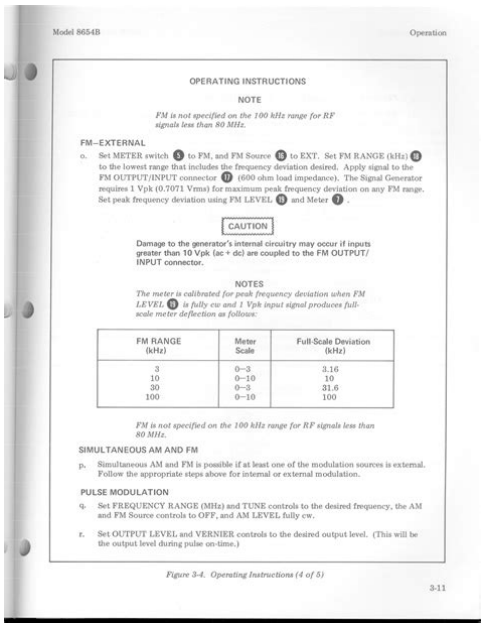
8713c manual


Model 8654B Operation

OPERATING INSTRUCTIONS

NOTE

FM is not specified on the 100 kHz range for RF signals less than 80 MHz.

FM–EXTERNAL

o. Set METER switch K to FM, and FM Source N to EXT. Set FM RANGE (kHz) H to the lowest range that includes the frequency deviation desired. Apply signal to the FM OUTPUT/INPUT connector P (600 ohm load impedance). The Signal Generator requires 1 Vpk (0.7071 Vrms) for maximum peak frequency deviation on any FM range. Set peak frequency deviation using FM LEVEL R and Meter J.

CAUTION

Damage to the generator's internal circuitry may occur if inputs greater than 10 Vpk (ac + dc) are coupled to the FM OUTPUT/INPUT connector.

NOTES

The meter is calibrated for peak frequency deviation when FM LEVEL R is fully cw and 1 Vpk input signal produces full-scale meter deflection as follows:

FM RANGE (kHz)	Meter Scale	Full-Scale Deviation (kHz)
3	0–3	3.16
10	0–10	10
30	0–3	31.6
100	0–10	100

FM is not specified on the 100 kHz range for RF signals less than 80 MHz.

SIMULTANEOUS AM AND FM

p. Simultaneous AM and FM is possible if at least one of the modulation sources is external. Follow the appropriate steps above for internal or external modulation.

PULSE MODULATION

q. Set FREQUENCY RANGE (MHz) and TUNE controls to the desired frequency, the AM and FM Source controls to OFF, and AM LEVEL fully cw.

r. Set OUTPUT LEVEL and VERNIER controls to the desired output level. (This will be the output level during pulse on-time.)

Figure 3-4. Operating Instructions (4 of 5)

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For example, model number HP478A is now model number Agilent 478A.Contacting Agilent This information supersedes all prior HP contact information. The information contained in this document is subject to change without notice. HewlettPackard makes no warranty of any kind with regard to this material, including but not limited to, the implied warranties of merchantability and tness for a particular purpose. HewlettPackard 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. HewlettPackard further certi es that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by the Institutes calibration facility, and to the calibration facilities of other International Standards Organization members. Regulatory Information The regulatory information is in the Users Guide supplied with the analyzer. Safety, Warranty, and Assistance Refer to Chapter 9 for information on safety, warranty, and assistance. How to Use This Guide This guide uses the following conventions 4FrontPanel Key5 This represents a key physically located on the instrument. Screen Text This indicates text displayed on the instruments screen. This guide contains servicing information for the following instruments HP 8711C HP 8712C HP 8713C HP 8714C HP 8730A Note Servicing information for the HP 87030A tuner test set is included in a separate manual. The operators check can be used as a quick 80% con dence test. The only equipment required for this check is a typeN cable and a good quality 50 typeN load 75 for the HP 8730A or Option 1EC analyzers. The performance tests will verify that the analyzer meets its published speci cation with greater than a 95% con dence level. The performance tests are completely
automated.http://milkreplacer.or.kr/files/fckeditor/camera-dock-6000-manual.xml

- **hp 8713c manual, 8713c manual.**

The performance test software is written for an HP 9000 Series 200, 300, or 700 computer or equivalent, HP BASIC 5.1 or greater. However, it will also run on a PC system with an HP BASIC language processor card HP 82324B or equivalent. There are no manual tests provided, nor are any test record cards provided. This program Operation is essentially identical to that described for an HP workstation computer. Results of the automated performance tests can be printed out at any time. They include all speci cations, limits, and uncertainties. Although no manual test is provided, each test is described in enough detail below to allow a knowledgeable technician to perform all needed tests in an accurate manner. Performance Tests 11 System Speci cations Summary The speci cations and characteristics in this section describe the system performance of the analyzer. These speci cations are valid only after the analyzer has been turned on and allowed to warm up for at least one hour. This section is a summary of the full System Speci cations. Speci cations indicated by boldface type describe the analyzers warranted performance Measurement Port Speci cations The following speci cations describe the residual system uncertainties. These speci cations apply after a user enhanced response calibration has been performed and within an environmental temperature range of 25C65C, with less than 1C deviation from the calibration temperature.The operators check does not verify that the analyzer is performing to speci cations. Its purpose is to provide you with a high degree of con dence that the analyzer is performing properly if it passes. The operators check consists of the following making a transmission measurement with the cable that was supplied with your analyzer, making a re ection measurement with the same cable, and making a measurement with a 50 or 75 termination. Caution The preset power level is userde nable.http://www.tsjikatilo.be/UserFiles/camera-control-pro-2-user-manual.xml

When pressing 4PRESET5, change the power level to 0 dBm if necessary. Caution If you have an HP 8730A, please read the following information carefully. The operators check, nonautomated adjustment procedures, and troubleshooting procedures all require the HP 8730A tuner analyzer to have the same preset state as a standard network analyzer. Instead of using the 4PRESET5 key, press the following keys to change the preset state of the HP 8730A tuner analyzer to the preset state of a standard network analyzer MHz 4SCALE5 415 4ENTER5. MHz 4SCALE5 415 4ENTER5. MHz 4SCALE5 415 4ENTER5. This concludes the Operators Check. If the analyzers frequency accuracy is critical for your application, verify a CW frequency using a frequency counter. Verify to6.005% accuracy for example,6 2500 Hz at 500 MHz. If the Analyzer Fails the Operators Check If your analyzer does not meet the criteria in the operators check, your analyzer may need servicing. Have a quali ed service technician check the analyzer or contact any HewlettPackard sales or service o ce for assistance. It will test all option combinations, including both 50 and 75 versions only the 75 versions apply to the HP 8730A. However, it will also run on a PC system with an HP BASIC language processor card HP 82324B or equivalent. The DOS version will run on any PC compatible computer that has HP BASIC for Windows installed and an HPIB interface card. HP BASIC for Windows is a separate product which may be purchased as HP model number E2060B. Operation under either platform is nearly identical. Note This program cannot be used to test an HP 8711A or any HP 871xB. To test an HP 8711A, order HP part number 0871110011. To test an HP 871xB, order HP part number 0871210011. Both of these programs are in LIF format only. Note All the data les and con guration les used in this program are compatible with the previous HP 871xB version of this program HP part number 0871210012.

It is not necessary to regenerate or modify any of these les. If you are adding this program to the same directory as the HP871xB software, only the main program le CAL871XC need be transferred. The performance test software is provided on a single disk. You can run the program directly from the disk, although it is recommended that you run it from your systems hard disk for best performance. Generally, the program can be stopped, reset and rerun with little or no loss of data. The DOS version is limited to DOS environments. Operation is a simple menu driven system with some softkey selections. Note All necessary instructions and test setup diagrams are contained within the program. A disk le is generated for each analyzer, and the results of each test are stored in that le. This le is updated after each test so that results will not be accidentally lost. A printout can be obtained for any previously tested analyzer. Estimated Time Before running the performance tests, turn on the analyzer and allow it to warm up for one hour. Performance test times are kept to a minimum, allowing analyzers to be fully tested within one hour after the initial warmup. Performance Tests 111 When testing an HP 8730A, the HP 87030A tuner test set should be Note disconnected. Ignore any error messages indicating that the analyzer cannot communicate with the test set. Power meter HP 437B, HP 438A X X X X Do not use an HP 436A. Power sensor, 50 HP 8482A X X X X Power sensor, 75 HP 8483A X Low power sensor HP 8481D X X For the HP 8730A or Option 1E1. 1 Cal kit typeN 50 HP 85032B Opt 001X X Cal kit typeN 75 HP 85036B X X This eliminates four 7mm adapters that are not needed, resulting in a signi cant cost savings. 2 The 75 20 dB attenuator can be substituted with two minimum loss pads and a 50 10 dB attenuator. NOTE a set of 75 attenuators 3,6,10,20 dB is available as HP 86213A. 3 The frequency counter is useful when very accurate frequency measurements are needed.

Note that the frequency measurement using a spectrum analyzer will not be quite as accurate as a frequency counter, but it is su cient in most cases. Performance Tests 113 File Structure The program disk contains several di erent les in addition to the main program le. The following list describes the les found on the performance test software disk. CAL871XC This is the main program le. Cfg xxxx This is the con guration le. The variable xxxx represents any userde ned name or Dflt

default. This le contains all the con guration setups for the program such as le directories and paths test equipment serial numbers HPIB addresses types of test equipment other optional choices If more than one con guration le exists on the disk, the program will prompt you to select a speci c con guration le to load. If none exists, the program will create a default le. P1D xxxx The cal factor le for the HP 8481D sensor. The variable xxxx represents the last four digits of the HP 8481D or HP 8484A sensors serial number. P2A xxxx The cal factor le for the HP 8482A sensor. The variable xxxx represents the last four digits of the HP 8482A sensors serial number. P3A xxxx The cal factor le for the HP 8483A sensor. The variable xxxx represents the last four digits of the HP 8483A sensors serial number. Stp xxxx The actual attenuation values for the external 10 dB step attenuator. The variable xxxx represents the last four digits in the attenuators serial number. Attenuator values are measured at 30 MHz on an accurate system such as an HP 8902A Option 050. Pd5 xxxx The actual value of the 20 dB 50 attenuator as measured by an accurate system. Values are attenuation versus frequency. Pd7 xxxx The actual value of the 20 dB 75 attenuator as measured by an accurate system. The variable xxxx represents the last four digits in the attenuators serial number.The variable xxxx represents the last four digits in the analyzers serial number.

CurrDUTx The data le that holds the test results of the most recently tested analyzer regardless of model or serial number. The variable x can represent any character 0 to 9. INSTALL This program is not needed but will help speed the installation of the LIF version program. The values in these le are nominal values. For example 100 percent for all sensor cal factors; 20 dB for the 20 dB attenuators; 10.00, 20.00, 30. dB for the external step attenuator, and so on. This is provided as a convenience only to demonstrate or learn about the program. The default con guration le will access these les if no userde ned serial number is speci ed. A warning message will be displayed if the program is using these default les. Con guration File The con guration con g le is the le that customizes this program for your usage. It contains speci c information for your setup. Some of the items contained in this le include the HPIB addresses of all the test equipment the HPIB address of the analyzer under test the model numbers of the test equipment the serial numbers of sensors, xed attenuators, and the external 10 dB step attenuator the disk drive locations path and directories other items speci c to your setup Ideally, only one con guration le should exist on the program disk so that the program will automatically load only that le. However, it is possible to have several con guration les stored on the same disk. In this case, the program will list all of the available les and prompt you to select one. This is useful if more than one setup is commonly used or if one performance test software disk serves several workstations. Getting Started Caution Make a copy of the performance test software disk for daytoday use. The master copy should remain stored in a safe place. This will decrease the likelihood of damage to the master disk. Note The DOS version, which is used in conjunction with HP BASIC for Windows, requires the proper set up of the HPIB interface card and drivers.

First, nd all serial numbers of the calibration devices required, such as external step attenuators, sensors, and xed attenuators for both 50 and 75 devices if applicable. Verify the HPIB addresses you will be using, as well as the mass storage directories and locations. If you plan to operate this program only from the supplied oppy disk, insert the disk into the computers disk drive and skip step 1 next. The INSTALL program will automatically copy all required les to your speci ed destination drive or directory HFS, SRM or LIF format. The INSTALL program is only contained in the LIF software version. If the current time or date is incorrect, The con guration les selection descriptions and their initial default values are listed below. Con guration Menu In this section, the default values for the parameters listed in bold type appear in parenthesis. The analyzers HPIB address 716. The rst selection is the analyzer DUT HPIB address. Please note that this is the only address that has both the Interface Select Code ISC and the device number associated with it. This address can be

any valid address with any valid ISC. The ISC does not have to be the same as all the other test equipment which must be all on the same ISC. Generally the full address for the DUT is set to either 716 or 816. This also sets the ISC to 7 or 8 respectively. The factory default HPIB device address for the analyzer is 16. The ISC for the test equipment 7. The second selection is the ISC for all the associated test equipment. This is generally 7 or 8 and may be the same as that for the DUT. The power meter model number HP 437B and address 13. The next two selections are for the power meter model number and address. Caution The program will accept the HP 436A power meter as a valid selection, but it is not recommended or supported and may cause the program to halt execution. The spectrum analyzer HP 8566B and address 18. Next is the spectrum analyzer selection.

Any of the listed models will su ce, but keep in mind that if you do not use a frequency counter, then the spectrum analyzer must have high degree of frequency accuracy since it will be used as the frequency counter. The function generator model number HP 8116A and address 14. The next selection is for the function generator and address. The HP 8116A is the only valid selection at this time. 116 Performance Tests The attenuator switch driver model number HP 11713A and address 28. Next is the attenuator switch driver selection and address. Since this is inconvenient, the use of an HP 11713A with a HP 8496G model attenuator is highly recommended. The frequency counter model number HP 5342A and address 02. The frequency counter model number and its address are next. The voltmeter model number HP 3456A and address 22. While the voltmeter and address are next, they are not currently used by this program. The printer address 01. The printer address is next. No model number is needed here; all HPIB printers should work equally well. For the DOS version, entering any valid number except 10 will direct the output to the attached HPIB printer. Selecting an address of 10 will redirect the output to the de ned Windows default printer. Typically this will be a printer attached to the computers parallel port or a networked printer. The program directory and the mass storage unit speci er the current MSI device. The program directory and Mass Storage Unit Speci er MSUS are next. These should point to the location of the CAL871XC program and all of its required data les all the les contained on the disk. If you are running this program from a oppy disk, the program directory entry should be blank. The entire length must be less than 80 characters preferably less than 60 for easier viewing. The MSUS, which indicates the physical address of the disk drive, also has an 80character limit. For the DOS version, this is typically just the drive letter for example, C.

When the program is rst run, the default will be the current MSI device. The data directory and MSUS. The next two entries are the data directory and MSUS. These should point to the location where the results of each DUT will be stored if applicable. The data directory and MSUS are otherwise similar to the program directory, including the defaults. The sensors, external 10 dB step attenuators, and xed attenuators pads serial numbers xxxx. Six of the next seven entries will contain the LAST FOUR digits of the serial numbers for the power meter sensors, the step attenuator, and the 20 dB attenuators. This allows the program to load the proper correction values for each device. The disk contains les that match these default serial numbers xxxx, but the correction data contained within these les is invalid e.g. 100 percent for all sensor cal factors. This allows the program to be run for experimental or training purposes only. As a precaution, a warning message will be displayed if a default le is loaded. The step attenuators 40 dB card selection 3. One of the next selections is the 40 dB step section. The HP 8496G step attenuator contains one 10 dB section, one 20 dB section, and two 40 dB sections. This step speci es which of the two 40 dB attenuator card sections of the HP 8496G step attenuator is to be used; section 3 or 4. Enter the value 3 or 4 for which you have calibration data. For example, when the step attenuator was calibrated, one of the two 40 dB sections was selected for the 40, 50, 60, and 70 dB attenuation value. The data corresponding to the selected 40 dB section must be input to ensure valid measurement data when using attenuations of 40 dB or greater. This entry is not applicable if you are using a manual

attenuator. Performance Tests 117 The beeper on. The last selection will suppress or enable the beeper, as desired. The current DUT le su x 1. Up to ten di erent le names can be speci ed.

This allows multiple users to operate from one system storage medium, such as an SRM environment. This entry can be ignored for singleuser applications. 6. Once all desired changes have been made, the program will ask if you want to store the data just entered. A speci c 4character le name su x can be provided if more than one con guration is required. If more than one is discovered, the program will list the le names found and allow you to choose one. At this point the program will also ask you if a hardcopy printout is desired. 7. After the con g le has been generated, the proper data les containing the correction Press NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN CAL DATA ENTRY. You will be shown a list including 3 sensors Select the desired item. Sensors. All sensors require both frequency and cal factor data. Frequencies must always be in MHz and cal factors in percent. The rst entry requested will be the last four digits of the serial number. The computer will search for a current con guration le containing this information. If one is present, the program will query you to either view or edit the old values. Assuming you are editing the data, the 50 MHz reference cal factor will be requested next. This value must use percent as its units and be within the range of 50 and 150 percent. You must start with the lowest frequency for which you have data and sequentially enter higher frequencies until done. Each entry must consist of both a frequency in MHz and the cal factor in percent, separated by a comma e.g. 500, 98.6. Each frequency entered must be higher than the previous entry. These cal factor values must be between 75 and 125 percent. If a mistake is made, you can back up one entry and reenter a value by entering a negative frequency. At this point the program will redisplay all values entered and ask if you want to store them.

Note Even if you nd a mistake, it will be easier to answer yes, then go back and reedit the values, otherwise you will have to reenter all values again. 20 dB Attenuators Pads. Valid entries for the 20 dB attenuator range from 17.5 to 23.5 dB. External 10 dB Step Attenuator. Step attenuator data is only measured at 30 MHz so only one value needs to be entered for each nominal attenuation step. All values are relative to the 0 dB setting, which is de ned as zero i.e. the program does not care about insertion loss at the 0 dB setting. 118 Performance Tests Valid entries are within 3 dB of the nominal attenuation setting. The program will request data up to 110 dB of attenuation. This contains the program name, revision number, date and other miscellaneous information. You are presented If the date has never been set, the program will force you to enter it regardless of whether or not this softkey is pressed. NNNNNNNNNNNNN HELP will present some very brief instructions and other information. NNNNNNNNNNNNNN EXIT will terminate the program. NNNNNNNNNNNNNNNNNNN RESUME will continue execution of the program and proceed to the main menu. Main Menu The main menu provides seven softkey choices. An eighth choice may be displayed if you are returning to this menu from the test selection menu. NNNNNNNNNNNNNNNNNNN CONFIG allows you to de ne a particular con guration of test equipment, mass storage, and HPIB addresses. If only one is available, it is automatically loaded without further con rmation. If several are available, you are instructed to select one. NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN CAL DATA ENTRY allows you to enter correction factors for sensors, attenuators and attenuators. NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN PRINT RESULTS allows you to print or view test results from the current DUT or any previously tested analyzer, assuming the data was archived. You can also add comments or correct any header information that was previously entered.

NNNNNNNNNNNNNNNNNNNNNN NEW DUT will appear only after an analyzer has been tested. This softkey must be selected before you begin to test another analyzer. Note This is the only way that the program can tell that the analyzer under test has changed.

NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN HPIB Addrs will display the current expected addresses of all required test equipment. In addition it will allow you to check each listed address for the presence of an active device. It will not indicate which device is set to which address. It only indicates whether or not the NNNNNNNNNNNNNN EXIT returns to the previous menu.If none are found, a message is displayed and you are then allowed to enter any pertinent data regarding this new DUT such as owner, technician, repair order, comments etc. The test selection menu is then presented. Test Selection Menu The test selection menu can be divided into four main categories Eleven automated analyzer performance tests One automated adjustment procedure Four utility procedures Two detector performance tests HP 86200B or HP 86201B Data for each of the eleven performance tests is archived upon completion. No archive data is stored for the one adjustment routine. The four utility programs are described as follows 1. NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN Set Serial Number utility allows you to enter a serial number into the analyzer. This may be required after some types of repairs. Caution Enter the number carefully; it cannot be easily changed once it has been entered. If a mistake is made, it will be necessary to contact an HP service center for correction. For each cycle, the attenuator card is switched in and out with each resulting trace measured. Minimum and maximum excursions are then noted. The test is performed at a low frequency and a high frequency. The number of cycles is selected by the user. A minimum of twenty ve is recommended.

One hundred cycles will take about ve to ten minutes depending upon computer speed. This routine should only be used as a last resort if no other method of obtaining data is available. Generally the device should be measured using one of the following methods Sending the device to a calibration standards lab Measuring the device with an HP 8753D with full twoport correction Measuring the device with an HP 8902A Option 050 4. These tests are only for testing these two speci c detector models. Archiving of data is not done for these tests. 120 Performance Tests Miscellaneous Information The program gives full step by step instructions along with connection diagrams. For clarity, some of the required adapters may not be depicted in the connection diagrams. Generally, solid connection lines between devices indicate a cable connection, where as a dotted line indicates a direct connection adapters may be required. All required equipment should be connected and switched ON before proceeding with any test, since the program will occasionally need to write to a device before it is shown in the connection diagram. If the device is not connected, the program will timeout before the connection diagram is drawn. The timeout limit is set to 30 seconds for all devices. If the program should stop for any reason, the computer may be reset and the program run again with little or no loss of data if a SCRATCH C is not performed. Individual Test Notes and Descriptions The following sections explain how each test is performed, in case it is necessary to perform them manually without a computer. Before running or manually performing the performance tests, turn on the analyzer and allow it to warm up for one hour. Note For the HP 8730A, it is necessary to precede each test with a service preset. Preset to 8711C. Preset to 8711C. Frequency Accuracy The device used to measure the frequency can either be a frequency counter or a spectrum analyzer with a high degree of frequency accuracy.

Accuracy is measured to.005 percent or 5 kHz at 1000 MHz. The HP 8730A and Option 1EC analyzers 75 will require a minimum loss pad in order to connect to a 50 frequency counter or spectrum analyzer. If This Test Fails Failures of this test are rare. If this test should fail by a small amount, readjust the reference crystal oscillator by performing the frequency accuracy adjustment. Gain Compression Gain compression is measured over the frequency range by inserting a calibrated 20 dB xed attenuator and measuring the change with the analyzer. The 3 dB attenuator is used to improve any mismatch errors. The resulting power is read by the analyzer. The calibrated 20 dB xed attenuator is then inserted into the path and the resulting power is measured again. The di erence is then compared to the known insertion loss of the calibrated 20 dB xed attenuator. Performance

Tests 121 The power levels tested for both high and low frequency units are based on known characteristics of the receiver. Compression is tested in a narrow 250 Hz bandwidth. If this does not solve the problem, replace the A5 receiver assembly. Noise Floor The noise oor test is divided into two sections; broadband and narrowband. During this test the RF output is terminated in 50 or 75 and the RF input is shorted. Worstcase noise oor is then measured starting from 10 MHz. This portion of the test is divided into two sections frequencies below 5 MHz and frequencies above 5 MHz. Dynamic Accuracy Dynamic accuracy is measured on the narrowband B detector at a CW frequency of 30 MHz, from 0 dBm if possible down to0100 dBm in 10 dB increments. A calibrated 10 dB step attenuator is used as the reference device. The analyzer is set to measure the B input in a ne 15 Hz bandwidth. Power is rst measured at020 dBm and all measurements are made relative to this point generally this means the attenuator is set to 20 dB. The attenuator is then switched in 10 dB increments and the resulting power is read from the analyzer.

These values are then compared to the known values of the calibrated step attenuator. The di erence is the dynamic accuracy error of the analyzer. For some combinations of options on 75 analyzers, the 0 dBm point may not be obtainable. In this case, only levels at and below010 dBm are tested. Crosstalk can also a ect this test; verify that all cables and screws are secure. 122 Performance Tests Power Flatness Power atness is de ned as the maximum variation in power at the RF output connector across the frequency range of the analyzer. If the speci cation is61 dB then a maximum variation of 2 dB is allowed. In this test a calibrated power sensor is connected directly to the RF output. The analyzer is stepped through twentyseven CW frequencies at one power level and each is measured and corrected based on the power sensor cal factor. The maximum variation is then compared to the speci cation. Several power levels are tested, ranging from the maximum speci ed power to the minimum speci ed power without using the built in attenuator if applicable. If the analyzer has an attenuator, three more levels are tested, each one using one section of the attenuator 10 dB, 20 dB, and 30 dB. The power meter is zeroed before making any series of measurements below019 dBm. A second test is performed as a precaution to ensure that no power holes exist. A through cable is connected and, starting at 10 MHz, the analyzer is swept over its frequency range using 1601 pointspersweep. The sweep is repeated again using each section of the attenuator if one is installed to verify its power atness. If This Test Fails Repeat the test, verifying that all connections are secure. A separate power source is required to achieve the required power in this case an HP 8116A function generator. An external 10 dB step attenuator is used to vary output power over the full 66 dB range. The output of the HP 8116A is sent to the step attenuator.