
Touch Screen & Mouse Lock	Switches the lock for the touch screen and mouse on/off.

NOTE You cannot use a locked device to unlock that same device. To unlock the front panel keys, keyboard, touch screen and mouse when they have all been locked, press the Standby switch to turn off the power supply and then turn it on again. When setting at power-on, the front panel keys, keyboard, touch screen and mouse are all in an unlocked state.

Setting the Beeper (Built-in Speaker)

The E5052A has a built-in speaker that sounds a beep tone. The beeper allows you to make the two types of settings shown in Table 6-1.

Table 6-1 Beeper functions

Type	Function
Operation complete beeper	Sounds a beep tone to inform the user that operations have completed. • When calibration data measurements are done • When saving/recalling has completed
Warning beeper	Sounds a beep tone to alert the user of a problem. • When an instrument error occurs (an error message appears at the same time)

The warning beeper sounds slightly longer than the operation complete beeper.

Setting the Operation Complete Beeper

Step 1. Press System.

Step 2. Press **Misc Setup**.

Step 3. Press **Beeper**.

Step 4. Press **Beep Complete** to switch the operation complete beeper on/off.

Pressing **Test Beep Complete** allows you to hear and check the beep tone of the operation complete beeper.

Setting the Warning Beeper

Step 1. Press System.

Step 2. Press **Misc Setup**.

Step 3. Press **Beeper**.

Step 4. Press **Beep Warning** to switch the warning beeper on/off.

Pressing **Test Beep Warning** allows you to hear and check the beep tone of the warning beeper.

Turning off the LCD Screen Backlight

You can switch off the backlight (illumination) of the E5052A's LCD screen. This extends the life of the backlight when using it continuously over a long period.

Turning off the LCD Screen Backlight

Step 1. Press System.

Step 2. Press **Backlight** to switch the backlight on/off.

Switching off the backlight causes indications on the LCD screen to be almost invisible.

A backlight that has been switched off can be turned on again by pressing Preset. When the LCD backlight is off, Preset works as a key for switching the backlight back on.

Checking the Product Information

Checking the serial number

The serial number of the E5052A can be checked by using the following procedure.

Step 1. Press System.

Step 2. Press **Product Information**.

The Product Information dialog box appears.

Step 3. Press **OK** to close the dialog box.

Checking the firmware revision

The revision number of the firmware installed in the E5052A can be checked by using the following procedure.

Step 1. Press System.

Step 2. Press **Product Information**.

The Product Information dialog box appears.

Step 3. Press **OK** to close the dialog box.

Checking the option number

The option number of the E5052A can be checked by using the following procedure.

Step 1. Press System.

Step 2. Press **Product Information**.

The Product Information dialog box appears.

Step 3. Press **OK** to close the dialog box.

7 Information on Maintenance

This chapter explains the measures you should take to maintain the Agilent E5052A.

Backing Up the Data

Be sure to regularly back up your important data (including program) files in this instrument to a CD-R or other backup medium. Agilent Technologies shall not be liable for any data damages caused by troubles of this instrument.

Making backup files

Making backup files on a floppy disk

You can make backup files on a floppy disk by using the copy function. See “Managing Files/Folders” on page 170 for making a copy.

Making backup files on the hard disk of an external PC

You can make backup files on the hard disk of an external PC by using the following methods.

- You can access drive F: of the E5052A from an external PC via LAN and copy your important data files on drive F: to the external PC. See “Accessing Hard Disk of E5052A from External PC” on page 191 for details.
- You can transfer your important data files on drive F: of the E5052A to an external PC using the :MMEM:TRAN command via GPIB. See *Programmer’s Guide* for details.

NOTE Do not modify any files or folders in drives other than drive A: and drive F:. Doing so will cause malfunctions.

System Recovery

By executing system recovery, you can return the system of the E5052A (the Windows operating system and the firmware) to the factory state (at the time of purchase[*1]).

Notes on executing system recovery

Executing system recovery results in the following:

- ❏ In addition to the Windows operating system and the firmware, the following settings of the E5052A are returned to the factory state.
  - Network setting
  - GPIB setting
  - Printer setting
- ❏ The driver for the supported printer installed after purchase is deleted.
- ❏ You need to execute initial registration again.

Files you created using the save function (files in the F drive) are not affected, but we recommend backing them up before executing system recovery as a prudent precaution. For more information on backup, refer to “Making backup files” on page 200.

*1. If the hard disk failed and has been replaced after purchase, the state when the replacement was performed is recovered.

Procedure To Execute System Recovery

NOTE You need to use the keyboard for this operation.

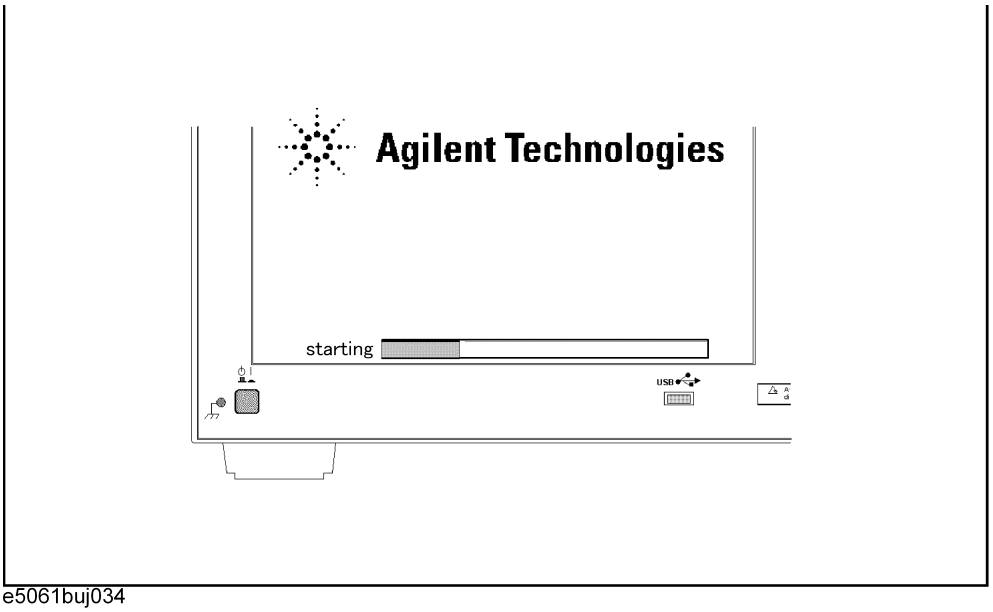
Step 1. Shut down the E5052A.

Step 2. Connect the keyboard to the E5052A.

Step 3. Insert the system recovery disk into the floppy disk drive of the E5052A.

Step 4. Press the standby switch of the E5052A to turn it on.

Step 5. When the screen shown in the figure below appears, press and hold Esc on the keyboard until this screen disappears.



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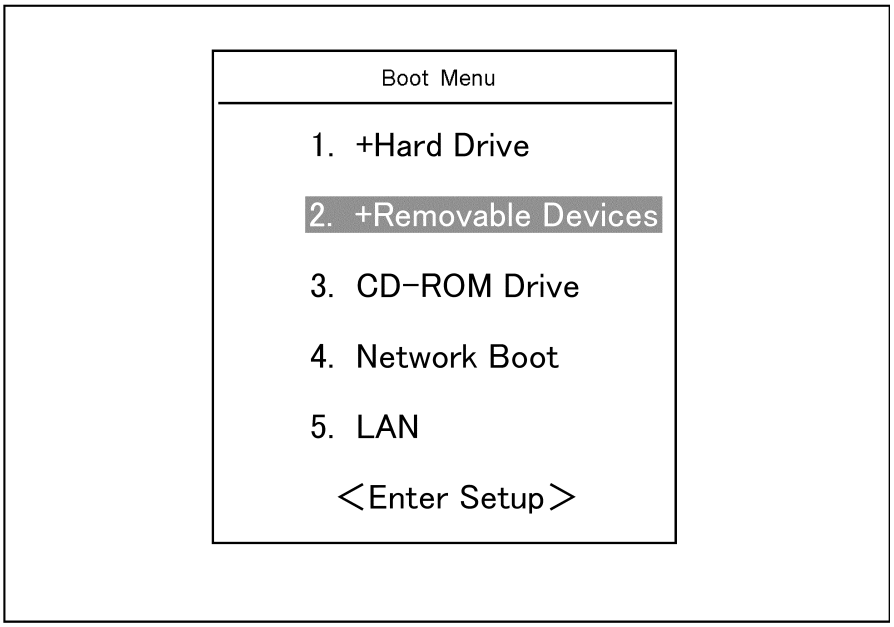
NOTE After several seconds, the Windows startup screen appears automatically even if you do not press any key, so be sure to execute Step 5 in a timely manner to avoid having to repeat the entire procedure.

If the above message does not appear, the instrument is faulty; contact your local Agilent Customer Center listed at the end of this manual or a distributor.

Step 6. The following screen appears. Select "+Removable Devices" with ↑ ↓ of the keyboard, and press Enter of the keyboard.



Step 7. The message shown below appears. Press 1 on the keyboard. If you want to cancel the system recovery, press 2 at this point.

```
Agilent Technologies System Utilities
Recovery & Backup Options for the E5052A

Choose One of the following:
```

```
   1. Recover Factory Backup Image
   2. Exit
```

```
Enter a Choice: _
```

NOTE If the above message does not appear, the instrument or the system recovery disk is faulty; contact your local Agilent Customer Center listed at the end of this manual or a distributor.

Step 8. The message shown below appears. Press C on the keyboard. If you want to cancel the system recovery, press E at this point.

```
You chose to Restore your system by installing the original factory
installed OS and system software.

WARNING: Press C to Continue only if you are sure that you want
to proceed.  The C: Drive will be completely overwritten with no
chance of recovering any data. Use Option 1 to recover the system
from a serious malfunction caused by corrupted or inadvertently
deleted files on the system's primary C: partition.

Press C to Continue or E to Exit: _
```

Step 9. The message shown below appears. Press C on the keyboard to start the system recovery. If you want to cancel the system recovery, press E at this point.

```
CAUTION! Interrupting this process may leave the system in an
         unstable state. Allow the software to complete the
         backup and recovery process. This may take up to 20
         minutes depending on the system configuration.

Press C to Continue or E to Exit: _
```

CAUTION **Never turn off the power during system recovery: This may cause serious damage to the E5052A.**

Step 10. The system recovery will be completed in about 5 minutes. When the system recovery is complete, the message shown below appears. Press Ctrl, Alt, and Delete on the keyboard at the same time to restart.

```
Remove the disk and Press CLT+ALT+DEL to restart your
system.
```

NOTE If the above message does not appear, the instrument is faulty; contact your local Agilent Customer Center listed at the end of this manual or a distributor.

Step 11. After restart, the screen for initial registration appears. Execute initial registration. For information on the execution procedure, refer to“Initial Registration of E5052A” on page 68 .

Step 12. Execute the calibration of the touch screen. For information on the execution procedure, refer to “Calibration of the Touch Screen” on page 205.

Calibration of the Touch Screen

After you have executed system recovery on the E5052A, you have to calibrate the touch screen. Follow the procedure described below to calibrate the touch screen.

Step 1. Press System.

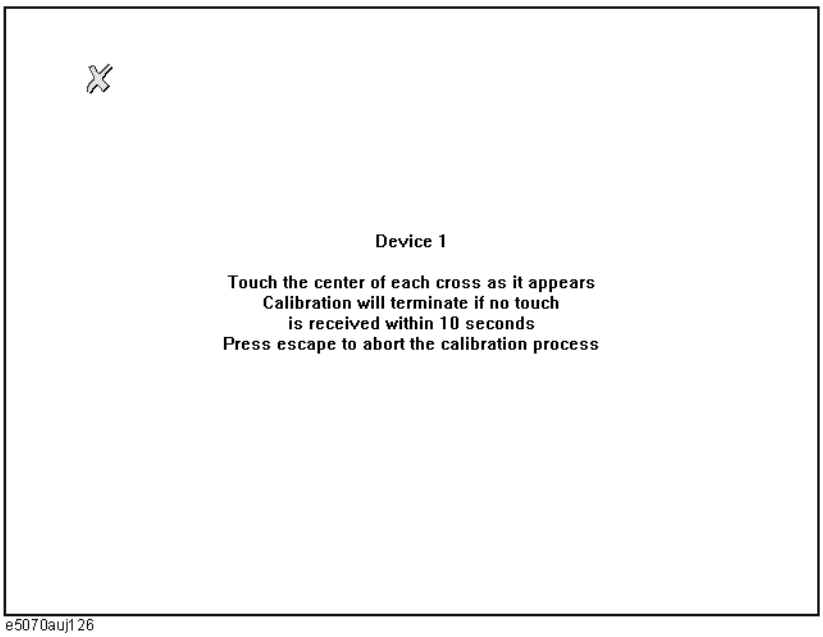
Step 2. Press **Service Menu**.

Step 3. Press **Test Menu**.

Step 4. Press **Adjust Touch Screen**.

The touch screen calibration screen (Figure 7-1) appears.

Figure 7-1 **Touch panel calibration screen**



Step 5. Touch the x mark on the upper left with your finger. This mark also appears on the lower left, upper right, and lower right. Touch the x marks in that order with your finger. Touching these four locations automatically finishes the touch screen calibration.

NOTE With no operation on the touch screen's calibration screen at this time, it automatically closes and the previous measurement screen reappears.

Cleaning the Instrument

This section describes how to clean your Agilent E5052A instrument.

WARNING **To protect yourself from electrical shock, be sure to unplug the power cable from the outlet before cleaning the instrument.**

Never clean the internal components of the instrument.

Cleaning the LCD

Use one of the following methods to clean the display surface regularly.

- For normal cleaning, rub the surface gently with a dry, soft cloth.
- When stains are difficult to remove, gently wipe the surface with cloth dampened with a small amount of ethanol or isopropyl alcohol.

NOTE Do not use chemicals other than ethanol and isopropyl alcohol to wet the cleaning cloth.

Do not wet the cloth with water.

Maintenance of test ports (DUT INTERFACE) and other connectors/ports

The test ports (DUT INTERFACE) on the front panel of the E5052A are fitted with N-type connector (f) and BNC connectors (f). Stains or other damage to these connectors can significantly affect the accuracy in measurements in the RF range. Always take the following precautions.

- Keep the connectors constantly free from stains and dust.
- Do not touch the contact surface on the connectors.
- Do not plug damaged or scratched connectors into the test ports.
- Use compressed air to clean connectors. Do not use abrasives under any circumstance.

The above precautions must also be observed in maintaining connectors and ports other than these test ports.

Cleaning parts other than the LCD

To remove stains on parts other than the LCD, test ports, and other connectors/ports of the instrument, wipe them gently with a soft cloth that is dry or wetted with a small amount of water and wrung tightly.

Replacement of Parts with Limited Service Life

This instrument incorporates parts with limited service life as shown in Table 7-1. Using the recommended replacement time shown in Table 7-1 as a guide, request the Agilent Service Center to replace these parts. However, a part may need to be replaced at an earlier time than that listed in the table, depending on such conditions as location, frequency of use, and where it is stored.

NOTE Each service life and recommended replacement time listed below is for reference only and does not imply a guarantee of the part's service life.

Table 7-1 Parts with Limited Service Life

Part name	Service life (parts supplier reference value)	Recommended replacement time
Hard disk drive*1	5 years or 20,000 operating hours, whichever comes earlier	3 years
Floppy disk drive*2	5 years or 30,000 operating hours, whichever comes earlier	4 years
Main fan*2	50,000 operating hours	5 years
Power supply*2	50,000 operating hours (depends on the service life of the power supply cooling fan)	5 years
LCD screen backlight*3	50,000 operating hours	5 years
Touch screen (function)	One million 'touches'	5 years

*1. Exchanging hard disk drives causes the contents written after shipment from the factory (LAN setup, etc.) to be initialized to the state at the time of shipment. The programs and data stored in Drive F: (user directory) are erased.
*2. The service life may be significantly shorter when used in a dusty or dirty environment.
*3. When the unit is used for automatic measurements in a production line and the on-screen information is not required, the life of the LCD backlight can be saved by turning it off. For the method of turning the backlight off, refer to "Turning off the LCD Screen Backlight" on page 196.

Cautions Applicable to Requesting Repair, Replacement, Regular Calibration, etc.

Backing up data in the hard disk

The user is requested to back up the stored programs and data onto external media by using the instrument's storing function before requesting the Agilent Service Center to repair the instrument or replace hard disks.

See "Making backup files" on page 200 for how to make backup files.

Please take note that Agilent Technologies will not be held liable to any extent for potential erasure or change of stored programs or data due to the repair or replacement of hard disks performed by the Agilent. When a hard disk itself fails, the programs and data stored in it cannot be recovered.

Devices to be sent back for repair or regular calibration

If it is necessary to send the unit to the Service Center of Agilent Technologies for repair or regular calibration, please follow the instructions below.

Equipment to be Sent

When requesting repair or regular calibration of the unit by our Service Center, send only the E5052A main unit without any installed option you may have ordered. Unless specifically instructed, it is not necessary to send accessories.

Packing

Use the original package and shock absorbers, or equivalent antistatic packing materials, when sending the unit.

Shipping Address

For the location of the nearest Agilent Technologies Service Center, contact the Customer Contact listed at the end of this guide.

Recommended Calibration Period

The recommended calibration period for this instrument is one year. The user is recommended to request the Agilent Service Center to perform regular calibration every year.

8 Specifications and Supplemental Information

This chapter provides specifications and supplemental information for the Agilent E5052A Signal Source Analyzer.

Definitions

All specifications apply over a 10°C to 40°C range (unless otherwise stated) and 30 minutes after the instrument has been turned on.

Specification (spec.): Warranted performance. Specifications include guardbands to account for the expected statistical performance distribution, measurement uncertainties, and changes in performance due to environmental conditions.

Supplemental information is intended to provide information that is helpful for using the instrument but that is not guaranteed by the product warranty. This information is denoted as either typical or nominal.

Typical (typ.): Expected performance of an average unit that does not include guardbands. It is not guaranteed by the product warranty.

Nominal (nom.): A general, descriptive term that does not imply a level of performance. It is not guaranteed by the product warranty.

Phase Noise Measurement

Table 8-1 Phase Noise Measurement

Description	Specifications
Frequency Range	10 M to 7 GHz Frequency Band : 10 M to 41 MHz, 39 M to 101 MHz, 99 M to 1.5 GHz, 300 M to 7 GHz
Input Power Level	–20 to + 20 dBm
Offset Frequency Range Carrier > 400 MHz Carrier < 400 MHz	 1 Hz to 40 MHz (Standard) 10 Hz to 40 MHz (Option 011) 1 Hz to 10% of carrier frequency (Standard) 10 Hz to 10% of carrier frequency (Option 011)
Enhanced Phase Noise Sensitivity*1	Cross-Correlation method (Standard) Number of Correlation : 1 to 10000
Frequency Tracking Range	0.4% of Carrier Frequency
Built-in LO Phase Noise Optimization	< 150 kHz (Optimized for Close-in Phase Noise) > 150 kHz (Optimized for Far-out Phase Noise) See Figure 8-4
Accuracy 1 to 100 Hz offset 100 to 1 kHz offset 1 k to 1 MHz offset 1 M to 40 MHz offset	 < ±4 dB (typical, at 23°C±5°C) < ±4 dB (typical, at 23°C±5°C) < ±2 dB (typical, at 23°C±5°C) < ±3 dB (typical, at 23°C±5°C)
Spurious	< -65 dBc (10 MHz to 7 GHz), > 1 kHz offset
SSB Phase Noise Sensitivity (at 23°C±5°C)	See Table 8-2 through Table 8-6, Figure 8-1 through Figure 8-3
Measurement Time	See Table 8-7

*1. Not available for Option 011.

Table 8-2 **SSB Phase Noise Sensitivity (Standard, < 150 kHz optim., Measurement quality = Normal, correlation = 1, +5 dBm input, start freuqency = 1 Hz, measurement time = 17.7 sec)**

Input Frequency		Offset from carrier (Hz)								
		1	10	100	1 k	10 k	100 k	1 M	10 M	40 M
10 MHz	spec.				-148.5	-156.5	-166.5	-168.5	-	-
	typ.	-74.0	-114.0	-144.5	-152.5	-160.5	-170.5	-172.5	-	-
100 MHz	spec.				-148.5	-156.5	-163.5	-168.5	-170.0	-
	typ.	-54.0	-94.0	-135.5	-152.5	-160.5	-167.5	-172.5	-174.0	-
1 GHz	spec.				-128.5	-137.5	-144.5	-160.5	-170.0	-170.5
	typ.	-34.0	-74.0	-115.5	-132.5	-141.5	-148.5	-164.5	-174.0	-174.5
3 GHz	spec.				-119.0	-128.0	-133.7	-149.7	-163.2	-166.7
	typ.	-24.5	-64.5	-106.0	-123.0	-132.0	-137.7	-153.7	-167.2	-170.7
7 GHz	spec.				-111.6	-120.6	-127.0	-143.0	-156.5	-160.0
	typ.	-17.1	-57.1	-98.6	-115.6	-124.6	-131.0	-147.0	-160.5	-164.0

Table 8-3 **SSB Phase Noise Sensitivity (Standard, < 150 kHz optim., Measurement quality = Fast, correlation = 1, +5 dBm input, start freuqency = 1 Hz)**

Input Frequency		Offset from carrier (Hz)								
		1	10	100	1 k	10 k	100 k	1 M	10 M	40 M
10 MHz	spec.				-145.5	-153.5	-163.5	-165.5	-	-
	typ.	-74.0	-112.5	-141.5	-149.5	-157.5	-167.5	-169.5	-	-
100 MHz	spec.				-145.5	-153.5	-160.5	-165.5	-167.0	-
	typ.	-54.0	-92.5	-132.5	-149.5	-157.5	-164.5	-169.5	-171.0	-
1 GHz	spec.				-125.5	-134.5	-141.5	-157.5	-167.0	-167.5
	typ.	-34.0	-72.5	-112.5	-129.5	-138.5	-145.5	-161.5	-171.0	-171.5
3 GHz	spec.				-116.0	-125.0	-130.7	-146.7	-160.2	-163.7
	typ.	-24.5	-63.0	-103.0	-120.0	-129.0	-134.7	-150.7	-164.2	-167.7
7 GHz	spec.				-108.6	-117.6	-124.0	-140.0	-153.5	-157.0
	typ.	-17.1	-55.6	-95.6	-112.6	-121.6	-128.0	-144.0	-157.5	-161.0

Table 8-4 **SSB Phase Noise Sensitivity (Option 011, < 150 kHz optim., Measurement quality = Normal, +5 dBm input, start frequency = 10 Hz, measurement time = 4.4 sec)**

Input Frequency		Offset from carrier (Hz)							
		10	100	1 k	10 k	100 k	1 M	10 M	40 M
10 MHz	spec.			-145.5	-153.5	-160.0	-160.0	-	-
	typ.	-82.0	-141.5	-149.5	-157.5	-167.5	-169.5	-	-
100 MHz	spec.			-145.5	-153.5	-160.0	-160.0	-160.0	-
	typ.	-82.0	-132.5	-149.5	-157.5	-164.5	-169.5	-170.0	-
1 GHz	spec.			-125.5	-134.5	-141.5	-157.5	-160.0	-160.0
	typ.	-40.0	-100.0	-129.5	-138.5	-145.5	-161.5	-170.0	-170.0
3 GHz	spec.			-116.0	-125.0	-130.7	-146.7	-160.0	-160.0
	typ.	-40.0	-100.0	-120.0	-129.0	-134.7	-150.7	-164.2	-167.7
7 GHz	spec.			-108.6	-117.6	-124.0	-140.0	-153.5	-157.0
	typ.	-40.0	-95.6	-112.6	-121.6	-128.0	-144.0	-157.5	-161.0

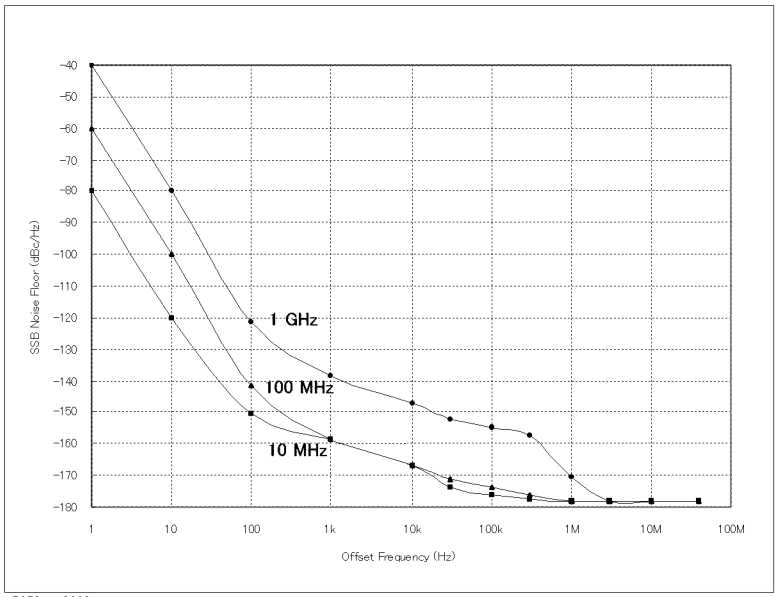
Table 8-5 **SSB Phase Noise Sensitivity (Option 011, < 150 kHz optim., Measurement quality = Fast, +5 dBm input, start frequency = 10 Hz)**

Input Frequency		Offset from carrier (Hz)							
		10	100	1 k	10 k	100 k	1 M	10 M	40 M
10 MHz	spec.			-141.0	-149.0	-159.0	-160.0	-	-
	typ.	-82.0	-138.0	-145.0	-153.0	-163.0	-165.0	-	-
100 MHz	spec.			-141.0	-149.0	-156.0	-160.0	-160.0	-
	typ.	-82.0	-129.0	-145.0	-153.0	-160.0	-165.0	-166.5	-
1 GHz	spec.			-121.0	-130.0	-137.0	-153.0	-160.0	-160.0
	typ.	-40.0	-100.0	-125.0	-134.0	-141.0	-157.0	-166.5	-167.0
3 GHz	spec.			-111.5	-120.5	-126.2	-142.2	-155.7	-159.2
	typ.	-40.0	-99.5	-115.5	-124.5	-130.2	-146.2	-159.7	-163.2
7 GHz	spec.			-104.1	-113.1	-119.5	-135.5	-149.0	-152.5
	typ.	-40.0	-92.1	-108.1	-117.1	-123.5	-139.5	-153.0	-156.5

Table 8-6 **SSB Phase Noise Sensitivity Improvement by Correlation**

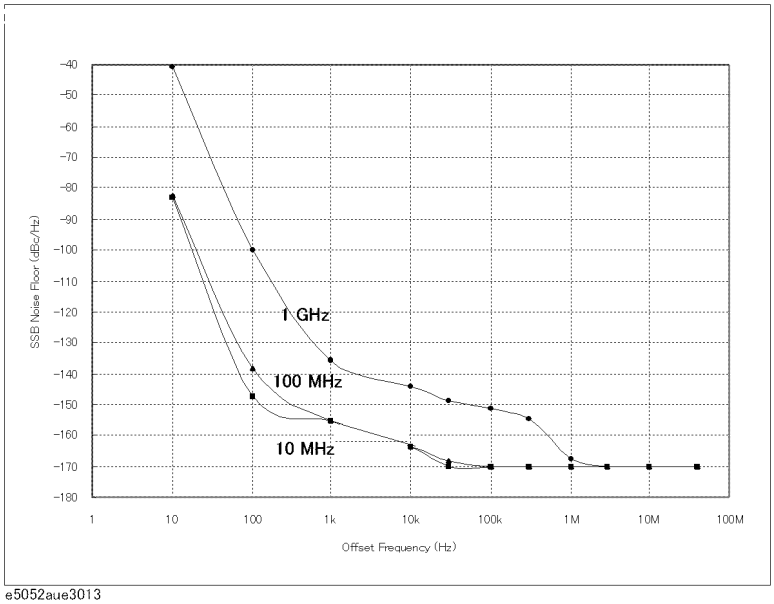
Number of Correlation	10	100	1000	10000
Improvement Factor	5 dB	10 dB	15 dB	20 dB

Figure 8-1 **SSB Phase Noise Sensitivity (Standard, < 150 kHz optim., Measurement quality = Normal, correlation = 1, start frequency = 1 Hz, measurement time = 17.7 sec), supplemental data**



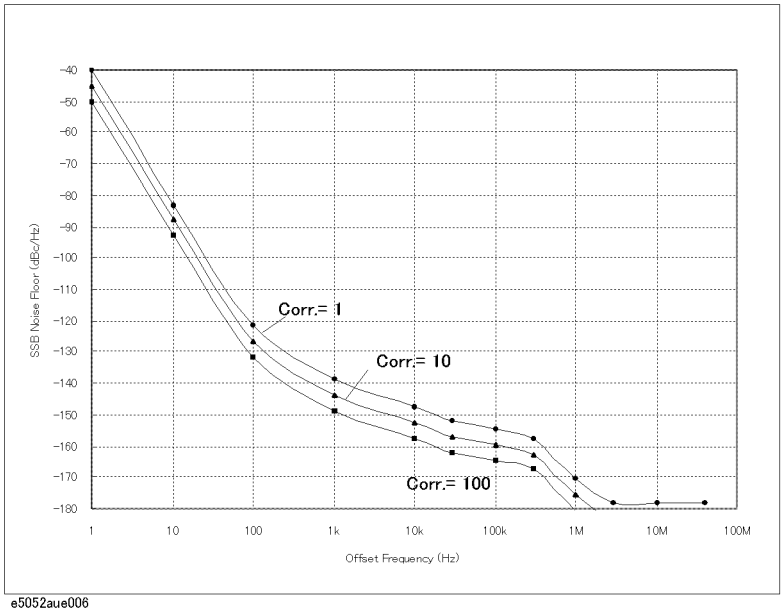
e5052aue3009

Figure 8-2 **SSB Phase Noise Sensitivity (Option 011, < 150 kHz optim., Measurement quality = Normal, start frequency = 10 Hz, measurement time = 4.4 sec), supplemental data**



e5052aue3013

Figure 8-3 **SSB Phase Noise Sensitivity (improvement by correlation, 1 GHz, < 150 kHz optim. Measurement quality = Normal), supplemental data**



e5052aue006

Figure 8-4 **SSB Phase Noise Sensitivity of different LO optimizations (Standard, Measurement quality = Normal, correlation = 1, start frequency = 1 Hz, measurement time = 17.7 sec, 1 GHz), supplemental data**

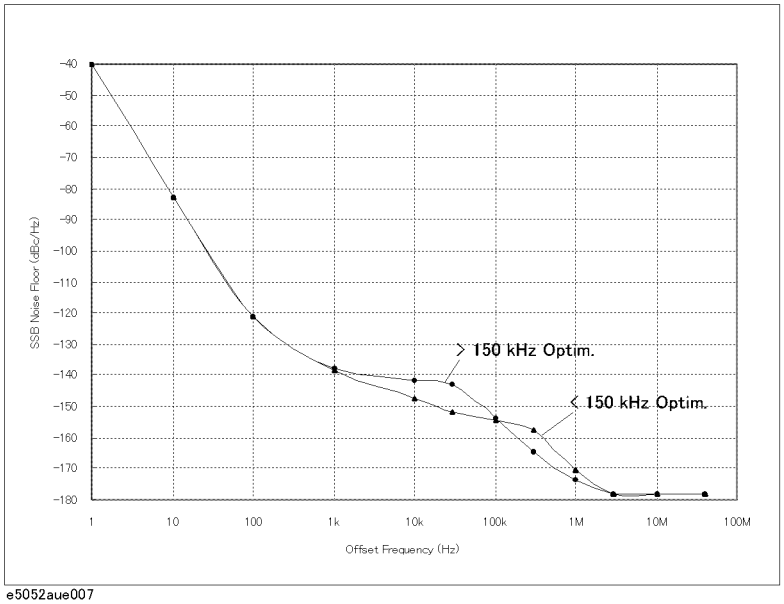


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Table 8-7 **Typical measurement time (sec) for phase noise measurement*1 (Measurement quality = Normal)**

Stop Frequency (Hz)	Start Frequency (Hz)			
	1	10	100	1 k
100 k	10.9	2.70	0.34	0.04
1 M	10.7	2.70	0.34	0.04
10 M	11.1	2.8	0.35	0.04
40 M	17.7	4.4	0.56	0.07

*1. Measurement Time (sec) = 0.2 + the above values × number of correlation when applying cross-correlation function (standard only). For Option 011, number of correlation = 1.

Measurement capabilities

Phase noise	
Measurement parameters	SSB Phase noise
Number of trace	1 data trace and 1 memory trace
Data formats	dBc/Hz
Measurement Trigger	Set to continuous, hold, or single, sweep with internal, external, manual, or bus trigger.

Table 8-8 **Limited functions along with the related SCPI commands when option 011 is installed**

Softkey	SCPI Command	Limitation of values
[Start/Center]	:SENSe:PN:FREQuency:STARt	The minimum value is down to 10 (Hz)*1
[Setup] - [IF Gain]	:SENSe:PN:IFGain	The value is fixed as 10 (dB)*2
[Average] - [Correlation]	:SENSe:PN:CORRelation:COUNt	The value is fixed as 1*2

*1. The minimum value is always set to 10 (Hz) when this command receives the value less than 10.
*2. Any values except listed in the table will not be accepted. The softkeys listed in the table are also not available when option 011 is installed.

Frequency, RF Power, DC current Measurements

Table 8-9 Frequency Measurement

Description	Specifications
Frequency Range	10 M to 7 GHz Frequency Band : 10 M to 1.5 GHz, 300 M to 7 GHz
Frequency Resolution	10 Hz, 1 kHz, 64 kHz
Internal time base stability	±5 ppm (at 23°C±5°C)
Accuracy	±(resolution + time base accuracy)

Table 8-10 RF Power Measurement

Description	Specifications
Frequency Range	10 M to 7 GHz Frequency Band : 10 M to 1.5 GHz, 300 M to 7 GHz
Input Level 10 MHz to 30 MHz 30 MHz to 7 GHz	 -15 dBm to +20 dBm -20 dBm to +20 dBm
Resolution	0.01 dB
Accuracy (Peak Voltage Response) 30 MHz to 3 GHz, >-10 dBm Other than the above	 ±0.5 dB (at 23°C±5°C) ±1 dB (at 23°C±5°C)

Table 8-11 DC Current Measurement

Description	Specifications
Current Range	0 to 80 mA
Resolution	10 µA
Accuracy	±(0.2% of reading + 160 µA) (at 23°C±5°C)

Measurement capabilities

Frequency, Power, and DC current (for Standard)	
Measurement parameters	Analyzer mode:*1 Frequency versus DC control voltage, dF/dVcontrol (Tuning sensitivity) Frequency versus DC power voltage (Frequency pushing), dF/dVpower RF power versus DC control voltage RF power versus DC power voltage DC current (at DC power port only) versus DC control voltage DC current (at DC power port only) versus DC power voltage Tester mode:*1 Frequency, power, and DC current (at DC power port)
Number of point	2 to 1001 (for analyzer mode only)
Data formats	Hz, Hz/V(Frequency), dBm(RF power), A(DC power port only)
Measurement Trigger	Set to continuous, hold, or single, sweep with internal, external, manual, or bus trigger.

*1. Refer to the chapter 4, “Frequency/power measurement in the frequency/power measurement mode” section for the difference between “Analyzer mode” and “Testser mode”

Frequency, Power, and DC current (for Option 011) *Point measurement only	
Measurement parameters	Frequency, power, and DC current (at DC power port) (Numerical Display Only)
Data formats	Hz (Frequency), dBm(RF power), A(DC power port only).
Measurement Trigger	Set to continuous, hold, or single with internal, external, manual, or bus trigger.

Softkeys and SCPI commands that are not available when using “Tester” mode or option 011 is installed

Table 8-12

Softkeys	SCPI commands
[Format]	:CALCulate:FP[1-1]:TRACe[1-3]
[Display] - [Marker Information]	:DISPlay:FP[1-1]:ANNotation:MARKer:POSition
[Display] - [Relative Y-Scale]	:DISPlay:FP[1-1]:GRATicule:AXIS:Y:RELative
[Display] - [Y # of Digits]	:DISPlay:FP[1-1]:GRATicule:AXIS:Y:STATe
[Marker]	:CALCulate:FP[1-1]:TRACe[1-3] :CALCulate:FP[1-1]:ALLTrace :DISPlay:FP[1-1]:TABLe[:STATe]
[Marker Function]	:CALCulate:FP[1-1]:TRACe[1-3] :CALCulate:FP[1-1]:ALLTrace

Table 8-12

[Marker Search]	:CALCulate:FP[1-1]:TRACe[1-3]
[Marker To]	:SOURce:FP[1-1]:VOLTage
[Save/Recall] - [Save Data Trace]	:MMEMory:FP[1-1]:TRACe[1-3]:STORe[:DATA]
[Save/Recall] - [Save Memory Trace]	:MMEMory:FP[1-1]:TRACe[1-3]:STORe:MEMory
[Scale]	:DISPlay:FP[1-1]:TRACe[1-3]:Y[:SCALe] :DISPlay:FP[1-1]:ALLTrace:Y[:SCALe]:AUTO :DISPlay:FP[1-1]:Y[:SCALe]:DIVision
[Setup] - [Point]	:SOURce:FP[1-1]:SWEep:POINt
[Setup] - [Sweep Parameter]	:SOURce:FP[1-1]:SWEep:PARameter
[Start/Center]	:SOURce:FP[1-1]:VOLTage
[Stop/Span]	:SOURce:FP[1-1]:VOLTage
[Trace View]	:CALCulate:FP[1-1]:TRACe :DISPlay:FP[1-1]:TRACe
	:CALCulate:FP[1-1]:DATA:RDATa
	:CALCulate:FP[1-1]:DATA:XDATa
	:DISPlay:FP[1-1]:MAXimize
	:SENSe:FP[1-1]:SWEep:TIME:DATA

Transient Measurement

Table 8-13 Transient Measurement

Description	Specifications
Measurement Function	Frequency, Power, Phase
Target Frequency Range	10 MHz to 7 GHz
Input Power Level	-20 to +20 dBm
Frequency Transient Range Wide Band Narrow Band	 See Table 8-14 1.6 MHz or 25.6 MHz (Target frequency ≥ 200 MHz)
Time Span	10 µsec to 100 msec, 1,2,5 step
Time resolution	10 nsec to 100 µsec
Frequency Transient measurement Accuracy	 ±(frequency resolution*1 + time base accuracy)
Power Transient measurement Range Accuracy Resolution	 -20 dBm to +20 dBm ±2 dB (typical, , at 23°C±5°C) 0.1 dB (typical)
Phase Transient measurement*2*3 Accuracy Trace noise Stability	 0.1 deg/GHz (0.1 deg min.) (typical, at 23°C±5°C) 0.02 deg/GHz (0.02 deg min.) (typical, at 23°C±5°C) 10 deg/sec (typical, at 23°C±5°C)

*1. See Table 8-15 through Table 8-18 for details.
*2. The time base of DUT is required to lock with the time base of the analyzer.
*3. When a DUT's frequency is settled to a selected phase reference frequency.

Table 8-14 Wide Band Frequency Selection Table

Frequency Max (MHz)	150	300	600	900	1200	1500	1800	2400	3000	3600	4200	4800	5400	6000	6600	7200
Frequency Min (MHz)	50	100	200	300	400	500	600	800	1000	1200	1400	1600	1800	2000	2200	2400

Table 8-15 Wide Band Transient (Time span, Time resolution and number of points)

Time Span (sec)	10 µ	20 µ	50 µ	100 µ	200µ	500 µ	1 m	2 m	5 m	10 m	20m	50 m	100 m
Time Resolution (µsec)	0.01	0.02	0.05	0.1	0.2	0.5	1	2	6.25	12.5	25	62.5	125
Number of point	1001	1001	1001	1001	1001	1001	1001	1001	801	801	801	801	801

Table 8-16 Frequency Resolution (Hzrms) of Wide Band Transient

Transient Frequency Band (MHz)	Time Span (sec)												
	10 µ	20 µ	50 µ	100 µ	200µ	500 µ	1 m	2 m	5 m	10 m	20m	50 m	100 m
50 to 150	28 k	28 k	28 k	28 k	10 k	3 k	1 k	1 k	1k	1 k	1 k	1 k	1 k
100 to 300	56 k	56 k	56 k	56 k	20 k	7 k	2 k	2 k	2k	2 k	2 k	2 k	2 k
200 to 600	113 k	113 k	113 k	113 k	40 k	14 k	5 k	5 k	5k	5 k	5 k	5 k	5 k
300 to 900	169 k	169 k	169 k	169 k	60 k	21 k	7 k	7 k	7k	7 k	7 k	7 k	7 k
400 to 1200	226 k	226 k	226 k	226 k	80 k	28 k	10 k	10 k	10k	10 k	10 k	10 k	10 k
500 to 1500	282 k	282 k	282 k	282 k	100 k	35 k	12 k	12 k	12k	12 k	12 k	12 k	12 k
600 to 1800	339 k	339 k	339 k	339 k	120 k	42 k	15 k	15 k	15 k	15 k	15 k	15 k	15 k
800 to 2400	452 k	452 k	452 k	452 k	160 k	56 k	20 k	20 k	20 k	20 k	20 k	20 k	20 k
1000 to 3000	565 k	565 k	565 k	565 k	200 k	70 k	25 k	25 k	25 k	25 k	25 k	25 k	25 k
1200 to 3600	678 k	678 k	678 k	678 k	240 k	84 k	30 k	30 k	30 k	30 k	30 k	30 k	30 k
1400 to 4200	791 k	791 k	791 k	791 k	280 k	98 k	35 k	35 k	35 k	35 k	35 k	35 k	35 k
1600 to 4800	905 k	905 k	905 k	905 k	320 k	113 k	40 k	40 k	40 k	40 k	40 k	40 k	40 k
1800 to 5400	1 M	1 M	1 M	1 M	360 k	127 k	45 k	45 k	45 k	45 k	45 k	45 k	45 k
2000 to 6000	1 M	1 M	1 M	1 M	400 k	141 k	50 k	50 k	50 k	50 k	50 k	50 k	50 k
2200 to 6600	1 M	1 M	1 M	1 M	440 k	155 k	55 k	55 k	55 k	55 k	55 k	55 k	55 k
2400 to 7200	1 M	1 M	1 M	1 M	480 k	169 k	60 k	60 k	60 k	60 k	60 k	60 k	60 k

Table 8-17 Narrow Band Transient (Frequency Transient Range = 1.6 MHz)

Time Span (sec)				100 µ	200 µ	500 µ	1 m	2 m	5 m	10 m	20m	50 m	100 m
Frequency Resolution (Hzrms)				110	110	110	39	20.5	14	5	5	5	5
Time Resolution (µsec)				0.16	0.32	0.8	0.8	1.6	4	8	20	80	160
Number of point				626	626	626	1251	1251	1251	1251	1001	626	626

Table 8-18 Narrow Band Transient (Frequency Transient Range = 25.6 MHz)

Time Span (sec)	10 µ	20 µ	50 µ	100 µ	200 µ	500 µ	1 m	2 m	5 m	10 m	20m	50 m	100 m
Frequency Resolution (Hzrms)	7 k	7 k	7 k	7 k	3 k	883.9	312.5	312.5	312.5	312.5	312.5	312.5	312.5
Time Resolution (µsec)	0.01	0.02	0.05	0.1	0.2	0.5	1	2	6.25	12.5	25	62.5	125
Number of point	1001	1001	1001	1001	1001	1001	1001	1001	801	801	801	801	801

Measurement capabilities

Transient	
Measurement parameters	Frequency versus time (Wide band) Frequency versus time (Narrow band) Phase versus time (Narrow band) Power versus time (Narrow band)
Number of trace	1 data trace and 1 memory trace per measurement trace
Data formats	Hz(Frequency versus time), dBm(Power versus time), degree/radian/gradian (phase versus time), wrap phase ON/OFF
Measurement Trigger	Set to continuous, hold, or single, sweep with internal, external, manual, bus, or video trigger.

Spectrum Monitor

Table 8-19 Spectrum Monitor

Description	Specifications
Frequency Span	20% of center frequency (center frequency: 10 MHz to 50 MHz)
	10 MHz (center frequency: 50 MHz to 100 MHz)
	15 MHz (center frequency : greater equal than 100 MHz)
RBW	1.53 Hz to 400 kHz
Absolute Level Accuracy	±2 dB @-10 dBm, Attenuator = 0 dB (typical, at 23°C±5°C)
Relative Level Accuracy	±1.5 dB @ratio of -10 dBm to -60 dBm during sweep (at 23°C±5°C)
Noise Floor	-95 dBm @RBW=24.4 Hz (typical, at 23°C±5°C)
Spurious	
Mixer harmonics	-30 dBc (typical, at 23°C±5°C)
IF distortion	-40 dBc (typical, at 23°C±5°C)

Measurement capabilities

Spectrum monitor	
Number of trace	1 data trace and 1 memory trace per measurement trace
Data formats	dBm, dBV, Watt, Volt, dBm/Hz, dBV/Hz, Watt/Hz, Volt/$\sqrt{Hz}$
Measurement Trigger	Set to continuous, hold, or single, sweep with internal, external, manual, or bus trigger.

Port Output (DC Power/Control)

Table 8-20 DC Power Voltage Output

Description	Specifications
Voltage Range	0 to 16 V
Resolution	1 mV
Setting Accuracy	±(0.2% + 2 mV) (at 23°C±5°C)
Maximum output current	80 mA
Noise	< 10 nV/√ Hz @10kHz (typical, at 23°C±5°C)
Output Resistance	< 0.3 Ω (typical)

Table 8-21 DC Control Voltage Output

Description	Specifications
Voltage Range	-15 to 35 V
Resolution	0.1 mV
Setting Accuracy -15 to 0 V 0 to 35 V	 ±((setting + 15 V) × 0.1% + 5 mV) (typical, at 23°C±5°C) ±(setting × 0.1% + 2 mV) (typical, at 23°C±5°C)
Maximum output current	20 mA (typical)
Noise 0 to 20 V -15 to 0 V, 20 to 35 V	 1 nV/√ Hz @10kHz (typical, at 23°C±5°C) 1.5 nV/√ Hz @10kHz (typical, at 23°C±5°C)
Output resistance (DC)	< 50 Ω
Output resistance (AC)	50 Ω (nominal)

Test Port Input

Table 8-22 RF IN

Description	Specifications
Input Level	
10 M to 30 MHz	-15 to +20 dBm
30 M to 7 GHz	-20 to +20 dBm
Input Attenuator	0 to 35 dB in 5 dB steps
Damage Level	+23 dBm (nominal)
VSWR	
10 M to 30 MHz	< 1.6 (at 23°C±5°C)
30 M to 2 GHz	< 1.2 (at 23°C±5°C)
2 G to 3 GHz	< 1.3 (at 23°C±5°C)
3 G to 4 GHz	< 1.3 (typical, at 23°C±5°C)
4 G to 7 GHz	< 1.5 (typical, at 23°C±5°C)

General Information

Table 8-23 Front Panel Information

Description	Supplemental Information
RF IN	
Type	Type-N, female, 50 Ω (nominal)
DC POWER/CONTROL	
Type	BNC, female, 50 Ω (nominal)
Display	
Size	10.4 in TFT color LCD
Resolution	VGA (640 × 480)*1

*1. Valid pixels are 99.99 % and more. Below 0.01 % (approx. 30 points) of fixed points of black, blue, green or red are not regarded as failure.

Table 8-24 Rear Panel Information

Description	Supplemental Information
External Trigger Connector	
Type	BNC, female
Input level	LOW threshold voltage: 0.5 V HIGH threshold voltage: 2.1 V Input level range: 0 to + 5 V
Pulse width	≥ 2 µsec, typical
Polarity	Positive/Negative selectable
External Reference Signal Input Connector	
Type	BNC, female
Input Frequency	10 MHz ± 10 Hz, typical
Input Level	-6 dBm to + 16 dBm, typical
Internal Reference Signal Output Connector	
Type	BNC, female
Output Frequency	10 MHz ± 50 Hz, typical
Signal Type	Sine Wave, nominal
Output Level	2.5 dBm ± 3 dB, typical
Output Impedance	50 Ω, nominal
VGA Video Output	15-pin mini D-Sub; female; drives VGA compatible monitors
GPIB	24-pin D-Sub (Type D-24), female; compatible with IEEE-488
Parallel Port	36-pin D-Sub (Type 1284-C), female; provides connection to printers
USB Port	
 Contact 1 Contact 2 Contact 3 Contact 4	Universal Serial Bus jack, Type A configuration (4 contacts inline, contact 1 on left); female; provides connection to printer, USB/GPIB interface Vcc: 4.75 to 5.25 VDC, 500 mA, maximum –Data +Data Ground
LAN	10/100BaseT Ethernet, 8-pin configuration; auto selects between the two data rates
24 Bit I/O Port	36-pin D-sub, female; provides connection to handler system

Table 8-24 Rear Panel Information

Description	Supplemental Information
Line Power[*1]	
Frequency	47 Hz to 63 Hz
Voltage	90 to 132 VAC, or 198 to 264 VAC (automatically switched)
VA Max	500 VA max.

*1. A third-wire ground is required.

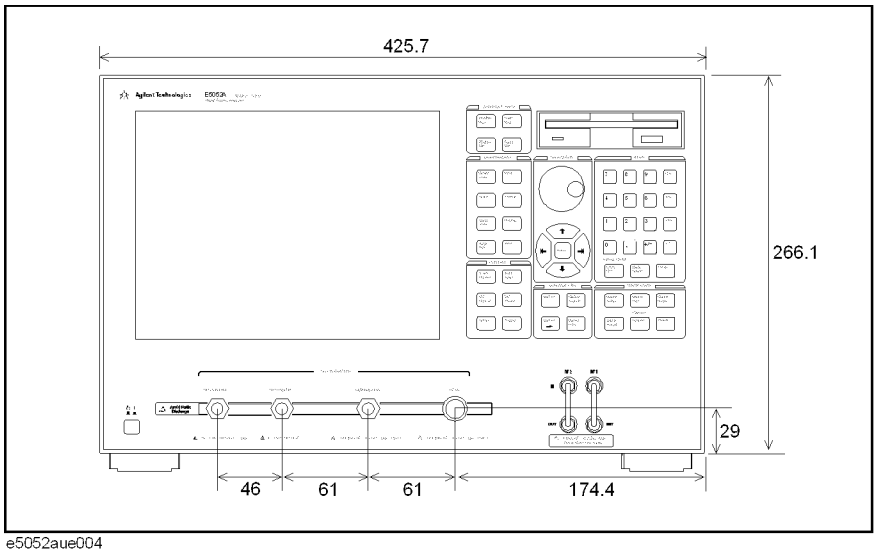
Table 8-25 EMC and Safety

Description	Supplemental Information
EMC	
CE ISM 1-A	European Council Directive 89/336/EEC, 92/31/EEC, 93/68/EEC IEC 61326-1:1997 +A1:1998 +A2:2000/EN 61326-1:1997 +A1:1998 +A2:2001 CISPR 11:1997 +A1:1999/EN 55011:1998 +A1:1999 Group 1, Class A IEC 61000-4-2:1995 +A1:1998/EN 61000-4-2:1995 +A1:1998 4 kV CD / 8 kV AD IEC 61000-4-3:1995 +A1:1998/EN 61000-4-3:1996 +A1:1998 3 V/m, 80-1000 MHz, 80% AM IEC 61000-4-4:1995/EN 61000-4-4:1995 1 kV power / 0.5 kV Signal IEC 61000-4-5:1995/EN 61000-4-5:1995 0.5 kV Normal / 1 kV Common IEC 61000-4-6:1996/EN 61000-4-6:1996 3 V, 0.15-80 MHz, 80% AM IEC 61000-4-11:1994/EN 61000-4-11:1994 100% 1cycle European Council Directive
ICES/NMB-001	This ISM device complies with Canadian ICES-001:1998. Cet appareil ISM est conforme a la norme NMB-001 du Canada.
N10149	AS/NZS 2064.1/2 Group 1, Class A
Safety	
CE ISM 1-A	European Council Directive 73/23/EEC, 93/68/EEC IEC 61010-1:2001/EN 61010-1:2001 Measurement Category I, Pollution Degree 2, Indoor Use IEC60825-1:1994 Class 1 LED
LR95111C	CAN/CSA C22.2 No. 1010.1-92

Table 8-26 Analyzer Environment and Dimensions

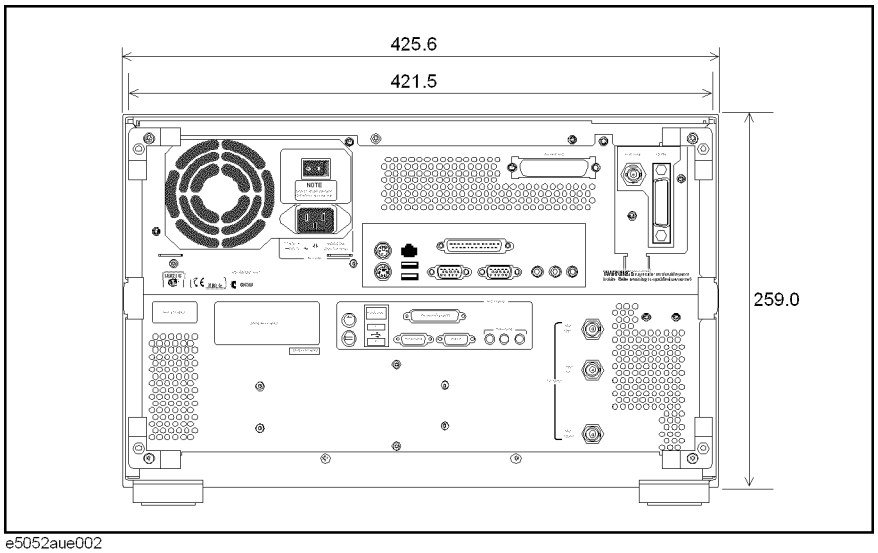
Description	Supplemental Information
Operating Environment	
Temperature	+10 °C to +40 °C
Humidity	20% to 80% at wet bulb temperature < +29 °C (non-condensing)
Altitude	0 to 2,000 m (0 to 6,561 feet)
Vibration	0.5 G maximum, 5 Hz to 500 Hz
Non-Operating Storage Environment	
Temperature	–10 °C to +60 °C
Humidity	20% to 90% at wet bulb temperature < +40 °C (non-condensing)
Altitude	0 to 4,572 m (0 to 15,000 feet)
Vibration	0.5 G maximum, 5 Hz to 500 Hz
Dimensions	See Figure 8-5 through Figure 8-7.
Weight (Net)	21 kg

Figure 8-5 Dimensions (front view, in millimeters, nominal)



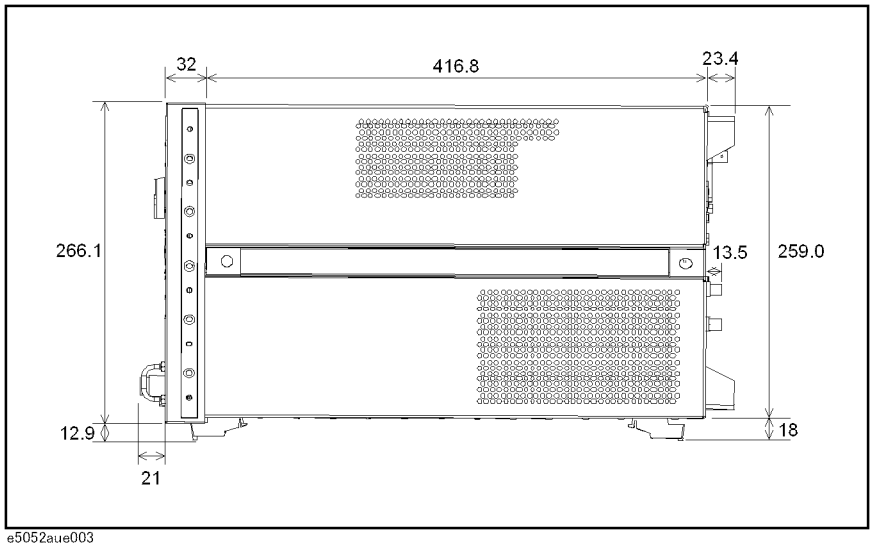
e5052aue004

Figure 8-6 **Dimensions (rear view, in millimeters, nominal)**



e5052aue002

Figure 8-7 **Dimensions (side view, in millimeters, nominal)**



e5052aue003

Measurement capabilities

Number of measurement windows	Up to 4 measurement windows and 1 user defined window.
Data markers	6 independent markers per trace. Reference marker available for delta marker operation.
Marker functions	
Marker search	Max value, Min value, peak, peak left, peak right, target, target left, target right, multi-peak, multi-target, bandwidth parameters with user-defined bandwidth values
Marker-to functions	Set start, stop, center to active marker stimulus value; set reference to active marker response value.
Search range	User definable
Tracking	Performs marker search continuously or on demand
User defined window	
Number of trace	8 data traces and 8 memory traces.

DC Power/Control Voltage Setting

Measured number of points per sweep	User definable from 2 to 1001.
Sweep type (parameter)	Control voltage sweep, power voltage sweep.
Control Voltage	Set control voltage from -15 V to +35 V.
Power Voltage	Set power voltage from 0 V to +16 V.

Trace functions

Display data	Display current measurement data, memory data, or current measurement and memory data simultaneously.
Trace math	Addition, subtraction, multiplication or division of measured values and memory data.
Title	Add custom title to each channel window. Titles are printed on hardcopies of displayed measurements.
Autoscale	Automatically selects scale resolution and reference value to vertically center the trace.
Statistics	Calculates and displays mean, standard deviation and peak-to-peak deviation of the data trace.

Storage

Internal hard disk drive	Store and recall instrument states, calibration data, and trace data on 10 GB, minimum, internal hard drive. Trace data can be saved in CSV (comma separated value) format. All files are MS-DOS® -compatible. Instrument states include all control settings, and memory trace data.
File sharing	Internal hard disk drive (F:) can be accessed from an external Windows® PC through LAN.
Disk drive	Instrument states, calibration data, and trace data can be stored on an internal 3.5 inch 1.4MB floppy disk in MS-DOS® -compatible format.
Screen hardcopy	Printouts of instrument data are directly produced on a printer.

System capabilities

Familiar graphical user interface	The analyzer employs a graphical user interface based on Windows® operating system. There are three ways to operate the instrument manually: you can use a hardkey interface, a touch screen interface, or a mouse interface.

Automation

Methods	
Internal analyzer execution	Applications can be developed in a built-in VBA® (Visual Basic for Applications) language. Applications can be executed from within the analyzer via COM (component object model) or using SCPI.
Controlling via GPIB	The GPIB interface operates to IEEE 488.2 and SCPI protocols. The analyzer can be controlled by a GPIB external controller. The analyzer can control external devices using a USB/GPIB interface.
LAN	
Standard conformity	10 Base-T or 100 Base-TX (automatically switched), Ethertwist, RJ45 connector
Protocol	TCP/IP
Function	Telnet, SICL-LAN

A Manual Changes

This appendix contains the information required to adapt this manual to versions or configurations of the E5052A manufactured earlier than the current printing date of this manual. The information in this manual applies directly to E5052A units having the serial number printed on the title page of this manual.

Manual Changes

To adapt this manual to your E5052A, refer to Table A-1 and Table A-2.

Table A-1 Manual Changes by Serial Number

Serial Prefix or Number	Make Manual Changes

Table A-2 Manual Changes by Firmware Version

Version	Make Manual Changes
1.10 or later	Change 1
1.50 or later	Change 2

Agilent Technologies uses a two-part, ten-character serial number that is stamped on the serial number plate (Figure A-1). The first five characters are the serial prefix and the last five digits are the suffix.

Figure A-1 Example of Serial Number Plate

e5052apj029

Change 2

The following functions are newly integrated into the firmware version 1.50 onward. They are not supported by firmware version 1.10 or earlier.

- ❏ Limit test function
- ❏ Auto frequency control function
- ❏ X-axis labels
- ❏ User preset
- ❏ Copy function of measurement result to user window
- ❏ Recall function of state file from softkey
- ❏ Selectable trace layout in frequency/power measurement mode.
- ❏ Integrated phase noise, jitter and residual FM measurement in phase noise measurement
- ❏ Selectable quality level on phase noise measurement
- ❏ Display the progress of phase noise measurement
- ❏ Display spurious power value on phase noise measurement
- ❏ Moving function of harmonics to the center on spectrum monitor measurement
- ❏ Supporting ΔHz,% and ppm data formats on frequency measurement
- ❏ Supporting 200kHz frequency range on transient measurement
- ❏ Offset adding function to phase reference frequency on transient measurement

Change 1

The functions listed below are limited when option 011 is installed.

Table A-3 Limited functions when option 011 is installed

Functions	Limitations
[PN] Start frequency	Minimum value is 10 Hz
[PN] Correlation	Not Available (The value is fixed as 1)
[PN] IF Gain	Not Available (The value is fixed as 10 dB)
[FP] Trigger Mode	Tester mode only

The SCPI commands that related the limited functions above have also the limitations on the initial values and the range of parameters.

Manual Changes

B Troubleshooting

This Chapter explains the steps to take in troubleshooting when your Agilent E5052A appears to be operating improperly. Explanations are also given for the error warning messages displayed on the screen.

Troubleshooting

This section explains the steps you should take when you believe the Agilent E5052A is operating improperly. The results of these simple investigative procedures may help you avoid the down-time and inconvenience of repair service. The troubleshooting instructions are divided into three categories:

❏ “Troubleshooting during Startup” on page 240
❏ “Troubleshooting during Operation” on page 241
❏ “Troubleshooting for External Devices” on page 243

Troubleshooting during Startup

The system does not start up

- Turning on (|) the standby switch does not start up the system.

  ➤ Confirm that the power cable is properly plugged in.

  ➤ Confirm that the line switch on the rear panel is turned on (◌). For information on the line switch on the rear panel, see “7. Line Switch (Always ON)” on page 45.

When taking all of the above measures does not restore normal operation, there is a possibility of a device failure. Unplug the power cable immediately and contact Agilent Technologies’ Customer Contact given at the end of this guide or the company from which you bought the device.

The system starts up, but the normal measurement screen does not appear

- The system starts up, but it automatically shuts down immediately.
- The system starts up, but it enters the service mode (the instrument status bar in the lower right part of the screen displays **SVC** in red).
- The measurement screen appears after startup, but the date and time displayed on the instrument status bar in the lower right part of the screen differ greatly from the previous settings.
- The measurement screen appears after startup, but the power-on test fails with Error Message 200 appearing against a red background in the instrument message/warning area in the lower left part of the screen.

  ➤ Execute system recovery. For information on the execution procedure, see “System Recovery” on page 201.

There is a possibility of a device failure. Contact Agilent Technologies’ Customer Contact given at the end of this guide or the company from which you bought the device.

NOTE **Occasionally, a few pixels may appear on the screen as a fixed point of blue, green or red. Please note that this is not a failure and does not affect the performance of your product.**

Troubleshooting during Operation

The sweep action stops during measurement or is not executed

- The sweep action stops during measurement or is not executed, but the front keys and softkeys are operational.

There is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

The error message "RF level overload" is displayed

- During measurement of the DUT, Error Messages 240 "RF level overload" on page 248 is displayed.
  This error occurs when the input to the RF IN port exceeds the maximum input level in the measurement. The measurement value obtained in such a case is not correct. In the worst case, a failure (damage to the receiver) may occur.

  ➤ Change the measurement condition so that the input to the RF IN port does not exceed the maximum input level.

  When this message is displayed with nothing connected to the RF IN port, there is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

A clearly abnormal measurement value

- The measurement value is not reproducible, or clearly abnormal.

  ➤ Confirm that the DUT, connection cables, and other parts are connected correctly.

  ➤ Confirm that the connectors and cables used to connect the DUT are free from damage or poor contact.

When taking all of these measures does not result in a correct measurement value, there is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

The system cannot be operated manually (front panel keys, keyboard, touch screen and mouse)

- The keyboard or mouse becomes inoperable.

  ➤ Confirm that the keyboard or mouse is connected correctly. When it is connected correctly, turn off the power and restart the system.

- The front panel key or keyboard becomes inoperable.

  ➤ Using the mouse, turn **System** – **Mics Setup** – **Key Lock** – **Front Panel & Keyboard Lock** OFF.

- The touch screen becomes inoperable.

  ➤ Using the front panel keys, turn **System** – **Mics Setup** – **Key Lock** – **Touch Screen & Mouse Lock** OFF.

  ➤ Execute the calibration of the touch screen. For information on the execution procedure, see "Calibration of the Touch Screen" on page 205.

- The mouse becomes inoperable.

➤ Using the front panel keys, turn **System** – **Mics Setup** – **Key Lock** – **Touch Screen & Mouse Lock** OFF.

- All of the front panel keys, keyboard, and mouse become inoperable.

  ➤ Confirm that the keyboard or mouse is connected correctly. When it is connected correctly, turn off the power and restart the system.

- The keyboard and mouse have been connected after power-on.

  ➤ Turn off the power and restart the system.

When taking all of these measures does not recover operability, there is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

The screen freezes and all operations become impossible

- The measurement in progress or screen update is stalled and all of the front panel keys, keyboard, mouse, and touch screen are inoperable.

  ➤ Press the standby switch to turn off the power and restart the system.

If a similar symptom reappears, there is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

The System Freezes while in Operation.

- The system freezes while in operation.

  ➤ Press the standby switch to turn off the power and restart the system.

The rear cooling fan does not operate

There is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

You cannot save a file in a floppy disk

- You cannot save a file on a floppy disk.

  ➤ Confirm that the floppy disk is initialized. If not, initialize it.

  ➤ Confirm that the floppy disk is inserted correctly. Insert a floppy disk until the eject button pops up fully.

  ➤ Confirm that the floppy disk is not write-protected. If it is, unprotect the disk.

  ➤ Confirm that the floppy disk has free space. If it does not, delete unnecessary files or use a new floppy disk.

When taking all of these measures does not make it possible to save a file, there is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

You cannot read a file from a floppy disk

- You cannot read a file from a floppy disk.

  ➤ Confirm that the floppy disk is inserted correctly. Insert the floppy disk until the eject button pops up fully.

  ➤ A stored file may be damaged by a magnetic field. Confirm that the file can be read on a PC.

When taking all of these measures does not make it possible to read the file, there is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

An error or warning message appears

When an error or warning message is displayed on the instrument message/warning area in the lower part of the screen, refer to Error Messages on page 244 and Warning Messages on page 250.

Troubleshooting for External Devices

Cannot Output to a Printer

- Cannot output a measurement screen or data to a printer.
- Attempting to output to a printer causes Error Messages 40 and 41 on page 248 to appear.

  ➤ Confirm that the power to the printer is on and that the power cable is connected correctly.

  ➤ Confirm that the connector cable of the printer is connected correctly.

  ➤ Confirm that the printer is online.

  ➤ Confirm that the printer has not run out of paper.

  ➤ Confirm that the printer has not run out of ink.

When taking all of these measures does not result in printer output, there is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

GPIB does not respond to an external controller/fails to function normally

- A GPIB device does not respond to the external controller or fails to function normally.

  ➤ Confirm that the GPIB address is defined correctly.

  ➤ Confirm that the GPIB cable is connected.

  ➤ Confirm that another instrument connected by the GPIB cable has the same GPIB address.

  ➤ Confirm that the GPIB cable connection forms a loop.

When taking all of these measures does not result in correct operation of the GPIB device, there is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

Error Messages

An error message is displayed against a red background in the instrument message/warning area in the lower-left part of the screen. Touching **Entry Off** key at the front panel or executing the **:DISPlay:MESSage:CLEar** command clears the error message. Moreover, about a specific error message, when a sweep is started again, the display of an error message may disappear. Errors caused by operation of a front panel key simply appear on the display; with a few exceptions, these are not stored in the error queue.

The log of an error message,a maximum of 100 pieces are recorded, and it can go back and check from the newest error. The following procedures perform the procedure of elimination of an error check and an error log. This operation can be performed only from a front panel. It cannot be operated by the "SCPI" command.

System - **Error Log** - **View Error Log**

System - **Error Log** - **Clear Error Log**

An error with a positive error number is one uniquely defined for this instrument. On the other hand, an error with a negative error number is basically one defined for common GPIB devices in IEEE488.2

A

120 **AFC Failed**

This error message appears when the Automatic frequency control function could not follow the fluctuation in the measurement condition or automatic frequency control function was set on, however, the power or control voltage is not being applied to the DUT For the corrective actions, refer to the error message “AFC out of loop” and the warning message “DC output on required in AFC”.

330 **AFC out of loop**

The Automatic frequency control function could not follow the fluctuation in the measurement condition, and did not converge on the target frequency. Possible problems and corrective action are shown below.

- Press DC Control - **Auto Freq Control** - **Sensitivity** to specify a proper tuning sensitivity.
- Press DC Control - **Auto Freq Control** - **Max Iteration** to specify a value larger than the current setting.
- Press DC Control - **Auto Freq Control** - **Max Ctrl Voltage Limit** to specify a maximum value larger then the current setting. Be careful not to set a value that exceeds the DUT’s maximum acceptable value.
- Press DC Control - **DC control Delay** to specify a value larger than the current setting.

D

-222 **Data out of range**

A data element (not violating the standard) outside the range defined by this instrument has been received. This error occurs, for example, when an integer-based command for which the parameter can be rounded exceeds the range of -65536 to +65536 or when a

real-number-based command for which the parameter can be rounded exceeds the range of -9.9e37 to +9.9e37.

280 **DC control overload**

The current through the DC CONTROL connector is too large.

270 **DC power overload**

The current through the DC POWER connector is too large.

E

-200 **Execution error**

An error associated with execution has been generated for which this instrument cannot specify the error message. This code shows the occurrence of an error associated with execution, as defined in 11.5.1.1.5, IEEE488.2.

F

72 **Failed to copy file**

This error occurs when copying a file (MMEM:COPY command) fails.

74 **Failed to create directory**

This error occurs when creating a directory (MMEM:MDIR command) fails.

73 **Failed to delete file**

This error occurs when deleting a file (MMEM:DEL command) fails.

91 **Failed to execute user defined key**

In the user menu function, this error occurs when a disabled softkey is executed.

61 **Failed to hide trace**

In the user window, this error occurs when the show trace “OFF” command is executed to turn off the remaining trace on the window. At least one trace should be visible at all times.

60 **Failed to hide window**

This error occurs when the show window “OFF” command is executed to turn off the remaining window on the screen. At least one window should be visible at all times.

70 **Failed to read file**

This error occurs when a VBA project file (MMEM:LOAD:PROG command) or other type of file cannot be read normally.

90 **Failed to stop program**

This error occurs when stopping a program fails.

71 **Failed to write file**

This error occurs when the display image (MMEM:STOR:IMAG command) for the LCD screen, a VBA project file (MMEM:STOR:PROG command) or other type of file cannot be written normally.

-257 **File name error**

A file name error. This message appears when an error exists in the file name and thus a

command is not executed correctly. This error occurs, for example, when you try to copy to an improper file name.

-256 **File name not found**

The file name specified is not found and thus the command is not executed correctly. This error occurs, for example, when you try to read a file that does not exist in a disk or a disk is not correctly inserted into the drive.

80 **File transfer failed**

This error occurs when writing data into or reading data from a file (MMEM:DATA command) fails.

I

213 **IF A/D overflow**

This message appears when the internal IF level is too high and it exceeds the internal A/D converter input range. In the phase noise measurement, check that the DUT's carrier signal is within the selected frequency band. Also, the message may appear if a DUT that has a large noise level and an unstable output level is measured. When measuring phase noise in such a case, decrease the IF Gain value or increase the sweep start value if possible. In the spectrum monitor measurement, decrease the DUT's carrier level, or set the reference level or input attenuator value larger than the current setting. In the transient measurement, decrease the DUT's carrier level, or set the max input level or input attenuator value larger than the current setting.

260 **IF Level Overload**

The IF level is too high. Set the input attenuator value larger than the current setting.

312 **IF not found**

The IF signal cannot be found. In the phase noise measurement, this error occurs when no signal is inputted to the RF IN, or the input level to the RF IN is too low. Also, the message may appear if a DUT that has an unstable output level is measured. Aside from the above reasons, there is the possibility of a device failure. Contact an Agilent Technologies sales office or the company from which you bought the device.

-224 **Illegal parameter value**

The parameter value is improperly set.

-282 **Illegal program name**

This error occurs when a nonexistent VBA program name is specified by the PROG:SEL:NAME command.

-213 **Init ignored**

Because another measurement is in progress, the request for initiating a measurement ("INIT" command) is ignored.

250 **Insufficient IF Level**

The IF level is too low. Set the input attenuator value smaller than the current setting.

230 **Insufficient RF Level**

The input level to the RF IN connector is too low.

L

77 **Load VBA program failed**

This error occurs when loading a VBA program file fails.

M

20 **Marker search failed**

This error occurs when marker search fails.

-109 **Missing parameter**

The number of parameters is less than that required for the command, or the parameter has not been entered.

N

111 **No signal found**

This error message appears when a carrier is outside the selected frequency band or the attenuator is improperly set during execution of the **Carrier to** function. Set the attenuator to 0 in case you measure a DUT whose output is less than - 15 dBm.

O

100 **Option not installed**

The command received has been ignored because of the mismatch between the contents of an option for this instrument and the command.

This error is not generated by front key operations.

P

-220 **Parameter error**

When a parameter-related error other than Errors -221 through -229 occurs, that error is displayed.

-108 **Parameter not allowed**

The number of parameters exceeds that required for the command.

See the command reference to confirm the required number of parameters.

210 **Phase lock loop unlocked**

This error occurs when the PLL circuit of the instrument becomes unlocked while the measurement is in progress. This message may appear if the DUT's carrier signal is unstable. If this message is displayed in the phase noise measurement, the following problems and corrective actions are shown below.

- The DUT's noise level is too large, or a large level spurious component exists in the measurement range.

  Verify the spectrum of the DUT's output signal.

  Decrease the IF Gain value, or increase the sweep start value when possible.

- The DUT's output signal is being modulated in frequency.

  Stop the frequency modulation.

- A large harmonics component is included in the DUT's output signal.

  Insert a low-pass filter between the DUT's output terminal and the E5052A RF IN connector to eliminate the harmonics component.

211 **PLL frequency range over**

This error occurs when the internal PLL circuit becomes unlocked while the measurement is in progress. This error may occur when the frequency of the input signal is out of range.

212 **PLL Input overflow**

This error occurs when the internal PLL circuit becomes unlocked while the measurement is in progress. This error may occur when the level of the input signal is too large.

200 **Power on test failed**

This error occurs when the power-on test fails, indicating a failure of the instrument. Contact an Agilent Technologies sales office or the company from which you bought the instrument.

40 **Printer error**

This error occurs when the previous printing is still in progress or the printer fails (offline, short of paper, etc.) at the time of outputting the display image on the LCD screen to the printer (HCOP:IMM command).

41 **Print failed**

This error occurs when printing fails for reasons other than Error 40, Printer error.

-284 **Program currently running**

This error occurs when the PROG:SEL:STAT RUN command is executed when the VBA program is in the Run state.

-286 **Program runtime error**

An error occurring when VBA is executed.

R

75 **Recall failed**

This error occurs when reading an instrument status file (State01.sta, etc.) (MMEM:LOAD:STAT command) fails.

220 **RF freq out of range**

This error occurs when the DUT's output frequency is not within the measurement range.

240 **RF level overload**

This error occurs when the input to the RF IN port exceeds the maximum input level in the measurement. The measurement value obtained in such a case is not correct. In the worst case, a failure (damage to the receiver) may occur.

S

76 **Save failed**

This error occurs when writing an instrument status file (State01.sta, etc.) (MMEM:STOR:STAT command) fails.

78 **Save VBA program failed**

This error occurs when saving a VBA program file fails.

-310 **System error**

One of the errors designated as “system errors” in this instrument has occurred.

T

110 **Target freq out of range**

This error indicates the 2nd, 3rd, or nth order harmonics is not within the E5052A measurement range. At this time, the previous measurement conditions still remain (any of sweep parameters are not changed).

-223 **Too much data**

The block-, expression-, or character-string-type program data that have been received conform with the standard but exceed the amount that can be processed under the conditions of the memory or conditions specific to memory-related devices. In this instrument, this error occurs when the number of characters exceeds 254 in a character-string parameter.

-211 **Trigger ignored**

This instrument receives and detects a trigger command (“TRIG”) or an external trigger signal, but it is ignored due to the timing conditions (the instrument is not in the wait-for-trigger state, for example). Change the setup so that a trigger command or an external trigger signal can be sent after the instrument has entered the wait-for-trigger state.

U

-113 **Undefined header**

A command not defined in this instrument, although not illegal in the syntactic structure, has been received. See the command reference and use correct commands.

311 **Unlock local**

This error occurs when the internal Local signal of the instrument cannot be unlocked. There is the possibility of a device failure. Contact an Agilent Technologies sales office or the company from which you bought the device.

Warning Message

A warning message is displayed in the instrument message/Warning area in the lower-left part of the display against a gray background. Touching **Entry Off** key at the front panel executing the **:DISPlay:MESSage:CLEar** command clears the message. Moreover, about a specific warning message, when a sweep is started again, a warning message may disappear.

This message simply appears on the display, since it is not known to remote environments such as a GPIB. This message is not displayed when another error message (against a red background) has already been displayed in the instrument message/Warning area.

The warning messages for this instrument are as follows:

571 **DC control out of limit**

This message occurs when the specified DC control voltage or the sweep start/stop DC control voltage for the frequency & power measurement is out of the maximum/minimum allowed voltage of DC control.

580 **DC control output on required in AFC**

The automatic frequency control function was set on, however, the power or control voltage is not being applied to the DUT. Verify that the control voltage output is set to ON.

570 **DC power out of limit**

This message occurs when the specified DC power voltage or the sweep start/stop DC power voltage for the frequency & power measurement is out of the maximum/minimum allowance voltage of DC control.

560 **Incompatible recall file**

This message occurs when an incompatible file is read.

550 **Marker tracking failed**

This message occurs when marker tracking fails.

503 **Set RF ATT 0dB**

This message occurs when the input attenuator is set improperly. Set the input attenuator to 0 dB.

504 **Set RF ATT 5dB**

This message occurs when the input attenuator is set improperly. Set the input attenuator to 5 dB.

505 **Set RF ATT 10dB**

This message occurs when the input attenuator is set improperly. Set the input attenuator to 10 dB.

506 **Set RF ATT 15dB**

This message occurs when the input attenuator is set improperly. Set the input attenuator to 15 dB.

507 **Set RF ATT 20dB**

This message occurs when the input attenuator is set improperly. Set the input attenuator to

20 dB.

508 **Set RF ATT 25dB**

This message occurs when the input attenuator is set improperly. Set the input attenuator to 25 dB.

510 **Set RF ATT 30dB**

This message occurs when the input attenuator is set improperly. Set the input attenuator to 30 dB.

511 **Set RF ATT 35dB**

This message occurs when the input attenuator is set improperly. Set the input attenuator to 35 dB.

C List of Default Values

This appendix gives the default values, settings for Save/Recall of an object, and settings for backing up an object when using the Agilent E5052A.

List of Default Values, Save/Recall Settings, and Backup Settings

The table below shows the following settings for the Agilent E5052A.

- Factory-shipped settings
- Settings valid when you press Preset - **Factory** key (Or when you execute the **:SYST:PRES** command)

NOTE

Pressing Preset - **User** recalls the Autorec.sta in the F drive.

- Settings valid when you execute the ***RST** command
- Settings that permit Save/Recall of a setup state

  In the table, states that can be saved/recalled are denoted in the following manner:

  * : Save/Recall can be performed

  Blank: Save/Recall cannot be performed
- Settings that are backed up (set state not affected by turning power ON/OFF)

  In the table, a setting that is automatically backed up is denoted in the following manner:

  * : Backup operation performed

  Blank: Backup operation not performed
- Available means of defining a setting

  In the table, the following symbols are used to denote the method(s) that can be used to define a setting.

  K: Using the front panel key (including the mouse and keyboard)

  C: Using the SCPI command or COM object

NOTE

In the table, the “<<“ symbol shows that the setup is the same as that in the box to the left.

FP Menu

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Attenuator						
Input Attenuator	5	<<	<<	*		K/C
Average						
Averaging	OFF	<<	<<	*		K/C
Averaging Restart						K/C
Avg Factor	16	<<	<<	*		K/C
DC Control Voltage						
Auto Freq Control						
AFC Status	OFF	<<	<<	*		K/C
Frequency Band	HIGH	<<	<<	*		K/C
Max Ctrl Voltage Limit	35	<<	<<	*		K/C
Max Iteration	10	<<	<<	*		K/C
Min Ctrl Voltage Limit	-15	<<	<<	*		K/C
Sensitivity	10M	<<	<<	*		K/C
Target	1G	<<	<<	*		K/C
Tolerance	1k	<<	<<	*		K/C
DC Control Delay	100m	<<	<<	*		K/C
DC Control Output	OFF	<<	<<			K/C
DC Control Voltage	0	<<	<<	*		K/C
Max Ctrl Voltage Limit	35	<<	<<	*		K/C
Min Ctrl Voltage Limit	-15	<<	<<	*		K/C
DC Power Voltage						
DC Power Delay	100m	<<	<<	*		K/C
DC Power Output	OFF	<<	<<			K/C
DC Power Voltage	0	<<	<<	*		K/C
Max Pwr Voltage Limit	16	<<	<<	*		K/C
Min Pwr Voltage Limit	0	<<	<<	*		K/C
Display						
Edit Title Label	""	<<	<<	*		K/C
Limit Test						
Delete Lower Limit Line						K/C
Delete Upper Limit Line						K/C
Fail Sign	ON	<<	<<	*		K/C
Import Lower Limit Line ...						K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Import Upper Limit Line ...						K/C
Limit Line	ON	<<	<<	*		K/C
Limit Test	OFF	<<	<<	*		K/C
Marker Information	LEFT	<<	<<	*		K/C
Meas Condition	ON	<<	<<	*		K/C
Relative Y-Scale	OFF	<<	<<	*		K/C
Title Label	OFF	<<	<<	*		K/C
Update	ON	<<	<<	*		K/C
Y # of Digits	SHORt	<<	<<	*		K/C
Format						
Frequency Format	HZ	<<	<<	*		K/C
Frequency Reference	0	<<	<<	*		K/C
Sensitivity Aperture	1	<<	<<	*		K/C
Macro Setup						
E5052 Event	OFF					K/C
Echo Window Menu						
Clear Echo						K/C
Echo Font Size	11					K/C
Echo Window	OFF					K/C
User Menu						
User Label 1						K/C
Marker						
Clear Marker Menu						
Marker 1	OFF	<<	<<	*		K/C
Couple	OFF	<<	<<	*		K/C
Marker List	OFF	<<	<<	*		K/C
More Functions						
Discrete	OFF	<<	<<	*		K/C
Ref Marker	1	<<	<<	*		K/C
Ref Marker Mode	OFF	<<	<<	*		K/C
Marker Function						
Analysis Range (X)	BDMarker	<<	<<	*		K/C
Analysis Range (Y)	BDMarker	<<	<<	*		K/C
Analysis Type	OFF	<<	<<	*		K/C
Band Marker X						
Band Marker X	OFF	<<	<<	*		K/C
Center	0					K/C
Span	2T					K/C
Start	-1T	<<	<<	*		K/C
Stop	1T	<<	<<	*		K/C
Band Marker Y						

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Band Marker Y	OFF	<<	<<	*		K/C
Center	0					K/C
Span	2T					K/C
Start	-1T	<<	<<	*		K/C
Stop	1T	<<	<<	*		K/C
Couple	OFF	<<	<<	*		K/C
Marker Search						
Peak						
Peak Excursion	0	<<	<<	*		K/C
Peak Polarity	POSitive	<<	<<	*		K/C
Search Left						K/C
Search Peak						K/C
Search Peak All						K/C
Search Right						K/C
Search Max						K/C
Search Min						K/C
Search Range (X)	FULLspan	<<	<<	*		K/C
Search Range (Y)	FULLscale	<<	<<	*		K/C
Target						
Search Left						K/C
Search Right						K/C
Search Target						K/C
Search Transition	BOTH	<<	<<	*		K/C
Search Value	0	<<	<<	*		K/C
Tracking	OFF	<<	<<	*		K/C
Measurement View						
Freq & Power	PN1	<<	<<	*		K/C
Phase Noise	PN1	<<	<<	*		K/C
Show Window						
Freq & Power	ON	<<	<<	*		K/C
Phase Noise	ON	<<	<<	*		K/C
Spectrum Monitor	ON	<<	<<	*		K/C
Transient	ON	<<	<<	*		K/C
User	OFF	<<	<<	*		K/C
Spectrum Monitor	PN1	<<	<<	*		K/C
Transient	PN1	<<	<<	*		K/C
User	PN1	<<	<<	*		K/C
Save/Recall						
Save State						
Save Type	STAT					K/C
Scale						
Auto Scale						K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Auto Scale All						K/C
Divisions	10	<<	<<	*		K/C
Marker						
Reference	1.5G	<<	<<	*		K/C
Reference Position	5	<<	<<	*		K/C
Reference Value	1.5G	<<	<<	*		K/C
Scale/Div	100M	<<	<<	*		K/C
Setup						
Freq Resolution	WIDE	<<	<<	*		K/C
Frequency Band	HIGH	<<	<<	*		K/C
Point Delay	0	<<	<<	*		K/C
Points	201	<<	<<	*		K/C
Sweep Parameter	CONTrol	<<	<<	*		K/C
Start/Center						
DC Control Center	50u					K/C
DC Control Span	100u					K/C
DC Control Start	0	<<	<<	*		K/C
DC Control Stop	100u	<<	<<	*		K/C
DC Power Center	500u					K/C
DC Power Span	1m					K/C
DC Power Start	0	<<	<<	*		K/C
DC Power Stop	1m	<<	<<	*		K/C
Stop/Span						
DC Control Center	50u					K/C
DC Control Span	100u					K/C
DC Control Start	0	<<	<<	*		K/C
DC Control Stop	100u	<<	<<	*		K/C
DC Power Center	500u					K/C
DC Power Span	1m					K/C
DC Power Start	0	<<	<<	*		K/C
DC Power Stop	1m	<<	<<	*		K/C
System						
Abort Printing						K/C
Backlight	ON					K/C
Invert Image	NORMal	<<	<<	*		K/C
Misc Setup						
Beeper						
Beep Complete	ON	<<	<<	*		K/C
Beep Warning	OFF	<<	<<	*		K/C
Test Beep Complete						K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Test Beep Warning						K/C
Clock Setup						
Show Clock	ON	<<	<<	*		K/C
Trace View						
Aperture	1.5	<<	<<	*		K/C
Clear Persistent Data						K/C
Copy to User						K/C
Data Hold	OFF	<<	<<	*		K/C
Data Math	NORMal	<<	<<	*		K/C
Display Trace	DATA	<<	<<	*		K/C
Persistence Mode	OFF	<<	<<	*		K/C
Smoothing	OFF	<<	<<	*		K/C
Trace Label	"Freq"	<<	<<	*		K/C
Trigger						
Ext Trig Polarity	NEGative	<<	<<	*		K/C
Mode	ANALyzer(standard)	<<	<<	*		K/C
	TESTer(option 011)	<<	<<	*		K/C
Source	INTernal	<<	<<	*		K/C
Trigger to Freq & Power	PN1	<<	<<	*		K/C

PN Menu

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Attenuator						
Input Attenuator	5	<<	<<	*		K/C
Average						
Averaging	OFF	<<	<<	*		K/C
Averaging Restart						K/C
Avg Factor	16	<<	<<	*		K/C
Correlation	1	<<	<<	*		K/C
DC Control Voltage						
Auto Freq Control						
AFC Status	OFF	<<	<<	*		K/C
Frequency Band	HIGH	<<	<<	*		K/C
Max Ctrl Voltage Limit	35	<<	<<	*		K/C
Max Iteration	10	<<	<<	*		K/C
Min Ctrl Voltage Limit	-15	<<	<<	*		K/C
Sensitivity	10M	<<	<<	*		K/C
Target	1G	<<	<<	*		K/C
Tolerance	1k	<<	<<	*		K/C
DC Control Delay	100m	<<	<<	*		K/C
DC Control Output	OFF	<<	<<			K/C
DC Control Voltage	0	<<	<<	*		K/C
Max Ctrl Voltage Limit	35	<<	<<	*		K/C
Min Ctrl Voltage Limit	-15	<<	<<	*		K/C
DC Power Voltage						
DC Power Delay	100m	<<	<<	*		K/C
DC Power Output	OFF	<<	<<			K/C
DC Power Voltage	0	<<	<<	*		K/C
Max Pwr Voltage Limit	16	<<	<<	*		K/C
Min Pwr Voltage Limit	0	<<	<<	*		K/C
Display						
Edit Title Label	""	<<	<<	*		K/C
Limit Test						
Delete Lower Limit Line						K/C
Delete Upper Limit Line						K/C
Fail Sign	ON	<<	<<	*		K/C
Import Lower Limit Line ...						K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Import Upper Limit Line ...						K/C
Limit Line	ON	<<	<<	*		K/C
Limit Test	OFF	<<	<<	*		K/C
Marker Information	RIGHt	<<	<<	*		K/C
Meas Condition	ON	<<	<<	*		K/C
Relative Y-Scale	OFF	<<	<<	*		K/C
Title Label	OFF	<<	<<	*		K/C
Update	ON	<<	<<	*		K/C
Y # of Digits	SHORt	<<	<<	*		K/C
Macro Setup						
E5052 Event	OFF					K/C
Echo Window Menu						
Clear Echo						K/C
Echo Font Size	11					K/C
Echo Window	OFF					K/C
User Menu						
User Label 1						K/C
Marker						
Clear Marker Menu						
Marker 1	OFF	<<	<<	*		K/C
Marker List	OFF	<<	<<	*		K/C
More Functions						
Discrete	OFF	<<	<<	*		K/C
Ref Marker	1	<<	<<	*		K/C
Ref Marker Mode	OFF	<<	<<	*		K/C
Marker Function						
Analysis Range (X)	BDMarker	<<	<<	*		K/C
Analysis Range (Y)	BDMarker	<<	<<	*		K/C
Analysis Type	OFF	<<	<<	*		K/C
Band Marker X						
Band Marker X	OFF	<<	<<	*		K/C
Center	0					K/C
Span	2T					K/C
Start	-1T	<<	<<	*		K/C
Stop	1T	<<	<<	*		K/C
Band Marker Y						
Band Marker Y	OFF	<<	<<	*		K/C
Center	0					K/C
Span	2T					K/C
Start	-1T	<<	<<	*		K/C
Stop	1T	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Marker Search						
Peak						
Peak Excursion	0	<<	<<	*		K/C
Peak Polarity	POSitive	<<	<<	*		K/C
Search Left						K/C
Search Peak						K/C
Search Peak All						K/C
Search Right						K/C
Search Max						K/C
Search Min						K/C
Search Range (X)	FULLspan	<<	<<	*		K/C
Search Range (Y)	FULLscale	<<	<<	*		K/C
Target						
Search Left						K/C
Search Right						K/C
Search Target						K/C
Search Transition	BOTH	<<	<<	*		K/C
Search Value	0	<<	<<	*		K/C
Tracking	OFF	<<	<<	*		K/C
Marker To						
Marker						
Start	1k	<<	<<	*		K/C
Stop	10M	<<	<<	*		K/C
Measurement View						
Freq & Power	PN1	<<	<<	*		K/C
Phase Noise	PN1	<<	<<	*		K/C
Show Window						
Freq & Power	ON	<<	<<	*		K/C
Phase Noise	ON	<<	<<	*		K/C
Spectrum Monitor	ON	<<	<<	*		K/C
Transient	ON	<<	<<	*		K/C
User	OFF	<<	<<	*		K/C
Spectrum Monitor	PN1	<<	<<	*		K/C
Transient	PN1	<<	<<	*		K/C
User	PN1	<<	<<	*		K/C
Save/Recall						
Save State						
Save Type	STAT					K/C
Scale						
Auto Scale						K/C
Divisions	16	<<	<<	*		K/C
Marker						

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Reference	-20	<<	<<	*		K/C
Reference Position	16	<<	<<	*		K/C
Reference Value	-20	<<	<<	*		K/C
Scale/Div	10	<<	<<	*		K/C
Setup						
Frequency Band	BAND4	<<	<<	*		K/C
IF Gain	20	<<	<<	*		K/C
LO PhNoise Optimize	WIDE	<<	<<	*		K/C
Measurement Quality	NORMal	<<	<<	*		K/C
Start						
100Hz	1k	<<	<<	*		K/C
10Hz	1k	<<	<<	*		K/C
1Hz	1k	<<	<<	*		K/C
1kHz	1k	<<	<<	*		K/C
Stop						
100kHz	10M	<<	<<	*		K/C
10MHz	10M	<<	<<	*		K/C
1MHz	10M	<<	<<	*		K/C
40MHz	10M	<<	<<	*		K/C
5MHz	10M	<<	<<	*		K/C
System						
Abort Printing						K/C
Backlight	ON					K/C
Invert Image	NORMal	<<	<<	*		K/C
Misc Setup						
Beeper						
Beep Complete	ON	<<	<<	*		K/C
Beep Warning	OFF	<<	<<	*		K/C
Test Beep Complete						K/C
Test Beep Warning						K/C
Clock Setup						
Show Clock	ON	<<	<<	*		K/C
Trace View						
Aperture	1.5	<<	<<	*		K/C
Clear Persistent Data						K/C
Copy to User						K/C
Data Hold	OFF	<<	<<	*		K/C
Data Math	NORMal	<<	<<	*		K/C
Display Trace	DATA	<<	<<	*		K/C
Omitting Spurious	OFF	<<	<<	*		K/C

PN Menu

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Persistence Mode	OFF	<<	<<	*		K/C
Smoothing	OFF	<<	<<	*		K/C
Spurious	Normalized (dBc/Hz)	<<	<<	*		K/C
Trace Label	"Phase Noise"	<<	<<	*		K/C
Trigger						
Ext Trig Polarity	NEGative	<<	<<	*		K/C
Source	INTernal	<<	<<	*		K/C
Trigger to Phase Noise	PN1	<<	<<	*		K/C

SP Menu

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Attenuator						
Input Attenuator	5	<<	<<	*		K/C
Average/BW						
Averaging	OFF	<<	<<	*		K/C
Averaging Restart						K/C
Averaging Type	LOGarithmic	<<	<<	*		K/C
Avg Factor	16	<<	<<	*		K/C
RBW	25k	<<	<<	*		K/C
DC Control Voltage						
Auto Freq Control						
AFC Status	OFF	<<	<<	*		K/C
Frequency Band	HIGH	<<	<<	*		K/C
Max Ctrl Voltage Limit	35	<<	<<	*		K/C
Max Iteration	10	<<	<<	*		K/C
Min Ctrl Voltage Limit	-15	<<	<<	*		K/C
Sensitivity	10M	<<	<<	*		K/C
Target	1G	<<	<<	*		K/C
Tolerance	1k	<<	<<	*		K/C
DC Control Delay	100m	<<	<<	*		K/C
DC Control Output	OFF	<<	<<			K/C
DC Control Voltage	0	<<	<<	*		K/C
Max Ctrl Voltage Limit	35	<<	<<	*		K/C
Min Ctrl Voltage Limit	-15	<<	<<	*		K/C
DC Power Voltage						
DC Power Delay	100m	<<	<<	*		K/C
DC Power Output	OFF	<<	<<			K/C
DC Power Voltage	0	<<	<<	*		K/C
Max Pwr Voltage Limit	16	<<	<<	*		K/C
Min Pwr Voltage Limit	0	<<	<<	*		K/C
Display						
Edit Title Label	""	<<	<<	*		K/C
Limit Test						
Delete Lower Limit Line						K/C
Delete Upper Limit Line						K/C
Fail Sign	ON	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Import Lower Limit Line ...						K/C
Import Upper Limit Line ...						K/C
Limit Line	ON	<<	<<	*		K/C
Limit Test	OFF	<<	<<	*		K/C
Marker Information	LEFT	<<	<<	*		K/C
Meas Condition	ON	<<	<<	*		K/C
Relative Y-Scale	OFF	<<	<<	*		K/C
Title Label	OFF	<<	<<	*		K/C
Update	ON	<<	<<	*		K/C
Y # of Digits	SHORt	<<	<<	*		K/C
Format						
Detector Mode	POSitive	<<	<<	*		K/C
Format	DBM	<<	<<	*		K/C
Macro Setup						
E5052 Event	OFF					K/C
Echo Window Menu						
Clear Echo						K/C
Echo Font Size	11					K/C
Echo Window	OFF					K/C
User Menu						
User Label 1						K/C
Marker						
Clear Marker Menu						
Marker 1	OFF	<<	<<	*		K/C
Marker List	OFF	<<	<<	*		K/C
More Functions						
Discrete	OFF	<<	<<	*		K/C
Ref Marker	1	<<	<<	*		K/C
Ref Marker Mode	OFF	<<	<<	*		K/C
Marker Function						
Analysis Range (X)	BDMarker	<<	<<	*		K/C
Analysis Range (Y)	BDMarker	<<	<<	*		K/C
Analysis Type	OFF	<<	<<	*		K/C
Band Marker X						
Band Marker X	OFF	<<	<<	*		K/C
Center	0					K/C
Span	2T					K/C
Start	-1T	<<	<<	*		K/C
Stop	1T	<<	<<	*		K/C
Band Marker Y						

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Band Marker Y	OFF	<<	<<	*		K/C
Center	0					K/C
Span	2T					K/C
Start	-1T	<<	<<	*		K/C
Stop	1T	<<	<<	*		K/C
Marker Search						
Peak						
Peak Excursion	0	<<	<<	*		K/C
Peak Polarity	POSitive	<<	<<	*		K/C
Search Left						K/C
Search Peak						K/C
Search Peak All						K/C
Search Right						K/C
Search Max						K/C
Search Min						K/C
Search Range (X)	FULLspan	<<	<<	*		K/C
Search Range (Y)	FULLscale	<<	<<	*		K/C
Target						
Search Left						K/C
Search Right						K/C
Search Target						K/C
Search Transition	BOTH	<<	<<	*		K/C
Search Value	0	<<	<<	*		K/C
Tracking	OFF	<<	<<	*		K/C
Marker To						
Marker						
Center	1G	<<	<<	*		K/C
Start	992.5M	<<	<<	*		K/C
Stop	1.0075G	<<	<<	*		K/C
Measurement View						
Freq & Power	PN1	<<	<<	*		K/C
Phase Noise	PN1	<<	<<	*		K/C
Show Window						
Freq & Power	ON	<<	<<	*		K/C
Phase Noise	ON	<<	<<	*		K/C
Spectrum Monitor	ON	<<	<<	*		K/C
Transient	ON	<<	<<	*		K/C
User	OFF	<<	<<	*		K/C
Spectrum Monitor	PN1	<<	<<	*		K/C
Transient	PN1	<<	<<	*		K/C
User	PN1	<<	<<	*		K/C
Save/Recall						

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Save State						
Save Type	STAT					K/C
Scale						
Auto Scale						K/C
Divisions	10	<<	<<	*		K/C
Marker						
Reference	10	<<	<<	*		K/C
Reference Position	10	<<	<<	*		K/C
Reference Value	10	<<	<<	*		K/C
Scale/Div	10	<<	<<	*		K/C
Setup						
Reference Level	5	<<	<<	*		K/C
Start/Center						
Carrier To						
Frequency Band	HIGH	<<	<<	*		K/C
Harmonic #	4	<<	<<	*		K
Center	1G	<<	<<	*		K/C
Span	15M	<<	<<	*		K/C
Start	992.5M	<<	<<	*		K/C
Stop	1.0075G	<<	<<	*		K/C
Stop/Span						
Carrier To						
Frequency Band	HIGH	<<	<<	*		K/C
Harmonic #	4	<<	<<	*		K
Center	1G	<<	<<	*		K/C
Span	15M	<<	<<	*		K/C
Start	992.5M	<<	<<	*		K/C
Stop	1.0075G	<<	<<	*		K/C
System						
Abort Printing						K/C
Backlight	ON					K/C
Invert Image	NORMal	<<	<<	*		K/C
Misc Setup						
Beeper						
Beep Complete	ON	<<	<<	*		K/C
Beep Warning	OFF	<<	<<	*		K/C
Test Beep Complete						K/C
Test Beep Warning						K/C
Clock Setup						
Show Clock	ON	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Trace View						
Aperture	1.5	<<	<<	*		K/C
Clear Persistent Data						K/C
Copy to User						K/C
Data Hold	OFF	<<	<<	*		K/C
Data Math	NORMal	<<	<<	*		K/C
Display Trace	DATA	<<	<<	*		K/C
Persistence Mode	OFF	<<	<<	*		K/C
Smoothing	OFF	<<	<<	*		K/C
Trace Label	"Spectrum"	<<	<<	*		K/C
Trigger						
Ext Trig Polarity	NEGative	<<	<<	*		K/C
Source	INTernal	<<	<<	*		K/C
Trigger to Spectrum Monitor	PN1	<<	<<	*		K/C

TR Menu

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Attenuator						
Input Attenuator	5	<<	<<	*		K/C
Average						
Averaging	OFF	<<	<<	*		K/C
Averaging Restart						K/C
Avg Factor	16	<<	<<	*		K/C
DC Control Voltage						
Auto Freq Control						
AFC Status	OFF	<<	<<	*		K/C
Frequency Band	HIGH	<<	<<	*		K/C
Max Ctrl Voltage Limit	35	<<	<<	*		K/C
Max Iteration	10	<<	<<	*		K/C
Min Ctrl Voltage Limit	-15	<<	<<	*		K/C
Sensitivity	10M	<<	<<	*		K/C
Target	1G	<<	<<	*		K/C
Tolerance	1k	<<	<<	*		K/C
DC Control Delay	100m	<<	<<	*		K/C
DC Control Output	OFF	<<	<<			K/C
DC Control Voltage	0	<<	<<	*		K/C
Max Ctrl Voltage Limit	35	<<	<<	*		K/C
Min Ctrl Voltage Limit	-15	<<	<<	*		K/C
DC Power Voltage						
DC Power Delay	100m	<<	<<	*		K/C
DC Power Output	OFF	<<	<<			K/C
DC Power Voltage	0	<<	<<	*		K/C
Max Pwr Voltage Limit	16	<<	<<	*		K/C
Min Pwr Voltage Limit	0	<<	<<	*		K/C
Display						
Edit Title Label	""	<<	<<	*		K/C
Limit Test						
Delete Lower Limit Line						K/C
Delete Upper Limit Line						K/C
Fail Sign	ON	<<	<<	*		K/C
Import Lower Limit Line ...						K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Import Upper Limit Line ...						K/C
Limit Line	ON	<<	<<	*		K/C
Limit Test	OFF	<<	<<	*		K/C
Marker Information	LEFT	<<	<<	*		K/C
Meas Condition	ON	<<	<<	*		K/C
Relative Y-Scale	OFF	<<	<<	*		K/C
Title Label	OFF	<<	<<	*		K/C
Update	ON	<<	<<	*		K/C
Y # of Digits	SHORt	<<	<<	*		K/C
Format						
Frequency Format	Hz	<<	<<	*		K/C
Frequency Reference	0	<<	<<	*		K/C
Phase Unit	DEG	<<	<<	*		K/C
Wrap Phase	ON	<<	<<	*		K/C
Macro Setup						
E5052 Event	OFF					K/C
Echo Window Menu						
Clear Echo						K/C
Echo Font Size	11					K/C
Echo Window	OFF					K/C
User Menu						
User Label 1						K/C
Marker						
Clear Marker Menu						
Marker 1	OFF	<<	<<	*		K/C
Couple	OFF	<<	<<	*		K/C
Marker List	OFF	<<	<<	*		K/C
More Functions						
Discrete	OFF	<<	<<	*		K/C
Ref Marker	1	<<	<<	*		K/C
Ref Marker Mode	OFF	<<	<<	*		K/C
Marker Function						
Analysis Range (X)	BDMarker	<<	<<	*		K/C
Analysis Range (Y)	BDMarker	<<	<<	*		K/C
Analysis Type	OFF	<<	<<	*		K/C
Band Marker X						
Band Marker X	OFF	<<	<<	*		K/C
Center	0					K/C
Span	2T					K/C
Start	-1T	<<	<<	*		K/C
Stop	1T	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Band Marker Y						
Band Marker Y	OFF	<<	<<	*		K/C
Center	0					K/C
Span	2T					K/C
Start	-1T	<<	<<	*		K/C
Stop	1T	<<	<<	*		K/C
Couple	OFF	<<	<<	*		K/C
Marker Search						
Peak						
Peak Excursion	0	<<	<<	*		K/C
Peak Polarity	POSitive	<<	<<	*		K/C
Search Left						K/C
Search Peak						K/C
Search Peak All						K/C
Search Right						K/C
Search Max						K/C
Search Min						K/C
Search Range (X)	FULLspan	<<	<<	*		K/C
Search Range (Y)	FULLscale	<<	<<	*		K/C
Target						
Search Left						K/C
Search Right						K/C
Search Target						K/C
Search Transition	BOTH	<<	<<	*		K/C
Search Value	0	<<	<<	*		K/C
Tracking	OFF	<<	<<	*		K/C
Marker To						
Marker						
Phase Reference	1G	<<	<<	*		K/C
Target Freq	1G	<<	<<	*		K/C
Measurement View						
Freq & Power	PN1	<<	<<	*		K/C
Phase Noise	PN1	<<	<<	*		K/C
Show Window						
Freq & Power	ON	<<	<<	*		K/C
Phase Noise	ON	<<	<<	*		K/C
Spectrum Monitor	ON	<<	<<	*		K/C
Transient	ON	<<	<<	*		K/C
User	OFF	<<	<<	*		K/C
Spectrum Monitor	PN1	<<	<<	*		K/C
Transient	PN1	<<	<<	*		K/C
User	PN1	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Save/Recall						
Save State						
Save Type	STAT					K/C
Scale						
Auto Scale						K/C
Auto Scale All						K/C
Divisions	10	<<	<<	*		K/C
Marker						
Reference	800M	<<	<<	*		K/C
Reference Position	5	<<	<<	*		K/C
Reference Value	800M	<<	<<	*		K/C
Scale/Div	80M	<<	<<	*		K/C
Setup						
Freq Range	R25_6	<<	<<	*		K/C
Max Input Level	0	<<	<<	*		K/C
Phase Reference	1G	<<	<<	*		K/C
Recalc Phase Reference						
Phase Ref. Offset	0	<<	<<	*		K/C
Target Freq	1G	<<	<<	*		K/C
Video Trigger						
Minimum Power Level	-20	<<	<<	*		K/C
Narrow Freq	1G	<<	<<	*		K/C
Wide Freq	1G	<<	<<	*		K/C
Span						
Narrow Ref Position	CENTer	<<	<<	*		K/C
Narrow Span	100m	<<	<<	*		K/C
Narrow Time Offset	0	<<	<<	*		K/C
Wide Ref Position	CENTer	<<	<<	*		K/C
Wide Span	100m	<<	<<	*		K/C
Wide Time Offset	0	<<	<<	*		K/C
System						
Abort Printing						K/C
Backlight	ON					K/C
Invert Image	NORMal	<<	<<	*		K/C
Misc Setup						
Beeper						
Beep Complete	ON	<<	<<	*		K/C
Beep Warning	OFF	<<	<<	*		K/C
Test Beep Complete						K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Test Beep Warning						K/C
Clock Setup						
Show Clock	ON	<<	<<	*		K/C
Time Offset						
Narrow Ref Position	CENTer	<<	<<	*		K/C
Narrow Span	100m	<<	<<	*		K/C
Narrow Time Offset	0	<<	<<	*		K/C
Wide Ref Position	CENTer	<<	<<	*		K/C
Wide Span	100m	<<	<<	*		K/C
Wide Time Offset	0	<<	<<	*		K/C
Trace View						
Aperture	1.5	<<	<<	*		K/C
Clear Persistent Data						K/C
Copy to User						K/C
Data Hold	OFF	<<	<<	*		K/C
Data Math	NORMal	<<	<<	*		K/C
Display Trace	DATA	<<	<<	*		K/C
Persistence Mode	OFF	<<	<<	*		K/C
Smoothing	OFF	<<	<<	*		K/C
Trace Label	"WB Freq"	<<	<<	*		K/C
Trigger						
Ext Trig Polarity	NEGative	<<	<<	*		K/C
Source	INTernal	<<	<<	*		K/C
Trigger to Transient	PN1	<<	<<	*		K/C

USER Menu

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Attenuator						
Input Attenuator	5	<<	<<	*		K/C
DC Control Voltage						
Auto Freq Control						
AFC Status	OFF	<<	<<	*		K/C
Frequency Band	HIGH	<<	<<	*		K/C
Max Ctrl Voltage Limit	35	<<	<<	*		K/C
Max Iteration	10	<<	<<	*		K/C
Min Ctrl Voltage Limit	-15	<<	<<	*		K/C
Sensitivity	10M	<<	<<	*		K/C
Target	1G	<<	<<	*		K/C
Tolerance	1k	<<	<<	*		K/C
DC Control Delay	100m	<<	<<	*		K/C
DC Control Output	OFF	<<	<<			K/C
DC Control Voltage	0	<<	<<	*		K/C
Max Ctrl Voltage Limit	35	<<	<<	*		K/C
Min Ctrl Voltage Limit	-15	<<	<<	*		K/C
DC Power Voltage						
DC Power Delay	100m	<<	<<	*		K/C
DC Power Output	OFF	<<	<<			K/C
DC Power Voltage	0	<<	<<	*		K/C
Max Pwr Voltage Limit	16	<<	<<	*		K/C
Min Pwr Voltage Limit	0	<<	<<	*		K/C
Display						
Edit Title Label	""	<<	<<	*		K/C
Limit Test						
Delete Lower Limit Line						K/C
Delete Upper Limit Line						K/C
Fail Sign	ON	<<	<<	*		K/C
Import Lower Limit Line ...						K/C
Import Upper Limit Line ...						K/C
Limit Line	ON	<<	<<	*		K/C
Limit Test	OFF	<<	<<	*		K/C
Marker Information	LEFT	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Meas Condition	ON	<<	<<	*		K/C
Relative Y-Scale	OFF	<<	<<	*		K/C
Title Label	OFF	<<	<<	*		K/C
Update	ON	<<	<<	*		K/C
Y # of Digits	SHORt	<<	<<	*		K/C
Macro Setup						
E5052 Event	OFF					K/C
Echo Window Menu						
Clear Echo						K/C
Echo Font Size	11					K/C
Echo Window	OFF					K/C
User Menu						
User Label 1						K/C
Marker						
Clear Marker Menu						
Marker 1	OFF	<<	<<	*		K/C
Couple	OFF	<<	<<	*		K/C
Marker List	OFF	<<	<<	*		K/C
More Functions						
Discrete	OFF	<<	<<	*		K/C
Ref Marker	1	<<	<<	*		K/C
Ref Marker Mode	OFF	<<	<<	*		K/C
Marker Function						
Analysis Range (X)	BDMarker	<<	<<	*		K/C
Analysis Range (Y)	BDMarker	<<	<<	*		K/C
Analysis Type	OFF	<<	<<	*		K/C
Band Marker X						
Band Marker X	OFF	<<	<<	*		K/C
Center	0					K/C
Span	2T					K/C
Start	-1T	<<	<<	*		K/C
Stop	1T	<<	<<	*		K/C
Band Marker Y						
Band Marker Y	OFF	<<	<<	*		K/C
Center	0					K/C
Span	2T					K/C
Start	-1T	<<	<<	*		K/C
Stop	1T	<<	<<	*		K/C
Couple	OFF	<<	<<	*		K/C
Marker Search						
Peak						
Peak Excursion	0	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Peak Polarity	POSitive	<<	<<	*		K/C
Search Left						K/C
Search Peak						K/C
Search Peak All						K/C
Search Right						K/C
Search Max						K/C
Search Min						K/C
Search Range (X)	FULLspan	<<	<<	*		K/C
Search Range (Y)	FULLscale	<<	<<	*		K/C
Target						
Search Left						K/C
Search Right						K/C
Search Target						K/C
Search Transition	BOTH	<<	<<	*		K/C
Search Value	0	<<	<<	*		K/C
Tracking	OFF	<<	<<	*		K/C
Measurement View						
Freq & Power	PN1	<<	<<	*		K/C
Phase Noise	PN1	<<	<<	*		K/C
Show Window						
Freq & Power	ON	<<	<<	*		K/C
Phase Noise	ON	<<	<<	*		K/C
Spectrum Monitor	ON	<<	<<	*		K/C
Transient	ON	<<	<<	*		K/C
User	OFF	<<	<<	*		K/C
Spectrum Monitor	PN1	<<	<<	*		K/C
Transient	PN1	<<	<<	*		K/C
User	PN1	<<	<<	*		K/C
Save/Recall						
Save State						
Save Type	STAT					K/C
Scale						
Auto Scale						K/C
Auto Scale All						K/C
Divisions	10	<<	<<	*		K/C
Marker						
Reference	-40	<<	<<	*		K/C
Reference Position	5	<<	<<	*		K/C
Reference Value	-40	<<	<<	*		K/C
Scale/Div	10	<<	<<	*		K/C
X Axis Type	LINear	<<	<<	*		K/C
X Unit	"U"	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Y Unit	"U"	<<	<<	*		K/C
System						
Abort Printing						K/C
Backlight	ON					K/C
Invert Image	NORMal	<<	<<	*		K/C
Misc Setup						
Beeper						
Beep Complete	ON	<<	<<	*		K/C
Beep Warning	OFF	<<	<<	*		K/C
Test Beep Complete						K/C
Test Beep Warning						K/C
Clock Setup						
Show Clock	ON	<<	<<	*		K/C
Trace View						
Aperture	1.5	<<	<<	*		K/C
Clear All Persistent Data						K/C
Copy to User						K/C
Data Hold	OFF	<<	<<	*		K/C
Data Math	NORMal	<<	<<	*		K/C
Display Trace	DATA	<<	<<	*		K/C
Enable Trace						
Trace 1	ON	<<	<<	*		K/C
Persistence Mode	OFF	<<	<<	*		K/C
Smoothing	OFF	<<	<<	*		K/C
Trace Label	"Tr1"	<<	<<	*		K/C

D Softkey Functions

This appendix explains the functions of softkeys and hardkeys supplied on the Agilent E5052A.

Phanse Noise Menu (Top Menu)

Key Operation	Function
Double-click on each softkey menu title	Displays the top menu of each menu item below. A preset operation will not cancel the menu display. Refer the PN menu about detail of following each menu item.
Measurement View	Same as [Meas].
Input	Same as [Scale].
Scale	Same as [Scale].
Format	Same as [Format].
Display	Same as [Display].
Average	Same as [Avg].
Attenuator	Same as [Cal].
Start	Displays the same softkey for setting up the sweep range that appears when [Start], or [Span] is pressed.
Stop	Displays the same softkey for setting up the sweep range that appears when [Start], or [Span] is pressed.
DC Conrol Voltage	Same as [Sweep Setup].
DC Power Voltage	Same as [Sweep Setup].
Setup	Same as [Sweep Setup].
Trigger	Same as [Trigger].
Marker	Same as [Marker].
Marker Search	Same as [Marker Search].
Marker To	Same as [Marker Search].
Marker Function	Same as [Marker Fctn].
Macro Setup	Same as [Macro Setup].
Save/Recall	Same as [Save/Recall].
System	Same as [System].
Preset	Same as [Preset].

PN Menu

Key Operation	Function	SCPI Command
Attenuator		
Input Attenuator	Sets/reads Input Attenuator level on 5dB Step	:SENS:ATT:LEV
Average		
Averaging	Turns on/off averaging function	:SENS:PN[1-1]:AVER:STAT
Averaging Restart	Restart averaging	:SENS:PN[1-1]:AVER:CLE
Avg Factor	Sets/reads average count	:SENS:PN[1-1]:AVER:COUN
Correlation	Sets/reads the number of correlation	:SENS:PN[1-1]:CORR:COUN
DC Control Voltage		
Auto Freq Control		
AFC Status	Turns on/off the auto frequency control function. Executes the auto frequency control once.	:SOUR:VOLT:CONT:AFC[:STAT] :SOUR:VOLT:CONT:AFC:IMM
Frequency Band	Sets/reads the frequency band in the auto frequency control function	:SOUR:VOLT:CONT:AFC:FBAN
Max Ctrl Voltage Limit	Sets/reads the maximum DC control voltage limit	:SOUR:VOLT:CONT:AFC:LIM:HIGH
Max Iteration	Sets/reads the maximum number of iterations for the DC control voltage-setting loops	:SOUR:VOLT:CONT:AFC:ITER
Min Ctrl Voltage Limit	Sets/reads the minimum DC control voltage limit	:SOUR:VOLT:CONT:AFC:LIM:LOW
Sensitivity	Sets/reads the tuning sensitivity	:SOUR:VOLT:CONT:AFC:SENS
Target	Sets/reads the target frequency in the auto frequency control function	:SOUR:VOLT:CONT:AFC:TARG
Tolerance	Sets/reads the tolerance limit	:SOUR:VOLT:CONT:AFC:TOL
Control Voltage Cal	Enables DC Control voltage calibration	:SOUR:VOLT:CONT:CORR[:STAT]
DC Control Delay	Sets/reads DC Control delay (sec)	:SOUR:VOLT:CONT:DEL
DC Control Output	Turns on/off DC Control voltage	:SOUR:VOLT:CONT:LEV:STAT
DC Control Voltage	Sets/reads DC Control voltage	:SOUR:VOLT:CONT:LEV:AMPL
Execute Control Voltage Cal	Execute DC control voltage calibration	:SOUR:VOLT:CONT:CORR:COLL:ACQ
Max Ctrl Voltage Limit	Sets/reads the maximum DC control voltage limit	:SOUR:VOLT:CONT:LIM:HIGH
Min Ctrl Voltage Limit	Sets/reads the minimum DC control voltage limit	:SOUR:VOLT:CONT:LIM:LOW
DC Power Voltage		
DC Power Delay	Sets/reads DC Power delay (sec)	:SOUR:VOLT:POW:DEL

Key Operation	Function	SCPI Command
DC Power Output	Turns on/off DC Power voltage	:SOUR:VOLT:POW:LEV:STAT
DC Power Voltage	Sets/reads DC Power voltage	:SOUR:VOLT:POW:LEV:AMPL
Max Pwr Voltage Limit	Sets/reads the maximum DC Power voltage limit	:SOUR:VOLT:POW:LIM:HIGH
Min Pwr Voltage Limit	Sets/reads the minimum DC Power voltage limit	:SOUR:VOLT:POW:LIM:LOW
Display		
Edit Title Label	Edit the measurement window title label	:DISP:PN[1-1]:LAB:DATA
Limit Test		
Delete Lower Limit Line	Clears the lower limit line	:CALC:PN[1-1]:TRAC[1-1]:LIM:LOW:SEGM:CLE
Delete Upper Limit Line	Clears the upper limit line	:CALC:PN[1-1]:TRAC[1-1]:LIM:UPP:SEGM:CLE
Explorer		
Fail Sign	Turns on/off the limit test judgement display	:DISP:PN[1-1]:LIM:FSIG
Import Lower Limit Line ...	Reads the lower limit line	:MMEM:PN[1-1]:TRAC[1-1]:LOAD:LIM:LOW
Import Upper Limit Line ...	Reads the upper limit line	:MMEM:PN[1-1]:TRAC[1-1]:LOAD:LIM:UPP
Limit Line	Turns on/off the limit line	:DISP:PN[1-1]:TRAC[1-1]:LIM:LINE
Limit Test	Turns on/off the limit test function	:CALC:PN[1-1]:TRAC[1-1]:LIM[:STAT]
Marker Information	Sets/reads the marker information position	:DISP:PN[1-1]:ANN:MARK:POS
Meas Condition	Turns on/off measurement conditions	:DISP:PN[1-1]:ANN:MEAS:STAT
Relative Y-Scale	Turns on/off relative Y-scale	:DISP:PN[1-1]:GRAT:AXIS:Y:REL
Title Label	Turns on/off the measurement window title label	:DISP:PN[1-1]:LAB:STAT
Update	Turns on/off the trace updates	:DISP:ENAB
Y # of Digits	Selects the number of digits (Y-axis)	:DISP:PN[1-1]:GRAT:AXIS:Y:STAT
Macro Setup		
E5052 Event	Turns on/off the E5052 VBA event callback function	:PROG:COM:EVEN
Echo Window Menu		
Clear Echo	Clears echo window	:DISP:ECHO:CLE
Echo Font Size	Sets/reads the font size on Echo window	:DISP:ECHO:FSIZ
Echo Window	Turns on./off the Echo window	:DISP:ECHO:STAT
Load & Run	Load and execute the macro selected on file names.	

Key Operation	Function	SCPI Command
Select Macro	Sets/reads the name of the program to be selected	:PROG:SEL:NAME
Stop	Set/reads the state of the selected program	:PROG:SEL:STAT
User Menu		
User Label 1	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 2	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 3	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 4	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 5	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 6	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 7	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 8	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
VBA Editor Menu		
Close Editor	Close VBA editor	
Load Project	Loads program	:MMEM:LOAD:PROG
New Project	Open new VBA project	
Open Editor	Open VBA editor	
Save Project	Save VBA project	:MMEM:STOR:PROG
Marker		
Clear Marker Menu		
All OFF	Clears all the markers	
Marker 1	Turns on/off marker 1	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 2	Turns on/off marker 2	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 3	Turns on/off marker 3	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 4	Turns on/off marker 4	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 5	Turns on/off marker 5	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 6	Turns on/off marker 6	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 1	Turns on/off marker 1	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 2	Turns on/off marker 2	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 3	Turns on/off marker 3	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT

Key Operation	Function	SCPI Command
Marker 4	Turns on/off marker 4	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 5	Turns on/off marker 5	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 6	Turns on/off marker 6	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker List	Turns on/off the marker list	:DISP:PN[1-1]:TABL[:STAT]
More Functions		
Discrete	Sets/reads marker movement (Continuous/Discrete)	:CALC:PN[1-1]:ALLT:MARK:DISC:STAT
Ref Marker	Sets/reads marker reference number	:CALC:PN[1-1]:ALLT:MARK:REF:NUMB
Ref Marker Mode	Turns on/off delta marker mode	:CALC:PN[1-1]:ALLT:MARK:REF:STAT
Marker Function		
Analysis Range (X)	Sets/reads analysis/search range (X-axis)	:CALC:PN[1-1]:TRAC[1-1]:FUNC:DOM:X
Analysis Range (Y)	Sets/reads analysis/search range (Y-axis)	:CALC:PN[1-1]:TRAC[1-1]:FUNC:DOM:Y
Analysis Type	Sets/reads analysis type	:CALC:PN[1-1]:TRAC[1-1]:FUNC:TYPE
Band Marker X		
Band Marker X	Turns on/off bandmarker X	:CALC:PN[1-1]:TRAC[1-1]:BDM:X:STAT
Center	Sets/reads the center value of bandmarker X	:CALC:PN[1-1]:TRAC[1-1]:BDM:X:CENT
Span	Sets/reads the span value of bandmarker X	:CALC:PN[1-1]:TRAC[1-1]:BDM:X:SPAN
Start	Sets/reads the start value of bandmarker X	:CALC:PN[1-1]:TRAC[1-1]:BDM:X:STAR
Stop	Sets/reads the stop value of bandmarker X	:CALC:PN[1-1]:TRAC[1-1]:BDM:X:STOP
Band Marker Y		
Band Marker Y	Turns on/off bandmarker Y	:CALC:PN[1-1]:TRAC[1-1]:BDM:Y:STAT
Center	Sets/reads the center value of bandmarker Y	:CALC:PN[1-1]:TRAC[1-1]:BDM:Y:CENT
Span	Sets/reads the span value of bandmarker Y	:CALC:PN[1-1]:TRAC[1-1]:BDM:Y:SPAN
Start	Sets/reads the start value of bandmarker Y	:CALC:PN[1-1]:TRAC[1-1]:BDM:Y:STAR

Key Operation	Function	SCPI Command
Stop	Sets/reads the stop value of bandmarker Y	:CALC:PN[1-1]:TRAC[1-1]:BDM:Y:STOP
Marker Search		
Band Marker X		
Band Marker X	Turns on/off bandmarker X	:CALC:PN[1-1]:TRAC[1-1]:BDM:X:STAT
Center	Sets/reads the center value of bandmarker X	:CALC:PN[1-1]:TRAC[1-1]:BDM:X:CENT
Span	Sets/reads the span value of bandmarker X	:CALC:PN[1-1]:TRAC[1-1]:BDM:X:SPAN
Start	Sets/reads the start value of bandmarker X	:CALC:PN[1-1]:TRAC[1-1]:BDM:X:STAR
Stop	Sets/reads the stop value of bandmarker X	:CALC:PN[1-1]:TRAC[1-1]:BDM:X:STOP
Band Marker Y		
Band Marker Y	Turns on/off bandmarker Y	:CALC:PN[1-1]:TRAC[1-1]:BDM:Y:STAT
Center	Sets/reads the center value of bandmarker Y	:CALC:PN[1-1]:TRAC[1-1]:BDM:Y:CENT
Span	Sets/reads the span value of bandmarker Y	:CALC:PN[1-1]:TRAC[1-1]:BDM:Y:SPAN
Start	Sets/reads the start value of bandmarker Y	:CALC:PN[1-1]:TRAC[1-1]:BDM:Y:STAR
Stop	Sets/reads the stop value of bandmarker Y	:CALC:PN[1-1]:TRAC[1-1]:BDM:Y:STOP
Peak		
Peak Excursion	Sets/reads the peak excursion value	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:PEAK:EXC
Peak Polarity	Sets/reads the marker peak-search polarity	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:PEAK:POL
Search Left	Execute marker peak search left	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:LPE
Search Peak	Execute marker peak search	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:PEAK
Search Peak All	Execute marker search all	:CALC:PN[1-1]:TRAC[1-1]:ALLM:SEAR:PEAK
Search Right	Execute marker peak search right	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:RPE
Search Max	Execute marker search maximum	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:MAX
Search Min	Execute marker search minimum	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:MIN

Key Operation	Function	SCPI Command
Search Range (X)	Sets/reads marker search range (X-axis)	:CALC:PN[1-1]:TRAC[1-1]:ALLM:SEAR:DOM:X
Search Range (Y)	Sets/reads marker search range (Y-axis)	:CALC:PN[1-1]:TRAC[1-1]:ALLM:SEAR:DOM:Y
Target		
Search Left	Execute marker target search left	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:LTAR
Search Right	Execute marker target search right	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:RTAR
Search Target	Execute marker target search	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:TARG
Target Transition	Sets/reads the target transition definition	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:TARG:TRAN
Target Value	Sets/reads the marker target value	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:TARG:Y
Tracking	Sets/reads the marker tracking type	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:TRAC:TYPE
Marker To		
Marker -> Start	Sets/reads the marker value to the start value	:SENS:PN[1-1]:FREQ:STAR
Marker -> Stop	Sets/reads the marker value to the stop value	:SENS:PN[1-1]:FREQ:STOP
Measurement View		
Freq & Power	Selects frequency, power and DC current measurement window	:DISP:WIND:ACT
Phase Noise	Selects phase noise measurement window	:DISP:WIND:ACT
Show Window		
Freq & Power	Turns on/off frequency, power and DC current measurement mode	:DISP:FP[1-1]:STAT
Phase Noise	Turns on/off phase noise measurement mode	:DISP:PN[1-1]:STAT
Spectrum Monitor	Turns on/off spectrum monitor mode	:DISP:SP[1-1]:STAT
Transient	Turns on/off transient measurement mode	:DISP:TR[1-1]:STAT
User	Turns on/off user defined window	:DISP:USER[1-1]:STAT
Spectrum Monitor	Selects spectrum monitor mode	:DISP:WIND:ACT
Transient	Selects transient measurement mode	:DISP:WIND:ACT
User	Selects user defined window	:DISP:WIND:ACT
Preset		
Factory	Preset instrument to the initial setup state	:SYST:PRES
User	Preset instrument and recalls the Autorec.sta in the F drive	
Save/Recall		
Explorer...	Open windows explorer	

Key Operation	Function	SCPI Command
Recall by filename	Recalls state file by file name	:MMEM:LOAD:STAT
Recall State		
Autorec	Recalls settings	:MMEM:LOAD:STAT
File Dialog...	Open file dialog	
State01	Recalls state file from register 1	:MMEM:LOAD:STAT
State02	Recalls state file from register 2	:MMEM:LOAD:STAT
State03	Recalls state file from register 3	:MMEM:LOAD:STAT
State04	Recalls state file from register 4	:MMEM:LOAD:STAT
State05	Recalls state file from register 5	:MMEM:LOAD:STAT
State06	Recalls state file from register 6	:MMEM:LOAD:STAT
Save Data Trace	Saves trace data	:MMEM:PN[1-1]:TRAC[1-1]:STOR[:DATA]
Save Memory Trace	Saves memory trace data	:MMEM:PN[1-1]:TRAC[1-1]:STOR:MEM
Save State		
Autorec	Save settings	:MMEM:STOR:STAT
File Dialog...	Open file dialog	
Save Type	Select instrument state type (Entire or instrument state only)	:MMEM:STOR:STYP
State01	Save state file to register 1	:MMEM:STOR:STAT
State02	Save state file to register 2	:MMEM:STOR:STAT
State03	Save state file to register 3	:MMEM:STOR:STAT
State04	Save state file to register 4	:MMEM:STOR:STAT
State05	Save state file to register 5	:MMEM:STOR:STAT
State06	Save state file to register 6	:MMEM:STOR:STAT
Scale		
Auto Scale	Execute autoscale	:DISP:PN[1-1]:TRAC[1-1]:Y[:SCAL]:AUTO
Divisions	Sets/reads Y-scale divisions	:DISP:PN[1-1]:Y[:SCAL]:DIV
Marker -> Reference	Sets the marker value to the reference level	:DISP:PN[1-1]:TRAC[1-1]:Y[:SCAL]:RLEV
Reference Position	Sets/reads reference position	:DISP:PN[1-1]:TRAC[1-1]:Y[:SCAL]:RPOS
Reference Value	Sets/reads the reference level value	:DISP:PN[1-1]:TRAC[1-1]:Y[:SCAL]:RLEV
Scale/Div	Sets/reads scale per division	:DISP:PN[1-1]:TRAC[1-1]:Y[:SCAL]:PDIV
Setup		

Key Operation	Function	SCPI Command
Frequency Band	Selects frequency band	:SENS:PN[1-1]:FBAN
IF Gain	Sets/reads the IF Gain	:SENS:PN[1-1]:IFG
LO PhNoise Optimize	Sets/reads phase noise Local bandwidth optimization.	:SENS:PN[1-1]:LOB
Measurement Quality	Sets/reads the quality level.	:SENS:PN[1-1]:SEGT[:MEAS][:QUAL]
Start		
100Hz	Sets 100Hz to the start frequency	:SENS:PN[1-1]:FREQ:STAR
10Hz	Sets 10Hz to the start frequency	:SENS:PN[1-1]:FREQ:STAR
1Hz	Sets 1Hz to the start frequency	:SENS:PN[1-1]:FREQ:STAR
1kHz	Sets 1kHz to the start frequency	:SENS:PN[1-1]:FREQ:STAR
Stop		
100kHz	Sets 100kHz to the stop frequency	:SENS:PN[1-1]:FREQ:STOP
10MHz	Sets 10MHz to the stop frequency	:SENS:PN[1-1]:FREQ:STOP
1MHz	Sets 1MHz to the stop frequency	:SENS:PN[1-1]:FREQ:STOP
40MHz	Sets 40MHz to the stop frequency	:SENS:PN[1-1]:FREQ:STOP
5MHz	Sets 5MHz to the stop frequency	:SENS:PN[1-1]:FREQ:STOP
System		
Abort Printing	Aborts printing	:HCOP:ABOR
Backlight	Turns on/off backlight	:SYST:BACK:STAT
Dump Screen Image	Save screen image	:MMEM:STOR:IMAG
Error Log		
Clear Error Log	Clear error log	
View Error Log...	Display error log	
Invert Image	Selects print mode	:HCOP:IMAG
Misc Setup		
Beeper		
Beep Complete	Turns on/off the beep for operation completion	:SYST:BEEP:COMP:STAT
Beep Warning	Turns on/off the beep for warning	:SYST:BEEP:WARN:STAT
Test Beep Complete	Makes beep sound for operation completion	:SYST:BEEP:COMP:IMM
Test Beep Warning	Makes beep sound for warning	:SYST:BEEP:WARN:IMM
Clock Setup		

Key Operation	Function	SCPI Command
Set Date and Time	Set/reads system time Set/reads system date	:SYST:TIME :SYST:DATE
Show Clock	Turns on/off internal clock display	:DISP:CLOC
Control Panel ...	Open control panel	
GPIB Setup		
System Controller Configuration	Turns on/off system controller mode	
Talker/Listener Address	Sets/the address for controlling the analyzer from a controller via GPIB	
Key Lock		
Front Panel & Keyboard Lock	Disables from panel/keyboard operations	:SYST:KLOC:KBD
Touch Screen & Mouse Lock	Disables from touch screen/mouse operations	:SYST:KLOC:MOUS
Network Setup		
MAC Address	Sets MAC address	
Network Configuration ...	Enables/disables network connections	
Network Identification ...	Sets network ID of the instrument	
SICL-LAN Address	Sets SICL-LAN address	
SICL-LAN Server	Enables/disables SICL-LAN server	
Socket Server	Enables/disables Socket server	
Telnet Server	Enables/disables Telnet server	
Print	Outputs print	:HCOP:IMM
Printer Setup ...	Executes printer setup	
Product Information	Reads product information	
Trace View		
Aperture	Smoothing aperture	:CALC:PN[1-1]:TRAC[1-1]:SMO:APER
Clear Persistent Data	Clears persistence mode	:DISP:PN[1-1]:TRAC[1-1]:PERS:CLE
Copy to User	Copies trace data to the user trace	:CALC:PN[1-1]:TRAC[1-1]:DATA:COPY

Key Operation	Function	SCPI Command
Data -> Mem	Copy data to memory	:CALC:PN[1-1]:TRAC[1-1]:MATH:MEM
Data Hold	Data hold	:CALC:PN[1-1]:TRAC[1-1]:HOLD
Data Math	Sets/reads math operation type	:CALC:PN[1-1]:TRAC[1-1]:MATH:FUNC
Display Trace	Shows data and/or memory trace	:DISP:PN[1-1]:TRAC[1-1]:MODE
Omitting Spurious	Spurious display omission ON/OFF	:CALC:PN[1-1]:TRAC[1-1]:SPUR:OMIS
Persistence Mode	Sets/reads persistence mode	:DISP:PN[1-1]:TRAC[1-1]:PERS:STAT
Smoothing	Smoothing on/off	:CALC:PN[1-1]:TRAC[1-1]:SMO:STAT
Spurious		
Clear Threshold Table	Clears the threshold data	:CALC:PN[1-1]:TRAC[1-1]:SPUR:THR:TABL:CLE
Import Threshold Table ...	Reads the threshold data	:MMEM:PN[1-1]:TRAC[1-1]:LOAD:SPUR:THR
Normalized (dBc/Hz)	Disables the spurious power value display	:CALC:PN[1-1]:TRAC[1-1]:SPUR:POW :CALC:PN[1-1]:TRAC[1-1]:SPUR:OMIS
Omit	Enables the spurious display omission	:CALC:PN[1-1]:TRAC[1-1]:SPUR:OMIS
Power (dBc)	Enables the spurious power value display	:CALC:PN[1-1]:TRAC[1-1]:SPUR:POW
Spurious List	Display the spurious data	
Trace Label	Edit trace title label	:DISP:PN[1-1]:TRAC[1-1]:LAB:DATA
Trigger		
Continuous	Sets/reads trigger continuous mode	:INIT:PN[1-1]:CONT :INIT:PN[1-1]:IMM
Ext Trig Polarity	External trigger polarity	:TRIG:EXT:SLOP
Hold	Sets trigger mode to waiting-for-trigger state	:INIT:PN[1-1]:IMM
Manual Trigger	move once to waiting-for-trigger state	:INIT:PN[1-1]:IMM
Restart	move once to waiting-for-trigger state	:INIT:PN[1-1]:IMM
Single	always move to waiting-for-trigger state after measuring move once to waiting-for-trigger state	:INIT:PN[1-1]:CONT :INIT:PN[1-1]:IMM
Source	trigger source	:TRIG:PN[1-1]:SOUR

Key Operation	Function	SCPI Command
Trigger to Phase Noise	select measurement mode	:TRIG:MODE

Spectrum Monitor Menu (Top Menu)

Key Operation	Function
Double-click on each softkey menu title	Displays the top menu of each menu item below. Refer the SP menu about detail of following each menu item.
Measurement View	Same as [Meas].
Input	Same as [Scale].
Scale	Same as [Scale].
Format	Same as [Format].
Display	Same as [Display].
Average	Same as [Avg].
Attenuator	Same as [Cal].
Start/Center	Displays the same softkey for setting up the sweep range that appears when [Start], or [Span] is pressed.
Stop/Span	Displays the same softkey for setting up the sweep range that appears when [Start], or [Span] is pressed.
DC Conrol Voltage	Same as [Sweep Setup].
DC Power Voltage	Same as [Sweep Setup].
Setup	Same as [Sweep Setup].
Trigger	Same as [Trigger].
Marker	Same as [Marker].
Marker Search	Same as [Marker Search].
Marker To	Same as [Marker Search].
Marker Function	Same as [Marker Fctn].
Macro Setup	Same as [Macro Setup].
Save/Recall	Same as [Save/Recall].
System	Same as [System].
Preset	Same as [Preset].

SP Menu

Key Operation	Function	SCPI Command
Attenuator		
Input Attenuator	Sets/reads Input Attenuator level on 5dB Step	:SENS:ATT:LEV
Average/BW		
Averaging	Turns on/off averaging function	:SENS:SP[1-1]:AVER:STAT
Averaging Restart	Restart averaging	:SENS:SP[1-1]:AVER:CLE
Averaging Type	Sets/reads averaging type	:SENS:SP[1-1]:AVER:TYPE
Avg Factor	Sets/reads the averaging count	:SENS:SP[1-1]:AVER:COUN
RBW	Sets/reads RBW value	:SENS:SP[1-1]:BAND:RES
DC Control Voltage		
Auto Freq Control		
AFC Status	Turns on/off the auto frequency control function. Executes the auto frequency control once.	:SOUR:VOLT:CONT:AFC[:STAT] :SOUR:VOLT:CONT:AFC:IMM
Frequency Band	Sets/reads the frequency band in the auto frequency control function	:SOUR:VOLT:CONT:AFC:FBAN
Max Ctrl Voltage Limit	Sets/reads the maximum DC control voltage limit	:SOUR:VOLT:CONT:AFC:LIM:HIGH
Max Iteration	Sets/reads the maximum number of iterations for the DC control voltage-setting loops	:SOUR:VOLT:CONT:AFC:ITER
Min Ctrl Voltage Limit	Sets/reads the minimum DC control voltage limit	:SOUR:VOLT:CONT:AFC:LIM:LOW
Sensitivity	Sets/reads the tuning sensitivity	:SOUR:VOLT:CONT:AFC:SENS
Target	Sets/reads the target frequency in the auto frequency control function	:SOUR:VOLT:CONT:AFC:TARG
Tolerance	Sets/reads the tolerance limit	:SOUR:VOLT:CONT:AFC:TOL
Control Voltage Cal	Enables DC Control voltage calibration	:SOUR:VOLT:CONT:CORR[:STAT]
DC Control Delay	Sets/reads DC Control delay (sec)	:SOUR:VOLT:CONT:DEL
DC Control Output	Turns on/off DC Control voltage	:SOUR:VOLT:CONT:LEV:STAT
DC Control Voltage	Sets/reads DC Control voltage	:SOUR:VOLT:CONT:LEV:AMPL
Execute Control Voltage Cal	Execute DC Control voltage calibration	:SOUR:VOLT:CONT:CORR:COLL:ACQ
Max Ctrl Voltage Limit	Sets/reads the maximum DC Control voltage limit	:SOUR:VOLT:CONT:LIM:HIGH
Min Ctrl Voltage Limit	Sets/reads the minimum DC Control voltage limit	:SOUR:VOLT:CONT:LIM:LOW
DC Power Voltage		

Key Operation	Function	SCPI Command
DC Power Delay	Sets/reads DC Power delay (sec)	:SOUR:VOLT:POW:DEL
DC Power Output	Turns on/off DC Power voltage	:SOUR:VOLT:POW:LEV:STAT
DC Power Voltage	Sets/reads DC Power voltage	:SOUR:VOLT:POW:LEV:AMPL
Max Pwr Voltage Limit	Sets/reads the maximum DC Power voltage limit	:SOUR:VOLT:POW:LIM:HIGH
Min Pwr Voltage Limit	Sets/reads the minimum DC Power voltage limit	:SOUR:VOLT:POW:LIM:LOW
Display		
Edit Title Label	Edits the measurement window title label	:DISP:SP[1-1]:LAB:DATA
Limit Test		
Delete Lower Limit Line	Clears the lower limit line	:CALC:SP[1-1]:TRAC[1-1]:LIM:LOW:SEGM:CLE
Delete Upper Limit Line	Clears the upper limit line	:CALC:SP[1-1]:TRAC[1-1]:LIM:UPP:SEGM:CLE
Explorer		
Fail Sign	Turns on/off the limit test judgement display	:DISP:SP[1-1]:LIM:FSIG
Import Lower Limit Line ...	Reads the lower limit line	:MMEM:SP[1-1]:TRAC[1-1]:LOAD:LIM:LOW
Import Upper Limit Line ...	Reads the upper limit line	:MMEM:SP[1-1]:TRAC[1-1]:LOAD:LIM:UPP
Limit Line	Turns on/off the limit line	:DISP:SP[1-1]:TRAC[1-1]:LIM:LINE
Limit Test	Turns on/off the limit test function	:CALC:SP[1-1]:TRAC[1-1]:LIM[:STAT]
Marker Information	Sets/reads the marker information position	:DISP:SP[1-1]:ANN:MARK:POS
Meas Condition	Turns on/off measurement conditions	:DISP:SP[1-1]:ANN:MEAS:STAT
Relative Y-Scale	Turns on/off relative Y-scale	:DISP:SP[1-1]:GRAT:AXIS:Y:REL
Title Label	Turns on/off measurement window title label	:DISP:SP[1-1]:LAB:STAT
Update	Turns on/off trace updates	:DISP:ENAB
Y # of Digits	Selects the number of digits (Y-axis)	:DISP:SP[1-1]:GRAT:AXIS:Y:STAT
Format		
Detector Mode	Sets/reads the detector mode	:SENS:SP[1-1]:DET:FUNC
Format	SP format	:CALC:SP[1-1]:TRAC[1-1]:FORM
Macro Setup		
E5052 Event	Turns on/off the E5052 VBA event callback function	:PROG:COM:EVEN

Key Operation	Function	SCPI Command
Echo Window Menu		
Clear Echo	Clears Echo window	:DISP:ECHO:CLE
Echo Font Size	Sets/reads the font size on Echo window	:DISP:ECHO:FSIZ
Echo Window	Turns on/off the Echo window	:DISP:ECHO:STAT
Load & Run	Load and execute the macro selected on file names.	
Select Macro	Sets/reads the name of the program to be selected	:PROG:SEL:NAME
Stop	Set/reads the state of the selected program	:PROG:SEL:STAT
User Menu		
User Label 1	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 2	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 3	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 4	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 5	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 6	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 7	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 8	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
VBA Editor Menu		
Close Editor	Close VBA editor	
Load Project	Loads program	:MMEM:LOAD:PROG
New Project	Open new VBA project	
Open Editor	Open VBA editor	
Save Project	Save VBA project	:MMEM:STOR:PROG
Marker		
Clear Marker Menu		
All OFF	Clears all the markers	
Marker 1	Turns on/off marker 1	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 2	Turns on/off marker 2	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 3	Turns on/off marker 3	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 4	Turns on/off marker 4	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 5	Turns on/off marker 5	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 6	Turns on/off marker 6	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT

Key Operation	Function	SCPI Command
Marker 1	Turns on/off marker 1	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 2	Turns on/off marker 2	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 3	Turns on/off marker 3	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 4	Turns on/off marker 4	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 5	Turns on/off marker 5	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker 6	Turns on/off marker 6	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT
Marker List	Turns on/off the marker list	:DISP:SP[1-1]:TABL[:STAT]
More Functions		
Discrete	Sets/reads marker movement (Continuous/Discrete)	:CALC:SP[1-1]:ALLT:MARK:DISC:STAT
Ref Marker	Sets/reads marker reference number	:CALC:SP[1-1]:ALLT:MARK:REF:NUMB
Ref Marker Mode	Turns on/off delta marker mode	:CALC:SP[1-1]:ALLT:MARK:REF:STAT
Marker Function		
Analysis Range (X)	Sets/reads analysis/search range (X-axis)	:CALC:SP[1-1]:TRAC[1-1]:FUNC:DOM:X
Analysis Range (Y)	Sets/reads analysis/search range (Y-axis)	:CALC:SP[1-1]:TRAC[1-1]:FUNC:DOM:Y
Analysis Type	Sets/reads analysis type	:CALC:SP[1-1]:TRAC[1-1]:FUNC:TYPE
Band Marker X		
Band Marker X	Turns on/off bandmarker X	:CALC:SP[1-1]:TRAC[1-1]:BDM:X:STAT
Center	Sets/reads the center value of bandmarker X	:CALC:SP[1-1]:TRAC[1-1]:BDM:X:CENT
Span	Sets/reads the span value of bandmarker X	:CALC:SP[1-1]:TRAC[1-1]:BDM:X:SPAN
Start	Sets/reads the start value of bandmarker X	:CALC:SP[1-1]:TRAC[1-1]:BDM:X:STAR
Stop	Sets/reads the stop value of bandmarker X	:CALC:SP[1-1]:TRAC[1-1]:BDM:X:STOP
Band Marker Y		
Band Marker Y	Turns on/off bandmarker Y	:CALC:SP[1-1]:TRAC[1-1]:BDM:Y:STAT

Key Operation	Function	SCPI Command
Center	Sets/reads the center value of bandmarker Y	:CALC:SP[1-1]:TRAC[1-1]:BDM :Y:CENT
Span	Sets/reads the span value of bandmarker Y	:CALC:SP[1-1]:TRAC[1-1]:BDM :Y:SPAN
Start	Sets/reads the start value of bandmarker Y	:CALC:SP[1-1]:TRAC[1-1]:BDM :Y:STAR
Stop	Sets/reads the stop value of bandmarker Y	:CALC:SP[1-1]:TRAC[1-1]:BDM :Y:STOP
Marker Search		
Band Marker X		
Band Marker X	Turns on/off bandmarker X	:CALC:SP[1-1]:TRAC[1-1]:BDM :X:STAT
Center	Sets/reads the center value of bandmarker X	:CALC:SP[1-1]:TRAC[1-1]:BDM :X:CENT
Span	Sets/reads the span value of bandmarker X	:CALC:SP[1-1]:TRAC[1-1]:BDM :X:SPAN
Start	Sets/reads the start value of bandmarker X	:CALC:SP[1-1]:TRAC[1-1]:BDM :X:STAR
Stop	Sets/reads the stop value of bandmarker X	:CALC:SP[1-1]:TRAC[1-1]:BDM :X:STOP
Band Marker Y		
Band Marker Y	Turns on/off bandmarker Y	:CALC:SP[1-1]:TRAC[1-1]:BDM :Y:STAT
Center	Sets/reads the center value of bandmarker Y	:CALC:SP[1-1]:TRAC[1-1]:BDM :Y:CENT
Span	Sets/reads the span value of bandmarker Y	:CALC:SP[1-1]:TRAC[1-1]:BDM :Y:SPAN
Start	Sets/reads the start value of bandmarker Y	:CALC:SP[1-1]:TRAC[1-1]:BDM :Y:STAR
Stop	Sets/reads the stop value of bandmarker Y	:CALC:SP[1-1]:TRAC[1-1]:BDM :Y:STOP
Peak		
Peak Excursion	Sets/reads the peak excursion value	:CALC:SP[1-1]:TRAC[1-1]:MAR K[1-6]:SEAR:PEAK:EXC
Peak Polarity	Sets/reads the marker peak-search polarity	:CALC:SP[1-1]:TRAC[1-1]:MAR K[1-6]:SEAR:PEAK:POL
Search Left	Execute marker peak search left	:CALC:SP[1-1]:TRAC[1-1]:MAR K[1-6]:SEAR:EXEC:LPE
Search Peak	Execute marker peak search	:CALC:SP[1-1]:TRAC[1-1]:MAR K[1-6]:SEAR:EXEC:PEAK
Search Peak All	Execute marker search all	:CALC:SP[1-1]:TRAC[1-1]:ALL M:SEAR:PEAK

Key Operation	Function	SCPI Command
Search Right	Execute marker peak search right	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:RPE
Search Max	Execute marker search maximum	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:MAX
Search Min	Execute marker search minimum	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:MIN
Search Range (X)	Sets/reads marker search range (X-axis)	:CALC:SP[1-1]:TRAC[1-1]:ALLM:SEAR:DOM:X
Search Range (Y)	Sets/reads marker search range (Y-axis)	:CALC:SP[1-1]:TRAC[1-1]:ALLM:SEAR:DOM:Y
Target		
Search Left	Execute marker target search left	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:LTAR
Search Right	Execute marker target search right	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:RTAR
Search Target	Execute marker target search	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:TARG
Target Transition	Sets/reads the target transition definition	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:TARG:TRAN
Target Value	Sets/reads the marker target value	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:TARG:Y
Tracking	Sets/reads the marker tracking type	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:TRAC:TYPE
Marker To		
Marker -> Center	Sets/reads the center value of frequency span	:SENS:SP[1-1]:FREQ:CENT
Marker -> Start	Sets/reads the start value of frequency span	:SENS:SP[1-1]:FREQ:STAR
Marker -> Stop	Sets/reads the stop value of frequency span	:SENS:SP[1-1]:FREQ:STOP
Measurement View		
Freq & Power	Selects frequency, power and DC current measurement window	:DISP:WIND:ACT
Phase Noise	Selects phase noise measurement window	:DISP:WIND:ACT
Show Window		
Freq & Power	Turn on/off frequency, power and DC current measurement mode	:DISP:FP[1-1]:STAT
Phase Noise	Turns on/off phase noise measurement mode	:DISP:PN[1-1]:STAT
Spectrum Monitor	Turns on/off spectrum monitor mode	:DISP:SP[1-1]:STAT
Transient	Turns on/off transient measurement mode	:DISP:TR[1-1]:STAT
User	Turns on/off user defined window	:DISP:USER[1-1]:STAT
Spectrum Monitor	Selects spectrum monitor mode	:DISP:WIND:ACT
Transient	Selects transient measurement mode	:DISP:WIND:ACT

Key Operation	Function	SCPI Command
User	Selects user defined window	:DISP:WIND:ACT
Preset		
Factory	Preset instrument to the initial setup state	:SYST:PRES
User	Preset instrument and recalls the Autorec.sta in the F drive	
Save/Recall		
Explorer...	Open windows explorer	
Recall by filename	Recalls state file by file name	:MMEM:LOAD:STAT
Recall State		
Autorec	Recalls settings	:MMEM:LOAD:STAT
File Dialog...	Open file dialog	
State01	Recalls state file from register 1	:MMEM:LOAD:STAT
State02	Recalls state file from register 2	:MMEM:LOAD:STAT
State03	Recalls state file from register 3	:MMEM:LOAD:STAT
State04	Recalls state file from register 4	:MMEM:LOAD:STAT
State05	Recalls state file from register 5	:MMEM:LOAD:STAT
State06	Recalls state file from register 6	:MMEM:LOAD:STAT
Save Data Trace	Saves trace data	:MMEM:SP[1-1]:TRAC[1-1]:STOR[:DATA]
Save Memory Trace	Saves memory trace data	:MMEM:SP[1-1]:TRAC[1-1]:STOR:MEM
Save State		
Autorec	Save settings	:MMEM:STOR:STAT
File Dialog...	Open file dialog	
Save Type	Select instrument state type (Entire or instrument state only)	:MMEM:STOR:STYP
State01	Save state file to register 1	:MMEM:STOR:STAT
State02	Save state file to register 2	:MMEM:STOR:STAT
State03	Save state file to register 3	:MMEM:STOR:STAT
State04	Save state file to register 4	:MMEM:STOR:STAT
State05	Save state file to register 5	:MMEM:STOR:STAT
State06	Save state file to register 6	:MMEM:STOR:STAT
Scale		
Auto Scale	Execute autoscale	:DISP:SP[1-1]:TRAC[1-1]:Y[:SCAL]:AUTO
Divisions	Sets/reads Y-scale divisions	:DISP:SP[1-1]:Y[:SCAL]:DIV
Marker -> Reference	Sets the marker value to the reference level	:DISP:SP[1-1]:TRAC[1-1]:Y[:SCAL]:RLEV

Key Operation	Function	SCPI Command
Reference Position	Sets/reads the reference position	:DISP:SP[1-1]:TRAC[1-1]:Y[:SCAL]:RPOS
Reference Value	Sets/reads the reference level value	:DISP:SP[1-1]:TRAC[1-1]:Y[:SCAL]:RLEV
Scale/Div	Sets/reads scale per division	:DISP:SP[1-1]:TRAC[1-1]:Y[:SCAL]:PDIV
Setup		
Reference Level	Sets/reads the reference level of frequency span	:SENS:SP[1-1]:POW:RLEV
Start/Center		
Carrier To		
Carrier -> Center	Changes the center frequency to the carrier frequency.	:SENS:SP[1-1]:CARR:SET:CENT 1
Carrier x 2 -> Center	Changes the center frequency to 2 times the carrier frequency.	:SENS:SP[1-1]:CARR:SET:CENT 2
Carrier x 3 -> Center	Changes the center frequency to 3 times the carrier frequency.	:SENS:SP[1-1]:CARR:SET:CENT 3
Carrier x # -> Center	Changes the center frequency to # times the carrier frequency. (The # is assigned by **Harmonic #** key.)	:SENS:SP[1-1]:CARR:SET:CENT #
Frequency Band	Sets/reads the carrier frequency band.	:SENSe:SP[1-1]:CARRier:FBAND
Harmonic #	Sets the magnification of carrier frequency when center frequency is set.	
Center	Sets/reads the center value of frequency span	:SENS:SP[1-1]:FREQ:CENT
Span	Sets/reads the span value of frequency span	:SENS:SP[1-1]:FREQ:SPAN
Start	Sets/reads the start value of frequency span	:SENS:SP[1-1]:FREQ:STAR
Stop	Sets/reads the stop value of frequency span	:SENS:SP[1-1]:FREQ:STOP
Stop/Span		
Carrier To		
Carrier -> Center	Changes the center frequency to the carrier frequency.	:SENS:SP[1-1]:CARR:SET:CENT 1
Carrier x 2 -> Center	Changes the center frequency to 2 times the carrier frequency.	:SENS:SP[1-1]:CARR:SET:CENT 2
Carrier x 3 -> Center	Changes the center frequency to 3 times the carrier frequency.	:SENS:SP[1-1]:CARR:SET:CENT 3
Carrier x # -> Center	Changes the center frequency to # times the carrier frequency. (The # is assigned by **Harmonic #** key.)	:SENS:SP[1-1]:CARR:SET:CENT #
Frequency Band	Sets/reads the carrier frequency band.	:SENSe:SP[1-1]:CARRier:FBAND
Harmonic #	Sets the magnification of carrier frequency when center frequency is set.	
Center	Sets/reads the center value of frequency span	:SENS:SP[1-1]:FREQ:CENT
Span	Sets/reads the span value of frequency span	:SENS:SP[1-1]:FREQ:SPAN

Key Operation	Function	SCPI Command
Start	Sets/reads the start value of frequency span	:SENS:SP[1-1]:FREQ:STAR
Stop	Sets/reads the stop value of frequency span	:SENS:SP[1-1]:FREQ:STOP
System		
Abort Printing	Aborts printing	:HCOP:ABOR
Backlight	Turns on/off backlight	:SYST:BACK:STAT
Dump Screen Image	Save screen image	:MMEM:STOR:IMAG
Error Log		
Clear Error Log	Clear error log	
View Error Log...	Display error log	
Invert Image	Selects print mode	:HCOP:IMAG
Misc Setup		
Beeper		
Beep Complete	Turns on/off the beep for operation completion	:SYST:BEEP:COMP:STAT
Beep Warning	Turns on/off the beep for warning	:SYST:BEEP:WARN:STAT
Test Beep Complete	Makes beep sound for operation completion	:SYST:BEEP:COMP:IMM
Test Beep Warning	Makes beep sound for warning	:SYST:BEEP:WARN:IMM
Clock Setup		
Set Date and Time	Set/reads system time Set/reads system date	:SYST:TIME :SYST:DATE
Show Clock	Turns on/off internal clock display	:DISP:CLOC
Control Panel ...	Open control panel	
GPIB Setup		
System Controller Configuration	Turns on/off system controller mode	
Talker/Listener Address	Sets the address for controlling the analyzer from a controller via GPIB.	
Key Lock		
Front Panel & Keyboard Lock	Disables from panel / keyboard operations	:SYST:KLOC:KBD
Touch Screen & Mouse Lock	Disables from touch screen / mouse operations	:SYST:KLOC:MOUS
Network Setup		
MAC Address	Sets MAC address	

Key Operation	Function	SCPI Command
Network Configuration ...	Enables/disables network connections	
Network Identification ...	Sets network ID of the instrument	
SICL-LAN Address	Sets SICL-LAN address	
SICL-LAN Server	Enables/disables SICL-LAN server	
Socket Server	Enables/disables Socket server	
Telnet Server	Enables/disables Telnet server	
Print	Outputs print	:HCOP:IMM
Printer Setup ...	Execute printer setup	
Product Information	Reads product information	
Trace View		
Aperture	Smoothing aperture	:CALC:SP[1-1]:TRAC[1-1]:SMO:APER
Clear Persistent Data	Clears persistence mode	:DISP:SP[1-1]:TRAC[1-1]:PERS:CLE
Copy to User	Copies trace data to the user trace	:CALC:SP[1-1]:TRAC[1-1]:DATA:COPY
Data -> Mem	Copy data to memory	:CALC:SP[1-1]:TRAC[1-1]:MATH:MEM
Data Hold	Data hold	:CALC:SP[1-1]:TRAC[1-1]:HOLD
Data Math	Sets/reads math operation type	:CALC:SP[1-1]:TRAC[1-1]:MATH:FUNC
Display Trace	Shows data and/or memory trace	:DISP:SP[1-1]:TRAC[1-1]:MODE
Persistence Mode	Sets/reads persistence mode	:DISP:SP[1-1]:TRAC[1-1]:PERS:STAT
Smoothing	Smoothing on/off	:CALC:SP[1-1]:TRAC[1-1]:SMO:STAT
Trace Label	Edits trace title label	:DISP:SP[1-1]:TRAC[1-1]:LAB:DATA
Trigger		
Continuous	Sets/reads trigger continuous mode	:INIT:SP[1-1]:CONT :INIT:SP[1-1]:IMM
Ext Trig Polarity	External trigger polarity	:TRIG:EXT:SLOP
Hold	Sets trigger mode to waiting-for-trigger state	:INIT:SP[1-1]:IMM

Key Operation	Function	SCPI Command
Manual Trigger	move once to waiting-for-trigger state	:INIT:SP[1-1]:IMM
Restart	move once to waiting-for-trigger state	:INIT:SP[1-1]:IMM
Single	always move to waiting-for-trigger state after measuring move once to waiting-for-trigger state	:INIT:SP[1-1]:CONT :INIT:SP[1-1]:IMM
Source	trigger source	:TRIG:SP[1-1]:SOUR
Trigger to Spectrum Monitor	select measurement mode	:TRIG:MODE

Frequency Power Menu (Top Menu)

Key Operation	Function
Double-click on each softkey menu title	Displays the top menu of each menu item below. Refer the FP menu about detail of following each menu item.
Measurement View	Same as [Meas].
Input	Same as [Scale].
Scale	Same as [Scale].
Format	Same as [Format].
Display	Same as [Display].
Average	Same as [Avg].
Attenuator	Same as [Cal].
Start/Center	Displays the same softkey for setting up the sweep range that appears when [Start], or [Span] is pressed.
Stop/Span	Displays the same softkey for setting up the sweep range that appears when [Start], or [Span] is pressed.
DC Conrol Voltage	Same as [Sweep Setup].
DC Power Voltage	Same as [Sweep Setup].
Setup	Same as [Sweep Setup].
Trigger	Same as [Trigger].
Marker	Same as [Marker].
Marker Search	Same as [Marker Search].
Marker To	Same as [Marker Search].
Marker Function	Same as [Marker Fctn].
Macro Setup	Same as [Macro Setup].
Save/Recall	Same as [Save/Recall].
System	Same as [System].
Preset	Same as [Preset].

FP Menu

Key Operation	Function	SCPI Command
Attenuator		
Input Attenuator	Sets/reads Input Attenuator level on 5dB Step	:SENS:ATT:LEV
Average		
Averaging	Turns on/off averaging function	:SENS:FP[1-1]:AVER:STAT
Averaging Restart	Restart averaging	:SENS:FP[1-1]:AVER:CLE
Avg Factor	Sets/reads averaging count	:SENS:FP[1-1]:AVER:COUN
DC Control Voltage		
Auto Freq Control		
AFC Status	Turns on/off the auto frequency control function. Executes the auto frequency control once.	:SOUR:VOLT:CONT:AFC[:STAT] :SOUR:VOLT:CONT:AFC:IMM
Frequency Band	Sets/reads the frequency band in the auto frequency control function	:SOUR:VOLT:CONT:AFC:FBAN
Max Ctrl Voltage Limit	Sets/reads the maximum DC control voltage limit	:SOUR:VOLT:CONT:AFC:LIM:HIGH
Max Iteration	Sets/reads the maximum number of iterations for the DC control voltage-setting loops	:SOUR:VOLT:CONT:AFC:ITER
Min Ctrl Voltage Limit	Sets/reads the minimum DC control voltage limit	:SOUR:VOLT:CONT:AFC:LIM:LOW
Sensitivity	Sets/reads the tuning sensitivity	:SOUR:VOLT:CONT:AFC:SENS
Target	Sets/reads the target frequency in the auto frequency control function	:SOUR:VOLT:CONT:AFC:TARG
Tolerance	Sets/reads the tolerance limit	:SOUR:VOLT:CONT:AFC:TOL
Control Voltage Cal	Enables DC Control voltage calibration	:SOUR:VOLT:CONT:CORR[:STAT]
DC Control Delay	Sets/reads DC Control delay (sec)	:SOUR:VOLT:CONT:DEL
DC Control Output	Turns on/off DC Control voltage	:SOUR:VOLT:CONT:LEV:STAT
DC Control Voltage	Sets/reads DC Control voltage	:SOUR:VOLT:CONT:LEV:AMPL
Execute Control Voltage Cal	Execute DC Control voltage calibration	:SOUR:VOLT:CONT:CORR:COLL:ACQ
Max Ctrl Voltage Limit	Sets/reads the maximum DC Control voltage limit	:SOUR:VOLT:CONT:LIM:HIGH
Min Ctrl Voltage Limit	Sets/reads the minimum DC Control voltage limit	:SOUR:VOLT:CONT:LIM:LOW
DC Power Voltage		
DC Power Delay	Sets/reads DC Power delay (sec)	:SOUR:VOLT:POW:DEL
DC Power Output	Turns on/off DC Power voltage	:SOUR:VOLT:POW:LEV:STAT

Key Operation	Function	SCPI Command
DC Power Voltage	Sets/reads DC Power voltage	:SOUR:VOLT:POW:LEV:AMPL
Max Pwr Voltage Limit	Sets/reads the maximum DC Power voltage limit	:SOUR:VOLT:POW:LIM:HIGH
Min Pwr Voltage Limit	Sets/reads the minimum DC Power voltage limit	:SOUR:VOLT:POW:LIM:LOW
Display		
Allocate	Sets/reads the trace layout	:DISP:FP[1-1]:SPL
Edit Title Label	Edit the measurement window title label	:DISP:FP[1-1]:LAB:DATA
Limit Test		
Delete Lower Limit Line	Clears the lower limit line	:CALC:FP[1-1]:TRAC[1-4]:LIM:LOW:SEGM:CLE
Delete Upper Limit Line	Clears the upper limit line	:CALC:FP[1-1]:TRAC[1-4]:LIM:UPP:SEGM:CLE
Explorer		
Fail Sign	Turns on/off the limit test judgement display	:DISP:FP[1-1]:LIM:FSIG
Import Lower Limit Line ...	Reads the lower limit line	:MMEM:FP[1-1]:TRAC[1-4]:LOAD:LIM:LOW
Import Upper Limit Line ...	Reads the upper limit line	:MMEM:FP[1-1]:TRAC[1-4]:LOAD:LIM:UPP
Limit Line	Turns on/off the limit line	:DISP:FP[1-1]:TRAC[1-4]:LIM:LINE
Limit Test	Turns on/off the limit test function	:CALC:FP[1-1]:TRAC[1-4]:LIM[:STAT]
Marker Information	Sets/reads the marker information position	:DISP:FP[1-1]:ANN:MARK:POS
Meas Condition	Turns on/off measurement conditions	:DISP:FP[1-1]:ANN:MEAS:STAT
Relative Y-Scale	Turns on/off relative Y-scale	:DISP:FP[1-1]:GRAT:AXIS:Y:REL
Title Label	Turns on/off the measurement window title label	:DISP:FP[1-1]:LAB:STAT
Update	Turns on/off the trace updates	:DISP:ENAB
Y # of Digits	Selects the number of digits (Y-axis)	:DISP:FP[1-1]:GRAT:AXIS:Y:STAT
Format		
Frequency Format	Selects frequency format (Hz or Hz/V)	:CALC:FP[1-1]:TRAC[1-4]:FORM:FREQ
Frequency Reference	Sets/reads the frequency reference.	:CALC:FP[1-1]:TRAC[1-4]:REF:FREQ
Sensitivity Aperture	Sets/reads the sensitivity aperture	:CALC:FP[1-1]:TRAC[1-4]:SAP
Macro Setup		
E5052 Event	Turns on/off the E5052 VBA event callback function	:PROG:COM:EVEN

Key Operation	Function	SCPI Command
Echo Window Menu		
Clear Echo	Clears Echo window	:DISP:ECHO:CLE
Echo Font Size	Sets/reads the font size on Echo window	:DISP:ECHO:FSIZ
Echo Window	Turns on/off the Echo window	:DISP:ECHO:STAT
Load & Run	Load and execute the macro selected on file names.	
Select Macro	Sets/reads the name of the program to be selected	:PROG:SEL:NAME
Stop	Sets/reads the state of the selected program	:PROG:SEL:STAT
User Menu		
User Label 1	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 2	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 3	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 4	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 5	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 6	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 7	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 8	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
VBA Editor Menu		
Close Editor	close VBA editor	
Load Project	Load program	:MMEM:LOAD:PROG
New Project	Open new VBA project	
Open Editor	Open VBA editor	
Save Project	Save VBA Project	:MMEM:STOR:PROG
Marker		
Clear Marker Menu		
All OFF	Clears all the markers	
Marker 1	Turns on/off marker 1	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 2	Turns on/off marker 2	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 3	Turns on/off marker 3	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 4	Turns on/off marker 4	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 5	Turns on/off marker 5	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 6	Turns on/off marker 6	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:STAT

Key Operation	Function	SCPI Command
Couple	Turns on/off marker coupling function	:CALC:FP[1-1]:ALLT:MARK:COUP:STAT
Marker 1	Turns on/off marker 1	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 2	Turns on/off marker 2	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 3	Turns on/off marker 3	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 4	Turns on/off marker 4	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 5	Turns on/off marker 5	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 6	Turns on/off marker 6	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker List	Turns on/off the marker list	:DISP:FP[1-1]:TABL[:STAT]
More Functions		
Discrete	Sets/reads marker movement (Continuous/Discrete)	:CALC:FP[1-1]:ALLT:MARK:DISC:STAT
Ref Marker	Sets/reads marker reference number	:CALC:FP[1-1]:ALLT:MARK:REF:NUMB
Ref Marker Mode	Turns on/off delta marker mode	:CALC:FP[1-1]:ALLT:MARK:REF:STAT
Marker Function		
Analysis Range (X)	Sets/reads analysis/search range (X-axis)	:CALC:FP[1-1]:TRAC[1-4]:FUNC:DOM:X
Analysis Range (Y)	Sets/reads analysis/search range (Y-axis)	:CALC:FP[1-1]:TRAC[1-4]:FUNC:DOM:Y
Analysis Type	Sets/reads analysis type	:CALC:FP[1-1]:TRAC[1-4]:FUNC:TYPE
Band Marker X		
Band Marker X	Turns on/off bandmarker X	:CALC:FP[1-1]:TRAC[1-4]:BDM:X:STAT
Center	Sets/reads the center value of bandmarker X	:CALC:FP[1-1]:TRAC[1-4]:BDM:X:CENT
Span	Sets/reads the span value of bandmarker X	:CALC:FP[1-1]:TRAC[1-4]:BDM:X:SPAN
Start	Sets/reads the start value of bandmarker X	:CALC:FP[1-1]:TRAC[1-4]:BDM:X:STAR
Stop	Sets/reads the stop value of bandmarker X	:CALC:FP[1-1]:TRAC[1-4]:BDM:X:STOP
Band Marker Y		

Key Operation	Function	SCPI Command
Band Marker Y	Turns on/off bandmarker Y	:CALC:FP[1-1]:TRAC[1-4]:BDM :Y:STAT
Center	Sets/reads the center value of bandmarker Y	:CALC:FP[1-1]:TRAC[1-4]:BDM :Y:CENT
Span	Sets/reads the span value of bandmarker Y	:CALC:FP[1-1]:TRAC[1-4]:BDM :Y:SPAN
Start	Sets/reads the start value of bandmarker Y	:CALC:FP[1-1]:TRAC[1-4]:BDM :Y:STAR
Stop	Sets/reads the stop value of bandmarker Y	:CALC:FP[1-1]:TRAC[1-4]:BDM :Y:STOP
Couple	Turns on/off bandmarker coupling function	:CALC:FP[1-1]:ALLT:BDM:X:C OUP:STAT
Marker Search		
Band Marker X		
Band Marker X	Turns on/off bandmarker X	:CALC:FP[1-1]:TRAC[1-4]:BDM :X:STAT
Center	Sets/reads the center value of bandmarker X	:CALC:FP[1 1]:TRAC[1-4]:BDM:X:CENT
Span	Sets/reads the span value of bandmarker X	:CALC:FP[1-1]:TRAC[1-4]:BDM :X:SPAN
Start	Sets/reads the start value of bandmarker X	:CALC:FP[1-1]:TRAC[1-4]:BDM :X:STAR
Stop	Sets/reads the stop value of bandmarker X	:CALC:FP[1-1]:TRAC[1-4]:BDM :X:STOP
Band Marker Y		
Band Marker Y	Turns on/off bandmarker Y	:CALC:FP[1-1]:TRAC[1-4]:BDM :Y:STAT
Center	Sets/reads the center value of bandmarker Y	:CALC:FP[1-1]:TRAC[1-4]:BDM :Y:CENT
Span	Sets/reads the span value of bandmarker Y	:CALC:FP[1-1]:TRAC[1-4]:BDM :Y:SPAN
Start	Sets/reads the start value of bandmarker Y	:CALC:FP[1-1]:TRAC[1-4]:BDM :Y:STAR
Stop	Sets/reads the stop value of bandmarker Y	:CALC:FP[1-1]:TRAC[1-4]:BDM :Y:STOP
Couple	Turns on/off bandmarker coupling function	:CALC:FP[1-1]:ALLT:BDM:X:C OUP:STAT
Peak		
Peak Excursion	Sets/reads the peak excursion value	:CALC:FP[1-1]:TRAC[1-4]:MAR K[1-6]:SEAR:PEAK:EXC
Peak Polarity	Sets/reads the marker peak-search polarity	:CALC:FP[1-1]:TRAC[1-4]:MAR K[1-6]:SEAR:PEAK:POL

Key Operation	Function	SCPI Command
Search Left	Execute marker peak search left	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:LPE
Search Peak	Execute marker peak search	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:PEAK
Search Peak All	Execute marker search all	:CALC:FP[1-1]:TRAC[1-4]:ALLM:SEAR:PEAK
Search Right	Execute marker peak search right	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:RPE
Search Max	Execute marker search maximum	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:MAX
Search Min	Execute marker search minimum	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:MIN
Search Range (X)	Sets/reads marker search range (X-axis)	:CALC:FP[1-1]:TRAC[1-4]:ALLM:SEAR:DOM:X
Search Range (Y)	Sets/reads marker search range (Y-axis)	:CALC:FP[1-1]:TRAC[1-4]:ALLM:SEAR:DOM:Y
Target		
Search Left	Execute marker target search left	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:LTAR
Search Right	Execute marker target search right	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:RTAR
Search Target	Execute marker target search	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:TARG
Target Transition	Sets/reads the target transition definition	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:TARG:TRAN
Target Value	Sets/reads the marker target value	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:TARG:Y
Tracking	Sets/reads the marker tracking type	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:TRAC:TYPE
Marker To		
Marker -> Center	Sets the marker value to the center value of DC Control voltage Sets the marker value to the center value of DC Power voltage	:SOUR:FP[1-1]:VOLT:CONT:CENT :SOUR:FP[1-1]:VOLT:POW:CENT
Marker -> Start	Sets the marker value to the start value of DC Control voltage Sets the marker value to the start value of DC Power voltage	:SOUR:FP[1-1]:VOLT:CONT:STAR :SOUR:FP[1-1]:VOLT:POW:STAR
Marker -> Stop	Sets the marker value to the stop value of DC Control voltage Sets the marker value to the stop value of DC Power voltage	:SOUR:FP[1-1]:VOLT:CONT:STOP :SOUR:FP[1-1]:VOLT:POW:STOP
Measurement View		

Key Operation	Function	SCPI Command
Freq & Power	Selects frequency,power and DC current measurement window	:DISP:WIND:ACT
Phase Noise	Selects phase noise measurement window	:DISP:WIND:ACT
Show Window		
Freq & Power	Turns on/off frequency,power and DC current measurement mode	:DISP:FP[1-1]:STAT
Phase Noise	Turns on/off noise measurement mode	:DISP:PN[1-1]:STAT
Spectrum Monitor	Turns on/off spectrum monitor mode	:DISP:SP[1-1]:STAT
Transient	Turns on/off transient measurement mode	:DISP:TR[1-1]:STAT
User	Turns on/off user defined window	:DISP:USER[1-1]:STAT
Spectrum Monitor	Selects spectrum monitor mode	:DISP:WIND:ACT
Transient	Selects transient monitor mode	:DISP:WIND:ACT
User	Selects user defined window	:DISP:WIND:ACT
Preset		
Factory	Preset instrument to the initial setup state	:SYST:PRES
User	Preset instrument and recalls the Autorec.sta in the F drive	
Save/Recall		
Explorer...	Open windows explorer	
Recall by filename	Recalls state file by file name	:MMEM:LOAD:STAT
Recall State		
Autorec	Recalls settings	:MMEM:LOAD:STAT
File Dialog...	Open file dialog	
State01	Recalls state file from register 1	:MMEM:LOAD:STAT
State02	Recalls state file from register 2	:MMEM:LOAD:STAT
State03	Recalls state file from register 3	:MMEM:LOAD:STAT
State04	Recalls state file from register 4	:MMEM:LOAD:STAT
State05	Recalls state file from register 5	:MMEM:LOAD:STAT
State06	Recalls state file from register 6	:MMEM:LOAD:STAT
Save Data Trace	Saves trace data	:MMEM:FP[1-1]:TRAC[1-4]:STOR[:DATA]
Save Memory Trace	Saves memory trace data	:MMEM:FP[1-1]:TRAC[1-4]:STOR:MEM
Save State		
Autorec	Save settings	:MMEM:STOR:STAT
File Dialog...	Open file dialog	
Save Type	Selects instrument state type (Entire or instrument state only)	:MMEM:STOR:STYP

Key Operation	Function	SCPI Command
State01	Save state file to register 1	:MMEM:STOR:STAT
State02	Save state file to register 2	:MMEM:STOR:STAT
State03	Save state file to register 3	:MMEM:STOR:STAT
State04	Save state file to register 4	:MMEM:STOR:STAT
State05	Save state file to register 5	:MMEM:STOR:STAT
State06	Save state file to register 6	:MMEM:STOR:STAT
Scale		
Auto Scale	Execute autoscale	:DISP:FP[1-1]:TRAC[1-4]:Y[:SCAL]:AUTO
Auto Scale All	Execute autoscale for all traces on frequency,power and DC current measurement window	:DISP:FP[1-1]:ALLT:Y:SCAL:AUTO
Divisions	Sets/reads Y-scale divisions	:DISP:FP[1-1]:Y[:SCAL]:DIV
Marker -> Reference	Sets the marker value to the reference level	:DISP:FP[1-1]:TRAC[1-4]:Y[:SCAL]:RLEV
Reference Position	Sets/reads reference position	:DISP:FP[1-1]:TRAC[1-4]:Y[:SCAL]:RPOS
Reference Value	Sets/reads the reference level value	:DISP:FP[1-1]:TRAC[1-4]:Y[:SCAL]:RLEV
Scale/Div	Sets/reads scale per division	:DISP:FP[1-1]:TRAC[1-4]:Y[:SCAL]:PDIV
Setup		
Freq Resolution	Sets/reads frequency resolution	:SENS:FP[1-1]:FREQ:RES
Frequency Band	Selects frequency band	:SENS:FP[1-1]:FBAN
Point Delay	Sets/reads the point delay value	:SENS:FP[1-1]:SWE:DWEL
Points	Sets/reads the number of measurement points	:SOUR:FP[1-1]:SWE:POIN
Sweep Parameter	Sets/reads sweep parameter	:SOUR:FP[1-1]:SWE:PAR
Start/Center		
DC Control Center	Sets/reads the center value of DC Control voltage	:SOUR:FP[1-1]:VOLT:CONT:CENT
DC Control Span	Sets/reads the span value of DC Control voltage	:SOUR:FP[1-1]:VOLT:CONT:SPAN
DC Control Start	Sets/reads the start value of DC Control voltage	:SOUR:FP[1-1]:VOLT:CONT:STAR
DC Control Stop	Sets/reads the stop value of DC Control voltage	:SOUR:FP[1-1]:VOLT:CONT:STOP
DC Power Center	Sets/reads the center value of DC Power voltage	:SOUR:FP[1-1]:VOLT:POW:CENT
DC Power Span	Sets/reads the span value of DC Power voltage	:SOUR:FP[1-1]:VOLT:POW:SPAN

Key Operation	Function	SCPI Command
DC Power Start	Sets/reads the start value of DC Power voltage	:SOUR:FP[1-1]:VOLT:POW:STAR
DC Power Stop	Sets/reads the stop value of DC Power voltage	:SOUR:FP[1-1]:VOLT:POW:STOP
Stop/Span		
DC Control Center	Sets/reads the center value of DC Power voltage	:SOUR:FP[1-1]:VOLT:CONT:CENT
DC Control Span	Sets/reads the span value of DC Power voltage	:SOUR:FP[1-1]:VOLT:CONT:SPAN
DC Control Start	Sets/reads the start value of DC Power voltage	:SOUR:FP[1-1]:VOLT:CONT:STAR
DC Control Stop	Sets/reads the stop value of DC Control voltage	:SOUR:FP[1-1]:VOLT:CONT:STOP
DC Power Center	Sets/reads the center value of DC Power voltage	:SOUR:FP[1-1]:VOLT:POW:CENT
DC Power Span	Sets/reads the span value of DC Power voltage	:SOUR:FP[1-1]:VOLT:POW:SPAN
DC Power Start	Sets/reads the start value of DC Power voltage	:SOUR:FP[1-1]:VOLT:POW:STAR
DC Power Stop	Sets/reads the stop value of DC Power voltage	:SOUR:FP[1-1]:VOLT:POW:STOP
System		
Abort Printing	Aborts printing	:HCOP:ABOR
Backlight	Turns on/off backlight	:SYST:BACK:STAT
Dump Screen Image	Save screen image	:MMEM:STOR:IMAG
Error Log		
Clear Error Log	Clear error log	
View Error Log...	Display error log	
Invert Image	Selects print mode	:HCOP:IMAG
Misc Setup		
Beeper		
Beep Complete	Turns on/off the beep for operation completion	:SYST:BEEP:COMP:STAT
Beep Warning	Turns on/off the beep for warning	:SYST:BEEP:WARN:STAT
Test Beep Complete	Make beep sound for operation completion	:SYST:BEEP:COMP:IMM
Test Beep Warning	Makes beep sound for warning	:SYST:BEEP:WARN:IMM
Clock Setup		

Key Operation	Function	SCPI Command
Set Date and Time	Sets/reads system time Sets/reads system date	:SYST:TIME :SYST:DATE
Show Clock	Turns on/off internal clock display	:DISP:CLOC
Control Panel ...	Open control panel	
GPIB Setup		
System Controller Configuration	Turns on/off system controller mode	
Talker/Listener Address	Sets/reads talker/listener GPIB address of the	
Key Lock		
Front Panel & Keyboard Lock	Disables from panelkeyboard operations	:SYST:KLOC:KBD
Touch Screen & Mouse Lock	Disables from mouse/touch screen operations	:SYST:KLOC:MOUS
Network Setup		
MAC Address	Sets MAC address	
Network Configuration ...	Enables/disables network connections	
Network Identification ...	Sets network ID of the instrument	
SICL-LAN Address	Sets SICL-LAN address	
SICL-LAN Server	Enables/disables SICL-LAN server	
Socket Server	Enables/disables Socket server	
Telnet Server	Enables/disables telnet server	
Print	Output print	:HCOP:IMM
Printer Setup ...	Execute printer setup	
Trace View		
Aperture	Smoothing aperture	:CALC:FP[1-1]:TRAC[1-4]:SMO:APER
Clear Persistent Data	Clear Persistent mode	:DISP:FP[1-1]:TRAC[1-4]:TRAC[1-4]:PERS:CLE
Copy to User	Copies trace data to the user trace	:CALC:FP[1-1]:TRAC[1-4]:DATA:COPY
Data -> Mem	Copy data to memory	:CALC:FP[1-1]:TRAC[1-4]:MATH:MEM

Key Operation	Function	SCPI Command
Data Hold	Data hold	:CALC:FP[1-1]:TRAC[1-4]:HOLD
Data Math	Sets/reads math operation type	:CALC:FP[1-1]:TRAC[1-4]:MATH:FUNC
Display Trace	Shows data and/or memory trace	:DISP:FP[1-1]:TRAC[1-4]:MODE
Persistence Mode	Sets/reads persistence mode	:DISP:FP[1-1]:TRAC[1-4]:PERS:STAT
Smoothing	Smoothing on/off	:CALC:FP[1-1]:TRAC[1-4]:SMO:STAT
Trace Label	Edits trace title label	:DISP:FP[1-1]:TRAC[1-4]:LAB:DATA
Trigger		
Continuous	always move to waiting-for-trigger state after measuring move once to waiting-fortrigger state	:INIT:FP[1-1]:CONT :INIT:FP[1-1]:IMM
Ext Trig Polarity	External trigger polarity	:TRIG:EXT:SLOP
Hold	Sets trigger mode to waiting-for-trigger state	:INIT:FP[1-1]:IMM
Manual Trigger	move once to waiting-for-trigger state	:INIT:FP[1-1]:IMM
Mode	Sets/reads insrument mode to analyzer or tester mode*1	:TRIG:FP[1-1]:MODE*2
Restart	move once to waiting-for-trigger state	:INIT:FP[1-1]:IMM
Single	always move to waiting-for-trigger state after measuring move once to waiting-for-trigger state	:INIT:FP[1-1]:CONT :INIT:FP[1-1]:IMM
Source	trigger source	:TRIG:FP[1-1]:SOUR
Trigger to Freq & Power	select measurement mode	:TRIG:MODE

*1. Only “Tester” mode is available when option 011 is installed.

*2. “Option not installed” error message is generated when setting the trigger mode to analyzer mode with the instrument for the option 011.

Transient Menu (Top Menu)

Key Operation	Function
Double-click on each softkey menu title	Displays the top menu of each menu item below. Refer the TR menu about detail of following each menu item.
Measurement View	Same as Meas.
Input	Same as Scale.
Scale	Same as Scale.
Format	Same as Format.
Display	Same as Display.
Average	Same as Avg.
Attenuator	Same as Cal.
Time Offset	Displays the same softkey for setting up the sweep range that appears when Start, or Span is pressed.
Span	Displays the same softkey for setting up the sweep range that appears when Start, or Span is pressed.
DC Conrol Voltage	Same as Sweep Setup.
DC Power Voltage	Same as Sweep Setup.
Setup	Same as Sweep Setup.
Trigger	Same as Trigger.
Marker	Same as Marker.
Marker Search	Same as Marker Search.
Marker To	Same as Marker Search.
Marker Function	Same as Marker Fctn.
Macro Setup	Same as Macro Setup.
Save/Recall	Same as Save/Recall.
System	Same as System.
Preset	Same as Preset.

TR Menu

Key Operation	Function	SCPI Command
Attenuator		
Input Attenuator	Sets/reads Input Attenuator level on 5dB Step	:SENS:ATT:LEV
Average		
Averaging	Turn on/off averaging function	:SENS:TR[1-1]:AVER:STAT
Averaging Restart	Restart averaging	:SENS:TR[1-1]:AVER:CLE
Avg Factor	Sets/reads averaging count	:SENS:TR[1-1]:AVER:COUN
DC Control Voltage		
Auto Freq Control		
AFC Status	Turns on/off the auto frequency control function. Executes the auto frequency control once.	:SOUR:VOLT:CONT:AFC[:STAT] :SOUR:VOLT:CONT:AFC:IMM
Frequency Band	Sets/reads the frequency band in the auto frequency control function	:SOUR:VOLT:CONT:AFC:FBAN
Max Ctrl Voltage Limit	Sets/reads the maximum DC control voltage limit	:SOUR:VOLT:CONT:AFC:LIM:HIGH
Max Iteration	Sets/reads the maximum number of iterations for the DC control voltage-setting loops	:SOUR:VOLT:CONT:AFC:ITER
Min Ctrl Voltage Limit	Sets/reads the minimum DC control voltage limit	:SOUR:VOLT:CONT:AFC:LIM:LOW
Sensitivity	Sets/reads the tuning sensitivity	:SOUR:VOLT:CONT:AFC:SENS
Target	Sets/reads the target frequency in the auto frequency control function	:SOUR:VOLT:CONT:AFC:TARG
Tolerance	Sets/reads the tolerance limit	:SOUR:VOLT:CONT:AFC:TOL
Control Voltage Cal	Enables DC Control voltage calibration	:SOUR:VOLT:CONT:CORR[:STAT]
DC Control Delay	Sets/reads DC Control delay (sec)	:SOUR:VOLT:CONT:DEL
DC Control Output	Turns on/off DC Control voltage	:SOUR:VOLT:CONT:LEV:STAT
DC Control Voltage	Sets/reads DC Control voltage	:SOUR:VOLT:CONT:LEV:AMPL
Execute Control Voltage Cal	Execute DC Control voltage calibration	:SOUR:VOLT:CONT:CORR:COLL:ACQ
Max Ctrl Voltage Limit	Sets/reads the maximum DC control voltage limit	:SOUR:VOLT:CONT:LIM:HIGH
Min Ctrl Voltage Limit	Sets/reads the minimum DC control voltage limit	:SOUR:VOLT:CONT:LIM:LOW
DC Power Voltage		
DC Power Delay	Sets/reads DC Power delay (sec)	:SOUR:VOLT:POW:DEL
DC Power Output	Turns on/off DC Power voltage	:SOUR:VOLT:POW:LEV:STAT

Key Operation	Function	SCPI Command
DC Power Voltage	Sets/reads DC Power voltage	:SOUR:VOLT:POW:LEV:AMPL
Max Pwr Voltage Limit	Sets/reads the maximum DC Power voltage limit	:SOUR:VOLT:POW:LIM:HIGH
Min Pwr Voltage Limit	Sets/reads the minimum DC Power voltage limit	:SOUR:VOLT:POW:LIM:LOW
Display		
Edit Title Label	Edits the measurement window title label	:DISP:TR[1-1]:LAB:DATA
Limit Test		
Delete Lower Limit Line	Clears the lower limit line	:CALC:TR[1-1]:TRAC[1-4]:LIM:LOW:SEGM:CLE
Delete Upper Limit Line	Clears the upper limit line	:CALC:TR[1-1]:TRAC[1-4]:LIM:UPP:SEGM:CLE
Explorer		
Fail Sign	Turns on/off the limit test judgement display	:DISP:TR[1-1]:LIM:FSIG
Import Lower Limit Line ...	Reads the lower limit line	:MMEM:TR[1-1]:TRAC[1-4]:LOAD:LIM:LOW
Import Upper Limit Line ...	Reads the upper limit line	:MMEM:TR[1-1]:TRAC[1-4]:LOAD:LIM:UPP
Limit Line	Turns on/off the limit line	:DISP:TR[1-1]:TRAC[1-4]:LIM:LINE
Limit Test	Turns on/off the limit test function	:CALC:TR[1-1]:TRAC[1-4]:LIM[:STAT]
Marker Information	Sets/reads the marker information position	:DISP:TR[1-1]:ANN:MARK:POS
Meas Condition	Turns on/off measurement conditions	:DISP:TR[1-1]:ANN:MEAS:STAT
Relative Y-Scale	Turns on/off relative Y-scale	:DISP:TR[1-1]:GRAT:AXIS:Y:REL
Title Label	Turns on/off the measurement window title lable	:DISP:TR[1-1]:LAB:STAT
Update	Turns on/off trace updates	:DISP:ENAB
Y # of Digits	Selects the number of digits (Y-axis)	:DISP:TR[1-1]:GRAT:AXIS:Y:STAT
Format		
Frequency Format	Sets/reads the frequency format	:CALC:TR[1-1]:TRAC[1-4]:FORM:FREQ
Frequency Reference	Sets/reads the reference frequency	:CALC:TR[1-1]:TRAC[1-4]:REF:FREQ
Phase Unit	Selects phase format on transient measurement	:CALC:TR[1-1]:TRAC[1-4]:FORM:PHAS:UNIT
Wrap Phase	Turns on/off wrap-phase	:CALC:TR[1-1]:TRAC[1-4]:FORM:PHAS:WRAP
Macro Setup		

Key Operation	Function	SCPI Command
E5052 Event	Turns on/off the E5052 VBA event callback function	:PROG:COM:EVEN
Echo Window Menu		
Clear Echo	Clears Echo window	:DISP:ECHO:CLE
Echo Font Size	Sets/reads the font size on Echo window	:DISP:ECHO:FSIZ
Echo Window	Turns on/off the Echo window	:DISP:ECHO:STAT
Load & Run	Load and execute the macro selected on file names.	
Select Macro	Sets/reads the name of the program to be selected	:PROG:SEL:NAME
Stop	Set/reads the state of the selected program	:PROG:SEL:STAT
User Menu		
User Label 1	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 2	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 3	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 4	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 5	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 6	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 7	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 8	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
VBA Editor Menu		
Close Editor	Close VBA editor	
Load Project	Loads program	:MMEM:LOAD:PROG
New Project	Open new VBA project	
Open Editor	Open VBA editor	
Save Project	Save VBA project	:MMEM:STOR:PROG
Marker		
Clear Marker Menu		
All OFF	Clears all the markers	
Marker 1	Turns on/off marker 1	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 2	Turns on/off marker 2	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 3	Turns on/off marker 3	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 4	Turns on/off marker 4	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 5	Turns on/off marker 5	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT

Key Operation	Function	SCPI Command
Marker 6	Turns on/off marker 6	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Couple	Turns on/off marker coupling function	:CALC:TR[1-1]:ALLT:MARK:COUP:STAT
Marker 1	Turns on/off marker 1	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 2	Turns on/off marker 2	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 3	Turns on/off marker 3	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 4	Turns on/off marker 4	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 5	Turns on/off marker 5	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker 6	Turns on/off marker 6	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT
Marker List	Turns on/off the marker list	:DISP:TR[1-1]:TABL[:STAT]
More Functions		
Discrete	Sets/reads marker movement (Continuous/Discrete)	:CALC:TR[1-1]:ALLT:MARK:DISC:STAT
Ref Marker	Sets/reads marker reference number	:CALC:TR[1-1]:ALLT:MARK:REF:NUMB
Ref Marker Mode	Turns on/off delta marker mode	:CALC:TR[1-1]:ALLT:MARK:REF:STAT
Marker Function		
Analysis Range (X)	Sets/reads analysis/search range (X-axis)	:CALC:TR[1-1]:TRAC[1-4]:FUNC:DOM:X
Analysis Range (Y)	Sets/reads analysis/search range (Y-axis)	:CALC:TR[1-1]:TRAC[1-4]:FUNC:DOM:Y
Analysis Type	Sets/reads analysis type	:CALC:TR[1-1]:TRAC[1-4]:FUNC:TYPE
Band Marker X		
Band Marker X	Turn on/off bandmarker X	:CALC:TR[1-1]:TRAC[1-4]:BDM:X:STAT
Center	Sets/reads the center value of bandmarker X	:CALC:TR[1-1]:TRAC[1-4]:BDM:X:CENT
Span	Sets/reads the span value of bandmarker X	:CALC:TR[1-1]:TRAC[1-4]:BDM:X:SPAN
Start	Sets/reads the start value of bandmarker X	:CALC:TR[1-1]:TRAC[1-4]:BDM:X:STAR
Stop	Sets/reads the stop value of bandmarker X	:CALC:TR[1-1]:TRAC[1-4]:BDM:X:STOP

Key Operation	Function	SCPI Command
Band Marker Y		
Band Marker Y	Turn on/off bandmarker Y	:CALC:TR[1-1]:TRAC[1-4]:BDM:Y:STAT
Center	Sets/reads the center value of bandmarker Y	:CALC:TR[1-1]:TRAC[1-4]:BDM:Y:CENT
Span	Sets/reads the span value of bandmarker Y	:CALC:TR[1-1]:TRAC[1-4]:BDM:Y:SPAN
Start	Sets/reads the start value of bandmarker Y	:CALC:TR[1-1]:TRAC[1-4]:BDM:Y:STAR
Stop	Sets/reads the stop value of bandmarker Y	:CALC:TR[1-1]:TRAC[1-4]:BDM:Y:STOP
Couple	Turns on/off bandmarker coupling function	:CALC:TR[1-1]:ALLT:BDM:X:COUP:STAT
Marker Search		
Band Marker X		
Band Marker X	Turn on/off bandmarker X	:CALC:TR[1-1]:TRAC[1-4]:BDM:X:STAT
Center	Sets/reads the center value of bandmarker X	:CALC:TR[1-1]:TRAC[1-4]:BDM:X:CENT
Span	Sets/reads the span value of bandmarker X	:CALC:TR[1-1]:TRAC[1-4]:BDM:X:SPAN
Start	Sets/reads the start value of bandmarker X	:CALC:TR[1-1]:TRAC[1-4]:BDM:X:STAR
Stop	Sets/reads the stop value of bandmarker X	:CALC:TR[1-1]:TRAC[1-4]:BDM:X:STOP
Band Marker Y		
Band Marker Y	Turn on/off bandmarker Y	:CALC:TR[1-1]:TRAC[1-4]:BDM:Y:STAT
Center	Sets/reads the center value of bandmarker Y	:CALC:TR[1-1]:TRAC[1-4]:BDM:Y:CENT
Span	Sets/reads the span value of bandmarker Y	:CALC:TR[1-1]:TRAC[1-4]:BDM:Y:SPAN
Start	Sets/reads the start value of bandmarker Y	:CALC:TR[1-1]:TRAC[1-4]:BDM:Y:STAR
Stop	Sets/reads the stop value of bandmarker Y	:CALC:TR[1-1]:TRAC[1-4]:BDM:Y:STOP
Couple	Turns on/off bandmarker coupling function	:CALC:TR[1-1]:ALLT:BDM:X:COUP:STAT
Peak		
Peak Excursion	Sets/reads the peak excursion value	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:PEAK:EXC

Key Operation	Function	SCPI Command
Peak Polarity	Sets/reads the marker peak-search polarity	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:PEAK:POL
Search Left	Execute marker peak search left	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:LPE
Search Peak	Execute marker peak search	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:PEAK
Search Peak All	Execute marker search all	:CALC:TR[1-1]:TRAC[1-4]:ALLM:SEAR:PEAK
Search Right	Execute marker peak search right	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:RPE
Search Max	Execute marker search maximum	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:MAX
Search Min	Execute marker search minimum	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:MIN
Search Range (X)	Sets/reads marker search range (X-axis)	:CALC:TR[1-1]:TRAC[1-4]:ALLM:SEAR:DOM:X
Search Range (Y)	Sets/reads marker search range (Y-axis)	:CALC:TR[1-1]:TRAC[1-4]:ALLM:SEAR:DOM:Y
Target		
Search Left	Execute marker target search left	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:LTAR
Search Right	Execute marker target search right	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:RTAR
Search Target	Execute marker target search	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:TARG
Target Transition	Sets/reads the target transition definition	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:TARG:TRAN
Target Value	Sets/reads the marker target value	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:TARG:Y
Tracking	Sets/reads the marker tracking type	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:TRAC:TYPE
Marker To		
Marker -> Phase Reference	phase reference freuency	:SENS:TR[1-1]:NARR:FREQ:PREF
Marker -> Target Freq	target frequency	:SENS:TR[1-1]:NARR:FREQ:TARG
Measurement View		
Freq & Power	Selects frequency, power and DC current measurement window	:DISP:WIND:ACT
Phase Noise	Selects phase noise measurement window	:DISP:WIND:ACT
Show Window		
Freq & Power	Turns on/off frequency, power and DC current measurement mode	:DISP:FP[1-1]:STAT

Key Operation	Function	SCPI Command
Phase Noise	Turns on/off phase noise measurement mode	:DISP:PN[1-1]:STAT
Spectrum Monitor	Turns on/off spectrum monitor mode	:DISP:SP[1-1]:STAT
Transient	Turns on/off transient measurement mode	:DISP:TR[1-1]:STAT
User	Turns on/off user defined window	:DISP:USER[1-1]:STAT
Spectrum Monitor	Selects spectrum monitor mode	:DISP:WIND:ACT
Transient	Selects transient measurement mode	:DISP:WIND:ACT
User	Selects user defined window	:DISP:WIND:ACT
Preset		
Factory	Preset instrument to the initial setup state	:SYST:PRES
User	Preset instrument and recalls the Autorec.sta in the F drive	
Save/Recall		
Explorer...	Open windows explorer	
Recall by filename	Recalls state file by file name	:MMEM:LOAD:STAT
Recall State		
Autorec	Recalls settings	:MMEM:LOAD:STAT
File Dialog...	Open file dialog	
State01	Recalls state file from register 1	:MMEM:LOAD:STAT
State02	Recalls state file from register 2	:MMEM:LOAD:STAT
State03	Recalls state file from register 3	:MMEM:LOAD:STAT
State04	Recalls state file from register 4	:MMEM:LOAD:STAT
State05	Recalls state file from register 5	:MMEM:LOAD:STAT
State06	Recalls state file from register 6	:MMEM:LOAD:STAT
Save Data Trace	Saves trace data	:MMEM:TR[1-1]:TRAC[1-4]:STOR[:DATA]
Save Memory Trace	Saves memory trace data	:MMEM:TR[1-1]:TRAC[1-4]:STOR:MEM
Save State		
Autorec	Save settings	:MMEM:STOR:STAT
File Dialog...	Open file dialog	
Save Type	Selects instrument state type (Entire or instrument state only)	:MMEM:STOR:STYP
State01	Save state file to register 1	:MMEM:STOR:STAT
State02	Save state file to register 2	:MMEM:STOR:STAT
State03	Save state file to register 3	:MMEM:STOR:STAT
State04	Save state file to register 4	:MMEM:STOR:STAT

Key Operation	Function	SCPI Command
State05	Save state file to register 5	:MMEM:STOR:STAT
State06	Save state file to register 6	:MMEM:STOR:STAT
Scale		
Auto Scale	Execute autoscale	:DISP:TR[1-1]:TRAC[1-4]:Y[:SCAL]:AUTO
Auto Scale All	Execute autoscale for all traces on transient measurement window	:DISP:TR[1-1]:ALLT:Y:SCAL:AUTO
Divisions	Sets/reads Y-scale divisions	:DISP:TR[1-1]:Y[:SCAL]:DIV
Marker -> Reference	Sets the marker value to the reference level	:DISP:TR[1-1]:TRAC[1-4]:Y[:SCAL]:RLEV
Reference Position	Sets/reads reference position	:DISP:TR[1-1]:TRAC[1-4]:Y[:SCAL]:RPOS
Reference Value	Sets/reads reference level value	:DISP:TR[1-1]:TRAC[1-4]:Y[:SCAL]:RLEV
Scale/Div	Sets/reads scale per division	:DISP:TR[1-1]:TRAC[1-4]:Y[:SCAL]:PDIV
Trigger Freq -> Reference	Sets the trigger frequency to the reference level	:DISP:TR[1-1]:TRAC[1-4]:Y[:SCAL]:RLEV
Setup		
Freq Range	Sets/reads frequency transient range (Narrowband)	:SENS:TR[1-1]:NARR:FREQ:RANG
Max Input Level	Sets/reads maximum input level	:SENS:TR[1-1]:POW:INP:LEV:MAX
Phase Reference	Sets/reads phase reference freuency	:SENS:TR[1-1]:NARR:FREQ:PREF
Recalc Phase Reference		
Phase Ref. Offset	Sets/reads the offset value of the phase reference frequency	:CALC:TR[1-1]:TRAC[1-4]:FORM:PHAS:PREF:OFFS
Target Freq	Sets/reads target frequency	:SENS:TR[1-1]:NARR:FREQ:TARG
Video Trigger		
Minimum Power Level	Sets/reads video trigger threshold level relative to max input level	:TRIG:TR[1-1]:NARR:VID:THR
Narrow Freq	Sets/reads video trigger frequency value (Narrowband)	:TRIG:TR[1-1]:NARR:VID:FREQ:CENT
Wide Freq	Sets/reads video trigger frequency value (Wideband)	:TRIG:TR[1-1]:WIDE:VID:FREQ:CENT
Wide Freq Range	Set/reads transient frequency range (Wideband)	:SENS:TR[1-1]:WIDE:FREQ:MAX
Span		

Key Operation	Function	SCPI Command
Narrow Ref Position	Sets/reads reference position for time span	:SENS:TR[1-1]:NARR:TIME:REF
Narrow Settings -> Wide	Sets narrowband mode settings to wideband mode settings	
Narrow Span	Sets/reads time span (Narrowband)	:SENS:TR[1-1]:NARR:TIME:SPAN
Narrow Time Offset	Sets/reads time offset(delay) relative to the reference point	:SENS:TR[1-1]:NARR:TIME:OFFS
Wide Ref Position	Sets/reads reference position	:SENS:TR[1-1]:WIDE:TIME:REF
Wide Settings -> Narrow	Sets wideband mode settings to narrowband mode settings	
Wide Span	Sets/reads time span (Wideband)	:SENS:TR[1-1]:WIDE:TIME:SPAN
Wide Time Offset	Sets/reads time offset(delay) relative to the reference point	:SENS:TR[1-1]:WIDE:TIME:OFFS
System		
Abort Printing	Aborts printing	:HCOP:ABOR
Backlight	Turns on/off backlight	:SYST:BACK:STAT
Dump Screen Image	Save screen image	:MMEM:STOR:IMAG
Error Log		
Clear Error Log	Clear error log	
View Error Log...	Display error log	
Invert Image	Selects print mode	:HCOP:IMAG
Misc Setup		
Beeper		
Beep Complete	Turns on/off the beep for operation completion	:SYST:BEEP:COMP:STAT
Beep Warning	Turns on/off the beep for warning	:SYST:BEEP:WARN:STAT
Test Beep Complete	Makes beep sound for operation completion	:SYST:BEEP:COMP:IMM
Test Beep Warning	Makes beep sound for warning	:SYST:BEEP:WARN:IMM
Clock Setup		
Set Date and Time	Set/reads system time Set/reads system date	:SYST:TIME :SYST:DATE
Show Clock	Turns on/off internal clock display	:DISP:CLOC
Control Panel ...	Open control panel	
GPIB Setup		

Key Operation	Function	SCPI Command
System Controller Configuration	Turns on/off system controller mode	
Talker/Listener Address	Sets the address for controlling the analyzer from a controller via GPIB	
Key Lock		
Front Panel & Keyboard Lock	Disables from panel / keyboard operations	:SYST:KLOC:KBD
Touch Screen & Mouse Lock	Disables touch screen / mouse operations	:SYST:KLOC:MOUS
Network Setup		
MAC Address	Sets MAC address	
Network Configuration ...	Enables/disables network connections	
Network Identification ...	Sets network ID of the instrument	
SICL-LAN Address	Sets SICL-LAN address	
SICL-LAN Server	Enables/disables SICL-LAN server	
Socket Server	Enables/disables Socket server	
Telnet Server	Enables/disables Telnet server	
Print	Outputs print	:HCOP:IMM
Printer Setup ...	Execute printer setup	
Product Information	Reads product information	
Time Offset		
Narrow Ref Position	Sets/reads reference position for time span (Narrowband mode)	:SENS:TR[1-1]:NARR:TIME:REF
Narrow Settings -> Wide	Sets narrowband mode settings to wideband mode settings	
Narrow Span	Sets/reads time span (Narrowband mode)	:SENS:TR[1-1]:NARR:TIME:SPAN
Narrow Time Offset	Sets/reads time offset(delay) relative to the reference point	:SENS:TR[1-1]:NARR:TIME:OFFS
Wide Ref Position	Sets/reads reference position for time span (Wideband mode)	:SENS:TR[1-1]:WIDE:TIME:REF
Wide Settings -> Narrow	Sets wideband mode settings to narrowband mode settings	
Wide Span	Sets/reads time span (Wideband mode)	:SENS:TR[1-1]:WIDE:TIME:SPAN

Key Operation	Function	SCPI Command
Wide Time Offset	Sets/reads time offset(delay) relative to the reference point	:SENS:TR[1-1]:WIDE:TIME:OFFS
Trace View		
Aperture	Sets/reads smoothing aperture value	:CALC:TR[1-1]:TRAC[1-4]:SMO:APER
Clear Persistent Data	Clears persistence mode	:DISP:TR[1-1]:TRAC[1-4]:PERS:CLE
Copy to User	Copies trace data to the user trace	:CALC:TR[1-1]:TRAC[1-4]:DATA:COPY
Data -> Mem	Copy data to memory	:CALC:TR[1-1]:TRAC[1-4]:MATH:MEM
Data Hold	Data hold	:CALC:TR[1-1]:TRAC[1-4]:HOLD
Data Math	Sets/reads math operation type	:CALC:TR[1-1]:TRAC[1-4]:MATH:FUNC
Display Trace	Shows data and/or memory trace	:DISP:TR[1-1]:TRAC[1-4]:MODE
Persistence Mode	Sets/reads persistence mode	:DISP:TR[1-1]:TRAC[1-4]:PERS:STAT
Smoothing	Turn on/off smoothing function	:CALC:TR[1-1]:TRAC[1-4]:SMO:STAT
Trace Label	Edit trace title label	:DISP:TR[1-1]:TRAC[1-4]:LAB:DATA
Trigger		
Continuous	Sets/reads trigger continuous mode	:INIT:TR[1-1]:CONT :INIT:TR[1-1]:IMM
Ext Trig Polarity	External trigger polarity	:TRIG:EXT:SLOP
Hold	Sets trigger mode to waiting-for-trigger state	:INIT:TR[1-1]:IMM
Manual Trigger	move once to waiting-for-trigger state	:INIT:TR[1-1]:IMM
Restart	move once to waiting-for-trigger state	:INIT:TR[1-1]:IMM
Single	always move to waiting-for-trigger state after measuring move once to waiting-for-trigger state	:INIT:TR[1-1]:CONT :INIT:TR[1-1]:IMM
Source	trigger source	:TRIG:TR[1-1]:SOUR
Trigger to Transient	select measurement mode	:TRIG:MODE

User Defined Menu (Top Menu)

Key Operation	Function
Double-click on each softkey menu title	Displays the top menu of each menu item below. Refer the USER menu about detail of following each menu item.
Measurement View	Same as [Meas].
Input	Same as [Scale].
Scale	Same as [Scale].
Format	Same as [Format].
Display	Same as [Display].
Average	Same as [Avg].
Attenuator	Same as [Cal].
Start/Center	Displays the same softkey for setting up the sweep range that appears when [Start], or [Span] is pressed.
Stop/Span	Displays the same softkey for setting up the sweep range that appears when [Start], or [Span] is pressed.
DC Conrol Voltage	Same as [Sweep Setup].
DC Power Voltage	Same as [Sweep Setup].
Setup	Same as [Sweep Setup].
Trigger	Same as [Trigger].
Marker	Same as [Marker].
Marker Search	Same as [Marker Search].
Marker To	Same as [Marker Search].
Marker Function	Same as [Marker Fctn].
Macro Setup	Same as [Macro Setup].
Save/Recall	Same as [Save/Recall].
System	Same as [System].
Preset	Same as [Preset].

USER Menu

Key Operation	Function	SCPI Command
Attenuator		
Input Attenuator	Sets/reads Input Attenuator level on 5dB Step	:SENS:ATT:LEV
DC Control Voltage		
Auto Freq Control		
AFC Status	Turns on/off the auto frequency control function. Executes the auto frequency control once.	:SOUR:VOLT:CONT:AFC[:STAT] :SOUR:VOLT:CONT:AFC:IMM
Frequency Band	Sets/reads the frequency band in the auto frequency control function	:SOUR:VOLT:CONT:AFC:FBAN
Max Ctrl Voltage Limit	Sets/reads the maximum DC control voltage limit	:SOUR:VOLT:CONT:AFC:LIM:HIGH
Max Iteration	Sets/reads the maximum number of iterations for the DC control voltage-setting loops	:SOUR:VOLT:CONT:AFC:ITER
Min Ctrl Voltage Limit	Sets/reads the minimum DC control voltage limit	:SOUR:VOLT:CONT:AFC:LIM:LOW
Sensitivity	Sets/reads the tuning sensitivity	:SOUR:VOLT:CONT:AFC:SENS
Target	Sets/reads the target frequency in the auto frequency control function	:SOUR:VOLT:CONT:AFC:TARG
Tolerance	Sets/reads the tolerance limit	:SOUR:VOLT:CONT:AFC:TOL
Control Voltage Cal	Enables DC Control voltage calibration	:SOUR:VOLT:CONT:CORR[:STAT]
DC Control Delay	Sets/reads DC Control delay (sec)	:SOUR:VOLT:CONT:DEL
DC Control Output	Turns on/off DC Control voltage	:SOUR:VOLT:CONT:LEV:STAT
DC Control Voltage	Sets/reads DC Control voltage	:SOUR:VOLT:CONT:LEV:AMPL
Execute Control Voltage Cal	Execute DC Control voltage calibration	:SOUR:VOLT:CONT:CORR:COLL:ACQ
Max Ctrl Voltage Limit	Sets/reads the maximum DC Control voltage limit	:SOUR:VOLT:CONT:LIM:HIGH
Min Ctrl Voltage Limit	Sets/reads the minimum DC Control voltage limit	:SOUR:VOLT:CONT:LIM:LOW
DC Power Voltage		
DC Power Delay	Sets/reads DC Power delay (sec)	:SOUR:VOLT:POW:DEL
DC Power Output	Turns on/off DC Power voltage	:SOUR:VOLT:POW:LEV:STAT
DC Power Voltage	Sets/reads DC Power voltage	:SOUR:VOLT:POW:LEV:AMPL
Max Pwr Voltage Limit	Sets/reads the maximum DC Power voltage limit	:SOUR:VOLT:POW:LIM:HIGH

Key Operation	Function	SCPI Command
Min Pwr Voltage Limit	Sets/reads the minimum DC Power voltage limit	:SOUR:VOLT:POW:LIM:LOW
Display		
Edit Title Label	Edit the measurement window title label	:DISP:USER[1-1]:LAB:DATA
Limit Test		
Delete Lower Limit Line	Clears the lower limit line	:CALC:USER[1-1]:TRAC[1-8]:LIM:LOW:SEGM:CLE
Delete Upper Limit Line	Clears the upper limit line	:CALC:USER[1-1]:TRAC[1-8]:LIM:UPP:SEGM:CLE
Explorer		
Fail Sign	Turns on/off the limit test judgement display	:DISP:USER[1-1]:LIM:FSIG
Import Lower Limit Line ...	Reads the lower limit line	:MMEM:USER[1-1]:TRAC[1-8]:LOAD:LIM:LOW
Import Upper Limit Line ...	Reads the upper limit line	:MMEM:USER[1-1]:TRAC[1-8]:LOAD:LIM:UPP
Limit Line	Turns on/off the limit line	:DISP:USER[1-1]:TRAC[1-8]:LIM:LINE
Limit Test	Turns on/off the limit test function	:CALC:USER[1-1]:TRAC[1-8]:LIM[:STAT]
Marker Information	Sets/reads the marker information position	:DISP:USER[1-1]:ANN:MARK:POS
Meas Condition	Turns on/off measurement conditions	:DISP:USER[1-1]:ANN:MEAS:STAT
Relative Y-Scale	Turns on/off relative Y-scale	:DISP:USER[1-1]:GRAT:AXIS:Y:REL
Title Label	Turns on/off the measurement window title label	:DISP:USER[1-1]:LAB:STAT
Update	Turns on/off the trace updates	:DISP:ENAB
Y # of Digits	Selects the number of digits (Y-axis)	:DISP:USER[1-1]:GRAT:AXIS:Y:STAT
Macro Setup		
E5052 Event	Turns on/off the E5052 VBA event callback function	:PROG:COM:EVEN
Echo Window Menu		
Clear Echo	Clears Echo window	:DISP:ECHO:CLE
Echo Font Size	Sets/reads the font size on Echo window	:DISP:ECHO:FSIZ
Echo Window	Turn on/off the Echo window	:DISP:ECHO:STAT
Load & Run	Load and execute the macro selected on file names.	
Select Macro	Sets/reads the name of the program to be selected	:PROG:SEL:NAME
Stop	Sets/reads the state of the selected program	:PROG:SEL:STAT
User Menu		

Key Operation	Function	SCPI Command
User Label 1	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 2	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 3	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 4	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 5	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 6	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 7	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
User Label 8	Execute the macro assigned under the user defined softkey	:PROG:SKEY:ITEM[1-8]:IMM
VBA Editor Menu		
Close Editor	Close VBA editor	
Load Project	Loads program	:MMEM:LOAD:PROG
New Project	Open new VBA project	
Open Editor	Open VBA editor	
Save Project	Save VBA project	:MMEM:STOR:PROG
Marker		
Clear Marker Menu		
All OFF	Clears all the markers	
Marker 1	Turns on/off marker 1	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:STAT
Marker 2	Turns on/off marker 2	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:STAT
Marker 3	Turns on/off marker 3	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:STAT
Marker 4	Turns on/off marker 4	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:STAT
Marker 5	Turns on/off marker 5	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:STAT
Marker 6	Turns on/off marker 6	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:STAT
Couple	Turns on/off marker coupling function	:CALC:USER[1-1]:ALLT:MARK:COUP:STAT
Marker 1	Turns on/off marker 1	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:STAT
Marker 2	Turns on/off marker 2	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:STAT
Marker 3	Turns on/off marker 3	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:STAT
Marker 4	Turns on/off marker 4	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:STAT

Key Operation	Function	SCPI Command
Marker 5	Turns on/off marker 5	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:STAT
Marker 6	Turns on/off marker 6	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:STAT
Marker List	Turns on/off the marker list	:DISP:USER[1-1]:TABL[:STAT]
More Functions		
Discrete	Sets/reads marker movement (Continuous/Discrete)	:CALC:USER[1-1]:ALLT:MARK:DISC:STAT
Ref Marker	Sets/reads marker reference number	:CALC:USER[1-1]:ALLT:MARK:REF:NUMB
Ref Marker Mode	Turns on/off delta marker mode	:CALC:USER[1-1]:ALLT:MARK:REF:STAT
Marker Function		
Analysis Range (X)	Sets/reads analysis/search range (X-axis)	:CALC:USER[1-1]:TRAC[1-8]:FUNC:DOM:X
Analysis Range (Y)	Sets/reads analysis/search range (Y-axis)	:CALC:USER[1-1]:TRAC[1-8]:FUNC:DOM:Y
Analysis Type	Sets/reads analysis type	:CALC:USER[1-1]:TRAC[1-8]:FUNC:TYPE
Band Marker X		
Band Marker X	Turns on/off bandmarker X	:CALC:USER[1-1]:TRAC[1-8]:BDM:X:STAT
Center	Sets/reads the center value of bandmarker X	:CALC:USER[1-1]:TRAC[1-8]:BDM:X:CENT
Span	Sets/reads the span value of bandmarker X	:CALC:USER[1-1]:TRAC[1-8]:BDM:X:SPAN
Start	Sets/reads the start value of bandmarker X	:CALC:USER[1-1]:TRAC[1-8]:BDM:X:STAR
Stop	Sets/reads the stop value of bandmarker X	:CALC:USER[1-1]:TRAC[1-8]:BDM:X:STOP
Band Marker Y		
Band Marker Y	Turns on/off bandmarker Y	:CALC:USER[1-1]:TRAC[1-8]:BDM:Y:STAT
Center	Sets/reads the center value of bandmarker Y	:CALC:USER[1-1]:TRAC[1-8]:BDM:Y:CENT
Span	Sets/reads the span value of bandmarker Y	:CALC:USER[1-1]:TRAC[1-8]:BDM:Y:SPAN
Start	Sets/reads the start value of bandmarker Y	:CALC:USER[1-1]:TRAC[1-8]:BDM:Y:STAR
Stop	Sets/reads the stop value of bandmarker Y	:CALC:USER[1-1]:TRAC[1-8]:BDM:Y:STOP

Key Operation	Function	SCPI Command
Couple	Turns on/off bandmarker coupling function	:CALC:USER[1-1]:ALLT:BDM:X:COUP:STAT
Marker Search		
Band Marker X		
Band Marker X	Turns on/off bandmarker X	:CALC:USER[1-1]:TRAC[1-8]:BDM:X:STAT
Center	Sets/reads the center value of bandmarker X	:CALC:USER[1-1]:TRAC[1-8]:BDM:X:CENT
Span	Sets/reads the span value of bandmarker X	:CALC:USER[1-1]:TRAC[1-8]:BDM:X:SPAN
Start	Sets/reads the start value of bandmarker X	:CALC:USER[1-1]:TRAC[1-8]:BDM:X:STAR
Stop	Sets/reads the stop value of bandmarker X	:CALC:USER[1-1]:TRAC[1-8]:BDM:X:STOP
Band Marker Y		
Band Marker Y	Turns on/off bandmarker Y	:CALC:USER[1-1]:TRAC[1-8]:BDM:Y:STAT
Center	Sets/reads the center value of bandmarker Y	:CALC:USER[1-1]:TRAC[1-8]:BDM:Y:CENT
Span	Sets/reads the span value of bandmarker Y	:CALC:USER[1-1]:TRAC[1-8]:BDM:Y:SPAN
Start	Sets/reads the start value of bandmarker Y	:CALC:USER[1-1]:TRAC[1-8]:BDM:Y:STAR
Stop	Sets/reads the stop value of bandmarker Y	:CALC:USER[1-1]:TRAC[1-8]:BDM:Y:STOP
Couple	Turns on/off bandmarker coupling function	:CALC:USER[1-1]:ALLT:BDM:X:COUP:STAT
Peak		
Peak Excursion	Sets/reads the peak excursion value	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:PEAK:EXC
Peak Polarity	Sets/reads the marker peak-search polality	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:PEAK:POL
Search Left	Execute marker peak search left	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:EXEC:LPE
Search Peak	Execute marker peak search	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:EXEC:PEAK
Search Peak All	Execute marker search all	:CALC:USER[1-1]:TRAC[1-8]:ALLM:SEAR:PEAK
Search Right	Execute marker peak search right	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:EXEC:RPE
Search Max	Execute marker search maximum	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:EXEC:MAX

Key Operation	Function	SCPI Command
Search Min	Execute marker search minimum	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:EXEC:MIN
Search Range (X)	Sets/reads marker search range (X-axis)	:CALC:USER[1-1]:TRAC[1-8]:ALLM:SEAR:DOM:X
Search Range (Y)	Sets/reads marker search range (Y-axis)	:CALC:USER[1-1]:TRAC[1-8]:ALLM:SEAR:DOM:Y
Target		
Search Left	Execute marker target search left	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:EXEC:LTAR
Search Right	Execute marker target search right	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:EXEC:RTAR
Search Target	Execute marker target search	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:EXEC:TARG
Target Transition	Sets/reads the target transition definition	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:TARG:TRAN
Target Value	Sets/reads the marker target value	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:TARG:Y
Tracking	Sets/reads the marker tracking type	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:TRAC:TYPE
Measurement View		
Freq & Power	Selects frequency, power and DC current measurement window	:DISP:WIND:ACT
Phase Noise	Selects phase noise measurement window	:DISP:WIND:ACT
Show Window		
Freq & Power	Turns on/off frequency, power and DC current measurement mode	:DISP:FP[1-1]:STAT
Phase Noise	Turns on/off phase noise measurement mode	:DISP:PN[1-1]:STAT
Spectrum Monitor	Turns on/off spectrum monitor mode	:DISP:SP[1-1]:STAT
Transient	Turns on/off transient measurement mode	:DISP:TR[1-1]:STAT
User	Turns on/off user defined window	:DISP:USER[1-1]:STAT
Spectrum Monitor	Selects spectrum monitor mode	:DISP:WIND:ACT
Transient	Selects transient measurement mode	:DISP:WIND:ACT
User	Selects user defined window	:DISP:WIND:ACT
Preset		
Factory	Preset instrument to the initial setup state	:SYST:PRES
User	Preset instrument and recalls the Autorec.sta in the F drive	
Save/Recall		
Explorer...	Open windows explorer	
Recall by filename	Recalls state file by file name	:MMEM:LOAD:STAT

Key Operation	Function	SCPI Command
Recall State		
Autorec	Recalls settings	:MMEM:LOAD:STAT
File Dialog...	Open file dialog	
State01	Recalls state file from register 1	:MMEM:LOAD:STAT
State02	Recalls state file from register 2	:MMEM:LOAD:STAT
State03	Recalls state file from register 3	:MMEM:LOAD:STAT
State04	Recalls state file from register 4	:MMEM:LOAD:STAT
State05	Recalls state file from register 5	:MMEM:LOAD:STAT
State06	Recalls state file from register 6	:MMEM:LOAD:STAT
Save Data Trace	Saves trace data	:MMEM:USER[1-1]:TRAC[1-8]:STOR[:DATA]
Save Memory Trace	Saves memory trace data	:MMEM:USER[1-1]:TRAC[1-8]:STOR:MEM
Save State		
Autorec	Save settings	:MMEM:STOR:STAT
File Dialog...	Open file dialog	
Save Type	Selects instrument state type (Entire or instrument state only)	:MMEM:STOR:STYP
State01	Save state file to register 1	:MMEM:STOR:STAT
State02	Save state file to register 2	:MMEM:STOR:STAT
State03	Save state file to register 3	:MMEM:STOR:STAT
State04	Save state file to register 4	:MMEM:STOR:STAT
State05	Save state file to register 5	:MMEM:STOR:STAT
State06	Save state file to register 6	:MMEM:STOR:STAT
Scale		
Auto Scale	Execute autoscale	:DISP:USER[1-1]:TRAC[1-8]:Y[:SCAL]:AUTO
Auto Scale All	Execute autoscale for all traces on user defined window	:DISP:USER[1-1]:ALLT:Y:SCAL:AUTO
Divisions	Sets/reads Y-scale divisions	:DISP:USER[1-1]:Y[:SCAL]:DIV
Marker -> Reference	Sets the marker value to the reference level	:DISP:USER[1-1]:TRAC[1-8]:Y[:SCAL]:RLEV
Reference Position	Sets/reads reference position	:DISP:USER[1-1]:TRAC[1-8]:Y[:SCAL]:RPOS
Reference Value	Sets/reads the reference level value	:DISP:USER[1-1]:TRAC[1-8]:Y[:SCAL]:RLEV
Scale/Div	Sets/reads scale per division	:DISP:USER[1-1]:TRAC[1-8]:Y[:SCAL]:PDIV

Key Operation	Function	SCPI Command
X Axis Type	Sets/reads the display type of the x axis.	:DISP:USER[1-1]:TRAC[1-8]:X:TYPE
X Unit	Sets/reads X-axis unit	:DISP:USER[1-1]:TRAC[1-8]:X:UNIT
Y Unit	Sets/reads Y-axis unit	:DISP:USER[1-1]:TRAC[1-8]:Y:UNIT
System		
Abort Printing	Aborts printing	:HCOP:ABOR
Backlight	Turns on/off backlight	:SYST:BACK:STAT
Dump Screen Image	Save screen image	:MMEM:STOR:IMAG
Error Log		
Clear Error Log	Clear error log	
View Error Log...	Display error log	
Invert Image	Selects print mode	:HCOP:IMAG
Misc Setup		
Beeper		
Beep Complete	Turns on/off the beep for operation completion	:SYST:BEEP:COMP:STAT
Beep Warning	Turns on/off the beep for warning	:SYST:BEEP:WARN:STAT
Test Beep Complete	Makes beep sound for operation completion	:SYST:BEEP:COMP:IMM
Test Beep Warning	Makes beep sound for warning	:SYST:BEEP:WARN:IMM
Clock Setup		
Set Date and Time	Set/reads system time Set/reads system date	:SYST:TIME :SYST:DATE
Show Clock	Turns on/off internal clock display	:DISP:CLOC
Control Panel ...	Open control panel	
GPIB Setup		
System Controller Configuration	Turns on/off system controller mode	
Talker/Listener Address	Sets the address for controlling the analyzer from a controller via GPIB	
Key Lock		
Front Panel & Keyboard Lock	Disables from panel / keyboard operations	:SYST:KLOC:KBD

Key Operation	Function	SCPI Command
Touch Screen & Mouse Lock	Disables touch screen / mouse operations	:SYST:KLOC:MOUS
Network Setup		
MAC Address	Sets MAC address	
Network Configuration	Enables/disables network connections	
Network Identification	Sets network ID of the instrument	
SICL-LAN Address	Sets SICL-LAN address	
SICL-LAN Server	Enables/disables SICL-LAN server	
Socket Server	Enables/disables Socket server	
Telnet Server	Enables/disables Telnet server	
Print	Outputs print	:HCOP:IMM
Printer Setup ...	Execute printer setup	
Product Information	Reads product information	
Trace View		
Aperture	Smoothing aperture	:CALC:USER[1-1]:TRAC[1-8]:SMO:APER
Clear All Persistent Data	clear all persistence mode	:DISP:USER[1-1]:ALLT:PERS:CLE
Copy to User	Copies trace data to the user trace	:CALC:USER[1-1]:TRAC[1-8]:DATA:COPY
Data -> Mem	Copy data to memory	:CALC:USER[1-1]:TRAC[1-8]:MATH:MEM
Data Hold	Data hold	:CALC:USER[1-1]:TRAC[1-8]:HOLD
Data Math	Sets/reads math operation type	:CALC:USER[1-1]:TRAC[1-8]:MATH:FUNC
Display Trace	Shows data and/or memory trace	:DISP:USER[1-1]:TRAC[1-8]:MODE
Enable Trace		
Trace 1	Enables/disables data trace 1	:DISP:USER[1-1]:TRAC[1-8]:STAT
Trace 2	Enables/disables data trace 2	:DISP:USER[1-1]:TRAC[1-8]:STAT
Trace 3	Enables/disables data trace 3	:DISP:USER[1-1]:TRAC[1-8]:STAT
Trace 4	Enables/disables data trace 4	:DISP:USER[1-1]:TRAC[1-8]:STAT

Key Operation	Function	SCPI Command
Trace 5	Enables/disables data trace 5	:DISP:USER[1-1]:TRAC[1-8]:STAT
Trace 6	Enables/disables data trace 6	:DISP:USER[1-1]:TRAC[1-8]:STAT
Trace 7	Enables/disables data trace 7	:DISP:USER[1-1]:TRAC[1-8]:STAT
Trace 8	Enables/disables data trace 8	:DISP:USER[1-1]:TRAC[1-8]:STAT
Persistence Mode	Sets/reads persistance mode	:DISP:USER[1-1]:TRAC[1-8]:PERS:STAT
Smoothing	Smoothing on/off	:CALC:USER[1-1]:TRAC[1-8]:SMO:STAT
Trace Label	Edits trace title label	:DISP:USER[1-1]:TRAC[1-8]:LAB:DATA

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