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

Sixth Edition

FIRMWARE REVISIONS
This manual applies directly to instruments that have the firmware revision A.02.5x.
For additional information about firmware revisions, see Appendix A.

Agilent Technologies

Manufacturing No. E5052-90050

June 2007

Notices

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 firmware version A.01.10)
February 2005	Third Edition (part number: E5052-90020, changes for firmware version A.01.50)
August 2005	Fourth Edition (part number: E5052-90030, changes for firmware version A.02.00)
June 2006	Fifth Edition (part number: E5052-90040, changes for firmware version A.02.50)
June 2007	Sixth Edition (part number: E5052-90050)

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.

Documentation Warranty

The material contained in this document is provided "as is," and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Agilent disclaims all warranties, either express or implied with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Agilent shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or any information contained herein. Should Agilent and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement will control.

Exclusive Remedies

The remedies provided herein are Buyer's sole and exclusive remedies. Agilent Technologies shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

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.

Contents

Contents

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 296.

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 296.

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 352.

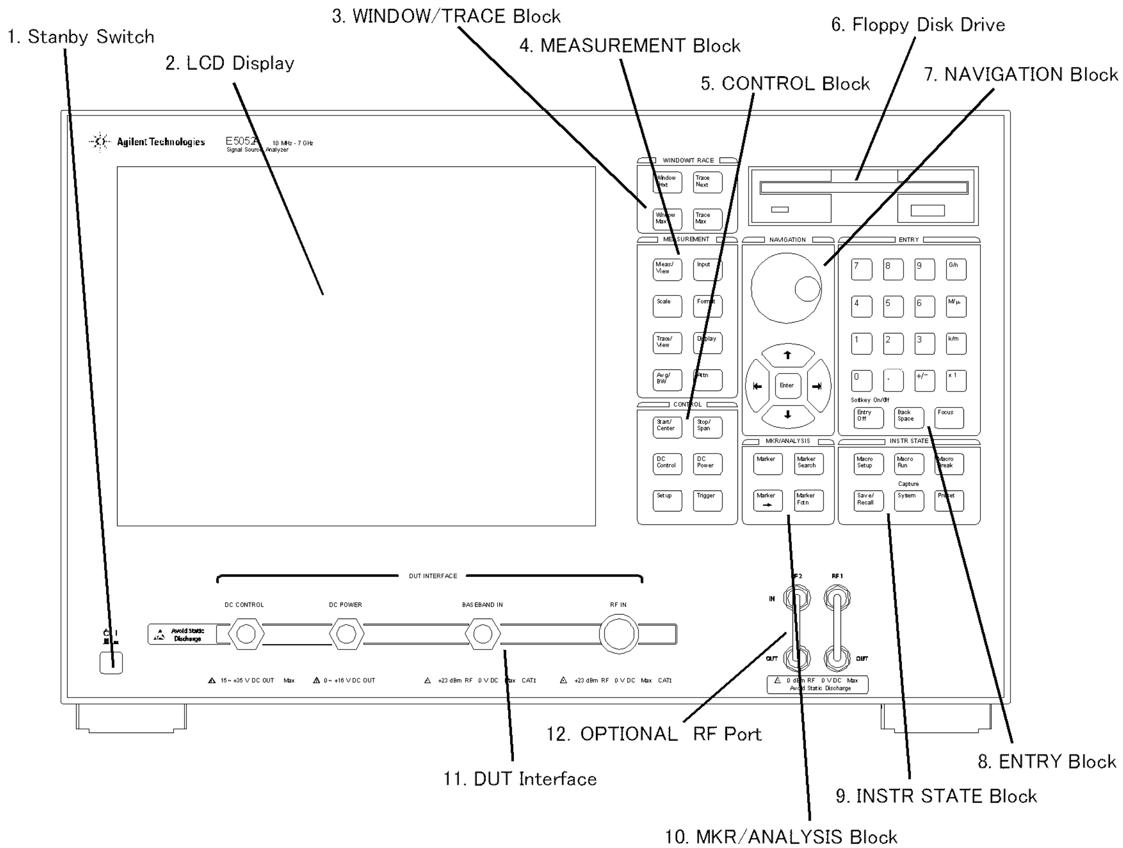
2 Overview of Functions

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 34. For more about the functions of softkeys, see Appendix D, “Softkey Functions,” on page 411.

Figure 2-1 **Front Panel**



e5052aue032

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 48 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 47 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 47, 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 34.

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 41.

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 30 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 Enter 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 28 and “8. ENTRY Block” on page 30. “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 365. Pressing **User** recalls the Autorec.sta in the F drive.

10. MKR/ANALYSIS Block

A group of keys used to control the markers in analyzing the measurement results. For more on the 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 the coupling of markers within a measurement and to display statistical 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, 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: 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’s power has been completely discharged.

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

12. OPTIONAL RF Ports

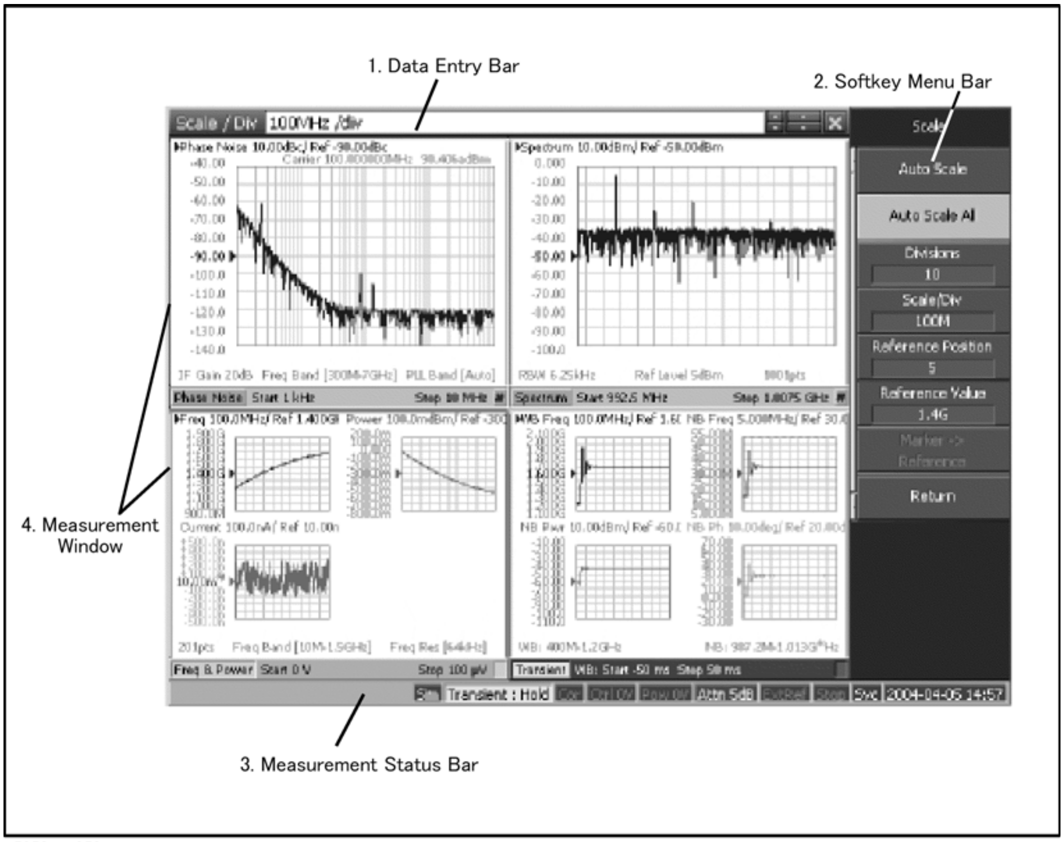
For the firmware version A.01.50, these ports are already connected and ready to operate; the user does not have to connect them.

For the firmware version A.02.00, the user have to connect these ports when the E5053A microwave downconverter are used with the E5052A.

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**

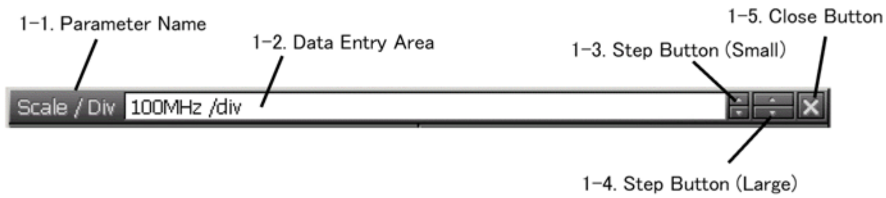


e5052aue053

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 30 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.

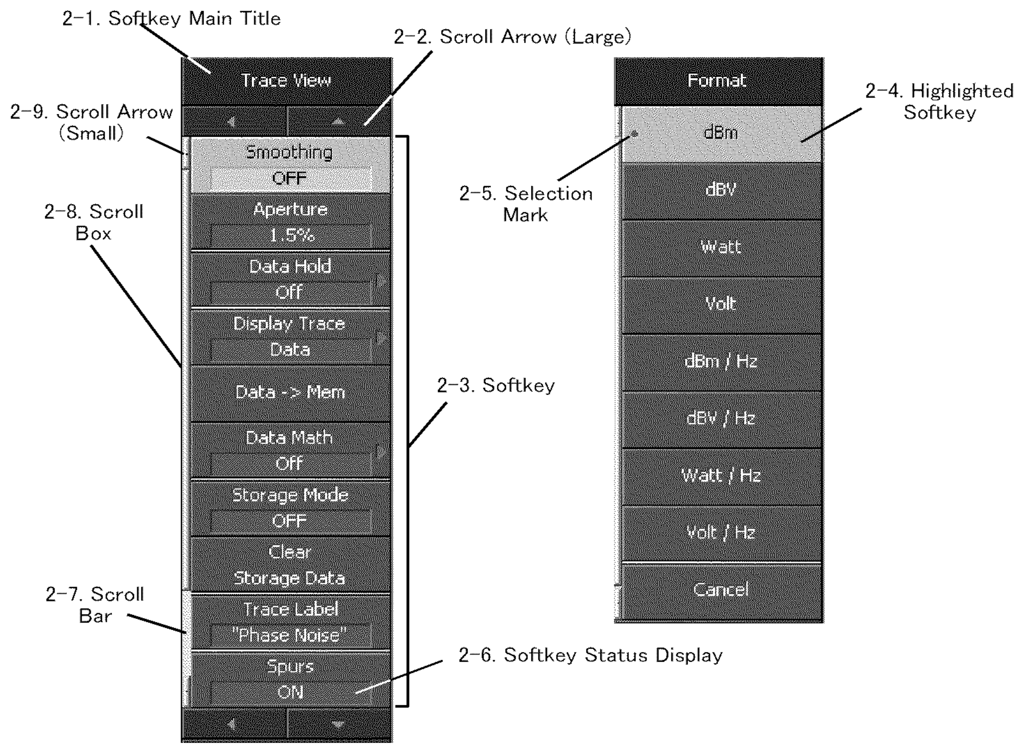
1-5. Close Button

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**



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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 Enter 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.

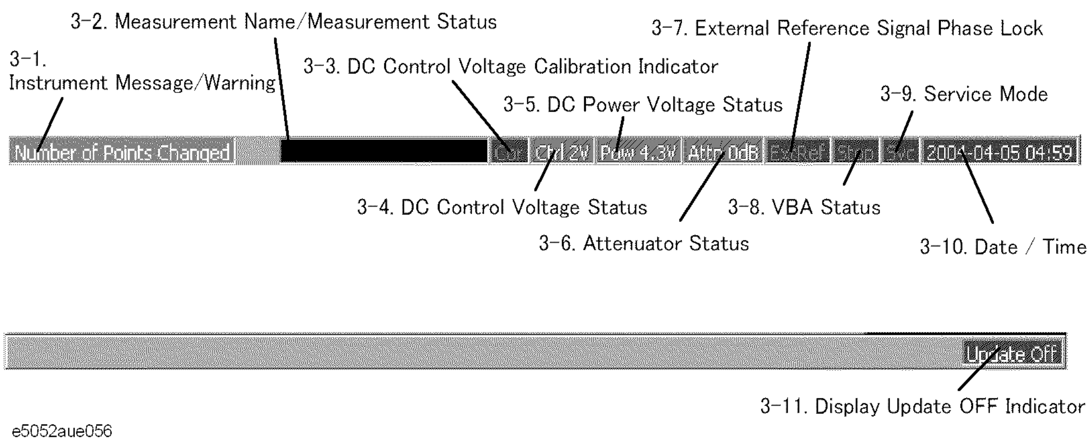
2-9. Scroll Arrow (Small)

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 351.

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 48 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 48 and “10. External Reference Signal Input Connector (Ref In)” on page 48 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**.

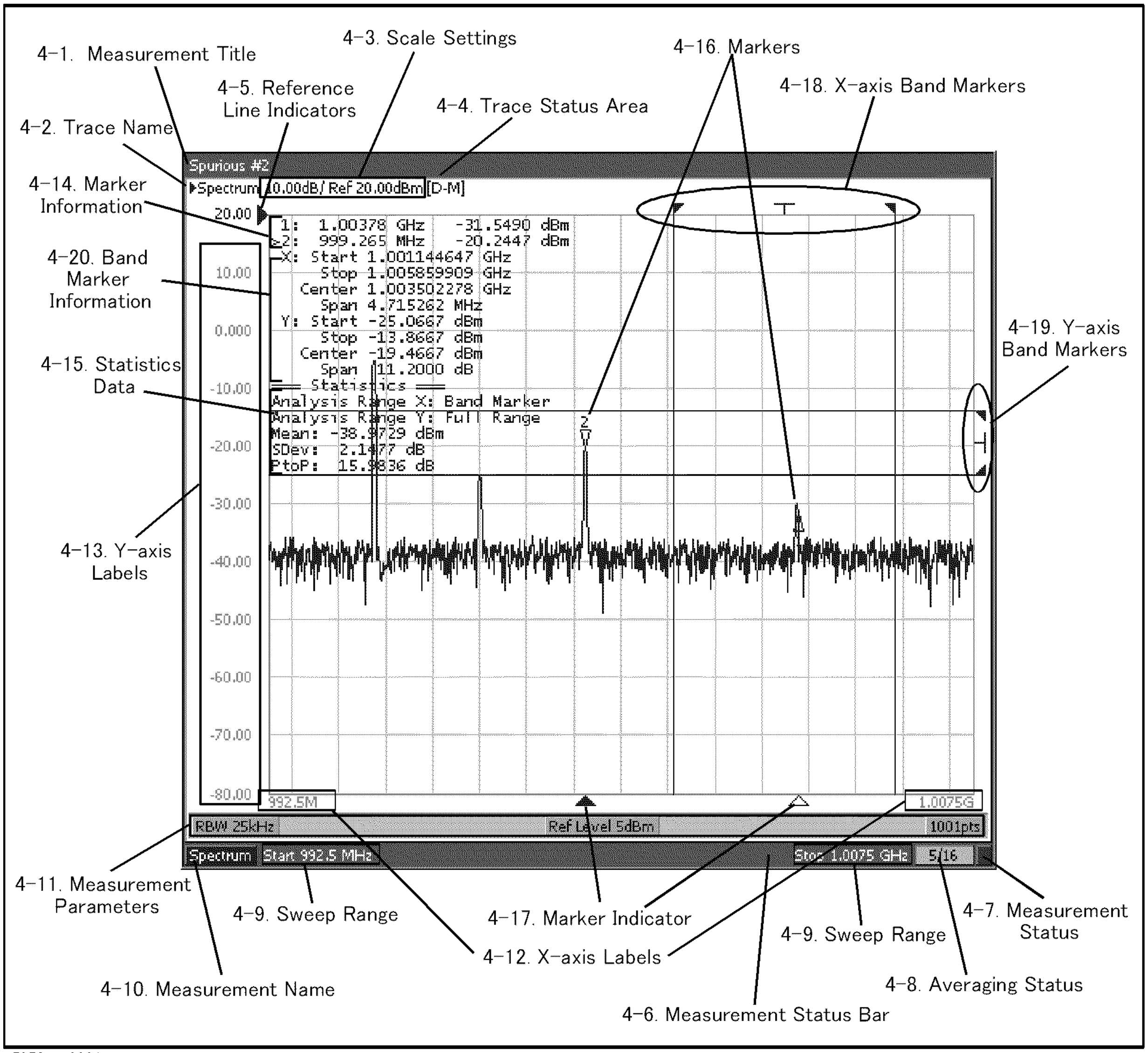
3-11. Display Update OFF Indicator

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 34 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**



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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 Mean, Standard Deviation, and Peak-to-Peak of the Trace” on page 220.

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.

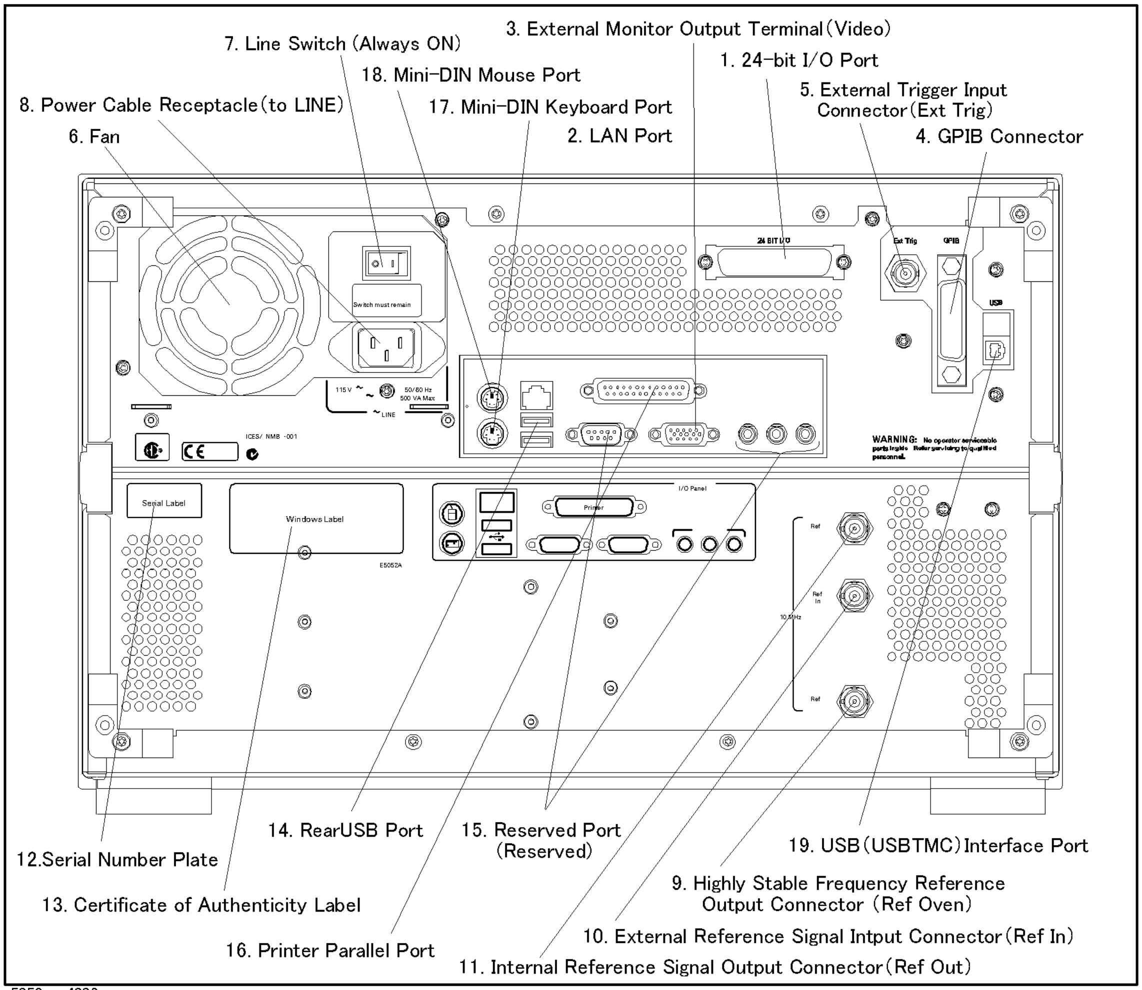
4-20. Bandmarker information

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



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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 23.

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 23.

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 (typical): 10 MHz ± 10 Hz, – 6 dBm to + 16 dBm

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 (typical): 10 MHz ± 50 Hz, + 2.5 dBm ±3 dB
Output impedance (typical): 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 245.

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.

19. USB (USBTMC) Interface Port

Through this port, you can control the E5052A from external controllers. For more information on the measurement system using the USB port, see the Programmer's Guide.

Connector Types: Universal serial bus (USB) jack, type B (4 contact positions), Female

Compliance Standards: USBTMC-USB488 and USB2.0

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

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.

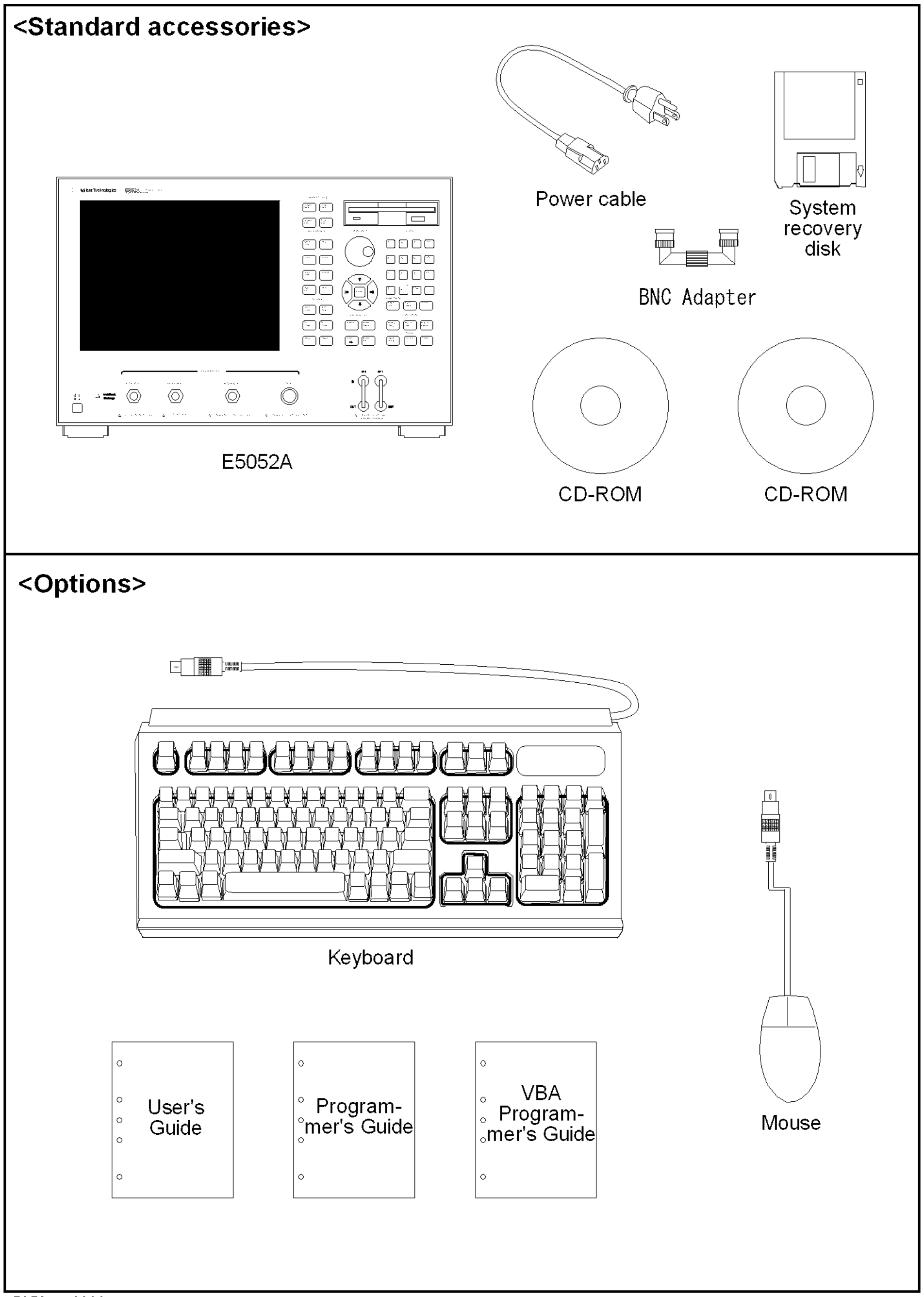
If an abnormality is detected in Step 1, contact the company that transported the analyzer as well as your nearest Agilent Technologies sales and service office. For inspection by the transport company, save the packing box, shock-absorbing material, and packaged items as you received them.

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 59.

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 the error-correction	23°C ±5°C (<1°C deviation from the temperature when performing the 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	0.21 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.

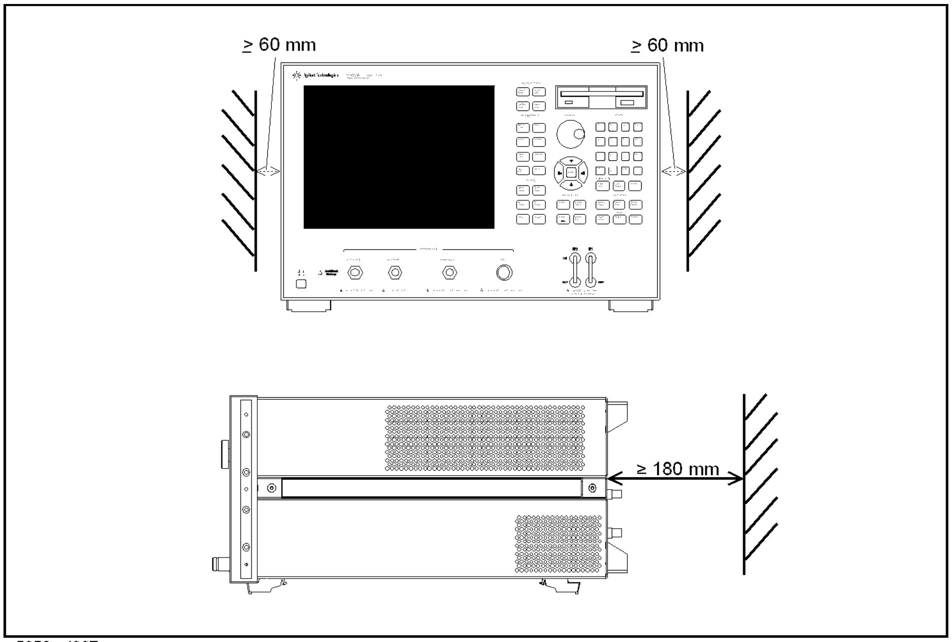
Ventilation requirements

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 10, “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 56), 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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3. Installation

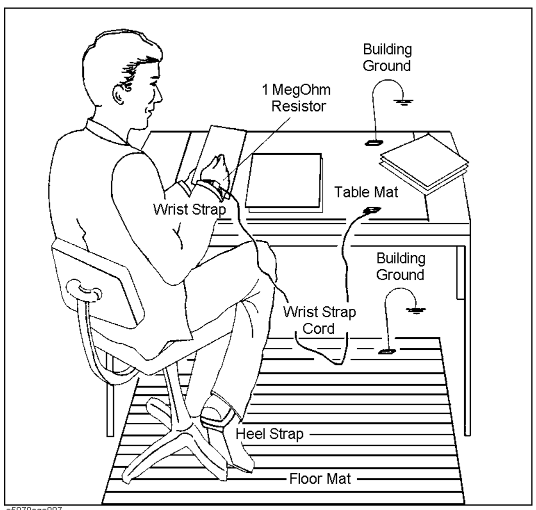
Protection against electrostatic discharge (ESD)

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 69, 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).

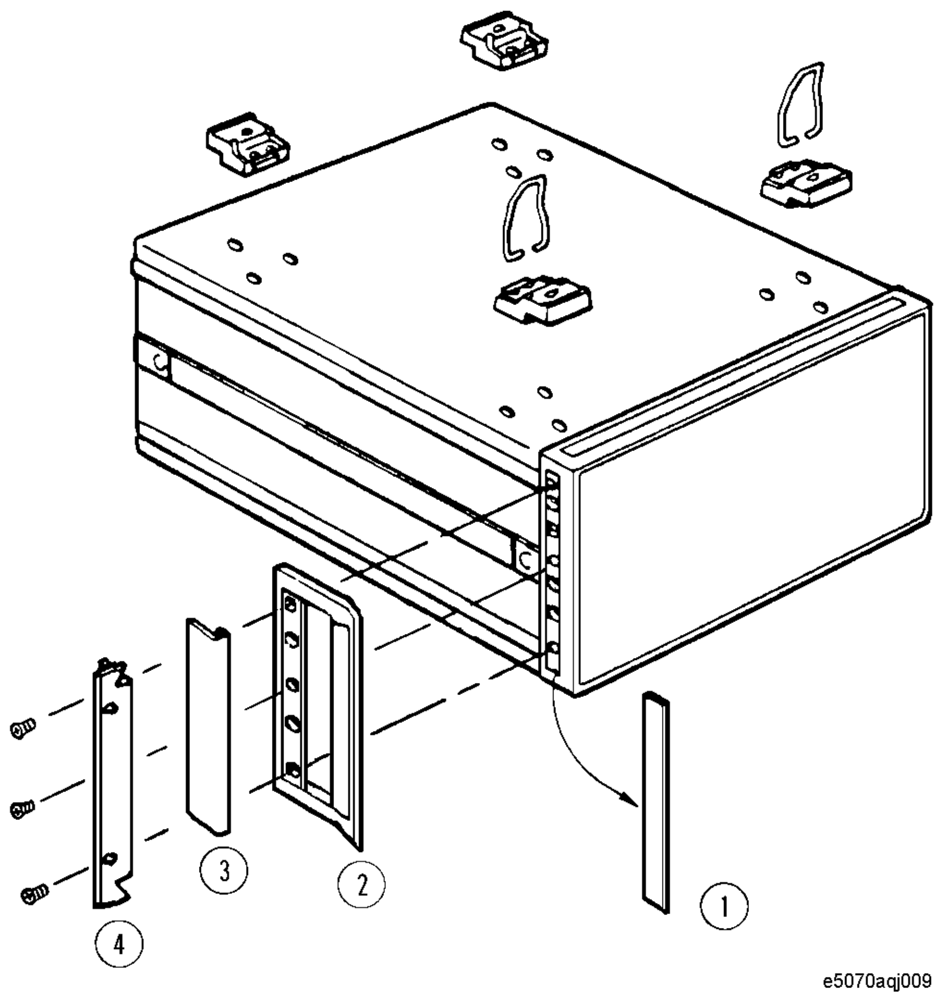
Table 3-3 Agilent E5052A handles/rack mounting options

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.

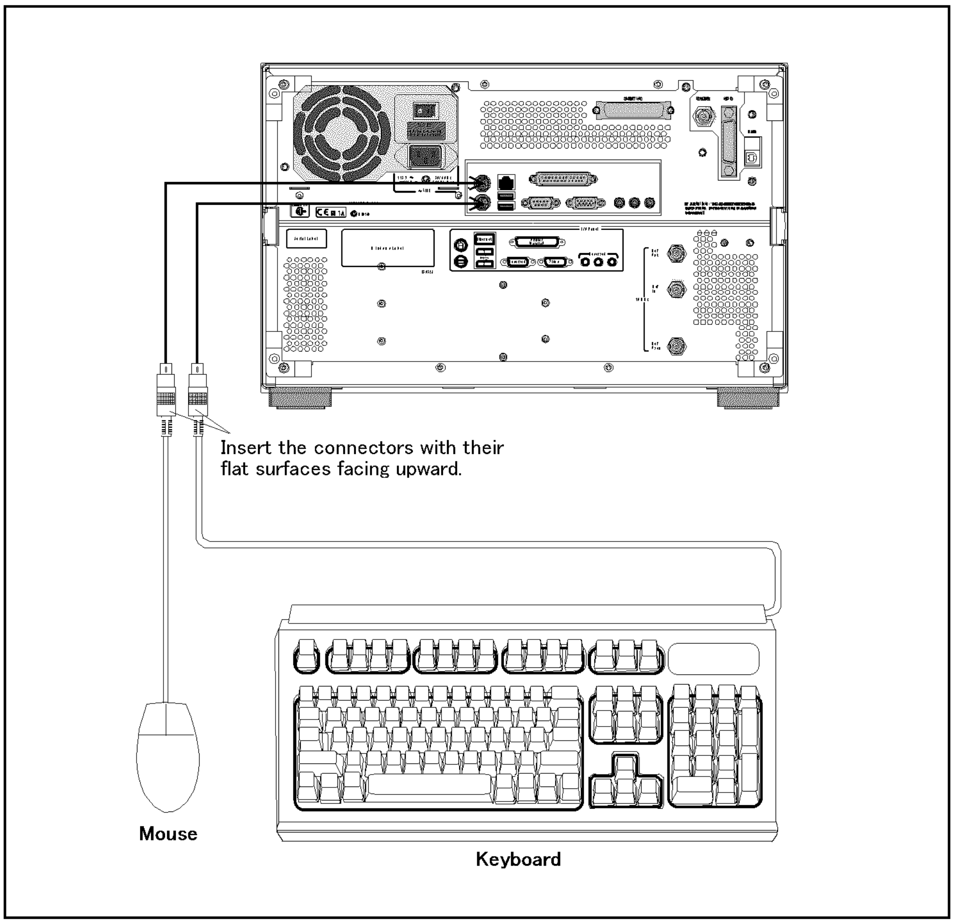
Connecting the Accessories

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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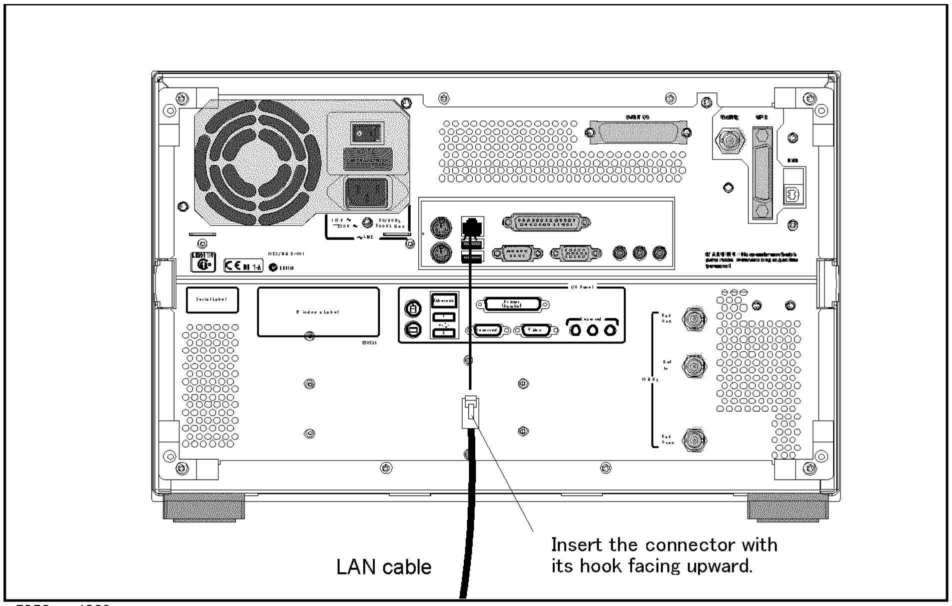
Connecting a LAN cable

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 8, “Setting and Using the Control and Management Functions,” on page 267, 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**



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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.

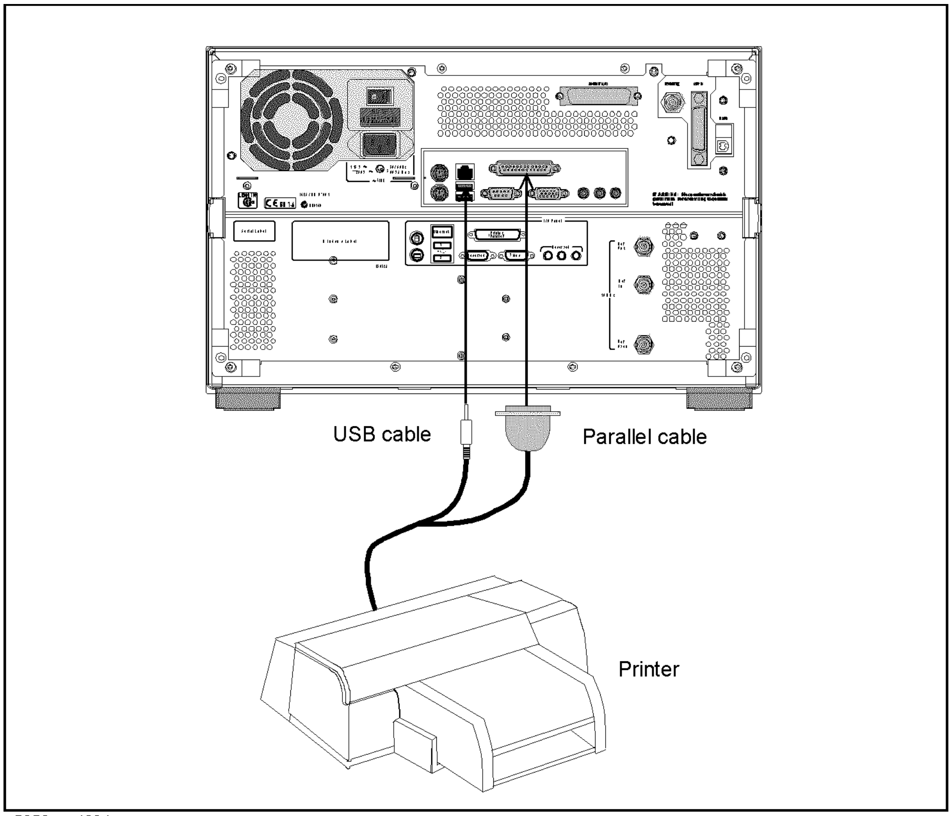
3. Installation

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 6, "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.**

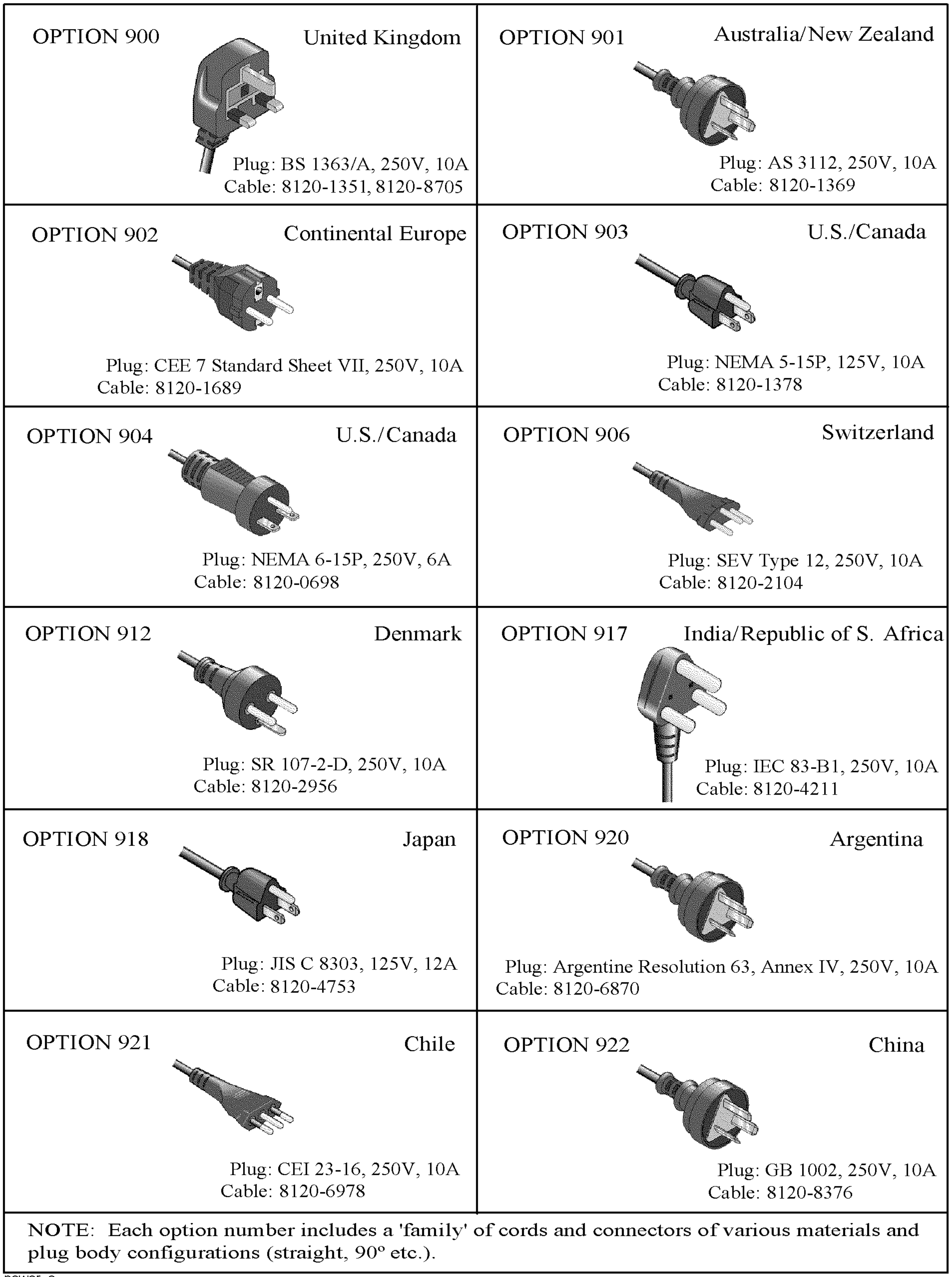
Step 2. Use the supplied cable to connect between the power cable receptacle (Figure 3-9 on page 69) on the rear panel of the E5052A and a three-wire power outlet, with the grounding prong firmly connected in the ground slot.

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

Figure 3-8 shows the power cable options.

3. Installation

Figure 3-8 **Power cable options**



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 76

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.

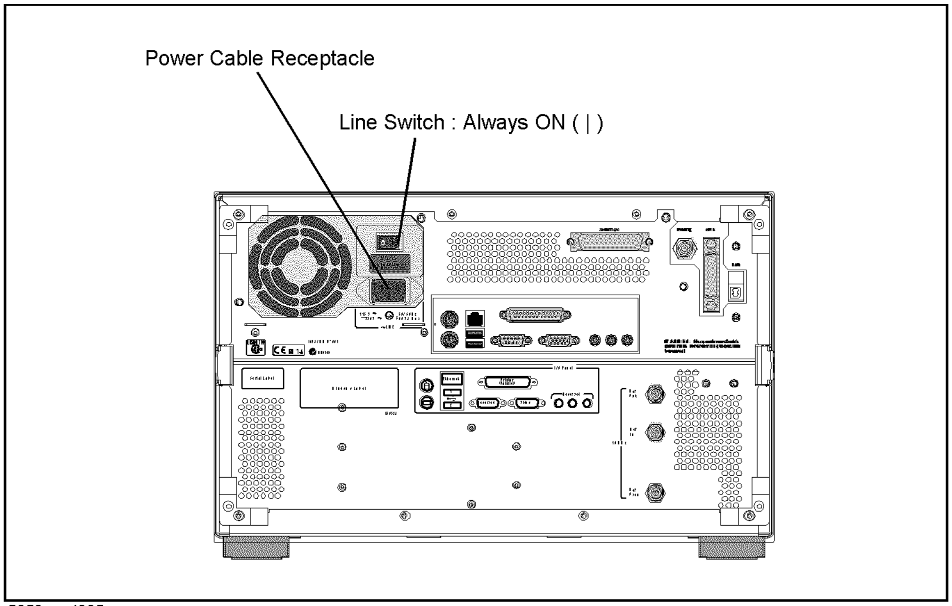
These operations will start the E5052A shutdown process (required software and hardware processes for turning the power off), and the power will turn OFF after a few seconds.

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 58.

When turning the power OFF under normal circumstances, always follow the methods described in “Turning the Power OFF” on page 68.

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.

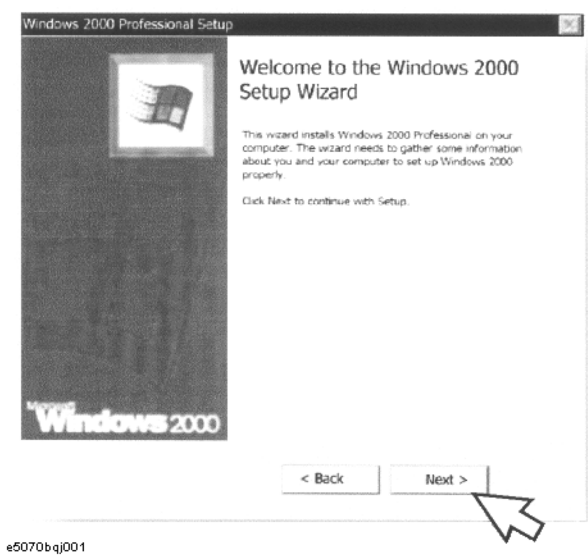
NOTE You cannot use the front panel keys during the initial registration of the E5052A, so be sure to connect the mouse and keyboard before turning on the power.

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.

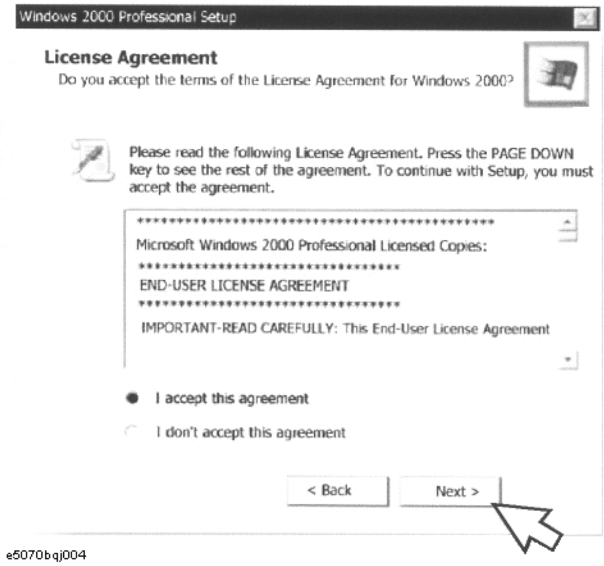
Step 2. The Windows 2000 Professional Setup Wizard appears. Click the **Next >** button (Figure 3-10).

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



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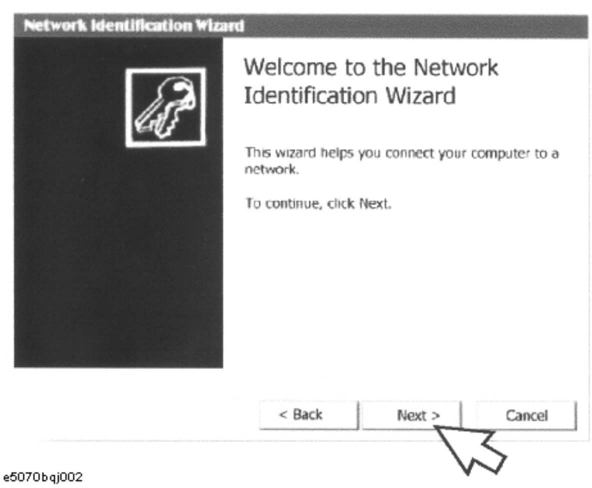
Step 4. The Network Identification Wizard appears. Click the **Next >** button (Figure 3-12).

Figure 3-12 Network Identification Wizard



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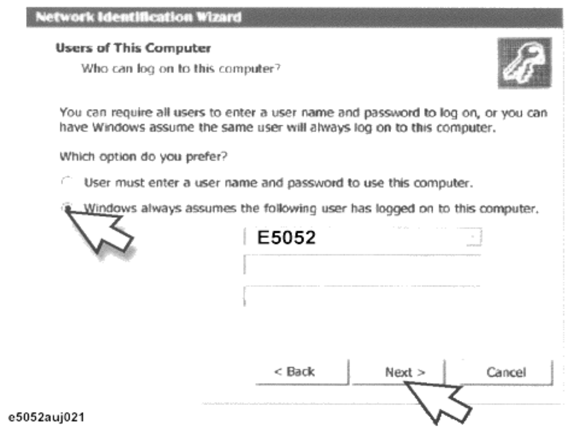
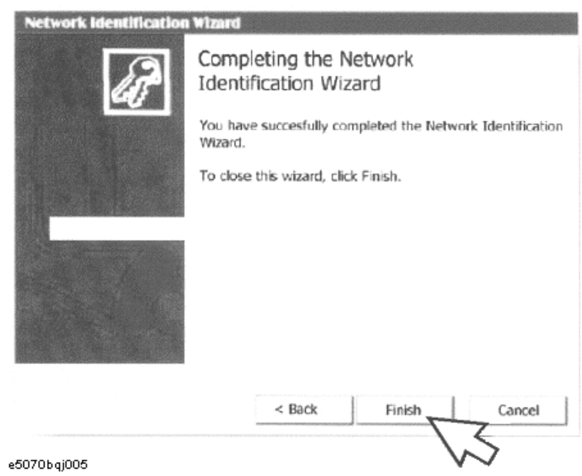
Step 5. In the Network Identification Wizard dialog box (1/2), select the **Windows always assumes the following user has logged on to this computer** box and check that **E5052** is in the **User Name** box. If not, type in **E5052**. Then type in **E5052** both in **Password box and Confirm password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

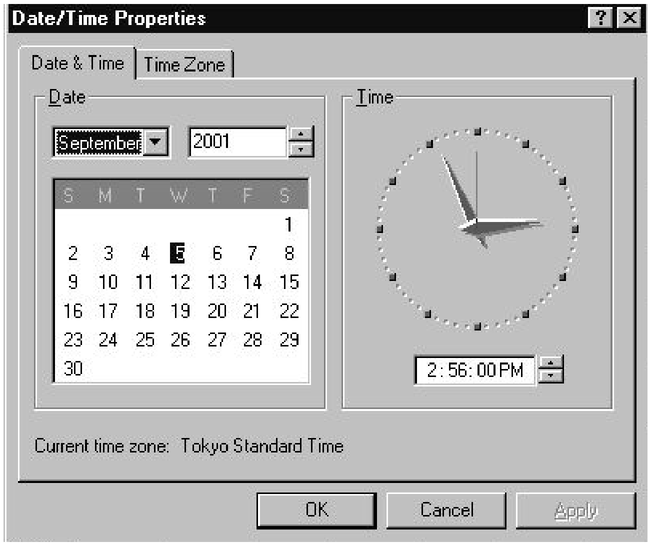
You can set the date/time displayed at the lower right of the screen. When you save data in the storage unit, for example, the settings of the internal clock will be used for the saved file's information. The following describes the setting procedure by using the keys on the front panel.

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)**



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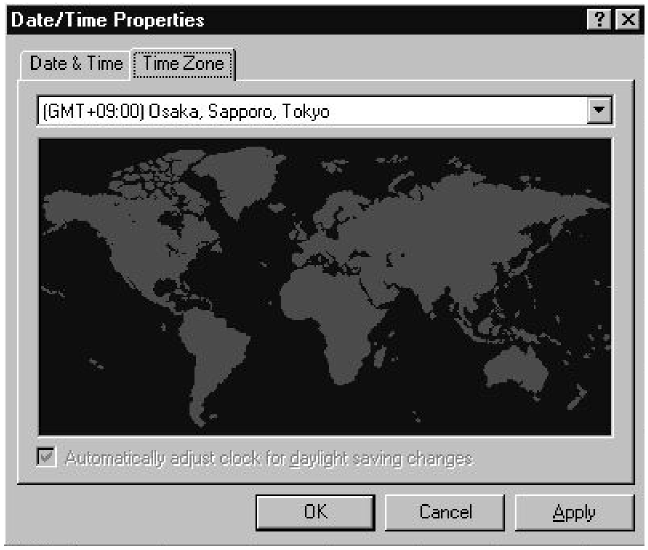
Step 2. Turn the rotary knob (◎)on the front panel to place the focus on the **Date & Time** tab and then press the **[→]** key to move the focus to the **Time Zone** tab (Figure 3-16).

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



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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 76.

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 range swept by DC voltage (DC control voltage or DC power voltage), and tester mode, which performs measurement on the spot without DC voltage sweeping.

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

In the tester mode, the frequency, RF power or power supply DC current of the input signals will be measured on the spot as if each was measured with dedicated single power meter, frequency counter, and DC current meter. You can confirm each numeric value by viewing the screen, however in this mode you cannot observe an exact change of the signals in response to DC voltage sweeping.

Analyzer mode is not available when option 011 is installed.

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 When option 011 is installed, switching analyzer mode and tester mode is not available; only tester mode is supported.

Figure 4-1 **Example of Tester Mode Screen**

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Setting Trace Layout

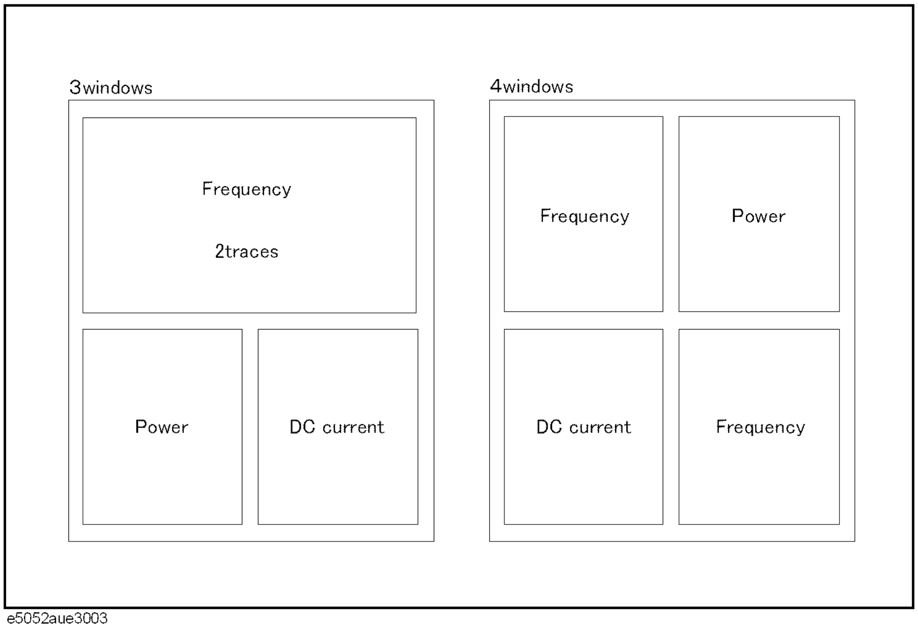
In frequency/power measurement mode, four traces will be displayed at the same time. The four traces consist of two traces in frequency measurement (the unit is Hz and Hz/V), a trace in RF power measurement (the unit is dBm) and a trace in power supply DC current measurement (the unit is mA).

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 94 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.

Setting Downconverter and External mixer

Follow these steps to make the setting when using the E5053A Microwave Downconverter.

Step 1. Press [Input] - **Downconverter**.

Step 2. Press **Downconverter** to toggle on/off.

Step 3. If the downconverter is on, press **RF Input** - **Downconverter** | **E5052A Direct** to select an RF input source.

Step 4. If the downconverter is on and the RF input is set to Downconverter, press **External Mixer** - **Not Used** | **ON** to select whether to use the external mixer.

NOTE For more information on the settings of the E5053A Microwave Downconverter, see Chapter 5, "Measurement Using E5053A and External Mixer.".

The settings when using the downconverter and the external mixer include:

- Setting of LO frequency and power
- Setting of DC bias current (CH1, CH2)
- Setting of IF gain inside downconverter
- Setting of downconverter ΔIF frequency

Procedure to Select Carrier Frequency Band

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

Step 2. Select a frequency band that contains the carrier signal to be measured from the softkey menu list. The ranges of the frequency bands are shown below.

Note that, for analyzer mode, select a frequency band that contains the frequency of the sweep start position.

4. Basic Measurement Using E5052A

NOTE Selectable frequency bands differ depending on whether the E5053A Microwave Downconverter is used and whether the RF input is direct input or downconverter input.

Table 4-1 Selecting Carrier Frequency Band (When E5052A is Used Standalone or with Downconverter is Off)

Carrier frequency band
10 M to 1.5 GHz
300 M to 7 GHz

Table 4-2 Selecting Carrier Frequency Band (When Downconverter is On and RF Input Set to 'E5052A Direct')

Carrier frequency band
10 M to 1.5 GHz
300 M to 3 GHz

Table 4-3 Selecting Carrier Frequency Band (When Downconverter is On and RF Input Set to 'Downconverter')

Carrier frequency band
3 G to 10 GHz
9 G to 26.5 GHz

Specifying Nominal Frequency

When the downconverter setting is turned on, the RF input setting is Downconverter, and the external mixer setting is Not Used, enter the nominal value of the carrier frequency to detect the carrier signal.

Note that, for analyzer mode, set the frequency of the sweep start position as the nominal frequency.

Step 1. Press [Setup] - **Nominal Frequency**.

Step 2. Enter the value of the nominal frequency in the data entry field displayed in the upper part of the screen.

NOTE When using the downconverter RF IN port, the Nominal Frequency setting range is limited to within the carrier frequency band, and the Nominal Frequency should be set to the actual input signal frequency.

In the tester mode, use the **Carrier Search** function to set the nominal frequency so as to the input signal frequency. See also "Executing Carrier Search Function" on page 96.

In the analyzer mode, the Nominal Frequency should be set to the initial frequency at the starting voltage of the built-in DC source (either control voltage or power voltage).

Specifying Maximum Input Level

When the downconverter is turned on, the RF input is set to Downconverter, and the external mixer is set to Not Used, set the maximum input level value of the measurement signal supplied from the input port of the E5053A Microwave Downconverter.

The maximum input level is set to determine the IF gain of the E5053A Microwave Downconverter.

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

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

NOTE In no cases other than when the downconverter is turned on, the RF input is set to Downconverter, and the external mixer is set to Not Used, you can set the maximum input level.

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.

Specifying Frequency Resolution, Number of Measurement Points and Delay

Step 1. Press Setup - **Freq Resolution**.

Step 2. Select the appropriate frequency resolution from the softkey menu list.The available frequency resolutions are as follows:

Table 4-4 Frequency Resolution List

Frequency Resolution
10 Hz
1 kHz
64 kHz

Step 3. Press Setup - **Points**.

Step 4. Enter the number of measurement points in the data entry field that appears in the upper part of the screen.

Step 5. Press Setup - **Points Delay**.

Step 6. Enter the waiting time between each measurement 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 86 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 88.

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 4-5 Trigger Source List

Softkey	Overview
Internal	Sets trigger source to internal continuous trigger signal

Table 4-5 Trigger Source List

Softkey	Overview
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 137 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 Averaging Trigger

Follow the steps below to use the averaging trigger.

Step 1. Press Trigger - **Average Trigger** to toggle on/off the averaging trigger.

When the averaging trigger is set to on, a single activation of the trigger system can perform the number of measurements set by the user as the averaging factor.

The following table shows how this function works by pressing Trigger - **Single** when the averaging trigger is on and off.

Averaging Trigger	Operation
ON	Executes state transitions among Waiting for Trigger, Trigger, and Measurement for the number of times set for averaging and then changes to the Hold state.
OFF	Enters Waiting for Trigger state once and then changes to the Hold state after measurement is completed.

NOTE The averaging function ("Setting Average Function" on page 84) must be set before enabling the averaging trigger.

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 waiting time to suppress DC power until the first measurement is finished 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 waiting time to suppress DC control until the first measurement is finished 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.

Pressing DC Control - **Execute Control Voltage Cal** automatically turns on the DC control voltage calibration function. As necessary, press DC Control - **Control Voltage Cal** to turn on/off the DC control voltage calibration function.

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.

Auto Frequency Control Function

The automatic frequency control (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 appears 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.

When the external mixer is set to of, the auto frequency control function is not available.

Specifying Auto Frequency Control Function

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 **Max Input Level**.

Step 7. Enter the maximum level value of the measurement signal that is supplied from the Input port of the E5053A Microwave Downconverter in the Auto Frequency Control function, in the data entry field that appears in the upper part of the screen.

NOTE With no settings other than the downconverter is turned on, the RF input is set to Downconverter, and the external mixer is set to Not Used, setting maximum input level is available.

Step 8. Press **Frequency Band**.

Step 9. Select an appropriate frequency band that contains the target carrier signal, from the softkey menu list.

NOTE Selectable frequency bands differ depending on whether the E5053A Microwave Downconverter is used and whether the RF input is direct input or downconverter input.

Table 4-6 Selecting Carrier Frequency Band (When E5052A is Used Standalone or with Downconverter is Off)

Carrier frequency band
10 M to 1.5 GHz
300 M to 7 GHz

Table 4-7 Selecting Carrier Frequency Band (When Downconverter is On and RF Input Set to 'E5052A Direct')

Carrier frequency band
10 M to 1.5 GHz
300 M to 3 GHz

Table 4-8 Selecting Carrier Frequency Band (When Downconverter is On and RF Input Set to 'Downconverter')

Carrier frequency band
3 G to 10 GHz
9 G to 26.5 GHz

Step 10. Press **Target**.

Step 11. 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 In the analyzer mode, the frequency band is automatically altered so that the input signal frequency is within the band when the actual input frequency crosses the band.

Also the E5053A downconverter is automatically controlled to offset the downconverter LO frequency to track the input signal frequency within the IF frequency being fed to the E5052A. Note that the maximum frequency step between the two adjacent measurement points may be limited due to the IF frequency range. Increase the number of measurement points for the E5052A to detect the input signal frequency within the IF frequency, when "Downconverter IF not found" error message is found.

Step 12. Press **Tolerance**.

Step 13. 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 14. Press **Sensitivity**.

Step 15. 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 16. Press **Max Iteration**.

Step 17. 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 18. Press **AFC Status**.

Step 19. 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.

NOTE When the downconverter is turned on, the RF input is set to Downconverter, and the external mixer is set to Not Used, the operation differs depending on whether the **AFC Status** is **ON** or **Immediate**.

- When executed before each sweep with the **ON** setting

  The auto frequency control function is executed assuming that the input signal frequency is near the target frequency (within several hundred MHz). If the input signal is not near the target frequency, the auto frequency control function fails.

- When executed with the **Immediate** setting

  Because the auto frequency control function is executed after detecting the input signal by searching for inside the frequency band that is set first in the execution, the auto frequency control function can be executed provided that the input signal is within the frequency band even if it is not near the target frequency.

  Note that, because the input signal search is performed first, the time required to complete the auto frequency control function is elongated compared to when it is executed before each sweep with the **AFC Status ON** setting.

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

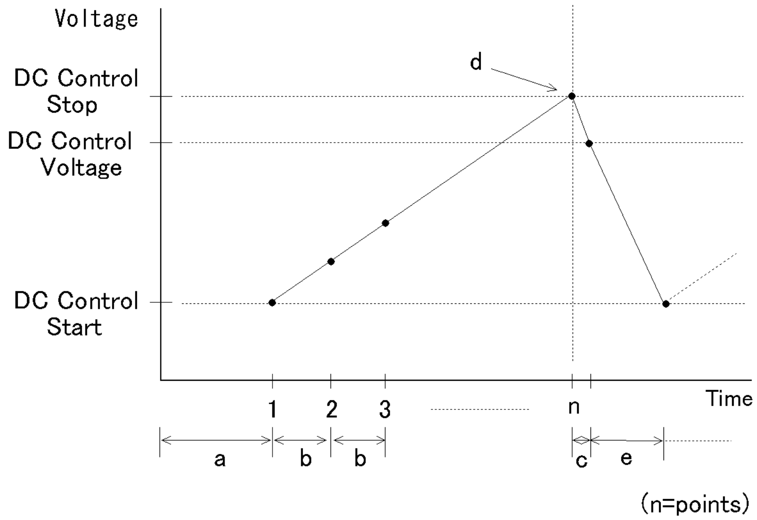
This section describes the point delay for DC control delay, DC power delay, and common settings, which were mentioned in the previous sections. This is not a part of the setting procedures, so for more on settings you can skip this section and proceed to "Confirming Result of RF Power Measurement" on page 98.

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," "c" and "e" and the measurement point "d" used in the description below, refer to Figure 4-3, "Delay While DC Control Selected for Sweep Parameter,".

- "a" signifies the delay until measurement of the first point starts in the single sweep, or the delay until measurement of the first point of the first sweep in the continuous sweep.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 setting of the voltage (DC Control Stop) at the last measurement point ("d") of the sweep is different from the setting value of DC Control Voltage. This time is required for generating the DC Control Voltage. It is not generated when the voltage setting of the DC Control Stop (Start/Center(Stop/Span) - **DC Control Stop**) and that of the DC Control Voltage(DC Control - **DC Control Voltage**) is same.
- "e" is signifies the time that elapses to set the voltage back to the starting voltage for next sweep in the continuous sweep. This time is required for setting of the DC Power Delay is completed.

Figure 4-3 Delay While DC Control Selected for Sweep Parameter



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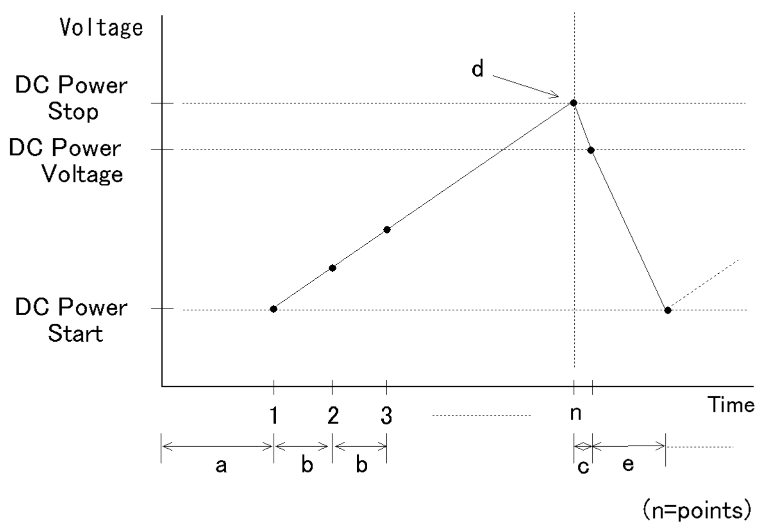
NOTE If the output voltage falls 0 V or exceeds 20 V, the setting time of DC control delay will be set as the delay, after the voltage is output.

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,” “c” and “e” 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 measurement of the first point starts in the single sweep, or the delay until measurement of the first point of the first sweep in the continuous sweep.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 setting of the voltage (DC Control Stop) at the last measurement point (“d”) of the sweep is different from the setting value of DC Control Voltage. This time is required for generating the DC Control Voltage. It is not generated when the voltage setting of the DC Control Stop (Start/Center(Stop/Span) - **DC Control Stop**) and that of the DC Control Voltage(DC Control - **DC Control Voltage**) is same.
- “e” signifies the time that elapses to set the voltage back to the starting voltage for next sweep in the continuous sweep. This time is required for setting of the DC Power Delay is completed.

Figure 4-4 **Delay While DC power is Selected for Sweep Parameter**



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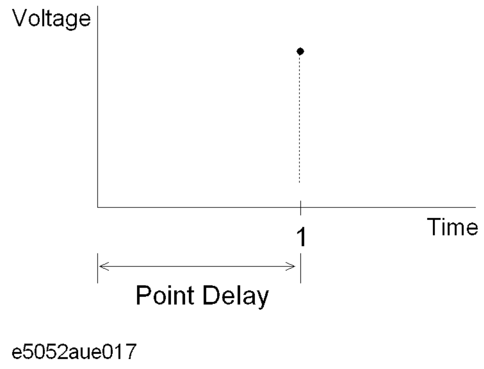
About Delay in Tester Mode

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**



Confirming 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 4-9 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 Display - **Y # of Digits**.

Step 4. Select the number of digits for Y-axis in the softkey menu. Available options are 4-digits, 8-digits, and 12-digits.

NOTE Set the number of digits for Y-axis display for each measurement mode. Therefore, when the number of digits for Y-axis is changed in the frequency measurement, those for the RF power measurement and the power supply DC current measurement are also changed.

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

Step 6. 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 7. Press Scale - **Reference Value**.

Step 8. 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 9. Press Scale - **Scale/Div**.

Step 10. 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 Trace Offset (manual setting)

You can add an offset value to the displayed trace by following the steps below.

Step 1. Press Format - **Offset**

Step 2. Enter the offset value to be added to the trace in the data entry field that appears in the upper part of the screen.The unit varies depending on the setting of the frequency format.

Setting Trace Offset (Y-axis marker setting)

When the marker is displayed, the value of the active marker is used as the offset value. This procedure is carried out as follows.

Step 1. Move the active marker to the position of the measurement value that you want to set as the reference.

Step 2. Press Format - **Marker -> -Offset**

NOTE

Even when the reference marker mode is on and the active marker displays a Δ value, the value of the active marker is used as the offset value.

When the offset value has already been set, that value is overwritten.

When an active marker does not exist, this function is not available.

Setting X-axis Scale (manual setting)

Follow the steps below to set the maximum/minimum display values of the x-axis. This is used when you want to enlarge a part of the displayed trace.

Step 1. Press Scale - **X axis** - **Auto** to turn off the auto adjustment of the x-axis scale.

Step 2. Press Scale - **X axis** - **Left**

Step 3. Enter the display start value of the x-axis in the data entry field that appears in the upper part of the screen. V is used as a unit

Step 4. Press Scale - **X axis** - **Right**

Step 5. Enter the display stop value of the x-axis in the data entry field that appears in the upper part of the screen. V is used as a unit

NOTE

When you want to restore the display's original start/stop values, press Scale - **X axis** - **Auto** to turn on the auto adjustment of the x-axis scale.

X-axis Scale Setting Procedure (x-axis band marker setting)

When the band marker of the x-axis is displayed, the x-axis scale can be adjusted to the band marker setting. The procedure is as follows.

Step 1. Press Scale - **X axis** - **Band Marker -> X Axis**

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.

NOTE

When the downconverter is turned on, the RF input is set to Downconverter, and the external mixer is set to Not Used, the attenuator value is fixed to 10 dB.

Executing Carrier Search Function

The carrier search function is to detect the input signal frequency with the selected carrier frequency band for the downconverter RF IN (i.e. 3 to 10 GHz or 9 to 26.5 GHz) and reflect the result to the nominal frequency.

Step 1. Press Setup.

Step 2. Press **Carrier Search** to execute the carrier signal search.

Step 3. The detected signal frequency is reflected on the nominal frequency.

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.

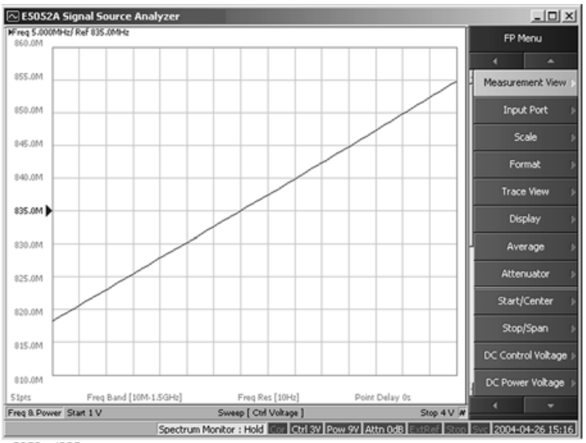
Step 3. Press Trace/View - **Smoothing** to turn on the smoothing function.

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 10)**, which allows you to display up to marker 10.

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 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.

NOTE Measurement display indicates a measured value obtained with the power meter if the downconverter is turned off, otherwise a measurement result obtained through the FFT.

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 Display - **Y # of Digits**.

Step 4. Select the number of digits for Y-axis in the softkey menu. Available options are 4-digits, 8-digits, and 12-digits.

NOTE Set the number of digits for Y-axis display for each measurement mode. Therefore, when the number of digits for Y-axis is changed in the frequency measurement, those for the RF power measurement and the power supply DC current measurement are also changed.

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

Step 6. 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 7. Press Scale - **Reference Value**.

Step 8. 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 9. Press Scale - **Scale/Div**.

Step 10. 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 Trace Offset (manual setting)

You can add an offset value to the displayed trace. Follow the steps below.

Step 1. Press Format - **Offset**

Step 2. Enter the offset value to be added to the trace in the data entry field that appears in the upper part of the screen. dBm is used as a unit.

Setting Trace Offset (Y-axis marker setting)

When the marker is displayed, the value of the active marker is used as the offset value. The procedure is as follows.

Step 1. Move the active marker to the position of the measurement value that you want to set as a reference.

Step 2. Press Format - **Marker -> -Offset**

NOTE Even when the reference marker mode is on and the active marker displays a Δ value, the value of the active marker is used as the offset value.

When the offset value has already been set, that value is overwritten.

When an active marker does not exist, this function is not available.

Setting X-axis Scale (manual setting)

Follow the steps below to set the maximum/minimum display values of the x-axis. This is used when you want to enlarge a part of the displayed trace.

Step 1. Press Scale - **X axis** - **Auto** to turn off the auto adjustment of the x-axis scale.

Step 2. Press Scale - **X axis** - **Left**

Step 3. Enter the display start value of the x-axis in the data entry field that appears in the upper part of the screen. V is used as a unit.

Step 4. Press Scale - **X axis** - **Right**

Step 5. Enter the display stop value of the x-axis in the data entry field that appears in the upper part of the screen. V is used as a unit.

NOTE When you want to restore the display's original start/stop values, press Scale - **X axis** - **Auto** to turn on the auto adjustment of the x-axis scale.

Setting X-axis Scale (x-axis band marker setting)

When the band marker of the x-axis is displayed, the x-axis scale can be adjusted to the band marker setting. The procedure is as follows.

Step 1. Press Scale - **X axis** - **Band Marker -> X Axis**

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.

NOTE When the downconverter is turned on, the RF input is set to Down converter, and the external mixer is set to Not Used, the attenuator value is fixed to 10 dB.

Executing Carrier Search Function

The carrier search function is to detect the input signal frequency with the selected carrier frequency band for the downconverter RF IN (i.e. 3 to 10 GHz or 9 to 26.5 GHz) and reflect the result to the nominal frequency. Refer to “Executing Carrier Search Function” on page 96 for the setting procedure.

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.

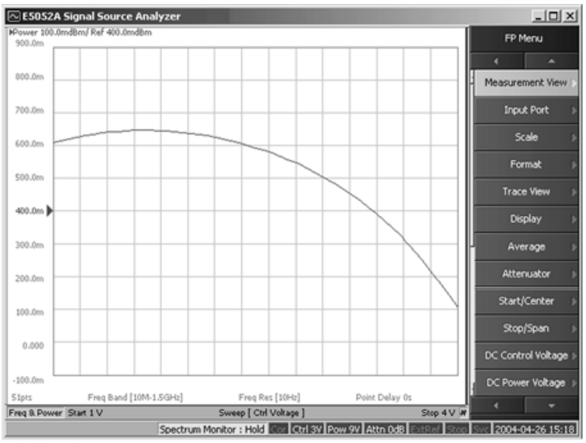
Step 3. Press Trace/View - **Smoothing** to turn on the smoothing function.

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 10)**, which allows you to display up to marker 10.

Figure 4-7 **Example of Measurement Screen (RF power 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]) - **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 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 [Display] - **Y # of Digits**.

Step 4. Select the number of digits for Y-axis in the softkey menu. Available options are 4-digits, 8-digits, and 12-digits.

NOTE Set the number of digits for Y-axis display for each measurement mode. Therefore, when the number of digits for Y-axis is changed in the frequency measurement, those for the RF power measurement and the power supply DC current measurement are also changed.

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

Step 6. 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 7. Press [Scale] - **Reference Value**.

Step 8. 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 9. Press [Scale] - **Scale/Div**.

Step 10. 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 Trace Offset (manual setting)

You can add an offset value to the displayed trace. Follow the steps below.

Step 1. Press Format - **Offset**

Step 2. Enter the offset value to be added to the trace in the data entry field that appears in the upper part of the screen. A is used as a unit.

Setting Trace Offset (Y-axis marker setting)

When the marker is displayed, the value of the active marker is used as the offset value. The procedure is as follows.

Step 1. Move the active marker to the position of the measurement value that you want to set as the reference

Step 2. Press Format - **Marker -> -Offset**

NOTE Even when the reference marker mode is on and the active marker displays a Δ value, the value of the active marker is used as the offset value.

When the offset value has already been set, that value is overwritten.

When an active marker does not exist, this function is not available.

Setting X-axis Scale (manual setting)

Follow the steps below to set the maximum/minimum display values of the x-axis. This is used when you want to enlarge a part of the displayed trace.

Step 1. Press Scale - **X axis** - **Auto** to turn off the auto adjustment of the x-axis scale.

Step 2. Press Scale - **X axis** - **Left**

Step 3. Enter the display start value of the x-axis in the data entry field that appears in the upper part of the screen. V is used as a unit.

Step 4. Press Scale - **X axis** - **Right**

Step 5. Enter the display stop value of the x-axis in the data entry field that appears in the upper part of the screen. V is used as a unit.

NOTE When you want to restore the display's original start/stop values, press Scale - **X axis** - **Auto** to turn on the auto adjustment of the x-axis scale.

Setting X-axis Scale (x-axis band marker setting)

When the band marker of the x-axis is displayed, the x-axis scale can be adjusted to the band marker setting. The procedure is as follows.

Step 1. Press Scale - **X axis** - **Band Marker -> X Axis**

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.

NOTE When the downconverter is turned on, the RF input is set to Down converter, and the external mixer is set to Not Used, the attenuator value is fixed to 10 dB.

Executing Carrier Search Function

The carrier search function is to detect the input signal frequency with the selected carrier frequency band for the downconverter RF IN (i.e. 3 to 10 GHz or 9 to 26.5 GHz) and reflect the result to the nominal frequency. Refer to “Executing Carrier Search Function” on page 96 for the setting procedure.

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.

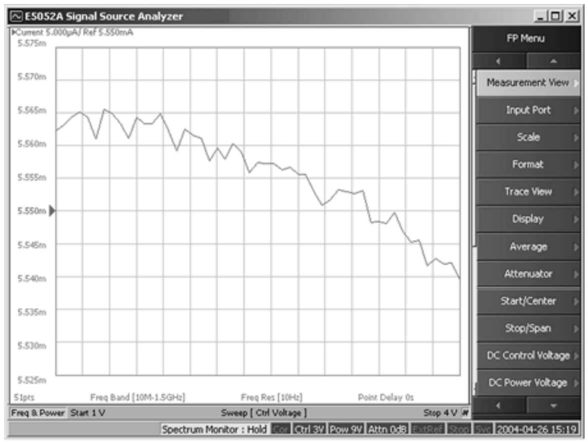
Step 3. Press Trace/View - **Smoothing** to turn on the smoothing function.

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 10)**, which allows you to display up to marker 10.

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 offset frequency 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.

Setting Downconverter and External mixer

Follow these steps to make the setting when using the E5053A Microwave Downconverter.

Step 1. Press Input - **Downconverter**.

Step 2. Press **Downconverter** to toggle on/off.

Step 3. If the downconverter is turned on, press **RF Input** - **Downconverter** | **E5052A Direct** to select an RF input source.

Step 4. If the downconverter is turned on and the RF input is set to Downconverter, press **External Mixer** - **Not Used** | **ON** to select whether to use the external mixer.

NOTE For more information on the settings of the E5053A Microwave Downconverter, see Chapter 5, "Measurement Using E5053A and External Mixer.".

The settings when using the downconverter and the external mixer include:

- Setting of LO frequency and power
- Setting of DC bias current (CH1, CH2)
- Setting of IF gain inside downconverter
- Setting of downconverter ΔIF frequency

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.

NOTE Selectable frequency bands differ depending on whether the E5053A Microwave Downconverter is used and whether the RF input is direct input or downconverter input.

Table 4-10 Selecting Carrier Frequency Band (When E5052A is Used Standalone or with Downconverter is Off)

Carrier frequency band
10 M to 41 MHz
39 M to 101 MHz
99 M to 1.5 GHz
300 M to 7 GHz

Table 4-11 Selecting Carrier Frequency Band (When Downconverter is On and RF Input Set to 'E5052A Direct')

Carrier frequency band
10 M to 41 MHz
39 M to 101 MHz
99 M to 1.5 GHz
300 M to 3 GHz

Table 4-12 Selecting Carrier Frequency Band (When Downconverter is On and RF Input Set to 'Downconverter')

Carrier frequency band
3 G to 10 GHz
9 G to 26.5 GHz

Specifying Nominal Frequency

Enter the nominal value of the carrier frequency.

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

Step 2. Enter the value of the nominal frequency in the data entry field displayed in the upper part of the screen.

NOTE The carrier search function is to detect the input signal frequency with the selected carrier frequency band for the downconverter RF IN (i.e. 3 to 10 GHz or 9 to 26.5 GHz) and reflect the result to the nominal frequency.

See also “Executing Carrier Search Function” on page 96.

Optimizing LO Phase Noise Characteristics

In the SSB phase noise measurement of the DUT, LO phase noise characteristics can be selected for optimizing the phase noise measurement accuracy.

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

Step 2. Select LO phase noise characteristics in the softkey menu displayed.

Table 4-13 LO Phase Noise Characteristics

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

NOTE Refer to the “Phase Noise Measurement” on page 313 in the Chapter 10, “Specifications and Supplemental Information.”

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.

Specifying 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, 20 MHz or 40 MHz.

NOTE Sweep stop values that are selectable differ depending on the selection of the carrier frequency band.

- For 10 M - 41 MHz

  100 kHz, 1 MHz, 5 MHz

- For 39 M -101 MHz

  100 kHz, 1 MHz, 5 MHz, 10 MHz, 20 MHz

- For frequency bands other than above

  100 kHz, 1 MHz, 5 MHz, 10 MHz, 20 MHz, 40 MHz

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

Table 4-14 Correlation Table for Measurement Points and Sweep Range

Start/ Stop	100 kHz	1 MHz	5 MHz	10 MHz	20 MHz	40 MHz
1 Hz	646	775	865	904	943	982
10 Hz	517	646	736	775	814	853
100 Hz	388	517	607	646	685	724
1 kHz	259	388	478	517	556	595

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

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 86 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 88.

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 4-15 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

Table 4-15 Trigger Source List

Softkey	Overview
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 137 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.

Setting Averaging Trigger

Follow the steps below to use the averaging trigger.

Step 1. Press Trigger - **Average Trigger** to toggle on/off the averaging trigger.

When the averaging trigger is set to on, a single activation of the trigger system can perform the number of measurements set by the user as the averaging factor.

The following table shows how this function works by pressing Trigger - **Single** when the averaging trigger is on and off.

Averaging Trigger	Operation
ON	Executes state transitions among Waiting for Trigger, Trigger, and Measurement for the number of times set for averaging and then changes to the Hold state.
OFF	Enters Waiting for Trigger state once and then changes to the Hold state after measurement is completed.

NOTE The averaging function (“Setting Average Function” on page 84) must be set before enabling the averaging trigger.

Confirming 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 Display - **Y # of Digits**.

Step 4. Select the number of digits for Y-axis in the softkey menu. Available options are 4-digits, 8-digits, and 12-digits.

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

Step 6. 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 7. Press Scale - **Reference Value**.

Step 8. 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 9. Press Scale - **Scale/Div**.

Step 10. 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 Trace Offset (manual setting)

You can add an offset value to the displayed trace. Follow the steps below.

Step 1. Press Format - **Offset**

Step 2. Enter the offset value to be added to the trace in the data entry field that appears in the upper part of the screen. dBc/Hz is used as a unit.

Setting Trace Offset (Y-axis marker setting)

When the marker is displayed, the value of the active marker is used as the offset value. The procedure is as follows.

Step 1. Move the active marker to the position of the measurement value that you want to set as the reference.

Step 2. Press Format - **Marker -> -Offset**

NOTE

Even when the reference marker mode is on and the active marker displays a Δ value, the value of the active marker is used as the offset value.

When the offset value has already been set, that value is overwritten.

When an active marker does not exist, this function is not available.

Setting X-axis Scale (manual setting)

Follow the steps below to set the maximum/minimum display values of the x-axis. This is used when you want to enlarge a part of the displayed trace.

Step 1. Press Scale - **X axis** - **Auto** to turn off the auto adjustment of the x-axis scale.

Step 2. Press Scale - **X axis** - **Left**

Step 3. Enter the display start value of the x-axis in the data entry field that appears in the upper part of the screen. Hz is used as a unit.

Step 4. Press Scale - **X axis** - **Right**

Step 5. Enter the display stop value of the x-axis in the data entry field that appears in the upper part of the screen. Hz is used as a unit.

NOTE

When you want to return the display start/stop values to the original ones, press Scale - **X axis** - **Auto** to turn on the auto adjustment of the x-axis scale.

Setting X-axis Scale (x-axis band marker setting)

When the band marker of the x-axis is displayed, the x-axis scale can be adjusted to the band marker setting. The procedure is as follows.

Step 1. Press Scale - **X axis** - **Band Marker -> X Axis**

Setting IF Gain

"IF over flow" error may be displayed when phase noise is distorted. On the other hand, internal noise level of the instrument may be significant in the measurement display when the DUT has a low-noise characteristics. 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 4-16).

Table 4-16 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

NOTE With the Option 011 configured, available IF Gain options are 0 dB, 10 dB, and 20 dB.

If the IF signal is not at appropriate value a "drop out" may occur as it will not be able to detect the phase noise of the DUT at the ADC resulting in strange measurement as show in the figure below.

In such a case, it is recommended to increase the value of IF gain (default value of 20 dB) as it is important to correctly measure the phase noise at close in offset.

Figure 4-9 Example of IF signal is not at appropriate value

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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.

NOTE When the downconverter is turned on, the RF input is set to Down converter, and the external mixer is set to Not Used, the attenuator value is fixed to 10 dB.

Executing Carrier Search Function

When the downconverter is turned on, the RF input is set to Downconverter, and the external mixer is set to Not Used, the function to search for the carrier signal in the specified carrier frequency band and reflect the result to the nominal frequency is available.

Step 1. Press [Setup]

Step 2. Press **Carrier Search** to execute the carrier signal search.

Step 3. The detected signal frequency is reflected on the nominal frequency.

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.

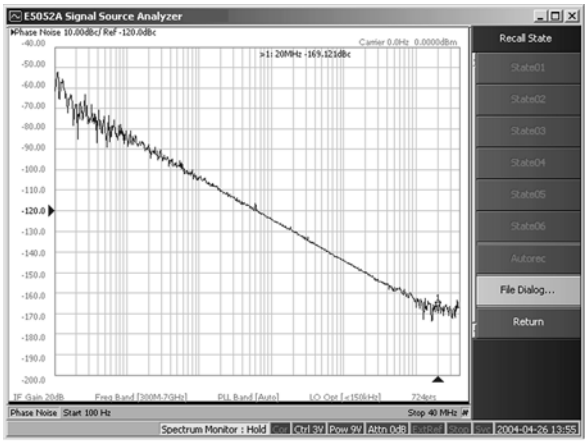
Step 3. Press [Trace/View] - **Smoothing** to turn on the smoothing function.

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 10)**, which allows you to display up to marker 10.

Figure 4-10 **Example of Measurement Screen (phase noise - offset frequency characteristics)**



e5052auj037

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 Specified Range” on page 209. 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].

Calculate Integral Phase Noise, Jitter and Residual FM, using the specified data by analysis range.

Integral Phase Noise returns the value of SSB Integral result. RMS Noise, Jitter and Residual FM returns the value after applying the DSB conversion.

Value	Formula
Integral Phase Noise	10 * log(integ(10 ^ (L(f) / 10))) [dBc]
RMS Noise	sqrt(2 * 10 ^ (Integral Phase Noise / 10)) [rad]
RMS Jitter	RMS Noise / (2 * π * Carrier Frequency) [sec]
Residual FM	sqrt(2 * integ(f ^ 2 * 10 ^ (L(f) / 10))) [Hz]

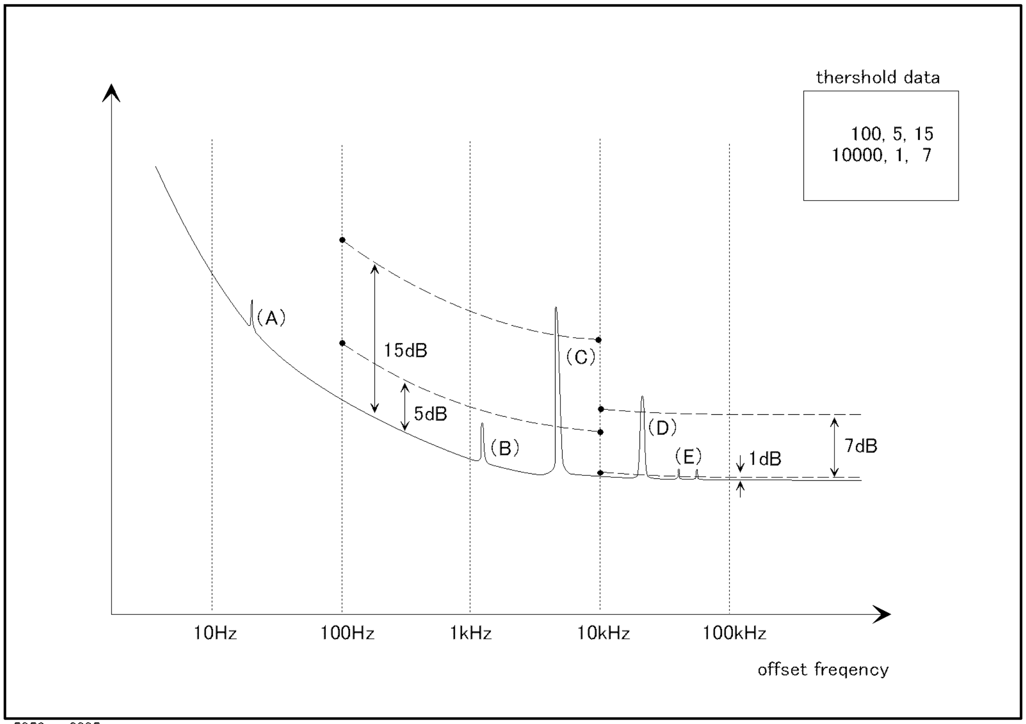
where, L(f) : Phase Noise [dBc/Hz] and integ : Integral

NOTE When Power is selected in the spurious measurement, it is calculated with adding the power of spurious after integrating except spurious.

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 4-11 Spurious 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.

Spurious judgment

(A), (E) For measurement values falling in the range for which no threshold is specified (A), or between the upper and lower thresholds (E), 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 segment, 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.

Confirming Allan Variance using with Phase Noise measurement value

It is available to calculate the Allan Variance (sigma) and Jitter using the measured average time and the key operation. For more information refer to the command reference of programmer's guide.

NOTE The value obtained with E5052A as sigma is standard deviation, and the Allan Variance as the general definition is the value that is squared this sigma.

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.

Setting the downconverter and the external mixer

Follow these steps to make the setting when using the E5053A Microwave Downconverter.

Step 1. Press Input - **Downconverter**.

Step 2. Press **Downconverter** to toggle on/off.

Step 3. If the downconverter is on, press **RF Input** - **Downconverter** | **E5052A Direct** to select an RF input source.

Step 4. If the downconverter is on and the RF input is set to Downconverter, press **External Mixer** - **Not Used** | **ON** to select whether to use the external mixer.

NOTE For more information on the settings of the E5053A Microwave Downconverter, see Chapter 5, "Measurement Using E5053A and External Mixer.".

The settings when using the downconverter and the external mixer include:

- Setting of LO frequency and power
- Setting of DC bias current (CH1, CH2)
- Setting of IF gain inside downconverter
- Setting of downconverter ΔIF frequency

Procedure to select a carrier frequency band

Step 1. Start/Center (Stop/Span) - **Carrier To** - **Frequency Band**.

Step 2. Select a frequency band that contains the carrier signal to be measured from the softkey menu list. The ranges of the frequency bands are shown below.

NOTE Selectable frequency bands differ depending on whether the E5053A Microwave Downconverter is used and whether the RF input is direct input or downconverter input.

Table 4-17 **Selecting Carrier Frequency Band (When E5052A is Used Standalone or with Downconverter is Off)**

Carrier frequency band
10 M to 1.5 GHz
300 M to 7 GHz

Table 4-18 **Selecting Carrier Frequency Band (When Downconverter is On and RF Input Set to 'E5052A Direct')**

Carrier frequency band
10 M to 1.5 GHz
300 M to 3 GHz

Table 4-19 **Selecting Carrier Frequency Band (When Downconverter is On and RF Input Set to 'Downconverter')**

Carrier frequency band
3 G to 10 GHz
9 G to 26.5 GHz

NOTE When the downconverter is turned on, the RF input is set to Downconverter, and the external mixer is set to on, setting the carrier frequency band is not available.

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.

NOTE Allowable setting range for the frequency sweep varies depending on whether the E5053A is turned on/off and the RF input is set to ‘E5052A Direct’/’Downconverter.’ Possible setting range for the center frequency is possible widest setting range of the carrier frequency bands. More specifically, when possible setting range for the carrier frequency bands are 10M to 1.5GHz and 300M to 3GHz, resultant possible setting range for the center frequency is 10M to 3GHz.

Device Configuration	Carrier Frequency Bands	Possible Setting Range for Center Frequency
E5052A is stand-alone, or with downconverter turned off	10 M to 1.5 GHz 300 M to 7 GHz	10 M to 7 GHz
With the downconverter turned on and RF input set to ‘E5052A Direct’	10 M to 1.5 GHz 300 M to 3 GHz	10 M to 3 GHz
With the downconverter turned on and RF input set to ‘Downconverter’	3 G to 10 GHz 9 G to 26.5 GHz	3 G to 26.5 GHz

Specifying 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 10, “Specifications and Supplemental Information,” on page 311.

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 86 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 88.

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 4-20 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 137 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.

Setting Averaging Trigger

Follow the steps below to use the averaging trigger.

Step 1. Press Trigger - **Average Trigger** to toggle on/off the averaging trigger.

When the averaging trigger is set to on, a single activation of the trigger system can perform the number of measurements set by the user as the averaging factor.

The following table shows how this function works by pressing Trigger - **Single** when the averaging trigger is on and off.

Averaging Trigger	Operation
ON	Executes state transitions among Waiting for Trigger, Trigger, and Measurement for the number of times set for averaging and then changes to the Hold state.
OFF	Enters Waiting for Trigger state once and then changes to the Hold state after measurement is completed.

NOTE The averaging function (“Setting Average Function” on page 84) must be set before enabling the averaging trigger.

Confirming 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 **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 Signal 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 4-21 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 Display - **Y # of Digits**.

Step 4. Select the number of digits for Y-axis in the softkey menu. Available options are 4-digits, 8-digits, and 12-digits.

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

Step 6. 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 7. Press Scale - **Reference Value**.

Step 8. 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 9. Press Scale - **Scale/Div**.

Step 10. 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 Trace Offset (manual setting)

You can add an offset value to the displayed trace. Follow the steps below.

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

Step 2. Enter the offset value to be added to the trace in the data entry field that appears in the upper part of the screen. The unit varies depending on the format setting.

Setting Trace Offset (Y-axis marker setting)

When the marker is displayed, the value of the active marker is used as the offset value. The procedure is as follows.

Step 1. Move the active marker to the position of the measurement value that you want to set as the reference.

Step 2. Press [Format] - **Marker -> -Offset**

NOTE Even when the reference marker mode is on and the active marker displays a Δ value, the value of the active marker is used as the offset value.

When the offset value has already been set, that value is overwritten.

When an active marker does not exist, this function is not available.

Setting X-axis Scale (manual setting)

Follow the steps below to set the maximum/minimum display values of the x-axis. This is used when you want to enlarge a part of the displayed trace.

Step 1. Press [Scale] - **X axis** - **Auto** to turn off the auto adjustment of the x-axis scale.

Step 2. Press [Scale] - **X axis** - **Left**

Step 3. Enter the display start value of the x-axis in the data entry field that appears in the upper part of the screen. Hz is used as a unit.

Step 4. Press [Scale] - **X axis** - **Right**

Step 5. Enter the display stop value of the x-axis in the data entry field that appears in the upper part of the screen. Hz is used as a unit.

NOTE When you want to restore the display's original start/stop values, press [Scale] - **X axis** - **Auto** to turn on the auto adjustment of the x-axis scale.

Setting X-axis Scale (x-axis band marker setting)

When the band marker of the x-axis is displayed, the x-axis scale can be adjusted to the band marker setting. The procedure is as follows.

Step 1. Press [Scale] - **X axis** - **Band Marker -> X Axis**

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.

NOTE When the downconverter is turned on, the RF input is set to Down converter, and the external mixer is set to Not Used, the attenuator value is fixed to 10 dB.

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.

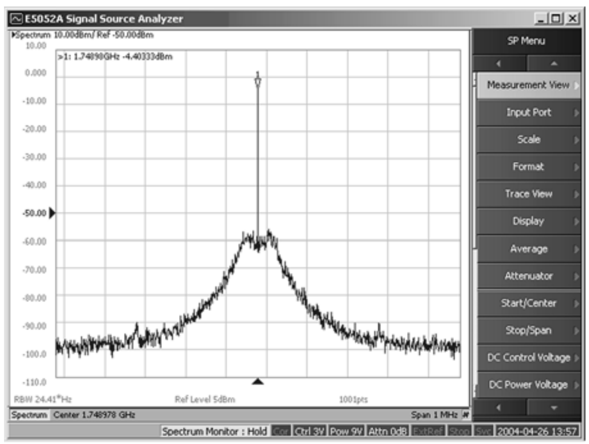
Step 3. Press Trace/View - **Smoothing** to turn on the smoothing function.

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 10)**, which allows you to display up to marker 10.

Figure 4-12 **Example of Measurement Screen (spectrum)**



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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.

Setting Downconverter and External Mixer

Follow these steps to make the setting when using the E5053A Microwave Downconverter.

Step 1. Press [Input] - **Downconverter**.

Step 2. Press **Downconverter** to toggle on/off.

Step 3. If the downconverter is on, press **RF Input** - **Downconverter** | **E5052A Direct** to select an RF input source.

Step 4. If the downconverter is on and the RF input is set to Downconverter, press **External Mixer** - **Not Used** | **ON** to select whether to use the external mixer.

NOTE For more information on the settings of the E5053A Microwave Downconverter, see Chapter 5, "Measurement Using E5053A and External Mixer."

The settings when using the downconverter and the external mixer include:

- Setting of LO frequency and power
- Setting of DC bias current (CH1, CH2)
- Setting of IF gain inside downconverter
- Setting of downconverter ΔIF frequency

Specifying Target Frequency

Specify target frequency for the Narrow Band measurement.

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.

Allowable setting range is 10 MHz to 7 GHz if the downconverter is turned off.

Allowable setting range is 10 MHz to 3 GHz if the downconverter is turned on, the RF input is set to 'E5052A Direct.'

Allowable setting range is 3 G to 26.5 GHz if the downconverter is turned on, the RF input is set to 'Downconverter,' and the external mixer is set to 'Not Used.'

NOTE Among the target frequency and the frequency band or the maximum frequency of the input signal (described later), one that is specified later overrides the other. For example, when the target frequency is set to 5 GHz, specifying the maximum frequency as 3 GHz will automatically decrease the target frequency below the maximum frequency.

Specifying Frequency Range

Specify frequency range for the Narrow Band measurement.

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

You can select either 1.6 MHz, 25.6 MHz, 200 kHz, 25 kHz, or 3.125 kHz. When the target frequency is set to less than 200 MHz, 1.6 MHz, 200 kHz, 25 kHz, or 3.125 kHz is available.

Specifying Frequency Band of Input Signal

Specify frequency range for the Wide Band measurement.

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 4-22 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 frequency bands shown above are all applicable only when the downconverter is turned off. When the downconverter is turned on and the RF input is set to ‘E5052A Direct,’ the maximum frequency band is “1 GHz to 3 GHz”.

When the downconverter is turned on, the RF input set to ‘Downconverter,’ and the external mixer set to ‘Not Used,’ specifying the frequency band is not available. In this case, specify the maximum frequency of the input signal. For details in the procedure, refer to “Specifying Maximum Frequency of Input Signal” on page 131.

Specifying Maximum Frequency of Input Signal

When the downconverter is turned on, the RF input set to ‘Downconverter,’ and the external mixer set to ‘Not Used,’ specify frequency of the input signal as the maximum frequency.

Step 1. Press Setup − **Wide Max Frequency**.

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

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 10, “Specifications and Supplemental Information,” on page 311.

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 86 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 4-23 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 137 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 135 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.

NOTE When trigger by using the SCPI command, it is needed to trigger after taking a certain latency time at trigger wait state if trigger source is selected “External”, “Wide Video” or “Narrow Video”.

Setting Averaging Trigger

Follow the steps below to use the averaging trigger.

Step 1. Press Trigger - **Average Trigger** to toggle on/off the averaging trigger.

When the averaging trigger is set to on, a single activation of the trigger system can perform the number of measurements set by the user as the averaging factor.

The following table shows how this function works by pressing Trigger - **Single** when the averaging trigger is on and off.

Averaging Trigger	Operation
ON	Executes state transitions among Waiting for Trigger, Trigger, and Measurement for the number of times set for averaging and then changes to the Hold state.
OFF	Enters Waiting for Trigger state once and then changes to the Hold state after measurement is completed.

NOTE The averaging function (“Setting Average Function” on page 84) must be set before enabling the averaging trigger.

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 This setting is restricted by the settings of frequency band or maximum frequency of the input signal.

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 This setting is restricted to the range of Narrow Band measurement that is determined by the target frequency and frequency range.

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 4-24 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 "Hz", "%", "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 [Display] - **Y # of Digits**.

Step 4. Select the number of digits for Y-axis in the softkey menu. Available options are 4-digits, 8-digits, and 12-digits.

NOTE Set the number of digits for Y-axis display for each measurement mode. Therefore, when the number of digits for Y-axis display is changed in the frequency transient (wide band) measurement, those for frequency transient (narrow band) measurement, power transient measurement and phase transient measurement are also automatically changed.

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

Step 6. 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 7. Press Scale - **Reference Value**.

Step 8. 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 9. Press Scale - **Scale/Div**.

Step 10. 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 Trace Offset (manual setting)

You can add an offset value to the displayed trace. Follow the steps below.

Step 1. Press Format - **Offset**

Step 2. Enter the offset value to be added to the trace in the data entry field that appears in the upper part of the screen. Hz is used as a unit.

Setting Trace Offset (Y-axis marker setting)

When the marker is displayed, the value of the active marker is used as the offset value. The procedure is as follows.

Step 1. Move the active marker to the position of the measurement value that you want to set as the reference

Step 2. Press Format - **Marker -> -Offset**

NOTE Even when the reference marker mode is on and the active marker displays a Δ value, the value of the active marker is used as the offset value.

When the offset value has already been set, that value is overwritten.

When an active marker does not exist, this function is not available.

Setting X-axis Scale (manual setting)

Follow the steps below to set the maximum/minimum display values of the x-axis. This is used when you want to enlarge a part of the displayed trace.

Step 1. Press Scale - **X axis** - **Auto** to turn off the auto adjustment of the x-axis scale.

Step 2. Press Scale - **X axis** - **Left**

Step 3. Enter the display start value of the x-axis in the data entry field that appears in the upper part of the screen. s (sec.) is used as a unit.

Step 4. Press Scale - **X axis** - **Right**

Step 5. Enter the display stop value of the x-axis in the data entry field that appears in the upper part of the screen. s (sec.) is used as a unit.

NOTE When you want to restore the display’s original start/stop values, press Scale - **X axis** - **Auto** to turn on the auto adjustment of the x-axis scale.

Setting X-axis Scale (x-axis band marker setting)

When the band marker of the x-axis is displayed, the x-axis scale can be adjusted to the band marker setting. The procedure is as follows.

Step 1. Press Scale - **X axis** - **Band Marker -> X Axis**

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.

NOTE When the downconverter is turned on, the RF input is set to Down converter, and the external mixer is set to Not Used, the attenuator value is fixed to 10 dB.

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.

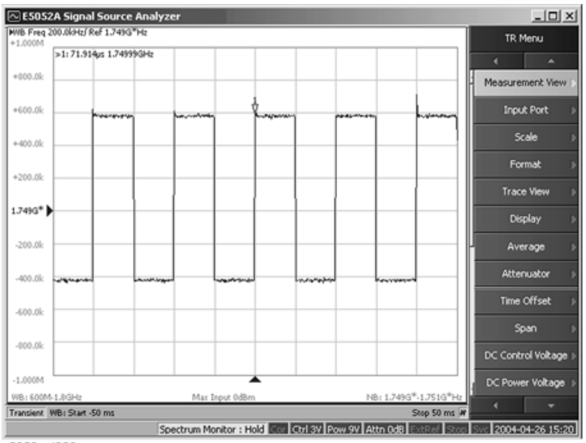
Step 3. Press `Trace/View` - **Smoothing** to turn on the smoothing function.

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 10)**, which allows you to display up to marker 10.

Figure 4-13 **Example of Measurement Screen (frequency transient wide band)**



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Confirming 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 4-25 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 [Display] - **Y # of Digits**.

Step 4. Select the number of digits for Y-axis in the softkey menu. Available options are 4-digits, 8-digits, and 12-digits.

NOTE Set the number of digits for Y-axis display for each measurement mode. Therefore, when the number of digits for Y-axis display is changed in the frequency transient (narrow band) measurement, those for the frequency transient (wide band) measurement, power transient measurement and phase transient measurement are also automatically changed.

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

Step 6. 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 7. Press Scale - **Reference Value**.

Step 8. 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 9. Press Scale - **Scale/Div**.

Step 10. 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 Trace Offset (manual setting)

You can add an offset value to the displayed trace. Follow the steps below.

Step 1. Press Format - **Offset**

Step 2. Enter the offset value to be added to the trace in the data entry field that appears in the upper part of the screen. Hz is used as a unit.

Setting Trace Offset (Y-axis marker setting)

When the marker is displayed, the value of the active marker is used as the offset value. Procedure is as follows.

Step 1. Move the active marker to the position of the measurement value that you want to set as the reference

Step 2. Press Format - **Marker -> -Offset**

NOTE Even when the reference marker mode is on and the active marker displays a Δ value, the value of the active marker is used as the offset value.

When the offset value has already been set, that value is overwritten.

When an active marker does not exist, this function is not available.

Setting X-axis Scale (manual setting)

Follow the steps below to set the maximum/minimum display values of the x-axis. This is used when you want to enlarge a part of the displayed trace.

Step 1. Press Scale - **X axis** - **Auto** to turn off the auto adjustment of the x-axis scale.

Step 2. Press Scale - **X axis** - **Left**

Step 3. Enter the display start value of the x-axis in the data entry field that appears in the upper part of the screen. s (sec.) is used as a unit.

Step 4. Press Scale - **X axis** - **Right**

Step 5. Enter the display stop value of the x-axis in the data entry field that appears in the upper part of the screen. s (sec.) is used as a unit.

NOTE When you want to restore the display's original start/stop values, press Scale - **X axis** - **Auto** to turn on the auto adjustment of the x-axis scale.

Setting X-axis Scale (x-axis band marker setting)

When the band marker of the x-axis is displayed, the x-axis scale can be adjusted to the band marker setting. The procedure is as follows.

Step 1. Press Scale - **X axis** - **Band Marker -> X Axis**

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.

NOTE When the downconverter is turned on, the RF input is set to Down converter, and the external mixer is set to Not Used, the attenuator value is fixed to 10 dB.

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.

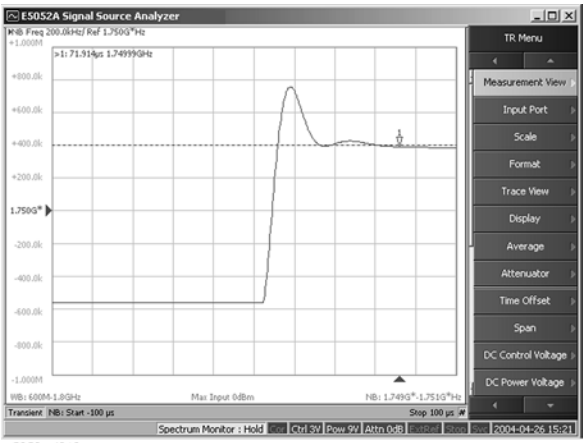
Step 3. Press Trace/View - **Smoothing** to turn on the smoothing function.

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 10)**, which allows you to display up to marker 10.

Figure 4-14 **Example of Measurement Screen (frequency transient narrow band)**



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Confirming 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 Display - **Y # of Digits**.

Step 4. Select the number of digits for Y-axis in the softkey menu. Available options are 4-digits, 8-digits, and 12-digits.

NOTE Set the number of digits for Y-axis display for each measurement mode. Therefore, when the number of digits for Y-axis is changed in the power transient measurement, those for the frequency transient (wide band) measurement, frequency transient (narrow band) measurement, and phase transient measurement are also automatically changed.

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

Step 6. 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 7. Press Scale - **Reference Value**.

Step 8. 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 9. Press Scale - **Scale/Div**.

Step 10. 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 Trace Offset (manual setting)

You can add an offset value to the displayed trace. Follow the steps below.

Step 1. Press Format - **Offset**

Step 2. Enter the offset value to be added to the trace in the data entry field that appears in the upper part of the screen. dBm is used as a unit.

Setting Trace Offset (Y-axis marker setting)

When the marker is displayed, the value of the active marker is used as the offset value. The procedure is as follows.

Step 1. Move the active marker to the position of the measurement value that you want to set as the reference

Step 2. Press Format - **Marker -> -Offset**

NOTE Even when the reference marker mode is on and the active marker displays a Δ value, the value of the active marker is used as the offset value.

When the offset value has already been set, that value is overwritten.

When an active marker does not exist, this function is not available.

Setting X-axis Scale (manual setting)

Follow the steps below to set the maximum/minimum display values of the x-axis. This is used when you want to enlarge a part of the displayed trace.

Step 1. Press Scale - **X axis** - **Auto** to turn off the auto adjustment of the x-axis scale.

Step 2. Press Scale - **X axis** - **Left**

Step 3. Enter the display start value of the x-axis in the data entry field that appears in the upper part of the screen. s (sec.) is used as a unit.

Step 4. Press Scale - **X axis** - **Right**

Step 5. Enter the display stop value of the x-axis in the data entry field that appears in the upper part of the screen. s (sec.) is used as a unit.

NOTE When you want to restore the display's original start/stop values, press Scale - **X axis** - **Auto** to turn on the auto adjustment of the x-axis scale.

Setting X-axis Scale (x-axis band marker setting)

When the band marker of the x-axis is displayed, the x-axis scale can be adjusted to the band marker setting. The procedure is as follows.

Step 1. Press [Scale] - **X axis** - **Band Marker -> X Axis**

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.

NOTE When the downconverter is turned on, the RF input is set to Down converter, and the external mixer is set to Not Used, the attenuator value is fixed to 10 dB.

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.

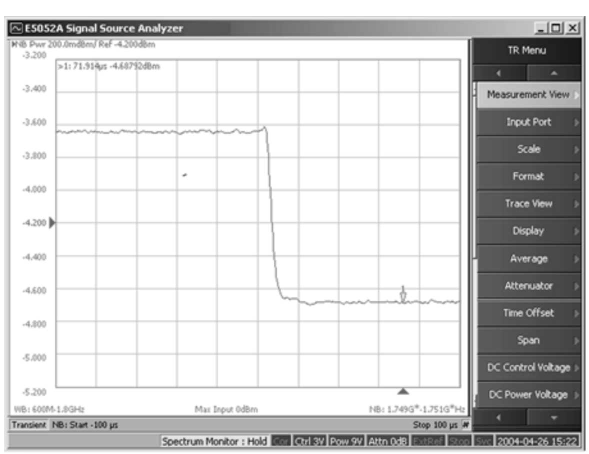
Step 3. Press [Trace/View] - **Smoothing** to turn on the smoothing function.

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 10)**, which allows you to display up to marker 10.

Figure 4-15 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

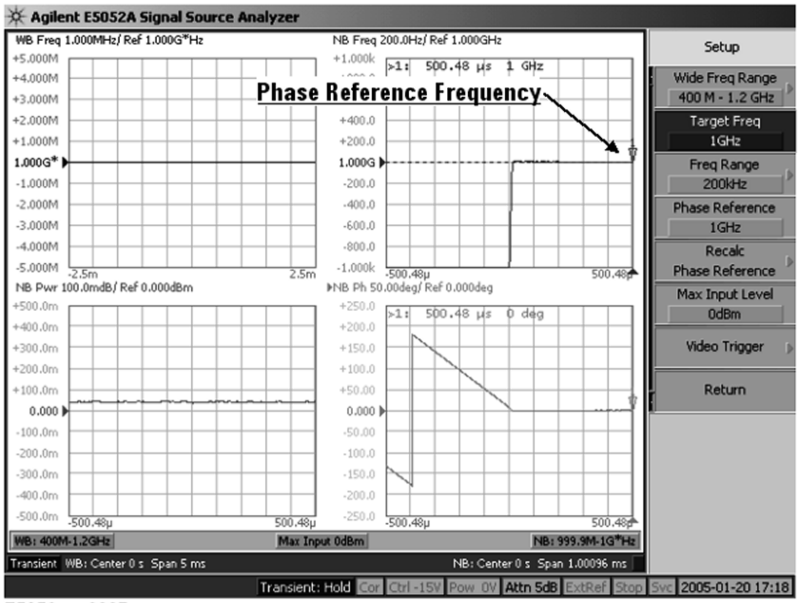
The instrument calculates the phase deviation within the Narrow Band measurement range based on the frequency transient (Narrow Band) measurement result. The phase reference function sets the reference value of frequency to calculate the phase transient.

In case the target frequency is equal to the final frequency (the right most measurement data obtained in the frequency transient (Narrow Band) measurement) of the DUT, it can be used as the phase reference frequency. If the target frequency is deviated from the final frequency of the DUT, 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 4-16 **Defining Phase Reference Frequency**



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NOTE

The phase reference frequency is restricted to the range of Narrow Band measurement that is determined by the target frequency and frequency range.

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.

Adjust Phase Reference by Specifying Value of X-axis

You can set the measurement value of the x-axis value you specified to the phase reference (phase 0). Follow the steps below.

Step 1. Press Format - **Phase X Reference**

Step 2. Enter the x-axis value (position) set as the phase reference in the data entry field that appears in the upper part of the screen.

You can also use the marker. Move the marker to the position of the phase reference and press Format - **Marker -> Phase X Reference**

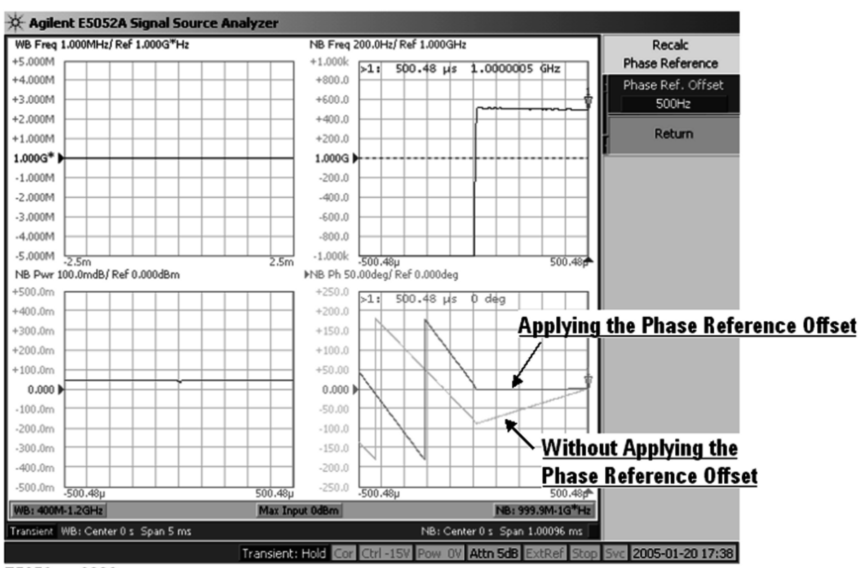
Using Phase Offset Frequency When Adjusting Phase Baseline Manually

If 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, and then the baseline of the phase transient data will be adjusted.

Figure 4-17 **Using Recalculating Phase Data Function to Adjust Baseline of Phase Transient**



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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 Display - **Y # of Digits**.

Step 4. Select the number of digits for Y-axis in the softkey menu. Available options are 4-digits, 8-digits, and 12-digits.

NOTE Set the number of digits for Y-axis display for each measurement mode. Therefore, when the number of digits for Y-axis is changed in the phase transient measurement, those for the frequency transient (wide band) measurement, frequency transient (narrow band) measurement, and power transient measurement are also automatically changed.

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

Step 6. 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 7. Press Scale - **Reference Value**.

Step 8. 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 9. Press Scale - **Scale/Div**.

Step 10. 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 Trace Offset (manual setting)

You can add an offset value to the displayed trace. Follow the steps below.

Step 1. Press Format - **Offset**

Step 2. Enter the offset value to be added to the trace in the data entry field that appears in the upper part of the screen. The unit varies depending on the format setting.

Setting Trace Offset (Y-axis marker setting)

When the marker is displayed, the value of the active marker is used as the offset value. The procedure is as follows.

Step 1. Move the active marker to the position of the measurement value that you want to set as the reference

Step 2. Press Format - **Marker -> -Offset**

NOTE Even when the reference marker mode is on and the active marker displays a Δ value, the value of the active marker is used as the offset value.

When the offset value has already been set, that value is overwritten.

When an active marker does not exist, this function is not available.

Setting X-axis Scale (manual setting)

Follow the steps below to set the maximum/minimum display values of the x-axis. This is used when you want to enlarge a part of the displayed trace.

Step 1. Press Scale - **X axis** - **Auto** to turn off the auto adjustment of the x-axis scale.

Step 2. Press Scale - **X axis** - **Left**

Step 3. Enter the display start value of the x-axis in the data entry field that appears in the upper part of the screen. s (sec.) is used as a unit.

Step 4. Press Scale - **X axis** - **Right**

Step 5. Enter the display stop value of the x-axis in the data entry field that appears in the upper part of the screen. s (sec.) is used as a unit.

NOTE When you want to restore the display's original start/stop values, press Scale - **X axis** - **Auto** to turn on the auto adjustment of the x-axis scale.

Setting X-axis Scale (x-axis band marker setting)

When the band marker of the x-axis is displayed, the x-axis scale can be adjusted to the band marker setting. The procedure is as follows.

Step 1. Press Scale - **X axis** - **Band Marker -> X Axis**

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.

NOTE When the downconverter is turned on, the RF input is set to Downconverter, and the external mixer is set to Not Used, the attenuator value is fixed to 10 dB.

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.

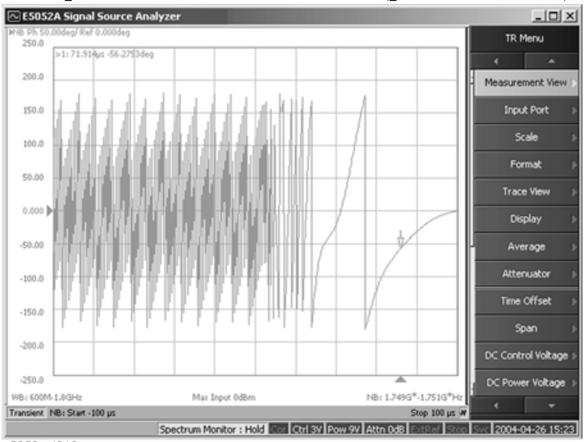
Step 3. Press Trace/View - **Smoothing** to turn on the smoothing function.

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 10)**, which allows you to display up to marker 10.

Figure 4-18 **Example of Measurement Screen (phase transient)**



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User Calibration

Overview of User Calibration

User calibration is a function to correct the power value using correction data set for the following measurement results.

Measurement Mode	Measurement Value to be Corrected
Phase noise	Carrier signal level
Spectrum monitor	Measurement value (array)
Frequency/power measurement	Power measurement value (array)[*1]
Transient measurement	Power measurement value (array)

*1. The result of tester mode is included.

Setting User Calibration Function

Loading Correction Data From CSV File

Load a correction data file written in CSV format to the E5052A. Follow these steps.

Step 1. Press System - **Instrument Setup** - **Correction** - **Import Power Correction Table**.

Step 2. Select a correction data file you want to load from the softkey file list.

CSV files (extension:.csv) in the surgical folder in the F: drive are listed as softkeys.

NOTE To load a correction data file from a floppy disk, other media, or another folder, follow these steps.

Step 1. Press System - **Instrument Setup** - **Correction** - **File Dialog ...**.

Step 2. Select a correction data file you want to load from the file dialog box.

Turning On/Off User Correction Function

Reflect the loaded correction data. Follow these steps.

Step 1. Press System - **Instrument Setup** - **Correction**.

Step 2. Press **Power Correction** to turn on the user calibration function for correction data.

Format of the correction data file

Correction data files must be written in CSV format.

Writing Correction Data File

Write a frequency value and a correction value for the frequency with a comma (,) separator. Deal them as a pair, and write pairs for all correction points with comma separators.

Line break characters are recognized as data separators in the same way as commas. Therefore, two formats as shown below are available: writing pairs in a single line, or writing a pair of a frequency value and a correction value in each line.

Write frequencies in Hz, and correction values in dB.

Example 4-1 **Example of Data Written in Single Line**

10E+6,0.04,100E+6,0.06,200E+6,0.07,300E+6,0.06

Example 4-2 **Example of Data Written in Multiple Lines**

10E+6,0.04
100E+6,0.06
200E+6,0.07
300E+6,0.06

Restrictions on Writing

There are some restrictions on writing correction data files. They are:

1. The maximum number of data items is 1001. Data after that is ignored when loaded.
2. Lines that start with a pound sign (#) are skipped as comment lines. Data in those lines is not recognized.
3. Data must be written in the order from data for the smallest frequency to data for the largest. If data for a frequency equal to or smaller than the previous one is read, the read operation ends immediately. This does not cause any error, and the correction data immediately before the end of the read operation is reflected.

Correction Method

Power data correction is performed as follows. (The correction value is Corr shown below.)

Data after correction (dBm) = data before correction (dBm) + Corr (dB)

If the power data frequency to be corrected is smaller than the minimum frequency in the loaded data, the correction coefficient for the minimum frequency is used for correction.

If the power data frequency to be corrected is greater than the maximum frequency in the loaded data, the correction coefficient for the maximum frequency is used for correction.

If the power data frequency to be corrected does not match any frequency in the loaded data, the correction coefficient obtained by linear interpolation of the nearest 2 points is used for correction.
In this case, a correction coefficient after linear interpolation (Corr') is used for calculation.

Data after correction (Watt) = data before correction (Watt) x correction value (Corr')

Corr' = 10 ^ (Corr / 10)

NOTE Note that correction is made before determining raw data. In other words, corrected values are stored as raw data. For more information on raw data, see “Internal data processing” written in “Chapter 4. Reading out/writing measurement data” of “Programmers Guide.”

5 Measurement Using E5053A and External Mixer

This chapter describes connection and settings when using the E5053A Microwave Downconverter, as well as those when using the external mixer. It also describes the frequency offset function.

E5053A Microwave Downconverter

This section described hardware configurations and setups when using the E5053A Microwave Downconverter with the E5052A.

Connection of E5052A and E5053A

Required Devices

Following devices are required when configuring the E5052A and E5053A Microwave Downconverter.

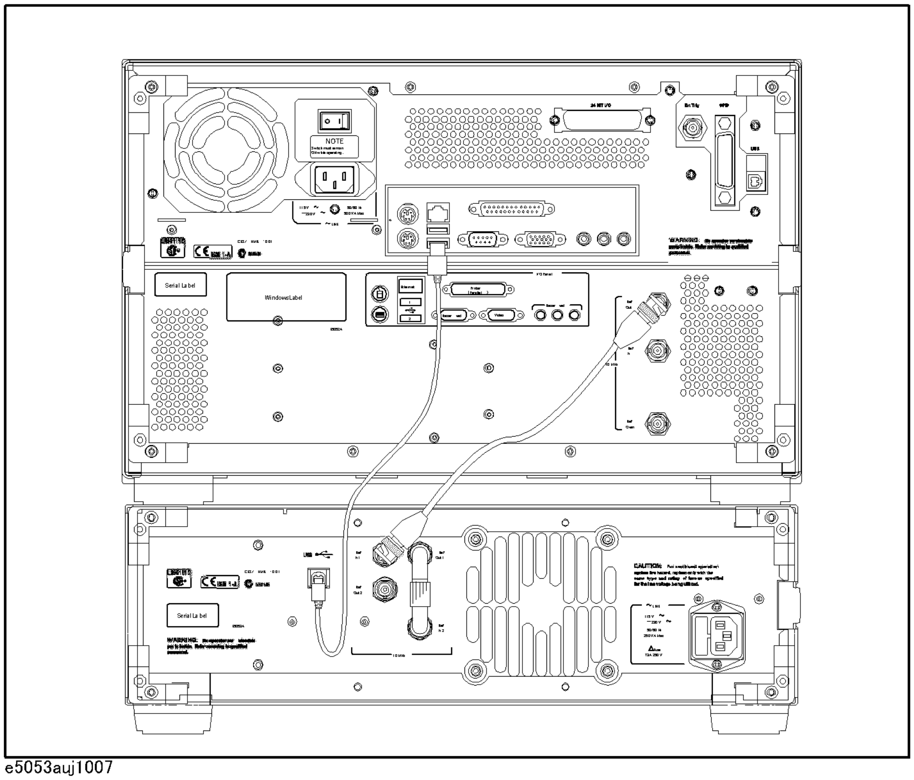
- E5052A
- E5053A Microwave Downconverter
- RF cables of 2 types × 2 (supplied with the E5053A, Agilent part number: E5053-61621, E5053-61622)
- USB cable (supplied with the E5053A, Agilent part number: 8121-0770)
- BNC cable (supplied with the E5053A, Agilent part number: 8120-1839)
- BNC adapter (supplied with the E5053A, Agilent part number: 1250-1859)

Connecting E5052A and E5053A Microwave Downconverter

Check the following connections on the rear panel before turning on both the E5052A and the E5053A, as shown in the Figure 5-1.

- USB Cable (PN: 8121-0770): Connecting the USB ports of both the E5052A and E5053A.
- BNC Cable (PN: 8120-1839): Connecting the E5052A internal reference signal output port (Ref Out) and the E5053A external reference signal input port (Ref In) of the channel 1.
- BNC Adaptor (PN: 1250-1859): Connecting the internal reference signal output port (Ref Out) of the channel 1 and the internal reference signal input port (Ref In) of the channel 2 o the E5053A rear panel.

Figure 5-1 **Connection of the E5052A and the E5053A (rear view)**



NOTE Do not connect or disconnect the USB cable during the measurement.

Check the following connections on the front panel as shown in the Figure 5-2.

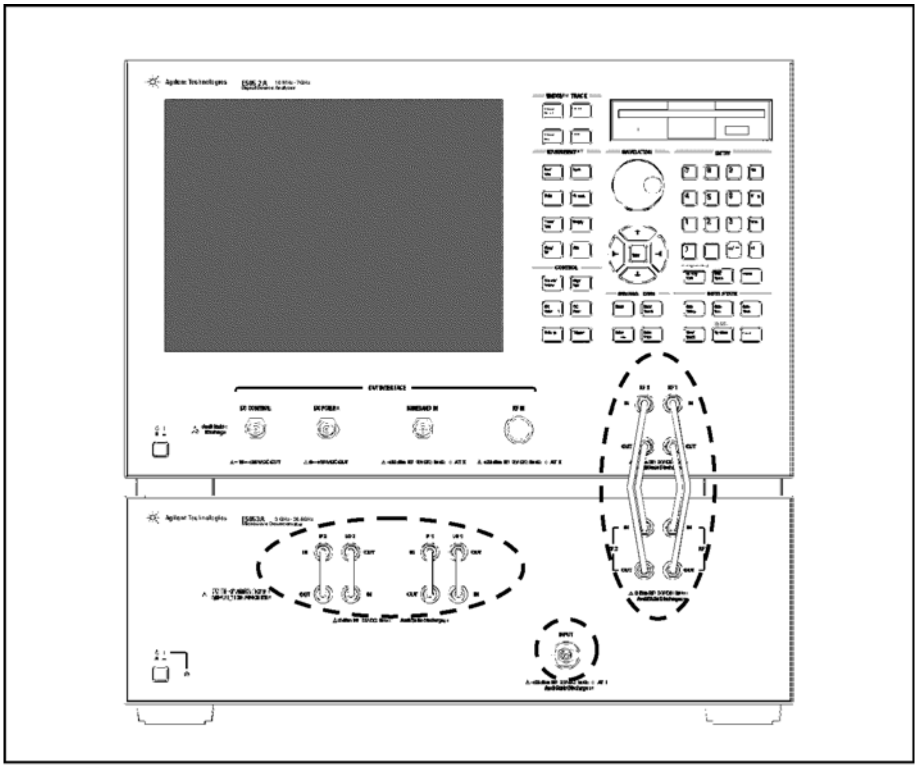
- RF Cable (PN: E5053-61621): Connecting the E5052A RF output ports and the E5053A RF input ports
- RF Cable (PN: E5053-61622): Connecting the E5052A RF input ports and the E5053A RF output ports

NOTE

When mounting the E5053A and the E5052A with the rack mount kit, use the following RF cables.

- RF Cable (PN: E5053-61623): Connecting the E5052A RF output ports and the E5053A RF input ports
- RF Cable (PN: E5053-61624): Connecting the E5052A RF input ports and the E5053A RF output ports

Figure 5-2 **Connection of E5052A and E5053A (front view)**



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NOTE

Use the torque wrench when the semi-rigid cable or adapter is fastened on the following connectors of E5052A and E5053A. The recommended torque and open-ended wrenches are shown below.

Connector	Recommended Torque	Recommended Wrench
SMA	5.7 kgf-cm/ 56 N - cm/ 5 in-lb	Wrench PN 8710-1582
3.5 mm	9.2 kgf-cm/ 90 N - cm/ 8 in-lb	Wrench PN 8710-1765

Turning On E5053A Microwave Downconverter

Turn on the E5053A Microwave Downconverter first, and then turn on the E5052A.

The E5052A automatically detects the E5053A Microwave Downconverter whenever it is connected. If there's an auto recall file, the instrument state is also set along with the settings defined in the auto recall file.

NOTE When the E5052A fails to detect the downconverter and you try to activate the E5053A Microwave Downconverter, “No downconverter unit connected” error message is displayed. In this case, the E5052A instrument state is initiated as the settings of the E5052A standalone by the firmware, even if there's an auto recall file that includes any instrument setups that relate the E5053A settings.

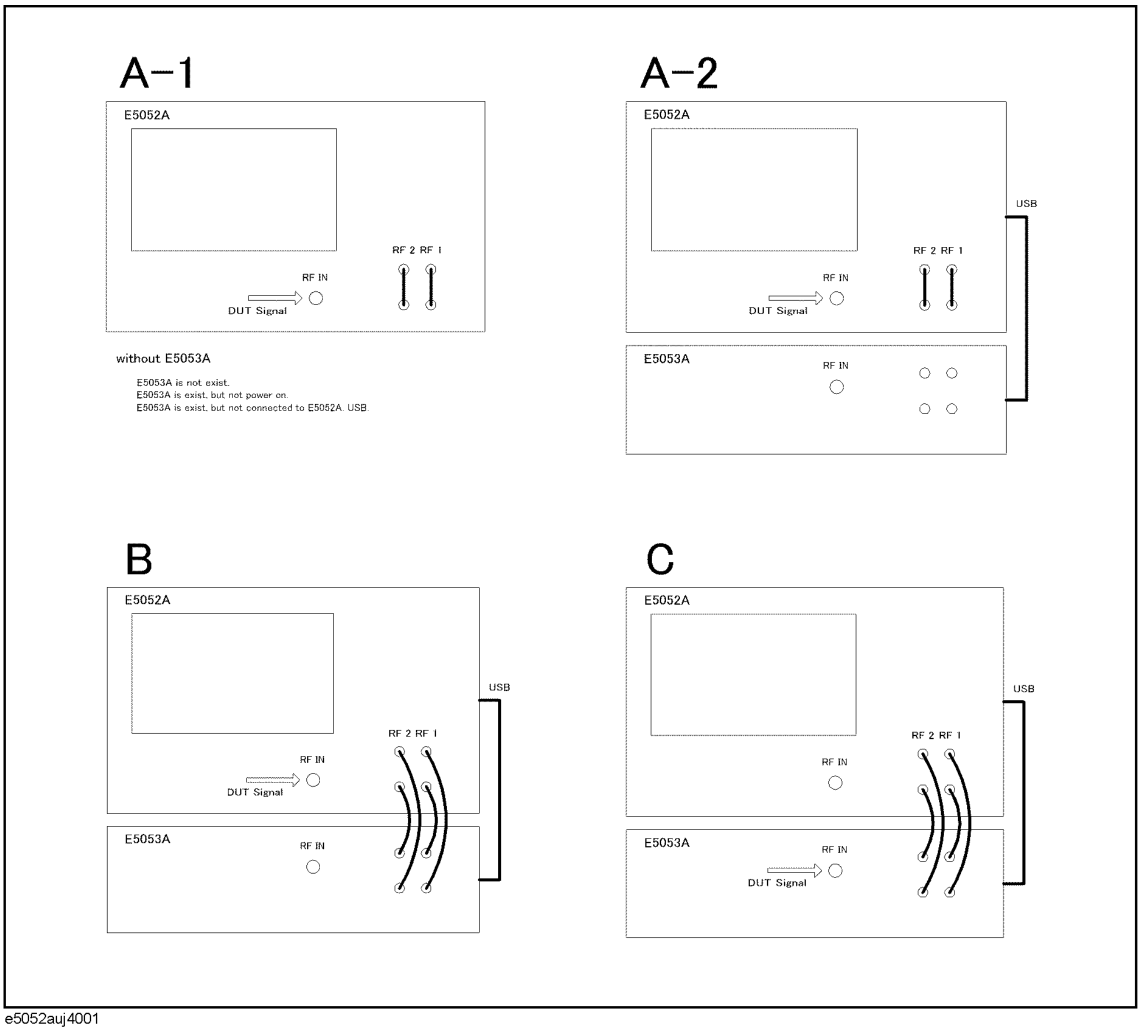
See also “Selecting Device Configuration” on page 165 for more information.

Device Configuration Using E5052A and E5053A Microwave Downconverter

Types of Device Configurations

There are 4 types of device configurations using the E5052A and the E5053A Microwave Downconverter including the standalone use of the E5052A: A-1, A-2, B, and C (Figure 5-3).

Figure 5-3 Device Configurations Using E5052A and E5053A



The device configurations of the E5052A and the E5053A Microwave Downconverter are classified by the following factors.

- Connection of the USB cable
- Input port for DUT signals (the RF IN port of the E5052A or the INPUT port of the E5053A)
- Connection of the RF1 and RF2 ports

NOTE The device configuration A-1 (standalone use of the E5052A) includes the configuration where the E5053A Microwave Downconverter is not turned on and the configuration where no USB cable is connected.

Selecting Device Configuration

Following items should be specified in order to identify the device configuration: A (A-1, A-2), B, or C.

Downconverter	On/off Input - **Downconverter** - **Downconverter [ON | OFF]**
Input port for DUT signals	E5052A RF IN port/E5053A INPUT port Input - **Downconverter** - **RF Input** - **Downconverter** | **E5052A Direct**

The device configuration A-2 is a configuration where the E5053A Microwave Downconverter is turned on and the USB cable is connected, but the E5053A Microwave Downconverter is disabled by the firmware. The basic functions available with this configuration is the same as those in A-1.

The device configuration B is a configuration where the E5053A Microwave Downconverter is enabled by the firmware, and the input port for the DUT signals is set to the RF IN port of the E5052A.

The device configuration C is a configuration where the E5053A Microwave Downconverter is enabled by the firmware, and the input port for the DUT signals is set to the INPUT port of the E5053A.

Discrepancy Between Device Configuration and Setting

The firmware recognizes none of discrepancy between the device configuration and settings but connection of the USB cable. Therefore, the E5052A performs processing based on the firmware setting which could be different than actual connection of the input port for the DUT signals or connection of the RF1 and RF2 ports. In this case, measurement cannot be performed properly. In addition, an error may occur during measurement.

The connection of the USB cable is recognized by the firmware, therefore discrepancy in each configuration can be eliminated as described below.

- Configuration A-1 (when the E5053A Microwave Downconverter is not present)

  You cannot activate the downconverter setting with the softkey. You can activate it by loading a configuration file with the downconverter setting enabled, but an error “No downconverter unit connected." appears.

To correct this error, deactivate the downconverter setting, or connect the E5053A Microwave Downconverter.

- Configurations A-2, B, and C (when the E5053A Microwave Downconverter is present)

  When power-on the E5052A, connection is checked and the downconverter setting is automatically activated if the E5053A Microwave Downconverter is recognized. Note that, if Auto Recall is set, the setting loaded by the function will be used.

- When the E5053A Microwave Downconverter is added to the configuration

  When the E5053A Microwave Downconverter is turned on (previously off) or the USB cable is connected (previously not connected), the downconverter setting remains disabled. It is not activated automatically. You need to activate the downconverter setting.

- When the E5053A Microwave Downconverter is removed from the configuration

  When the E5053A Microwave Downconverter is present in the configuration and it is turned off or the USB cable is disconnected, the E5052A does no particular action if the downconverter setting is disabled. If the downconverter setting is activated, an error "No downconverter unit connected." appears.

  Take the same corrective action as that for configuration A-1.

Setting E5053A Microwave Downconverter

This section describes the differences of the settings when the E5053A Microwave Downconverter is used from that of the E5052A standalone operations.

Common to All Measurement Modes

1. Selecting the input port

   The RF input port has to be selected first depending on the device configuration as well as the carrier frequency range. Selecting External Mixer ON is available only when “Downconverter ON” is selected AND “Downconverter” is selected in the RF Input menu.

   Input - **Downconverter** - **External Mixer** - **Not Used** | **ON**

2. Setting of the attenuator

   For the device configuration C in Figure 5-3 on page 164, the attenuator setting is fixed to 10 dB when the external mixer is off. For the device configurations A (A-1, A-2) and B and the device configuration C with the external mixer on, you can change the attenuator setting.

   Attn - **Input Attenuator**

Phase-noise Measurement

The following settings for phase-noise measurement mode differ from the settings when using the E5052A alone.

1. Setting of the carrier frequency band

   Set the frequency band for the carrier frequency.

   Setup - **Frequency Band** - **10 M - 41 MHz** | ••• | **9 G - 26.5 GHz**

Band 1	10 M - 41 MHz
Band 2	39 M -101 MHz
Band 3	99 M -1.5 GHz
Band 4	300 M - 7 GHz (300 M - 3 GHz)
Band 5	3 G -10 GHz
Band 6	9 G - 26.5 GHz

   For the device configuration A in Figure 5-3 on page 164, you can set Band 1 to Band 4. You cannot specify Band 5 and Band 6.

   For the device configuration B, you can set Band 1 to Band 4. Note that the frequency range of Band 4 is changed to 300 M - 3 GHz. You cannot specify Band 5 and Band 6.

   For the device configuration C, you can set Band 5 and Band 6 when the external mixer is off. You cannot specify Band 1 to Band 4.

NOTE For the device configuration C with the external mixer ON, actual settings are dependent on the external mixer settings and/or the frequency function used. For more information, see “External Mixer” on page 178 and “Frequency Offset Function” on page 181.

2. Input of the nominal frequency

   Set the nominal frequency of the carrier frequency.

   Setup - **Nominal Frequency**

   You can make this setting only when the device configuration is C in Figure 5-3 on page 164 and the external mixer is off. If the device configuration is C with the external mixer on or if the device configuration is A or B, you cannot make this setting.

   The allowable range is limited by the range of the carrier frequency band.

3. Carrier search function

   This function searches for the carrier signal, and reflects the result on the nominal frequency. To execute this function:

   Setup - **Carrier Search**

   You can execute this function only when the device configuration is C in Figure 5-3 on page 164 and the external mixer is off. If the device configuration is C with the external mixer on or if the device configuration is A or B, you cannot execute this function.

   The range to be searched is the range of the carrier frequency band.

4. Display of the carrier power

   Information on the carrier signal is displayed.

   For the device configuration A in Figure 5-3 on page 164, the measurement value of the power meter of the E5052A is displayed.

   For the device configurations B and C, the measurement value of FFT is displayed.

Spectrum Monitor Measurement

The following settings for spectrum monitor measurement mode differ from the settings when using the E5052A alone.

1. Start, Stop, Center, Span frequencies

   Set the 4 frequencies to determine the sweep range.

   Start/Center (Stop/Span) - **Start** (**Stop**, **Center**, **Span**)

   For the device configuration A in Figure 5-3 on page 164, the following limits are applied.

Start	9 M -6.99999995 GHz
Stop	10.00005 M -7.0075 GHz
Center	10 M -7 GHz
Span	100 - 15 MHz

   For the device configuration B, the upper limit of Center is 3 GHz, and that of Stop is

3.0075 GHz. Other settings are the same as those for the device configuration A.

For the device configuration C with the external mixer off, the range of Center is 3 G - 26.5 GHz. The range of Start is 2.9925 G - 26.49999995 GHz, the range of Stop is 3.00000005 G - 26.5075 GHz, and the range of Span is 100 - 15 MHz.

NOTE For the device configuration C with the external mixer ON, actual settings are dependent on the external mixer settings and/or the frequency function used. For more information, see “External Mixer” on page 178 and “Frequency Offset Function” on page 181.

2. Harmonic measurement function

Set the frequency band to measure the harmonics of the carrier signal. To set the frequency band:

Start/Center (Stop/Span) - **Carrier to** - **Frequency Band** - **10 M - 1.5 GHz** | **•••** | **9 G - 26.5 GHz**

Low (Band 1)	10 M -1.5 GHz
High (Band 2)	300 M - 7 GHz (300 M - 3 GHz)
Band 3	3 G -10 GHz
Band 4	9 G - 26.5 GHz

For the device configuration A in Figure 5-3 on page 164, you can set Low (Band 1) and High (Band 2). You cannot specify Band 3 and Band 4.

For the device configuration B, you can set Low (Band 1) and High (Band 2). Note that the frequency range of High (Band 2) is changed to 300 M - 3 GHz. You cannot specify Band 3 and Band 4.

For the device configuration C, you can set Band 3 and Band 4 when the external mixer is off. You cannot specify Low (Band 1) and High (Band 2).

Frequency/Power Measurement

The following settings for frequency/power measurement mode differ from the settings when using the E5052A alone.

1. Setting of the carrier frequency band

Set the frequency band for the carrier frequency.

Setup - **Frequency Band** - **10 M - 1.5 GHz** | **•••** | **9 G - 26.5 GHz**

Low (Band 1)	10 M -1.5 GHz
High (Band 2)	300 M - 7 GHz (300 M - 3 GHz)
Band 3	3 G -10 GHz
Band 4	9 G - 26.5 GHz

For the device configuration A in Figure 5-3 on page 164, you can set Low (Band 1) and High (Band 2). You cannot specify Band 3 and Band 4.

For the device configuration B, you can set Low (Band 1) and High (Band 2). Note that the frequency range of High (Band 2) is changed to 300 M - 3 GHz. You cannot specify Band 3 and Band 4.

For the device configuration C, you can set Band 3 and Band 4 when the external mixer is off. You cannot specify Low (Band 1) and High (Band 2).

NOTE For the device configuration C with the external mixer ON, actual settings are dependent on the external mixer settings and/or the frequency function used. For more information, see "External Mixer" on page 178 and "Frequency Offset Function" on page 181.

2. Input of the nominal frequency

   Set the nominal frequency of the carrier frequency.

   Setup - **Nominal Frequency**

   You can make this setting only when the device configuration is C in Figure 5-3 on page 164 and the external mixer is off. If the device configuration is C with the external mixer on or if the device configuration is A or B, you cannot make this setting.

   The settable range is limited to the range of the carrier frequency band.

3. Carrier search function

   This function searches for the carrier signal, and reflects the result on the nominal frequency. To execute this function:

   Setup - **Carrier Search**

   You can execute this function only when the device configuration is C in Figure 5-3 on page 164 and the external mixer is off. If the device configuration is C with the external mixer on or if the device configuration is A or B, you cannot execute this function.

   The range to be searched is the range of the carrier frequency band.

4. Setting of the maximum input level

   Set the maximum input level value of the measurement signal inputted from the Input port of the E5053A Microwave Downconverter. To execute this function:

   Setup - **Max Input Level**

   You can make this setting only when the device configuration is C in Figure 5-3 on page 164 and the external mixer is off. If the device configuration is C with the external mixer on or if the device configuration is A or B, you cannot make this setting.

5. Measurement value of power measurement

   For the device configuration A in Figure 5-3 on page 164, the measurement value of the power meter of the E5052A is displayed. For the device configurations B and C, the measurement value of FFT is displayed.

Transient Measurement

The following settings for transient measurement mode differ from the settings when using the E5052A alone.

1. Setting of the frequency band of the input signal (wide band)

   Set the frequency band (wide band) of the input signal. To execute this function:

Setup - **Wide Freq Range** - **50 M - 150 MHz** | **•••** | **2.4 G - 7.2 GHz**

Table 5-1 Frequency Bands (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 M -1.2 GHz	1.8 G -5.4 GHz
500 M -1.5 GHz	2 G -6 GHz
600 M -1.8 GHz	2.2 G -6.6 GHz
800 M -2.4 GHz	2.4 G -7.2 GHz

For the device configuration A in Figure 5-3 on page 164, you can set any of the above frequency bands.

For the device configuration B, you can set 50 M - 150 MHz to 1 G - 3 GHz. You cannot set frequency bands equal to or greater than 1.2 G - 3.6 GHz.

For the device configuration C, you cannot set the frequency band of the input signal because the maximum frequency of the input signal must be specified when the external mixer is off.

NOTE For the device configuration C with the external mixer ON, actual settings are dependent on the external mixer settings and/or the frequency function used. For more information, see “External Mixer” on page 178 and “Frequency Offset Function” on page 181.

2. Setting of the maximum frequency of the input signal

   For the device configuration C in Figure 5-3 on page 164 with the external mixer off, you specify the maximum frequency of the input signal instead of the frequency band setting of the input signal. To execute this function:

   Setup - **Wide Max Frequency**

   For the device configuration C with the external mixer off, the settable range is 3.5 G - 26.5 GHz. The frequency span is fixed to 500 MHz, and cannot be changed.

NOTE For the device configuration C with the external mixer ON, actual settings are dependent on the external mixer settings and/or the frequency function used. For more information, see “External Mixer” on page 178 and “Frequency Offset Function” on page 181.

3. Setting of the center frequency (wide band) of the video trigger

   This setting is required when Wide Video is selected for the video trigger.

   Setup - **Video Trigger** - **Wide Freq**

   The settable range is limited to within the frequency band setting of the input signal described above, or below the maximum frequency of the input signal.

4. Setting of the target frequency

   Set the target frequency for narrow band measurement.

   Setup - **Target Freq**

   For the device configuration A in Figure 5-3 on page 164, the valid input range is 10 M - 7 GHz.

   For the device configuration B, the valid input range is 10 M - 3 GHz.

   For the device configuration C with the external mixer off, the valid input range is 3 G - 26.5 GHz.

NOTE For the device configuration C with the external mixer off, the setting of the target frequency or the setting of the maximum frequency of the input signal, whichever made later, has precedence.

More specifically, if the inputted target frequency is greater than the setting value of the maximum frequency of the input signal, the setting value of the maximum frequency is changed so that it is greater than the target frequency.

On the other hand, if the maximum frequency of the inputted input signal is smaller than the setting value of the target frequency, the setting value of the target frequency is changed so that it is smaller than the maximum frequency of the input signal.

NOTE For the device configuration C with the external mixer on, this setting differs depending on the setting of the external mixer and the setting of the frequency offset function. For more information, see “External Mixer” on page 178 and “Frequency Offset Function” on page 181.

5. Setting of the phase reference frequency

   The phase deviation within the narrow band measurement range can be calculated based on the result of frequency transient (narrow band) measurement. The phase reference frequency is a frequency used as the reference when calculating the phase deviation.

   Setup - **Phase Reference**

   The setting range is limited to within the measurement range determined by the target frequency and the measurement range.

6. Setting of the center frequency (narrow band) of the video trigger

   This setting is required when Narrow Video is selected for the video trigger.

   Setup - **Video Trigger** - **Narrow Freq**

   The setting range is limited to within the measurement range determined by the target frequency and the measurement range.

Auto Frequency Control Function

The following settings for auto frequency control measurement mode differ from the settings when using the E5052A alone.

1. Setting of the frequency band

   Set the frequency band that contains the carrier signal to be measured.

DC Control - **Auto Freq Control** - **Frequency Band** - **10 M - 1.5 GHz** | **•••** | **9 G - 26.5 GHz**

Low (Band 1)	10 M -1.5 GHz
High (Band 2)	300 M - 7 GHz (300 M - 3 GHz)
Band 3	3 G -10 GHz (added)
Band 4	9 G - 26.5 GHz (added)

For the device configuration A in Figure 5-3 on page 164, you can set Low (Band 1) and High (Band 2). You cannot specify Band 3 and Band 4.

For the device configuration B, you can set Low (Band 1) and High (Band 2). Note that the frequency range of High (Band 2) is changed to 300 M - 3 GHz. You cannot specify Band 3 and Band 4.

For the device configuration C, you can set Band 3 and Band 4 when the external mixer is off. You cannot specify Low (Band 1) and High (Band 2).When the external mixer is on, you cannot make this setting because the auto frequency control function itself is not available.

2. Setting of the target frequency

   Set the target frequency for the DUT output.

   DC Control - **Auto Freq Control** - **Target**

   For the device configuration A in Figure 5-3 on page 164, you can set 10 M - 7 GHz.

   For the device configuration B, you can set 10 M - 3 GHz.

   For the device configuration C, you can set 3 G - 26.5 GHz when the external mixer is off. When the external mixer is on, you cannot make this setting because the auto frequency control function itself is not available.

3. Setting of the maximum input level

   Set the maximum input level value of the measurement signal inputted from the Input port of the E5053A Microwave Downconverter. To execute this function:

   DC Control - **Auto Freq Control** - **Max Input Level**

   You can make this setting only when the device configuration is C in Figure 5-3 on page 164 and the external mixer is off. If the device configuration is C with the external mixer on or if the device configuration is A or B, you cannot make this setting.

Effects of Setting of Downconverter and Input Port for RF Signals

The table below lists items whose setting range changes or whose display is affected depending on the setting of the E5053A Microwave Downconverter and the setting of the input port of the RF signal.

Table 5-2 Items Affected by E5053A Microwave Downconverter and Input Port

Measurement mode	Affected items	Downconverter		
		OFF	ON	
			Input port	
			E5052A direct	E5053A downconverter
Common to all modes	Setting of attenuator	Available (0,5,10,15,20,25,30, 35 dB)	Available (0,5,10,15,20,25,30, 35 dB)	fixed to 10dB
phase-noise measurement mode	Setting of carrier frequency band	10 M - 41 MHz 39 M - 101 MHz 99 M -1.5 GHz 300 M -7 GHz	10 M - 41 MHz 39 M - 101 MHz 99 M -1.5 GHz 300 M - 3 GHz	3 G -10 GHz 9 G - 26.5 GHz
	Setting of nominal frequency	N/A	N/A	Yes (Allowable range is limited by carrier frequency band.)
	Carrier search function	N/A	N/A	Can be executed
Spectrum monitor measurement mode	Setting of start frequency	9 M -6.99999995 GHz	9 M -6.99999995 GHz	2.9925 G -26.49999995 GHz
	Setting of stop frequency	10.00005 M -7.0075 GHz	10.00005 M - 3.0075 GHz	3.00000005 G - 26.5075 GHz
	Setting of center frequency	10 M -7 GHz	10 M -3 GHz	3 G -26.5 GHz
	Setting of span frequency	100 - 15 MHz	100 - 15 MHz	100 - 15 MHz
	Setting of carrier frequency band for harmonic measurement function	10 M -1.5 GHz 300 M -7 GHz	10 M -1.5 GHz 300 M - 3 GHz	3 G -10 GHz 9 G - 26.5 GHz

Table 5-2 Items Affected by E5053A Microwave Downconverter and Input Port

Measurement mode	Affected items	Downconverter		
		OFF	ON	
			Input port	
			E5052A direct	E5053A downconverter
Frequency/power measurement mode	Setting of carrier frequency band	10 M -1.5 GHz 300 M -7 GHz	10 M -1.5 GHz 300 M - 3 GHz	3 G -10 GHz 9 G - 26.5 GHz
	Setting of nominal frequency	N/A	N/A	Yes (Allowable range is limited by carrier frequency band.)
	Carrier search function	N/A	N/A	Yes
	Setting of maximum input level	N/A	N/A	Yes (-45 to 30 dBm)
Transient measurement mode	Setting of frequency band of input signal (wide band)	50 M -150 MHz 100 M -300 MHz 200 M -600 MHz 300 M -900 MHz 400 M -1.2 GHz 500 M -1.5 GHz 600 M -1.8 GHz 800 M -2.4 GHz 1 G -3 GHz 1.2 G -3.6 GHz 1.4 G -4.2 GHz 1.6 G -4.8 GHz 1.8 G -5.4 GHz 2 G -6 GHz 2.2 G -6.6 GHz 2.4 G -7.2 GHz	50 M -150 MHz 100 M -300 MHz 200 M -600 MHz 300 M -900 MHz 400 M -1.2 GHz 500 M -1.5 GHz 600 M -1.8 GHz 800 M -2.4 GHz 1 G -3 GHz	N/A (set with maximum frequency of input signal)

Table 5-2 Items Affected by E5053A Microwave Downconverter and Input Port

Measurement mode	Affected items	Downconverter		
		OFF	ON	
			Input port	
			E5052A direct	E5053A downconverter
Transient measurement mode (continued)	Setting of maximum frequency of input signal (wide band)	N/A (set with frequency band of input signal (wide band))	N/A (set with frequency band of input signal (wide band))	Allowable range: 3 G - 26.5 GHz Setting resolution: 50 MHz (3.5 G -10.85 GHz) 150 MHz (10.85 G - 26.5 GHz) Frequency span: 500 MHz
	Setting of center frequency of video trigger (wide band)	Limited to within setting of frequency band of input signal (wide band)	Limited to within setting of frequency band of input signal (wide band)	Limited to value less than or equal to setting value of maximum frequency of input signal (wide band)
	Setting of target frequency (narrow band)	10 M -7 GHz	10 M -3 GHz	3 G -26.5 GHz
	Setting of phase reference frequency (narrow band)	Limited to within measurement range determined by target frequency (narrow band) and measurement range (narrow band).	Limited to within measurement range determined by target frequency (narrow band) and measurement range (narrow band).	Limited to within measurement range determined by target frequency (narrow band) and measurement range (narrow band).
	Setting of center frequency of video trigger (narrow band)	Limited to within measurement range determined by target frequency (narrow band) and measurement range (narrow band).	Limited to within measurement range determined by target frequency (narrow band) and measurement range (narrow band).	Limited to within measurement range determined by target frequency (narrow band) and measurement range (narrow band).

Table 5-2 Items Affected by E5053A Microwave Downconverter and Input Port

Measurement mode	Affected items	Downconverter		
		OFF	ON	
			Input port	
			E5052A direct	E5053A downconverter
Auto frequency control function (AFC)	Setting of frequency band	10 M -1.5 GHz 300 M -7 GHz	10 M -1.5 GHz 300 M - 3 GHz	3 G -10 GHz 9 G - 26.5 GHz
	Setting of target frequency	10 M -7 GHz	10 M -3 GHz	3 G -26.5 GHz
	Setting of maximum input level	N/A	N/A	Yes (-45 to 30 dBm)

NOTE In the above table, the setting of the external mixer and the setting of the frequency offset are not taken into consideration. The table assumes that they are disabled.

External Mixer

This section describes settings and limitations when using the external mixer.

Overview

The E5053A Microwave Downconverter with the external mixer connected enables measurement up to 110 GHz.

Setting the E5052A when used with the E5053A Microwave Downconverter and the external mixer is based on the frequency of the RF signal (IF signal of the downconverter) supplied to the E5052A.

NOTE In practice, the hardware in the E5052A narrows the measurement range of a sigal down-converted by the E5053A Microwave Downconverter.

The frequency offset function described later is supported also when using the external mixer. You can use this function to display the setting values and measurement results of the E5052A in terms of DUT frequencies (frequencies before down-conversion).

Setup Parameters

The settings of the external mixer are common to all measurement modes (phase-noise measurement, spectrum monitor measurement, frequency/power measurement, and transient measurement).

The settings are applied to the hardware immediately when the device configuration is C in Figure 5-3 on page 164 and the external mixer is on.

Other than the phase-noise measurement mode, use the identical LO frequency for each channel (channel 1 and channel 2), while the LO frequency of channel 1 and channel2 can be set differently.

In the phase-noise measurement mode, the carrier frequency is measured using the channel2 path. In the frequency/power/DC current measurement, the carrier frequency is measured using the channel1 path.

Both channel paths are required to complete the measurement other than spectrum monitor mode, which uses channel2 path only.

In the transient measurement mode, the channel1 path is used for the wideband transient measurement, and the channel2 path is used for the narrowband transient measurement.

The settings when using the downconverter and the external mixer include:

- Setting of LO
- Setting of DC bias current (CH1, CH2)
- Setting of the IF gain inside the downconverter
- Setting of the downconverter ΔIF frequency

Setting of LO

Set the external signal source (LO).

(Channel 1 side)

System - **Instrument Setup** - **Downconverter Manual Setup** - **LO1 Frequency**

System - **Instrument Setup** - **Downconverter Manual Setup** - **LO1 Level**

(Channel 2 side)

System - **Instrument Setup** - **Downconverter Manual Setup** - **LO2 Frequency**

System - **Instrument Setup** - **Downconverter Manual Setup** - **LO2 Level**

Allowable range of the LO frequency setting is 2.975 G - 10.025 GHz, and setting resolution setting is 50 MHz.

Allowable range of the LO level setting is 10 - 16 dBm when the setting frequency is 2.975 G - 6 GHz; it is fixed to 10 dBm when the setting frequency is 6 G - 10.025 GHz.

Setting of DC Bias Current

Set a bias current supplied to the external mixer.

(Channel 1 side)

System - **Instrument Setup** - **Downconverter Manual Setup** - **Mixer 1 Bias**

System - **Instrument Setup** - **Downconverter Manual Setup** - **Current**

(Channel 2 side)

System - **Instrument Setup** - **Downconverter Manual Setup** - **Mixer 2 Bias**

System - **Instrument Setup** - **Downconverter Manual Setup** - **Current**

Valid input range of the bias current is -10 mA to 10 mA both for Channel 1 and Channel 2.

Setting of downconverter IF Gain

Set IF gain inside the downconverter.

(Channel 1 side)

System - **Instrument Setup** - **Downconverter Manual Setup** - **IF Gain 1**

(Channel 2 side)

System - **Instrument Setup** - **Downconverter Manual Setup** - **IF Gain 2**

Valid input range of the downconverter IF gain is 0 dB to 35 dB both for Channel 1 and Channel 2.

Setting of downconverter ΔIF Frequency

Set frequency difference when the IF frequency (RF frequency of the E5052A) of the downconverter differs between Channel 1 and Channel 2.

System - **Instrument Setup** - **Downconverter Manual Setup** - **ΔIF = IF2 - IF1**

Set the value ΔIF obtained by the following equation.

ΔIF = IF (Channel 2) - IF (Channel 1)

Limitations

Using the external mixer has following limitations:

- Limitations on the auto frequency control function and the carrier search function

  When the external mixer is enabled, the auto frequency control function (AFC) is not available. Also not available is the carrier search function.

- The LO frequency of the downconverter is not changed automatically.

  When using the external mixer, values are not changed automatically so the settings should be done manually

  For example, when you make measurement in analyzer mode for frequency/power measurement, if the measurement frequency exceeds a valid measurement range during a sweep, LO frequency of the downconverter is not changed automatically. (The frequency is not changed automatically to follow the excess of frequency.)

Frequency Offset Function

This section describes the frequency offset function and applicable setting values/measurement values.

Overview

This function offsets the frequency readouts when using an external downconverter or external mixers. All the frequency data and marker readouts are converted along with the equation below.

RF = N × LO –/+ IF

Where RF is the DUT frequency, N is the harmonic number, LO is the LO frequency of the external downconverter or the mixer used.

You can use this function to display the setting values and measurement results of the E5052A in terms of DUT frequencies (frequencies before down-conversion).

This function supports an offset not only when the internal local signal (LO) supplied to the internal mixer is at the lower frequency side of the DUT signal, but also when it is at the higher frequency side.

The frequency offset function is available when the device configuration is A or B in Figure 5-3 on page 164, and when the device configuration is C with the external mixer enabled.

Setting Items

Setting items to use the frequency offset function are as follows.

- On/off setting of the frequency offset function
- Setting of the conversion mode
- Setting of the frequency of the local signal (LO)
- Setting of the harmonic

NOTE Settings of the frequency offset function are common to all measurement modes (phase-noise measurement mode, spectrum monitor measurement mode, frequency/power measurement mode, and transient measurement mode). You cannot make these settings for each measurement mode separately.

On/off Setting of Frequency Offset Function

Turn on/off the frequency offset function.

System - **Instrument Setup** - **Frequency Offset (User Downconv.)** - **Frequency Offset** - **ON** | **OFF**

Setting of Conversion Mode

Set the conversion mode of the frequency offset function.

System - **Instrument Setup** - **Frequency Offset (User Downconv.)** - **Conversion Mode** - **RF = n * LO + IF** | **RF = n * LO – IF**

When you select RF = n * LO + IF, Upper Side Band (USB) mode is used, while selecting RF = n * LO – IF, Lower Side Band (LSB) mode is used.

For information on the frequency conversion equations, see “Frequency Conversion Equations” on page 182.

Setting of LO Frequency

Set the LO frequency of a mixer or a downconverter used.

The LO frequency range is as follows:

- 10 M to 110 GHz for the USB conversion mode
- 500 M to 110 GHz for the LSB conversion mode

System - **Instrument Setup** - **Frequency Offset (User Downconv.)** - **LO Frequency**

The LO frequency is used for the equations as described “Frequency Conversion Equations” on page 182. When the conversion mode is USB, the setting range is 10 M - 330 GHz, and when the conversion mode is LSB, 500 M - 330 GHz.

Setting of Harmonic Number

Set the harmonic number of a mixer.

System - **Instrument Setup** - **Frequency Offset (User Downconv.)** - **Harmonic #**

The harmonic number is used for the conversion equations as described “Frequency Conversion Equations” on page 182. The setting range is 1-34.

Frequency Conversion Equations

The frequency conversion equations are as follows.

1. When the conversion mode is USB. ($RF > N \times LO$)

   $RF = N \times LO + IF$

2. When the conversion mode is LSB. ($RF < N \times LO$)

   $RF = N \times LO - IF$

, where RF is the DUT frequency, LO is the LO frequency of a mixer or a downconverter used, IF is the IF frequency of the downconverted signal, and N is the harmonic number.

Consideration on Frequency Setting

All the measurement setup parameters concerning frequency can be input as DUT frequency when frequency offset function is applied. The applicable frequency range is from 20 M to 117 GHz. There are some constraints on measurement setup parameters actually depending on the IF frequency of the downconverted signal being fed into the E5052A, and it is determined by the measurement range of the E5052A.

The listed below may be needed on considering the frequency setting when using the frequency offset function.

1. Setting common to all measurement modes
   - Setting of the target frequency of the auto frequency control function
2. Spectrum monitor measurement mode
   - Setting of Start, Stop, and Center frequencies

     Note that the start and stop frequency may be limited by the actual IF signal being inputted to the E5052A. For example, the IF frequency is 10 MHz, the maximum span is limited up to 2 MHz, 10 percent of the IF frequency, not the RF frequency.
3. Transient measurement mode
   - Setting of the frequency range (wide band) or the maximum frequency

     When the frequency offset function is on, the **Wide Freq Range** softkey is not available, and the **Wide Freq Span** softkey appears instead. Use the **Wide Max Frequency** softkey to set the maximum frequency.
   - Setting of the target frequency (narrow band)
   - Setting of the phase reference frequency (narrow band, phase transient measurement)
   - Setting of the video trigger frequency (wide band)
   - Setting of the video trigger frequency (narrow band)

Applicable Measurement Results

The listed below are the measurement results that the frequency data is converted by the use of frequency offset function.

1. Phase-noise measurement mode
   - Frequency of the carrier signal
2. Frequency/power measurement mode
   - Measurement data array for frequency measurement (frequency data of all measurement points in analyzer mode)
   - Frequency measurement data in tester mode
3. Transient measurement mode
   - Measurement data array for frequency transient measurement (wide band)
   - Measurement data array for frequency transient measurement (narrow band)

Making phase-noise measurement above 26.5 GHz

This chapter contains information on making phase-noise measurements of signal sources above 26.5 GHz. This information is fundamental to configuring millimeter-wave phase-noise measurement systems with the Agilent E5052A and E5053A.

Basic configuration for expanding frequency range

The E5053A is designed to use two independent paths for the signal downconversion from RF to IF. Above 26.5 GHz, a power divider and a pair of external mixers can be added to extend the scheme of the E5053A. External mixers can be driven by the E5053A's built-in LOs. A block diagram of the basic setup is shown in Figure 5-4.

Figure 5-4 **Block diagram for making phase-noise measurement above 26.5 GHz**

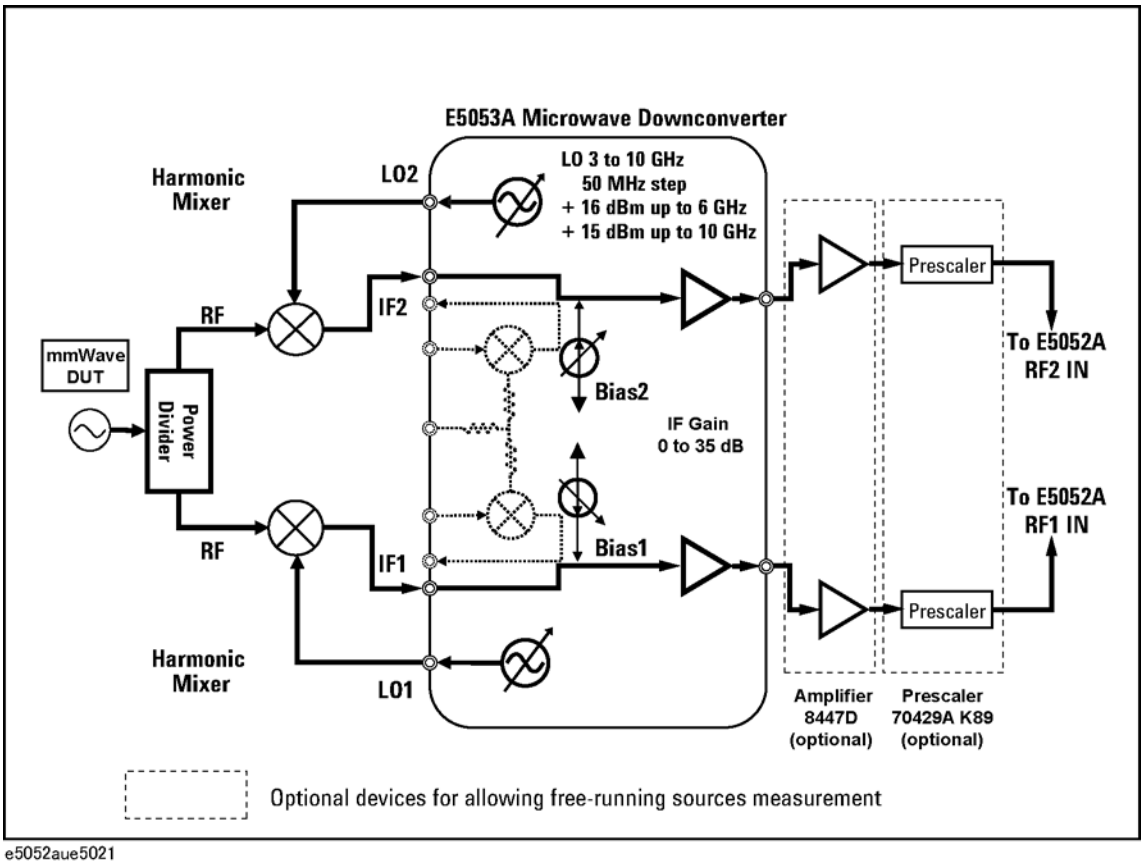


Table 5-3 Required equipment for expanding frequency range > 26.5 GHz

Equipment	Quantity	Note
11970 Series	2	
Hybrid matched tee	1	Available from third-party vendors of millimeter-wave equipment
Waveguide termination	1	Available from third-party vendors of millimeter-wave equipment
Waveguide bend	2	Available from third-party vendors of millimeter-wave equipment
Coax cables	4	
70429A K89 frequency divider (prescaler)	2	Required if the frequency drift and/or high phase-noise pedestal of your DUT has difficulties with phase lock. Refer to “Advanced measurement techniques for a free-running source measurement” on page 189.
8447D Option 011 Dual Channel amplifier	1	Required if the IF power level is insufficient. Refer to “Advanced measurement techniques for a free-running source measurement” on page 189

Setup considerations for > 26.5 GHz measurement

If a source is not able to provide a sufficient power level, it may be necessary to insert an amplifier between the output of the mixer and the IF input of the E5052A. The allowable power level at the E5053A IF input port depends on the equipment's IF Gain setting (Figure 5-5). The detailed power requirements of your DUT along with the millimeter-wave mixers selected are shown in Table 5-4.

Figure 5-5 **Allowable power level at E5053A IF input port**

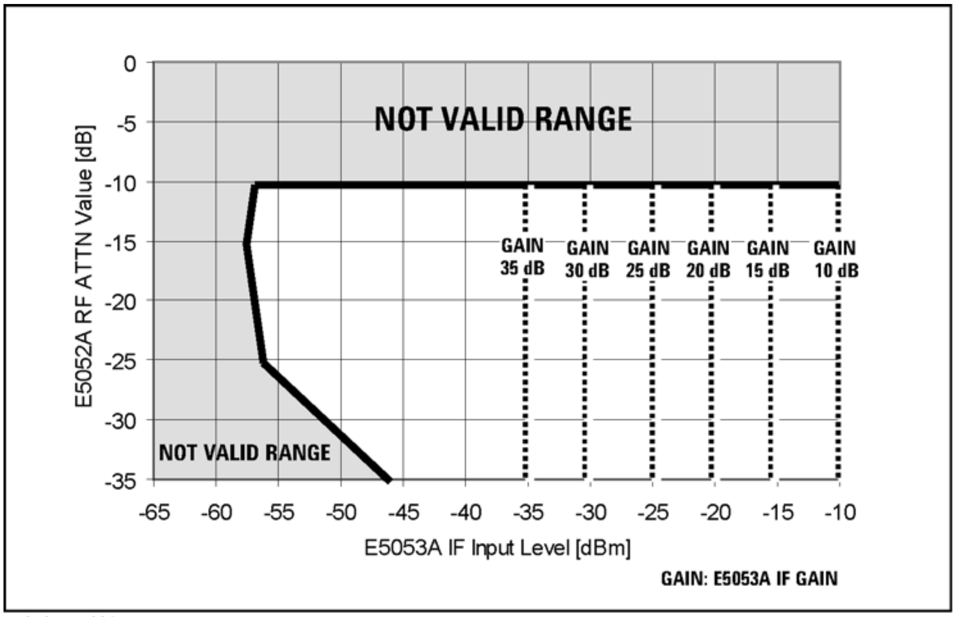


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Table 5-4 **Applicable power level by selected harmonic mixer**

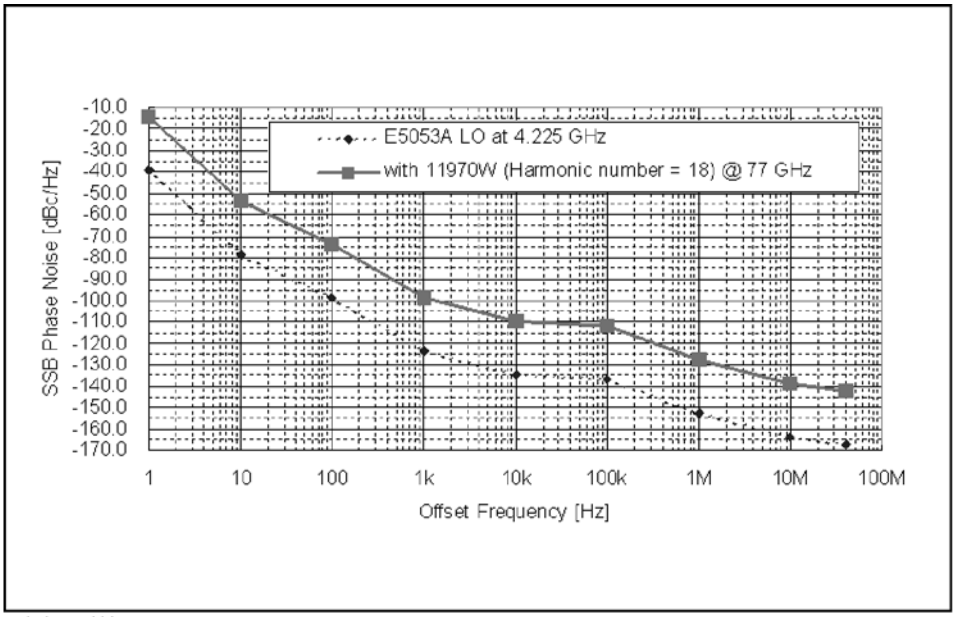
Harmonic mixer	Frequency band [GHz]	Maximum conversion loss [dB]	Gain Compression [dBm] (typ.)	Minimum power level of DUT*1 [dBm]
11970A	26.5 to 40	26	-5	-29 approx.
11970Q	33 to 50	28	-7	-27 approx.
11970U	40 to 60	28	-7	-27 approx.
11970V	50 to 75	40	-3	-15 approx.
11970W	75 to 110	46	-1	-9 approx.

*1. Assumes 3 dB loss of the waveguide adaptors between output port of the DUT and the mixers. If the DUT noise floor at IF port is greater than -110 dBc/Hz, the phase-noise measurement may not be performed properly. A poor S/N ratio would prevent the frequency counter of the E5052A from working correctly.

Measurement noise floor

Using harmonic mixers alone degrades the phase noise of the LO of the E5053A, depending on the harmonics number. Figure A-3 shows an example of 77-GHz millimeter-wave measurement. If you need to insert amplifiers to boost the IF signal, the noise of the inserted amplifier will also be summed into the measured noise level along with the noise of your device under test. Setting a correlation rate reduces the additive noise of the inserted dual-channel amplifier.

Figure 5-6 **Example of millimeter-wave phase-noise sensitivity (start offset = 1 Hz, correlation = 1)**



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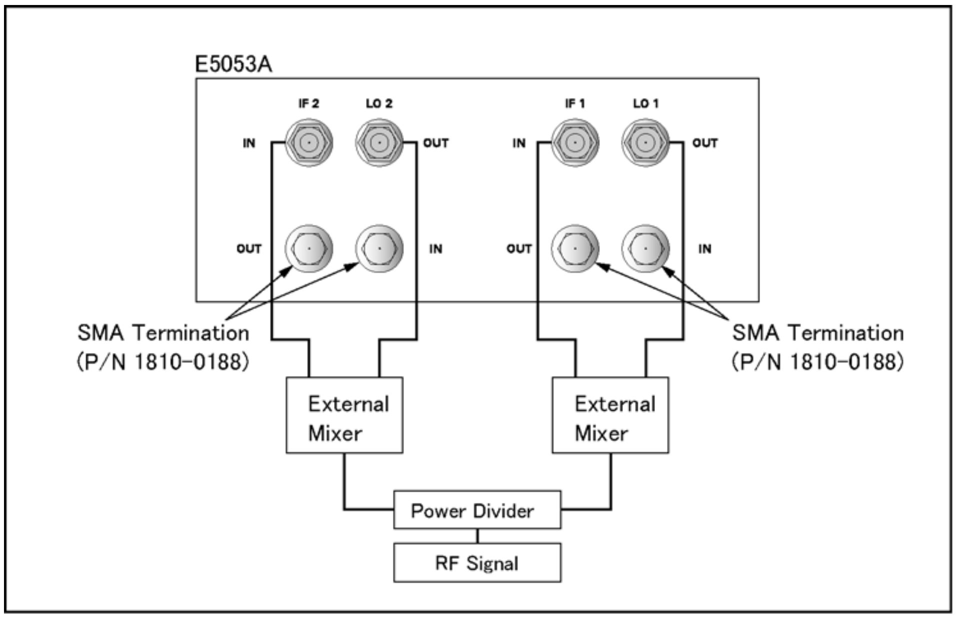
Configuring millimeter-wave phase-noise measurement setup

A typical millimeter-wave measurement setup is shown in Figure A-4.

CAUTION To prevent damage to the Agilent E5053A hardware, input signals MUST NOT be applied to the signal output connector of the E5053A. Also, to prevent unexpected static discharge during operation, terminate the output signal connectors with coax-sma termination, part number 1810-0188.

Figure 5-7 **Millimeter-wave measurement setup for stable source**



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Advanced measurement techniques for a free-running source measurement

Some free-running oscillators exhibit large frequency drift and high phase noise, especially in the millimeter-wave frequency range. Sometimes these oscillators cause measurement difficulties, such as PLL unlock and/or invalid measurement. Prescaler techniques can help you overcome these difficulties.

Large frequency drift

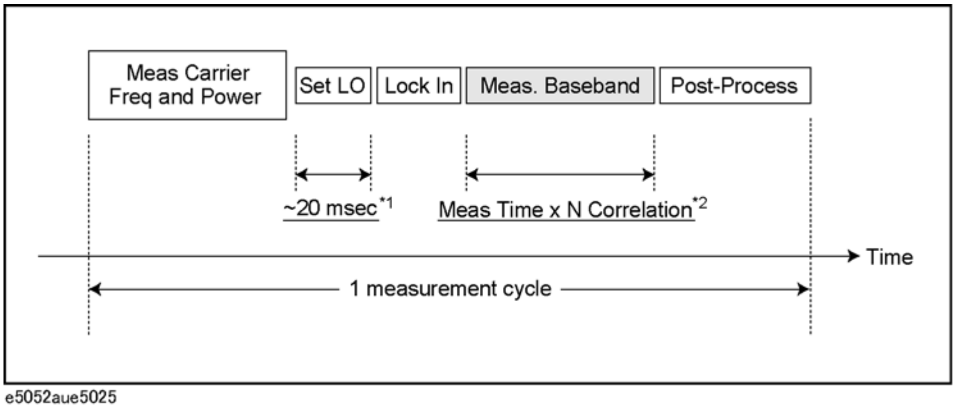
The E5052A automates the phase-noise measurement in several steps: measuring carrier frequency and power level, calibrating phase detector constant, tuning the built-in LO, closing the phase-locked loop, and measuring the noise signal coming out of the phase detector.

The tracking ability of the E5052A is limited by:

- Instantaneous peak-to-peak frequency drift threw rate when attaining phase lock.
- Peak-to-peak frequency change during a single measurement.

1. Check whether the instantaneous peak-to-peak frequency drift threw rate exceeds the maximum allowable threw rate, which is approximately 5 kHz per 20 msec with 0 or 10 dB IF GAIN. The instantaneous peak-to-peak frequency drift can be checked with the transient measurement mode. Measure the downconverted frequency profile over time by setting the time length to 20 msec or 50 msec.
2. Check whether your peak-to-peak frequency change exceeds 0.4% of the carrier frequency or the downconverted IF signal frequency. Note that this is also a function of measurement time depending on the start offset you select and/or the number of cross-correlations you set. (Refer to table xx for specification, page xx). Taking a longer time for a single measurement increases the chances of losing phase lock.

Figure 5-8 **E5052A tracking ability**



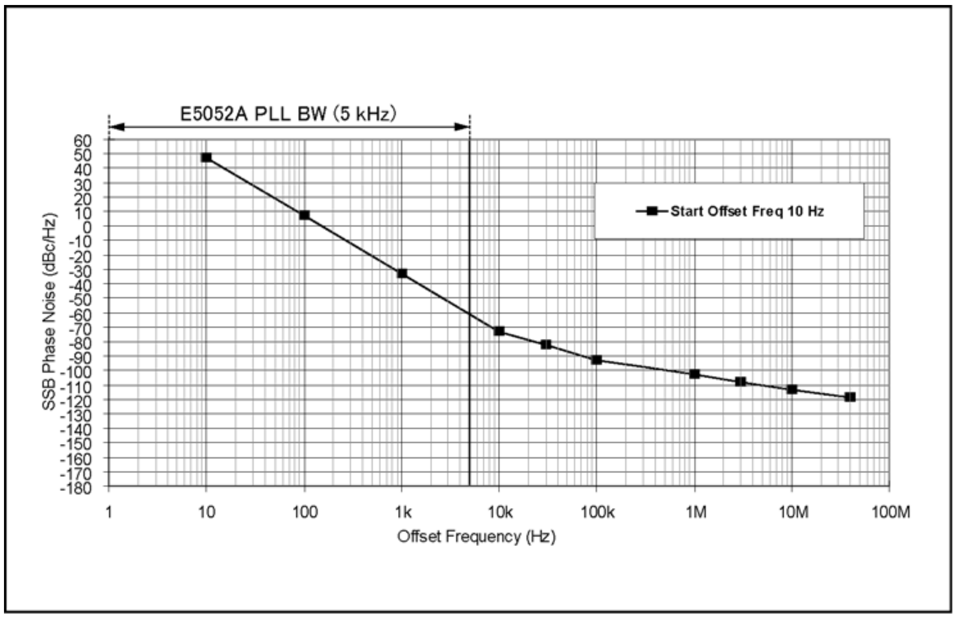
*1. Maximum E5052A PLL BW
Approximately 5 kHz (IF GAIN = 0, 10 dB)

*2. Maximum LO Tunable Range During Baseband Measurement
0.4% of downconverted IF Signal

High phase noise that may saturate phase detector

An average noise level of the input signals that exceeds approximately 0.2 radian rms, integrated outside of the phase-locked loop (PLL) bandwidth, can prevent the Agilent E5052A from attaining phase lock. Please confirm that the expected phase noise of your DUT does not exceed the limit line shown in Figure 5-9.

Figure 5-9 **Phase-noise measurement limit line**



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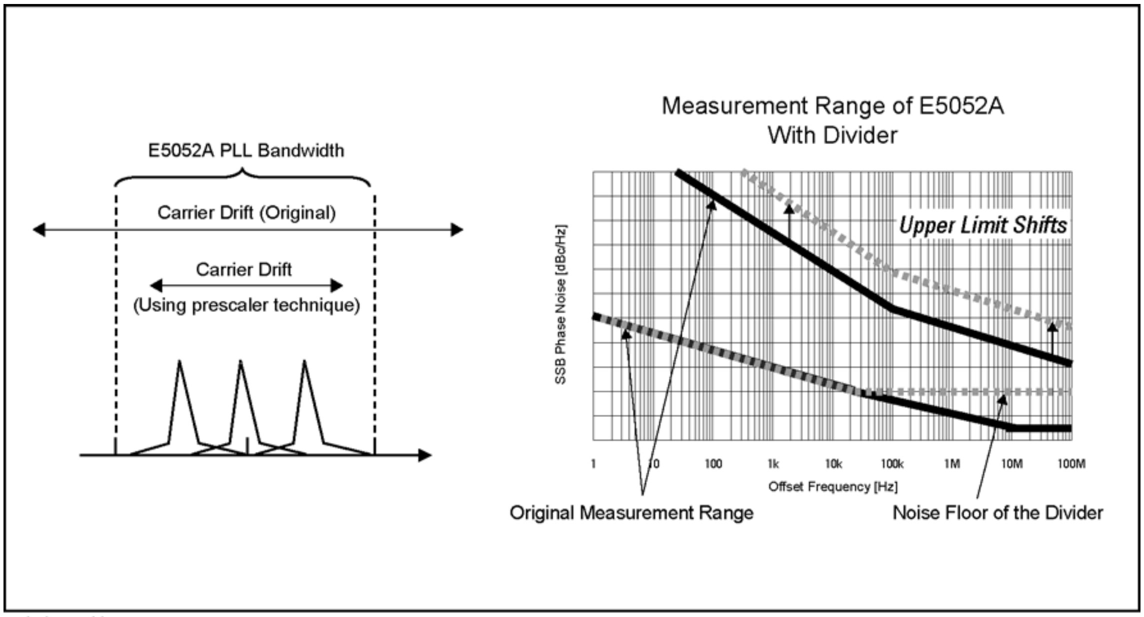
In either case, prescaler techniques can help you overcome problems related to this issue.

Prescaler techniques to suppress frequency drift and high phase noise

Inserting frequency dividers (prescaler) reduces the frequency drift as well as phase-noise level in order to make valid phase-noise measurement with the E5052A.

Note that the additive noise of the inserted frequency dividers will be summed into the noise level to determine the noise floor of the measurement. By taking advantage of the dual-prescaler technique for setting the appropriate the number of correlations, you can reduce the additive noise of the prescaler used.

Figure 5-10 Effect of prescaler techniques



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Configuring millimeter-wave setup to allow prescaler techniques

CAUTION To prevent damage to the Agilent E5052A and E5053A hardware, the input signal MUST NOT be applied to the signal input connector until the input attenuator has been correctly set for the desired configuration. Apply the input signal when the AgtmmWave VBA macro form appears. (See the section “Operation of VBA macro AgtmmWave”.)

A typical millimeter-wave measurement setup is shown in Figure 5-11.

Figure 5-11 **Setup for millimeter-wave phase-noise measurement with prescaler techniques**

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Operation of the AgtmmWave VBA macro

The “AgtmmWave” macro in the assistant tool, which is a VBA macro program running on the E5052A, is used to automate the setup of the E5053A and E5052A when making millimeter-wave phase-noise measurement.

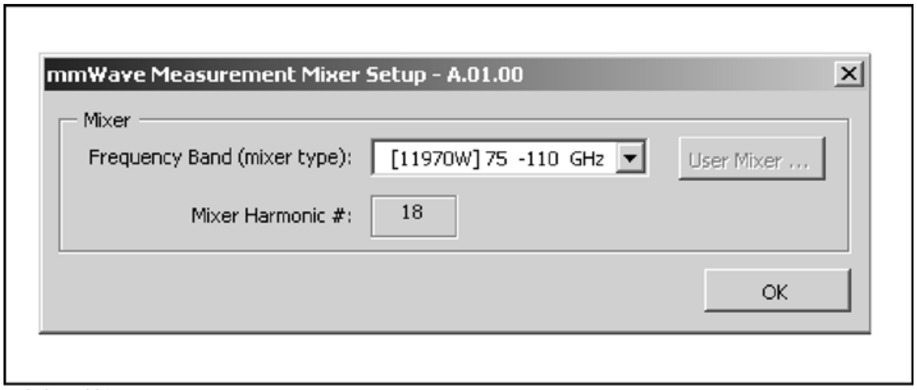
Start up the AgtmmWave macro

Step 1. Press [Macro Setup].

Step 2. Press **Application** - **mmWave** to start up the macro

The macro window shown in Figure 5-12 appears on the E5052A display.

Figure 5-12 **AgtmmWave macro window**



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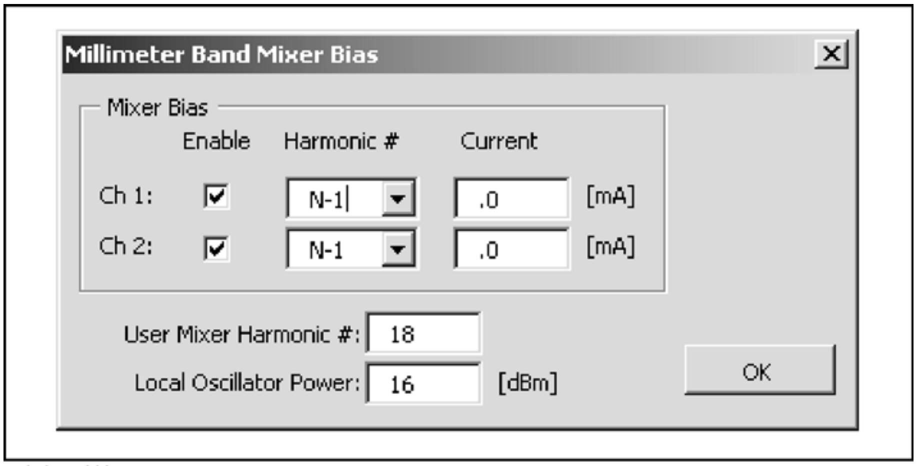
Set up millimeter-wave measurement parameters

Step 1. Select a frequency band from the pull-down menu of the macro window (Figure 5-12).

Step 2. If you select “User Mixer” from the menu, press the **User Mixer...** button to set up the necessary parameters of the harmonic mixer used (Figure 5-13).

Figure 5-13 **User Mixer setup menu**



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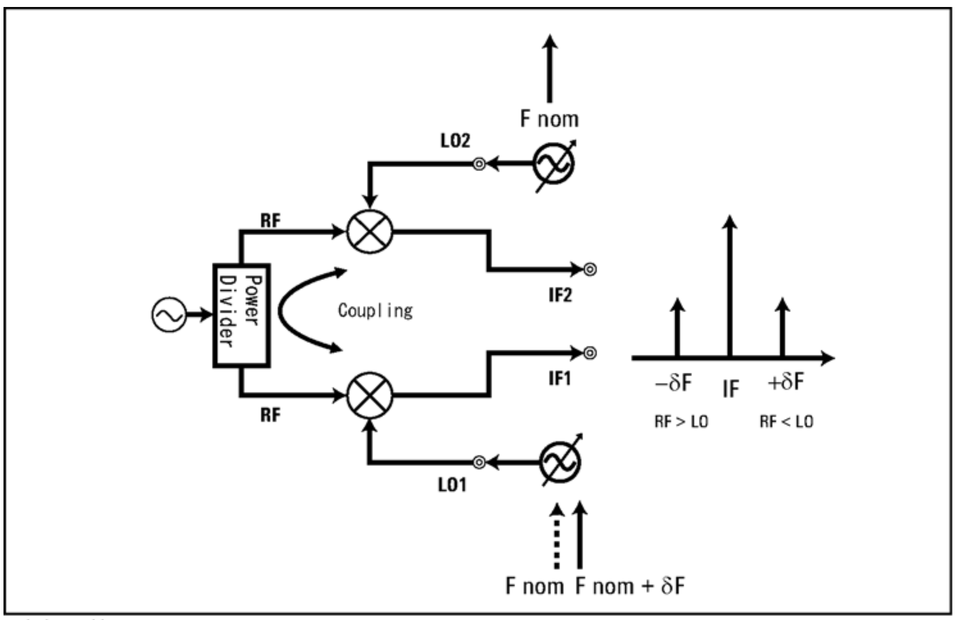
Step 3. Click **OK**.

Step 4. Input DUT Frequency (Figure 5-15).

The AgtmmWave automatically sets the E5053A LO to output the appropriate IF frequency of the downconverted signal.

NOTE The AgtmmWave VBA macro sets the downconverted IF frequency differently between channel 1 and channel 2 without prescaler techniques. This is to avoid the generation of spurs by the E5053A. The E5053A uses slightly different reference frequencies for the LOs of channel 1 and channel 2. In order to take the advantage of the cross-correlation technique, both LOs have to be incoherent to each other. If the E5053A uses the same nominal LO frequency for both channels, whose frequencies are even slightly different from each other, inter-modulation signals are generated and fall into the baseband signal as spurious signals due to the coupling of channel 1 and channel 2.

Figure 5-14 **Mechanism of spurs generation due to incoherent LO of E5053A**



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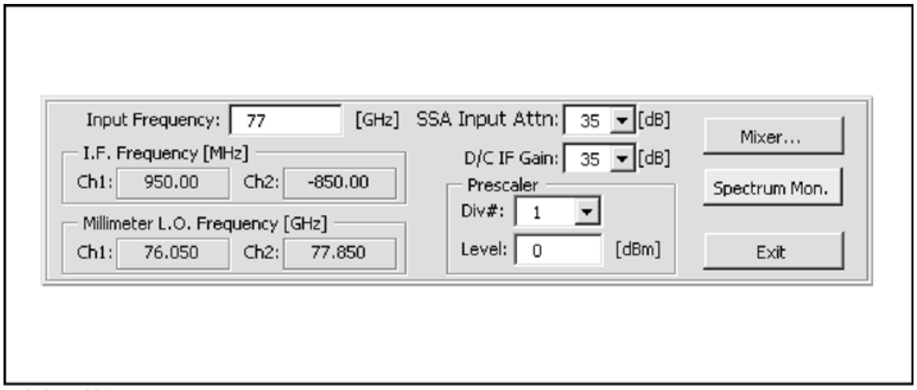
Step 5. Select the appropriate **SSA Input Attn** and **D/C IF GAIN** from the pull down menus (Figure 5-15).

Change the **SSA Input Attn** value if a warning message “Set RF ATTN to xx dB” is displayed. The default setting is 35 dB ATTN for preventing damage to the E5052A from unexpectedly high applied IF power.

Change the **D/C IF Gain** value from the pull down menu if an error message such as “IF A/D overflow” or “IF Level overload” is displayed. The default setting is 35 dB for maximum gain.

Figure 5-15 SSA Input ATTN and D/C IF Gain menu



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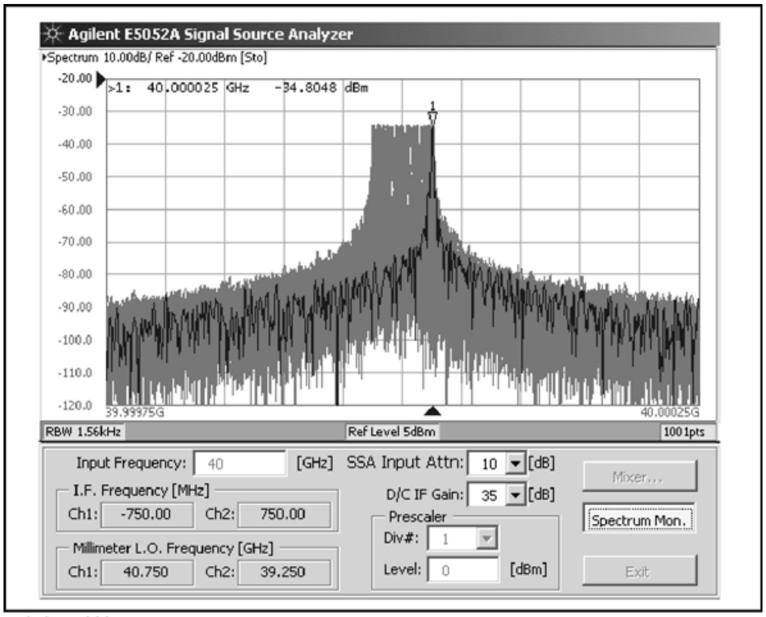
NOTE If you fail to measure phase noise (phase-locked loop unlock error or IF not found) or get an unstable phase-noise measurement result, you can check the signal quality of the downconverted IF signal. Press **Spectrum Mon.** to verify that the IF signal is present. If no IF signal is present, vary the input frequency slightly until the IF signal is found. If the frequency drift is large, the use of prescaler techniques is recommended. (Refer to “Advanced measurement techniques for a free-running source measurement” on page 189)

Figure 5-16 Verify downconverted IF signal with spectrum monitor function



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Setup for prescaler techniques (Advanced technique for measuring a free-running source)

CAUTION To prevent damage to the Agilent E5052A hardware, the input signal MUST NOT be applied to the RF1 IN and RF2 IN connectors until the E5052A input attenuator has been set to 35 dB. Do not connect anything as the E5052A is turning off because the INPUT ATTN is automatically set to 0 dB during shutdown.

CAUTION To prevent damage to the Agilent E5052A hardware, the input signal MUST:

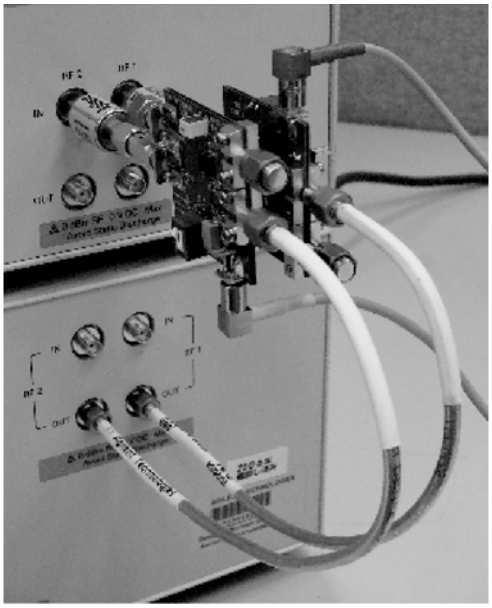
- NOT BE GREATER THAN 0 dBm RF OUTPUT POWER
- NOT CONTAIN DC OFFSET VOLTAGE

when applied to the RF1 IN and RF2 IN connectors. Use an external attenuator to ensure that the input signal to RF1 IN and RF2 IN is less than or equal to 0 dBm. Use DC Blocking Capacitors if the DC voltage is present at the output signal of the prescaler used.

Step 1. Set **SSA Input Attn** to 35 dB.

Connect prescalers between RF1 OUT of the E5053A and RF1 IN of the E5052A and between RF2 OUT of the E5053A and RF2 IN of the E5052A.

Figure 5-17 **Connecting prescalers**



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Step 2. Select **Div#** and input the prescaler output power level (Figure 5-15).

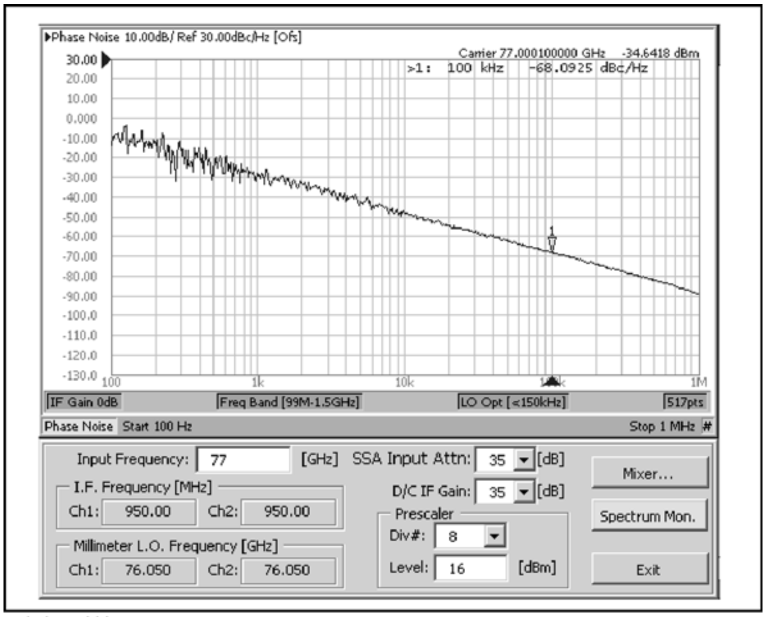
NOTE Set an appropriate D/C IF Gain if the downconverted signal-power level is not sufficient for the required input-power level of the prescaler used.

The phase-noise measurement amplitude is automatically corrected according to the following equation, and the results are shown in Figure 5-18.

Corrected Phase Noise = Phase Noise at Prescaler Output + 20 * LOG(N)

N = Prescaler's Dividing Number

Figure 5-18 Phase-noise correction with prescaler techniques



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5. Measurement Using E5053A and External Mixer

6 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 Trace Using 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 208.

For the procedure used to change the sweep range and scale by using the marker, refer to “Specifying Sweep Range by Using Marker” on page 203.

The E5052A is capable of displaying up to 10 markers (10 normal markers or 9 normal markers and 1 reference marker) 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 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.

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 10	Turns on marker 10, which has been turned off; activates marker 10

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 10**) 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:

Softkey	Function
All OFF	Turns off all markers on active trace
Marker 1 to **Marker 10**	Turns off one of markers 1 through 6 on active trace

Changing 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.

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 207.

Specifying Sweep Range by Using 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 →].

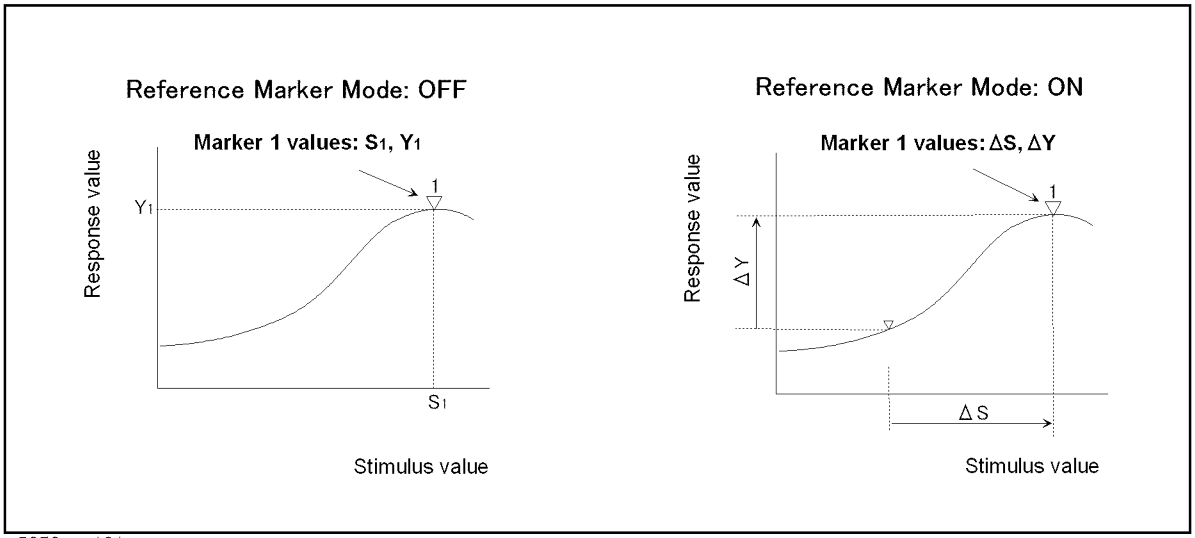
Step 3. Press the corresponding softkey to specify the sweep range.

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 Relative Value From Reference Point on Trace

You can convert the marker reading to a relative value from the reference point.

Figure 6-1 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 Trace" on page 201, 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 Trace" on page 201, place markers 1 through 6 on the desired points to read the values.

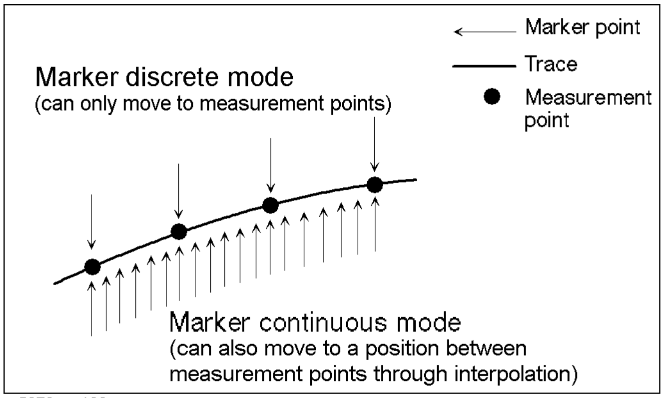
To use the list view of the marker values, refer to "Listing All Marker Values in All Displayed Traces" on page 207.

Reading Only Actual Measurement Point/Reading 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.

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 6-2 **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**.

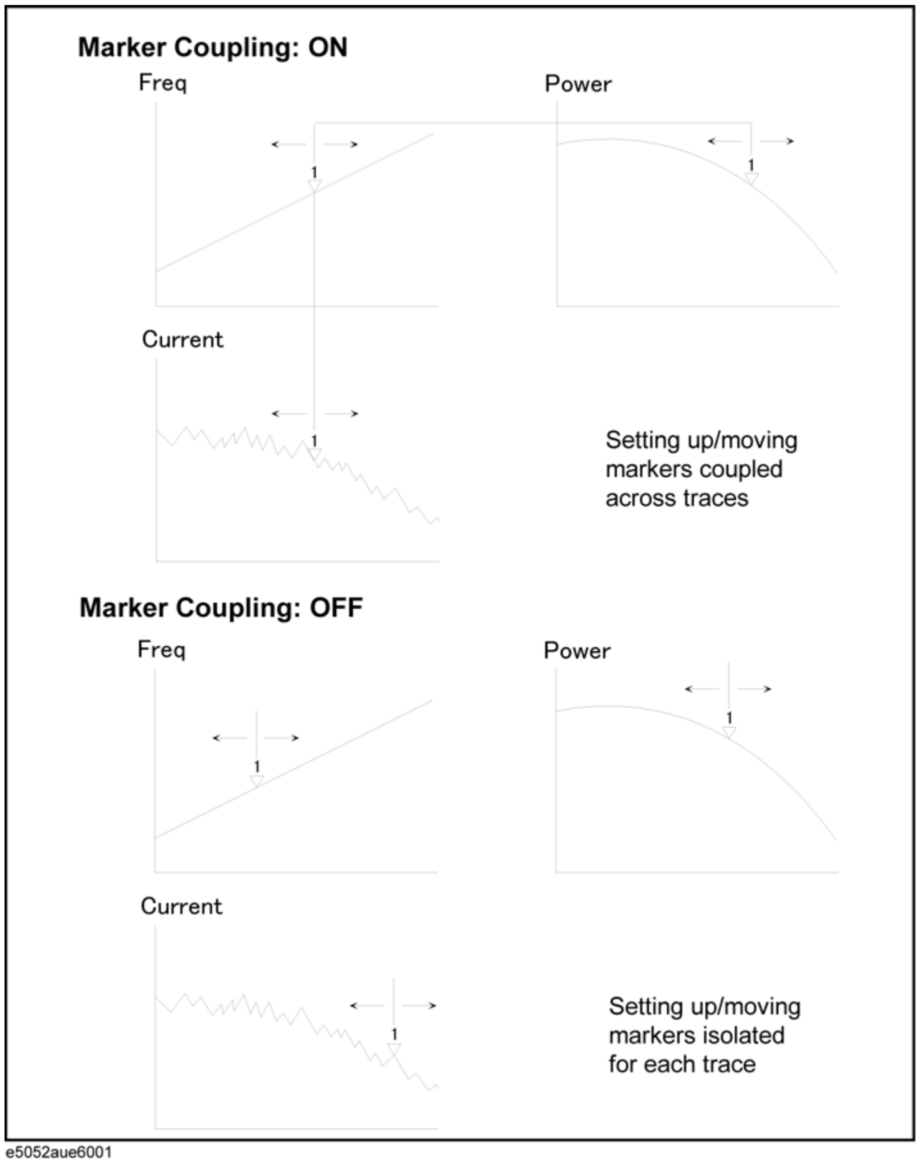
Step 4. Press **Discrete** to turn the discrete mode on or off.

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 6-3 Marker Coupling



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.

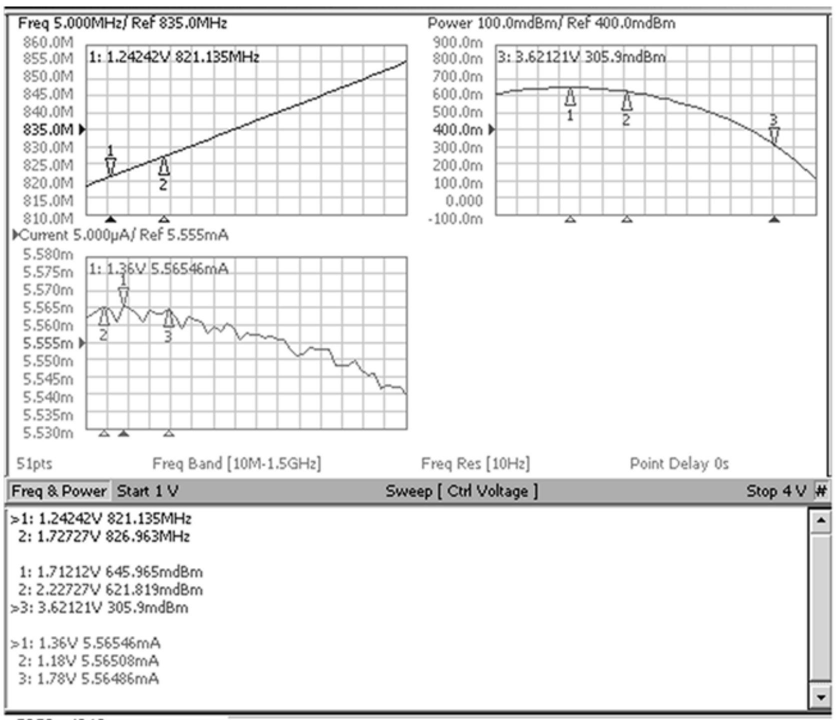
Operational Procedure

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 6-4).

Figure 6-4 **Turning on Marker List**



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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 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.

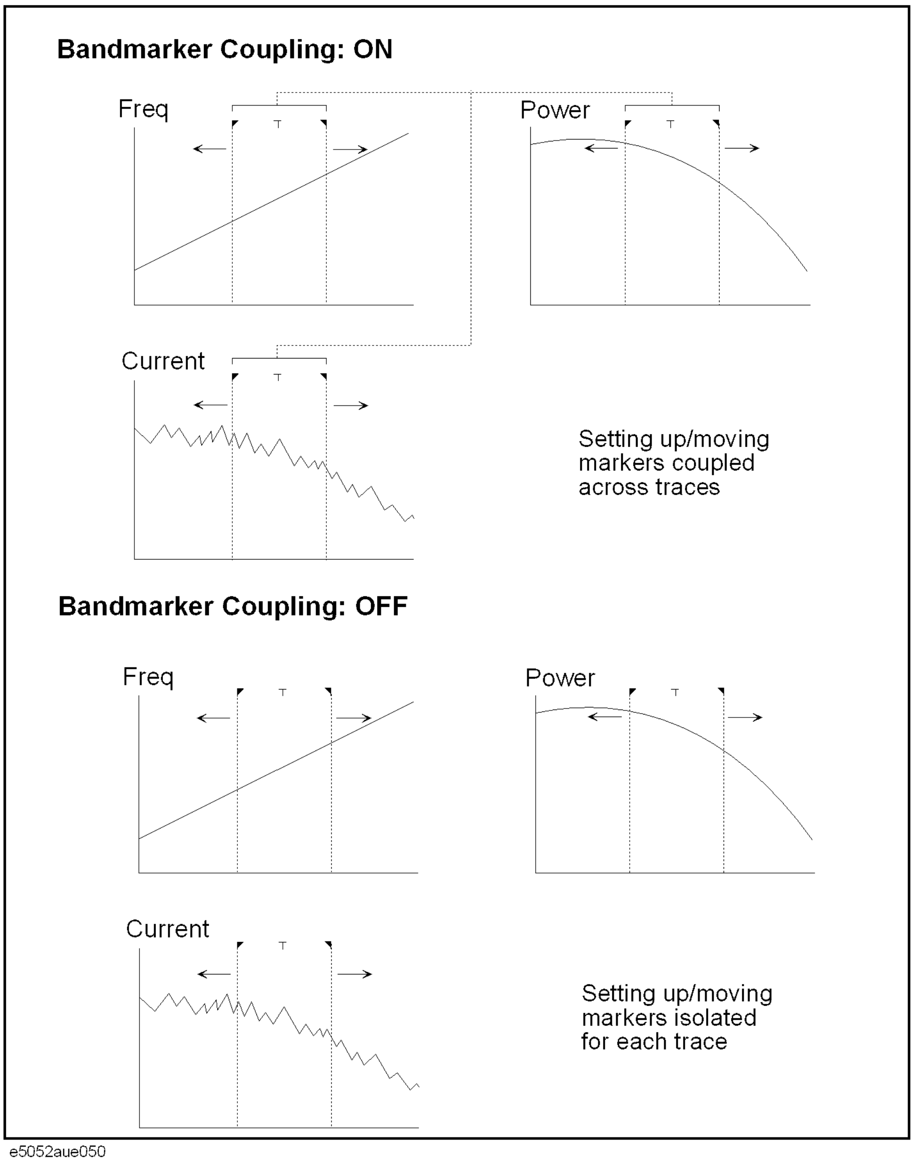
Fullspan Search (Full Range)	All data on the trace are specified as the search target.
Left search (Bandmarker)	Partial data on the trace are specified as the search target.

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 6-5 Bandmarker Coupling



Bandmarker Couple is on (Couple ON)	Bandmarkers are set up and moved in coupled operation on all traces in a channel.

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 208.

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 Search Each Time 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].

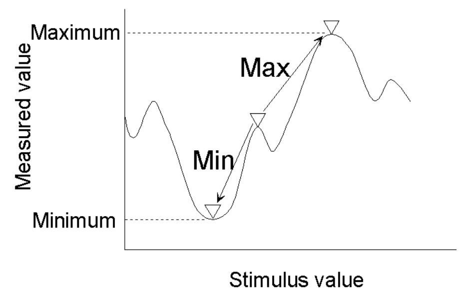
Step 3. Press **Tracking** and specify the parameters of the search tracking function.

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 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 6-6).

Figure 6-6 Searching for Maximum and Minimum Measured Values



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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 Trace” on page 201, 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.

Softkey	Function
Search Max	Performs a search for the maximum value
Search Min	Performs a search for the minimum value

Searching for Target Value (target search)

The target search function enables you to move the marker to the point that has the target measured value.

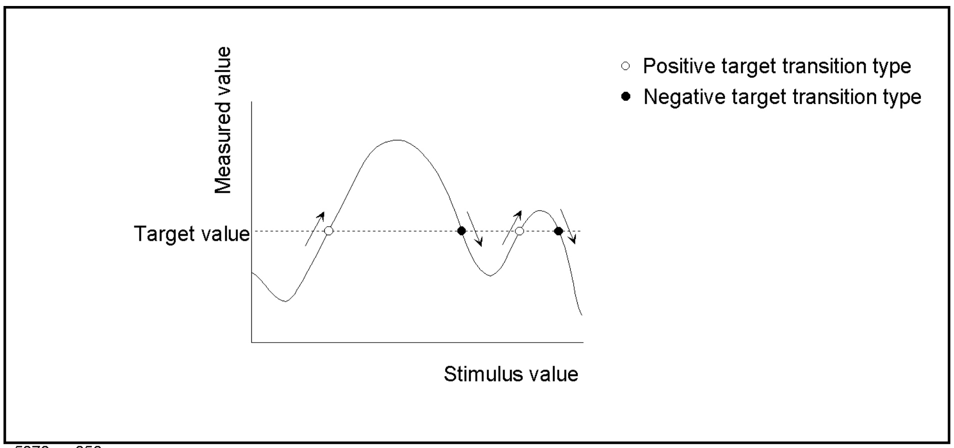
Target and Transition Types

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.

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 6-7 Target and Transition Types



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About 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.

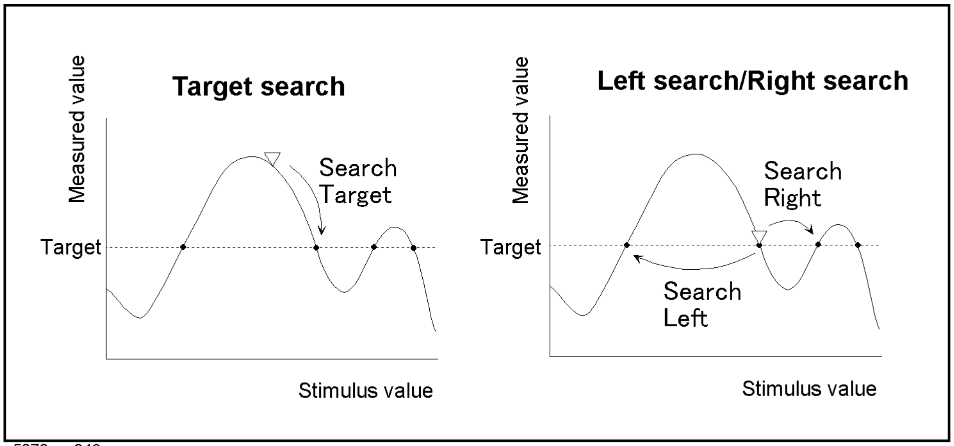
The following three methods are available for executing the target search:

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 6-8 **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 Trace” on page 201, 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.

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.

Softkey	Function
Search Target	Executes target search
Search Left	Executes left search
Search Right	Executes right search

Searching for 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.

Positive peak (Positive) — A peak whose measurement value is greater than those of the measurement points on either side of it (peak polarity: positive)

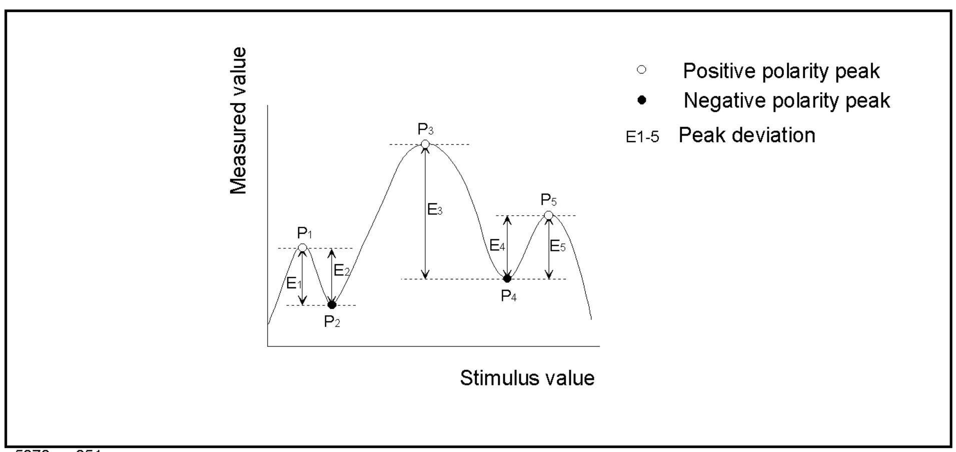
Negative peak (Negative) — A peak whose measurement value is smaller value than those of measurement points on either side of it (peak polarity: negative)

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 6-9 Positive Peak, Negative Peak and Peak Excursion



The following four methods are available for executing the peak search:

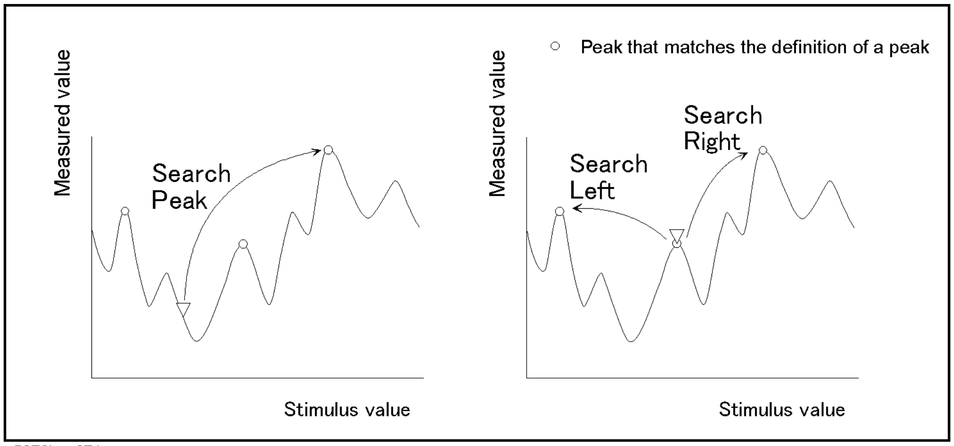
Search peak (Search Peak) — Moves marker to the maximum peak when peak polarity is **Positive** or **Both**; moves marker to the minimum peak when peak polarity is **Negative**

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**

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 6-10 Peak Search (when peak polarity is positive)



Operational Procedure

Step 1. Following Step 1 through Step 3 in "Reading Values on Trace" on page 201, 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.

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.

Softkey	Function
Search Peak	Executes peak search
Search Left	Executes left search
Search Right	Executes right search

Searching for Multiple Peaks

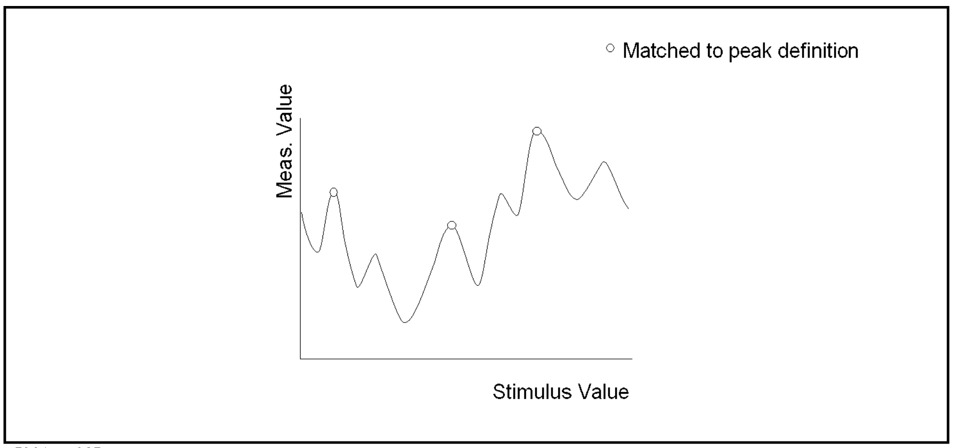
The multi-peak search function enables you to display markers on multiple peaks on traces.

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 6-11 **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 Trace” on page 201, 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.

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

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 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 6-12 and Table 6-1 show the definitions for the statistics data elements.

Figure 6-12 Parameters Used for Calculating Statistics Data

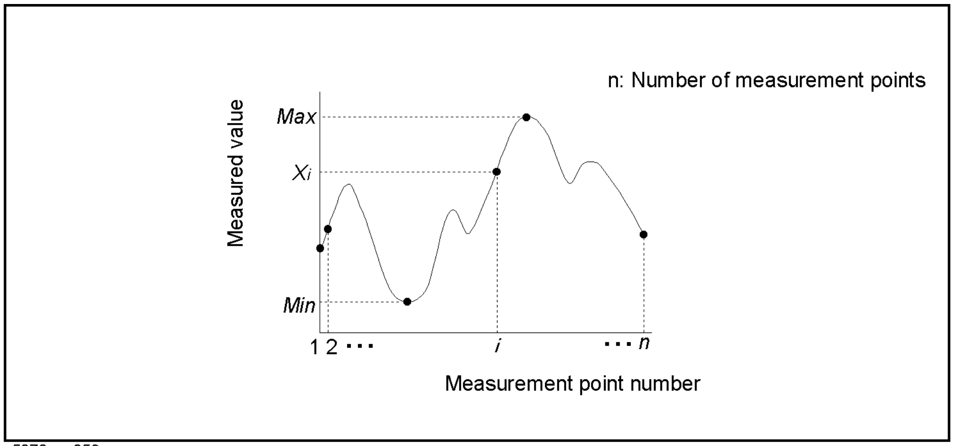

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Table 6-1 Definitions of Statistics Data

Statistics data element	Definition
Average (**Mean**)	$\dfrac{\sum_{i=1}^{n} x_i}{n}$ (in: number of points; xi: i measured value at the i-th measurement point)
Standard deviation (**SDev**)	$\sqrt{\dfrac{\sum_{i=1}^{n} \langle x_i - mean \rangle^2}{n-1}}$ (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 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.

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 208.

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 Range for Statistical Data” on page 221.

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 207.

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:

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.

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.

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 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 the same screen.

When you copy traces of phase-noise measurement to the user window, carrier frequency and level are also copied in the upper-right area of the graph. Since this value is treated as annotation, you can change or delete it later.

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].

Step 3. Press **Copy to USER**

Step 4. From **Copy to USER1** to **Copy to USER8**, select user window trace of the copy destination.

Step 5. Press [Meas/View] - **User** to select the user window. The trace that has been copied to the user window is displayed.

NOTE Note that you are viewing the sweep range of the active trace in the user window.

Add Annotation to Each Trace in User Window

You can add annotation to each active trace, and only the annotation of the active trace is displayed in the upper-right area of the graph.

Step 1. Press [Trace Next] or [Trace Max] to activate the trace to be copied.

Step 2. Press [Trace/View].

Step 3. Press **Trace Annotation**

Step 4. When the dialog box appears, enter the annotation.

NOTE You can also use the keyboard to enter the annotation.

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 Limit Line” on page 227.

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 226.

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:

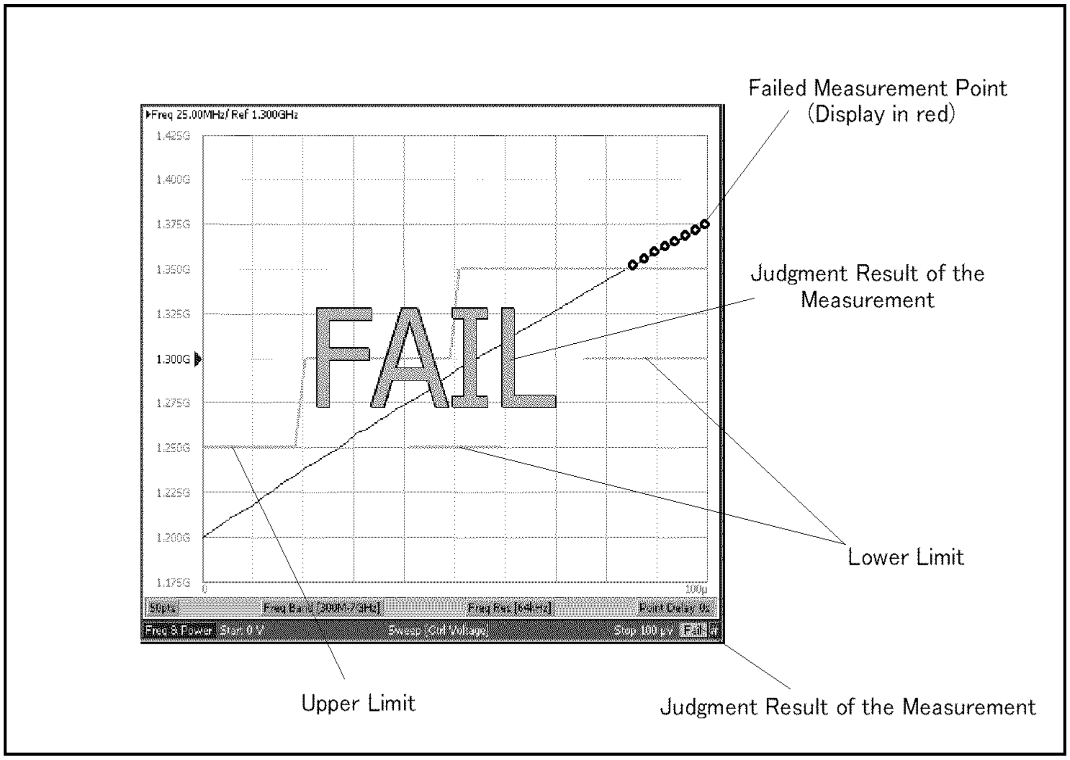
- Either “Pass” or “Fail” is displayed in the lower-right part of the measurement window. The result can be seen whenever the limit test is turned on.
- “Fail” can be displayed in the center of the measurement window. You can specify display/hide by following the steps below.

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 6-13 **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 286 to turn on or off the warning beeper.

Defining 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 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 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 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 6-2 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 arrays and 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 6-3 Compatibility of Files

		Recalling	
		Standard	Option 011
Saving	Standard	Yes	Yes[*1]
	Option 011	Yes	Yes

*1. If files saved with the standard model contain data trace, "state & data", having not-allowed parameters such as start offset frequency down to 1 Hz, they cannot be recalled with the option 011. In case that files contain instrument 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 6-4 Parameters to be Set to Initial Values When Recalling Files Saved with Incompatible Values Between 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	Higher than or equal to 20 dB	Changed to 20 dB
Frequency & power - Trigger mode[*1]	“Analyzer mode”	“Tester mode”
Phase noise -- Start offset frequency[*2]	1 (Hz)	10 (Hz)

*1. A warning message as “Incompatible recall file” is displayed.
*2. 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.

Table 6-5 Compatibility Between Different Firmware Revisions

			Recalling							
			A.02.50		A.02.00		A.01.50		Before A.01.10	
			Standard	Option 011	Standard	Option 011	Standard	Option 011	Standard	Option 011
Saving	A.02.50	Standard	Yes	Yes[*1]	Yes[*1]	Yes[*1]	Yes[*1]	Yes[*1]	Yes[*1]	Yes[*1]
		Option 011	Yes	Yes	Yes[*1]	Yes[*1]	Yes[*1]	Yes[*1]	Yes[*1]	Yes[*1]
	A.02.00	Standard	Yes[*1]	Yes[*1]	Yes	Yes[*1]	Yes[*1]	Yes[*1]	Yes[*1]	Yes[*1]
		Option 011	Yes[*1]	Yes[*1]	Yes	Yes	Yes[*1]	Yes[*1]	Yes[*1]	Yes[*1]
	A.01.50	Standard	Yes[*1]	Yes[*1]	Yes[*1]	Yes[*1]	Yes	Yes[*1]	Yes[*1]	Yes[*1]
		Option 011	Yes[*1]	Yes[*1]	Yes[*1]	Yes[*1]	Yes	Yes	Yes[*1]	Yes[*1]
	Before A.01.10	Standard	Yes[*1]	Yes[*1]	Yes[*1]	Yes[*1]	Yes	Yes[*1]	Yes	Yes[*1]
		Option 011	Yes[*1]	Yes[*1]	Yes[*1]	Yes[*1]	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 incompatible with the older firmware revision are ignored when recalling.

NOTE If revision difference includes any additional save/recall items, the recall operation will result in a message “Incompatible recall file,” recalling all of the saved items but the additional ones. If the difference includes no additional save/recall items and no changes in the save/recall specification, the recall operation will end normally.

NOTE When the state file that has created with the E5052A firmware Rev.A.01.50 or before is recalled in the E5052A with the Rev.A.02.00 firmware, all of the setup parameters concerning the E5053A Microwave Downconverter are neglected and the E5052A Rev.A.02.00 firmware presets to the instrument state as that of the E5052A standalone.

NOTE The Security Level can be stored or recalled in the E5052A with the Rev.A.02.00 firmware.

When recalling the state file that includes “Frequency Blank” security level, the E5052A's security level is set to “Frequency Blank” even if the security level was set to None before recalling. When the state file that was created with the Rev.A.01.50 or before, is recalled on the E5052A with the Rev.A.02.00 firmware, the security level is always set to None.

Table 6-6 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 arrays and 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.

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.

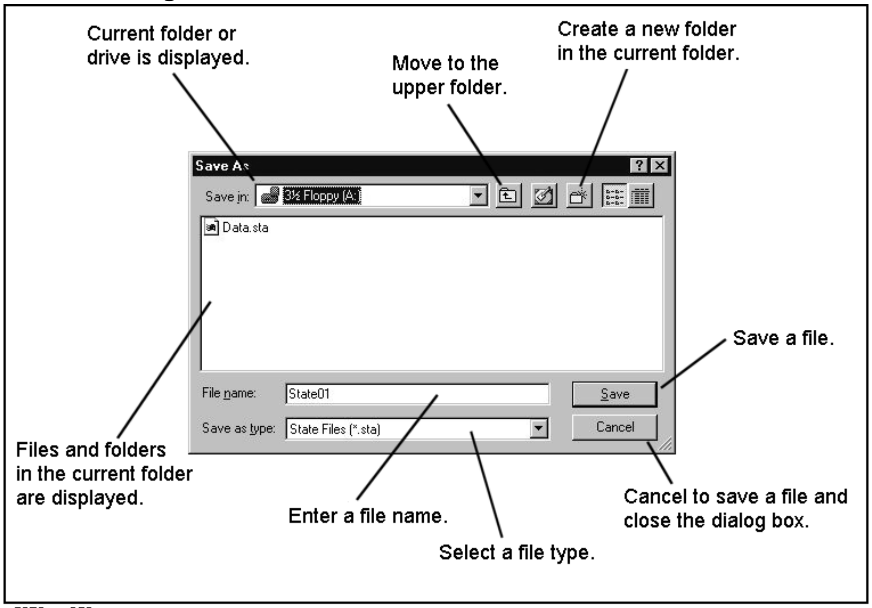
When you save the state with any file name (including files on the floppy disk):

1. Press **File Dialog...** to open the dialog box. This operation should be done with the external keyboard and/or mouse. Figure 6-14 shows the user interface elements in the “Save As” dialog box.

2. Specify any folder, and enter the file name.

3. Press **Save**.

Figure 6-14 **Save As dialog box**



The E5052A provides the following drives to save/recall files. Select a drive in the **Save In** area of the dialog box (Figure 6-14).

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**.

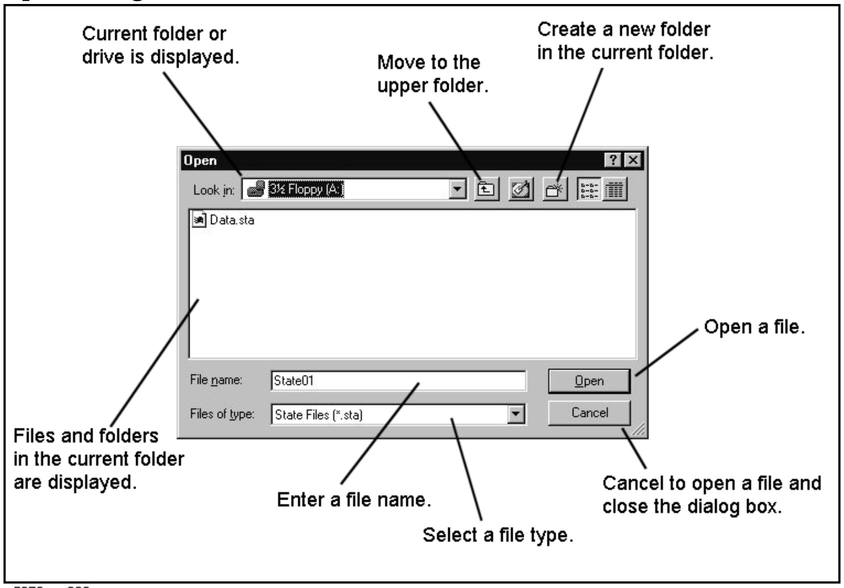
When you recall any file:

1. Press **File Dialog...** to open the Open dialog box. This operation should be conducted using the external keyboard and/or mouse. The Figure 6-15 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 6-15 **Open Dialog Box**



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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.

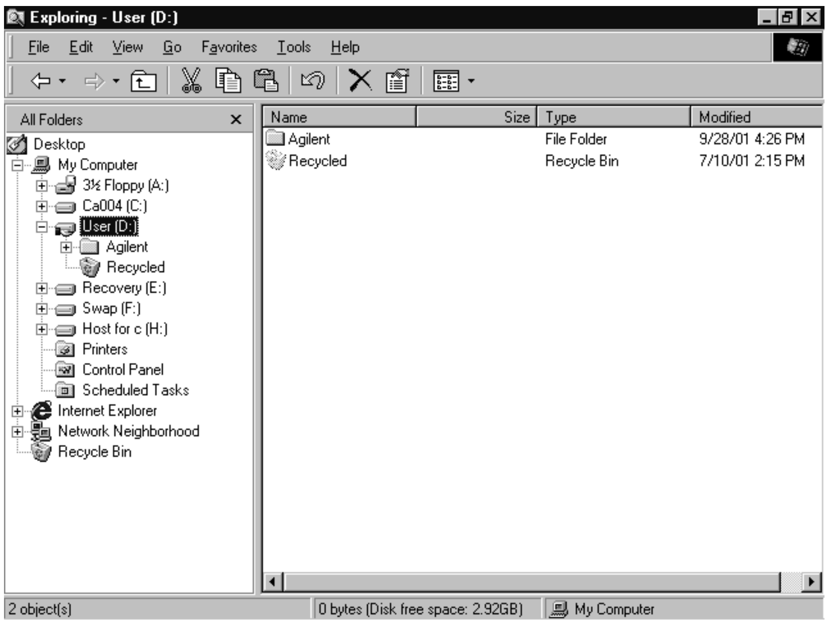
Step 2. Press **Recall by File Name**.

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 6-16 **Windows Explorer**



e5070auj171

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 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 Trace on File

Saving Trace Data 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 6-1 **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 6-14, “Save As dialog box,” on page 234. 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 6-2 **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 6-14, "Save As dialog box," on page 234. 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.

Linearity Evaluation of Chirped FM Signal

The linearity evaluation of a chirped FM signal is a function that statistically evaluates errors in test signals by using a reference regression line created by changing the test frequency to the line’s values.

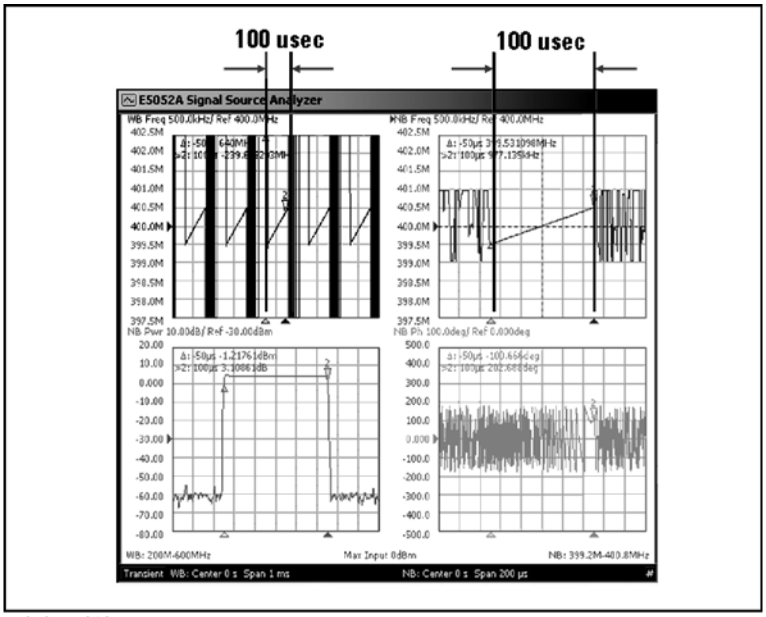
This function has two processes: creating the reference regression line and evaluating the linearity of test signals. When evaluating linearity, you can specify the analysis range by using the band marker.

The linearity evaluation of chirped signals can be used for phase-noise measurements and transient measurements.

Create Reference Regression Line

This section describes steps to create a reference regression line based on the following chirped FM signal in transient measurement.

Figure 6-17 Measurement example of chirped FM signal in transient measurement



e5052auj5010

Procedure

Step 1. Press [Trace Next] or [Trace Max] to activate the trace in which you want to save the trace memory.

Step 2. Press [Marker Fctn].

Step 3. Press **Band Marker X** to enable it, and then set the analysis range.

Step 4. Press [Trace/View].

Step 5. Press **Memory Trace - Line(Y = AX + B) - A** to enter the value (slope) of the regression line coefficient (Y = aX + b).

Step 6. Press **B** to enter the value of b (intercept) of the regression line coefficient (Y = aX + b).

Step 7. When you want to assign the measurement value currently displayed to the linear regression coefficient, the values of a and b can be obtained by pressing the **DATA Trace -> A,B** button.

NOTE When fewer than two measurement points are in the analysis range, the values of a and b return to zero.

Step 8. Press **Set Line to Memory** to write into the memory trace.

Evaluate the Linearity

After obtaining the regression line coefficient, calculate error from reference by comparing traces. Here, statistics are used for calculating error (refer to "Determining Mean, Standard Deviation, and Peak-to-Peak of the Trace" on page 220).

Procedure

Step 1. Press [Trace/View].

Step 2. Press **Data Math** and select **Data - Mem** to perform data math.

Step 3. Press [Marker Fctn].

Step 4. Set **Analysis Type** to **Statistics** to display the analysis results.

NOTE When the marker list is on, statistics are displayed on the screen of another window. For display method of the marker list, refer to "Listing All Marker Values in All Displayed Traces" on page 207.

Step 5. When you want to compare traces, set **Data Math** to off and display traces and trace memory on the screen. For the display method, refer to "Comparing Traces/Performing Data Math" on page 222.

Hiding Numeric Information

You can hide numeric information on the screen for purposes such as security.

Hiding Frequency Information on Screen

Follow these steps to display frequency information on the measurement screen and frequency information in softkeys and data entry box as asterisks (***...).

Step 1. Press Display - **Security Level**.

Step 2. Select **Frequency Blank** from the security level setting (Table 6-7).

Table 6-7 Security Level Setting

Softkey	Function
None	Displays all information on the screen.
Frequency Blank	Displays frequency information as asterisks. You cannot return the setting to None with the Security Level menu. You need to execute Preset or Recall to return the display setting to None.
All Numeric Blank	Displays all numeric information as asterisks. You cannot change the security level with the Security Level menu. You need to execute Preset or Recall to return the display setting to None or Frequency Blank.

NOTE Once you set the security level to Frequency Blank, the frequency readouts are disabled (any frequency readouts are marked as asterisks, “***”) unless cycling power, executing **Preset** or recall a setting whose security level is None.

Hiding All Numeric Information Screen

Follow these steps to display all numeric information on the measurement screen and numeric information in softkeys and data entry box as asterisks (***...).

Step 1. Press Display - **Security Level**.

Step 2. Select **All Numeric Blank** from the security level setting (Table 6-7).

NOTE Once you set the security level to **All Numeric Blank**, the **Security Level** is no more changed by the user unless cycling power, executing **Preset** or recall a setting whose security level is None or Frequency Blank.

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 menu.

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 246.

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 6-14, "Save As dialog box," on page 234. 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 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 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 inverted 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 6-18. In this case, press **Cancel** to close the Printers Folder dialog box and retry the operation after the printer is ready.

Figure 6-18 **Printers Folder dialog box**

7 Clock Jitter Measurement

This chapter describes procedures used to install the E5001A SSA-J and to perform clock jitter measurement.

Overview

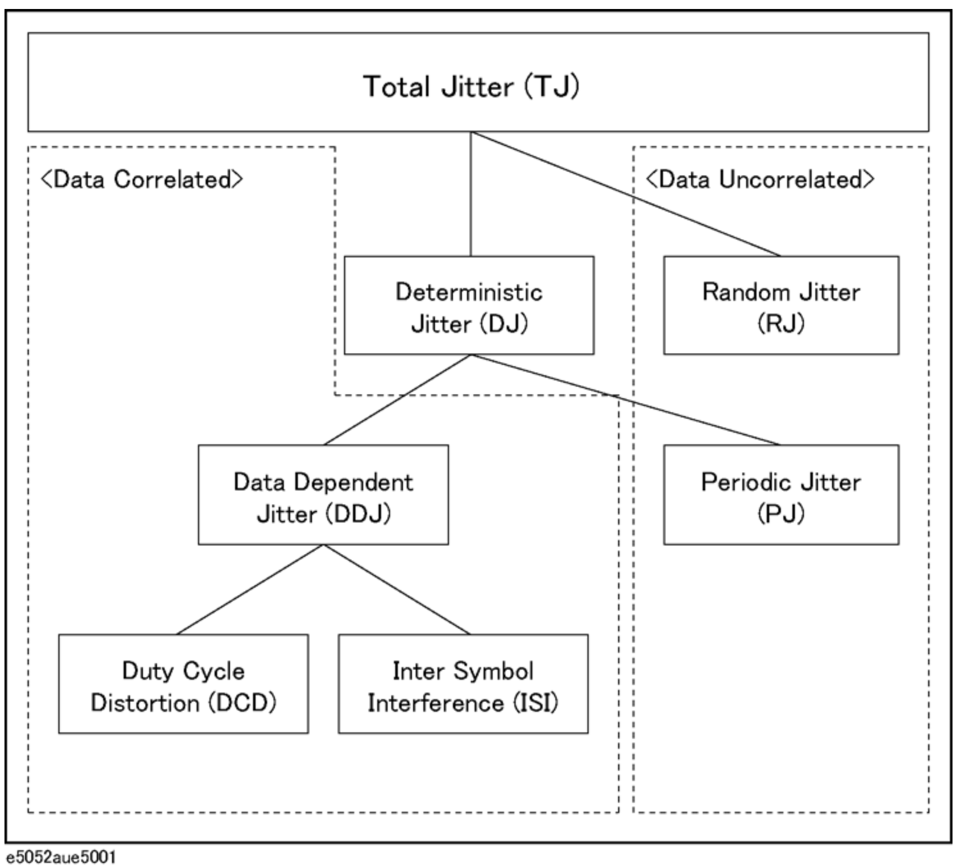
The E5052A provides application software that lets you perform very-low-level clock jitter measurement. To use this function, you need to separately purchase the E5001A SSA-J option. For more information, contact your local Agilent customer center listed at the end of this manual or your distributor.

Overview of clock jitter measurement

The periods (reference times) of clock sources actually vary depending on a number of factors such as noise. This variation is called jitter, which is generally evaluated using a statistical measurement method. Jitter analysis is an important measurement for applications that handle high-frequency signals.

There are two types of jitter: one dependent on data (Data Correlated or Data Dependent) and one independent of data (Data Uncorrelated or Data Independent). Each type of jitter has various components (jitter components, Figure 7-1).

Figure 7-1 **Jitter Components**



The E5052A can measure only data-uncorrelated jitter components. Such data-uncorrelated jitters are described below.

Table 7-1 Types of Jitters

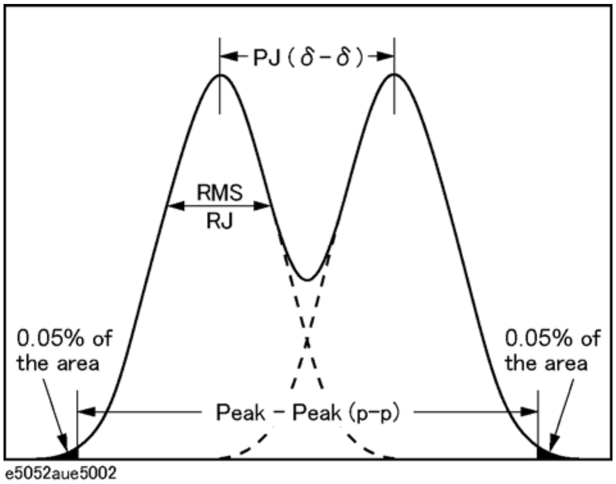
Jitter	Description
Random jitter (RJ)	Jitter that occurs randomly. Generally, it is expressed as a gaussian with an average value (μ) and a standard deviation (σ). Its peak-to-peak (p-p) value has no limit. As measurement time becomes longer, the p-p value measured during the time becomes larger.
Periodic jitter (PJ)	Jitter that occurs over entire periods independent of data patterns. Its peak-to-peak (p-p) value has a limit. Even when measurement time is elongated, the p-p value converges to a finite value.

The Dual Dirac model is used to obtain periodic jitter (PJ). The standard deviation of a random jitter (RJ) distribution is obtained from the RMS value of actually measured random jitter. The Dual Dirac model consists of two identical gaussians defined with the RMS value of the random jitter.

The distance between the two gaussians is adjusted so that the probability density function (PDF) of the model matches the measured jitter histogram. The model for analysis is identified under the condition that the peak-to-peak (p-p) distance representing 99.9% of the area of the model's PDF matches the width that contains 99.9% of the area of the measured histogram (Figure 7-2).

PJ (δ-δ), which is a parameter indicating the actual effect of the periodic jitter component, is defined by the distance between the average values of the two gaussians. The effective value of periodic jitter independent of its waveform is calculated by rms sum analysis using the standard deviation of the random jitter, which is obtained from the random jitter/periodic jitter histogram giving the RMS value of the periodic jitter.

Figure 7-2 Dual Dirac Model



Relation between phase deviation (spurious) and jitter

Equation 7-1 shows the relation between jitter (J) expressed in seconds (s) or unit intervals (UI) and phase deviation (spurious) expressed in radians $\Delta\varphi$, where the frequency of the clock signal is expressed as f_c[Hz].

Equation 7-1

$$J[s] = \frac{1}{2\pi f_c}\Delta\varphi[rad] \qquad J[UI] \equiv \frac{J[s]}{\frac{1}{fc}} = f_c \bullet J[s] = \frac{1}{2\pi}\Delta\varphi[rad]$$

The following equation gives the relation between phase deviation $\Delta\varphi$ and phase-noise spectrum, $L\varphi(f)$[dBc/Hz]. A and B in the equation indicate the frequency range specified with the band marker.

Equation 7-2

$$\Delta\varphi = \sqrt{2 \times 10^{\frac{IPN}{10}}} \qquad [rad]$$

Equation 7-3

$$IPN = 10 \times LOG\left[\int_A^B 10^{\frac{L\varphi(f)}{10}} df\right] \qquad [dBc]$$

IPN (Integrated Phase Noise)	Relative value of phase-noise power integrated over a range between frequencies A and B

The following equation gives the residual FM component (RFM) within a range of frequencies A and B.

Equation 7-4

$$RFM = \sqrt{2 \times \int_A^B f^2 \times 10^{\frac{L\varphi(f)}{10}} df} \qquad [Hzrms]$$

Clock jitter measurement with the E5052A

The E5052A uses phase-noise measurement and transient measurement for clock jitter measurement. The user window is used to display the jitter trend and histogram.

NOTE To use this function, you need to purchase the E5001A SSA-J option. For more information, contact your local Agilent customer center listed at the end of this manual or your distributor.

The clock jitter measurement provides the following capabilities:

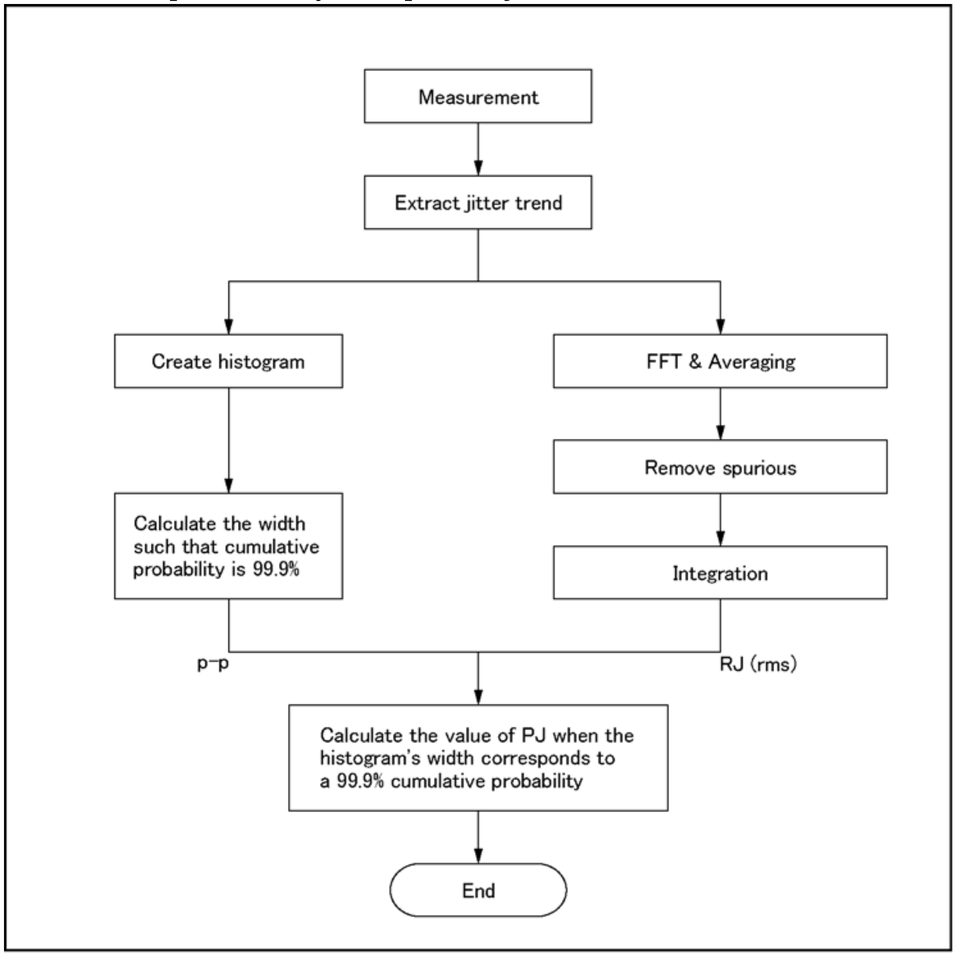
- Displaying the jitter trend and total jitter value
- Displaying the jitter probability distribution (histogram)
- Displaying the periodic jitter (PJ) value and random jitter (RJ) value

The clock jitter measurement of the E5052A provides three analysis functions that you can select from the screen.

Analysis function	Description
Random jitter analysis (RJ)	Displays the clock frequency and the RMS value of the random jitter in phase-noise measurement.
Frequency analysis for periodic jitter (PJ Freq)	In phase-noise measurement, displays the clock frequency and the RMS value of the periodic jitter with the spurious power value display enabled.
Decomposition analysis for periodic jitter (PJ decomposition)	Displays the jitter trend and histogram for jitter value analysis. The target frequency for transient measurement can be linked.

The following figure shows the decomposition analysis for periodic jitter.

Figure 7-3 **Flow of decomposition analysis for periodic jitter**



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Executing Clock Jitter Measurement

Starting the VBA program

Follow these steps to start up the program.

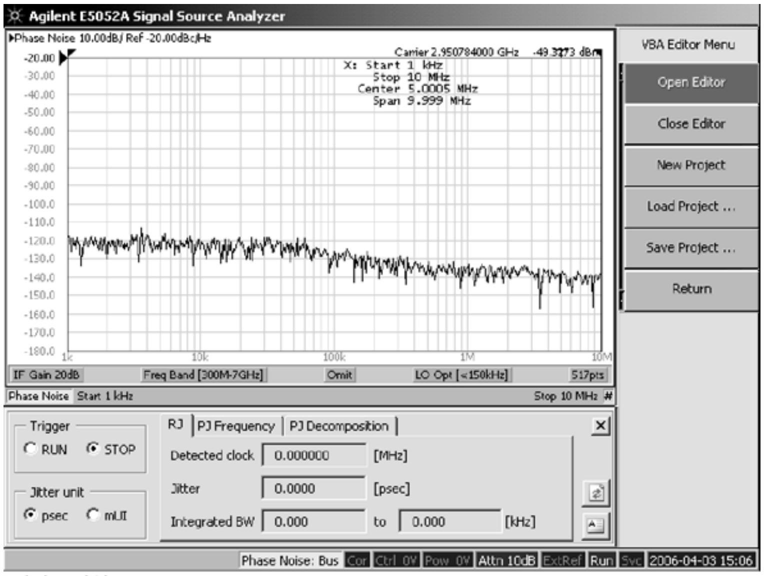
Step 1. Press Macro Setup .

Step 2. Press **Application**.

Step 3. Press **Jitter**.

The following screen appears.

Figure 7-4 **Initial screen for jitter analysis**



e5052auj5018

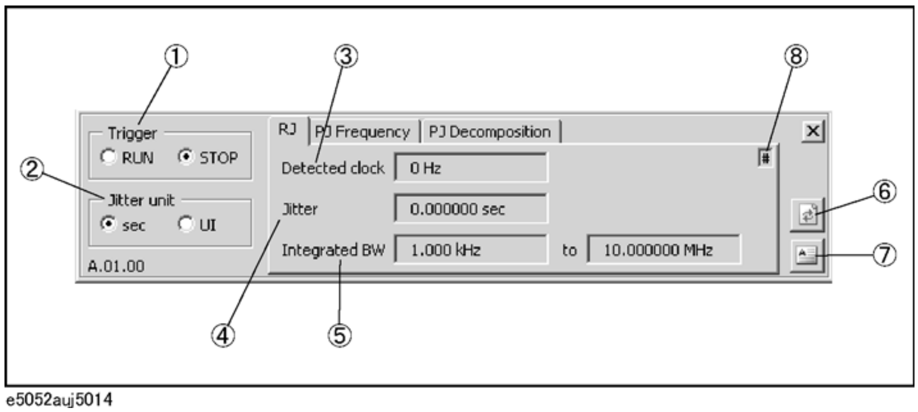
Random jitter analysis

Overview

This analysis displays the clock frequency and the rms value of random jitter in phase-noise measurement. You can use the band marker on the screen to specify an analysis range. In this case, the analysis range is also displayed.

Setting procedure

Figure 7-5 **Screen for random jitter analysis**



Step 1. Select **RJ** from the analysis function selection tabs (default)

Step 2. When you want to specify an analysis range, use the band marker on the phase-noise measurement screen.The specified analysis range is displayed in the measurement result display area (5 in Figure 7-5).

Step 3. Select a jitter display unit (2 in Figure 7-5).

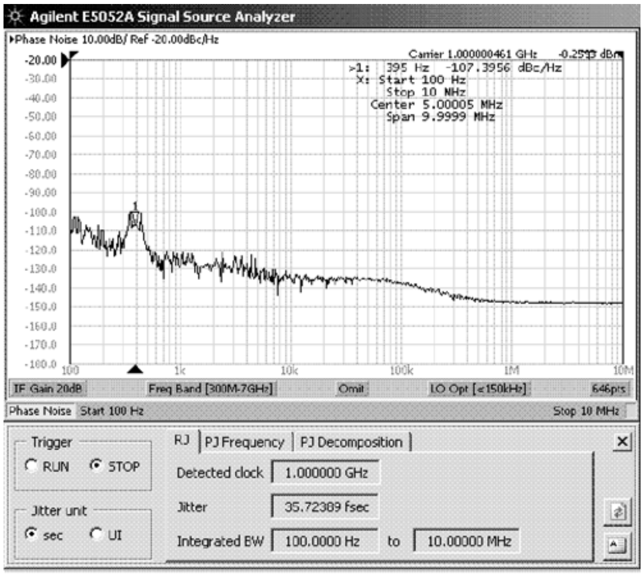
Button	Function
sec	Displays data in the unit of second.
UI	Displays data in the unit of unit interval.

Step 4. Select the **RUN** button (1 in Figure 7-5).

Step 5. The measurement starts, and the clock frequency (3 in Figure 7-5) and the random jitter rms value (4 in Figure 7-5) are displayed.

Step 6. Click the **STOP** button (1 in Figure 7-5) to finish the measurement.

Figure 7-6 **Example of screen for random jitter analysis**



e5052auj5011

Saving analysis result

You can save the analysis result to a file by following the steps below.

Step 1. Click the tab of the analysis result that you want to save. At this time, analysis is carried out once.

Step 2. Use the Save/Recall function to save the analysis result. For details, refer to “File Saving and Loading Instrument Status Settings” on page 229.

Recalling analysis result

You can recall the analysis result from a file by following the steps below.

Step 1. Use the Save/Recall function. For details, refer to “File Saving and Loading Instrument Status Settings” on page 229.

Step 2. Press the **Refresh** button (6 in Figure 7-5).

Saving analysis result to a file

You can save the result of random jitter analysis to a text file by pressing the **Export** button (7 in Figure 7-5).

Pressing the Export button opens the analysis result file in the Notepad application. Pressing this button during measurement writes the analysis result displayed at that time.

Notes on measurement

If you select another analysis function tab (PJ Frequency/PJ Decomposition) during measurement, the current measurement is aborted. In this case, the **#** sign (8 in Figure 7-5) is displayed for the analysis result to indicate a possible mismatch of displayed information between the E5052A and VBA.

Note that the **#** sign is not displayed if the E5052A’s displayed information is changed without using the VBA.

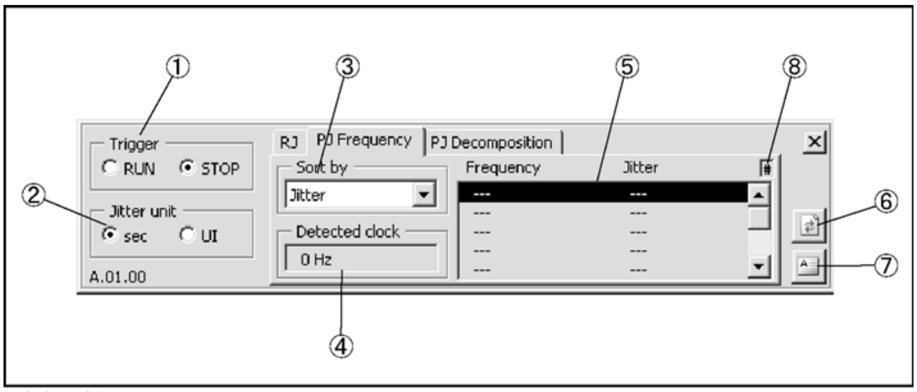
Frequency analysis for periodic jitter

Overview

This analysis displays the clock frequency and the RMS value of the periodic jitter when the spurious power value display is enabled in phase-noise measurement. You can use the band marker on the screen to specify an analysis range.

Setting procedure

Figure 7-7 **Screen for periodic jitter frequency analysis**



e5052auj5015

Step 1. Select **PJ Frequency** from the analysis function selection tabs.

Step 2. When you want to specify an analysis range, use the band marker on the phase-noise measurement screen.

Step 3. Select a spurious sorting method displayed on the phase-noise measurement screen (3 in Figure 7-7).

Button	Function
Jitter	Sorts jitters in ascending order.
Frequency	Sorts frequencies in ascending order.

Step 4. Select a display unit (2 in Figure 7-7).

Button	Function
sec	Displays data in the unit of second.
UI	Displays data in the unit of unit interval.

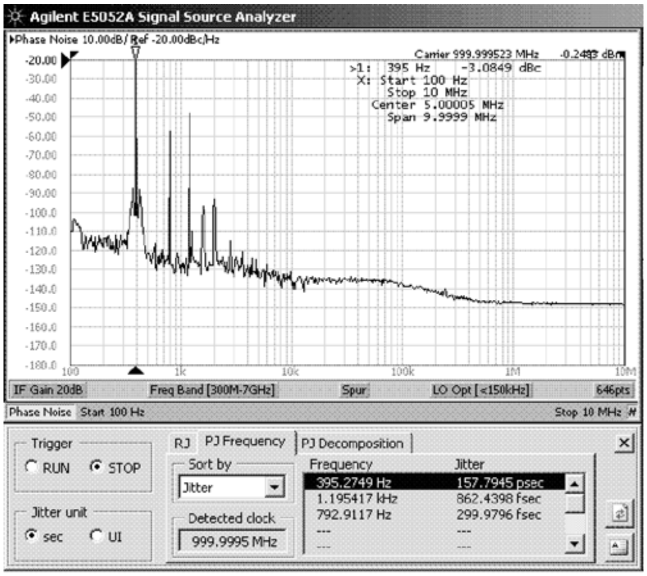
Step 5. Select the **RUN** button (1 in Figure 7-7).

Step 6. The measurement starts, and the lists of clock frequencies (4 in Figure 7-7) and periodic jitter rms values (5 in Figure 7-7) are displayed.

Step 7. Select the point you want to analyze from the list (5 in Figure 7-7). When you select a point, the marker moves to the analysis point on the phase-noise measurement screen.

Step 8. Click the **STOP** button to finish the measurement (1 in Figure 7-7).

Figure 7-8 **Example screen of periodic jitter frequency analysis**



e5052auj5012

Saving analysis result

You can save the analysis result to a file by following the steps below.

Step 1. Click the tab of the analysis result that you want to save. At this time analysis is carried out once.

Step 2. Use the Save/Recall function to save the analysis result. For details, refer to “File Saving and Loading Instrument Status Settings” on page 229.

Recalling analysis result

You can recall the analysis result from a file by following the steps below.

Step 1. Use the Save/Recall function. For details, refer to “File Saving and Loading Instrument Status Settings” on page 229.

Step 2. Press the **Refresh** button (6 in Figure 7-5).

Saving analysis result to a file

You can save the analysis result of random jitter analysis to a text file by pressing the **Export** button (7 in Figure 7-7).

Pressing the Export button opens the analysis result file in the Notepad application. Pressing the Export button during measurement writes the analysis result displayed at that time.

Note on measurement interruption

If you select another analysis function tab (RJ/PJ Decomposition) during measurement, the current measurement is aborted. In this case, the **#** sign (8 in Figure 7-5) is displayed for the analysis result to indicate a possible mismatch of displayed information between the

E5052A and VBA.

Note that the **#** sign is not displayed if the E5052A's displayed information is changed without using the VBA.

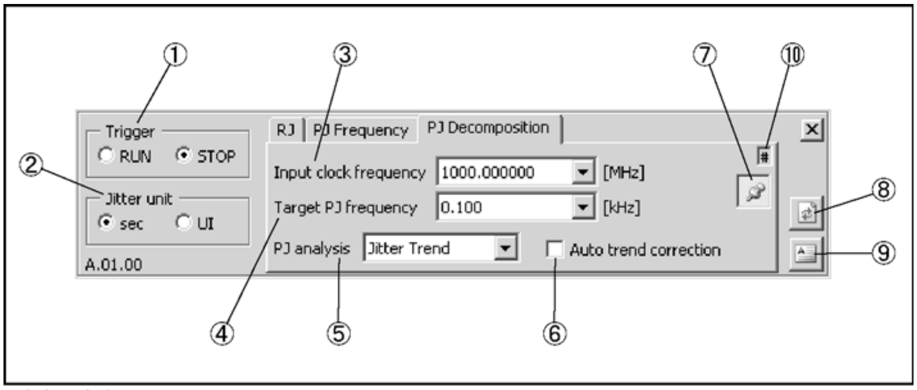
Decomposition analysis for periodic jitter

Overview

This analysis displays the jitter trend and histogram for jitter value analysis. The target frequency for transient measurement is linked.

Setting procedure

Figure 7-9 **Screen for periodic jitter decomposition analysis**



e5052auj5016

Step 1. Select **PJ Decomposition** from the analysis function selection tabs.

Step 2. Specify a clock frequency (MHz) for the periodic jitter frequency analysis (3 in Figure 7-9). Frequencies added here are saved in the list.

Step 3. Enter the period jitter frequency you want to analyze (4 in Figure 7-9). Frequencies entered here are saved in the list of jitter values (5 in Figure 7-7).

Step 4. Select an analysis function (5 in Figure 7-9).

Button	Function
Jitter Trend	Displays the jitter trend and analyzes the total jitter.
Histogram	Displays the histogram and analyzes the total jitter.
PJ Separation	Displays the histogram and gaussian and analyzes the total jitter and periodic jitter.

Step 5. Turns on/off the jitter trend auto correction function (6 in Figure 7-9).

The average of the narrow band measurement frequencies used in transient measurement is set to the phase reference frequency offset value.

To turn on this function, select the **Auto Trend Correction** checkbox.

Step 6. Select a display unit (2 in Figure 7-9).

Button	Function
sec	Displays data in the unit of second.

UI Displays data in the unit of unit interval.

Step 7. Select the **RUN** button (1 in Figure 7-9).

NOTE The previous analysis result is cleared.

Step 8. Measurement starts, and the analysis result is displayed.

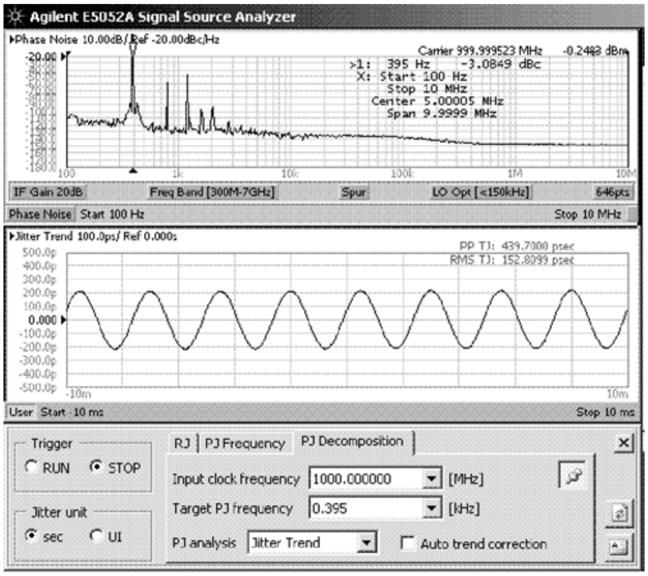
Button	Function
Jitter Trend	• Total jitter (p-p) • Total jitter (rms) • Clock*1
Histogram	• Total jitter (p-p) • Total jitter (rms) • Sampling count • Clock*1
PJ Separation	• Total jitter (p-p) • Total jitter (rms) • Periodic jitter (δ-δ) • Sampling count • Clock*1

*1. Displayed when the jitter trend auto correction function is on.

NOTE If fitting fails, ? (question mark) is added at the end of the analysis result.

Step 9. Click the **STOP** button to finish the measurement (1 in Figure 7-9).

Figure 7-10 Example screen for periodic jitter decomposition analysis



e5052auj5013

Adjusting the position where the analysis result is displayed

You can display the result of periodic jitter decomposition analysis at your desired position. Clicking the **Adjust Position** button (7 in Figure 7-9) will bring up another window on which you can adjust the display position.

Saving analysis result

You can save the analysis result to a file. Follow the steps below.

Step 1. Click the tab of the analysis result that you want to save. At this time analysis is carried out once.

Step 2. Use the Save/Recall function to save the analysis result. For details, refer to “File Saving and Loading Instrument Status Settings” on page 229.

Recalling analysis result

You can recall the analysis result from a file by following the steps below.

Step 1. Use the Save/Recall function. For details, refer to “File Saving and Loading Instrument Status Settings” on page 229.

Step 2. Press the **Refresh** button (6 in Figure 7-5).

Saving analysis result to a file

You can save the result of random jitter analysis to a text file by pressing the **Export** button (7 in Figure 7-9).

Pressing the Export button opens the analysis result file in the Notepad application. Pressing the Export button during measurement writes the analysis result displayed at that time.

Note on measurement interruption

If you select another analysis function tab (RJ/PJ Frequency) during measurement, the current measurement is aborted. In this case, the # sign (10 in Figure 7-5) is displayed for the analysis result to indicate a possible mismatch of displayed information between the E5052A and VBA.

Note that the **#** sign is not displayed if the E5052A's displayed information is changed without using the VBA.

Installing the program

To install the program, you need to separately purchase the E5001A SSA-J option. After you purchase this, a license certificate is issued from Agilent Technologies.

Follow the instructions on the license certificate to access the Agilent Technologies license server and receive your license key code.

NOTE License key codes are managed based on the serial number of the E5052A. The license for a certain E5052A cannot be transferred to any other E5052A.

There are two types of E5001A licenses: permanent license and limited-time license, which have different methods for entering the license code. For more information, see “Example of entering a permanent license key code” on page 266 or “Example of entering a limited-time license key code” on page 266.

Follow these steps to enable this function after receiving your license key code.

Setting procedure

Step 1. Press System .

Step 2. Press the **Service Menu** button.

Step 3. Press the **Install Option License** button.

Step 4. Press the **Jitter** button.

Step 5. The screen below appears for entering the license key code (SIGN=xxxxxx). After entering it, press the **Enter** key. After installation, the **Jitter** button is enabled (on).

NOTE You can enter the license key code with the keyboard.

Figure 7-11 **License key code entry screen**

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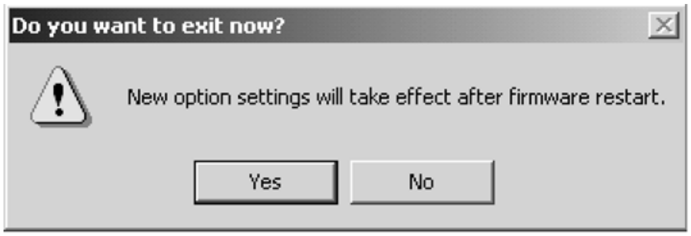
Step 6. After entering the license code, the following dialog box appears. Press **Yes** to restart the firmware.

Figure 7-12 **Confirmation dialog box after using key code entry screen**



e5052auj5019

Example of entering a permanent license key code

For the following sample permanent license, enter “128E234EE8B0.”

```
    FEATURE SSA-J Agilent 1.000 permanent uncounted \
HOSTID=VDH=E5052A_JP1KL00066 SIGN=128E234EE8B0
```

Example of entering a limited-time license key code

For the following sample limited-time license, enter “1-apr-2006, 1-may-2006, 1269EA605D7C.”

```
    FEATURE SSA-J Agilent 1.000 1-may-2006 uncounted \
HOSTID=VDH=E5052A_JP1KL00066 START=1-apr-2006 \
SIGN=1269EA605D7C
```

Confirming installation of E5001A

You can confirm that the E5001 is installed by checking the following items.

- The return value of the *OPT? command (should be “SSA-J”)
- Options displayed according to “Checking the Product Information” on page 290
- Options displayed at the startup of the E5052A

Error messages

If an error occurs during clock jitter measurement, a dialog box appears and the measurement stops. You may encounter the following messages.

Option SSA-J not Installed.

The E5001 (Option SSA-J) is not installed.

Unexpected error.

This massage may be displayed on the periodic jitter decomposition analysis screen.

It indicates that the trend range of the current measurement is greatly different from those of previous measurements and thus analysis cannot be performed.

Trigger error.

This message is displayed when the setting of the E5052A is changed during measurement and thus measurement cannot be triggered.

No AgtJitter data on SSA.

This massage may be displayed on the periodic jitter frequency analysis screen and the periodic jitter decomposition analysis screen.

It indicates that no measurement data exists when you try to save/recall.

File write error.

This message is displayed when writing to a file fails.

8 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 c drive volume label in hard disk is less than CL250

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.

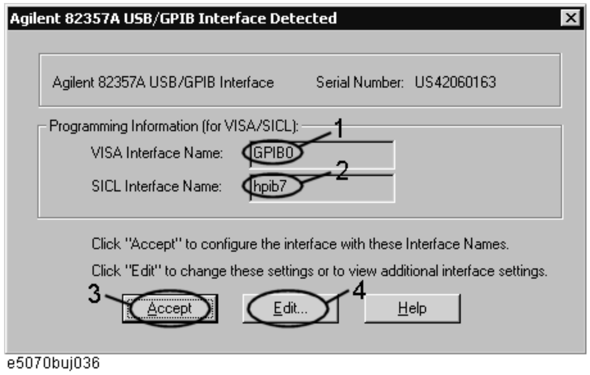
Follow these steps to set the USB/GPIB interface when c drive volume label in hard disk is less than CL250:

NOTE Do not connect two or more USB/GPIB interfaces.

NOTE 82357B USB/GPIB interface can not be used if not the c drive volume label in hard disk is more than CL251. When use the 82357B USB/GPIB interface, hard disk is requred to change.

Step 1. Connect the USB port of the E5052A to the USB/GPIB interface. The USB/GPIB Interface Detected dialog box (Figure 8-1) appears.

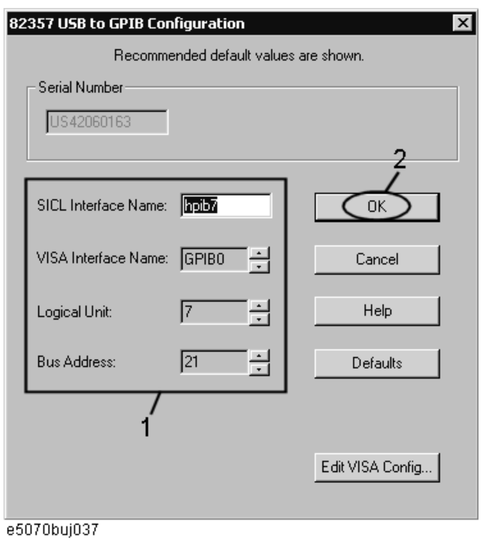
Figure 8-1 **USB/GPIB Interface Detected dialog box**



Step 2. Confirm that VISA Interface Name is set to GPIB0 (1 in Figure 8-1) and that the SICL Interface Name is set to hpib7 (2 in Figure 8-1) and then click the **Accept** button (3 in Figure 8-1). If the setting is correct, the procedure is complete. If the setting is different, click the **Edit** button (4 in Figure 8-1).

Step 3. The USB to GPIB Configuration dialog box (Figure 8-2) appears. Make the settings as shown in the thick-lined box (1 in Figure 8-2) and then click the **OK** button (2 in Figure 8-2).

Figure 8-2 **USB to GPIB Configuration dialog box**



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**.

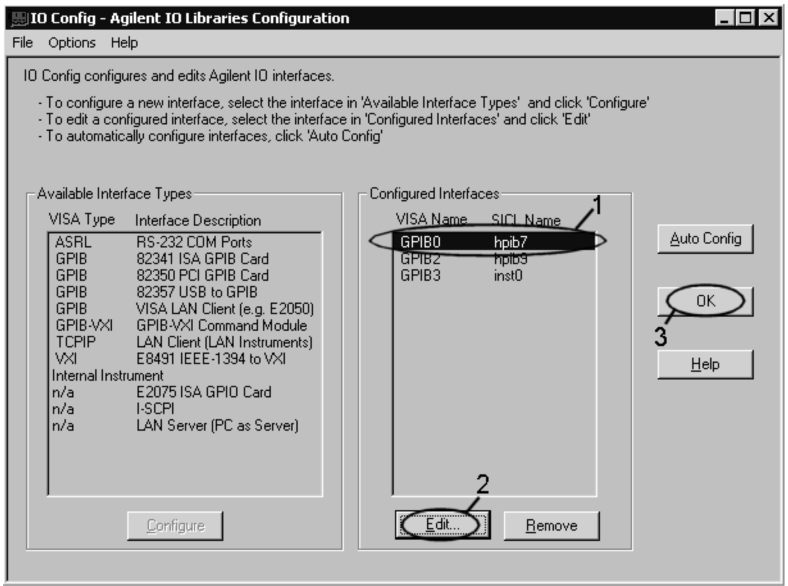
Step 3. Press **GPIB Setup**.

Step 4. Press **System Controller Configuration**.

Step 5. The IO Config dialog box (Figure 8-3) appears. Select (highlight) **GPIB0 hpib7** (1 in Figure 8-3) and then click the **Edit** button (2 in Figure 8-3).

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 8-3 **IO Config dialog box**



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Step 6. The USB to GPIB Configuration dialog box (Figure 8-2) appears. Check/change the setting of the USB/GPIB interface and then click the **OK** button (2 in Figure 8-2).

Step 7. In the USB to GPIB Configuration dialog box, click the **OK** button (3 in Figure 8-3).

Setting system controller (USB/GPIB interface) when c drive volume label in hard disk is more than CL251

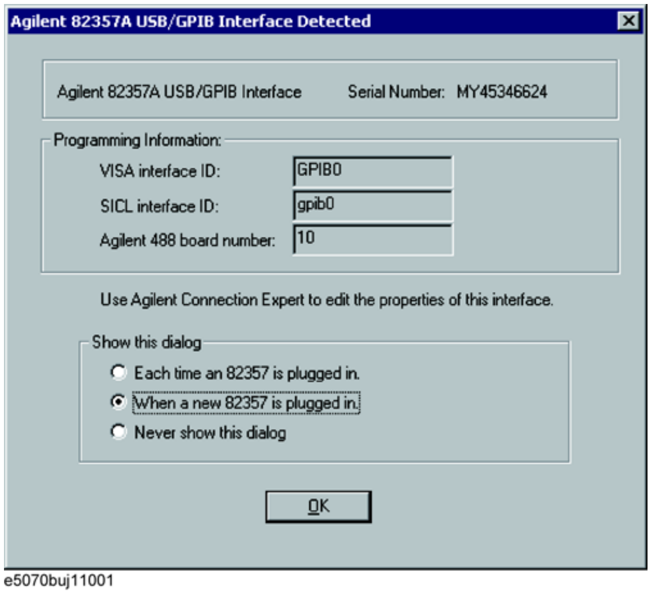
When controlling an external device from the E5052A, connect the USB port of the E5052A and the GPIB port of the external device through the USB/GPIB interface.

Follow these steps to set the USB/GPIB interface when c drive volume label in hard disk is more than CL251:

NOTE Do not connect two or more USB/GPIB interfaces.

Step 1. Connect the USB/GPIB interface to the USB port of the E5052A. The USB/GPIB Interface Detected dialog box (Figure 8-4) appears.

Figure 8-4 **USB/GPIB Interface Detected dialog box**



Step 2. Choose the “When a new 82357 is plugged in” in Show this dialog flame, then click **OK** button.

If you need to check/change the setting of the USB/GPIB interface after connecting the USB/GPIB interface, follow these steps:

Step 1. Press [System].

Step 2. Press **Misc Setup**.

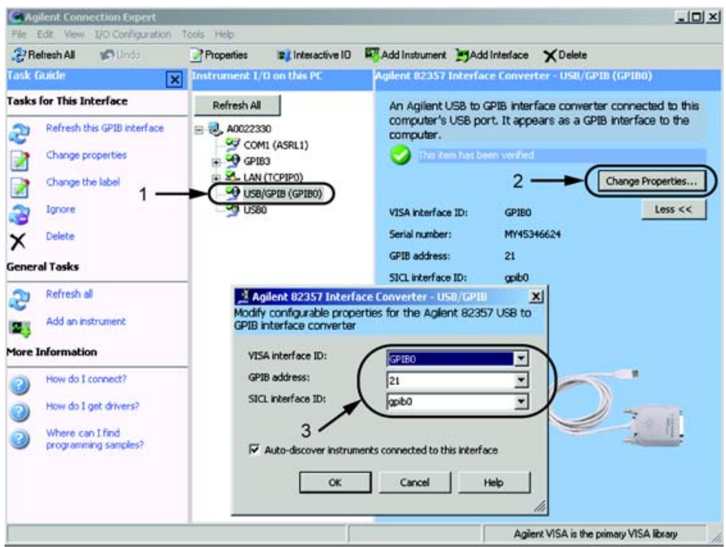
Step 3. Press **GPIB Setup**.

Step 4. Press **System Controller Configuration**.

Step 5. Agilent Connection Expert (Figure 8-5) appears. After selecting the **USB/GPIB(GPIB0)** (1 in Figure 8-5), click **Change Properties...** button (2 in Figure 8-5).

Step 6. Screen of USB/GPIB Interface appears. Check/change the setting of the USB/GPIB interface (3 in Figure 8-5)and then click the **OK** button.

Figure 8-5 **USB to GPIB Configuration dialog box**



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NOTE In Agilent Connection Expert, do not click buttons other than specified here or do not change other settings because doing so may cause serious damage to the functions of the E5052A.

Setting the Mouse

The user can change the setup for the mouse connected to the E5052A and the movement of the pointer.

Setup steps

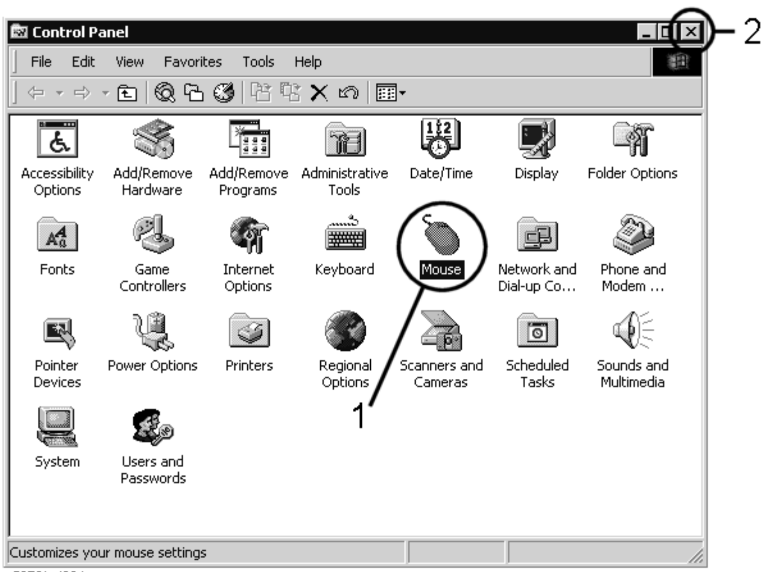
NOTE Be sure to use a mouse and a keyboard for mouse setup operations.

Step 1. Press System .

Step 2. Press **Misc Setup**.

Step 3. Press **Control Panel** to open the Control Panel window.

Figure 8-6 **Control Panel window**



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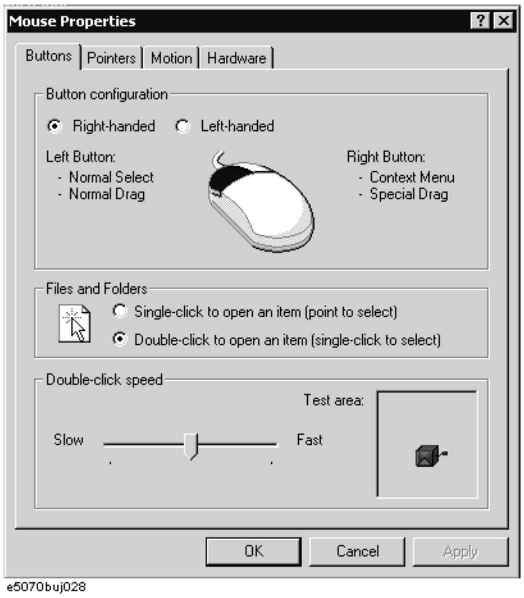
Step 4. Double-click the **Mouse** icon (1 in Figure 8-6) in the Control Panel window.

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 8-7) is displayed.

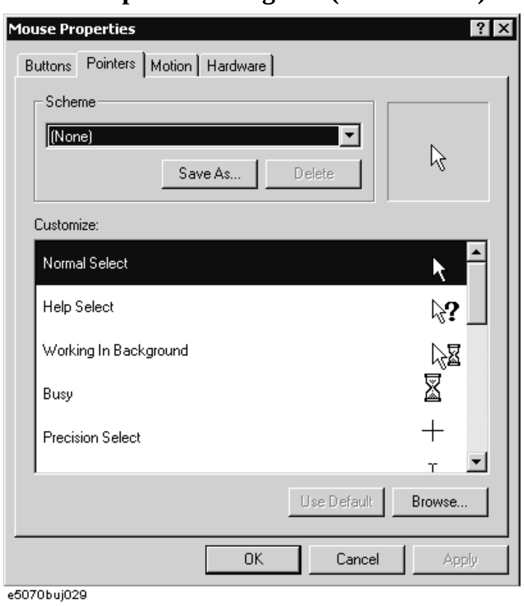
Define the setup for a right-handed/left-handed person in the **Buttons configuration** area. Define the setup for double-click speed in the **Double-click speed** area.

Figure 8-7 **Mouse Properties Dialog Box (Buttons tab)**



Step 6. Click the **Pointers** tab (Figure 8-8).

Figure 8-8 **Mouse Properties dialog box (Pointers tab)**

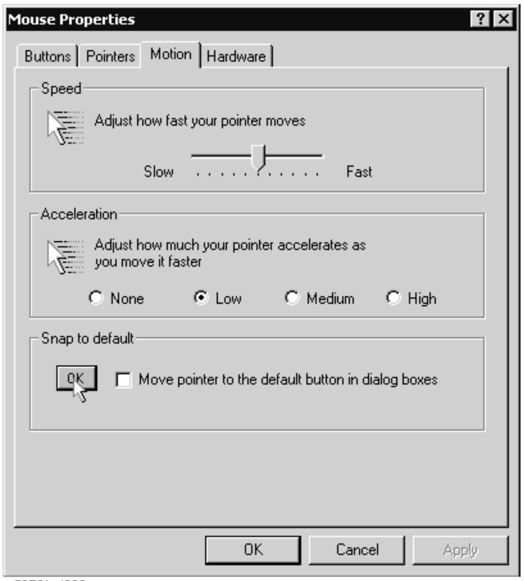


Step 7. Enter a registration name into the **Scheme** box and specify the shapes of pointers for the registration name in the box below.

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 8-9).

Figure 8-9 **Mouse Properties Dialog Box (Motion tab)**



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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 8-6) 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 276
- ❏ "Setting IP address" on page 277
- ❏ "Specifying computer name" on page 279

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.

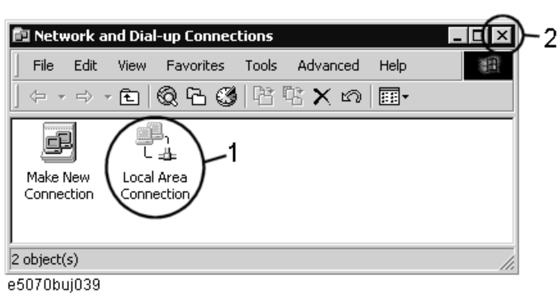
Step 2. Press System .

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 8-10).

Figure 8-10 **Network and Dial-up Connections window**



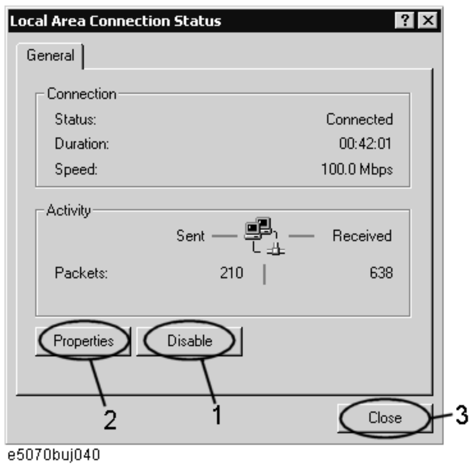
Step 6. When switching from disable to enable:

Double-click the Local Area Connection icon (1 in Figure 8-10) 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 8-10) in the Network and Dial-up Connections window. The Local Area Connection Status dialog box (Figure 8-11) appears. Click the **Disable** button (1 in Figure 8-11) to disable the network connection function.

Figure 8-11 Local Area Connection Status dialog box



Step 7. Click the × button (2 in Figure 8-10) 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**.

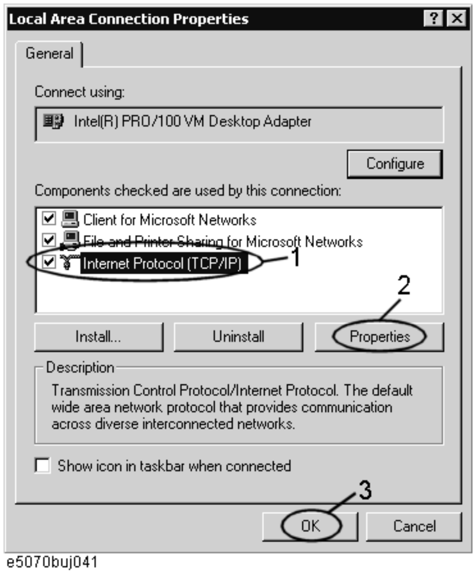
Step 3. Press **Network Setup**.

Step 4. Press **Network Configuration**.

Step 5. Double-click the Local Area Connection icon (1 in Figure 8-10) in the Network and Dial-up Connections window. The Local Area Connection Status dialog box (Figure 8-11) appears. Click the **Properties** button (2 in Figure 8-11).

Step 6. The Local Area Connection Properties dialog box (Figure 8-12) appears. Select (highlight) **Internet Protocol (TCP/IP)** (1 in Figure 8-12) and then click the **Properties** button (2 in Figure 8-12).

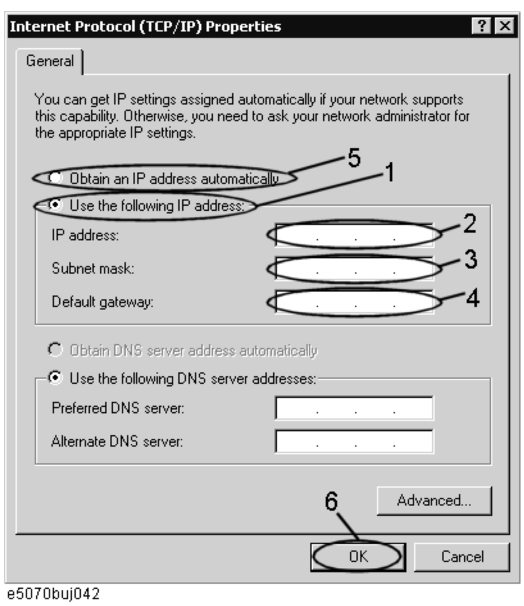
Figure 8-12 **Local Area Connection Properties dialog box**



Step 7. The Internet Protocol (TCP/IP) Properties dialog box (Figure 8-13) appears. Click (select) **Use the following IP address** (1 in Figure 8-13) and then enter the IP address (2 in Figure 8-13), the subnet mask (3 in Figure 8-13), and the gateway address (4 in Figure 8-13).

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 8-13).

Figure 8-13 **Internet Protocol (TCP/IP) Properties dialog box**



Step 8. In the Internet Protocol (TCP/IP) Properties dialog box, click the **OK** button (6 in Figure 8-13).

Step 9. In the Local Area Connection Properties dialog box, click the **OK** button (3 in Figure 8-12).

Step 10. In the Local Area Connection Status dialog box, click the **Close** button (3 in Figure 8-11).

Step 11. Click the × button (2 in Figure 8-10) 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.

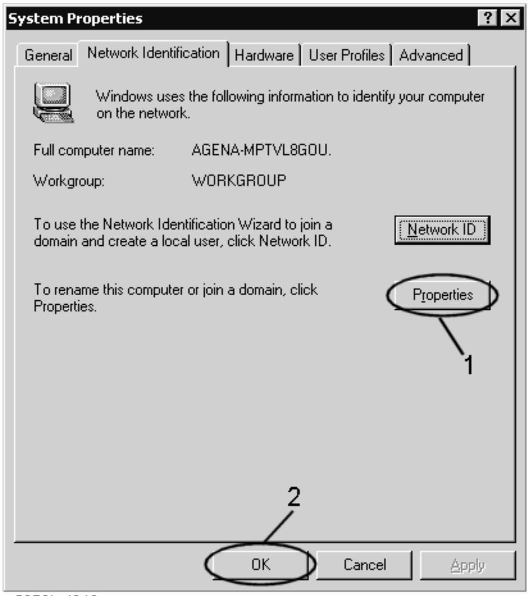
Step 2. Press **Misc Setup**.

Step 3. Press **Network Setup**.

Step 4. Press **Network Identification**.

Step 5. The System Properties dialog box (Figure 8-14) appears. Click the **Properties** button (1 in Figure 8-14).

Figure 8-14 **System Properties dialog box**



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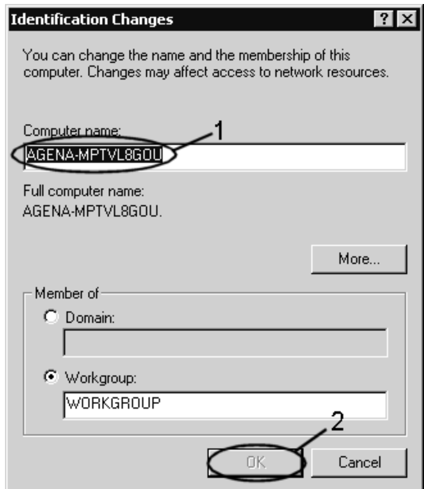
8. Setting and Using the Control and Management Functions

Step 6. The Identification Changes dialog box (Figure 8-15) appears. Enter the computer name in the **Computer Name** box (1 in Figure 8-15).

Figure 8-15 **Identification Changes dialog box**



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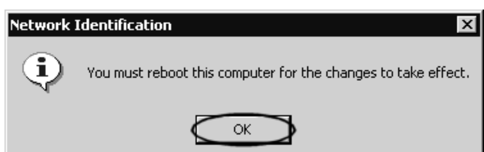
Step 7. The Network Identification dialog box (Figure 8-16) appears. Click the **OK** button.

Figure 8-16 **Network Identification dialog box**



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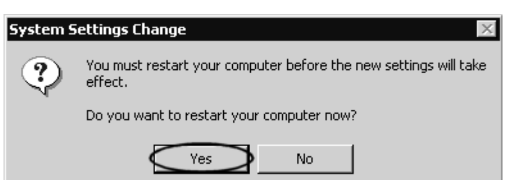
Step 8. In the Identification Changes dialog box, click the **OK** button (2 in Figure 8-15).

Step 9. In the System Properties dialog box, click the **OK** button (2 in Figure 8-14).

Step 10. The System Settings Change dialog box (Figure 8-17) appears. Click the **Yes** button to restart the E5052A.

Figure 8-17 **System Settings Change dialog box**



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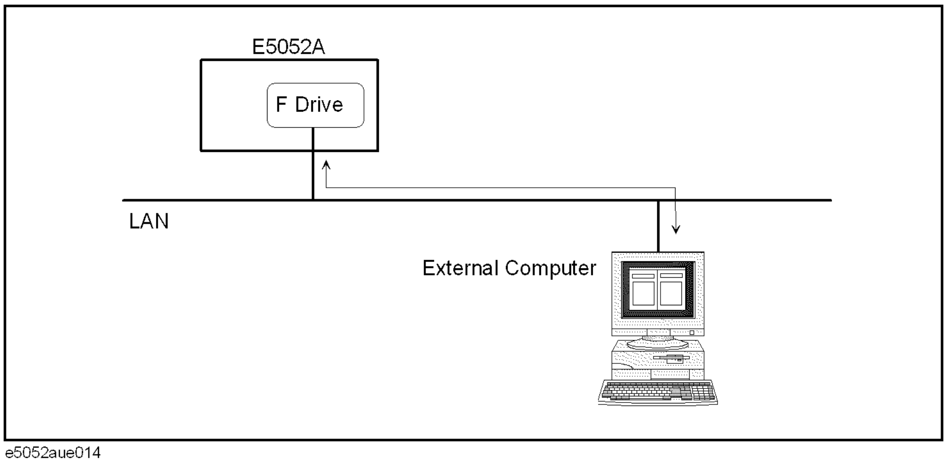
NOTE The changed settings do not take effect until the E5052A is restarted.

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 8-18 Accessing drive F of E5052A from external PC



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.

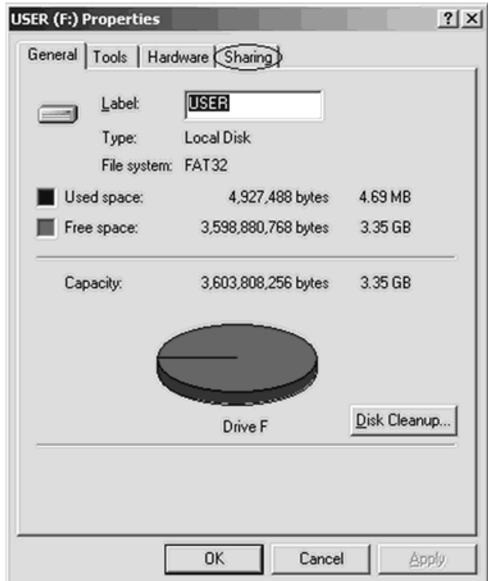
Step 1. Press Save/Recall.

Step 2. Press **Explorer...**.

Step 3. Windows Explorer (Refer to the Figure 6-16 on page 237) opens. Select (highlight) **USER (F:)** and then click **Properties** in the File menu.

Step 4. The USER(F:) Properties dialog box (Figure 8-19) appears. Select the **Sharing** tab.

Figure 8-19 USER(F:) Properties dialog box (General tab)



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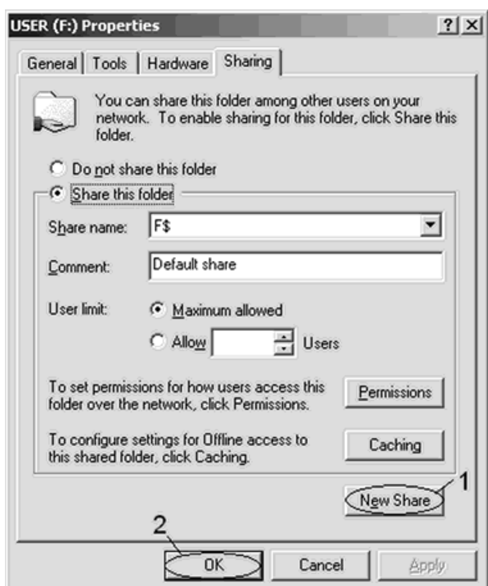
Step 5. Click the **New Share** button (1 in Figure 8-20).

Figure 8-20 USER(F:) Properties dialog box (Sharing tab)



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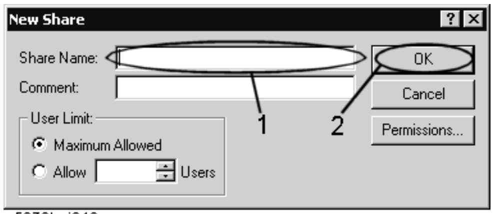
Step 6. The New Share dialog box (Figure 8-21) appears. Enter the share name (name used when accessed from the external PC) in the **Share Name** box (1 in Figure 8-21) and click the **OK** button (2 in Figure 8-21).

Figure 8-21 **New Share dialog box**



e5070buj049

Step 7. In the USER(F:) Properties dialog box, click the **OK** button (2 in Figure 8-20).

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 281. 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 279; for information on how to set the share name, refer to "Enabling access from an external PC" on page 281.

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 281, you can make connection using the user name, **E5052**, without the password.

Disabling USB Mass Storage Device

You can disable any USB-compatible external mass storage devices in order to ensure confidentiality or for other reasons.

Steps for Setting Modification

The following procedure shows how to disable a USB Mass Storage Device.

Step 1. Press Save/Recall.

Step 2. Press **Explorer...**.

Step 3. Double-click DisableUsbStorage.exe from F:¥Agilent¥Service.

Step 4. Click OK in the SUCCEEDED message window that appears. If any USB mass storage device is connected to the E5052A under this condition, the Hardware Wizard will start, but the USB mass storage device will not work.

The procedure shows how to enable a USB Mass Storage Device.

Step 1. Press Save/Recall.

Step 2. Press **Explorer...**.

Step 3. Double-click EnableUsbStorage.exe from F:¥Agilent¥Service.

Step 4. Click OK in the SUCCEEDED message window that appears.

NOTE If you do not want any USB mass storage device to ever be enabled at any time, delete EnableUsbStorage.exe from the E5052A after DisableUsbStorage.exe has been completed.

These two programs will not be recovered automatically by applying the firmware update or other such action. Before deleting any of these programs, you should make a backup copy to a recording medium such as a floppy disk and store it separately.

NOTE If the program fails to run, it is possible that you have not logged in as a user in the Administrators Group. When you want to execute any of the above programs, make sure to log in as a user in the Administrators Group.

The “E5052” that is the username when the factory is shipped is Administrator Group.

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 8-1.

Table 8-1 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.

Setting display colors

Selecting display mode

You can select the display mode of the LCD display from two options: normal display (background: black) and inverted display (background: white). In normal display, the colors of items are preset so that you can recognize them easily on the display of the instrument. On the other hand, in inverted display, items are preset to colors obtained by almost completely inverting the default settings of the normal display; this mode allows you to use data easily when storing it into a graphic file.

The selection procedure is as follows.

Step 1. Press Display.

Step 2. Press **Color Type** to select the display mode. **Normal** indicates the normal display, **Invert** the inverted display.

Setting display color for each item

You can set the display color to the normal display or to the inverted display separately for each of the following items.

- ❏ Data/memory trace
- ❏ Labels and lines of graphs
- ❏ File display of the limit test and limit lines
- ❏ Background

Set the color of each item by specifying the amounts of red (R), green (G), and blue (B) contained in the color. You can specify each level of R, G, and B in 256 steps (0 to 255). Therefore, 16.77 million colors in total are available by combining the color levels. The table below shows the R, G, and B values for the main colors as a reference.

	R	**G**	**B**		**R**	**G**	**B**		**R**	**G**	**B**
White	255	255	255	Gray	128	128	128	Black	0	0	0
Red	255	0	0	Yellow	255	255	0	Green	0	255	0
Cyan	0	255	255	Blue	0	0	255	Magenta	255	0	255

The setting procedure is as follows:

Step 1. Press System.

Step 2. Press **Misc Setup**.

Step 3. Press **Color Setup**.

Step 4. Press **Normal** (for normal display) or **Invert** (for inverted display).

Step 5. Press the softkey corresponding to the item for which you want to set the display color.

Softkey	Function
Data Trace 1 to **8**	Specifies the data trace of traces 1 to 8
Mem Trace 1 to **8**	Specifies the memory trace of traces 1 to 8
Graticule Main	Specifies the graticule label and the outer lines of graphs
Graticule Sub	Specifies the grid lines of graphs
Limit Fail	Specifies the fail display in the limit test result
Limit Line	Specifies the limit line
Background	Specifies the background

Step 6. Press **Red**.

Step 7. Select the amount of red (R) from **0** to **255**.

Step 8. Press **Green**.

Step 9. Select the amount of green (G) from **0** to **255**.

Step 10. Press **Blue**.

Step 11. Select the amount of blue (B) from **0** to **255**.

Resetting the display colors to factory defaults

You can reset the display colors in normal display and inverted display to the values of the preset factory state.

The selection procedure is as follows.

Step 1. Press System.

Step 2. Press **Misc Setup**.

Step 3. Press **Color Setup**.

Step 4. Press **Normal** (for normal display) or **Invert** (for inverted display).

Step 5. Press **Reset Color**.

Step 6. Press **OK**.

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.

9 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 237 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 281 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.

Maintenance of removable hard disk

This section describes how to attach/detach the removable hard disk, and how to write the system calibration data. The serial number indicates whether the removable hard disk function is available. For more information, see “Manual Changes.” of “Change 4” on page 347

CAUTION

Be sure to send the E5052A with the removable hard disk attached when sending it to our company for calibration/repair.

If you replace the removable hard disk by yourself, load the system calibration data from a floppy disk. For information on the procedure, see “Recalling system calibration data to removable hard disk” on page 295.

If you need a spare removable hard disk, we recommended that you purchase an E5052U -Opt018 Harddisk drive.

Saving system calibration data from removable hard disk to floppy disk

Replacing a removable hard disk causes the system calibration data to be lost. Therefore, before replacing the removable hard disk, you need to save the system calibration data to a floppy disk.

Follow these steps to save the system calibration data to a floppy disk before replacing the removable hard disk.

Step 1. Insert a formatted floppy disk into the floppy disk drive.

Step 2. Press Save/Recall - **Explorer...**to bring Windows Explorer.

Step 3. Copy the entire D:\syscal directory to the floppy disk.

Place the mouse pointer at the D:\syscal directory, right-click it, and select **Copy** .

Place the mouse pointer at the A: drive, right-click it, and select **Paste** .

Step 4. Copy the entire D:\limit directory to the floppy disk.

Place the mouse pointer at the D:\limit directory, right-click it, and select **Copy** .

Place the mouse pointer at the A: drive, right-click it, and select **Paste** .

Removing Removable Hard Disk

Follow the steps below to remove a removable hard disk.

CAUTION

Before removing a hard disk, you must turn off the unit’s power and then disconnect the power cord from the outlet.

Step 1. Unscrew the four screws that hold the cover panel ([1] in Figure 9-1, P/N 0515-2146).

Step 2. Remove the panel.

Step 3. Unscrew the four screws that hold the removable hard disk ([1] in Figure 9-2, P/N0515-0374).

Step 4. Carefully remove the flat cable ([2] in Figure 9-2, P/N E5070-61638[*1]) from the removable hard disk. Release the cable's connector by pressing the locking hooks at the sides of the connector.

Mounting Removable Hard Disk

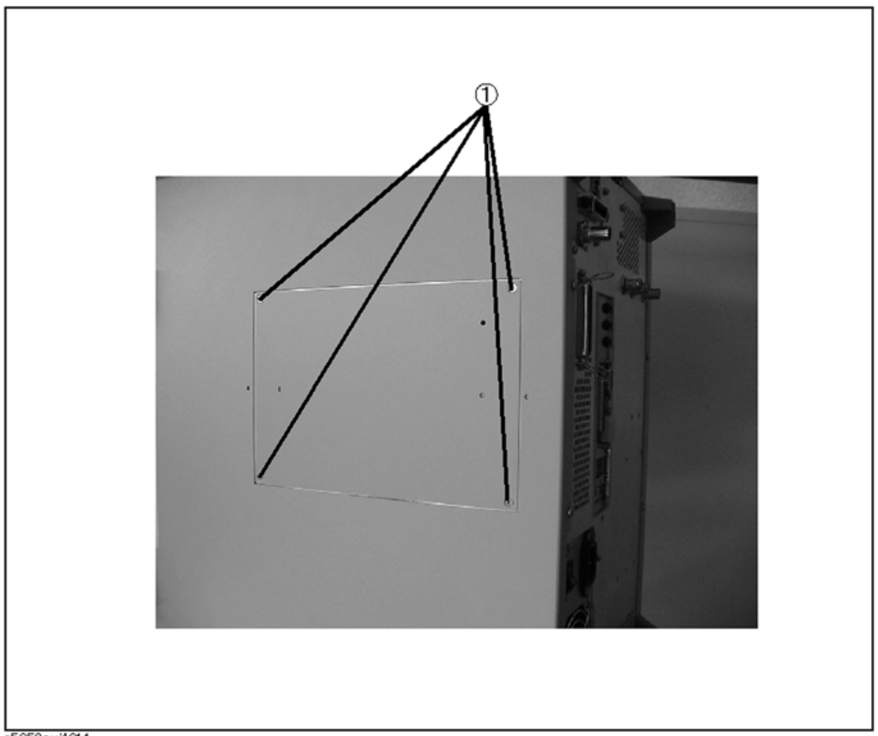
Follow the steps below to mount a removable hard disk.

Step 1. Connect the removable hard disk to the flat cable's connector ([2] in Figure 9-2).

Step 2. Secure the removable hard disk in place with the four screws ([1] in Figure 9-2).

Step 3. Secure the cover panel in place with the four screws ([1] in Figure 9-1).

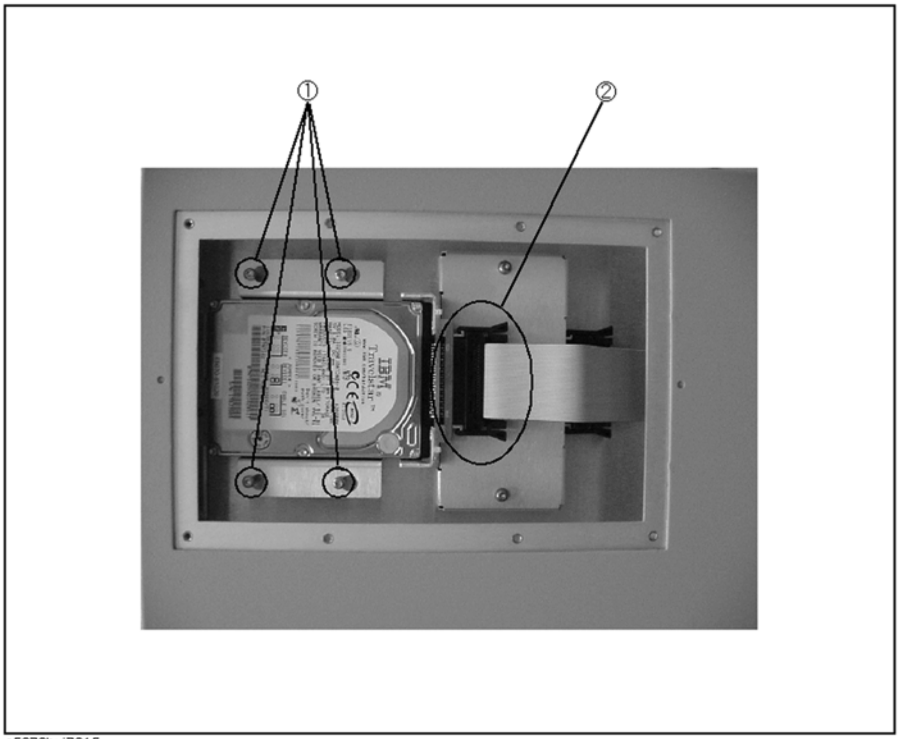
Figure 9-1 **Attaching/detaching removable hard disk: 1**



e5052auj4011

*1. Flat cable with connector

Figure 9-2 Attaching/detaching removable hard disk: 2



Recalling system calibration data to removable hard disk

Follow these steps to recall the system calibration data from a floppy disk in which it is saved after replacing the removable hard disk.

Step 1. Turn on the E5052A.

Step 2. Insert the floppy disk in which the system calibration data is saved into the floppy disk drive.

Step 3. Press Save/Recall - **Explorer...**to bring Windows Explorer.

Step 4. Copy the entire syscal directory of the A: drive to immediately under the D: drive.

Place the mouse pointer at the A:\syscal directory, right-click it, and select **Copy** .

Place the mouse pointer at the D: drive, right-click it, and select **Paste** .

Step 5. Copy the entire limit directory of the A: drive to immediately under the D: drive.

Place the mouse pointer at the A:\limit directory, right-click it, and select **Copy** .

Place the mouse pointer at the D: drive, right-click it, and select **Paste** .

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).

Types of system recoveries

The following two types of system recoveries are available.

❏ Factory recovery

Returns the contents of the C drive to the factory state.

❏ User recovery*2

Returnes the contents of the C drive to a user-specified state. To use this function, you must prepare for recovery in advance. For information on preparation, see “Procedure to create the user backup image” on page 300. For information on the execution, see “Procedure to execute the user recovery” on page 303.

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 292.

*1. If the hard disk failed and has been replaced after purchase, the state when the replacement was performed is recovered.
*2. This function is available when the volume label on the hard disk is CL250 or higher.

Procedure to execute factory recovery

NOTE You need to use the keyboard for this operation.

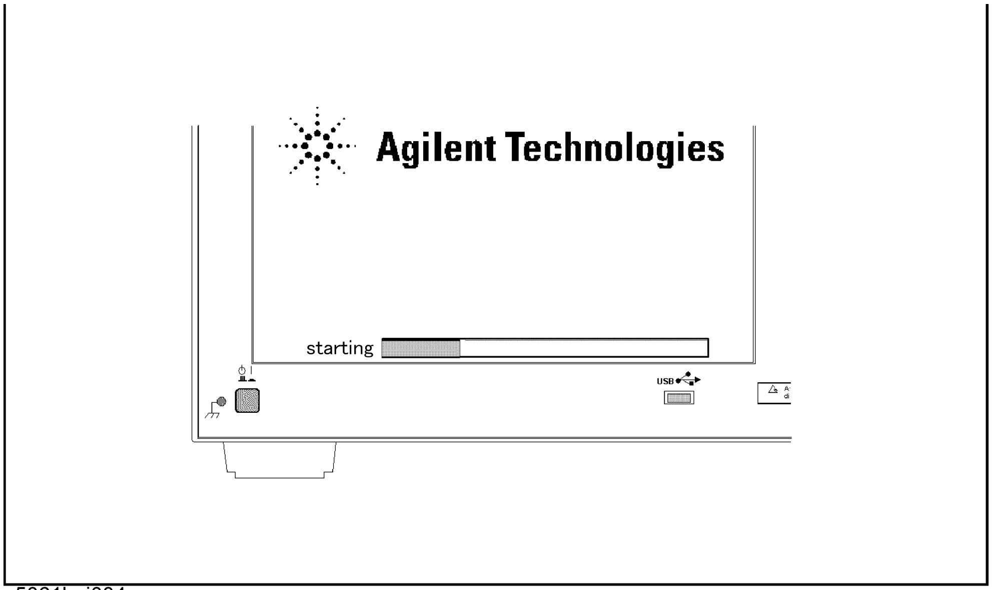
Step 1. Shut down the E5052A.

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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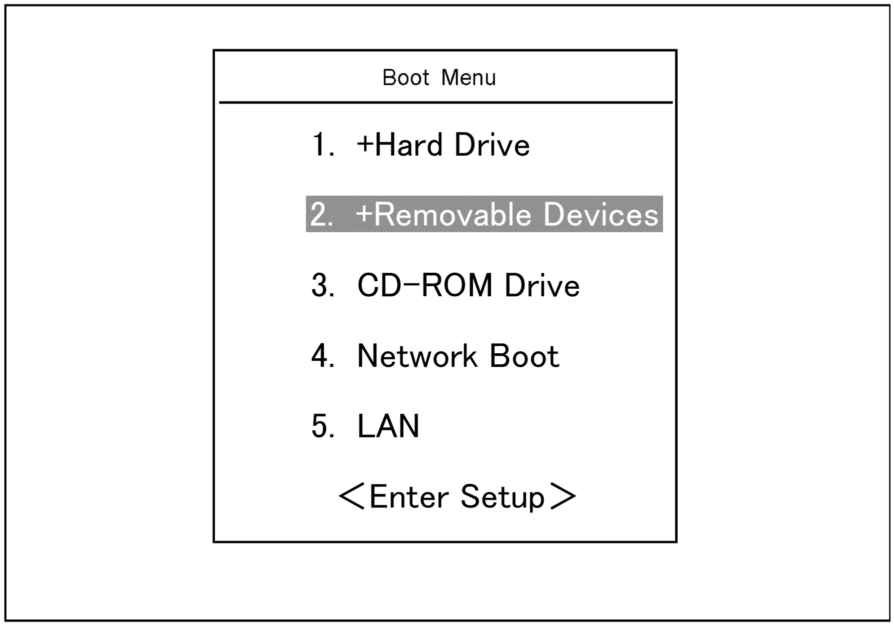
NOTE After several seconds, the next screen appears automatically even if you do not press any key, so do not miss it.

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 factory recovery, press 4 at this point.

```
Agilent Technologies System Utilities
Recovery & Backup Options (for the E5052A)

Choose One of the following:
________________________________________________________________

   1. Recover Factory Backup Image
   2. Create User Backup Image
   3. Recover User Backup Image
   4. 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 70 .

Step 12. Execute the calibration of the touch screen. For information on the execution procedure, refer to “Calibration of the Touch Screen” on page 306.

Procedure to create the user backup image

This section describes how to create the user backup image. The C drive contents saved in this creation are recalled when when the user recovery function is executed.

NOTE This function is available when the volume label on the hard disk is CL250 or higher.

NOTE You need the keyboard for this operation.

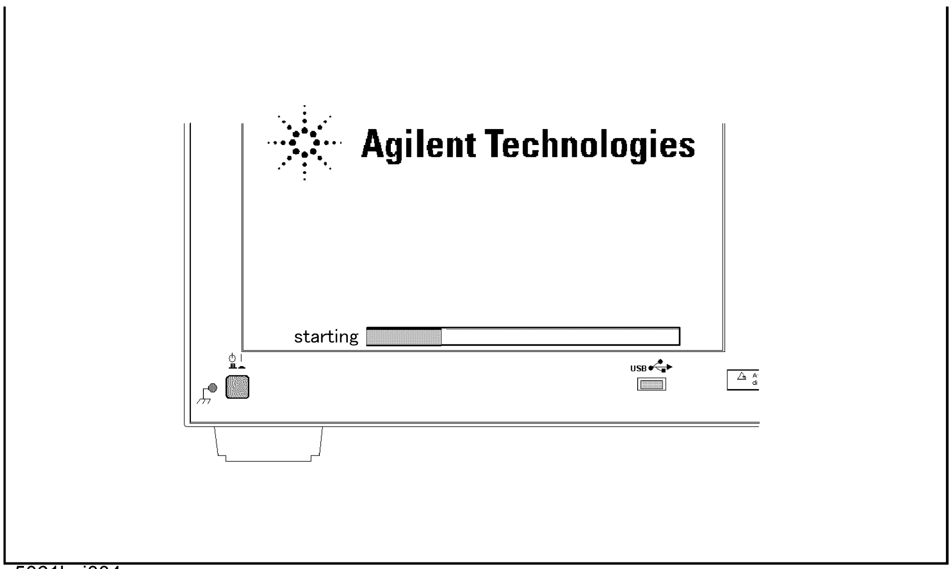
Step 1. Shut down the E5052A.

Step 2. Connect the keyboard to the E5052A.

Step 3. Insert the disk for the system recovery into the floppy disk drive of the E5052A.

Step 4. Press the standby swith of the E5052A to turn it on.

Step 5. When the screen as shown in the figure below appears, press and hold the Esc on the keyboard until this screen disappears.

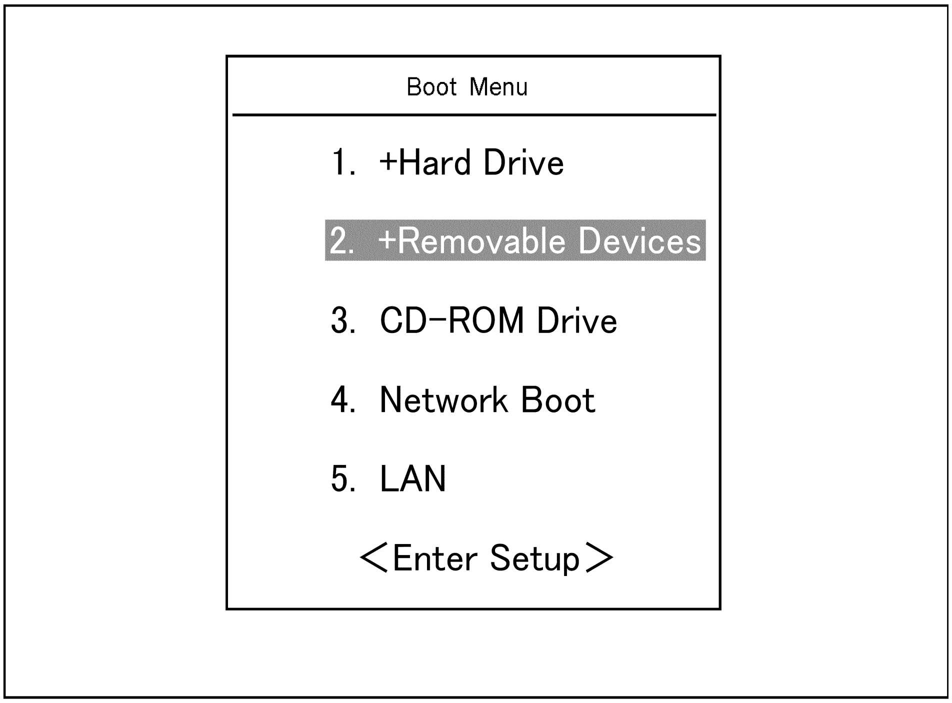


e5061buj034

NOTE After several seconds, the next screen appears automatically even if you do not press any key, so do not miss it.

If the above message does not appear, the instrument is at fault; contact your local Agilent customer center listed at the end of this manual or distributor.

Step 6. The following screen appears. Select "+Removable Device" with ↑ ↓ of the keyboard, and press Enter of the keyboard.



Step 7. The message as shown below appears. Press 2 of the keyboard. If you want to cancel creation of the user backup image, press 4 at this point.

```
Agilent Technologies System Utilities
Recovery & Backup Options for the E5052A

Choose One of the following:
______________________________________________________________
   1. Recover Factory Backup Image
   2. Create User Backup Image
   3. Recover User Backup Image
   4. Exit
______________________________________________________________
Enter a Choice: _
```

NOTE If the above message does not appear, the instrument or the disk for the system recovery is at fault; contact your local Agilent customer center listed at the end of this manual or distributor.

Step 8. The message as shown below appears. Press C of the keyboard. If you want to cancel creation of the user backup image, press E at this point.

```
You chose to create a backup image file of your system.

The system will perform a quick integrity check of the file
structure on the C: Drive.  It will then copy the C: partition to
an image file and store it on the System Recovery partition.

Press C to Continue or E to Exit: _
```

Step 9. The message as shown below appears. Press C of the keyboard to start creating the user backup image. If you want to cancel creation of the user backup image, 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 creating the user backup image because doing so may cause serious damage to the E5052A.**

Step 10. Creation of user backup image will be complete in about 5 minutes. When it is complete, the message as shown below appears. Press Ctrl, Alt, and Delete of 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 at fault; contact your local Agilent customer center listed at the end of this manual or distributor.

Procedure to execute the user recovery

Returns the contents of the C drive to a user-specified state. To use this function, you must create the user backup image in advance. For more information, see “Procedure to create the user backup image” on page 300.

NOTE This function is available when the volume label on the hard disk is CL250 or higher.

NOTE You need the keyboard for this operation.

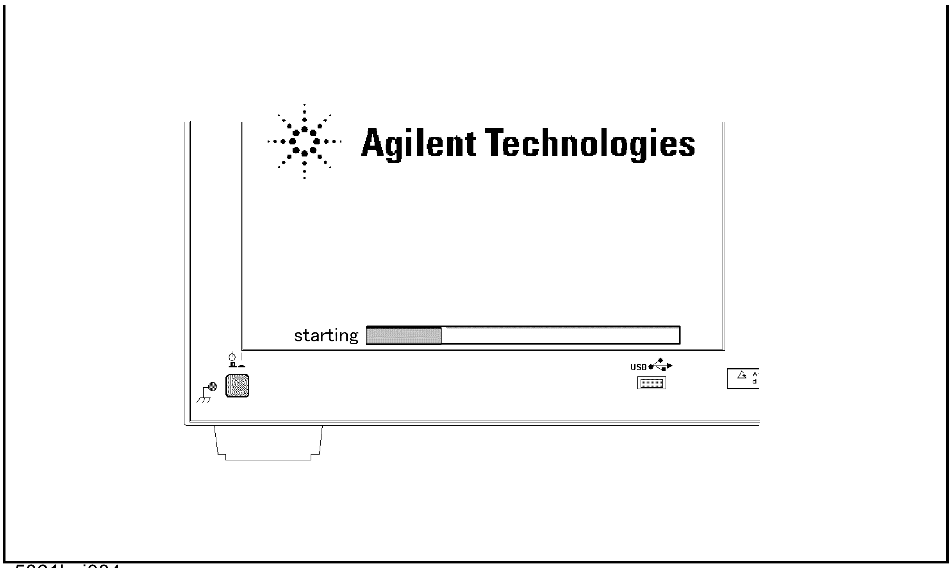
Step 1. Shut down the E5052A.

Step 2. Connect the keyboard to the E5052A.

Step 3. Insert the disk for the system recovery into the floppy disk drive of the E5052A.

Step 4. Press the standby swith of the E5052A to turn it on.

Step 5. When the screen as shown in the figure below appears, press and hold the Esc on the keyboard until this screen disappears.

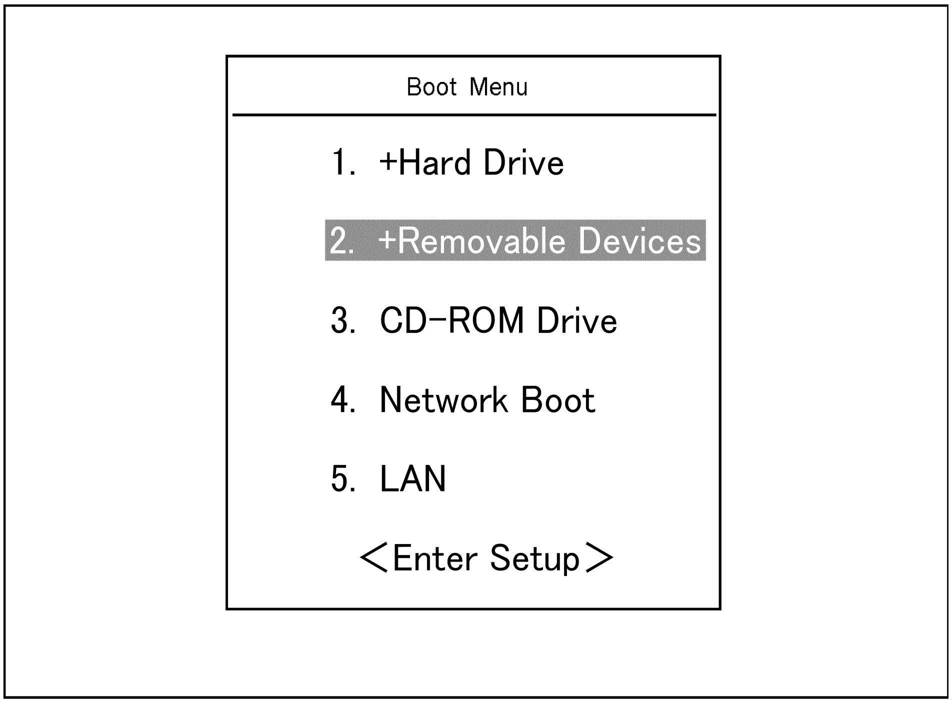


e5061buj034

NOTE After several seconds, the next screen appears automatically even if you do not press any key, so do not miss it.

If the above message does not appear, the instrument is at fault; contact your local Agilent customer center listed at the end of this manual or distributor.

Step 6. The following screen appears. Select "+Removable Device" with ↑ ↓ of the keyboard and press Enter of the keyboard.



Step 7. The message as shown below appears. Press 3 of the keyboard. If you want to cancel the user recovery, press 4 at this point.

```
Agilent Technologies System Utilities
Recovery & Backup Options for the E5052A

Choose One of the following:
_________________________________________________________________
   1. Recover Factory Backup Image
   2. Create User Backup Image
   3. Recover User Backup Image
   4. Exit
_________________________________________________________________
Enter a Choice: _
```

NOTE If the above message does not appear, the instrument or the disk for the system recovery is at fault; contact your local Agilent customer center listed at the end of this manual or distributor.

Step 8. The message as shown below appears. Press [C] of the keyboard. If you want to cancel the user recovery, press [E] at this point.

```
 You chose to recover your own system backup image file.

WARNING: Press C to Continue only if you are sure that you want
to proceed.  The C: partition will be completely overwritten with no
chance of recovering any data.  Use Option 3 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 as shown below appears. Press [C] of the keyboard to start the user recovery. If you want to cancel the user 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 the user recovery because doing so may cause serious damage to the E5052A.**

Step 10. The user recovery will be complete in about 5 minutes. When it is complete, the message as shown below appears. Press [Ctrl], [Alt], and [Delete] of 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 at fault; contact your local Agilent customer center listed at the end of this manual or distributor.

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 .

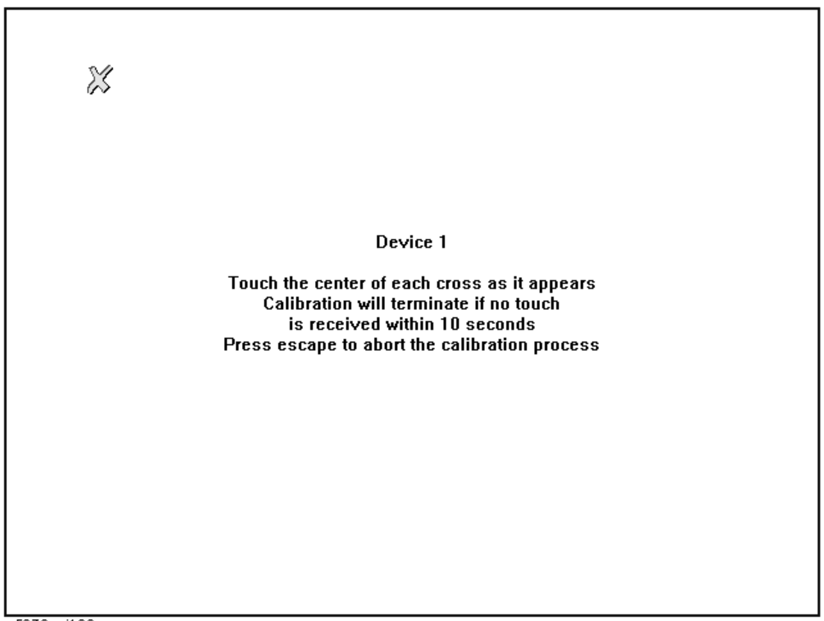
Step 2. Press **Service Menu**.

Step 3. Press **Test Menu**.

Step 4. Press **Adjust Touch Screen**.

The touch screen calibration screen (Figure 9-3) appears.

Figure 9-3 **Touch panel calibration screen**



e5070auj126

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 9-1. Using the recommended replacement time shown in Table 9-1 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 9-1 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 287.

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 292 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.

10 Specifications and Supplemental Information

This chapter provides specifications and supplemental information for the Agilent E5052A Signal Source Analyzer.

Definitions

All specifications apply over a 23°C ± 5°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 10-1 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	
10 MHz to 30 MHz	–15 to + 20 dBm
30 MHz to 7 GHz	–20 to + 20 dBm
Offset Frequency Range	
Carrier > 400 MHz	1 Hz to 40 MHz (Standard) 10 Hz to 40 MHz (Option 011)
Carrier < 400 MHz	1 Hz to 10% of carrier frequency (Standard) 10 Hz to 10% of carrier frequency (Option 011)
Offset Frequency Settable Range	
Carrier ≥ 99 MHz	1 Hz to 40 MHz (Standard) 10 Hz to 40 MHz (Option 011)
39 MHz ≤ Carrier < 99 MHz	1 Hz to 20 MHz (Standard) 10 Hz to 20 MHz (Option 011)
10 MHz ≤ Carrier < 39 MHz	1 Hz to 5 MHz (Standard) 10 Hz to 5 MHz (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
IF Gain	0, 10, 20, 30, 40, 50 dB (Standard) 0, 10, 20 dB (Option 011)
Built-in LO Phase Noise Optimization	< 150 kHz (Optimized for Close-in Phase Noise) > 150 kHz (Optimized for Far-out Phase Noise) See Figure 10-4
Accuracy	
1 to 100 Hz offset (Standard)	< ±4 dB (typical, at 23°C±5°C)
1 to 100 Hz offset (Option 011)	< ±4 dB (typical, at 23°C±5°C)
100 to 1 kHz offset	< ±4 dB (typical, at 23°C±5°C)
1 k to 1 MHz offset	< ±2 dB (typical, at 23°C±5°C)
1 M to 40 MHz offset	< ±3 dB (typical, at 23°C±5°C)

Table 10-1 Phase Noise Measurement

Description	Specifications
Spurious level	65 dBc (typical), > 1 kHz Offset
SSB Phase Noise Sensitivity (at 23°C±5°C)	See Table 10-2 through Table 10-6, Figure 10-1 through Figure 10-3
Measurement Time	See Table 10-7

*1. Not available for Option 011.

Table 10-2 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	-77.0	-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 10-3 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 10-4 **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.	-106.0	-138.5	-149.5	-157.5	-167.5	-169.5	-	-
100 MHz	spec.			-145.5	-153.5	-160.0	-160.0	-160.0	-
	typ.	-94.0	-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.	-74.0	-112.5	-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.	-64.5	-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.	-57.1	-95.6	-112.6	-121.6	-128.0	-144.0	-157.5	-161.0

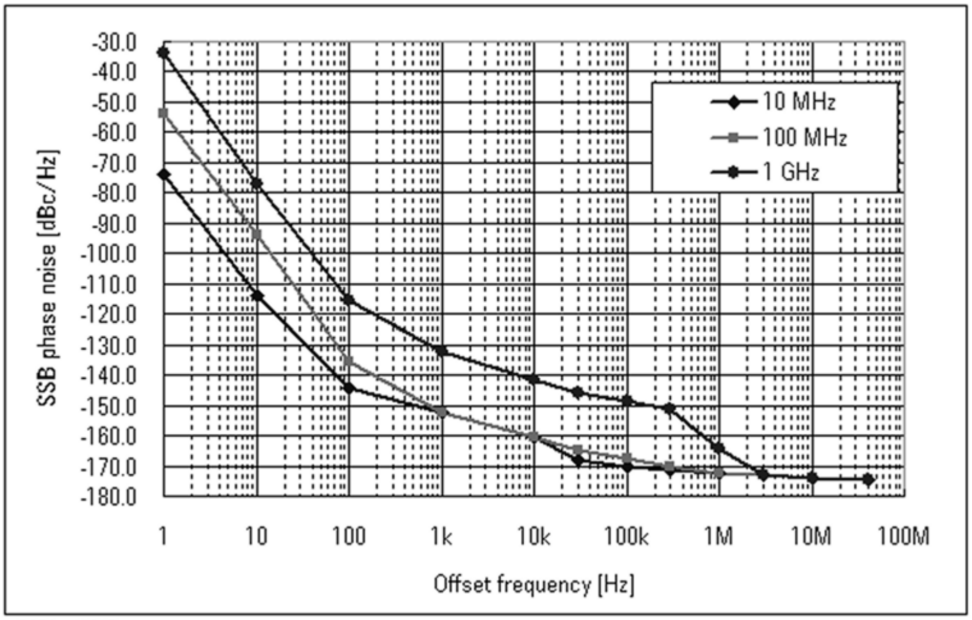
Table 10-5 **SSB Phase Noise Sensitivity (Option 011, < 150 kHz optim., Measurement quality = Fast, +5 dBm input, start frequency = 10 Hz)**

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.	-114.0	-138.0	-145.0	-153.0	-163.0	-165.0	-	-
100 MHz	spec.			-141.0	-149.0	-156.0	-160.0	-160.0	-
	typ.	-94.0	-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.	-74.0	-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.	-64.5	-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.	-57.1	-92.1	-108.1	-117.1	-123.5	-139.5	-153.0	-156.5

Table 10-6 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 10-1 SSB Phase Noise Sensitivity (Standard, < 150 kHz optim., Measurement quality = Normal, correlation = 1, start frequency = 1 Hz, measurement time = 17.7 sec), supplemental data



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10. Specifications and Supplemental Information

Figure 10-2 **SSB Phase Noise Sensitivity (Option 011, < 150 kHz optim., Measurement quality = Normal, start frequency = 10 Hz, measurement time = 4.4 sec), supplemental data**

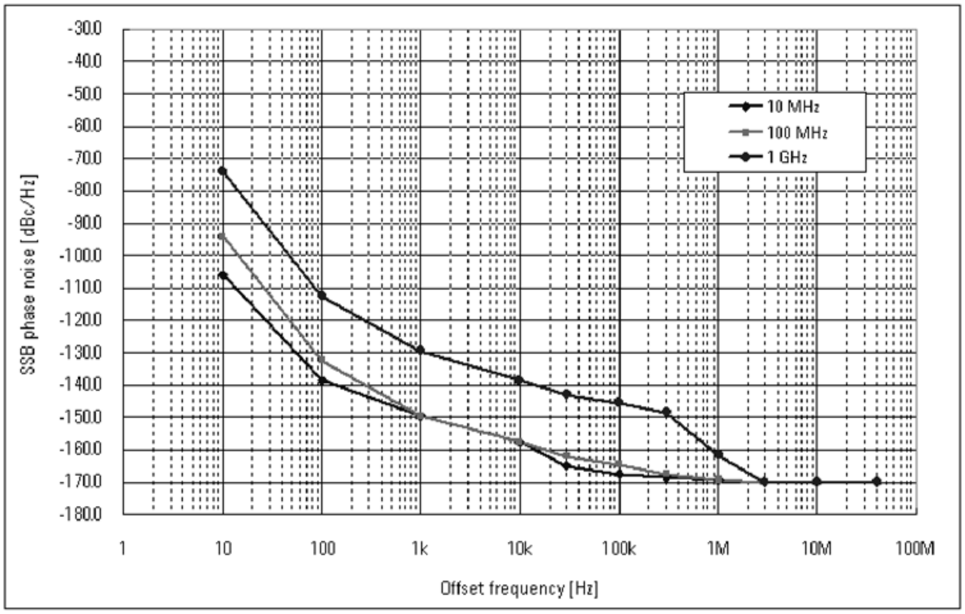

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Figure 10-3 **SSB Phase Noise Sensitivity (improvement by correlation, 1 GHz, < 150 kHz optim. Measurement quality = Normal), supplemental data**

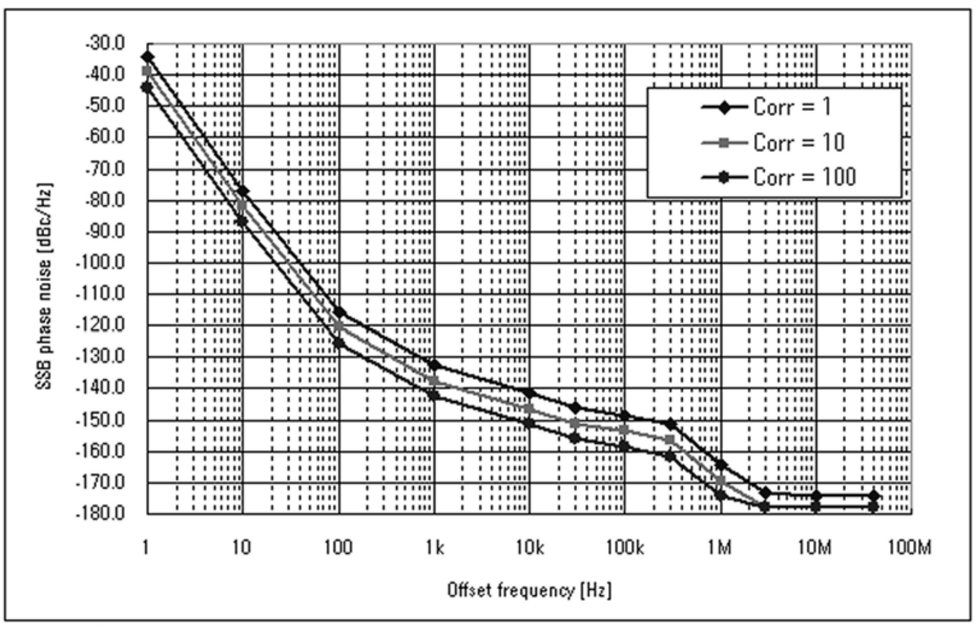

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Figure 10-4 **SSB Phase Noise Sensitivity of different LO optimizations (Standard, Measurement quality = Normal, correlation = 1, start frequency = 1 Hz, measurement time = 17.7 sec, 1 GHz), supplemental data**

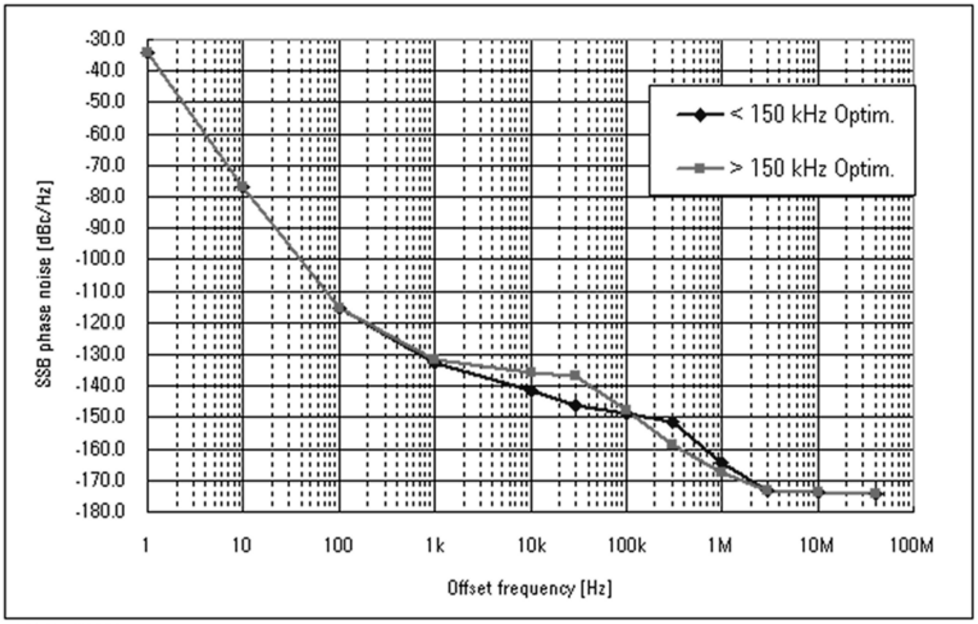

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Table 10-7 **Typical measurement time (sec) for phase noise measurement*1 (Measurement quality = Normal)**

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
20 M	17.7	4.4	0.56	0.07
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, spurious, integrated phase noise, rms noise, rms jitter, residual FM
Number of trace	1 data trace and 1 memory trace
Data formats	dBc/Hz (SSB phase noise), dBc (spurious), rms degree, rms radian (rms noise), sec (rms jitter), Hz rms (residual FM)
Measurement Trigger	Set to continuous, hold, or single, sweep with internal, external, manual, or bus trigger.

Table 10-8 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 ranges are 0, 10, 20 (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. It is changed to the best value within the range when this command receives the value outside the set range.

Frequency, RF Power, DC current Measurements

Specifications of the E5052A use only

Table 10-9 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 10-10 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 10-11 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, ΔHz, %, ppm (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 10-12

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]

Table 10-12

[Marker Function]	:CALCulate:FP[1-1]:TRACe[1-3] :CALCulate:FP[1-1]:ALLTrace
[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
Command Only	: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 10-13 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	See Table 10-14
Narrow Band	3.125 kHz, 25 kHz, 200 kHz, 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	-20 dBm to +20 dBm
Accuracy	±2 dB (typical, , at 23°C±5°C)
Resolution	0.1 dB (typical)
Phase Transient measurement*2*3	
Accuracy	0.1 deg/GHz (0.1 deg min.) (typical, at 23°C±5°C)
Trace noise	0.02 deg/GHz (0.02 deg min.) (typical, at 23°C±5°C)
Stability	10 deg/sec (typical, at 23°C±5°C)

*1. See Table 10-15 through Table 10-21 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 10-14 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 10-15 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

Time Span (sec)	200 m	500 m	1	2	5
Time Resolution (µsec)	250	625	1250	2500	6250
Number of point	801	801	801	801	801

Table 10-16 Frequency Resolution (Hzrms) of Wide Band Transient

Transient Frequency Band (MHz)	Time Span (sec)			
	10 µ to 100 µ	200 µ	500 µ	1 m to 5
50 to 150	28 k	10 k	3 k	1 k
100 to 300	56 k	20 k	7 k	2 k
200 to 600	113 k	40 k	14 k	5 k
300 to 900	169 k	60 k	21 k	7 k
400 to 1200	226 k	80 k	28 k	10 k
500 to 1500	282 k	100 k	35 k	12 k
600 to 1800	339 k	120 k	42 k	15 k
800 to 2400	452 k	160 k	56 k	20 k
1000 to 3000	565 k	200 k	70 k	25 k
1200 to 3600	678 k	240 k	84 k	30 k
1400 to 4200	791 k	280 k	98 k	35 k
1600 to 4800	905 k	320 k	113 k	40 k
1800 to 5400	1 M	360 k	127 k	45 k
2000 to 6000	1 M	400 k	141 k	50 k
2200 to 6600	1 M	440 k	155 k	55 k
2400 to 7200	1 M	480 k	169 k	60 k

Table 10-17 Narrow Band Transient (Frequency Transient Range = 3.125 kHz)

Time Span (sec)	100 m	200 m	500 m	1	2	5	10
Frequency Resolution (Hzrms)	0.0095	0.0095	0.0034	0.0012	0.0004	0.0004	0.0004
Time Resolution (µsec)	81.92	163.84	409.6	819.2	1638.4	4096	10240
Number of point	1222	1222	1222	1222	1222	1222	978

Table 10-18 Narrow Band Transient (Frequency Transient Range = 25 kHz)

Time Span (sec)	10 m	20 m	50 m	100 m	200 m	500 m	1	2	5	10
Frequency Resolution (Hzrms)	0.22	0.22	0.076	0.027	0.0095	0.0095	0.0095	0.0095	0.0095	0.0095
Time Resolution (µsec)	10.24	20.48	51.2	102.4	204.8	512	1280	1250	6400	12800
Number of point	978	978	978	978	978	978	783	783	783	783

Table 10-19 Narrow Band Transient (Frequency Transient Range = 200 kHz)

Time Span (sec)	1 m	2 m	5 m	10 m	20 m	50 m	100 m	200 m	500 m	1	2	5	10
Frequency Resolution (Hzrms)	4.9	4.9	1.7	0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Time Resolution (µsec)	1.28	2.56	6.4	12.8	25.6	64	160	320	800	1600	3200	8000	16000
Number of point	783	783	783	783	783	783	626	626	626	626	626	626	626

Table 10-20 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	20 m	50 m	100 m	200 m	500 m	1
Frequency Resolution (Hzrms)	110	110	110	39	21	14	5	5	5	5	5	5	5
Time Resolution (µsec)	0.16	0.32	0.8	0.8	1.6	4	8	20	80	160	320	800	1600
Number of point	626	626	626	1251	1251	1251	1251	1001	626	626	626	626	626

Time Span (sec)	2	5	10
Frequency Resolution (Hzrms)	5	5	5
Time Resolution (µsec)	3200	8000	16000
Number of point	626	626	626

Table 10-21 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	20 m	50 m	100 m
Frequency Resolution (Hzrms)	7 k	7 k	7 k	7 k	3 k	884	313	313	313	313	313	313	313
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

Time Span (sec)	200 m	500 m	1	2	5
Frequency Resolution (Hzrms)	313	313	313	312.5	312.5
Time Resolution (µsec)	250	625	1250	2500	6250
Number of point	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 10-22 Spectrum Monitor

Description	Specifications
Frequency Range	10 M to 7 GHz
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 10-23 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/$\sqrt{Hz}$ @10 kHz (typical, at 23°C±5°C)
Output Resistance	< 0.3 Ω (typical)

Table 10-24 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/$\sqrt{Hz}$ @10 kHz (typical, at 23°C±5°C) 1.5 nV/$\sqrt{Hz}$ @10 kHz (typical, at 23°C±5°C)
Output resistance (DC)	< 50 Ω
Output resistance (AC)	50 Ω (nominal)

Test Port Input

Table 10-25 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 10-26 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 10-27 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	
	Universal Serial Bus jack, Type A configuration (4 contacts inline, contact 1 on left); female; provides connection to printer, USB/GPIB interface
Contact 1	Vcc: 4.75 to 5.25 VDC, 500 mA, maximum
Contact 2	–Data
Contact 3	+Data
Contact 4	Ground
USB (USBTMC[*1]) Interface Port	Universal Serial Bus jack, Type B configuration (4 contact inline); female; provides connection to an external PC; compatible with USBTMC-USB488 and USB 2.0.
LAN	10/100 BaseT Ethernet, 8-pin configuration; auto selects between the two data rates

Table 10-27 Rear Panel Information

Description	Supplemental Information
24 Bit I/O Port	36-pin D-sub, female; provides connection to handler system
Line Power[*2]	
Frequency	47 Hz to 63 Hz
Voltage	90 to 132 VAC, or 198 to 264 VAC (automatically switched)
VA Max	500 VA max.

*1. USB Test and Measurement Class (TMC) interface that communicates over USB, complying with the IEEE 488.1 and IEEE 488.2 standards.
*2. A third-wire ground is required.

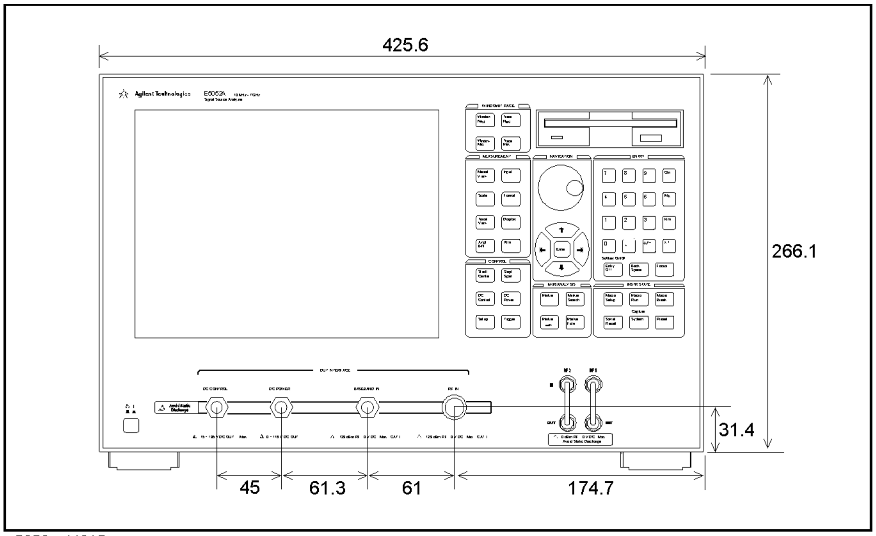
Table 10-28 EMC and Safety

Description	Supplemental Information
EMC	
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	
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
Environment	
	This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that you must not discard this electrical/ electronic product in domestic household waste. Product Category : With reference to the equipment types in the WEEE Directive Annex I, this product is classed as a “Monitoring and Control instrumentation” product. Do not dispose in domestic household waste. To return unwanted products, contact your local Agilent office, or see www.agilent.com/environment/product/ for more information.

Table 10-29 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	0.21 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 10-5 through Figure 10-8.
Weight (Net)	21 kg

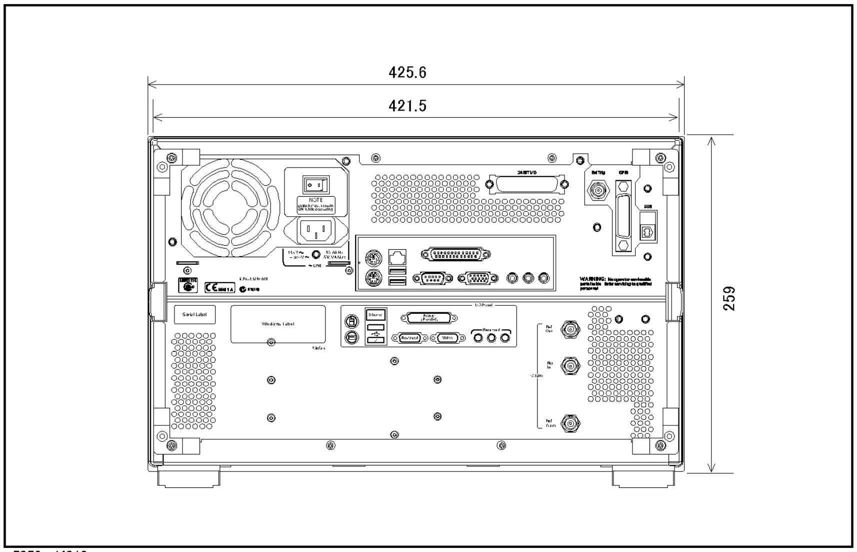
Figure 10-5 Dimensions (front view, in millimeters, nominal)



e5052auj4015

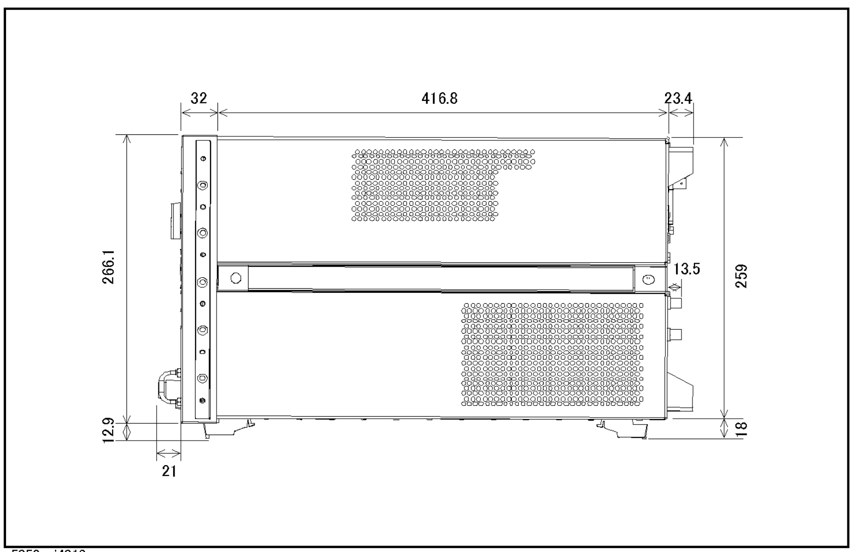
10. Specifications and Supplemental Information

Figure 10-6 **Dimensions (rear view, in millimeters, nominal)**



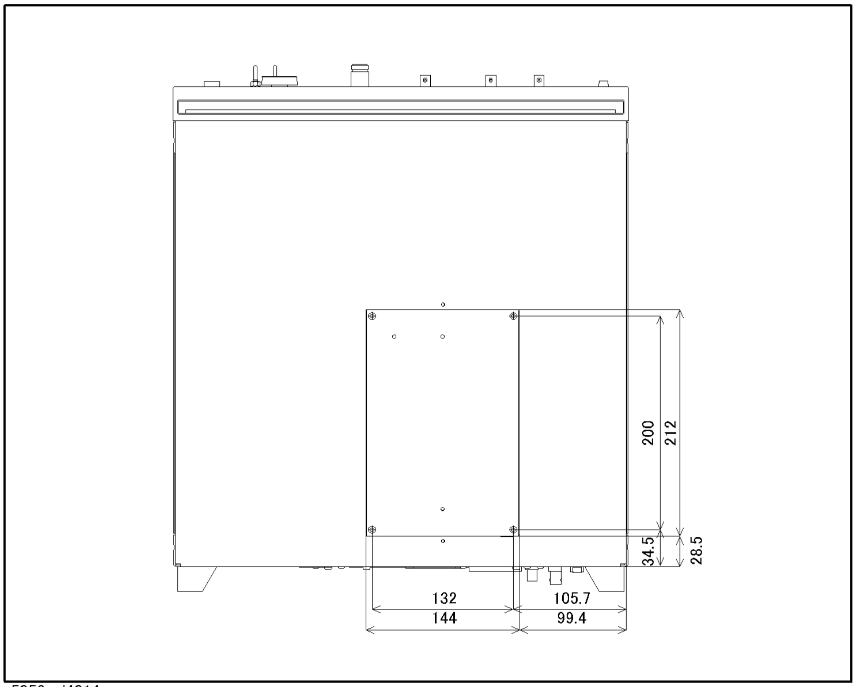
e5052auj4012

Figure 10-7 **Dimensions (side view, in millimeters, nominal)**



e5052auj4013

Figure 10-8 **Dimensions (top view, in millimeters, nominal)**



e5052auj4014

Measurement capabilities

Number of measurement windows	Up to 4 measurement windows and 1 user defined window.
Data markers	10 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.
Limit line	
Limit test	Define the test limit that appear on the display for pass/fain testing. Defined limits may be any combination of horizontal/sloping lines and discrete data points.

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.
USB (USBTMC)	
Controlling via USB (USBTMC)	The USB interface operates to USBTMC and SCPI protocols. The analyzer can be controlled by an external PC using the USB interface with a USB cable.
LAN	
Standard conformity	10 Base-T or 100 Base-TX (automatically switched), Ethertwist, RJ45 connector
Protocol	TCP/IP
Function	Telnet, SICL-LAN

Function differences between standard and option 011

Phase noise measurement	
Offset frequency	1 Hz to 40 MHz (Standard) 10 M to 40 MHz (Option 011)
IF Gain	0, 10, 20, 30, 40, 50 dB (Standard) 0, 10, 20 dB (Option 011)
Enhanced phase noise sensitivity	Cross-Correlation method, Number of Correlation : 1 to 10000 (Standard) Not available (Option 011)
SSB Phase Noise Sensitivity	See Table 10-2 through Table 10-6
Frequency, RF power, DC current measurement	
Measurement parameters (standard)	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)
Measurement parameters (Option 011)	Frequency, power, and DC current (at DC power port) (Numerical Display Only)

*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”

System performance with E5053A Microwave Downconverter

The following provide the performances of the system in which the E5052A is connected to the E5053A microwave downconverter. All values are typical values. (23°C±5°C)

Test port	
Frequency Range	10 M to 3 GHz (E5052A SSA RF IN port) 3 G to 26.5 GHz (E5053A Microwave downconverter INPUT port)
Input level	-15 to +20 dBm (10 M to 3 GHz, E5052A RF IN port) -30 to + 10 dBm (3 G to 10 GHz frequency band, E5053A Microwave downconverter INPUT port) -20 to + 5 dBm (10 G to 26.5 GHz frequency band, E5053A Microwave downconverter INPUT port)
Carrier search range[*1]	-10 to +10 dBm (3 G to 10 GHz frequency band) -10 to +5 dBm (9 G to 26.5 GHz frequency band)
Phase noise measurement	
Frequency band	10 M to 3 GHz (E5052A SSA RF IN port) 3 G to 10 GHz or 9 G to 26.5 GHz (E5053A Microwave downconverter INPUT port)
SSB phase noise sensitivity	See Table 10-30, and Figure 10-9
Frequency tracking range	1.8 MHz (< 4.9 GHz, 3 G to 10 GHz band) 2.8 MHz (>= 4.9 GHz, 3 G to 10 GHz band) 1.3 MHz (< 10 GHz, 9 G to 26.5 GHz band) 2.6 MHz (>= 10 GHz, 9 G to 26.5 GHz band)
Transient measurement	
Wide band measurement range	50 MHz to 3 GHz (E5052A SSA RF IN port) 500 MHz (E5053A Microwave downconverter INPUT port)
Narrow band measurement range	3.125 kHz, 25 kHz, 200 kHz, 1.6 MHz, or 25.6 MHz
RF power measurement accuracy	±2 dB (10 M to 3 GHz) ±3 dB (3 G to 10 GHz) ±4 dB (9 G to 26.5 GHz)
Frequency, RF power, DC current measurement	
Frequency measurement resolution	10 Hz, 1 kHz, or 64 kHz
RF power measurement accuracy	±2 dB (10 M to 3 GHz) ±3 dB (3 G to 10 GHz) ±4 dB (9 G to 26.5 GHz)

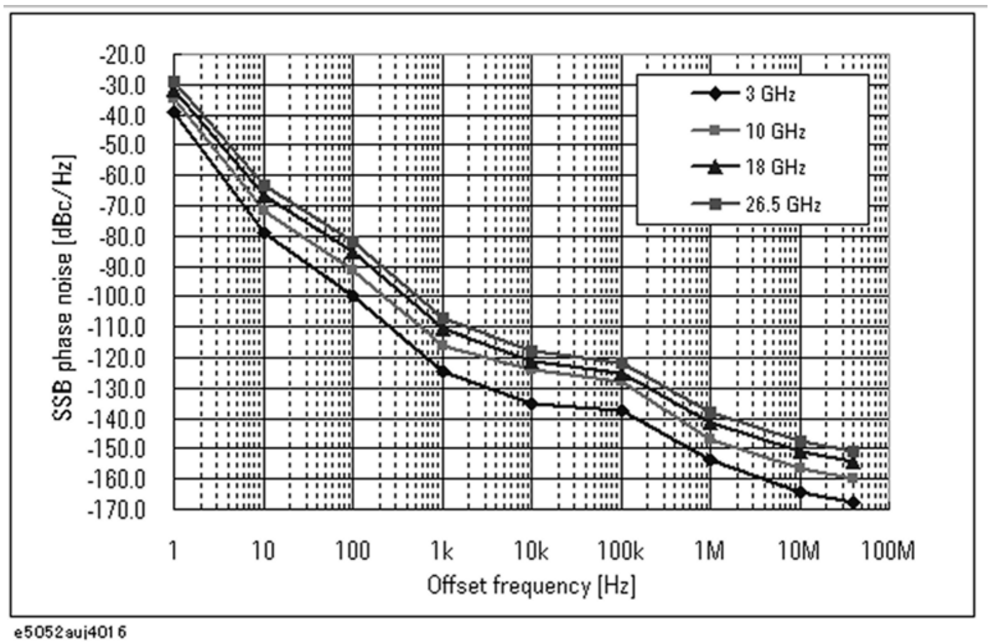
Spectrum monitor measurement	
Frequency span	15 MHz max
RBW	1.53 Hz to 400 kHz, 1, 3, 5 step
Absolute level accuracy	±4 dB

*1. Carrier search function is applicable for the phase noise, frequency/power/DC current, and spectrum monitor functions when using the E5053A microwave downconverter INPUT port.

Table 10-30 System phase noise sensitivity (with the E5053A downconverter, standard, 0 dBm input, correlation = 1, start offset frequency = 1 Hz, measurement time = 17.7 sec), typical

Input Frequency		Offset from carrier (Hz)								
		1	10	100	1 k	10 k	100 k	1 M	10 M	40 M
3 GHz	typ.	-39.0	-78.7	-99.5	-124.4	-135.3	-137.5	-153.5	-164.5	-167.6
10 GHz	typ.	-34.6	-71.8	-91.1	-116.1	-124.1	-128.1	-147.1	-156.6	-160.0
18 GHz	typ.	-31.6	-66.5	-85.3	-110.3	-121.2	-125.3	-141.3	-150.7	-154.2
26.5 GHz	typ.	-29.0	-63.2	-81.8	-106.8	-117.8	-121.8	-137.8	-147.3	-150.8

Figure 10-9 SSB Phase Noise Sensitivity (with the E5053A downconverter, standard, 0 dBm input, correlation = 1, start offset frequency = 1 Hz, measurement time = 17.7 sec), typical



10. Specifications and Supplemental Information

Clock jitter Analysis

Table 10-31 E5001A SSA-J Precision Clock Jitter Analysis Software

Description	Specification
Measurement parameters	• Random jitter (RJ) • Periodic jitter (PJ) PJ (p-p), PJ (δ-δ), PJ (rms) • Jitter trend (TJ vs time) • Total jitter (TJ) TJ (p-p)
Jitter spectrum bandwidth	1 Hz to 40 MHz (Standard) 10 Hz to 40 MHz (Option 011)

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

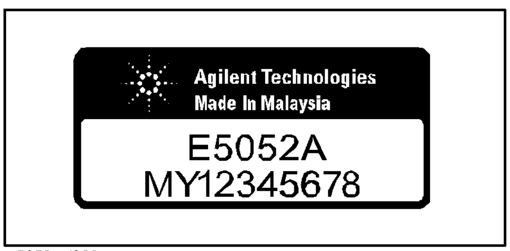
Serial Prefix or Number	Make Manual Changes
MY442 or later	Change 4

Table A-2 Manual Changes by Firmware Version

Version	Make Manual Changes
A.01.10 or later	Change 1
A.01.50 or later	Change 2
A.02.00 or later	Change 3
A.02.50 or later	Change 5

The ten-character serial number is stamped on the serial number plate (Figure A-1) on the rear panel.

Figure A-1 Example of Serial Number Plate



e5052apj029

Change 5

The following functions are newly integrated into the firmware version A.02.50 onward. They are not supported by firmware version A.02.00 or earlier.

- ❑ Allan variance and jitter calculation in phane noise measurement (PN)
- ❑ Addition of 20 MHz to the offset stop frequency in phase noise measurement (PN)
- ❑ Addition of 25 kHz and 3.125 kHz to the test frequency range of the narrow band in transient measurement (TR)
- ❑ Y-axis offset setting
- ❑ Function to make 0 degree reference variable when measuring phase in transient measurement (TR)
- ❑ Averaging trigger function
- ❑ Function to detect the end of measurement using the *OPC? command (except for VBA)
- ❑ Function to invert display color of a LCD display and color setting
- ❑ The number of markers changed from six to ten
- ❑ Function to set the minimum value and maximum value of X-axis
- ❑ Annotation in the user window and function that frequency and signal level are copied to the user window when traces of the phase noise measurement are copied to the user window.
- ❑ Linearity evaluation of FM chirp signal
- ❑ Timing control of external trigger in transient measurement (TR)
- ❑ Function to have the 11970 external mixer which equals to or is more than 26.5 Ghz correspond to this instrument by VBA
- ❑ Clock jitter measurement by VBA (E5001A)
- ❑ Setting the minimum level for spurious judgement
- ❑ User recovery function[*1]
- ❑ Expansion of the maximum number of display characters in the eco window up to 2000
- ❑ Expansion of the frequency offset setting range when using downconverter to 330 GHz, and the setting range of harmonic to 34

Change 4

The equipment with prefix MY441 or earlier does not support the USB (USBTMC) interface port nor the removable hard disk function.

*1. This function is available when the volume label on the C drive is CL250 or higher.

Change 3

The following functions are newly integrated into the firmware version A.02.00 onward. They are not supported by firmware version A.01.50 or earlier.

- ❑ Support E5053A microwave downconverter
- ❑ Support external mixer
- ❑ User calibration function
- ❑ Frequency offset function
- ❑ Support USB (USBTMC) interface port
- ❑ When option 011 is installed, the IF gain setting by the PN measurement mode is changed from 10 dB fixation to 0, 10, and 20 dB selection.
- ❑ Eight digit display is added to the number of display digits of Y axes.
- ❑ Questionable Downconverter Status Register is added to the status register.

For the function addition of the above-mentioned, there is a case that becomes an initial value and a setting range different from a standard composition (when only the E5052A is used).

Change 2

The following functions are newly integrated into the firmware version A.01.50 onward. They are not supported by firmware version A.01.10 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 200 kHz 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 352
❏ "Troubleshooting during Operation" on page 353
❏ "Troubleshooting for External Devices" on page 355

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 47.

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 296.

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 361 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 306.

- 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 356 and Warning Messages on page 363.

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 361 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.

51 **A21 flash ROM write error**

This error occurs when writing the system calibration data to ROM on the A21 board fails. Contact Agilent Technologies’ Customer Contact given at the end of this guide or the company from which you bought the device.

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.

373 **Downconverter Fan Stop**

This error occurs when the fan of the downconverter stops. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

354 **Downconverter IF not found**

This error occurs when the down-converted signal does not fall into the expected IF range. The deviation between the set nominal frequency and the actual input signal's frequency may be too large. Execute the carrier search function, and set a correct nominal frequency.

352 **Downconverter Oven Cold**

This error may occur due to the unlocked PLL because the oven is not heated sufficiently for some time after the downconverter is turned on. Heat the oven for some time with the power on.

374 **Downconverter P5V power fail**

This error occurs when the 5-V power of the downconverter fails. A device failure is suspected. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

353 **Downconverter Ref Input Level Low**

This error occurs when the level of the 10-MHz reference signal to the downconverter is low.

372 **Downconverter Ref PLL unlocked**

This error occurs when the PLL circuit of the downconverter is unlocked during measurement. This error may occur when the carrier frequency of the measurement sample is unstable.

It may occur also due to the same reason as "Downconverter Oven Cold."

375 **Downconverter test failed**

This error occurs when the self-test of the downconverter fails. A device failure is suspected. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

371 **Downconverter Unlock local**

This error occurs when the local of the downconverter cannot be locked. A device failure is suspected. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

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, or if the carrier frequency of a DUT is out of the specified frequency band. 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

101 **License installation failed**

This error occurs when an invalid license code is input during installation of the E5001

SSA-J license.

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

351 **No downconverter unit connected**

This error occurs when the downconverter is not turned on or when the USB (USBTMC) cable is not connected even though the downconverter is enabled. Disable the downconverter, turn on the downconverter, or connect the USB (USBTMC) cable.

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.

B. Troubleshooting

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

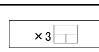
  In the table, the following symbols are used to denote the method(s) that can be used to define a setting.

  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 dB	<<	<<	*		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	300 M - 7 GHz	<<	<<	*		K/C
Max Ctrl Voltage Limit	35 V	<<	<<	*		K/C
Max Input Level	0 dBm	<<	<<	*		K/C
Max Iteration	10	<<	<<	*		K/C
Min Ctrl Voltage Limit	-15 V	<<	<<	*		K/C
Sensitivity	10 MHz/V	<<	<<	*		K/C
Target	1 GHz	<<	<<	*		K/C
Tolerance	1 kHz	<<	<<	*		K/C
Control Voltage Cal	OFF	<<	<<			K/C
DC Control Delay	100 ms	<<	<<	*		K/C
DC Control Output	OFF	<<	<<			K/C
DC Control Voltage	0 V	<<	<<	*		K/C
Max Ctrl Voltage Limit	35 V	<<	<<	*		K/C
Min Ctrl Voltage Limit	-15 V	<<	<<	*		K/C
DC Power Voltage						
DC Power Delay	100 ms	<<	<<	*		K/C
DC Power Output	OFF	<<	<<			K/C
DC Power Voltage	0 V	<<	<<	*		K/C
Max Pwr Voltage Limit	16 V	<<	<<	*		K/C
Min Pwr Voltage Limit	0 V	<<	<<	*		K/C
Display						
Allocate		<<	<<	*		K/C
Edit Title Label	""	<<	<<	*		K/C
Color Type	"Normal"	<<	<<	*		K/C

Key Operation			Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
				Preset	*RST			
	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
	Meas Condition		ON	<<	<<	*		K/C
	Relative Y-Scale		OFF	<<	<<	*		K/C
	Security Level		None	<<	<<	*		K/C
	Title Label		OFF	<<	<<	*		K/C
	Update		ON	<<	<<	*		K/C
	Y # of Digits		4-digits	<<	<<	*		K/C
Format								
	Frequency Format		Hz	<<	<<	*		K/C
	Frequency Reference		0 Hz	<<	<<	*		K/C
	Sensitivity Aperture		1 %	<<	<<	*		K/C
Input Port								
	Down Converter							
		Down Converter	OFF	<<	<<	*		K/C
		External Mixer	Not Used	<<	<<	*		K/C
		RF Input	Down Converter	<<	<<	*		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

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
More Functions						
Discrete	OFF	<<	<<	*		K/C
Ref Marker	1	<<	<<	*		K/C
Ref Marker Mode	OFF	<<	<<	*		K/C
Marker Function						
Analysis Range (X)	Band Marker	<<	<<	*		K/C
Analysis Range (Y)	Band Marker	<<	<<	*		K/C
Analysis Type	Off	<<	<<	*		K/C
Band Marker X						
Band Marker X	OFF	<<	<<	*		K/C
Center	0 V					K/C
Span	2 TV					K/C
Start	-1 TV	<<	<<	*		K/C
Stop	1 TV	<<	<<	*		K/C
Band Marker Y						
Band Marker Y	OFF	<<	<<	*		K/C
Center	0 Hz					K/C
Span	2 THz					K/C
Start	-1 THz	<<	<<	*		K/C
Stop	1 THz	<<	<<	*		K/C
Couple	OFF	<<	<<	*		K/C
Marker Search						
Band Marker X						
Band Marker X	OFF	<<	<<	*		K/C
Center	0 V					K/C
Span	2 TV					K/C
Start	-1 TV	<<	<<	*		K/C
Stop	1 TV	<<	<<	*		K/C
Band Marker Y						
Band Marker Y	OFF	<<	<<	*		K/C
Center	0 Hz					K/C
Span	2 THz					K/C
Start	-1 THz	<<	<<	*		K/C
Stop	1 THz	<<	<<	*		K/C
Couple	OFF	<<	<<	*		K/C
Peak						
Peak Excursion	0 Hz	<<	<<	*		K/C
Peak Polarity	Positive	<<	<<	*		K/C
Search Left						K/C
Search Peak						K/C
Search Peak All						K/C
Search Right						K/C

Key Operation			Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
				Preset	*RST			
	Search Max							K/C
	Search Min							K/C
	Search Range (X)		Full Range	<<	<<	*		K/C
	Search Range (Y)		Full Range	<<	<<	*		K/C
	Target							
		Search Left						K/C
		Search Right						K/C
		Search Target						K/C
		Search Transition	Both	<<	<<	*		K/C
		Search Value	0 Hz	<<	<<	*		K/C
	Tracking		Off	<<	<<	*		K/C
Measurement View								
	Freq & Power		Selected Phase Noise	<<	<<	*		K/C
	Phase Noise		Selected Phase Noise	<<	<<	*		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		Selected Phase Noise	<<	<<	*		K/C
	Transient		Selected Phase Noise	<<	<<	*		K/C
	User		Selected Phase Noise	<<	<<	*		K/C
Save/Recall								
	Save State							
		Save Type	State Only					K/C
Scale								
	Auto Scale							K/C
	Auto Scale All							K/C
	Divisions		10	<<	<<	*		K/C
	Marker -> Reference							K/C
	Reference Position		5 Div	<<	<<	*		K/C
	Reference Value		1.5 GHz	<<	<<	*		K/C
	Scale/Div		100 MHz/Div	<<	<<	*		K/C
	X Axis							
		Auto	ON	<<	<<	*		K/C
		Band Marker -> X Axis						K/C
		Left	0 V	<<	<<	*		K/C
		Right	100 uV	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Setup						
Carrier Search						K/C
Freq Resolution	64 kHz	<<	<<	*		K/C
Frequency Band	300 M - 7 GHz	<<	<<	*		K/C
Nominal Frequency	3 GHz	<<	<<	*		K/C
Max Input Level	0 dBm	<<	<<	*		K/C
Point Delay	0 s	<<	<<	*		K/C
Points	201	<<	<<	*		K/C
Sweep Parameter	Control Voltage	<<	<<	*		K/C
Start/Center						
DC Control Center	50 uV					K/C
DC Control Span	100 uV					K/C
DC Control Start	0 V	<<	<<	*		K/C
DC Control Stop	100 uV	<<	<<	*		K/C
DC Power Center	500 uV					K/C
DC Power Span	1 mV					K/C
DC Power Start	0 V	<<	<<	*		K/C
DC Power Stop	1 mV	<<	<<	*		K/C
Stop/Span						
DC Control Center	50 uV					K/C
DC Control Span	100 uV					K/C
DC Control Start	0 V	<<	<<	*		K/C
DC Control Stop	100 uV	<<	<<	*		K/C
DC Power Center	500 uV					K/C
DC Power Span	1 mV					K/C
DC Power Start	0 V	<<	<<	*		K/C
DC Power Stop	1 mV	<<	<<	*		K/C
System						
Abort Printing						K/C
Backlight	ON					K/C
Dump Screen Image...						K
Instrument Setup						
Correction						
File Dialog...						K/C
Import Power Correction Table						K/C
Power Correction	OFF	<<	<<	*		K/C

C. List of Default Values

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Down Converter Manual Setup						
Current	0 A	<<	<<	*		K/C
Current	0 A	<<	<<	*		K/C
IF Gain 1	0 dB	<<	<<	*		K/C
IF Gain 2	0 dB	<<	<<	*		K/C
LO1 Frequency	2.975 GHz	<<	<<	*		K/C
LO1 Level	10 dBm	<<	<<	*		K/C
LO2 Frequency	2.975 GHz	<<	<<	*		K/C
LO2 Level	10 dBm	<<	<<	*		K/C
Mixer 1 Bias	OFF	<<	<<	*		K/C
Mixer 2 Bias	OFF	<<	<<	*		K/C
∆IF = IF2 - IF1	0 Hz	<<	<<	*		K/C
Frequency Offset (User Down Conv.)						
Conversion Mode	RF = n * LO + IF	<<	<<	*		K/C
Frequency Offset	OFF	<<	<<	*		K/C
Harmonic #	1	<<	<<	*		K/C
LO Frequency	3 GHz	<<	<<	*		K/C
Invert Image	OFF	<<	<<	*		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						
Set Date and Time						K
Show Clock	ON	<<	<<	*		K/C
Color Setup						
Invert						
Background	Red:255 Green:255 Blue:255	<<	<<	*		K/C
Data Trace 1	Red:0 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 2	Red:255 Green:0 Blue:0	<<	<<	*		K/C
Data Trace 3	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 4	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 5	Red:0 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 6	Red:255 Green:0 Blue:0	<<	<<	*		K/C
Data Trace 7	Red:255 Green:0 Blue:255	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Data Trace 8	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Graticule Main	Red:128 Green:128 Blue:128	<<	<<	*		K/C
Graticule Sub	Red:192 Green:192 Blue:192	<<	<<	*		K/C
Limit Fail	Red:0 Green:255 Blue:255	<<	<<	*		K/C
Limit Line	Red:95 Green:223 Blue:223	<<	<<	*		K/C
Mem Trace 1	Red:128 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 2	Red:255 Green:128 Blue:128	<<	<<	*		K/C
Mem Trace 3	Red:255 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 4	Red:128 Green:255 Blue:128	<<	<<	*		K/C
Mem Trace 5	Red:128 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 6	Red:255 Green:128 Blue:128	<<	<<	*		K/C
Mem Trace 7	Red:255 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 8	Red:128 Green:255 Blue:128	<<	<<	*		K/C
Reset Color						K/C
Normal						
Background	Red:0 Green:0 Blue:0	<<	<<	*		K/C
Data Trace 1	Red:255 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 2	Red:0 Green:255 Blue:255	<<	<<	*		K/C
Data Trace 3	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 4	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 5	Red:255 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 6	Red:0 Green:255 Blue:255	<<	<<	*		K/C
Data Trace 7	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 8	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Graticule Main	Red:127 Green:127 Blue:127	<<	<<	*		K/C
Graticule Sub	Red:63 Green:63 Blue:63	<<	<<	*		K/C
Limit Fail	Red:255 Green:0 Blue:0	<<	<<	*		K/C
Limit Line	Red:160 Green:32 Blue:32	<<	<<	*		K/C
Mem Trace 1	Red:127 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 2	Red:0 Green:127 Blue:127	<<	<<	*		K/C
Mem Trace 3	Red:0 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 4	Red:127 Green:0 Blue:127	<<	<<	*		K/C
Mem Trace 5	Red:127 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 6	Red:0 Green:127 Blue:127	<<	<<	*		K/C
Mem Trace 7	Red:0 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 8	Red:127 Green:0 Blue:127	<<	<<	*		K/C
Reset Color						K/C

Key Operation	Factory-shipped Setting	Default Value Preset	Default Value *RST	Save / Recall	Backup	Avaiable Means of Defining a Setting
Control Panel						K
GPIB Setup						
System Controller Configuration						
Talker/Listener Address	17	<<	<<	*		K/C
Key Lock						
Front Panel & Keyboard Lock	OFF	<<	<<	*		K/C
Touch Screen & Mouse Lock	OFF	<<	<<	*		K/C
Network Setup						
MAC Address						
Network Configuration...						K
Network Identification...						K
SICL-LAN Address	17	<<	<<	*		K/C
SICL-LAN Server	OFF	<<	<<	*		K/C
Socket Server	OFF	<<	<<	*		K/C
Telnet Server	OFF	<<	<<	*		K/C
Print						K
Printer Setup...						K
Product Information						K
Trace View						
Aperture	1.5 %	<<	<<	*		K/C
Copy to User						K/C
Data Hold	Off	<<	<<	*		K/C
Data Math	Off	<<	<<	*		K/C
Display Trace	Data	<<	<<	*		K/C
Marker -> -Offset						K/C
Memory Trace						
Line (Y = AX + B)						
A	0	<<	<<	*		K/C
B	0	<<	<<	*		K/C
Data Trace -> A, B						K/C
Set Line to Memory						K/C
Offset	0	<<	<<	*		K/C

Key Operation			Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
				Preset	*RST			
	Persistence							
		Clear Persistent Data						K/C
		Persistece Mode	OFF	<<	<<	*		K/C
	Smoothing		OFF	<<	<<	*		K/C
	Trace Label		"Freq"	<<	<<	*		K/C
Trigger								
	Average Trigger		OFF			*		K/C
	Ext Trig Polarity		Negative	<<	<<	*		K/C
	Mode		Analyzer(standard)	<<	<<	*		K/C
			Tester(option 011)	<<	<<	*		K/C
	Source		Internal	<<	<<	*		K/C
	Trigger to Freq & Power		Selected Phase Noise	<<	<<	*		K/C

C. List of Default Values

PN Menu

Key Operation			Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
				Preset	*RST			
Attenuator								
	Input Attenuator		5 dB	<<	<<	*		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	300 M - 7 GHz	<<	<<	*		K/C
		Max Ctrl Voltage Limit	35 V	<<	<<	*		K/C
		Max Input Level	0 dBm	<<	<<	*		K/C
		Max Iteration	10	<<	<<	*		K/C
		Min Ctrl Voltage Limit	-15 V	<<	<<	*		K/C
		Sensitivity	10 MHz/V	<<	<<	*		K/C
		Target	1 GHz	<<	<<	*		K/C
		Tolerance	1 kHz	<<	<<	*		K/C
	Control Voltage Cal		OFF	<<	<<			K/C
	DC Control Delay		100 ms	<<	<<	*		K/C
	DC Control Output		OFF	<<	<<			K/C
	DC Control Voltage		0 V	<<	<<	*		K/C
	Max Ctrl Voltage Limit		35 V	<<	<<	*		K/C
	Min Ctrl Voltage Limit		-15 V	<<	<<	*		K/C
DC Power Voltage								
	DC Power Delay		100 ms	<<	<<	*		K/C
	DC Power Output		OFF	<<	<<			K/C
	DC Power Voltage		0 V	<<	<<	*		K/C
	Max Pwr Voltage Limit		16 V	<<	<<	*		K/C
	Min Pwr Voltage Limit		0 V	<<	<<	*		K/C
Display								
	Edit Title Label		""	<<	<<	*		K/C
	Color Type		"Normal"	<<	<<	*		K/C

Key Operation			Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
				Preset	*RST			
	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		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		4-digits	<<	<<	*		K/C
Input Port								
	Down Converter							
		Down Converter	OFF	<<	<<	*		K/C
		External Mixer	Not Used	<<	<<	*		K/C
		RF Input	Down Converter	<<	<<	*		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

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Marker Function						
Analysis Range (X)	Band Marker	<<	<<	*		K/C
Analysis Range (Y)	Band Marker	<<	<<	*		K/C
Analysis Type	Off	<<	<<	*		K/C
Band Marker X						
Band Marker X	OFF	<<	<<	*		K/C
Center	0 Hz					K/C
Span	2 THz					K/C
Start	-1 THz	<<	<<	*		K/C
Stop	1 THz	<<	<<	*		K/C
Band Marker Y						
Band Marker Y	OFF	<<	<<	*		K/C
Center	0 dBc/Hz					K/C
Span	2 TdBc/Hz					K/C
Start	-1 TdBc/Hz	<<	<<	*		K/C
Stop	1 TdBc/Hz	<<	<<	*		K/C
Marker Search						
Band Marker X						
Band Marker X	OFF	<<	<<	*		K/C
Center	0 Hz					K/C
Span	2 THz					K/C
Start	-1 THz	<<	<<	*		K/C
Stop	1 THz	<<	<<	*		K/C
Band Marker Y						
Band Marker Y	OFF	<<	<<	*		K/C
Center	0 dBc/Hz					K/C
Span	2 TdBc/Hz					K/C
Start	-1 TdBc/Hz	<<	<<	*		K/C
Stop	1 TdBc/Hz	<<	<<	*		K/C
Peak						
Peak Excursion	0 dB	<<	<<	*		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)	Full Range	<<	<<	*		K/C
Search Range (Y)	Full Range	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Target						
Search Left						K/C
Search Right						K/C
Search Target						K/C
Search Transition	Both	<<	<<	*		K/C
Search Value	0 dBc/Hz	<<	<<	*		K/C
Tracking	Off	<<	<<	*		K/C
Marker To						
Marker -> Start						K/C
Marker -> Stop						K/C
Measurement View						
Freq & Power	Selected Phase Noise	<<	<<	*		K/C
Phase Noise	Selected Phase Noise	<<	<<	*		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	Selected Phase Noise	<<	<<	*		K/C
Transient	Selected Phase Noise	<<	<<	*		K/C
User	Selected Phase Noise	<<	<<	*		K/C
Save/Recall						
Save State						
Save Type	State Only					K/C
Scale						
Auto Scale						K/C
Divisions	16	<<	<<	*		K/C
Marker -> Reference						K/C
Reference Position	16 Div	<<	<<	*		K/C
Reference Value	-20 dBc/Hz	<<	<<	*		K/C
Scale/Div	10 dB/Div	<<	<<	*		K/C
X Axis						
Auto	ON	<<	<<	*		K/C
Band Marker -> X Axis						K/C
Left	1 kHz	<<	<<	*		K/C
Right	10 MHz	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Setup						
Carrier Search						K/C
Frequency Band	300 M - 7 GHz	<<	<<	*		K/C
IF Gain	20 dB	<<	<<	*		K/C
LO PhNoise Optimize	L(f) for < 150 kHz	<<	<<	*		K/C
Measurement Quality	Normal	<<	<<	*		K/C
Nominal Frequency	3 GHz	<<	<<	*		K/C
Start						
100Hz	1 kHz	<<	<<	*		K/C
10Hz	1 kHz	<<	<<	*		K/C
1Hz	1 kHz	<<	<<	*		K/C
1kHz	1 kHz	<<	<<	*		K/C
Stop						
100kHz	10 MHz	<<	<<	*		K/C
10MHz	10 MHz	<<	<<	*		K/C
1MHz	10 MHz	<<	<<	*		K/C
40MHz	10 MHz	<<	<<	*		K/C
5MHz	10 MHz	<<	<<	*		K/C
System						
Abort Printing						K/C
Backlight	ON					K/C
Dump Screen Image...						K
Instrument Setup						
Correction						
File Dialog...						K/C
Import Power Correction Table						K/C
Power Correction	OFF	<<	<<	*		K/C
Down Converter Manual Setup						
Current	0 A	<<	<<	*		K/C
Current	0 A	<<	<<	*		K/C
IF Gain 1	0 dB	<<	<<	*		K/C
IF Gain 2	0 dB	<<	<<	*		K/C
LO1 Frequency	2.975 GHz	<<	<<	*		K/C
LO1 Level	10 dBm	<<	<<	*		K/C
LO2 Frequency	2.975 GHz	<<	<<	*		K/C
LO2 Level	10 dBm	<<	<<	*		K/C
Mixer 1 Bias	OFF	<<	<<	*		K/C
Mixer 2 Bias	OFF	<<	<<	*		K/C
ΔIF = IF2 - IF1	0 Hz	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Frequency Offset (User Down Conv.)						
Conversion Mode	RF = n * LO + IF	<<	<<	*		K/C
Frequency Offset	OFF	<<	<<	*		K/C
Harmonic #	1	<<	<<	*		K/C
LO Frequency	3 GHz	<<	<<	*		K/C
PN Ext. Prescaler						
Division	1	<<	<<	*		K/C
Output Power Level	0 dBm	<<	<<	*		K/C
Invert Image	OFF	<<	<<	*		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						
Set Date and Time						K
Show Clock	ON	<<	<<	*		K/C
Color Setup						
Invert						
Background	Red:255 Green:255 Blue:255	<<	<<	*		K/C
Data Trace 1	Red:0 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 2	Red:255 Green:0 Blue:0	<<	<<	*		K/C
Data Trace 3	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 4	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 5	Red:0 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 6	Red:255 Green:0 Blue:0	<<	<<	*		K/C
Data Trace 7	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 8	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Graticule Main	Red:128 Green:128 Blue:128	<<	<<	*		K/C
Graticule Sub	Red:192 Green:192 Blue:192	<<	<<	*		K/C
Limit Fail	Red:0 Green:255 Blue:255	<<	<<	*		K/C
Limit Line	Red:95 Green:223 Blue:223	<<	<<	*		K/C
Mem Trace 1	Red:128 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 2	Red:255 Green:128 Blue:128	<<	<<	*		K/C
Mem Trace 3	Red:255 Green:128 Blue:255	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Mem Trace 4	Red:128 Green:255 Blue:128	<<	<<	*		K/C
Mem Trace 5	Red:128 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 6	Red:255 Green:128 Blue:128	<<	<<	*		K/C
Mem Trace 7	Red:255 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 8	Red:128 Green:255 Blue:128	<<	<<	*		K/C
Reset Color						K/C
Normal						
Background	Red:0 Green:0 Blue:0	<<	<<	*		K/C
Data Trace 1	Red:255 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 2	Red:0 Green:255 Blue:255	<<	<<	*		K/C
Data Trace 3	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 4	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 5	Red:255 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 6	Red:0 Green:255 Blue:255	<<	<<	*		K/C
Data Trace 7	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 8	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Graticule Main	Red:127 Green:127 Blue:127	<<	<<	*		K/C
Graticule Sub	Red:63 Green:63 Blue:63	<<	<<	*		K/C
Limit Fail	Red:255 Green:0 Blue:0	<<	<<	*		K/C
Limit Line	Red:160 Green:32 Blue:32	<<	<<	*		K/C
Mem Trace 1	Red:127 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 2	Red:0 Green:127 Blue:127	<<	<<	*		K/C
Mem Trace 3	Red:0 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 4	Red:127 Green:0 Blue:127	<<	<<	*		K/C
Mem Trace 5	Red:127 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 6	Red:0 Green:127 Blue:127	<<	<<	*		K/C
Mem Trace 7	Red:0 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 8	Red:127 Green:0 Blue:127	<<	<<	*		K/C
Reset Color						K/C
Control Panel						K
GPIB Setup						
System Controller Configuration						
Talker/Listener Address	17	<<	<<	*		K/C
Key Lock						
Front Panel & Keyboard Lock	OFF	<<	<<	*		K/C
Touch Screen & Mouse Lock	OFF	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Network Setup						
MAC Address						
Network Configuration...						K
Network Identification...						K
SICL-LAN Address	17	<<	<<	*		K/C
SICL-LAN Server	OFF	<<	<<	*		K/C
Socket Server	OFF	<<	<<	*		K/C
Telnet Server	OFF	<<	<<	*		K/C
Print						K
Printer Setup...						K
Product Information						K
Trace View						
Aperture	1.5 %	<<	<<	*		K/C
Copy to User						K/C
Data Hold	Off	<<	<<	*		K/C
Data Math	Off	<<	<<	*		K/C
Display Trace	Data	<<	<<	*		K/C
Marker -> -Offset						K/C
Offset	0 dBc/Hz	<<	<<	*		K/C
Persistence						
Clear Persistent Data						K/C
Persistence Mode	OFF	<<	<<	*		K/C
Smoothing	OFF	<<	<<	*		K/C
Spurious	Normalized (dBc/Hz)	<<	<<	*		K/C
Clear Threshold Table						K/C
Explorer						K
Import Threshold Table...						K/C
Minimum Spur Level	-500 dBc	<<	<<	*		K/C
Spurious List						K
Trace Label	"Phase Noise"	<<	<<	*		K/C
Trigger						
Average Trigger	OFF			*		K/C
Ext Trig Polarity	Negative	<<	<<	*		K/C
Source	Internal	<<	<<	*		K/C
Trigger to Phase Noise	Selected Phase Noise	<<	<<	*		K/C

C. List of Default Values

SP Menu

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Attenuator						
Input Attenuator	5 dB	<<	<<	*		K/C
Average/BW						
Averaging	OFF	<<	<<	*		K/C
Averaging Restart						K/C
Averaging Type	Log-Pwr Avg	<<	<<	*		K/C
Avg Factor	16	<<	<<	*		K/C
RBW	25 kHz	<<	<<	*		K/C
DC Control Voltage						
Auto Freq Control						
AFC Status	OFF	<<	<<	*		K/C
Frequency Band	300 M - 7 GHz	<<	<<	*		K/C
Max Ctrl Voltage Limit	35 V	<<	<<	*		K/C
Max Input Level	0 dBm	<<	<<	*		K/C
Max Iteration	10	<<	<<	*		K/C
Min Ctrl Voltage Limit	-15 V	<<	<<	*		K/C
Sensitivity	10 MHz/V	<<	<<	*		K/C
Target	1 GHz	<<	<<	*		K/C
Tolerance	1 kHz	<<	<<	*		K/C
Control Voltage Cal	OFF	<<	<<			K/C
DC Control Delay	100 ms	<<	<<	*		K/C
DC Control Output	OFF	<<	<<			K/C
DC Control Voltage	0 V	<<	<<	*		K/C
Max Ctrl Voltage Limit	35 V	<<	<<	*		K/C
Min Ctrl Voltage Limit	-15 V	<<	<<	*		K/C
DC Power Voltage						
DC Power Delay	100 ms	<<	<<	*		K/C
DC Power Output	OFF	<<	<<			K/C
DC Power Voltage	0 V	<<	<<	*		K/C
Max Pwr Voltage Limit	16 V	<<	<<	*		K/C
Min Pwr Voltage Limit	0 V	<<	<<	*		K/C
Display						
Edit Title Label	""	<<	<<	*		K/C
Color Type	"Normal"	<<	<<	*		K/C

Key Operation			Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
				Preset	*RST			
	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
	Meas Condition		ON	<<	<<	*		K/C
	Relative Y-Scale		OFF	<<	<<	*		K/C
	Security Level		None	<<	<<	*		K/C
	Title Label		OFF	<<	<<	*		K/C
	Update		ON	<<	<<	*		K/C
	Y # of Digits		4-digits	<<	<<	*		K/C
Format								
	Detector Mode		Positive	<<	<<	*		K/C
	Format		dBm	<<	<<	*		K/C
Input Port								
	Down Converter							
		Down Converter	OFF	<<	<<	*		K/C
		External Mixer	Not Used	<<	<<	*		K/C
		RF Input	Down Converter	<<	<<	*		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

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Marker Function						
Analysis Range (X)	Band Marker	<<	<<	*		K/C
Analysis Range (Y)	Band Marker	<<	<<	*		K/C
Analysis Type	Off	<<	<<	*		K/C
Band Marker X						
Band Marker X	OFF	<<	<<	*		K/C
Center	0 Hz					K/C
Span	2 THz					K/C
Start	-1 THz	<<	<<	*		K/C
Stop	1 THz	<<	<<	*		K/C
Band Marker Y						
Band Marker Y	OFF	<<	<<	*		K/C
Center	0 dBm					K/C
Span	2 TdB					K/C
Start	-1 TdBm	<<	<<	*		K/C
Stop	1 TdBm	<<	<<	*		K/C
Marker Search						
Band Marker X						
Band Marker X	OFF	<<	<<	*		K/C
Center	0 Hz					K/C
Span	2 THz					K/C
Start	-1 THz	<<	<<	*		K/C
Stop	1 THz	<<	<<	*		K/C
Band Marker Y						
Band Marker Y	OFF	<<	<<	*		K/C
Center	0 dBm					K/C
Span	2 TdB					K/C
Start	-1 TdBm	<<	<<	*		K/C
Stop	1 TdBm	<<	<<	*		K/C
Peak						
Peak Excursion	0 dB	<<	<<	*		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)	Full Range	<<	<<	*		K/C
Search Range (Y)	Full Range	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Target						
Search Left						K/C
Search Right						K/C
Search Target						K/C
Search Transition	Both	<<	<<	*		K/C
Search Value	0 dBm	<<	<<	*		K/C
Tracking	Off	<<	<<	*		K/C
Marker To						
Marker -> Center						K/C
Marker -> Start						K/C
Marker -> Stop						K/C
Measurement View						
Freq & Power	Selected Phase Noise	<<	<<	*		K/C
Phase Noise	Selected Phase Noise	<<	<<	*		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	Selected Phase Noise	<<	<<	*		K/C
Transient	Selected Phase Noise	<<	<<	*		K/C
User	Selected Phase Noise	<<	<<	*		K/C
Save/Recall						
Save State						
Save Type	State Only					K/C
Scale						
Auto Scale						K/C
Divisions	10	<<	<<	*		K/C
Marker -> Reference						K/C
Reference Position	10 Div	<<	<<	*		K/C
Reference Value	10 dBm	<<	<<	*		K/C
Scale/Div	10 dB/Div	<<	<<	*		K/C
X Axis						
Auto	ON	<<	<<	*		K/C
Band Marker -> X Axis						K/C
Left	992.5 MHz	<<	<<	*		K/C
Right	1.0075 GHz	<<	<<	*		K/C

Key Operation				Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
					Preset	*RST			
Setup									
	Reference Level			5 dBm	<<	<<	*		K/C
Start/Center									
	Carrier To								
		Carrier -> Center							K/C
		Carrier x # -> Center							K/C
		Carrier x 2 -> Center							K/C
		Carrier x 3 -> Center							K/C
		Frequency Band		300 M - 7 GHz	<<	<<	*		K/C
		Harmonic #		4	<<	<<	*		K
	Center			1 GHz	<<	<<	*		K/C
	Span			15 MHz	<<	<<	*		K/C
	Start			992.5 MHz	<<	<<	*		K/C
	Stop			1.0075 GHz	<<	<<	*		K/C
Stop/Span									
	Carrier To								
		Carrier -> Center							K/C
		Carrier x # -> Center							K/C
		Carrier x 2 -> Center							K/C
		Carrier x 3 -> Center							K/C
		Frequency Band		300 M - 7 GHz	<<	<<	*		K/C
		Harmonic #		4	<<	<<	*		K
	Center			1 GHz	<<	<<	*		K/C
	Span			15 MHz	<<	<<	*		K/C
	Start			992.5 MHz	<<	<<	*		K/C
	Stop			1.0075 GHz	<<	<<	*		K/C
System									
	Abort Printing								K/C
	Backlight			ON					K/C
	Dump Screen Image...								K
	Instrument Setup								
		Correction							
			File Dialog...						K/C
			Import Power Correction Table						K/C
			Power Correction	OFF	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Down Converter Manual Setup						
Current	0 A	<<	<<	*		K/C
Current	0 A	<<	<<	*		K/C
IF Gain 1	0 dB	<<	<<	*		K/C
IF Gain 2	0 dB	<<	<<	*		K/C
LO1 Frequency	2.975 GHz	<<	<<	*		K/C
LO1 Level	10 dBm	<<	<<	*		K/C
LO2 Frequency	2.975 GHz	<<	<<	*		K/C
LO2 Level	10 dBm	<<	<<	*		K/C
Mixer 1 Bias	OFF	<<	<<	*		K/C
Mixer 2 Bias	OFF	<<	<<	*		K/C
∆IF = IF2 - IF1	0 Hz	<<	<<	*		K/C
Frequency Offset (User Down Conv.)						
Conversion Mode	RF = n * LO + IF	<<	<<	*		K/C
Frequency Offset	OFF	<<	<<	*		K/C
Harmonic #	1	<<	<<	*		K/C
LO Frequency	3 GHz	<<	<<	*		K/C
Invert Image	OFF	<<	<<	*		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						
Set Date and Time						K
Show Clock	ON	<<	<<	*		K/C
Color Setup						
Invert						
Background	Red:255 Green:255 Blue:255	<<	<<	*		K/C
Data Trace 1	Red:0 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 2	Red:255 Green:0 Blue:0	<<	<<	*		K/C
Data Trace 3	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 4	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 5	Red:0 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 6	Red:255 Green:0 Blue:0	<<	<<	*		K/C
Data Trace 7	Red:255 Green:0 Blue:255	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Data Trace 8	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Graticule Main	Red:128 Green:128 Blue:128	<<	<<	*		K/C
Graticule Sub	Red:192 Green:192 Blue:192	<<	<<	*		K/C
Limit Fail	Red:0 Green:255 Blue:255	<<	<<	*		K/C
Limit Line	Red:95 Green:223 Blue:223	<<	<<	*		K/C
Mem Trace 1	Red:128 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 2	Red:255 Green:128 Blue:128	<<	<<	*		K/C
Mem Trace 3	Red:255 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 4	Red:128 Green:255 Blue:128	<<	<<	*		K/C
Mem Trace 5	Red:128 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 6	Red:255 Green:128 Blue:128	<<	<<	*		K/C
Mem Trace 7	Red:255 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 8	Red:128 Green:255 Blue:128	<<	<<	*		K/C
Reset Color						K/C
Normal						
Background	Red:0 Green:0 Blue:0	<<	<<	*		K/C
Data Trace 1	Red:255 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 2	Red:0 Green:255 Blue:255	<<	<<	*		K/C
Data Trace 3	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 4	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 5	Red:255 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 6	Red:0 Green:255 Blue:255	<<	<<	*		K/C
Data Trace 7	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 8	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Graticule Main	Red:127 Green:127 Blue:127	<<	<<	*		K/C
Graticule Sub	Red:63 Green:63 Blue:63	<<	<<	*		K/C
Limit Fail	Red:255 Green:0 Blue:0	<<	<<	*		K/C
Limit Line	Red:160 Green:32 Blue:32	<<	<<	*		K/C
Mem Trace 1	Red:127 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 2	Red:0 Green:127 Blue:127	<<	<<	*		K/C
Mem Trace 3	Red:0 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 4	Red:127 Green:0 Blue:127	<<	<<	*		K/C
Mem Trace 5	Red:127 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 6	Red:0 Green:127 Blue:127	<<	<<	*		K/C
Mem Trace 7	Red:0 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 8	Red:127 Green:0 Blue:127	<<	<<	*		K/C
Reset Color						K/C

Key Operation	Factory-shipped Setting	Default Value: Preset	Default Value: *RST	Save / Recall	Backup	Avaiable Means of Defining a Setting
Control Panel						K
GPIB Setup						
System Controller Configuration						
Talker/Listener Address	17	<<	<<	*		K/C
Key Lock						
Front Panel & Keyboard Lock	OFF	<<	<<	*		K/C
Touch Screen & Mouse Lock	OFF	<<	<<	*		K/C
Network Setup						
MAC Address						
Network Configuration...						K
Network Identification...						K
SICL-LAN Address	17	<<	<<	*		K/C
SICL-LAN Server	OFF	<<	<<	*		K/C
Socket Server	OFF	<<	<<	*		K/C
Telnet Server	OFF	<<	<<	*		K/C
Print						K
Printer Setup...						K
Product Information						K
Trace View						
Aperture	1.5 %	<<	<<	*		K/C
Copy to User						K/C
Data Hold	Off	<<	<<	*		K/C
Data Math	Off	<<	<<	*		K/C
Display Trace	Data	<<	<<	*		K/C
Marker -> -Offset						K/C
Offset	0 dBm	<<	<<	*		K/C
Persistence						
Clear Persistent Data						K/C
Persistence Mode	OFF	<<	<<	*		K/C
Smoothing	OFF	<<	<<	*		K/C
Trace Label	"Spectrum"	<<	<<	*		K/C

Key Operation		Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
			Preset	*RST			
Trigger							
	Average Trigger	OFF			*		K/C
	Ext Trig Polarity	Negative	<<	<<	*		K/C
	Source	Internal	<<	<<	*		K/C
	Trigger to Spectrum Monitor	Selected Phase Noise	<<	<<	*		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 dB	<<	<<	*		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	300 M - 7 GHz	<<	<<	*		K/C
		Max Ctrl Voltage Limit	35 V	<<	<<	*		K/C
		Max Input Level	0 dBm	<<	<<	*		K/C
		Max Iteration	10	<<	<<	*		K/C
		Min Ctrl Voltage Limit	-15 V	<<	<<	*		K/C
		Sensitivity	10 MHz/V	<<	<<	*		K/C
		Target	1 GHz	<<	<<	*		K/C
		Tolerance	1 kHz	<<	<<	*		K/C
	Control Voltage Cal		OFF	<<	<<			K/C
	DC Control Delay		100 ms	<<	<<	*		K/C
	DC Control Output		OFF	<<	<<			K/C
	DC Control Voltage		0 V	<<	<<	*		K/C
	Max Ctrl Voltage Limit		35 V	<<	<<	*		K/C
	Min Ctrl Voltage Limit		-15 V	<<	<<	*		K/C
DC Power Voltage								
	DC Power Delay		100 ms	<<	<<	*		K/C
	DC Power Output		OFF	<<	<<			K/C
	DC Power Voltage		0 V	<<	<<	*		K/C
	Max Pwr Voltage Limit		16 V	<<	<<	*		K/C
	Min Pwr Voltage Limit		0 V	<<	<<	*		K/C
Display								
	Edit Title Label		""	<<	<<	*		K/C
	Color Type		"Normal"	<<	<<	*		K/C

Key Operation			Factory-shipped Setting	Default Value: Preset	Default Value: *RST	Save / Recall	Backup	Avaiable Means of Defining a Setting
	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
	Meas Condition		ON	<<	<<	*		K/C
	Relative Y-Scale		OFF	<<	<<	*		K/C
	Security Level		None	<<	<<	*		K/C
	Title Label		OFF	<<	<<	*		K/C
	Update		ON	<<	<<	*		K/C
	Y # of Digits		4-digits	<<	<<	*		K/C
Format								
	Frequency Format		Hz	<<	<<	*		K/C
	Frequency Reference		0 Hz	<<	<<	*		K/C
	Marker -> Phase X Reference							K/C
	Phase Unit		Deg	<<	<<	*		K/C
	Phase X Reference		11.0096 s	<<	<<	*		K/C
	Wrap Phase		ON	<<	<<	*		K/C
Input Port								
	Down Converter							
		Down Converter	OFF	<<	<<	*		K/C
		External Mixer	Not Used	<<	<<	*		K/C
		RF Input	Down Converter	<<	<<	*		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

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
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)	Band Marker	<<	<<	*		K/C
Analysis Range (Y)	Band Marker	<<	<<	*		K/C
Analysis Type	Off	<<	<<	*		K/C
Band Marker X						
Band Marker X	OFF	<<	<<	*		K/C
Center	0 s					K/C
Span	2 Ts					K/C
Start	-1 Ts	<<	<<	*		K/C
Stop	1 Ts	<<	<<	*		K/C
Band Marker Y						
Band Marker Y	OFF	<<	<<	*		K/C
Center	0 Hz					K/C
Span	2 THz					K/C
Start	-1 THz	<<	<<	*		K/C
Stop	1 THz	<<	<<	*		K/C
Couple	OFF	<<	<<	*		K/C
Marker Search						
Band Marker X						
Band Marker X	OFF	<<	<<	*		K/C
Center	0 s					K/C
Span	2 Ts					K/C
Start	-1 Ts	<<	<<	*		K/C
Stop	1 Ts	<<	<<	*		K/C
Band Marker Y						
Band Marker Y	OFF	<<	<<	*		K/C
Center	0 Hz					K/C
Span	2 THz					K/C
Start	-1 THz	<<	<<	*		K/C
Stop	1 THz	<<	<<	*		K/C
Couple	OFF	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Peak						
Peak Excursion	0 Hz	<<	<<	*		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)	Full Range	<<	<<	*		K/C
Search Range (Y)	Full Range	<<	<<	*		K/C
Target						
Search Left						K/C
Search Right						K/C
Search Target						K/C
Search Transition	Both	<<	<<	*		K/C
Search Value	0 Hz	<<	<<	*		K/C
Tracking	Off	<<	<<	*		K/C
Marker To						
Marker -> Phase Reference						K/C
Marker -> Target Freq						K/C
Measurement View						
Freq & Power	Selected Phase Noise	<<	<<	*		K/C
Phase Noise	Selected Phase Noise	<<	<<	*		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	Selected Phase Noise	<<	<<	*		K/C
Transient	Selected Phase Noise	<<	<<	*		K/C
User	Selected Phase Noise	<<	<<	*		K/C
Save/Recall						
Save State						
Save Type	State Only					K/C

Key Operation			Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
				Preset	*RST			
Scale								
	Auto Scale							K/C
	Auto Scale All							K/C
	Divisions		10	<<	<<	*		K/C
	Marker -> Reference							K/C
	Reference Position		5 Div	<<	<<	*		K/C
	Reference Value		800 MHz	<<	<<	*		K/C
	Scale/Div		80 MHz/Div	<<	<<	*		K/C
	X Axis							
		Auto	ON	<<	<<	*		K/C
		Band Marker -> X Axis						K/C
		Left	-50 ms	<<	<<	*		K/C
		Right	50 ms	<<	<<	*		K/C
Setup								
	Freq Range		25.6 MHz	<<	<<	*		K/C
	Max Input Level		0 dBm	<<	<<	*		K/C
	Phase Reference		1 GHz	<<	<<	*		K/C
	Recalc Phase Reference							
		Phase Ref. Offset	0 Hz	<<	<<	*		K/C
	Target Freq		1 GHz	<<	<<	*		K/C
	Video Trigger							
		Minimum Power Level	-20 dB	<<	<<	*		K/C
		Narrow Freq	1 GHz	<<	<<	*		K/C
		Wide Freq	1 GHz	<<	<<	*		K/C
	Wide Freq Range		400 M - 1.2 GHz	<<	<<	*		K/C
	Wide Max Frequency		1.2 GHz	<<	<<	*		K/C
Span								
	Narrow Ref Position		Center	<<	<<	*		K/C
	Narrow Settings -> Wide							K/C
	Narrow Span		100 ms	<<	<<	*		K/C
	Narrow Time Offset		0 s	<<	<<	*		K/C
	Wide Ref Position		Center	<<	<<	*		K/C
	Wide Settings -> Narrow							K/C
	Wide Span		100 ms	<<	<<	*		K/C
	Wide Time Offset		0 s	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
System						
Abort Printing						K/C
Backlight	ON					K/C
Dump Screen Image...						K
Instrument Setup						
Correction						
File Dialog...						K/C
Import Power Correction Table						K/C
Power Correction	OFF	<<	<<	*		K/C
Down Converter Manual Setup						
Current	0 A	<<	<<	*		K/C
Current	0 A	<<	<<	*		K/C
IF Gain 1	0 dB	<<	<<	*		K/C
IF Gain 2	0 dB	<<	<<	*		K/C
LO1 Frequency	2.975 GHz	<<	<<	*		K/C
LO1 Level	10 dBm	<<	<<	*		K/C
LO2 Frequency	2.975 GHz	<<	<<	*		K/C
LO2 Level	10 dBm	<<	<<	*		K/C
Mixer 1 Bias	OFF	<<	<<	*		K/C
Mixer 2 Bias	OFF	<<	<<	*		K/C
∆IF = IF2 - IF1	0 Hz	<<	<<	*		K/C
Frequency Offset (User Down Conv.)						
Conversion Mode	RF = n * LO + IF	<<	<<	*		K/C
Frequency Offset	OFF	<<	<<	*		K/C
Harmonic #	1	<<	<<	*		K/C
LO Frequency	3 GHz	<<	<<	*		K/C
Invert Image	OFF	<<	<<	*		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

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Clock Setup						
Set Date and Time						K
Show Clock	ON	<<	<<	*		K/C
Color Setup						
Invert						
Background	Red:255 Green:255 Blue:255	<<	<<	*		K/C
Data Trace 1	Red:0 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 2	Red:255 Green:0 Blue:0	<<	<<	*		K/C
Data Trace 3	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 4	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 5	Red:0 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 6	Red:255 Green:0 Blue:0	<<	<<	*		K/C
Data Trace 7	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 8	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Graticule Main	Red:128 Green:128 Blue:128	<<	<<	*		K/C
Graticule Sub	Red:192 Green:192 Blue:192	<<	<<	*		K/C
Limit Fail	Red:0 Green:255 Blue:255	<<	<<	*		K/C
Limit Line	Red:95 Green:223 Blue:223	<<	<<	*		K/C
Mem Trace 1	Red:128 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 2	Red:255 Green:128 Blue:128	<<	<<	*		K/C
Mem Trace 3	Red:255 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 4	Red:128 Green:255 Blue:128	<<	<<	*		K/C
Mem Trace 5	Red:128 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 6	Red:255 Green:128 Blue:128	<<	<<	*		K/C
Mem Trace 7	Red:255 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 8	Red:128 Green:255 Blue:128	<<	<<	*		K/C
Reset Color						K/C
Normal						
Background	Red:0 Green:0 Blue:0	<<	<<	*		K/C
Data Trace 1	Red:255 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 2	Red:0 Green:255 Blue:255	<<	<<	*		K/C
Data Trace 3	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 4	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 5	Red:255 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 6	Red:0 Green:255 Blue:255	<<	<<	*		K/C
Data Trace 7	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 8	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Graticule Main	Red:127 Green:127 Blue:127	<<	<<	*		K/C
Graticule Sub	Red:63 Green:63 Blue:63	<<	<<	*		K/C
Limit Fail	Red:255 Green:0 Blue:0	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Limit Line	Red:160 Green:32 Blue:32	<<	<<	*		K/C
Mem Trace 1	Red:127 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 2	Red:0 Green:127 Blue:127	<<	<<	*		K/C
Mem Trace 3	Red:0 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 4	Red:127 Green:0 Blue:127	<<	<<	*		K/C
Mem Trace 5	Red:127 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 6	Red:0 Green:127 Blue:127	<<	<<	*		K/C
Mem Trace 7	Red:0 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 8	Red:127 Green:0 Blue:127	<<	<<	*		K/C
Reset Color						K/C
Control Panel						K
GPIB Setup						
System Controller Configuration						
Talker/Listener Address	17	<<	<<	*		K/C
Key Lock						
Front Panel & Keyboard Lock	OFF	<<	<<	*		K/C
Touch Screen & Mouse Lock	OFF	<<	<<	*		K/C
Network Setup						
MAC Address						
Network Configuration...						K
Network Identification...						K
SICL-LAN Address	17	<<	<<	*		K/C
SICL-LAN Server	OFF	<<	<<	*		K/C
Socket Server	OFF	<<	<<	*		K/C
Telnet Server	OFF	<<	<<	*		K/C
Print						K
Printer Setup...						K
Product Information						K

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Time Offset						
Narrow Ref Position	Center	<<	<<	*		K/C
Narrow Settings -> Wide						K/C
Narrow Span	100 ms	<<	<<	*		K/C
Narrow Time Offset	0 s	<<	<<	*		K/C
Wide Ref Position	Center	<<	<<	*		K/C
Wide Settings -> Narrow						K/C
Wide Span	100 ms	<<	<<	*		K/C
Wide Time Offset	0 s	<<	<<	*		K/C
Trace View						
Aperture	1.5 %	<<	<<	*		K/C
Copy to User						K/C
Data Hold	Off	<<	<<	*		K/C
Data Math	Off	<<	<<	*		K/C
Display Trace	Data	<<	<<	*		K/C
Marker -> -Offset						K/C
Memory Trace						
Line (Y = AX + B)						
A	0	<<	<<	*		K/C
B	0	<<	<<	*		K/C
Data Trace -> A, B						K/C
Set Line to Memory						K/C
Offset	0 Hz	<<	<<	*		K/C
Persistence						
Clear Persistent Data						K/C
Persistence Mode	OFF	<<	<<	*		K/C
Smoothing	OFF	<<	<<	*		K/C
Trace Label	"WB Freq"	<<	<<	*		K/C
Trigger						
Average Trigger	OFF			*		K/C
Ext Trig Adj.	0 s	<<	<<	*		K/C
Ext Trig Polarity	Negative	<<	<<	*		K/C
Source	Internal	<<	<<	*		K/C
Trigger to Transient	Selected Phase Noise	<<	<<	*		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 dB	<<	<<	*		K/C
DC Control Voltage								
	Auto Freq Control							
		AFC Status	OFF	<<	<<	*		K/C
		Frequency Band	300 M - 7 GHz	<<	<<	*		K/C
		Max Ctrl Voltage Limit	35 V	<<	<<	*		K/C
		Max Input Level	0 dBm	<<	<<	*		K/C
		Max Iteration	10	<<	<<	*		K/C
		Min Ctrl Voltage Limit	-15 V	<<	<<	*		K/C
		Sensitivity	10 MHz/V	<<	<<	*		K/C
		Target	1 GHz	<<	<<	*		K/C
		Tolerance	1 kHz	<<	<<	*		K/C
	Control Voltage Cal		OFF	<<	<<			K/C
	DC Control Delay		100 ms	<<	<<	*		K/C
	DC Control Output		OFF	<<	<<			K/C
	DC Control Voltage		0 V	<<	<<	*		K/C
	Max Ctrl Voltage Limit		35 V	<<	<<	*		K/C
	Min Ctrl Voltage Limit		-15 V	<<	<<	*		K/C
DC Power Voltage								
	DC Power Delay		100 ms	<<	<<	*		K/C
	DC Power Output		OFF	<<	<<			K/C
	DC Power Voltage		0 V	<<	<<	*		K/C
	Max Pwr Voltage Limit		16 V	<<	<<	*		K/C
	Min Pwr Voltage Limit		0 V	<<	<<	*		K/C
Display								
	Edit Title Label		""	<<	<<	*		K/C
	Color Type		"Normal"	<<	<<	*		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

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
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
Security Level	None	<<	<<	*		K/C
Title Label	OFF	<<	<<	*		K/C
Update	ON	<<	<<	*		K/C
Y # of Digits	4-digits	<<	<<	*		K/C
Input Port						
Down Converter						
Down Converter	OFF	<<	<<	*		K/C
External Mixer	Not Used	<<	<<	*		K/C
RF Input	Down Converter	<<	<<	*		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)	Band Marker	<<	<<	*		K/C
Analysis Range (Y)	Band Marker	<<	<<	*		K/C
Analysis Type	Off	<<	<<	*		K/C
Band Marker X						
Band Marker X	OFF	<<	<<	*		K/C
Center	0 (The unit changes by the selected trace.)					K/C
Span	2T (The unit changes by the selected trace.)					K/C
Start	-1T (The unit changes by the selected trace.)	<<	<<	*		K/C

C. List of Default Values

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Stop	1T (The unit changes by the selected trace.)	<<	<<	*		K/C
Band Marker Y						
Band Marker Y	OFF	<<	<<	*		K/C
Center	0 (The unit changes by the selected trace.)					K/C
Span	2T (The unit changes by the selected trace.)					K/C
Start	-1T (The unit changes by the selected trace.)	<<	<<	*		K/C
Stop	1T (The unit changes by the selected trace.)	<<	<<	*		K/C
Couple	OFF	<<	<<	*		K/C
Marker Search						
Band Marker X						
Band Marker X	OFF	<<	<<	*		K/C
Center	0 (The unit changes by the selected trace.)					K/C
Span	2T (The unit changes by the selected trace.)					K/C
Start	-1T (The unit changes by the selected trace.)	<<	<<	*		K/C
Stop	1T (The unit changes by the selected trace.)	<<	<<	*		K/C
Band Marker Y						
Band Marker Y	OFF	<<	<<	*		K/C
Center	0 (The unit changes by the selected trace.)					K/C
Span	2T (The unit changes by the selected trace.)					K/C
Start	-1T (The unit changes by the selected trace.)	<<	<<	*		K/C
Stop	1T (The unit changes by the selected trace.)	<<	<<	*		K/C
Couple	OFF	<<	<<	*		K/C
Peak						
Peak Excursion	0 (The unit changes by the selected trace.)	<<	<<	*		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)	Full Range	<<	<<	*		K/C

Key Operation			Factory-shipped Setting	Default Value: Preset	Default Value: *RST	Save / Recall	Backup	Avaiable Means of Defining a Setting
	Search Range (Y)		Full Range	<<	<<	*		K/C
	Target							
		Search Left						K/C
		Search Right						K/C
		Search Target						K/C
		Target Transition	Both	<<	<<	*		K/C
		Target Value	0 (The unit changes by the selected trace.)	<<	<<	*		K/C
	Tracking		Off	<<	<<	*		K/C
Measurement View								
	Freq & Power		Selected Phase Noise	<<	<<	*		K/C
	Phase Noise		Selected Phase Noise	<<	<<	*		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		Selected Phase Noise	<<	<<	*		K/C
	Transient		Selected Phase Noise	<<	<<	*		K/C
	User		Selected Phase Noise	<<	<<	*		K/C
Save/Recall								
	Save State							
		Save Type	State Only					K/C
Scale								
	Auto Scale							K/C
	Auto Scale All							K/C
	Divisions		10	<<	<<	*		K/C
	Marker -> Reference							K/C
	Reference Position		This parameter changes by the selected trace.	<<	<<	*		K/C
	Reference Value		This parameter changes by the selected trace.	<<	<<	*		K/C
	Scale/Div		This parameter changes by the selected trace.	<<	<<	*		K/C
	X Axis							
		Auto	ON	<<	<<	*		K/C
		Band Marker -> X Axis						K/C
		Left	0	<<	<<	*		K/C
		Right	100	<<	<<	*		K/C

C. List of Default Values

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
X Axis Type	Linear	<<	<<	*		K/C
X Unit	U	<<	<<	*		K/C
Y Unit	U	<<	<<	*		K/C
System						
Abort Printing						K/C
Backlight	ON					K/C
Dump Screen Image...						K
Instrument Setup						
Correction						
File Dialog...						K/C
Import Power Correction Table						K/C
Power Correction	OFF	<<	<<	*		K/C
Down Converter Manual Setup						
Current	0 A	<<	<<	*		K/C
Current	0 A	<<	<<	*		K/C
IF Gain 1	0 dB	<<	<<	*		K/C
IF Gain 2	0 dB	<<	<<	*		K/C
LO1 Frequency	2.975 GHz	<<	<<	*		K/C
LO1 Level	10 dBm	<<	<<	*		K/C
LO2 Frequency	2.975 GHz	<<	<<	*		K/C
LO2 Level	10 dBm	<<	<<	*		K/C
Mixer 1 Bias	OFF	<<	<<	*		K/C
Mixer 2 Bias	OFF	<<	<<	*		K/C
ΔIF = IF2 - IF1	0 Hz	<<	<<	*		K/C
Frequency Offset (User Down Conv.)						
Conversion Mode	RF = n * LO + IF	<<	<<	*		K/C
Frequency Offset	OFF	<<	<<	*		K/C
Harmonic #	1	<<	<<	*		K/C
LO Frequency	3 GHz	<<	<<	*		K/C
Invert Image	OFF	<<	<<	*		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

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Clock Setup						
Set Date and Time						K
Show Clock	ON	<<	<<	*		K/C
Color Setup						
Invert						
Background	Red:255 Green:255 Blue:255	<<	<<	*		K/C
Data Trace 1	Red:0 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 2	Red:255 Green:0 Blue:0	<<	<<	*		K/C
Data Trace 3	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 4	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 5	Red:0 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 6	Red:255 Green:0 Blue:0	<<	<<	*		K/C
Data Trace 7	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 8	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Graticule Main	Red:128 Green:128 Blue:128	<<	<<	*		K/C
Graticule Sub	Red:192 Green:192 Blue:192	<<	<<	*		K/C
Limit Fail	Red:0 Green:255 Blue:255	<<	<<	*		K/C
Limit Line	Red:95 Green:223 Blue:223	<<	<<	*		K/C
Mem Trace 1	Red:128 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 2	Red:255 Green:128 Blue:128	<<	<<	*		K/C
Mem Trace 3	Red:255 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 4	Red:128 Green:255 Blue:128	<<	<<	*		K/C
Mem Trace 5	Red:128 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 6	Red:255 Green:128 Blue:128	<<	<<	*		K/C
Mem Trace 7	Red:255 Green:128 Blue:255	<<	<<	*		K/C
Mem Trace 8	Red:128 Green:255 Blue:128	<<	<<	*		K/C
Reset Color						K/C
Normal						
Background	Red:0 Green:0 Blue:0	<<	<<	*		K/C
Data Trace 1	Red:255 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 2	Red:0 Green:255 Blue:255	<<	<<	*		K/C
Data Trace 3	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 4	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Data Trace 5	Red:255 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 6	Red:0 Green:255 Blue:255	<<	<<	*		K/C
Data Trace 7	Red:0 Green:255 Blue:0	<<	<<	*		K/C
Data Trace 8	Red:255 Green:0 Blue:255	<<	<<	*		K/C
Graticule Main	Red:127 Green:127 Blue:127	<<	<<	*		K/C
Graticule Sub	Red:63 Green:63 Blue:63	<<	<<	*		K/C
Limit Fail	Red:255 Green:0 Blue:0	<<	<<	*		K/C

Key Operation	Factory-shipped Setting	Default Value		Save / Recall	Backup	Avaiable Means of Defining a Setting
		Preset	*RST			
Limit Line	Red:160 Green:32 Blue:32	<<	<<	*		K/C
Mem Trace 1	Red:127 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 2	Red:0 Green:127 Blue:127	<<	<<	*		K/C
Mem Trace 3	Red:0 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 4	Red:127 Green:0 Blue:127	<<	<<	*		K/C
Mem Trace 5	Red:127 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 6	Red:0 Green:127 Blue:127	<<	<<	*		K/C
Mem Trace 7	Red:0 Green:127 Blue:0	<<	<<	*		K/C
Mem Trace 8	Red:127 Green:0 Blue:127	<<	<<	*		K/C
Reset Color						K/C
Control Panel						K
GPIB Setup						
System Controller Configuration						
Talker/Listener Address	17	<<	<<	*		K/C
Key Lock						
Front Panel & Keyboard Lock	OFF	<<	<<	*		K/C
Touch Screen & Mouse Lock	OFF	<<	<<	*		K/C
Network Setup						
MAC Address						
Network Configuration...						K
Network Identification...						K
SICL-LAN Address	17	<<	<<	*		K/C
SICL-LAN Server	OFF	<<	<<	*		K/C
Socket Server	OFF	<<	<<	*		K/C
Telnet Server	OFF	<<	<<	*		K/C
Print						K
Printer Setup...						K
Product Information						K

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
Copy to User						K/C
Data Hold	Off	<<	<<	*		K/C
Data Math	Off	<<	<<	*		K/C
Display Trace	Data	<<	<<	*		K/C
Enable Trace						
Trace 1	ON	<<	<<	*		K/C
Marker -> -Offset						K/C
Offset	0	<<	<<	*		K/C
Persistence						
Clear All Persistent Data						K/C
Persistence Mode	OFF	<<	<<	*		K/C
Smoothing	OFF	<<	<<	*		K/C
Trace Annotation	""	<<	<<	*		K/C
Trace Label	"Tr1"	<<	<<	*		K/C

NOTE

The user menu is not displayed to press Preset - **Factory** key or to execute **:SYST:PRES** command. This is because the user menu is not set in the setting when the factory is shipped.

The initial value that has been described to the user menu in the initial value table is a value that internally has the E5052A.

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

Table D-1 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 Input Level	Sets/reads the maximum input level	:SENS:FP[1-1]:POW:INP:LEV:MAX
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

Table D-1 PN Menu

Key Operation	Function	SCPI Command
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
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
Color Type	Sets/Reads the display type of the display (normal/inverted)	:DISP:IMAG
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
Security Level	Sets/recalls the security level	:SYST:SEC[:LEV]
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

Table D-1 PN Menu

Key Operation	Function	SCPI Command
Input Port		
Downconverter		
Downconverter	Sets the use of the downconverter on or off, or reads its setting	:SENS:DCON[:STAT]
RF Input	Sets/reads the signal supplied to the RF input port	:SENS:DCON:INP
External Mixer	Sets the use of the external mixer on or off and reads its settings	:SENS:DCON:MEXT
Macro Setup		
Application		
Jitter	Executes clock jitter analysis (VBA)	
mmWave	Executes phase-noise measurement (VBA)	
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

Table D-1 PN Menu

Key Operation	Function	SCPI Command
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[1-10]:STAT
: **:**		
Marker 10	Turns on/off marker 10	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-10]:STAT
Marker 1	Turns on/off marker 1	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-10]:STAT
: **:**		
Marker 6	Turns on/off marker 6	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-10]: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
More Markers		
Marker 7	Turns on/off marker 7	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-10]:STAT
: **:**		
Marker 10	Turns on/off marker 10	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-10]: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

Table D-1 PN Menu

Key Operation	Function	SCPI Command
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
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

Table D-1 PN Menu

Key Operation	Function	SCPI Command
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[1-10]:SEAR:PEAK:EXC
Peak Polarity	Sets/reads the marker peak-search polarity	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:PEAK:POL
Search Left	Execute marker peak search left	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:EXEC:LPE
Search Peak	Execute marker peak search	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-10]: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[1-10]:SEAR:EXEC:RPE
Search Max	Execute marker search maximum	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:EXEC:MAX
Search Min	Execute marker search minimum	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:EXEC:MIN
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[1-10]:SEAR:EXEC:LTAR
Search Right	Execute marker target search right	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:EXEC:RTAR
Search Target	Execute marker target search	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:EXEC:TARG
Target Transition	Sets/reads the target transition definition	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:TARG:TRAN
Target Value	Sets/reads the marker target value	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:TARG:Y
Tracking	Sets/reads the marker tracking type	:CALC:PN[1-1]:TRAC[1-1]:MARK[1-10]: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

Table D-1 PN Menu

Key Operation	Function	SCPI Command
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
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

Table D-1 PN Menu

Key Operation	Function	SCPI Command
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
X Axis		
Auto	Sets/Reads automatic setting of the X-axis display range to the stimulus value	:DISP:PN[1-1]:TRAC[1-1]:X:SCAL:AUTO
Band Marker -> X Axis	Sets the X-axis band marker range to the X-axis display range of a graph	:DISP:PN[1-1]:TRAC[1-1]:X:SCAL:LEFT :DISP:PN[1-1]:TRAC[1-1]:X:SCAL:RIGH
Left	Sets/Reads the start value of the X-axis display range	:DISP:PN[1-1]:TRAC[1-1]:X:SCAL:LEFT
Right	Sets/Reads the stop value of the X-axis display range	:DISP:PN[1-1]:TRAC[1-1]:X:SCAL:RIGH
Setup		
Carrier Search	Searches carrier signal and reflects the result to the input frequency of the downconverter	:SENS:FP[1-1]:DCON:SSE:EXEC
Frequency Band	Selects frequency band	:SENS:PN[1-1]:FBAN
IF Gain	Sets/reads the IF Gain	:SENS:PN[1-1]:IFG

Table D-1 PN Menu

Key Operation	Function	SCPI Command
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]
Nominal Frequency	Sets/reads input frequency of the downconverter	:SENS:FP[1-1]:DCON:FREQ
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
20MHz	Sets 20MHz 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
Instrument Setup		
Correction		
File Dialog ...	Loads correction data for a specified power	:MMEM:LOAD:CORR:POW
Import Power Correction Table	Loads correction data for a specified power	:MMEM:LOAD:CORR:POW
Power Correction	Sets user the user calibration on or off or reads its setting	:SENS:CORR:POW:STAT
Downconverter Manual Setup		
Current	Sets/reads the bias current to be supplied to the external mixer	:SENS:DCON:MAN:MEXT[1-2]:BIAS:CURR
IF Gain 1 **IF Gain 2**	Sets/reads the IF gain of the external mixer	:SENS:DCON:MAN:IFG[1-2]

Table D-1 PN Menu

Key Operation	Function	SCPI Command
LO1 Frequency **LO2 Frequency**	Sets/reads the LO frequency of the external mixer	:SENS:DCON:MAN:LO[1-2]:FREQ
LO1 Level **LO2 Level**	Sets/reads the LO level of the external mixer	:SENS:DCON:MAN:LO[1-2]:LEV
Mixer 1 Bias **Mixer 2 Bias**	Sets the bias current supplied to the external mixer on or off and reads its settings	:SENS:DCON:MAN:MEXT[1-2]:BIAS:STAT
∆IF = IF2 - IF1	Sets/reads the differential frequency between CH1 and CH2 from the external mixer	:SENS:DCON:MAN:IFD
Frequency Offset (User Downconv.)		
Conversion Mode	Sets/reads the conversion mode of the frequency offset	:SENS:UDC:MODE
Frequency Offset	Sets/reads the frequency offset	:SENS:UDC:STAT
Harmonic #	Sets/reads the frequency offset factor	:SENS:UDC:HARM
LO Frequency	Sets/reads the LO frequency of the frequency offset	:SENS:UDC:LO
PN Ext. Prescaler		
Division	Sets/Reads the frequency-dividing ratio	:SENS:PN[1-1]:EPR:DIV
Output Power Level	Sets/Reads the output level of the frequency divider	:SENS:PN[1-1]:EPR:POW
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

Table D-1 PN Menu

Key Operation	Function	SCPI Command
Color Setup		
Invert	Sets each color when the inverted display is selected	
Background	Sets/Reads the background color	:DISP:COL2:BACK[:VAL]
Data Trace 1	Sets/Reads the color of the data trace of trace 1	:DISP:COL2:TRAC1:DATA[:VAL]
: **:**		
Data Trace 8	Sets/Reads the color of the data trace of trace 8	:DISP:COL2:TRAC8:DATA[:VAL]
Graticule Main	Sets/Reads the color of the graph	:DISP:COL2:GRAT1[:VAL]
Graticule Sub	Sets/Reads the color of the grid line of the graph	:DISP:COL2:GRAT2[:VAL]
Limit Fail	Sets/Reads the limit display color	:DISP:COL2:LIM1[:VAL]
Limit Line	Sets/Reads the color of the limit line	:DISP:COL2:LIM2[:VAL]
Mem Trace 1	Sets/Reads the color of the memory trace of trace 1	:DISP:COL2:TRAC1:MEM[:VAL]
: **:**		
Mem Trace 8	Sets/Reads the color of the memory trace of trace 8	:DISP:COL2:TRAC8:MEM[:VAL]
Reset Color	Resets the display color to the factory preset default setting	:DISP:COL2:RES
Normal	Sets each color when the normal display is selected	
Background	Sets/Reads the background color	:DISP:COL1:BACK[:VAL]
Data Trace 1	Sets/Reads the color of the data trace of trace 1	:DISP:COL1:TRAC1:DATA[:VAL]
: **:**		
Data Trace 8	Sets/Reads the color of the data trace of trace 8	:DISP:COL1:TRAC8:DATA[:VAL]
Graticule Main	Sets/Reads the color of the graph	:DISP:COL1:GRAT1[:VAL]
Graticule Sub	Sets/Reads the color of the grid lines in the graph	:DISP:COL1:GRAT2[:VAL]
Limit Fail	Sets/Reads the limit display color	:DISP:COL1:LIM1[:VAL]
Limit Line	Sets/Reads the color of the limit line	:DISP:COL1:LIM2[:VAL]
Mem Trace 1	Sets/Reads the color of the memory trace of trace 1	:DISP:COL1:TRAC1:MEM[:VAL]

Table D-1 PN Menu

Key Operation	Function	SCPI Command
: :		
Mem Trace 8	Sets/Reads the color of the memory trace of trace 8	:DISP:COL1:TRAC8:MEM[:VAL]
Reset Color	Resets the display color to the factory preset default setting	:DISP:COL1:RES
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	
Service Menu		
Administrator Menu	Displays softkeys associated with Administrator Menu. This function is not available to general users	

Table D-1 PN Menu

Key Operation	Function	SCPI Command
Error Log		
Clear Error Log	Clears the error log	
View Error Log ...	Displays the error log	
Install Option License		
Jitter	Enters license for clock jitter analysis	
Service Function	Displays softkeys associated with Service Menu. This function is not available to general users.	
Test Menu		
Power On Test	Performs internal test	
Display Test	Performs display test	
Front Panel	Performs front panel key (hard key) test	
Adjust Touch Screen	Performs touch screen calibration	
E5053A Test	Displays the connection status of E5053A	
Trace View		
Aperture	Smoothing aperture	:CALC:PN[1-1]:TRAC[1-1]:SMO:APER
Copy to User	Copies trace data to the user trace	:CALC:PN[1-1]:TRAC[1-1]:DATA:COPY
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
Marker -> -Offset	Sets sign-inverted data value of the data trace’s active marker to the offset value	:CALC:PN[1-1]:TRAC[1-1]:MATH:OFFS
Offset	Sets/Reads the offset value of the data trace	:CALC:PN[1-1]:TRAC[1-1]:MATH:OFFS
Persistence		
Clear Persistent Data	Clears persistent mode	:DISP:PN[1-1]:TRAC[1-4]:PERS:CLE
Persistence Mode	Sets/reads persistent mode	:DISP:PN[1-1]:TRAC[1-4]:PERS:STAT

D. Softkey Functions

Table D-1 PN Menu

Key Operation	Function	SCPI Command
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
Minimum Spur Level	Sets/Reads the minimum spurious level	:CALC:PN[1-1]:TRAC[1-1]:SPUR:THR:LEV:MIN
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		
Average Trigger	Sets/Reads the averaging trigger function	:TRIG:AVER
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
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.

D. Softkey Functions

SP Menu

Table D-2 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 Input Level	Sets/reads the maximum input level	:SOUR:VOLT:CONT:AFC:INP:LEV:MAX
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

Table D-2 SP Menu

Key Operation	Function	SCPI Command
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
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
Color Type	Sets/Reads the display type of the display (normal/inverted)	:DISP:IMAG
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
Security Level	Sets/recalls the security level	:SYST:SEC[:LEV]
Title Label	Turns on/off measurement window title label	:DISP:SP[1-1]:LAB:STAT
Update	Turns on/off trace updates	:DISP:ENAB

Table D-2 SP Menu

Key Operation	Function	SCPI Command
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
Input Port		
Downconverter		
Downconverter	Sets the use of the downconverter on or off, or reads its setting	:SENS:DCON[:STAT]
RF Input	Sets/reads the signal supplied to the RF input port	:SENS:DCON:INP
External Mixer	Sets the use of the external mixer on or off and reads its settings	:SENS:DCON:MEXT
Macro Setup		
Application		
Jitter	Executes clock jitter analysis (VBA)	
mmWave	Executes phase-noise measurement (VBA)	
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

Table D-2 SP Menu

Key Operation	Function	SCPI Command
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[1-10]:STAT
: :		
Marker 10	Turns on/off marker 10	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-10]:STAT
Marker 1	Turns on/off marker 1	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-10]:STAT
: :		
Marker 6	Turns on/off marker 6	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-10]: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
More Markers		
Marker 7	Turns on/off marker 6	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-10]:STAT
: :		
Marker 10	Turns on/off marker 6	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-10]:STAT

Table D-2 SP Menu

Key Operation	Function	SCPI Command
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
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

Table D-2 SP Menu

Key Operation	Function	SCPI Command
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]:MARK[1-10]:SEAR:PEAK:EXC
Peak Polarity	Sets/reads the marker peak-search polarity	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:PEAK:POL
Search Left	Execute marker peak search left	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:EXEC:LPE
Search Peak	Execute marker peak search	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:EXEC:PEAK
Search Peak All	Execute marker search all	:CALC:SP[1-1]:TRAC[1-1]:ALLM:SEAR:PEAK
Search Right	Execute marker peak search right	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:EXEC:RPE
Search Max	Execute marker search maximum	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:EXEC:MAX
Search Min	Execute marker search minimum	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-10]: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[1-10]:SEAR:EXEC:LTAR
Search Right	Execute marker target search right	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:EXEC:RTAR
Search Target	Execute marker target search	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:EXEC:TARG
Target Transition	Sets/reads the target transition definition	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:TARG:TRAN

D. Softkey Functions

Table D-2 SP Menu

Key Operation	Function	SCPI Command
Target Value	Sets/reads the marker target value	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-10]:SEAR:TARG:Y
Tracking	Sets/reads the marker tracking type	:CALC:SP[1-1]:TRAC[1-1]:MARK[1-10]: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
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

Table D-2 SP Menu

Key Operation	Function	SCPI Command
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
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
X Axis		
Auto	Sets/Reads automatic setting of the X-axis display range to the stimulus value	:DISP:SP[1-1]:TRAC[1-1]:X:SCAL:AUTO
Band Marker -> X Axis	Sets the X-axis band marker range to the X-axis display range of a graph	:DISP:SP[1-1]:TRAC[1-1]:X:SCAL:LEFT :DISP:SP[1-1]:TRAC[1-1]:X:SCAL:RIGH
Left	Sets/Reads the start value of the X-axis display range	:DISP:SP[1-1]:TRAC[1-1]:X:SCAL:LEFT
Right	Sets/Reads the stop value of the X-axis display range	:DISP:SP[1-1]:TRAC[1-1]:X:SCAL:RIGH

D. Softkey Functions

Table D-2 SP Menu

Key Operation	Function	SCPI Command
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
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

Table D-2 SP Menu

Key Operation	Function	SCPI Command
System		
Abort Printing	Aborts printing	:HCOP:ABOR
Backlight	Turns on/off backlight	:SYST:BACK:STAT
Dump Screen Image	Save screen image	:MMEM:STOR:IMAG
Instrument Setup		
Correction		
File Dialog ...	Loads correction data for a specified power	:MMEM:LOAD:CORR:POW
Import Power Correction Table	Loads correction data for a specified power	:MMEM:LOAD:CORR:POW
Power Correction	Sets user the user calibration on or off or reads its setting	:SENS:CORR:POW:STAT
Downconverter Manual Setup		
Current	Sets/reads the bias current to be supplied to the external mixer	:SENS:DCON:MAN:MEXT[1-2]:BIAS:CURR
IF Gain 1 **IF Gain 2**	Sets/reads the IF gain of the external mixer	:SENS:DCON:MAN:IFG[1-2]
LO1 Frequency **LO2 Frequency**	Sets/reads the LO frequency of the external mixer	:SENS:DCN:MAN:LO[1-2]:FREQ
LO1 Level **LO2 Level**	Sets/reads the LO level of the external mixer	:SENS:DCON:MAN:LO[1-2]:LEV
Mixer 1 Bias **Mixer 2 Bias**	Sets the bias current supplied to the external mixer on or off and reads its settings	:SENS:DCON:MAN:MEXT[1-2]:BIAS:STAT
ΔIF = IF2 - IF1	Sets/reads the differential frequency between CH1 and CH2 from the external mixer	:SENS:DCON:MAN:IFD
Frequency Offset (User Downconv.)		
Conversion Mode	Sets/reads the conversion mode of the frequency offset	:SNES:UDC:MODE
Frequency Offset	Sets/reads the frequency offset	:SENS:UDC:STAT
Harmonic #	Sets/reads the frequency offset factor	:SENS:UDC:HARM
LO Frequency	Sets/reads the LO frequency of the frequency offset	:SENS:UDC:LO

D. Softkey Functions

Table D-2 SP Menu

Key Operation	Function	SCPI Command
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
Color Setup		
Invert	Sets each color when the inverted display is selected	
Background	Sets/Reads the background color	:DISP:COL2:BACK[:VAL]
Data Trace 1	Sets/Reads the color of the data trace of trace 1	:DISP:COL2:TRAC1:DATA[:VAL]
: **:**		
Data Trace 8	Sets/Reads the color of the data trace of trace 8	:DISP:COL2:TRAC8:DATA[:VAL]
Graticule Main	Sets/Reads the color of the graph	:DISP:COL2:GRAT1[:VAL]
Graticule Sub	Sets/Reads the color of the grid lines in the graph	:DISP:COL2:GRAT2[:VAL]
Limit Fail	Sets/Reads the limit display color	:DISP:COL2:LIM1[:VAL]
Limit Line	Sets/Reads the color of the limit line	:DISP:COL2:LIM2[:VAL]
Mem Trace 1	Sets/Reads the color of the memory trace of trace 1	:DISP:COL2:TRAC1:MEM[:VAL]
: **:**		
Mem Trace 8	Sets/Reads the color of the memory trace of trace 8	:DISP:COL2:TRAC8:MEM[:VAL]
Reset Color	Resets the display color to the factory preset default setting	:DISP:COL2:RES

Table D-2 SP Menu

Key Operation	Function	SCPI Command
Normal	Sets each color when the normal display is selected	
Background	Sets/Reads the background color	:DISP:COL1:BACK[:VAL]
Data Trace 1	Sets/Reads the color of the data trace of trace 1	:DISP:COL1:TRAC1:DATA[:VAL]
: :		
Data Trace 8	Sets/Reads the color of the data trace of trace 8	:DISP:COL1:TRAC8:DATA[:VAL]
Graticule Main	Sets/Reads the color of the graph	:DISP:COL1:GRAT1[:VAL]
Graticule Sub	Sets/Reads the color of the grid lines in the graph	:DISP:COL1:GRAT2[:VAL]
Limit Fail	Sets/Reads the limit display color	:DISP:COL1:LIM1[:VAL]
Limit Line	Sets/Reads the color of the limit line	:DISP:COL1:LIM2[:VAL]
Mem Trace 1	Sets/Reads the color of the memory trace of trace 1	:DISP:COL1:TRAC1:MEM[:VAL]
: :		
Mem Trace 8	Sets/Reads the color of the memory trace of trace 8	:DISP:COL1:TRAC8:MEM[:VAL]
Reset Color	Resets the display color to the factory preset default setting	:DISP:COL1:RES
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	

D. Softkey Functions

Table D-2 SP Menu

Key Operation	Function	SCPI Command
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	
Service Menu		
Administrator Menu	Displays softkeys associated with Administrator Menu. This function is not available to general users	
Error Log		
Clear Error Log	Clears the error log	
View Error Log ...	Displays the error log	
Install Option License		
Jitter	Enters the lincense for clock jitter analysis (VBA)	
Service Function	Displays softkeys associated with Service Menu. This function is not available to general users.	
Test Menu		
Power On Test	Performs internal test	
Display Test	Performs display test	
Front Panel	Performs front panel key (hard key) test	
Adjust Touch Screen	Performs touch screen calibration	
E5053A Test	Displays the connection status of E5053A	
Trace View		
Aperture	Smoothing aperture	:CALC:SP[1-1]:TRAC[1-1]:SMO:APER
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

Table D-2 SP Menu

Key Operation	Function	SCPI Command
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
Marker -> -Offset	Sets the sign-inverted data value of the data trace's active marker to the offset value	:CALC:SP[1-1]:TRAC[1-1]:MATH:OFFS
Offset	Sets/Reads the offset value of the data trace	:CALC:SP[1-1]:TRAC[1-1]:MATH:OFFS
Persistence		
Clear Persistent Data	Clears persistent mode	:DISP:SP[1-1]:TRAC[1-4]:PERS:CLE
Persistence Mode	Sets/reads persistent mode	:DISP:SP[1-1]:TRAC[1-4]: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		
Average Trigger	Sets/Reads the averaging trigger function	:TRIG:AVER
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
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

Table D-3 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 Input Level	Sets/reads the maximum input level	:SOUR:VOLT:CONT:AFC:INP:LEV:MAX
		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

Table D-3 FP Menu

Key Operation	Function	SCPI Command
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
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
Color Type	Sets/Reads the display type of the display (normal/inverted)	:DISP:IMAG
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
Security Level	Sets/recalls the security level	:SYST:SEC[:LEV]
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

Table D-3 FP Menu

Key Operation	Function	SCPI Command
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
Input Port		
Downconverter		
Downconverter	Sets the use of the downconverter on or off, or reads its setting	:SENS:DCON[:STAT]
RF Input	Sets/reads the signal supplied to the RF input port	:SENS:DCON:INP
External Mixer	Sets the use of the external mixer on or off and reads its settings	:SENS:DCON:MEXT
Macro Setup		
Application		
Jitter	Executes clock jitter analysis (VBA)	
mmWave	Executes phase-noise measurement (VBA)	
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	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

Table D-3 FP Menu

Key Operation	Function	SCPI Command
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[1-10]:STAT
: :		
Marker 10	Turns on/off marker 10	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-10]:STAT
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[1-10]:STAT
: :		
Marker 6	Turns on/off marker 6	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-10]: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
More Markers		
Marker 7	Turns on/off marker 7	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-10]:STAT
: :		
Marker 10	Turns on/off marker 10	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-10]:STAT

Table D-3 FP Menu

Key Operation	Function	SCPI Command
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		
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:COUP: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

D. Softkey Functions

Table D-3 FP Menu

Key Operation		Function	SCPI Command
	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[1-10]:SEAR:PEAK:EXC
	Peak Polarity	Sets/reads the marker peak-search polarity	:CALC:FP[1-1]:TRAC[1-4]:MAR K[1-10]:SEAR:PEAK:POL
	Search Left	Execute marker peak search left	:CALC:FP[1-1]:TRAC[1-4]:MAR K[1-10]:SEAR:EXEC:LPE
	Search Peak	Execute marker peak search	:CALC:FP[1-1]:TRAC[1-4]:MAR K[1-10]:SEAR:EXEC:PEAK
	Search Peak All	Execute marker search all	:CALC:FP[1-1]:TRAC[1-4]:ALL M:SEAR:PEAK
	Search Right	Execute marker peak search right	:CALC:FP[1-1]:TRAC[1-4]:MAR K[1-10]:SEAR:EXEC:RPE
Search Max		Execute marker search maximum	:CALC:FP[1-1]:TRAC[1-4]:MAR K[1-10]:SEAR:EXEC:MAX
Search Min		Execute marker search minimum	:CALC:FP[1-1]:TRAC[1-4]:MAR K[1-10]:SEAR:EXEC:MIN
Search Range (X)		Sets/reads marker search range (X-axis)	:CALC:FP[1-1]:TRAC[1-4]:ALL M:SEAR:DOM:X
Search Range (Y)		Sets/reads marker search range (Y-axis)	:CALC:FP[1-1]:TRAC[1-4]:ALL M:SEAR:DOM:Y
Target			
	Search Left	Execute marker target search left	:CALC:FP[1-1]:TRAC[1-4]:MAR K[1-10]:SEAR:EXEC:LTAR
	Search Right	Execute marker target search right	:CALC:FP[1-1]:TRAC[1-4]:MAR K[1-10]:SEAR:EXEC:RTAR

Table D-3 FP Menu

Key Operation	Function	SCPI Command
Search Target	Execute marker target search	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-10]:SEAR:EXEC:TARG
Target Transition	Sets/reads the target transition definition	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-10]:SEAR:TARG:TRAN
Target Value	Sets/reads the marker target value	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-10]:SEAR:TARG:Y
Tracking	Sets/reads the marker tracking type	:CALC:FP[1-1]:TRAC[1-4]:MARK[1-10]: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		
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	

D. Softkey Functions

Table D-3 FP Menu

Key Operation	Function	SCPI Command
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
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

Table D-3 FP Menu

Key Operation	Function	SCPI Command
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
X Axis		
Auto	Sets/Reads automatic setting of the X-axis display range to the stimulus value	:DISP:FP[1-1]:TRAC[1-4]:X:SCAL:AUTO
Band Marker -> X Axis	Sets the X-axis band marker range to the X-axis display range of a graph	:DISP:FP[1-1]:TRAC[1-4]:X:SCAL:LEFT :DISP:FP[1-1]:TRAC[1-4]:X:SCAL:RIGH
Left	Sets/Reads the start value of the X-axis display range	:DISP:FP[1-1]:TRAC[1-4]:X:SCAL:LEFT
Right	Sets/Reads the stop value of the X-axis display range	:DISP:FP[1-1]:TRAC[1-4]:X:SCAL:RIGH
Setup		
Carrier Search	Searches carrier signal and reflects the result to the input frequency of the downconverter	:SENS:FP[1-1]DCON:SSE:EXEC
Freq Resolution	Sets/reads frequency resolution	:SENS:FP[1-1]:FREQ:RES
Frequency Band	Selects frequency band	:SENS:FP[1-1]:FBAN
Max Input Level	Sets/reads the maximum input level of the downconverter in order to determine the IF Gain	:SENS:FP[1-1]:POW:INP:LEV:MAX
Nominal Frequency	Sets/reads the input frequecny to be supplied to the downconverter	:SENS:FP[1-1]:DCON:FREQ
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

Table D-3 FP Menu

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
Instrument Setup		
Correction		
File Dialog ...	Loads correction data for a specified power	:MMEM:LOAD:CORR:POW
Import Power Correction Table	Loads correction data for a specified power	:MMEM:LOAD:CORR:POW
Power Correction	Sets user the user calibration on or off or reads its setting	:SENS:CORR:POW:STAT
Downconverter Manual Setup		
Current	Sets/reads the bias current to be supplied to the external mixer	:SENS:DCON:MAN:MEXT[1-2]:BIAS:CURR
IF Gain 1 IF Gain 2	Sets/reads the IF gain of the external mixer	:SENS:DCON:MAN:IFG[1-2]

Table D-3 FP Menu

Key Operation	Function	SCPI Command
LO1 Frequency **LO2 Frequency**	Sets/reads the LO frequency of the external mixer	:SNES:DCON:MAN:LO[1-2]:FREQ
LO1 Level **LO2 Level**	Sets/reads the LO level of the external mixer	:SENS:DCON:MAN:LO[1-2]:LEV
Mixer 1 Bias **Mixer 2 Bias**	Sets the bias current supplied to the external mixer on or off and reads its settings	:SENS:DCON:MAN:MEXT[1-2]:BIAS:STAT
ΔIF = IF2 - IF1	Sets/reads the differential frequency between CH1 and CH2 from the external mixer	:SENS:DCON:MAN:IFD
Frequency Offset (User Downconv.)		
Conversion Mode	Sets/reads the conversion mode of the frequency offset	:SENS:UDC:MODE
Frequency Offset	Sets/reads the frequency offset	:SENS:UDC:STAT
Harmonic #	Sets/reads the frequency offset factor	:SENS:UDC:HARM
LO Frequency	Sets/reads the LO frequency of the frequency offset	:SENS:UDC:LO
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		
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

D. Softkey Functions

Table D-3 FP Menu

Key Operation	Function	SCPI Command
Color Setup		
Invert	Sets each color when the inverted display is selected	
Background	Sets/Reads the background color	:DISP:COL2:BACK[:VAL]
Data Trace 1	Sets/Reads the color of the data trace of trace 1	:DISP:COL2:TRAC1:DATA[:VAL]
: :		
Data Trace 8	Sets/Reads the color of the data trace of trace 8	:DISP:COL2:TRAC8:DATA[:VAL]
Graticule Main	Sets/Reads the color of the graph	:DISP:COL2:GRAT1[:VAL]
Graticule Sub	Sets/Reads the color of the grid lines in the graph	:DISP:COL2:GRAT2[:VAL]
Limit Fail	Sets/Reads the limit display color	:DISP:COL2:LIM1[:VAL]
Limit Line	Sets/Reads the color of the limit line	:DISP:COL2:LIM2[:VAL]
Mem Trace 1	Sets/Reads the color of the memory trace of trace 1	:DISP:COL2:TRAC1:MEM[:VAL]
: :		
Mem Trace 8	Sets/Reads the color of the memory trace of trace 8	:DISP:COL2:TRAC8:MEM[:VAL]
Reset Color	Resets the display color to the factory preset default setting	:DISP:COL2:RES
Normal	Sets each color when the normal display is selected	
Background	Sets/Reads the background color	:DISP:COL1:BACK[:VAL]
Data Trace 1	Sets/Reads the color of the data trace of trace 1	:DISP:COL1:TRAC1:DATA[:VAL]
: :		
Data Trace 8	Sets/Reads the color of the data trace of trace 8	:DISP:COL1:TRAC8:DATA[:VAL]
Graticule Main	Sets/Reads the color of the graph	:DISP:COL1:GRAT1[:VAL]
Graticule Sub	Sets/Reads the color of the grid lines in the graph	:DISP:COL1:GRAT2[:VAL]
Limit Fail	Sets/Reads the limit display color	:DISP:COL1:LIM1[:VAL]
Limit Line	Sets/Reads the color of the limit line	:DISP:COL1:LIM2[:VAL]
Mem Trace 1	Sets/Reads the color of the memory trace of trace 1	:DISP:COL1:TRAC1:MEM[:VAL]

Table D-3 FP Menu

Key Operation	Function	SCPI Command
: :		
Mem Trace 8	Sets/Reads the color of the memory trace of trace 8	:DISP:COL1:TRAC8:MEM[:VAL]
Reset Color	Resets the display color to the factory preset default setting	:DISP:COL1:RES
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	
Service Menu		
Administrator Menu	Displays softkeys associated with Administrator Menu. This function is not available to general users.	

Table D-3 FP Menu

Key Operation	Function	SCPI Command
Error Log		
Clear Error Log	Clears the error log	
View Error Log ...	Displays the error log	
Install Option License		
Jitter	Enters the license for clock jitter analysis	
Service Function	Displays softkeys associated with Service Menu. This function is not available to general users.	
Test Menu		
Power On Test	Performs internal test	
Display Test	Performs display test	
Front Panel	Performs front panel key (hard key) test	
Adjust Touch Screen	Performs touch screen calibration	
E5053A Test	Displays the connection status of **E5053A**	
Trace View		
Aperture	Smoothing aperture	:CALC:FP[1-1]:TRAC[1-4]:SMO:APER
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
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
Marker -> -Offset	Sets the sign-inverted data value of the data trace’s active marker to the offset value	:CALC:FP[1-1]:TRAC[1-4]:MATH:OFFS
Memory Trace		
Line (Y = AX + B)		
A	Sets/Reads regression line coefficient a (slope)	:CALC:FP[1-1]:TRAC[1-4]:LINE:A
B	Sets/Reads regression line coefficient b (intercept)	:CALC:FP[1-1]:TRAC[1-4]:LINE:B

Table D-3 FP Menu

Key Operation	Function	SCPI Command
Data Trace -> A, B	Assigns the measurement results to regression line coefficients (a, b)	:CALC:FP[1-1]:TRAC[1-4]:FUNC:LREG:DATA? :CALC:FP[1-1]:TRAC[1-4]:LINE:A :CALC:FP[1-1]:TRAC[1-4]:LINE:B
Set Line to Memory	Sets the obtained regression line to the memory trace	:CALC:FP[1-1]:TRAC[1-4]:LINE:MEM
Offset	Sets/Reads the offset value of the data trace	:CALC:FP[1-1]:TRAC[1-4]:MATH:OFFS
Persistence		
Clear Persistent Data	Clears persistent mode	:DISP:FP[1-1]:TRAC[1-4]:PERS:CLE
Persistence Mode	Sets/reads persistent 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		
Average Trigger	Sets/Reads the averaging trigger function	:TRIG:AVER
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.

D. Softkey Functions

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

Table D-4 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 Input Level	Sets/reads the maximum input level	:SOUR:VOLT:CONT:AFC:INP:LEV:MAX
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

D. Softkey Functions

Table D-4 TR Menu

Key Operation	Function	SCPI Command
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
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
Color Type	Sets/Reads the display type of the display (normal/inverted)	:DISP:IMAG
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
Security Level	Sets/recalls the security level	:SYST:SEC[:LEV]
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

Table D-4 TR Menu

Key Operation	Function	SCPI Command
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
Marker -> Phase X Reference	Sets/Reads the data value of the active marker’s position to 0 degree reference of phase	:CALC:TR[1-1]:TRAC[1-4]:FORM:PHAS:XREF
Phase Unit	Selects phase format on transient measurement	:CALC:TR[1-1]:TRAC[1-4]:FORM:PHAS:UNIT
Phase X Reference	Sets/Reads the data value of the active trace’s specified X-axis position to 0 degree reference of phase	:CALC:TR[1-1]:TRAC[1-4]:FORM:PHAS:XREF
Wrap Phase	Turns on/off wrap-phase	:CALC:TR[1-1]:TRAC[1-4]:FORM:PHAS:WRAP
Input Port		
Downconverter		
Downconverter	Sets the use of the downconverter on or off, or reads its settingÇµ	:SENS:DCON[:STAT]
RF Input	Sets/reads the signal supplied to the RF input port	:SENS:DCON:INP
External Mixer	Sets the use of the external mixer on or off and reads its settings	:SENS:DCON:MEXT
Macro Setup		
Application		
Jitter	Executes clock jitter analysis (VBA)	
mmWave	Executes phase-noise measurement (VBA)	
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

Table D-4 TR Menu

Key Operation	Function	SCPI Command
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[1-10]:STAT
: :		
Marker 10	Turns on/off marker 10	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-10]: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[1-10]:STAT
: :		
Marker 6	Turns on/off marker 6	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-10]: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

Table D-4 TR Menu

Key Operation	Function	SCPI Command
More Markers		
Marker 7	Turns on/off marker 7	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-10]:STAT
: :		
Marker 10	Turns on/off marker 10	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-10]: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
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

Table D-4 TR Menu

Key Operation			Function	SCPI Command
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[1-10]:SEAR:PEAK:EXC
		Peak Polarity	Sets/reads the marker peak-search polarity	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-10]:SEAR:PEAK:POL
		Search Left	Execute marker peak search left	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-10]:SEAR:EXEC:LPE
		Search Peak	Execute marker peak search	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-10]: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[1-10]:SEAR:EXEC:RPE

Table D-4 TR Menu

Key Operation	Function	SCPI Command
Search Max	Execute marker search maximum	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-10]:SEAR:EXEC:MAX
Search Min	Execute marker search minimum	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-10]: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[1-10]:SEAR:EXEC:LTAR
Search Right	Execute marker target search right	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-10]:SEAR:EXEC:RTAR
Search Target	Execute marker target search	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-10]:SEAR:EXEC:TARG
Target Transition	Sets/reads the target transition definition	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-10]:SEAR:TARG:TRAN
Target Value	Sets/reads the marker target value	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-10]:SEAR:TARG:Y
Tracking	Sets/reads the marker tracking type	:CALC:TR[1-1]:TRAC[1-4]:MARK[1-10]: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
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

Table D-4 TR Menu

Key Operation	Function	SCPI Command
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
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

Table D-4 TR Menu

Key Operation	Function	SCPI Command
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
X Axis		
Auto	Sets/Reads automatic setting of the X-axis display range to the stimulus value	:DISP:TR[1-1]:TRAC[1-4]:X:SCAL:AUTO
Band Marker -> X Axis	Sets the X-axis band marker range to the X-axis display range of a graph	:DISP:TR[1-1]:TRAC[1-4]:X:SCAL:LEFT :DISP:TR[1-1]:TRAC[1-4]:X:SCAL:RIGH
Left	Sets/Reads the start value of the X-axis display range	:DISP:TR[1-1]:TRAC[1-4]:X:SCAL:LEFT
Right	Sets/Reads the stop value of the X-axis display range	:DISP:TR[1-1]:TRAC[1-4]:X:SCAL:RIGH
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

D. Softkey Functions

Table D-4 TR Menu

Key Operation	Function	SCPI Command
Wide Freq Range	Set/reads transient frequency range (Wideband)	:SENS:TR[1-1]:WIDE:FREQ:MAX
Wide Max Frequency	Set/get transient frequency range in the wideband mode	:SENS:TR[1-1]:WIDE:FREQ:MAX
Span		
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
Instrument Setup		
Correction		
File Dialog ...	Loads correction data for a specified power	:MMEM:LOAD:CORR:POW
Import Power Correction Table	Loads correction data for a specified power	:MMEM:LOAD:CORR:POW
Power Correction	Sets user the user calibration on or off or reads its setting	:SENS:CORR:POW:STAT
Downconverter Manual Setup		
Current	Sets/reads the bias current to be supplied to the external mixer	:SENS:DCON:MAN:MEXT[1-2]:BIAS:CURR
IF Gain 1 **IF Gain 2**	Sets/reads the IF gain of the external mixer	:SENS:DCON:MAN:IFG[1-2]

Table D-4 TR Menu

Key Operation	Function	SCPI Command
LO1 Frequency **LO2 Frequency**	Sets/reads the LO frequency of the external mixer	:SENS:DCON:MAN:LO[1-2]:FREQ
LO1 Level **LO2 Level**	Sets/reads the LO level of the external mixer	:SENS:DCON:MAN:LO[1-2]:LEV
Mixer 1 Bias **Mixer 2 Bias**	Sets the bias current supplied to the external mixer on or off and reads its settings	:SENS:DCON:MAN:MEXT[1-2]:BIAS:STAT
∆IF = IF2 - IF1	Sets/reads the differential frequency between CH1 and CH2 from the external mixer	:SENS:DCON:MAN:IFD
Frequency Offset (User Downconv.)		
Conversion Mode	Sets/reads the conversion mode of the frequency offset	:SENS:UDC:MODE
Frequency Offset	Sets/reads the frequency offset	:SENS:UDC:STAT
Harmonic #	Sets/reads the frequency offset factor	:SENS:UDC:HARM
LO Frequency	Sets/reads the LO frequency of the frequency offset	:SENS:UDC:LO
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
Color Setup		
Invert	Sets each color when the inverted display is selected	
Background	Sets/Reads the background color	:DISP:COL2:BACK[:VAL]
Data Trace 1	Sets/Reads the color of the data trace of trace 1	:DISP:COL2:TRAC1:DATA[:VAL]

D. Softkey Functions

Table D-4 TR Menu

Key Operation	Function	SCPI Command
: :		
Data Trace 8	Sets/Reads the color of the data trace of trace 8	:DISP:COL2:TRAC8:DATA[:VAL]
Graticule Main	Sets/Reads the color of the graph	:DISP:COL2:GRAT1[:VAL]
Graticule Sub	Sets/Reads the color of the grid lines in the graph	:DISP:COL2:GRAT2[:VAL]
Limit Fail	Sets/Reads the limit display color	:DISP:COL2:LIM1[:VAL]
Limit Line	Sets/Reads the color of the limit line	:DISP:COL2:LIM2[:VAL]
Mem Trace 1	Sets/Reads the color of the memory trace of trace 1	:DISP:COL2:TRAC1:MEM[:VAL]
: :		
Mem Trace 8	Sets/Reads the color of the memory trace of trace 8	:DISP:COL2:TRAC8:MEM[:VAL]
Reset Color	Resets the display color to the factory preset default setting	:DISP:COL2:RES
Normal	Sets each color when the normal display is selected	
Background	Sets/Reads the background color	:DISP:COL1:BACK[:VAL]
Data Trace 1	Sets/Reads the color of the data trace of trace 1	:DISP:COL1:TRAC1:DATA[:VAL]
: :		
Data Trace 8	Sets/Reads the color of the data trace of trace 8	:DISP:COL1:TRAC8:DATA[:VAL]
Graticule Main	Sets/Reads the color of the graph	:DISP:COL1:GRAT1[:VAL]
Graticule Sub	Sets/Reads the color of the grid lines in the graph	:DISP:COL1:GRAT2[:VAL]
Limit Fail	Sets/Reads the limit display color	:DISP:COL1:LIM1[:VAL]
Limit Line	Sets/Reads the color of the limit line	:DISP:COL1:LIM2[:VAL]
Mem Trace 1	Sets/Reads the color of the memory trace of trace 1	:DISP:COL1:TRAC1:MEM[:VAL]
: :		
Mem Trace 8	Sets/Reads the color of the memory trace of trace 8	:DISP:COL1:TRAC8:MEM[:VAL]
Reset Color	Resets the display color to the factory preset default setting	:DISP:COL1:RES

Table D-4 TR Menu

Key Operation	Function	SCPI Command
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 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	
Service Menu		
Administrator Menu	Displays softkeys associated with Administrator Menu. This function is not available to general users.	
Error Log		
Clear Error Log	Clears the error log	
View Error Log ...	Displays the error log	

D. Softkey Functions

Table D-4 TR Menu

Key Operation	Function	SCPI Command
Install Option License		
Jitter	Enters the license for clock jitter analysis	
Service Function	Displays softkeys associated with Service Menu. This function is not available to general users.	
Test Menu		
Power On Test	Performs internal test	
Display Test	Performs display test	
Front Panel	Performs front panel key (hard key) test	
Adjust Touch Screen	Performs touch screen calibration	
E5053A Test	Displays the connection status of E5053A	
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
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
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

Table D-4 TR Menu

Key Operation	Function	SCPI Command
Display Trace	Shows data and/or memory trace	:DISP:TR[1-1]:TRAC[1-4]:MODE
Marker -> -Offset	Sets sign-inverted data value of the data trace's active marker to the offset value	:CALC:TR[1-1]:TRAC[1-4]:MATH:OFFS
Memory Trace		
Line (Y = AX + B)		
A	Sets/Reads regression line coefficient a (slope)	:CALC:TR[1-1]:TRAC[1-4]:LINE:A
B	Sets/Reads regression line coefficient b (intercept)	:CALC:TR[1-1]:TRAC[1-4]:LINE:B
Data Trace -> A, B	Assigns the measurement results to regression line coefficients (a, b)	:CALC:TR[1-1]:TRAC[1-4]:FUNC:LREG:DATA? :CALC:TR[1-1]:TRAC[1-4]:LINE:A :CALC:TR[1-1]:TRAC[1-4]:LINE:B
Set Line to Memory	Sets the obtained regression line to the memory trace	:CALC:TR[1-1]:TRAC[1-4]:LINE:MEM
Offset	Sets/Reads the offset value of the data trace	:CALC:TR[1-1]:TRAC[1-4]:MATH:OFFS
Persistence		
Clear Persistent Data	Clears persistent mode	:DISP:TR[1-1]:TRAC[1-4]:PERS:CLE
Persistence Mode	Sets/reads persistent 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		
Average Trigger	Sets/Reads the averaging trigger function	:TRIG:AVER
Continuous	Sets/reads trigger continuous mode	:INIT:TR[1-1]:CONT :INIT:TR[1-1]:IMM
Ext Trig Adj.	Sets/Reads the offset of the waiting time for external trigger	:TRIG:TR[1-1]:ETTA
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

Table D-4 TR Menu

Key Operation	Function	SCPI Command
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

Table D-5 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 Input Level	Sets/reads the maximum input level	:SOUR:VOLT:CONT:AFC:INP:LEV:MAX
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

Table D-5 User Menu

Key Operation	Function	SCPI Command
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:USER[1-1]:LAB:DATA
Color Type	Sets/Reads the display type of the display (normal/inverted)	:DISP:IMAG
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
Security Level	Sets/recalls the security level	:SYST:SEC[:LEV]
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
Input Port		
Downconverter		
Downconverter	Sets the use of the downconverter on or off, or reads its setting	:SENS:DCON[:STAT]
RF Input	Sets/reads the signal supplied to the RF input port	:SENS:DCON:INP
External Mixer	Sets the use of the external mixer on or off and reads its settings	:SENS:DCON:MEXT

D. Softkey Functions

Table D-5 User Menu

Key Operation	Function	SCPI Command
Macro Setup		
Application		
Jitter	Executes clock jitter analysis (VBA)	
mmWave	Executes phase-noise measurement (VBA)	
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		
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[1-10]:STAT
: :		

Table D-5 User Menu

Key Operation	Function	SCPI Command
Marker 10	Turns on/off marker 10	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-10]: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[1-10]:STAT
: :		
Marker 6	Turns on/off marker 6	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-10]: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
More Markers		
Marker 7	Turns on/off marker 7	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-10]:STAT
: :		
Marker 10	Turns on/off marker 10	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-10]: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

Table D-5 User Menu

Key Operation	Function	SCPI Command
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
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

Table D-5 User Menu

Key Operation	Function	SCPI Command
Peak		
Peak Excursion	Sets/reads the peak excursion value	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-10]:SEAR:PEAK:EXC
Peak Polarity	Sets/reads the marker peak-search polality	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-10]:SEAR:PEAK:POL
Search Left	Execute marker peak search left	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-10]:SEAR:EXEC:LPE
Search Peak	Execute marker peak search	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-10]: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[1-10]:SEAR:EXEC:RPE
Search Max	Execute marker search maximum	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-10]:SEAR:EXEC:MAX
Search Min	Execute marker search minimum	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-10]: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[1-10]:SEAR:EXEC:LTAR
Search Right	Execute marker target search right	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-10]:SEAR:EXEC:RTAR
Search Target	Execute marker target search	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-10]:SEAR:EXEC:TARG
Target Transition	Sets/reads the target transition definition	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-10]:SEAR:TARG:TRAN
Target Value	Sets/reads the marker target value	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-10]:SEAR:TARG:Y
Tracking	Sets/reads the marker tracking type	:CALC:USER[1-1]:TRAC[1-8]:MARK[1-10]: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

Table D-5 User Menu

Key Operation	Function	SCPI Command
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
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

Table D-5 User Menu

Key Operation	Function	SCPI Command
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
X Axis		
Auto	Sets/Reads automatic setting of the X-axis display range to the stimulus value	:DISP:USER[1-1]:TRAC[1-8]:X:SCAL:AUTO
Band Marker -> X Axis	Sets the X-axis band marker range to the X-axis display range of a graph	:DISP:USER[1-1]:TRAC[1-8]:X:SCAL:LEFT :DISP:USER[1-1]:TRAC[1-8]:X:SCAL:RIGH
Left	Sets/Reads the start value of the X-axis display range	:DISP:USER[1-1]:TRAC[1-8]:X:SCAL:LEFT
Right	Sets/Reads the stop value of the X-axis display range	:DISP:USER[1-1]:TRAC[1-8]:X:SCAL:RIGH
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

Table D-5 User Menu

Key Operation	Function	SCPI Command
Instrument Setup		
Correction		
File Dialog ...	Loads correction data for a specified power	:MMEM:LOAD:CORR:POW
Import Power Correction Table	Loads correction data for a specified power	:MMEM:LOAD:CORR:POW
Power Correction	Sets user the user calibration on or off or reads its setting	:SENS:CORR:POW:STAT
Downconverter Manual Setup		
Current	Sets/reads the bias current to be supplied to the external mixer	:SENS:DCON:MAN:MEXT[1-2]:BIAS:CURR
IF Gain 1 **IF Gain 2**	Sets/reads the IF gain of the external mixer	:SENS:DCON:MAN:IFG[1-2]
LO1 Frequency **LO2 Frequency**	Sets/reads the LO frequency of the external mixer	:SENS:DCON:MAN:LO[1-2]:FREQ
LO1 Level **LO2 Level**	Sets/reads the LO level of the external mixer	:SENS:DCON:MAN:LO[1-2]:LEV
Mixer 1 Bias **Mixer 2 Bias**	Sets the bias current supplied to the external mixer on or off and reads its settings	:SENS:DCON:MAN:MEXT[1-2]:BIAS:STAT
ΔIF = IF2 - IF1	Sets/reads the differential frequency between CH1 and CH2 from the external mixer	:SENS:DCON:MAN:IFD
Frequency Offset (User Downconv.)		
Conversion Mode	Sets/reads the conversion mode of the frequency offset	:SNES:UDC:MODE
Frequency Offset	Sets/reads the frequency offset	:SENS:UDC:STAT
Harmonic #	Sets/reads the frequency offset factor	:SENS:UDC:HARM
LO Frequency	Sets/reads the LO frequency of the frequency offset	:SENS:UDC:LO
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

Table D-5 User Menu

Key Operation	Function	SCPI Command
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
Color Setup		
Invert	Sets each color when the inverted display is selected	
Background	Sets/Reads the background color	:DISP:COL2:BACK[:VAL]
Data Trace 1	Sets/Reads the color of the data trace of trace 1	:DISP:COL2:TRAC1:DATA[:VAL]
: :		
Data Trace 8	Sets/Reads the color of the data trace of trace 8	:DISP:COL2:TRAC8:DATA[:VAL]
Graticule Main	Sets/Reads the color of the graph	:DISP:COL2:GRAT1[:VAL]
Graticule Sub	Sets/Reads the color of the grid lines in the graph	:DISP:COL2:GRAT2[:VAL]
Limit Fail	Sets/Reads the limit display color	:DISP:COL2:LIM1[:VAL]
Limit Line	Sets/Reads the color of the limit line	:DISP:COL2:LIM2[:VAL]
Mem Trace 1	Sets/Reads the color of the memory trace of trace 1	:DISP:COL2:TRAC1:MEM[:VAL]
: :		
Mem Trace 8	Sets/Reads the color of the memory trace of trace 8	:DISP:COL2:TRAC8:MEM[:VAL]
Reset Color	Resets the display color to the factory preset default setting	:DISP:COL2:RES
Normal	Sets each color when the normal display is selected	
Background	Sets/Reads the background color	:DISP:COL1:BACK[:VAL]
Data Trace 1	Sets/Reads the color of the data trace of trace 1	:DISP:COL1:TRAC1:DATA[:VAL]
: :		
Data Trace 8	Sets/Reads the color of the data trace of trace 8	:DISP:COL1:TRAC8:DATA[:VAL]

Table D-5 User Menu

Key Operation	Function	SCPI Command
Graticule Main	Sets/Reads the color of the graph	:DISP:COL1:GRAT1[:VAL]
Graticule Sub	Sets/Reads the color of the grid lines in the graph	:DISP:COL1:GRAT2[:VAL]
Limit Fail	Sets/Reads the limit display color	:DISP:COL1:LIM1[:VAL]
Limit Line	Sets/Reads the color of the limit line	:DISP:COL1:LIM2[:VAL]
Mem Trace 1	Sets/Reads the color of the memory trace of trace 1	:DISP:COL1:TRAC1:MEM[:VAL]
: :		
Mem Trace 8	Sets/Reads the color of the memory trace of trace 8	:DISP:COL1:TRAC8:MEM[:VAL]
Reset Color	Resets the display color to the factory preset default setting	:DISP:COL1:RES
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 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	

Table D-5 User Menu

Key Operation	Function	SCPI Command
Product Information	Reads product information	
Service Menu		
Administrator Menu	Displays softkeys associated with Administrator Menu. This function is not available to general users	
Error Log		
Clear Error Log	Clears the error log	
View Error Log ...	Displays the error log	
Install Option License		
Jitter	Enters the license for clock jitter analysis (VBA)	
Service Function	Displays softkeys associated with Service Menu. This function is not available to general users	
Test Menu		
Power On Test	Performs internal test	
Display Test	Performs display test	
Front Panel	Performs front panel key (hard key) test	
Adjust Touch Screen	Performs touch screen calibration	
E5053A Test	Displays the connection status of E5053A	
Trace View		
Aperture	Smoothing aperture	:CALC:USER[1-1]:TRAC[1-8]:SMO:APER
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

Table D-5 User Menu

Key Operation	Function	SCPI Command
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
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
Marker -> -Offset	Sets the sign-inverted data value of the data trace’s active marker to the offset value	:CALC:USER[1-1]:TRAC[1-8]:MATH:OFFS
Offset	Sets/Reads the offset value of the data trace	:CALC:USER[1-1]:TRAC[1-8]:MATH:OFFS
Persistence		
Clear All Persistent Data	Clears persistent data from all traces	:DISP:USER[1-1]:ALLT:PERS:CLE
Persistence Mode	Enables/Disables 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 Annotation	Edits trace annotation	:DISP:USER[1-1]:TRAC[1-8]:ANN:DATA
Trace Label	Edits trace title label	:DISP:USER[1-1]:TRAC[1-8]:LAB:DATA

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