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Agilent e4408b spectrum analyzer manual pdf printable



User's Guide

Agilent Technologies ESA Series Spectrum Analyzers

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Seahorse XFe Analyzer
Operating Manual



Agilent e4407b spectrum analyzer manual. Agilent e4407b spectrum analyzer.

The VOLUME knob adjusts the volume of the internal speaker. HI SWP IN (TTL) can be grounded to stop and reset the sweep. The data controls will change the active function in a manner prescribed by that function. The next key you press will remove the help window from the display. For example, the units keys for frequency span are GHz, MHz, khz, and Hz, whereas the units for reference level are +dbm, dbm, mv, and μ v. Refer to Table 2-5 on page 2-16 for other valid annunciators for the first letter. Alternatively, an externally installed switch or circuit breaker (which is readily identifiable and is easily reached by the operator) may be used as a disconnecting device. Most of the labeled keys on the analyzer front panel (also called front-panel heys) access menus of keys having related functions. In this chapter you will: Get acquainted with the front-panel and rear-panel features. The second letter C indicates the spectrum analyzer is in continuous-sweep mode. Where to Find the Latest Information Documentation is updated periodically. WARNING For continued protection against fire hazard, replace the line fuse only with the same type and rating. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to Agilent Technologies from another country. NOTE To avoid damage to the analyzer, always turn off power before plugging a keyboard into the instrument. For those parameters with fixed values (resolution bandwidth), the next value in a sequence is selected each time a step key is pressed. Option 1DN or 1DQ only. Keep the container and cushioning material until you have inspected the analyzer. ESA Spectrum Analyzers, 9 kHz-1.5/3.0/6.7/13.2/26.5 GHz 1 User's Guide Agilent Technologies ESA Spectrum Analyzers This guide documents firmware revision A.05.xx This manual provides documentation for the following instruments: Agilent Technologies ESA-E Series E4401B (9 khz 1.5 GHz) E4402B (9 khz 1.5 GHz) and Agilent Technologies ESA-E Series E4401B (9 khz 1.5 GHz) E4407B (9 khz 1.5 GHz) and Agilent Technologies ESA-E Series E4401B (9 khz 1.5 GHz) E4402B (9 khz 1. Series E4411B (9 khz 1.5 GHz) E4403B (9 khz 3.0 GHz) E4408B (9 khz 26.5 GHz) Manufacturing Part Number: E Supersedes E Includes changes documented in E Printed in USA August 2000 Copyright 2000 Agilent Technologies 2 The information contained in this document is subject to change without notice. Refer to Table 2-1 and Table 2-2 for card slot versus option card compatibility information MHz REF IN accepts an external frequency source to provide the 10 MHz, 15 to +10 dbm as a timebase reference signal. This fuse may be used with input line voltages of 115 V or 230 V. If you should ever need to call Agilent Technologies for service or with any questions regarding your analyzer, it will be helpful to have the firmware revision number readily available. See the label on the rear panel Chapter 232 Getting Started Display Annotation Display power cable plug only into a socket outlet that has a protective earth contact. After turning on the analyzer, allow 5 minutes of warm-up time to ensure the analyzer, allow 5 minutes of warm-up time to ensure the analyzer will meet all specifications. 12 Key menu title Dependent on key selection. CAUTION If the tracking generator output power is too high, it may damage the device under test. Table 1-1 contains the accessories shipped with the analyzer. Learn about analyzer accuracy and the internal alignment process. 13 Key menu See key label descriptions in Chapter 6, Front-Panel Key Reference. AUX IF OUT is a 50 Ω , 21.4 MHz IF output that is the down-converted signal of the RF input of the analyzer. Output is from 0 V to 1 V. 7 SYSTEM functions affect the state of the entire spectrum analyzer. Chapter 2 2-525 Getting Started Front-Panel Features The Step Keys () increase or decrease the active function value. iii 4 EXCLUSIVE REMEDIES THE REMEDIES THE REMEDIES THE REMEDIES THE REMEDIES THE REMEDIES THE REMEDIES PROVIDED HEREIN ARE BUYER S SOLE AND EXCLUSIVE REMEDIES. Figure 2-3 Screen Annotation Chapter 33 Getting Started Display Annotation Table 2-3 Screen Annotation Item Description of the activated function. If the shipping materials are in good condition, retain them for possible future use. 1-2 Chapter 1 13 Preparing for Use Initial Inspection Table 1-1 Accessories Supplied with the Analyzer Description HP/Agilent Part Number Comments Adapter, Type-N (m) to BNC (f) Adapter, BNC (m) to SMA (f) Adapter, BNC (m) to SMA (f) Adapter, BNC (m) to SMA (m) Not shipped with Option 1DP. Make a basic measurement (using the internal alignment signal). Cable, BNC (m) to BNC (m) to BNC (m) to SMA (f) Adapter, BNC (m) to SMA (m) to mm 10502A Shipped only with Agilent E4402B, E4403B, E4404B, E4405B, E4407B and E4408B. See How to Return Your Analyzer for Service in Chapter 4 for more information about shipping materials. AB indicates that auto alignment of all analyzer for Service in Chapter 4 for more information about shipping materials. You can listen to audio signals on a built-in speaker or with an earphone. A # in front of display annotation indicates that the function is uncoupled. Two adapters shipped with Option 1DN for Agilent E4402B, E4403B, E4403B, E4404B, E4403B, E4404B, E4403B, E4404B, E4404B, E4405B, E4405 with the knob, in discrete steps with the step keys, or to an exact (1 Hz resolution) value with the numeric keypad. The units keys change depending on what the active function is. Learn about file menus. You may wish to ship the analyzer to another location or to return it to Agilent Technologies for service. Amplitude-correction factors are not applied to this signal. Once a measurement is running, Meas Setup accesses additional menu keys for defining your measurement. To eliminate the clicking sound, turn off the automatic alignment. Before turning on the analyzer, you must connect its protective earth terminals to the protective conductor of the main power cable. AC Power Requirements Voltage Voltage Power Consumption, On Power Consumption, Standby Vrms (47 to 66 Hz) less than 300 W less than 5 W Table 1-3 DC Power Requirements Voltage Power Consumption Vdc less than 200 W Checking the Fuse Where IEC regulations apply, use a 5 by 20 mm, rated F5A, 250 V IEC approved fuse. The Print key immediately sends hardcopy data to the printer. Warranty This Agilent Technologies instrument product is warranted against defects in material and workmanship for a period of three years from date of shipment. Be sure the supply voltage is within the specified range. The following safety symbols are used throughout this manual. For more information on how often to perform Align Now All when the Auto Alignment function is off, refer to the appropriate Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technologies ESA Spectrum Analyzer Specifications and Characteristics chapter in the Agilent Technol Turning On the Analyzer for the First Time Getting Started What You Will Find in This Chapter Front-Panel Features Rear-Panel Features Rear-Panel Features Rear-Panel Features Display Annotation Key Overview Making a Measurement Summary Analyzer Accuracy and the Internal Alignment Process Warm-up Time File Menu Functions Locate and view files in the catalog Creating a directory Format a Floppy Disk Save a File Load a file Rename a File Copy a File Delete a File Printer Setup and Operation Analyzer Battery Information Functional Testing What You Will Find in This Chapter What Are the Functional Tests? Power cable See the table after page 1-5. 9 FM Demod (Option BAA) allows you to demodulate, display, and measure deviation on FM signals. Refer to Table 2-6 on page 2-16 for other valid annunciators for the second letter. 22 RF OUT 500 (for Option 1DN) or RF OUT 750 (for Option 1 with the Speaker On Off key in the Det/Demod menu. Item 10 refers to the data invalid indicator. If the analyzer is an Agilent Technologies E4402B, E4403B, E4404B, E4405B, E4403B, E4404B, E4405B, E4404B, each and a start a initialization process is complete. ii 3 WARNING If this product is not used as specified, the protection provided by the equipment could be impaired. The PWR ALWAYS ON setting turns the analyzer on whenever external power is applied. 2 DC Power is the input for the DC power source. CAUTION When operating in DC coupled mode on spectrum analyzers with Option UKB, take care to protect the input mixer by limiting the input level to 0 VDC, +30 dbm. For slow sweeps, the analyzer uses a smooth panning feature which is designed to move the trace display to the latest function value as the knob is turned. NOTE If an entry from the numeric keypad does not coincide with an allowed function value (for example, that of a 12 MHz bandwidth), the analyzer defaults to the nearest allowable value. 2-8 Chapter 228 Getting Started Rear-Panel Features 4 Service Connector. CAUTION Caution denotes a hazard. 24 Trace mode Trace See below for more information. The Print Setup menu keys allow you to configure hardcopy outputs. (Refer to the Agilent Technologies ESA Spectrum Analyzer Specifications Guide.) CAUTION Ventilation Requirements: When installing the product must not be restricted. The EXT KEYBOARD connector is a 6-pin mini-din connector. An asterisk is placed in the message block (the upper righthand corner of the analyzer display) to indicate that the data on the screen does not reflect data at the current setting. 11 Card Slot Identification Numbers. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. An instrument alignment is performed (if Auto Align is on) every time the analyzer is turned on. Refer to Chapter 6, Front-Panel Key Reference for more information on a specific function key. A parallel port is included for printing only. 2 Esc. To remove the fuse, first disconnect the power cord from the instrument. The trace mode annotation for trace 3 is displayed under the trace mode annotation of trace 1. 13 PROBE POWER provides power for high-impedance AC probes or other accessories. Each press results in a single step change. AGILENT TECHNOLOGIES SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, IND SMA (m) to Type-N (m), 220 mm Shipped only with Option 1DN for Agilent E4402B, E4403B, E4404B, E4405B, E4405B, E4407B and E4408B. The requency Extension Assembly comes standard with the Agilent E4408B. Then insert the tip of a screwdriver into the slot at the middle of the fuse holder, and turn counterclockwise to extend the fuse holder. When the (*) is displayed, it means that some or all trace data may not match the annotation due to possible changes in instrument settings. Refer to Table 2-1 if you have an Agilent ESA-L Series spectrum analyzer. Learn about display annotation. GATE TRIG/EXT TRIG IN (TTL) accepts the positive edge of an external voltage input that triggers the analyzer internal sweep source or the gate function (Time Gate, Option 1D6). Out-of-range values or out-of-sequence values will not occur using these keys. Refer to Table 2-2 if you have an Agilent ESA-E Series spectrum analyzer. This fuse may only be used with an input line voltage of 115 V. NOTE Printing is only supported from the parallel port. 8 MARKER functions control the markers, read out frequencies and amplitudes along the analyzer trace, automatically locate the signals of highest amplitude, and parallel (Option 1AX) is an optional interface. 10 Data invalid indicator Sweep (Single) or View/Trace 11 Status Informational messages See Chapter 4, Troubleshooting. 14 Frequency Span or Stop Freq 15 Sweep Time Auto Man, Sweep Time Auto Man, Sweep Time Auto Man 17 Frequency offset 18 Displays instrument status and error messages. You may include a decimal point in the number portion. This product must be used in a normal condition (in which all means for protection are intact) only. Numeric entries must be terminated with a units key. Chapter 1 1-7 18 Preparing for Use Turning On the Analyzer for the First Time Before using your analyzer, plug the power cord

into the analyzer. The PWR NORM setting (factory default) assigns analyzer on/off control to the front-panel On key (see Figure 2-1 on page 2-3, item 23); however if the external power is reconnected. The Numeric Keypad allows entry of exact values for many of the analyzer functions. The mains plug shall only be inserted in a socket outlet provided with a protected earth contact. Cleared by pressing Esc key. This symbol is used to mark the on position of the power line switch. device). The green Preset key resets the analyzer to a known state. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the product by 4 C for every 100 watts dissipated in the cabinet. Learn about the analyzer battery for retaining internal memory. See Chapter 6 for more details. The earphone connector provides a connection for an earphone jack which bypasses the internal speaker. 2-4 Chapter 224 Getting Started Front-Panel Features 10 The Data Control Keys, which include the step keys, knob, and numeric keypad, allow you to change the numeric keypad, allow you to change th 2 Chapter 222 Getting Started Front-Panel Features Figure 2-1 Front-Panel Features be set for some functions (100 MHz for center frequency). Figure 1-1 Information Screen Displayed During Initialization 1-8 Chapter 1 19 Preparing for Use Turning On the Analyzer for the First Time NOTE Record the firmware revision number and keep it for reference. NOTE The instrument continues to draw power even if the line power switch is in standby. The detachable power cord is the instrument disconnecting device. 16 Return. CAUTION AC line power and DC power should not be plugged in simultaneously. Any interruption of the product is likely to make the product is likely to make the product of the product is likely to make the product is likely to make the product of the product is likely to make the product is likely to make the product of the product is likely to make the product of the product is likely to make the product of t function should be performed periodically. Do not exceed the maximum power that the device under test can tolerate. They also set other analyzer parameters, except the tracking generator and FM demodulation options, will occur. 10 Frequency Extension Assembly controls the microwave front-end components in the Agilent E4404B, E4407B and E4408B. The trace 3 (3) is in the store blank mode (S). Your analyzer product number, the firmware revision number (A.04.01), and a URL for accessing product support information on the World Wide Web are shown. The extent of alteration is determined by the size of the measurement range. (Refer to Auto Couple in Chapter 6) Refer to the following tables for trace, trigger, and sweep modes. The line fuse is housed in a fuse holder in the upper left hand corner of the rear panel. The Return key accesses the previously selected menu. 14 Power On Selection selects an instrument power preference. You can order additional AC power cables for use in different areas. The signal level should be greater than 15 dbm. 4 Screen title Change Title 5 Time and date display Time/Date On Off 6 RF attenuation Auto Man 7 Marker Count On Off 8 Marker amplitude Marker 9 GPIB annunciators See Table 2-7 on page 2-17 for more information. 18 Tab Keys are used to move around in the Limit editor. See the label on the rear panel. 21 Help. HI SWP OUT (TTL) is high when the analyzer is sweeping Chapter 230 Getting Started Rear-Panel Features AUX VIDEO OUT provides detected video output (before the analog-to-digital conversion) proportional to vertical deflection of the trace. Keep the shipping materials for the carrier s inspection. The following table lists the available ac power cables, illustrates the plug configurations, and identifies the geographic area in which each cable is appropriate. 2-6 Chapter 226 Getting Started Front-Panel Features 20 The Next Window key can be used to select the active window in functions access menus that allow you to adjust the resolution bandwidth, adjust the sweep time, and control the instrument display. RS-232 supports remote instrument operation. 26 Display Line On Off 27 Amplitude offset Ref Lvl Offst 28 Amplitude scale Scale Type Log Lin When the analyzer is set to the external mixer state (Option AYZ), item 6 changes to display Ext Mix in place of Atten XdB. This output is taken after the resolution bandwidth filters and step gains and before the log amplifier. (P) = Preferred Card Slot (A) = Acceptable Card Slot (A) = Acceptable Card Slot (A) = Unacceptable Card Slot (A) = Acceptable Card Slot (A) = Card Slot (A) = Acceptable Card Slot (A) = Card S Scale, and AMPLITUDE Y Scale are the three large keys that activate the primary analyzer functions and access menus of related functions. Various power cables are available to connect the analyzer functions and access menus of related functions. Various power cables are available to connect the analyzer functions and access menus of related functions. minute warm-up before making calibrated measurements. (+15 V, 12.6 V, 150 ma max) 14 LO OUTPUT provides the proper local oscillator signal for use with external mixers (Option AYZ). The cable appropriate for the area to which the analyzer is originally shipped is included with the unit. 11 VOLUME. The File key menu allows you to save and load traces, states, limit-line tables, and amplitude correction factors to or from analyzer memory or the floppy disk drive. 12 EXT KEYBOARD. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met. Item 23 refers to the trigger and sweep modes of the analyzer. PAvg indicates power average on. Chapter 2 2-929 Getting Started Rear-Panel Features Table 2-2 Agilent ESA-E Series (E4401B, E4402B, E4407B) Slot # GPIB and Parallel (Opt A4J) FM Demod (Opt A over 50 years. Not shipped with Option BAB Shipped only with Option BAB. When a numeric entry is begun, the menu keys show the units key labels. SWP OUT provides a voltage ramp corresponding to the sweep of the analyzer (0 V to 10 V). It provides a voltage ramp corresponding to the sweep of the analyzer (0 V to 10 V). This is a Safety Class 1 Product (provided with a protective earthing ground incorporated in the power cord). Some cards may not be installed due to mechanical interference. Chapter 2 2-727 Getting Started Rear-Panel Features you wish to use an external 10 MHz source as the reference frequency, connect an external reference source to the 10 MHz REF IN connector on the rear panel. GATE/HI SWP OUT (TTL) is high when the analyzer is sweeping or when Gate (Option 1D6) is active. Table 2-1 and Table 2-2 show the appropriate rear panel slots to be used for the optional cards available with the Agilent ESA spectrum analyzers. The Function Key column indicates which key activates the function related to the annotation. DO NOT defeat the earth-grounding protection by using an extension cable, or autotransformer without a protective ground conductor. Some of the circuitry is controlled by relays. 9 The Media Door on the right side of the front panel accesses the 3.5 inch disk drive and the Earphone connector. Esc will abort a print (if one is in progress) and clear error messages from the status line at the bottom of the display. Use a dry cloth or one slightly dampened with water to clean the external case parts. The secondary labels on these keys (Channel, X Scale, and Y Scale) are used in some measurements. 6 GPIB and parallel (Option A4H) is an optional interface. After a 5 minute warm-up, press System, Alignments, Align Now, All. The PWR NORM setting assigns analyzer on/off control to the front-panel On key (see Figure 2-3, item 23); however, if the external power is removed for >20 seconds, the instrument returns to the Standby condition of the front-panel On key when external power is reconnected. The Frequency Extension Assembly comes standard with the Agilent E4404B, E4405B and E4407B. The display annotation is referenced by numbers which are listed in the following table. Intertuption is prohibited. Chapter 31 Getting Started Rear-Panel Features 15 DC Fuse protects the analyzer from drawing too much DC power. Two adapters are shipped with Option A4J or Option 1DP. 8 IF, Video, and Sweep Ports (Option A4J or Option A4J information.) NOTE Only one IF and Sweep Port (Option A4J or Option A4J operation. 19 Resolution bandwidth Resolution BW Auto Man 20 Center frequency 21 Auto alignment routine is on Center Freq or Start Freq Auto Align See below for more information Table 2-3 Screen Annotation Table 2-3 Screen Annotation Item Description Function Key 22 Amplitude corrections are on (This indicates that the overall correction state is On. There may be any or none of the individual corrections On.) Correction Solution of the individual correction shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material. Clockwise rotation of the knob increases values. 1-1 12 Preparing for Use Initial Inspection Inspect the shipping container and verify that the contents are complete. (See the Alignments key description in Chapter 6, Front-Panel Key Reference. If you are using an autotransformer, make sure its common terminal is connected to the protective earth contact of the power source outlet socket. No indicator will appear if auto alignment is off. For the latest information, please visit the following Internet URL: iv 5 Contents 1. It is the rapid switching of these relays between sweeps which causes the clicking sound. NO OTHER WARRANTY IS EXPRESSED OR IMPLIED. NOTE Only one optional interface (Option A4H or Option 1AX) can be installed at a time. To ensure your analyzer meets specifications, it must meet operating temperature conditions. Agilent Technologies does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error-free. When connected to an appropriate power line outlet, this cable grounds the instrument cabinet. Agilent Technologies E4402B, E4403B, E440B, E440B, E440B, E440B, E440B, E440B, E440 speed at which the knob is turned affects the rate at which the values are changed. During the interval between sweeps, portions of the analyzer s circuitry are realigned. The Knob provides fine incremental changes of functions such as center frequency, reference level, and marker position. The second letter is 1, representing trace 1. Buyer shall prepay shipping charges to Agilent Technologies and Agilent Technologies shall pay shipping charges to return the product to Buyer. Make sure that the line-power source outlet has a protective ground contact. When you turn on the analyzer, the information screen as shown in Figure 1-1 will be displayed during initialization of the instrument. It also includes the analyzer power requirements. The Save key immediately executes the Save Now function defined under File in Chapter 6, Front-Panel Key Reference. Refer to the Power Requirements section in the specifications chapter of the Agilent ESA Spectrum Analyzers. the System key. Item 21 refers to the auto alignment mode. Refer to Table 2-4 for other valid trace mode annunciators. 1-4 Chapter 1 15 Preparing for Use Power Cable, in accordance with international safety standards. Press (the On key). The fuse is removed by twisting counterclockwise 1/4 turn. 6 MEASURE accesses a menu of keys that automate some common analyzer measurements. AGILENT TECHNOLOGIES SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. CAUTION This instrument has autoranging line voltage input Get acquainted with the function keys. 15 IF INPUT connects to the IF OUTPUT of the external mixer (Option AYZ). The use of other fuses or material is prohibited. WARNING Failure to ground the analyzer properly can result in personal injury. Chapter 1 1-5 16 Preparing for Use Preparing for Use Preparation Preparation WARNING If this product is to be energized via an external autotransformer for voltage reduction, make sure that its common terminal is connected to a neutral (earthed pole) of the power supply. 19 INPUT 50Ω (INPUT 75Ω for Option 1DP) is the signal input for the analyzer. The Esc (escape) key cancels any entry in progress. The front panel switch is only a standby switch and is not a LINE switch. Refer to Det/Demod in Chapter 6 and FM Demodulation (Option BAA) in Chapter 7 for more information about this option. If cleaning is necessary, use a damp cloth only. It also clears input and tracking generator overload conditions. When center, stop or, start frequency or reference level is adjusted, the signal will shift right or left or up or down with the rotation of the knob before a new sweep is actually taken. The trace 2 (2) is in the store-blank mode (S). NOTE Note calls out special information for the user s attention. CAUTION When operating in DC coupled mode on spectrum analyzers with Option UKB, ensure protection of the input mixer by limiting the input level to 0 VDC, +30 dbm. See Chapter 4, Troubleshooting. Refer to Det/Demod in Chapter 6 or FM Demodulation (Option BAA) in Chapter 7 for more information about this option. WARNING To prevent electrical shock, disconnect the analyzer mains before cleaning. Replace only with a fuse of the same rating. It also describes many safety considerations that should not be overlooked. Choose a power on preference using the switch on the rear panel (refer to Figure 2-2 on page 2-8, item 14). Agilent Technologies makes no warranty of any kind with regard to this material, including but not limited to, the implied warranties of merchantability and fitness for a particular purpose. There is no need to select a line voltage. Press the Help key and then any front panel or menu key to get a short description of the key function AYZ). WARNING Warning denotes a hazard. During the warranty period, Agilent Technologies will, at its option, either repair or replace products which prove to be defective. For warranty service or repair, this product must be returned to a service facility designated by Agilent Technologies. This mode is useful if an external power switch is used to control a rack of several instruments. If the contents are incomplete, or the analyzer does not pass the performance tests, notify the nearest Agilent Technologies office. Table 2-5 Screen Annotation for Trace Mode Screen Annotatio Trigger Mode Screen Annotation F L V E Description Free Run Line Video External Table 2-6 Screen Annotation for Sweep 2-16 Chapter 2 If the total power dissipated in the cabinet is greater than 800 watts, then forced convection must be used. NOTE It is normal to hear clicking when the Auto Alignment function is on. It disconnects the mains circuits from the mains supply before other parts of the instrument. This symbol is used to mark the standby position of the power line switch. Its part number). 17 AMPTD REF OUT provides an amplitude reference signal of 50 MHz at 20 dbm. The step size depends upon the current analyzer measurement. The instruction documentation symbol. It calls attention to a procedure that, if not correctly performed or adhered to, could result in damage to or destruction of the instrument. 25 Average Average On Off VAvg indicates video average on. Familiarize yourself with the symbols and their meaning before operating this instrument. Continuing to press Return accesses earlier menus. LIMITATION OF WARRANTY The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation on the screen next to the unlabeled keys. The first letter W indicates that the analyzer is in clear-write mode. Data control keys are used to change values for functions such as center frequency, resolution bandwidth, and marker position. The Agilent office will arrange for repair or replacement without waiting for a claim settlement. Functional Test Versus Performance Verification Test Descriptions Displayed Average Noise Level Test Limits Test Description Required Equipment v 6 Contents Procedure (10 MHz to 500 MHz) E4401B and E4411B Procedure (501 MHz to 1.0 GHz) E4402B, E4404B, E4402B, E4404B, E4405B, E4404B, E4405B, E4407B, E4404B, E4405B, E4405B, E4404B, E4405B, E4408B Procedure (2.01 GHz to 3.0 GHz) E4408B, E4405B, E4407B, E4408B Procedure (6.01 GHz to 6.0 GHz) E4404B, E4405B, E4407B, E4408B Procedure (6.01 GHz to 6.0 GHz) E4404B, E4405B, E4407B, E4408B Procedure (6.01 GHz to 6.0 GHz) E4404B, E4405B, E4407B, E4408B Procedure (6.01 GHz to 6.0 GHz) E4404B, E4405B, E4407B, E4408B Procedure (6.01 GHz to 6.0 GHz) E4404B, E4405B, E4407B, E4408B Procedure (6.01 GHz to 6.0 GHz) E4404B, E4405B, E4407B, E4408B Procedure (6.01 GHz to 6.0 GHz) E4404B, E4405B, E4407B, E4408B Procedure (6.01 GHz to 6.0 GHz) E4404B, E4405B, E4407B, E4408B Procedure (6.01 GHz to 6.0 GHz) E4408B, E4405B, E4407B, E4408B Procedure (6.01 GHz to 6.0 GHz) E4408B, E4405B, E4407B, E4408B Procedure (6.01 GHz to 6.0 GHz) E4408B, E4405B, E4407B, E4408B, E4405B, E4405B, E4407B, E4408B, E4405B, E4405B, E4407B, E4408B, E4405B, E4407B, E4408B, E4405B, E4405B, E4407B, E4408B, E4405B, E4405B, E4407B, E4408B, E4405B, E4405B, E4405B, E4407B, E4408B, E4405B, E4407B, E4408B, E4405B, E4407B, E4408B, E4405B, E4405B, E4407B, E4408B, E4405B, E4407B, E4408B, E4405B, E4 GHz) E4407B and E4408B Procedure (22.01 GHz to 26.5 GHz) E4407B and E4408B Frequency Response Test Limits Test Description Required Equipment Procedure Reference Level Accuracy Test Limits Test Description Required Equipment Log Mode Procedure Linear Mode Procedure Resolution Bandwidth Switching Uncertainty Test Limits Test Description Required Equipment vi 7 Contents Procedure Second Harmonic Spurious Responses Test Limits Test Description Required Equipment Vi 7 Contents Procedure Second Harmonic Spurious Responses Test Limits Test Description Required Equipment vi 7 Contents Procedure Second Harmonic Spurious Responses Test Limits Test Description Required Equipment vi 7 Contents Procedure Second Harmonic Spurious Responses Test Limits Test Description Required Equipment Vi 7 Contents Procedure Second Harmonic Spurious Responses Test Limits Test Description Required Equipment Vi 7 Contents Procedure Second Harmonic Spurious Responses Test Limits Test Description Required Equipment Vi 7 Contents Procedure Second Harmonic Spurious Responses Test Limits Test Description Required Equipment Vi 7 Contents Procedure Second Harmonic Spurious Responses Test Limits Test Description Required Equipment Vi 7 Contents Procedure Second Harmonic Spurious Responses Test Limits Test Description Required Equipment Vi 7 Contents Procedure Second Harmonic Spurious Responses Test Limits Test Description Required Equipment Vi 7 Contents Procedure Second Harmonic Spurious Responses Test Limits Test Description Required Equipment Vi 7 Contents Procedure Second Harmonic Spurious 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Print Setup Restart Return Save Single viii 9 Contents Source SPAN X Scale Standby Sweep System (Local) Trig Viewing Angle View/Trace Zoom Options and Adjustment Software (Option 0BV) Service Documentation (Option 0BV) Service Documentation and Adjustment Software (Option 0BW) RS-232 and Parallel Interface (Option 1DA) Ω to 75 Ω Matching Pad (Option 1D7) Ω Tracking Generator (Option 1D7) Ω Tracking Generator (Option 1D7) Ω Tracking Generator (Option 1D7) Ω Tracking Content of the sector (Option 1D7) Ω Tracking Content of th Generator (Option 1DQ) Pre-amplifier (Option A4H) IF, Sweep and Video Ports (Option A4H) IF, Sweep and Video Ports (Option A4J) Vdc Power Cable (Option A4J) Vdc Analyzer (Option B70) Enhanced Memory Upgrade (Option B72) RF and Digital Communications Hardware (Option B75) TV Trigger and Picture on Screen (Option B76) TV (Option B7K) FM Demodulation (Option BAA) APC 3.5 Input Connector (Option BAB) cdmaone Measurement Personality (Option BAC) GSM Measurement Personality (Option BAC) GSM Measurement Personality (Option BAB) cdmaone Measurement Personality (Option BAC) GSM Measurement Personality (Opt UKB) Year Calibration Contract (Option W32) Year Service Support (Option W50) Year Calibration Contract (Option W52) Accessories RF and Transformer RF Bridges HP/Agilent E1779A Battery Pack HP/Agilent E1779A Battery Pack HP/Agilent N2717A Performance Verification Software AC Probe Broadband Preamplifiers and Power Amplifiers External Keyboard GPIB Cable Parallel Interface Cable Printer RS-232 Cable Carrying Strap (Part Number E) HP/Agilent Series Harmonic Mixers x 11 1 Preparing for Use This chapter provides information on how to inspect your analyzer when it arrives and what to expect when it is first powered on. If not, the decimal point is placed at the end of the number. The service connector is for service use only. 5 Inputs/Outputs (Refer to Agilent Technologies ESA Spectrum Analyzer Specifications Guide for more information.) Table 2-1 5a 5b 5c VGA OUTPUT drives an external VGA compatible monitor with a signal that has 31.5 khz horizontal, 60 Hz vertical synchronizing rate, non-interlaced. The keyboard can be used to enter screen titles and filenames. Chapter 1 1-9 20 2 Getting Started 2-1 21 Getting Sta Zone in Chapter 6 for more information.) In such modes, pressing Zoom allows you to switch between the split-screen and full-sized display of the active window. The product is marked with this symbol when it is necessary for the user to refer to the instructions in the documentation. The first letter F indicates the spectrum analyzer is in free-run trigger mode. Do not proceed beyond a warning note until the indicated conditions are fully understood and met. NOTE Before using your analyzer and how to verify that it is operational. 23 The (On) key turns the analyzer on, while the (Standby) key turns most of the analyzer off. NOTE Install the instrument so that the detachable power cord is readily identifiable and is easily reached by the operator. Meas Control functions. You can also obtain the firmware revision number by pressing System, More 1 of 3, Show System. Agilent Technologies warrants that its software and firmware designated by Agilent Technologies for use with an instrument will execute its programming instructions when properly installed on that instrument.

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