

Agilent E5071C ENA Network Analyzers

Service Guide

Fifth Edition



Manufacturing No. E5071-90140

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Manual Printing History

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

October 2006	First Edition
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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. In addition it violates 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 requirements.

NOTE

E5071C comply with INSTALLATION CATEGORY II and POLLUTION DEGREE 2 in

IEC61010-1. E5071C are INDOOR USE product.

NOTE LEDs in E5071C 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 hazard, the instrument chassis and cabinet must be connected to a safety earth ground by the supplied power cable with earth blade.
- **DO NOT Operate In An Explosive Atmosphere**

Do not operate the instrument in the presence of flammable gasses or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.
- **Keep Away From Live Circuits**

Operating personnel 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 voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.
- **DO NOT Service Or Adjust 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 Instrument**










Because of the danger of introducing additional hazards, do not install substitute parts or perform unauthorized modifications to the instrument. Return the instrument to a Agilent Technologies Sales and Service Office for service and repair to ensure that safety features are maintained.
- **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 voltages, capable of causing death, are presenting this instrument. Use extreme caution when handling, testing, and adjusting this instrument.**

Safety Symbol

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.
-  Frame (or chassis) terminal. A connection to the frame (chassis) of the equipment which normally include all exposed metal structure.
-  Stand-by.

WARNING	This warning sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, 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, condition or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.
----------------	--

NOTE	Note denotes important information. It calls attention to a procedure, practice, condition or the like, which is essential to highlight.
-------------	--

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 to the calibration facilities of other International Standards Organization members.

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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 emphasised.
<i>Sample (Italic)</i>	Italic type is used for emphasis.
Sample key / [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.

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1 General Information

The Service Manual is a guide to servicing the E5071C ENA Series Network Analyzer. The manual contains information requisite to do performance tests, adjustments, troubleshooting, and repairs.

Precautions

This section describes cautions that must be observed in operating the E5071C.

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 Appendix B.

Organization of Service Manual

Tabs are used to divide the major chapter and appendix of this manual. The contents of each chapter and appendix in this manual is as follows:

Chapter 1 , “General Information,”

The Service Manual is a guide to servicing the E5071C ENA Series Network Analyzer. The manual contains information requisite to do performance tests, adjustments, troubleshooting, and repairs.

Chapter 2 , “Performance Test,”

This chapter provides information on how to verify the E5071C performance.

Chapter 3 , “Adjustment,”

This chapter provides the adjustment information for the E5071C ENA Series Network Analyzer to ensure that it is within its specifications. The adjustment must be performed Agilent’s qualified service personnel. If you need the adjustment for your E5071C, it should be sent to the nearest Agilent Technologies service office.

Chapter 4 , “Troubleshooting,”

This chapter provides procedure to isolate a faulty assembly in the E5071C Network Analyzer.

Chapter 5 , “Replaceable Parts,”

This chapter contains information for ordering replacement parts for the E5071C ENA Series RF Network Analyzers.

Chapter 6 , “Replacement Procedure,”

This chapter provides procedure for removing and replacing the major assemblies in the E5071C ENA Series Network Analyzer.

Chapter 7 , “Post-Repair Procedures,”

This chapter lists the procedures required to verify the E5071C operation after an assembly is replaced with a new one.

Appendix A , “Manual Changes,”

This appendix contains the information required to adapt this manual to versions or configurations of the E5071C manufactured earlier than the current printing date of this manual. The information in this manual applies directly to E5071C units with the serial number that is printed on the title page of this manual.

Appendix B , “System Recovery,”

This appendix describes how to recover the operating system (Windows operating system) when the operating system has been damaged.

Appendix C , “Firmware Update,”

General Information
Organization of Service Manual

This appendix describes how to update the E5071C firmware. When you want to update the E5071C firmware, refer to this appendix.

Appendix D , “Power Requirement,”

Appendix E, “Messages,”

The E5071C can display error messages as well as messages that indicate the internal operating status of the equipment. This appendix explains what these messages mean by listing them in alphabetical order.

Instrument Covered by This Manual

Agilent Technologies uses a two-part, ten-character serial number label (See Figure 1-1) attached to the instrument's rear panel. The first five characters are the serial prefix and the last five digits are the suffix.

Figure 1-1

Serial Number Label Example



e5071cse1001

An instrument manufactured after the printing date of this manual may have serial number prefix that is not listed on the title page. This unlisted serial number prefix indicates the instrument is different from those described in this manual. The manual for this new instrument may be accompanied by a yellow Manual Changes supplement or have a different manual part number. This sheet contains “change information” that explains how to adapt the manual to the newer instrument.

In addition to change information, the supplement may contain information for correcting errors (Errata) in the manual. To keep this manual as current and accurate as possible, Agilent Technologies recommends that you periodically request the latest Manual Changes supplement. The supplement for this manual is identified by this manual's printing data and is available from Agilent Technologies. If the serial prefix or number of an instrument is lower than that on the title page of this manual, see Appendix A, Manual Changes. For information concerning a serial number prefix that is not listed on the title page or in the Manual change supplement, contact the nearest Agilent Technologies office.

Required Equipment

1) Option 230/235/430/435/280/285/480/485/240/245/440/445

Table 1-1 lists the recommended equipment for performing maintenance on the E5071C.

Table 1-1 Recommended Test Equipment

Equipment	Critical specifications	Recommended Model	Qty.	Use *1
Frequency Counter	Frequency: 50 MHz to 8.5 GHz Accuracy: < 2.5 ppm	Agilent 53181A with Opt.010 & 124	1	P,A
Frequency Standard	Frequency: 10 MHz, Time Base Error: $\leq \pm 1 \times 10^{-10}$ /year	Agilent 5071A	1	A
Power Meter	No Substitute	Agilent E4419A/B *2	1	P,A
Power Sensor	No Substitute	Agilent 8482A	1	P
Power Sensor	No Substitute	Agilent E9304A with Opt. H18	1	P,A
Function Generator		Agilent 33120A	1	P,A
Multimeter		Agilent 3458A or 34401A	1	P,A
Dynamic Accuracy Test Kit	No substitute	Agilent Z5623A with Opt. H01	1	P
Calibration Kit	No Substitute	Agilent 85032F	1	P,A,T
Short	Type-N(m)	part of Agilent 85032F/54D/33E/50D with Type-N adapter	1	P,T
Short	Type-N(f)	Agilent p/n 85032-60009	1	P,T
Short	Type-N(m)	Agilent p/n 85032-60008	4	P,T
Load	Type-N(m)	part of Agilent 85032F/54D/33E/50D with Type-N adapter	2	P
Fixed attenuator (6 dB)	50 Ω , N(m)-N(f), VSWR ≤ 1.015	Agilent 8491A w/Opt.006 and H60	1	P
Fixed attenuator (10 dB)	50 Ω , N(m)-N(f)	Agilent 8491A/B/C	1	T
Handler I/O Test Kit	No substitute	Agilent p/n E5070-65001	1	T

Table 1-1 Recommended Test Equipment

Equipment	Critical specifications	Recommended Model	Qty.	Use* ¹
Cable	BNC(m)-BNC(m) Cable, 61 cm	Agilent p/n 8120-1839	4	P,A
	Coaxial cable with Type-N (m) connectors, 61 cm (24 in), 2 ea.	Agilent N6314A (p/n 8120-8862)	1	P,A,T
Cable	20 inch 50 ohm cable	Agilent p/n 8121-1834	1	P,T
Adapter	N(m)-BNC(f) Adapter	Agilent p/n 1250-0780	1	P,A
Torque Wrench	Size: 3/4 inch Torque: 136 N-cm	Agilent p/n 8710-1766	1	P,A
Personal Computer with GPIB board	Windows XP, VEE7.5 or later		1	P,A

*1.P: Performance Tests, A: Adjustment, T: Troubleshooting

*2. The accuracy of a standard E4419A/B of ± 0.02 dB is adequate for all tests/adjustment except “Dynamic Accuracy Test”. This test requires a power meter with Option G12 or H12 that has been certified to a higher accuracy specification. If an Option G12 or H12 power meter is not available, a test is provided on “Power Meter Accuracy Test” on page 26 to verify the accuracy of a standard power meter.

Table 1-2 Alternative Test Equipment

Equipment	Critical specifications	Model	Qty.	Use* ¹
Frequency Counter	Frequency: 50 MHz to 8.5 GHz Accuracy: < 2.5 ppm	Agilent 53131/2A with Opt.010 and 124	1	P,A
Multimeter		Agilent 34401A	1	P,T
		Agilent 34410A	1	P,T
		Agilent 34411A	1	P,T
Function Generator		Agilent 33220A	1	P,T
		Agilent 33250A	1	P,T
Power Sensor	No Substitute	Agilent E9304A with Opt. H19	1	P,A
Short	Type-N(m)	Agilent 11512A	4	P,T
Load	Type-N(m)	Agilent 909F Opt. 012	4	P

*1.P: Performance Tests, A: Adjustment, T: Troubleshooting

General Information
Required Equipment

2) Option 2K5/4K5

Table 1-3 lists the recommended equipment for performing maintenance on the E5071C.

Table 1-3 Recommended Test Equipment

Equipment	Critical specifications	Recommended Model	Qty.	Use *1
Frequency Counter 1	Frequency: 50 MHz to 8.5 GHz Accuracy: < 2.5 ppm	Agilent 53181A with Opt.010 & 124	1	P,A
Frequency Counter 2	Frequency: 50 MHz to 20 GHz Accuracy: > 0.1 ppm	Agilent 53151A with Opt.001	1	P
Frequency Standard	Frequency: 10 MHz, Time Base Error: $\leq \pm 1 \times 10^{-10}$ /year	Agilent 5071A	1	A
Power Meter	No Substitute	Agilent E4419A/B*2	1	P,A
Power Sensor	No Substitute	Agilent 8482A	1	P
Power Sensor	No Substitute	Agilent E4413A	1	P,A
Power Sensor	No Substitute	Agilent E9304A with Opt. H18	1	A
Function Generator		Agilent 33120A	1	P,A
Multimeter		Agilent 3458A or 34401A	1	P,A
Dynamic Accuracy Test Kit	No substitute	Agilent Z5623A with Opt. H01	1	P
Calibration Kit	No Substitute	Agilent 85052D	1	P,A,T
Short	50ohm 3.5mm (f) Short Termination	Agilent p/n 85052-60007	4	P,T
Short	50ohm 3.5mm (m) Short Termination	Agilent p/n 85052-60006	1	P,T
Load	Type 3.5mm (f)	part of Agilent 85052D	2	P, A
Fixed attenuator (6 dB)	50 Ω , N(m)-N(f), VSWR \leq 1.015	Agilent 8491A w/Opt.006 and H60	1	P
Fixed attenuator (10 dB)	50 Ω , N(m)-N(f)	Agilent 8491A/B/C	1	T
Handler I/O Test Kit	No substitute	Agilent p/n E5070-65001	1	T
Low Pass Filter	No substitute	Agilent p/n 9135 -5852	1	P
Cable	BNC(m)-BNC(m) Cable, 61 cm	Agilent p/n 8120-1839	4	P,A
	Coaxial cable with Type-N (m) connectors, 61 cm (24 in), 2 ea.	Agilent N6314A (p/n 8120-8862)	1	P,A,T

Table 1-3 Recommended Test Equipment

Equipment	Critical specifications	Recommended Model	Qty.	Use* ¹
Cable	20 inch 50 ohm cable	Agilent p/n 8121-1834	1	P,T
Adapter	N(m)-BNC(f) Adapter	Agilent p/n 1250-0780	1	P,A
Adapter	APC 3.5 (f)-(f) Adapter	Agilent p/n 85027-60005	4	P,A
Adapter	APC 2.5 (m)-N(f) Adapter	Agilent p/n 1250-1811	1	P,A
Torque Wrench	Size: 3/4 inch Torque: 136 N-cm	Agilent p/n 8710-1766	1	P,A
Personal Computer with GPIB board	Windows XP, VEE7.5 or later		1	P,A

*1.P: Performance Tests, A: Adjustment, T: Troubleshooting

*2. The accuracy of a standard E4419A/B of ± 0.02 dB is adequate for all tests/adjustment except "Dynamic Accuracy Test". This test requires a power meter with Option G12 or H12 that has been certified to a higher accuracy specification. If an Option G12 or H12 power meter is not available, a test is provided on "Power Meter Accuracy Test" on page 26 to verify the accuracy of a standard power meter.

Table 1-4 Alternative Test Equipment

Equipment	Critical specifications	Model	Qty.	Use* ¹
Frequency Counter 1	Frequency: 50 MHz to 8.5 GHz Accuracy: < 2.5 ppm	Agilent 53131/2A with Opt.010 and 124	1	P,A
Multimeter		Agilent 34401A	1	P,T
		Agilent 34410A	1	P,T
		Agilent 34411A	1	P,T
Function Generator		Agilent 33220A	1	P,T
		Agilent 33250A	1	P,T
Power Sensor	No Substitute	Agilent E9304A with Opt. H19	1	P,A
Short	Type-N(m)	Agilent 11512A	4	P,T
Load	Type-N(m)	Agilent 909F Opt. 012	4	P

*1.P: Performance Tests, A: Adjustment, T: Troubleshooting

Power Meter Accuracy Test

This test is intended for power meters used in testing the E5071C. The “Dynamic Accuracy Test” requires the use of a power meter that has been calibrated to a higher accuracy than the standard power meter.

Power meters with options G12 and H12 specify an improved instrument accuracy over a limited power range. (These power meters do not contain unique hardware.) A power meter may be returned to the factory to have one of these options added to an existing power meter or to renew the calibration for one of these options.

This test procedure is an alternative to returning the power meter to the factory. When a power meter passes this test, it is considered to be *calibrated* for the G12 or H12 option even though it has not been returned to the factory.

Power Meters That Can Be Tested Using This Procedure

This procedure assume that the E4419B power meter is being tested.

NOTE

It is recommended that the revision number for the power meter “Main Firmware” be Ax.03.00 or higher.

Equipment Used for the Power Meter Accuracy Test

Equipment Type	Recommended Model or Part Number	Alternate Model or Part Number
Range calibrator	Agilent 11683A	None
Precision digital voltmeter	Agilent 3458A	Any with the required accuracy and resolution ^{*1}
Power sensor cable	Agilent 11730A, p/n 8120-8319	Any equivalent
Cable, BNC, 50 Ω	Any	Any
Adapter for connecting BNC cable to DVM inputs	Any	Any

*1. Required accuracy and resolution at the following voltage levels:
14 mV input: 0.0100% accuracy, 10 nV resolution
0.14 V input: 0.0050% accuracy, 100 nV resolution
0.45 V input: 0.0030% accuracy, 100 nV resolution

Description of the Test

The power meter accuracy is verified for various power inputs and the actual readings are recorded in a test record. A range calibrator is used to provide the reference inputs.

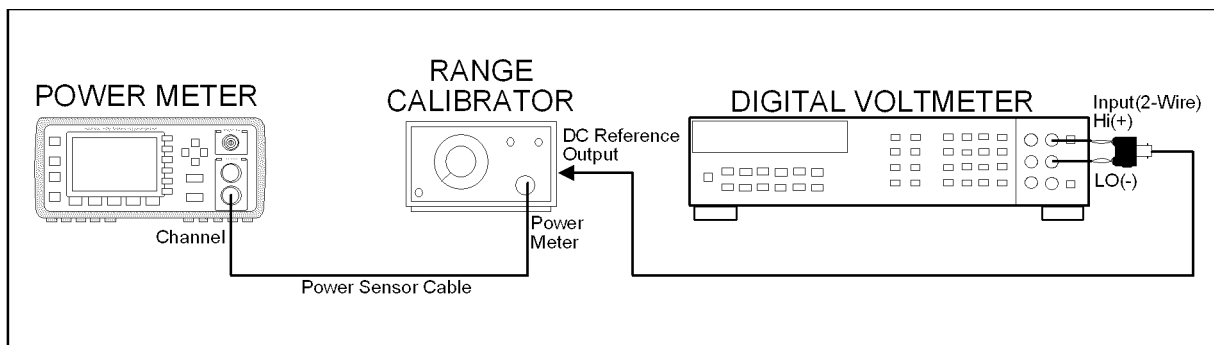
NOTE It is recommended that a copy of the test record on page 30 be made, and the values be recorded on the copy, thus preserving the original for future use.

Test Procedure

NOTE This procedure assumes the use of the recommended equipment model numbers. The actual steps required, therefore, may differ for other model numbers of equipment used.

- Step 1.** Setup the equipment as shown in Figure 1-2.
- a. Connect the DC REFERENCE OUTPUT connector on the rear panel of the range calibrator to the DVM voltage input.
 - b. Connect the POWER METER output of the range calibrator to the input of the power meter being tested.
 - c. Switch on the power to the power meter, the range calibrator, and the digital voltmeter.

Figure 1-2 Setup for the Power Meter Accuracy Test



e5061ase037

- Step 2.** Press the power meter: Press [**Preset/Local**], then **Confirm**.
- Step 3.** Perform the following steps for each channel on the power meter:
- a. Set to read in dBm: Press [**dBm/W**], then **dBm**.
 - b. Set the ref cal factor to 100%: Press [**Zero/Cal**], **Cal**, **A/B Ref CF**, then set to **100.0**, if necessary.
 - c. Set the cal factor to 100%: Press [**Frequency/Cal Fac**], **A/B Cal Fac**, then set to **100.0**, if necessary.
 - d. Set readout to 0.001 dBm: Press [**Meas Setup**], then **Resolution 1234**, to highlight **4**.
 - e. Set filter step detect on and filter length to 512: Press [**System/Inputs**], channel **A or B Input Setting**, [**More**], **Ch A/B Filter**, **Step Det On**, **Filter On**, **Mode MAN**, **Length**, then set the filter length to **512**.
- Step 4.** Setup the digital voltmeter (DVM) as follows:
- a. Reset the DVM: Press the **blue key** followed by **Reset**.
 - b. Set the sample period to a value greater than one second: Press **NPLC, 5, 0**, then **Enter**.
- Step 5.** Set the range calibrator controls as follows:

General Information
Power Meter Accuracy Test

- POLARITY: NORMAL
- RANGE: 1 mW
- FUNCTION: CALIBRATE

Step 6. Allow the equipment to warm up for approximately 30 minutes. Do not change any connections or control setting during this time.

Step 7. Zero and calibrate the power meter channel to which the range calibrator is connected:

- a. The range calibrator's RANGE switch should be set to 1 mW.
- b. Set the range calibrator's FUNCTION switch to STANDBY.
- c. Press **[Zero/Cal]**, then **Zero A** or **Zero B** (as appropriate). Wait for the operation to complete.
- d. Set the range calibrator's FUNCTION switch to CALIBRATE.
- e. Press **[Zero/Cal]**, **Cal**, then **Cal A** or **Cal B** (as appropriate). Wait for the operation to complete.

Step 8. Monitor the drift rate of the power meter reading: Five minutes following calibration, the meter must read 0.001, 0.000, or -0.001 dBm. If the power meter reading is not one of these values, allow additional warm up time, then check the drift rate again. The range calibrator must remain connected to the power meter during this warm up time.

Step 9. Zero and calibrate the power meter channel to which the range calibrator is connected:

NOTE

After a channel on the power meter is calibrated, do not allow more than 5 minutes to elapse before completing the remaining measurement steps for that channel.

- a. The range calibrator's RANGE switch should be set to 1 mW.
- b. Set the range calibrator's FUNCTION switch to STANDBY.
- c. Press **[Zero/Cal]**, then **Zero A** or **Zero B** (as appropriate). Wait for the operation to be completed.
- d. Set the range calibrator's FUNCTION switch to CALIBRATE.
- e. Press **[Zero/Cal]**, **Cal**, then **Cal A** or **Cal B** (as appropriate). Wait for the operation to complete.

Step 10. Record the DVM voltage reading as value A in the test record on page 30.

NOTE

All DVM readings in this procedure should be recorded showing five significant digits.

Step 11. The reading on the power meter should be 0.000 ± 0.001 dBm.

Step 12. Switch the range calibrator RANGE to 300 μ W.

Step 13. Record the DVM voltage reading as value B in the test record.

Step 14. Wait for the power meter reading to settle (no settling drift within 20 seconds).

Step 15. Record the power meter reading as value C in the test record.

Step 16. Switch the range calibrator RANGE to 100 μ W.

- Step 17.** Record the DVM voltage reading as value D in the test record.
- Step 18.** Wait for the power meter reading to settle (no settling drift within 20 seconds).
- Step 19.** Record the power meter reading as value E in the test record.
- Step 20.** If testing a dual-channel power meter, perform Step 7 through Step 19 for the other channel.
- Step 21.** Perform the pass/fail calculations indicated on the test record.

NOTE

If a channel of the power meter does not pass this test, the power meter cannot be used in applications that require Option G12 or H12. There are no adjustments that can be performed to improve the performance of the power meter. Typically, replacing the A6 measurement assembly associated with the failed channel will correct the problem.

General Information
Power Meter Accuracy Test

Test Record for Power Meter Accuracy Test

Power Meter Tested			
Model Number:		Test Date:	
Serial Number:		Tested by:	

Test Equipment Used

Range Calibrator: Model No.:		Serial No.:	
Digital Voltmeter: Model No.:		Serial No.:	

Test Results

Range Calibrator: Setting	Channel A		Channel B	
	DVM Reading (Vdc)	Power Meter Reading (dBm)	DVM Reading (Vdc)	Power Meter Reading (dBm)
1 mW	A=	0.00±0.001	A=	0.00±0.001
300 µW	B =	C =	B =	C=
100 µW	D =	E=	D =	E =

Pass/Fail Calculation

300 µW	$R=B/A =$ $S=10^{(C/10)} =$ $\% \text{ ERROR} = ((R-S)/R) \times 100 =$ Limits: ±0.13% Pass __ Fail __	$R=B/A =$ $S=10^{(C/10)} =$ $\% \text{ ERROR} = ((R-S)/R) \times 100 =$ Limits: ±0.13% Pass __ Fail __
100 µW	$T=D/A =$ $U=10^{(E/10)} =$ $\% \text{ ERROR} = ((T-U)/T) \times 100 =$ Limits: ±0.10% Pass __ Fail __	$T=D/A =$ $U=10^{(E/10)} =$ $\% \text{ ERROR} = ((T-U)/T) \times 100 =$ Limits: ±0.10% Pass __ Fail __

2 Performance Test

This chapter provides information on how to verify the E5071C performance.

Introduction

This literature provides the performance test procedures for the Agilent E5071C RF Network Analyzers. The performance test names are listed in Table 2-1. The test procedures are described sequentially in the following pages.

The test name indicates the tested performance and to which performance group the tested performance belongs.

NOTE Allow the analyzer to warm up for at least 90 minutes before you execute any of the performance tests.

Perform all performance tests in an ambient temperature of 23 ± 5 °C

NOTE The performance tests should be performed periodically. The recommended test interval is 12 months.

The test interval depends on maintenance of use and the environmental conditions under which the instrument is used. You may find that the interval could be shortened or lengthened; however, such a decision should be based on substantial quantitative data.

NOTE Before performing any tests, make extra copies of the calculation sheets and the performance test record pertaining to the test procedure. These are required in the test procedure. For explanation of how to use these records, see the calculation sheet and performance test record at the end of this literature.

Table 2-1 The E5071C performance test procedure

Para.	Title
1	AUX Input test
2	Frequency accuracy test
3	RF output level accuracy and flatness test
4	RF output level linearity test
5	Trace noise test
6	Crosstalk test
7	System dynamic range test
8	Dynamic accuracy test
9	Uncorrected system performance test

Test Equipment Required

The required equipment for the performance test is listed on Table 1-1, Table 1-2, Table 1-3 and Table 1-4. Use only calibrated equipment when doing the performance test.

Softkey Selection Procedure for Performance Test

NOTE

The procedure of the softkey selection depends on the firmware revision. Please note that some softkey selection procedures for your E5071C might be a little bit different from the procedure described in this chapter.

1. AUX INPUT TEST

Description

This test checks the measurement accuracy of AUX Input. This test is checked, compared with the measured value of Multimeter by inputting the DC voltage to AUX-1 and 2 ports from function generator.

Specification

@ 23°C ± 5°C (Warming up over 90 minutes);

-1mV ≤ Offset Error ≤ +1mV @ DC voltage = +1V

-10mV ≤ Offset Error ≤ +10mV @ DC voltage = +10V

-0.01 ≤ Proportional Error ≤ +0.01 @ DC voltage ±1V, ±10V

Test equipment

Function generator	Agilent 33120A or 33250A
Multimeter	Agilent 34401A, 34410A, 34411A or 3458A
BNC(m)-BNC(m) Cable, 61 cm	Agilent p/n 8120-1839
BNC T Adapter	Common part
Banana BNC	Common part
BNC Short Termination	Common part

2. FREQUENCY ACCURACY TEST

Description

This test checks the frequency accuracy of the E5071C test port output signal. The frequency accuracy is checked at several frequency from 9kHz to 20 GHz range. Since the E5071C employs a PLL frequency synthesizer for the signal source, the frequency accuracy at these frequency points can verify the accuracy for the entire frequency range.

Specification

@ 23°C ± 5°C (Warming up over 90 minutes);

Error ≤ ± 5.0 ppm from 9 kHz to 20 GHz (without Opt 1E5)

Error ≤ ± 1.0 ppm from 9 kHz to 20 GHz (with Opt 1E5)

Test equipment

1) Option 230/235/430/435/240/245/440/445/280/285/480/485

Frequency Counter	Agilent 53181A with Opt. 010 and 124 or Agilent 53131/2A with Opt. 010 and 124
48 inch BNC cable	Agilent p/n 8120-1840
N(m) - BNC(f) adapter	Agilent p/n 1250-0780

2) Option 2K5/4K5

Frequency Counter 1	Agilent 53181A with Opt. 010 and 124 or Agilent 53131/2A with Opt. 010 and 124
Frequency Counter 2	Agilent 53151A with Opt.001
48 inch BNC cable	Agilent p/n 8120-1840
N(m) - BNC(f) adapter	Agilent p/n 1250-0780

3. RF OUTPUT LEVEL ACCURACY AND FLATNESS TEST

Description

This test checks the level accuracy and frequency flatness of the E5071C test port output signal. The level accuracy is checked for an output power level setting of 0 dBm for option 230/235/430/435/240/245/440/445/280/285/480/485 and -5 dBm for option 2K5/4K5 at 50 MHz using a power meter. The frequency flatness is tested by measuring the power level at 26 frequency points from 9 kHz to 8.5 GHz and 45 frequency points from 300 kHz to 20 GHz and calculating the differences of the power meter readings from the level at 50 MHz.

Specification

Level Accuracy

@ 23°C ± 5°C (Warming up over 90 minutes);

Power ≤ ± 0.65dBm, 50MHz

Flatness

@ 23°C ± 5°C (Warming up over 30 minutes);

1. Option 230/235/240/245/280/285/430/435/440/445/480/485

Error ≤ ± 1.0 dB from 9 kHz to 8.5 GHz, 0 dBm, relative to 50 MHz

2. Option 2K5/4K5

Error ≤ ± 2.0 dB from 300 kHz to 5 MHz, -5 dBm, relative to 50 MHz

Error ≤ ± 1.0 dB from 5 MHz to 8.5 GHz, -5 dBm, relative to 50 MHz

Error ≤ ± 2.5 dB from 8.5 GHz to 20 GHz, -5 dBm, relative to 50 MHz

NOTE

The specifications of the level accuracy and flatness apply to test port 1 only.

Test equipment

1) Option 230/235/430/435/240/245/440/445/280/285/480/485

Power meter	Agilent E4419A/B
Power sensor	Agilent E9304A Opt. H18 or Agilent E9304A Opt.H19

2) Option 2K5/4K5

Power meter	Agilent E4419A/B
Power sensor	Agilent 8482A

3. RF OUTPUT LEVEL ACCURACY AND FLATNESS TEST

Power sensor	Agilent E4413A
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4. RF OUTPUT LEVEL LINEARITY TEST

Description

This test checks the level accuracy of the E5071C test port output signal across the specified level range. The RF output level is measured for power level settings of -20 dBm to 10 dBm in 2.5dB step increments at 9 kHz, 100 kHz, 50 MHz, 3 GHz, 4.5 GHz, 5 GHz, and -20 dBm to 9 dBm in 2.5 dB step increments at 6 GHz, and -20 dBm to 8 dBm in 2.5 dB step increments at 7 GHz, and -20 dBm to 7 dBm in 2.5 dB step increments at 8.5 GHz. Measure the linearity of source power. Regards the differences from source power at 0 dBm setting as the measurement value. For option 2K5/4K5 the RF output level is measured for power level setting of -25 dBm to 8 dBm in 2.5 dB step increments at 300 kHz, -25 dBm to 10 dBm in 2.5 dB step increments at 1 MHz, 50 MHz, 3GHz and 6 GHz, -25 dBm to 9 dBm in 2.5 dB step increments at 8 GHz, -25 dBm to 7 dBm in 2.5 dB step increments at 10.5 GHz, -25 dBm to 3 dBm in 2.5 dB step increments at 15 GHz and -25 dBm to 0 dBm in 2.5 dB step increments at 20 GHz. Measure the linearity of source power. Regards the differences from source power at -5 dBm setting as the measurement value.

Specification

@ 23°C ± 5°C (Warming up over 90 minutes);

1. Option 230/235/240/245/280/285/430/435/440/445/480/485

Error ≤ ± 0.75 dB from 9 kHz to 5 GHz, -20 dBm to 10 dBm

Error ≤ ± 0.75 dB from 5 GHz to 6 GHz, -20 dBm to 9 dBm

Error ≤ ± 0.75 dB from 6 GHz to 7 GHz, -20 dBm to 8 dBm

Error ≤ ± 0.75 dB from 7 GHz to 8.5 GHz, -20 dBm to 7 dBm

2. Option 2K5/4K5

Error ≤ ± 0.75 dB from 300 kHz to 1 MHz, -25 dBm to 8 dBm

Error ≤ ± 0.75 dB from 1 MHz to 6 GHz, -25 dBm to 10 dBm

Error ≤ ± 0.75 dB from 6 GHz to 8 GHz, -25dBm to 9 dBm

Error ≤ ± 0.75 dB from 8 GHz to 10.5 GHz, -25dBm to 7 dBm

Error ≤ ± 0.75 dB from 10.5 GHz to 15 GHz, -25dBm to 3 dBm

Error ≤ ± 0.75 dB from 15 GHz to 20 GHz, -25 dBm to 0 dBm

NOTE

The specifications of the level linearity apply to test port 1 only.

Test equipment

1) Option 230/235/430/435/280/285/480/485/240/245/440/445

Power meter	Agilent E4419A/B
-------------	------------------

4. RF OUTPUT LEVEL LINEARITY TEST

Power sensor	Agilent E9304A Opt. H18 or Agilent E9304A Opt. H19
--------------	--

2) Option 2K5/4K5

Power meter	Agilent E4419A/B
Power sensor	Agilent 8482A
Power sensor	Agilent E4413A

5. TRACE NOISE TEST

Description

This test checks the trace noise level for each test port of E5071C. The trace noise level is quantified by performing a “through” measurement 32 times from 9 kHz to 20 GHz range, with a cable connected between two ports. The trace noise level for S11, S22, S33 and S44 are quantified by performing a “short” measurement 32 times from 9 kHz to 20 GHz range, with a cable (terminated with “Short” device) connected to each ports(1,2,3, and 4). Standard deviation of the measured values at each frequency is calculated and, then translated into a noise level expressed in dB rms / deg rms.

Specification

@ 23°C ± 5°C (Warming up over 90 minutes);

Option 230/235/240/245/280/285/430/435/440/445/480/485

Magnitude

Standard deviation $\leq \pm 4.0 \times 10^{-3}$ dB, IFW = 3 kHz, from 9 kHz to 30 kHz

Standard deviation $\leq \pm 3.0 \times 10^{-3}$ dB, IFW = 3 kHz, from 30 kHz to 10 MHz

Standard deviation $\leq \pm 4.0 \times 10^{-3}$ dB, IFW = 70 kHz, from 10 MHz to 4.38 GHz

Standard deviation $\leq \pm 6.0 \times 10^{-3}$ dB, IFW = 70 kHz, from 4.38 GHz to 8.5 GHz

Phase

Standard deviation $\leq \pm 35 \times 10^{-3}$ deg, IFW = 3 kHz, from 9 kHz to 30 kHz

Standard deviation $\leq \pm 20 \times 10^{-3}$ deg, IFW = 3 kHz, from 30 kHz to 10 MHz

Standard deviation $\leq \pm 35 \times 10^{-3}$ deg, IFW = 70 kHz, from 10 MHz to 4.38 GHz

Standard deviation $\leq \pm 50 \times 10^{-3}$ deg, IFW = 70 kHz, from 4.38 GHz to 8.5 GHz

Option 2K5/4K5

Magnitude

Standard deviation $\leq \pm 3.0 \times 10^{-3}$ dB, IFW = 3 kHz, from 300 kHz to 10 MHz

Standard deviation $\leq \pm 4.0 \times 10^{-3}$ dB, IFW = 70 kHz, from 10 MHz to 4.38 GHz

Standard deviation $\leq \pm 6.0 \times 10^{-3}$ dB, IFW = 70 kHz, from 4.38 GHz to 8.5 GHz

Standard deviation $\leq \pm 9.0 \times 10^{-3}$ dB, IFW = 70 kHz, from 8.5 GHz to 13.137 GHz

Standard deviation $\leq \pm 13.0 \times 10^{-3}$ dB, IFW = 70 kHz, from 13.137 GHz to 17 GHz

Standard deviation $\leq \pm 23.0 \times 10^{-3}$ dB, IFW = 70 kHz, from 17 GHz to 20 GHz

Phase

Standard deviation $\leq \pm 20 \times 10^{-3}$ deg, IFW = 3 kHz, from 300 kHz to 10 MHz

Standard deviation $\leq \pm 35 \times 10^{-3}$ deg, IFW = 70 kHz, from 10 MHz to 4.38 GHz

Standard deviation $\leq \pm 50 \times 10^{-3}$ deg, IFW = 70 kHz, from 4.38 GHz to 8.5 GHz

Standard deviation $\leq \pm 64 \times 10^{-3}$ deg, IFW = 70 kHz, from 8.5 GHz to 13.137 GHz

Standard deviation $\leq \pm 95 \times 10^{-3}$ deg, IFW = 70 kHz, from 13.137 GHz to 17 GHz

Standard deviation $\leq \pm 165 \times 10^{-3}$ deg, IFW = 70 kHz, from 17 GHz to 20 GHz

Test equipment

1) Option 230/235/430/435/280/285/480/485/240/245/440/445

20 inch 50 ohm cable	Agilent p/n 5062-6691
N-SMA Adapter	Agilent p/n 1250-2879
Type N, 50 ohm Short termination (1ea)	Agilent p/n 85032-60009

2) Option 2K5/4K5

SMA cable	Agilent p/n 5062-6691
APC 3.5 (f)-(f) Adapter	Agilent p/n 85052-60005
50 ohm 3.5mm (f) Short termination (1ea)	Agilent p/n 85052-60007

6. CROSSTALK TEST

Description

This test checks the crosstalks between test ports of the E5071C. The crosstalk is tested by performing "through" measurements with two test ports connected together and, short-ended "isolation" measurements with the test ports terminated with N-type "Short" devices. A "through" calibration is performed to have the through measurement data as the reference to which the isolation measurement data is compared. With segment sweep points for a specified frequency range, a swept measurement with the short-ended test ports is repeated 16 times and the measurement data is averaged. The worst crosstalk value is determined from the peak value of the average data.

Specification

@ 23°C ± 5°C (Warming up over 90 minutes);

Crosstalk

1. Option 230/235/240/245/280/285/430/435/440/445/480/485

- ≤ -100 dB @ 9 kHz to 300 kHz
- ≤ -110 dB @ 300 kHz to 10 MHz
- ≤ -120 dB @ 10 MHz to 3 GHz
- ≤ -110 dB @ 3 GHz to 6 GHz
- ≤ -100 dB @ 6 GHz to 8.5 GHz

2. Option 2K5/4K5

- ≤ -68 dB @ 300 kHz to 1 MHz
- ≤ -70 dB @ 1 MHz to 5 MHz
- ≤ -100 dB @ 5 MHz to 10 MHz
- ≤ -110 dB @ 10 MHz to 45 MHz
- ≤ -118 dB @ 45 MHz to 4 GHz
- ≤ -123 dB @ 4 GHz to 6 GHz
- ≤ -120 dB @ 6 GHz to 8.5 GHz
- ≤ -112 dB @ 8.5 GHz to 15 GHz
- ≤ -106 dB @ 15 GHz to 20 GHz

NOTE

This crosstalk is not specified formally on the points of 5MHz and 50MHz as customer's spec. It is not judged pass/fail at these two points.

Test equipment

1) Option 230/235/430/435/280/285/480/485/240/245/440/445

Type-N(m) 50 ohm short termination (4 ea.)	Agilent p/n 85032-60008
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2) Option 2K5/4K5

50 ohm 3.5mm (f) Short termination (4 ea.)	Agilent p/n 85052-60007
--	-------------------------

7. SYSTEM DYNAMIC RANGE TEST

Description

This test checks the system dynamic range for the receiver ports of the E5071C. The system dynamic range is tested by performing an "Isolation" measurement 16 times with segment sweep points for specified frequency ranges (after the response and isolation calibrations are performed) and calculating the RMS deviation value from the 16 measurement data for each sweep frequency point. The maximum RMS deviation value in each frequency range is extracted to determine the system dynamic range performance.

Specification

@ 23°C ± 5°C (Warming up over 90 minutes);

1. Option 230/235/240/245/280/285/430/435/440/445/480/485

≤ -97 dB @ 10 Hz BW, 9 kHz to 300 kHz
 ≤ -107 dB @ 10 Hz BW, 300 kHz to 10 MHz
 ≤ -123 dB @ 10 Hz BW, 10 MHz to 6 GHz
 ≤ -117 dB @ 10 Hz BW, 6 GHz to 8.5 GHz

≤ -72 dB @ 3 kHz BW, 9 kHz to 300 kHz
 ≤ -82 dB @ 3 kHz BW, 300 kHz to 10 MHz
 ≤ -98 dB @ 3 kHz BW, 10 MHz to 6 GHz
 ≤ -92 dB @ 3 kHz BW, 6 GHz to 8.5 GHz

2. Option 2K5/4K5

≤ -95 dB @ 10 Hz BW, 300 kHz to 1 MHz
 ≤ -107 dB @ 10 Hz BW, 1 MHz to 10 MHz
 ≤ -120 dB @ 10 Hz BW, 10 MHz to 100 MHz
 ≤ -123 dB @ 10 Hz BW, 100 MHz to 6 GHz
 ≤ -117 dB @ 10 Hz BW, 6 GHz to 8.5 GHz
 ≤ -105 dB @ 10 Hz BW, 8.5 GHz to 10.5 GHz
 ≤ -100 dB @ 10 Hz BW, 10.5 GHz to 15 GHz
 ≤ -96 dB @ 10 Hz BW, 15 GHz to 20 GHz

≤ -70 dB @ 3 kHz BW, 300 kHz to 1 MHz
 ≤ -82 dB @ 3 kHz BW, 1 MHz to 10 MHz
 ≤ -95 dB @ 3 kHz BW, 10 MHz to 100 MHz
 ≤ -98 dB @ 3 kHz BW, 100 MHz to 6 GHz

7. SYSTEM DYNAMIC RANGE TEST

≤ -92 dB @ 3 kHz BW, 6 GHz to 8.5 GHz

≤ -80 dB @ 3 kHz BW, 8.5 GHz to 10.5 GHz

≤ -75 dB @ 3 kHz BW, 10.5 GHz to 15 GHz

≤ -71 dB @ 3 kHz BW, 15 GHz to 20 GHz

NOTE

This System Dynamic Range is not specified formally on the points of 5 MHz and 50 MHz as customer's spec. It is not judged pass/fail at these two points.

Test equipment**1) Option 230/235/430/435/280/285/480/485/240/245/440/445**

Coaxial cable with Type-N (m) connectors, 61 cm (24 in)	Agilent N6314A(p/n 8120-8862)
Type-N(m) 50 Ω Load termination (2 ea.)	part of Agilent 85032F/54D/33E/50D with Type-N adapter

2) Option 2K5/4K5

SMA Cable	Agilent p/n 5062-6693
50 ohm 3.5 mm (f) Load Termination	part of Agilent 85052D with 3.5 mm (f) adapter

8. DYNAMIC ACCURACY TEST

Description

This test checks the dynamic accuracy of the E5071C. The dynamic accuracy is tested at 1.195 GHz for each receiver port using the Agilent Z5623A (with option H01) Dynamic Accuracy Test Kit. The 1.195 GHz source signal of the E5071C goes through the Z5623A's first attenuator variable from 0 dB to 11 dB in 1 dB steps and second attenuator variable up to 100 dB in 10 dB steps and is measured with the receiver port. The test procedure checks the measured receiver-input power for each 5 dB increment in the range from 10 dBm to 100 dBm. The ratios of the measured receiver-input powers to the reference input level of -10 dBm are calculated and compared to the attenuation values of the Z5623A. The 1.195 GHz signal flow is split with a power splitter present between the two attenuators in the Z5623A and measured with an external power meter to calibrate the attenuated power level.

NOTE

Since the dynamic accuracy does not have frequency dependence, this test is performed at 1.195 GHz only.

Specification

@ 23°C ± 5°C (Warming up over 90 minutes);

Power level [dBm]	Test limit [dB] (Option 230/235/240/245/280/285/430/435/440/445/480/485)	Test limit [dB] (Option 2K5/4K5)
10	0.207	2.4972
5	0.075	0.3936
0	0.041	0.0948
-5	0.031	0.0384
-10	0.024	0.024188
-15	0.03	0.03
-20	0.035	0.035
-25	0.04	0.04
-30	0.045	0.045
-35	0.056	0.056
-40	0.067	0.067
-45	0.078	0.078
-50	0.091	0.091
-55	0.106	0.106

-60	0.125	0.125
-65	0.151	0.151
-70	0.189	0.189
-75	0.248	0.248
-80	0.346	0.346
-85	0.509	0.509
-90	0.785	0.785
-95	1.248	1.248
-100	2.008	2.008

Test Equipment

Power meter	Agilent E4419A/B
Power sensor	Agilent 8482A
Dynamic Accuracy Test Kit	Agilent Z5623A w/Opt. H01
6 dB fixed attenuator	Agilent 8491A w/Opt. 006 and H60
Coaxial cable with N-type (m) connectors, 61 cm (24 in), 2 ea.	Agilent N6314A (p/n 8120-8862)
GPIB controller (or PC with GPIB Interface Card)	
GPIB Interconnection Cable	Agilent 10833A/B

NOTE Before starting this test, input and store the calibration data of 8482A to E4419A/B.

9. UNCORRECTED SYSTEM PERFORMANCE TEST

Description

This test checks the directivity, source match, load match, transmission tracking, and reflection tracking which are the key S-parameter measurement hardware characteristics. These characteristics are tested using the Agilent 85032F (Option 230/235/430/435/240/245/440/445/280/285/480/485) or Agilent 85052D (Option 2K5/4K5) Calibration Kit with segment points for a specified frequency range. After a full two-port (Option 230, 235, 240, 245, 280, 285 and 2K5) or a full four-port (Option 430, 435, 440, 445, 480, 485 and 4K5) calibration is performed for each test port VBA test programs are executed to output the directivity, source match, load match, transmission tracking and reflection data to the display.

Specification

@ 23°C ± 5°C (Warming up over 90 minutes);

1. Option 230/235/240/245/280/285/430/435/440/445/480/485

Description	Specification			
	9 kHz to 300 kHz	300 kHz to 3 GHz	3 GHz to 6 GHz	6 GHz to 8.5 GHz
Directivity	≤ -20	≤ -25	≤ -20	≤ -15
Source Match	≤ -20	≤ -25	≤ -20	≤ -15
Load Match	≤ -12	≤ -17	≤ -12	≤ -10
Transmission Tracking	± 1.5	± 1.0	± 1.0	± 1.0
Reflection Tracking	± 1.5	± 1.0	± 1.0	± 1.0

2. Option 2K5/4K5

Description	Specification						
	300 kHz to 1 MHz	1 MHz to 1 GHz	1 GHz to 3 GHz	3 GHz to 6 GHz	6 GHz to 8.5 GHz	8.5 GHz to 11 GHz	11 GHz to 20 GHz
Directivity	≤ -25	≤ -25	≤ -20	≤ -20	≤ -15	≤ -15	≤ -15
Source Match	≤ -25	≤ -25	≤ -20	≤ -20	≤ -15	≤ -15	≤ -15
Load Match	≤ -9	≤ -17	≤ -15	≤ -11	≤ -9	≤ -8	≤ -7

9. UNCORRECTED SYSTEM PERFORMANCE TEST

Transmission Tracking	± 1.0	± 1.0	± 1.0	± 1.0	± 1.0	± 1.0	± 1.0
Reflection Tracking	± 1.0	± 1.0	± 1.0	± 1.0	± 1.0	± 1.0	± 1.0

Test Equipment**1) Option 230/235/430/435/280/285/480/485/240/245/440/445**

Calibration Kit	Agilent 85032F
Coaxial cable with N-type (m) connectors, 61 cm (24 in)	Agilent N6314A (p/n 8120-8862)

2) Option 2K5/4K5

Calibration Kit	Agilent 85052D
SMA Cable	Agilent p/n 5062-6693

E5071C Performance Test Calculation Sheet

Introduction

This section contains calculation sheets for each performance test that requires additional calculations to determine the final test result.

Use the calculation sheet in this section as an aid for recording raw measurement data and calculating the performance test results.

Calculation sheet entries are provided only for performance tests in which calculations are required to obtain the test results.

3. RF Output Level Accuracy and Flatness Test

Flatness Test (Option 230, 430)

Frequency [Hz]	Power meter reading [dBm]		Test result equation
	[a]	[REF]	
50 M	_____		
9 k		_____	a - REF
20 k		_____	a - REF
70 k		_____	a - REF
100 k		_____	a - REF
300 k		_____	a - REF
1 M		_____	a - REF
68 M		_____	a - REF
68 M + 1		_____	a - REF
550 M		_____	a - REF
1.05 G		_____	a - REF
1.55 G		_____	a - REF
2.05 G		_____	a - REF
2.55 G		_____	a - REF
3.00 G		_____	a - REF

Flatness Test (Option 235, 435)

Frequency [Hz]	Power meter reading [dBm]		Test result equation
	[a]	[REF]	
50 M	_____		
100 k		_____	a - REF
300 k		_____	a - REF
1 M		_____	a - REF
68 M		_____	a - REF
68 M + 1		_____	a - REF
550 M		_____	a - REF
1.05 G		_____	a - REF
1.55 G		_____	a - REF
2.05 G		_____	a - REF
2.55 G		_____	a - REF
3.00 G		_____	a - REF

Flatness Test (Option 240, 440)

Frequency [Hz]	Power meter reading [dBm]		Test result equation
	[a]	[REF]	
50 M	_____		
9 k		_____	a - REF
20 k		_____	a - REF
70 k		_____	a - REF
100 k		_____	a - REF
300 k		_____	a - REF
1 M		_____	a - REF
68 M		_____	a - REF
68 M + 1		_____	a - REF
550 M		_____	a - REF
1.05 G		_____	a - REF
1.55 G		_____	a - REF

2. Performance Test

Performance Test
E5071C Performance Test Calculation Sheet

Frequency [Hz]	Power meter reading [dBm]		Test result equation
	[a]	[REF]	
2.05 G		_____	a - REF
2.55 G		_____	a - REF
3.00 G		_____	a - REF
3.025 G		_____	a - REF
3.525 G		_____	a - REF
4.025 G		_____	a - REF
4.5 G		_____	a - REF

Flatness Test (Option 245, 445)

Frequency [Hz]	Power meter reading [dBm]		Test result equation
	[a]	[REF]	
50 M	_____		
100 k		_____	a - REF
300 k		_____	a - REF
1 M		_____	a - REF
68 M		_____	a - REF
68 M + 1		_____	a - REF
550 M		_____	a - REF
1.05 G		_____	a - REF
1.55 G		_____	a - REF
2.05 G		_____	a - REF
2.55 G		_____	a - REF
3.00 G		_____	a - REF
3.025 G		_____	a - REF
3.525 G		_____	a - REF
4.025 G		_____	a - REF
4.5 G		_____	a - REF

(Option 280, 480)

Frequency [Hz]	Power meter reading [dBm]		Test result equation
	[a]	[REF]	
50 M	_____		
9 k		_____	a - REF
20 k		_____	a - REF
70 k		_____	a - REF
100 k		_____	a - REF
300 k		_____	a - REF
1 M		_____	a - REF
68 M		_____	a - REF
68 M + 1		_____	a - REF
550 M		_____	a - REF
1.05 G		_____	a - REF
1.55 G		_____	a - REF
2.05 G		_____	a - REF
2.55 G		_____	a - REF
3.00 G		_____	a - REF
3.025 G		_____	a - REF
3.525 G		_____	a - REF
4.025 G		_____	a - REF
4.525 G		_____	a - REF
5.025 G		_____	a - REF
5.525 G		_____	a - REF
6.025 G		_____	a - REF
6.525 G		_____	a - REF
7.025 G		_____	a - REF
7.525 G		_____	a - REF
8.025 G		_____	a - REF
8.5 G		_____	a - REF

2. Performance Test

Performance Test
E5071C Performance Test Calculation Sheet

(Option 285, 485)

Frequency [Hz]	Power meter reading [dBm]		Test result equation
	[a]	[REF]	
50 M	_____		
100 k		_____	a - REF
300 k		_____	a - REF
1 M		_____	a - REF
68 M		_____	a - REF
68 M + 1		_____	a - REF
550 M		_____	a - REF
1.05 G		_____	a - REF
1.55 G		_____	a - REF
2.05 G		_____	a - REF
2.55 G		_____	a - REF
3.00 G		_____	a - REF
3.025 G		_____	a - REF
3.525 G		_____	a - REF
4.025 G		_____	a - REF
4.525 G		_____	a - REF
5.025 G		_____	a - REF
5.525 G		_____	a - REF
6.025 G		_____	a - REF
6.525 G		_____	a - REF
7.025 G		_____	a - REF
7.525 G		_____	a - REF
8.025 G		_____	a - REF
8.5 G		_____	a - REF

(Option 2K5, 4K5)

Frequency [Hz]	Power meter reading [dBm]		Test result equation
	[a]	[REF]	
50 M	_____		
300 k		_____	a - REF
1 M		_____	a - REF
68 M		_____	a - REF
68 M + 1		_____	a - REF
550 M		_____	a - REF
1.05 G		_____	a - REF
1.55 G		_____	a - REF
2.05 G		_____	a - REF
2.55 G		_____	a - REF
3.00 G		_____	a - REF
3.025 G		_____	a - REF
3.525 G		_____	a - REF
4.025 G		_____	a - REF
4.525 G		_____	a - REF
5.025 G		_____	a - REF
5.525 G		_____	a - REF
6.025 G		_____	a - REF
6.525 G		_____	a - REF
7.025 G		_____	a - REF
7.525 G		_____	a - REF
8.025 G		_____	a - REF
8.525 G		_____	a - REF
9.025 G		_____	a - REF
9.525 G		_____	a - REF
10.025 G		_____	a - REF
10.525 G		_____	a - REF
11.025 G		_____	a - REF

Performance Test
E5071C Performance Test Calculation Sheet

Frequency [Hz]	Power meter reading [dBm]		Test result equation
	[a]	[REF]	
11.525 G		_____	a - REF
12.025 G		_____	a - REF
12.525 G		_____	a - REF
13.025 G		_____	a - REF
13.525 G		_____	a - REF
14.025 G		_____	a - REF
14.525 G		_____	a - REF
15.025 G		_____	a - REF
15.525 G		_____	a - REF
16.025 G		_____	a - REF
16.525 G		_____	a - REF
17.025 G		_____	a - REF
17.525 G		_____	a - REF
18.025 G		_____	a - REF
18.525 G		_____	a - REF
19.025 G		_____	a - REF
19.525 G		_____	a - REF
20 G			a - REF

4. RF Output Level Linearity Test

NOTE

Make a copy of the following calculation sheet for each combination of the test frequencies listed below:

- Option 230, 430: 9 kHz, 100 kHz, 50 MHz, 3 GHz
- Option 235, 435: 100 kHz, 50 MHz, 3 GHz
- Option 240, 440: 9 kHz, 100 kHz, 50 MHz, 3 GHz, 4.5 GHz
- Option 245, 445: 100 kHz, 50 MHz, 3 GHz, 4.5 GHz
- Option 280, 480: 9 kHz, 100 kHz, 50 MHz, 3 GHz, 5 GHz
- Option 285, 485: 100 kHz, 50 MHz, 3 GHz, 5 GHz

CW frequency: _____ Hz

Power level [dBm]	Power meter reading [dBm]		Test result equation
	[a]	REF	
0	_____	_____	
10		_____	a-REF
7.5		_____	a-REF
5		_____	a-REF
2.5		_____	a-REF
-2.5		_____	a-REF
-5		_____	a-REF
-7.5		_____	a-REF
-10		_____	a-REF
-12.5		_____	a-REF
-15		_____	a-REF
-17.5		_____	a-REF
-20		_____	a-REF

NOTE

Make a copy of the following calculation sheet for each combination of the test frequencies listed below:

- Option 280, 285, 480, 485: 6 GHz

Performance Test
E5071C Performance Test Calculation Sheet

CW frequency: _____ Hz

Power level [dBm]	Power meter reading [dBm]		Test result equation
	[a]	REF	
0	_____		
9		_____	a-REF
7.5		_____	a-REF
5		_____	a-REF
2.5		_____	a-REF
-2.5		_____	a-REF
-5		_____	a-REF
-7.5		_____	a-REF
-10		_____	a-REF
-12.5		_____	a-REF
-15		_____	a-REF
-17.5		_____	a-REF
-20		_____	a-REF

NOTE

Make a copy of the following calculation sheet for each combination of the test frequencies listed below:

Option 280, 285, 480, 485: 7 GHz

CW frequency: _____ Hz

Power level [dBm]	Power meter reading [dBm]		Test result equation
	[a]	REF	
0	_____		
8		_____	a-REF
7.5		_____	a-REF
5		_____	a-REF
2.5		_____	a-REF
-2.5		_____	a-REF
-5		_____	a-REF
-7.5		_____	a-REF
-10		_____	a-REF

Power level [dBm]	Power meter reading [dBm]		Test result equation
	[a]	REF	
-12.5		_____	a-REF
-15		_____	a-REF
-17.5		_____	a-REF
-20		_____	a-REF

NOTE Make a copy of the following calculation sheet for each combination of the test frequencies listed below:

Option 280, 285, 480, 485: 8.5 GHz

CW frequency: _____ Hz

Power level [dBm]	Power meter reading [dBm]		Test result equation
	[a]	REF	
0	_____		
7		_____	a-REF
7.5		_____	a-REF
5		_____	a-REF
2.5		_____	a-REF
-2.5		_____	a-REF
-5		_____	a-REF
-7.5		_____	a-REF
-10		_____	a-REF
-12.5		_____	a-REF
-15		_____	a-REF
-17.5		_____	a-REF
-20		_____	a-REF

NOTE Make a copy of the following calculation sheet for each combination of the test frequencies listed below:

Option 2K5, 4K5: 300 kHz

Performance Test
E5071C Performance Test Calculation Sheet

CW frequency: _____ Hz

Power level [dBm]	Power meter reading [dBm]		Test result equation
	[a]	REF	
-5	_____		
8		_____	a-REF
7.5		_____	a-REF
5		_____	a-REF
2.5		_____	a-REF
0		_____	a-REF
-2.5		_____	a-REF
-7.5		_____	a-REF
-10		_____	a-REF
-12.5		_____	a-REF
-15		_____	a-REF
-17.5		_____	a-REF
-20		_____	a-REF
-22.5		_____	a-REF
-25		_____	a-REF

NOTE

Make a copy of the following calculation sheet for each combination of the test frequencies listed below:

Option 2K5, 4K5: 1 MHz, 50 MHz, 3 GHz, 6 GHz

CW frequency: _____ Hz

Power level [dBm]	Power meter reading [dBm]		Test result equation
	[a]	REF	
-5	_____		
10		_____	a-REF
7.5		_____	a-REF
5		_____	a-REF

Power level [dBm]	Power meter reading [dBm]		Test result equation
	[a]	REF	
2.5		_____	a-REF
0		_____	a-REF
-2.5		_____	a-REF
-7.5		_____	a-REF
-10		_____	a-REF
-12.5		_____	a-REF
-15		_____	a-REF
-17.5		_____	a-REF
-20		_____	a-REF
-22.5		_____	a-REF
-25		_____	a-REF

NOTE

Make a copy of the following calculation sheet for each combination of the test frequencies listed below:

Option 2K5, 4K5: 8 GHz

CW frequency: _____ Hz

Power level [dBm]	Power meter reading [dBm]		Test result equation
	[a]	REF	
-5	_____		
9		_____	a-REF
7.5		_____	a-REF
5		_____	a-REF
2.5		_____	a-REF
0		_____	a-REF
-2.5		_____	a-REF
-7.5		_____	a-REF
-10		_____	a-REF
-12.5		_____	a-REF

Performance Test
E5071C Performance Test Calculation Sheet

Power level [dBm]	Power meter reading [dBm]		Test result equation
	[a]	REF	
-15		_____	a-REF
-17.5		_____	a-REF
-20		_____	a-REF
-22.5		_____	a-REF
-25		_____	a-REF

NOTE

Make a copy of the following calculation sheet for each combination of the test frequencies listed below:

Option 2K5, 4K5: 10.5 GHz

CW frequency: _____ Hz

Power level [dBm]	Power meter reading [dBm]		Test result equation
	[a]	REF	
-5	_____		
7		_____	a-REF
5		_____	a-REF
2.5		_____	a-REF
0		_____	a-REF
-2.5		_____	a-REF
-7.5		_____	a-REF
-10		_____	a-REF
-12.5		_____	a-REF
-15		_____	a-REF
-17.5		_____	a-REF
-20		_____	a-REF
-22.5		_____	a-REF
-25		_____	a-REF

NOTE

Make a copy of the following calculation sheet for each combination of the test frequencies

listed below:

Option 2K5, 4K5: 15 GHz

CW frequency: _____ Hz

Power level [dBm]	Power meter reading [dBm]		Test result equation
	[a]	REF	
-5	_____		
3		_____	a-REF
2.5		_____	a-REF
0		_____	a-REF
-2.5		_____	a-REF
-7.5		_____	a-REF
-10		_____	a-REF
-12.5		_____	a-REF
-15		_____	a-REF
-17.5		_____	a-REF
-20		_____	a-REF
-22.5		_____	a-REF
-25		_____	a-REF

NOTE

Make a copy of the following calculation sheet for each combination of the test frequencies listed below:

Option 2K5, 4K5: 20 GHz

CW frequency: _____ Hz

Power level [dBm]	Power meter reading [dBm]		Test result equation
	[a]	REF	
-5	_____		
3		_____	a-REF
2.5		_____	a-REF
0		_____	a-REF

Performance Test
E5071C Performance Test Calculation Sheet

Power level [dBm]	Power meter reading [dBm]		Test result equation
	[a]	REF	
-2.5		_____	a-REF
-7.5		_____	a-REF
-10		_____	a-REF
-12.5		_____	a-REF
-15		_____	a-REF
-17.5		_____	a-REF
-20		_____	a-REF
-22.5		_____	a-REF
-25		_____	a-REF

8. Dynamic Accuracy Test

Make a copy of the following calculation sheet for each of the S-parameters listed below:

Option 230, 235, 240, 245, 280, 285 and 2K5: S21 and S12

Option 430, 435, 440, 445, 480, 485 and 4K5: S21, S12, S31 and S41

NOTE

A dynamic accuracy calculation example is shown at the end of the calculation sheets.

S-Parameter: _____ (10 dBm to -100 dBm)

Name	A1	A2	Power setting [dB]	Pm [dB]	Tx [dB] @ Port (Port Char OFF)	Running D.A.	True D.A.	
DA10	0	10				REF	REF	
DA15	5	10				_____	_____	
	(Tx @ DA15) - (Tx @ DA10) - (Pm @ DA15) + (Pm @ DA10) →							
DA20	10	10				_____	_____	
	(Tx @ DA20) - (Tx @ DA10) - (Pm @ DA20) + (Pm @ DA10) →							
DA20a	0	20				_____	_____	
	Adjust source power for (Pm [db] @ DA20a) - (Tx [dB] @ DA20a) + (Tx [dB] @ DA20)							
DA20b	0	20				REF20	REF20	
DA25	5	20				_____	_____	
	(Tx @ DA25) - (Tx @ DA20b) - (Pm @ DA25) + (Pm @ DA20b) → True D.A. = (Running D.A. [dB] @ DA25) + (True D.A. [dB] @ DA20)							
DA30	10	20				_____	_____	
	(Tx @ DA30) - (Tx @ DA20b) - (Pm @ DA30) + (Pm @ DA20b) → True D.A. = (Running D.A. [dB] @ DA30) + (True D.A. [dB] @ DA20)							
DA30a	0	30				_____	_____	
	Adjust source power for (Pm [db] @ DA30a) - (Tx [dB] @ DA30a) + (Tx [dB] @ DA30)							
DA30b	0	30				REF30	REF30	
DA35	5	30				_____	_____	
	(Tx @ DA35) - (Tx @ DA30b) - (Pm @ DA35) + (Pm @ DA30b) → True D.A. = (Running D.A. [dB] @ DA35) + (True D.A. [dB] @ DA30)							
DA40	10	30				_____	_____	
	(Tx @ DA40) - (Tx @ DA30b) - (Pm @ DA40) + (Pm @ DA30b) → True D.A. = (Running D.A. [dB] @ DA40) + (True D.A. [dB] @ DA30)							
DA40a	0	40				_____	_____	
	Adjust source power for (Pm [db] @ DA40a) - (Tx [dB] @ DA40a) + (Tx [dB] @ DA40)							
DA40b	0	40				REF40	REF40	

Performance Test
E5071C Performance Test Calculation Sheet

Name	A1	A2	Power setting [dB]	Pm [dB]	Tx [dB] @ Port (Port Char OFF)	Running D.A.	True D.A.
DA45	5	40				_____	_____
	(Tx @ DA45) - (Tx @ DA40b) - (Pm @ DA45) + (Pm @ DA40b) → True D.A. = (Running D.A. [dB] @ DA45) + (True D.A. [dB] @ DA40)						
DA50	10	40				_____	_____
	(Tx @ DA50) - (Tx @ DA40b) - (Pm @ DA50) + (Pm @ DA40b) → True D.A. = (Running D.A. [dB] @ DA50) + (True D.A. [dB] @ DA40)						
DA50a	0	50				_____	_____
Adjust source power for (Pm [db] @ DA50a) - (Tx [dB] @ DA50a) + (Tx [dB] @ DA50)							
DA50b	0	50				REF50	REF50
DA55	5	50				_____	_____
	(Tx @ DA55) - (Tx @ DA50b) - (Pm @ DA55) + (Pm @ DA50b) → True D.A. = (Running D.A. [dB] @ DA55) + (True D.A. [dB] @ DA50)						
DA60	10	50				_____	_____
	(Tx @ DA60) - (Tx @ DA50b) - (Pm @ DA60) + (Pm @ DA50b) → True D.A. = (Running D.A. [dB] @ DA60) + (True D.A. [dB] @ DA50)						
DA60a	0	60				_____	_____
Adjust source power for (Pm [db] @ DA60a) - (Tx [dB] @ DA60a) + (Tx [dB] @ DA60)							
DA60b	0	60				REF60	REF60
DA65	5	60				_____	_____
	(Tx @ DA65) - (Tx @ DA60b) - (Pm @ DA65) + (Pm @ DA60b) → True D.A. = (Running D.A. [dB] @ DA65) + (True D.A. [dB] @ DA60)						
DA70	10	60				_____	_____
	(Tx @ DA70) - (Tx @ DA60b) - (Pm @ DA70) + (Pm @ DA60b) → True D.A. = (Running D.A. [dB] @ DA70) + (True D.A. [dB] @ DA60)						
DA70a	0	70				_____	_____
Adjust source power for (Pm [db] @ DA70a) - (Tx [dB] @ DA70a) + (Tx [dB] @ DA70)							
DA70b	0	70				REF70	REF70
DA75	5	70				_____	_____
	(Tx @ DA75) - (Tx @ DA70b) - (Pm @ DA75) + (Pm @ DA70b) → True D.A. = (Running D.A. [dB] @ DA75) + (True D.A. [dB] @ DA70)						
DA80	10	70				_____	_____
	(Tx @ DA80) - (Tx @ DA70b) - (Pm @ DA80) + (Pm @ DA70b) → True D.A. = (Running D.A. [dB] @ DA80) + (True D.A. [dB] @ DA70)						
DA80a	0	80				_____	_____

Name	A1	A2	Power setting [dB]	Pm [dB]	Tx [dB] @ Port (Port Char OFF)	Running D.A.	True D.A.	
Adjust source power for (Pm [db] @ DA80a) - (Tx [dB] @ DA80a) + (Tx [dB] @ DA80)								
DA80b	0	80				REF80	REF80	
DA85	5	80				_____	_____	
	(Tx @ DA85) - (Tx @ DA80b) - (Pm @ DA85) + (Pm @ DA80b) → True D.A. = (Running D.A. [dB] @ DA85) + (True D.A. [dB] @ DA80)							
DA90	10	80				_____	_____	
	(Tx @ DA90) - (Tx @ DA80b) - (Pm @ DA90) + (Pm @ DA80b) True D.A. = (Running D.A. [dB] @ DA90) + (True D.A. [dB] @ DA80)							
DA90a	0	90				_____	_____	
Adjust source power for (Pm [db] @ DA90a) - (Tx [dB] @ DA90a) + (Tx [dB] @ DA90)								
DA90b	0	90				REF90	REF90	
DA95	5	90				_____	_____	
	(Tx @ DA95) - (Tx @ DA90b) - (Pm @ DA95) + (Pm @ DA90b)→ True D.A. = (Running D.A. [dB] @ DA95) + (True D.A. [dB] @ DA90)							
DA100	10	90				_____	_____	
	(Tx @ DA100) - (Tx @ DA90b)- (Pm @ DA100) + (Pm @ DA90b)→ True D.A. = (Running D.A. [dB] @ DA100) + (True D.A. [dB] @ DA90)							
DA10	10	0				REF10	REF10	
DA5	5	0				_____	_____	
	(Tx @ DA5) - (Tx @ DA10) - (Pm @ DA5) + (Pm @ DA10)							
DA0	0	0				_____	_____	
	(Tx @ DA0) - (Tx @ DA10) - (Pm @ DA0) + (Pm @ DA10) →							
DA+5	0	0				_____	_____	
	(Tx @ DA+5) - (Tx @ DA10) - (Pm @ DA+5) + (Pm @ DA10) → True D.A. = (Running D.A. [dB] @ DA+5) + (True D.A. [dB] @ DA10)							
DA+10	0	0				_____	_____	
	(Tx @ DA+10) - (Tx @ DA10) - (Pm @ DA+10) + (Pm @ DA10) → True D.A. = (Running D.A. [dB] @ DA+10) + (True D.A. [dB] @ DA10)							

2. Performance Test

E5071C Performance Test Record

Agilent Technologies E5071C RF Network Analyzer

Serial Number:		Option:	
Temperature:	°C	Test Date:	
Humidity:	% R.H.	Tested by:	

AUX Input Test

1. Multimeter : 3458A

AUX1 Offset error

AUX Power Range[V]	Test limit [mV]	Test result [mV]	Measurement Uncertainty [mV]	TAR
1	± 1		± 0.14	7.4
10	± 10		± 0.21	47.9

AUX1 Proportional error

AUX Input Range[V]	Test limit [mV]	Test result [mV]	Measurement uncertainty [mV]	TAR
1	± 11		± 0.97	11.4
- 1	± 11		± 0.77	14.3
10	± 110		± 0.78	140.6
- 10	± 110		± 0.71	155.7

AUX2 Offset error

AUX Power Range[V]	Test limit [mV]	Test result [mV]	Measurement Uncertainty [mV]	TAR
1	± 1		± 0.14	7.4
10	± 10		± 0.21	47.9

AUX2 Proportional error

AUX Input Range[V]	Test limit [mV]	Test result [mV]	Measurement uncertainty [mV]	TAR
1	± 11		± 0.97	11.4
- 1	± 11		± 0.77	14.3

AUX Input Range[V]	Test limit [mV]	Test result [mV]	Measurement uncertainty [mV]	TAR
10	± 110		± 0.78	140.6
- 10	± 110		± 0.71	155.7

2. Multimeter : 34401A, 34410A or 34411A

AUX1 Offset error

AUX Power Range[V]	Test limit [mV]	Test result [mV]	Measurement Uncertainty [mV]
1	± 1		± 0.01
10	± 10		± 0.05

AUX1 Proportional error

AUX Input Range[V]	Test limit [mV]	Test result [mV]	Measurement uncertainty [mV]
1	± 11		± 0.5
- 1	± 11		± 2.3
10	± 110		± 1.4
- 10	± 110		± 1.3

AUX2 Offset error

AUX Power Range[V]	Test limit [mV]	Test result [mV]	Measurement Uncertainty [mV]
1	± 1		± 0.01
10	± 10		± 0.05

AUX2 Proportional error

AUX Input Range[V]	Test limit [mV]	Test result [mV]	Measurement uncertainty [mV]
1	± 11		± 0.5
- 1	± 11		± 2.3
10	± 110		± 1.4
- 10	± 110		± 1.3

Frequency Accuracy Test

Option 230, 430

Without Option 1E5

Frequency [Hz]	Test limit [Hz]	Test result [Hz]	Measurement uncertainty [Hz]
9 k	± 0.045		± 0.0004
100 k	± 0.5		± 0.004
50 M	± 250		± 1.7
134.1 M	± 670.5		± 4.6
548 M	$\pm 2.74 \text{ k}$		± 16.4
3 G	$\pm 15 \text{ k}$		± 90

With Option 1E5

Frequency [Hz]	Test limit [Hz]	Test result [Hz]	Measurement uncertainty [Hz]
9 k	± 0.009		± 0.0003
100 k	± 0.1		± 0.003
50 M	± 50		± 0.58
134.1 M	± 134.1		± 1.6
548 M	$\pm 0.548 \text{ k}$		± 6.4
3 G	$\pm 3 \text{ k}$		± 35

Option 235, 435

Without Option 1E5

Frequency [Hz]	Test limit [Hz]	Test result [Hz]	Measurement uncertainty [Hz]
100 k	± 0.5		± 0.004
50 M	± 250		± 1.7
134.1 M	± 670.5		± 4.6
548 M	$\pm 2.74 \text{ k}$		± 16.4
3 G	$\pm 15 \text{ k}$		± 90

With Option 1E5

Frequency [Hz]	Test limit [Hz]	Test result [Hz]	Measurement uncertainty [Hz]
100 k	± 0.1		± 0.003
50 M	± 50		± 0.58
134.1 M	± 134.1		± 1.6
548 M	± 0.548 k		± 6.4
3 G	± 3 k		± 35

Option 240, 440

Without Option 1E5

Frequency [Hz]	Test limit [Hz]	Test result [Hz]	Measurement uncertainty [Hz]
9 k	± 0.045		± 0.0004
100 k	± 0.5		± 0.004
50 M	± 250		± 1.7
134.1 M	± 670.5		± 4.6
548 M	± 2.74 k		± 16.4
3 G	± 15 k		± 90
4.5 G	± 22.5 k		± 582

With Option 1E5

Frequency [Hz]	Test limit [Hz]	Test result [Hz]	Measurement uncertainty [Hz]
9 k	± 0.009		± 0.0003
100 k	± 0.1		± 0.003
50 M	± 50		± 0.58
134.1 M	± 134.1		± 1.6
548 M	± 0.548 k		± 6.4
3 G	± 3 k		± 35
4.5 G	± 4.5 k		± 52.5

Performance Test
E5071C Performance Test Record

Option 245, 445

Without Option 1E5

Frequency [Hz]	Test limit [Hz]	Test result [Hz]	Measurement uncertainty [Hz]
100 k	± 0.5		± 0.004
50 M	± 250		± 1.7
134.1 M	± 670.5		± 4.6
548 M	± 2.74 k		± 16.4
3 G	± 15 k		± 90
4.5 G	± 22.5 k		± 582

With Option 1E5

Frequency [Hz]	Test limit [Hz]	Test result [Hz]	Measurement uncertainty [Hz]
100 k	± 0.1		± 0.003
50 M	± 50		± 0.58
134.1 M	± 134.1		± 1.6
548 M	± 0.548 k		± 6.4
3 G	± 3 k		± 35
4.5 G	± 4.5 k		± 52.5

Option 280, 480

Without Option 1E5

Frequency [Hz]	Test limit [Hz]	Test result [Hz]	Measurement uncertainty [Hz]
9 k	± 0.045		± 0.0004
100 k	± 0.5		± 0.004
50 M	± 250		± 1.7
134.1 M	± 670.5		± 4.6
548 M	± 2.74 k		± 16.4
3 G	± 15 k		± 90
8.5 G	± 42.5 k		± 254

With Option 1E5

Frequency [Hz]	Test limit [Hz]	Test result [Hz]	Measurement uncertainty [Hz]
9 k	± 0.009		± 0.0003
100 k	± 0.1		± 0.003
50 M	± 50		± 0.58
134.1 M	± 134.1		± 1.6
548 M	± 0.548 k		± 6.4
3 G	± 3 k		± 35
8.5 G	± 8.5 k		± 99

Option 285, 485

Without Option 1E5

Frequency [Hz]	Test limit [Hz]	Test result [Hz]	Measurement uncertainty [Hz]
100 k	± 0.5		± 0.004
50 M	± 250		± 1.7
134.1 M	± 670.5		± 4.6
548 M	± 2.74 k		± 16.4
3 G	± 15 k		± 90
8.5 G	± 42.5 k		± 254

With Option 1E5

Frequency [Hz]	Test limit [Hz]	Test result [Hz]	Measurement uncertainty [Hz]
100 k	± 0.1		± 0.003
50 M	± 50		± 0.58
134.1 M	± 134.1		± 1.6
548 M	± 0.548 k		± 6.4
3 G	± 3 k		± 35
8.5 G	± 8.5 k		± 99

Performance Test
E5071C Performance Test Record

Option 2K5, 4K5

Without Option 1E5

Frequency [Hz]	Test limit [Hz]	Test result [Hz]	Measurement uncertainty [Hz]	TAR
300 k	± 1.5		± 0.31	4.8
50 M	± 250		± 51.6	4.8
134.1 M	± 670.5		± 138.3	4.8
548 M	± 2.74 k		± 545.0	5.0
8.76 G	± 43.8 k		± 8713.0	5.0
17.52 G	± 87.6 k		± 17417.0	5.0
20 G	± 100 k		± 19909.0	5.0

With Option 1E5

Frequency [Hz]	Test limit [Hz]	Test result [Hz]	Measurement uncertainty [Hz]	TAR
300 k	± 0.3		± 0.001	560.6
50 M	± 50		± 0.10	568.7
134.1 M	± 134.1		± 0.20	573.7
548 M	± 548		± 1.70	330.9
8.76 G	± 8.76 k		± 14.0	629.0
17.52 G	± 17.52 k		± 27.0	649.7
20 G	± 20 k		± 30.0	658.8

RF Output Level Accuracy and Flatness Test

1. Power Sensor: E9304A Option H18

Level Accuracy Test (@ Port 1)

Power level [dBm]	Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
0	50 M	± 0.65		± 0.19

Level Flatness Test (@ Port 1) (at 0 dBm, relative to 50 MHz reference)

Option 230, 430

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k	± 1.0		± 0.27
20 k	± 1.0		± 0.27
70 k	± 1.0		± 0.27
100 k	± 1.0		± 0.27
300 k	± 1.0		± 0.27
1 M	± 1.0		± 0.23
68 M	± 1.0		± 0.23
68M + 1	± 1.0		± 0.23
550 M	± 1.0		± 0.24
1.05 G	± 1.0		± 0.24
1.55 G	± 1.0		± 0.23
2.05 G	± 1.0		± 0.23
2.55 G	± 1.0		± 0.23
3 G	± 1.0		± 0.23

Option 235, 435

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k	± 1.0		± 0.27
300 k	± 1.0		± 0.27
1 M	± 1.0		± 0.23

Performance Test
E5071C Performance Test Record

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
68 M	± 1.0		± 0.23
68M + 1	± 1.0		± 0.23
550 M	± 1.0		± 0.24
1.05 G	± 1.0		± 0.24
1.55 G	± 1.0		± 0.23
2.05 G	± 1.0		± 0.23
2.55 G	± 1.0		± 0.23
3 G	± 1.0		± 0.23

Option 240, 440

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k	± 1.0		± 0.27
20 k	± 1.0		± 0.27
70 k	± 1.0		± 0.27
100 k	± 1.0		± 0.27
300 k	± 1.0		± 0.27
1 M	± 1.0		± 0.23
68 M	± 1.0		± 0.23
68M + 1	± 1.0		± 0.23
550 M	± 1.0		± 0.24
1.05 G	± 1.0		± 0.24
1.55 G	± 1.0		± 0.23
2.05 G	± 1.0		± 0.23
2.55 G	± 1.0		± 0.23
3 G	± 1.0		± 0.23
3.025 G	± 1.0		± 0.24
3.525 G	± 1.0		± 0.24
4.025 G	± 1.0		± 0.24
4.5 G	± 1.0		± 0.24

Option 245, 445

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k	± 1.0		± 0.27
300 k	± 1.0		± 0.27
1 M	± 1.0		± 0.23
68 M	± 1.0		± 0.23
68M + 1	± 1.0		± 0.23
550 M	± 1.0		± 0.24
1.05 G	± 1.0		± 0.24
1.55 G	± 1.0		± 0.23
2.05 G	± 1.0		± 0.23
2.55 G	± 1.0		± 0.23
3 G	± 1.0		± 0.23
3.025 G	± 1.0		± 0.24
3.525 G	± 1.0		± 0.24
4.025 G	± 1.0		± 0.24
4.5 G	± 1.0		± 0.24

Option 280, 480

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k	± 1.0		± 0.27
20 k	± 1.0		± 0.27
70 k	± 1.0		± 0.27
100 k	± 1.0		± 0.27
300 k	± 1.0		± 0.27
1 M	± 1.0		± 0.23
68 M	± 1.0		± 0.23
68M + 1	± 1.0		± 0.23
550 M	± 1.0		± 0.24
1.05 G	± 1.0		± 0.24
1.55 G	± 1.0		± 0.23

Performance Test
E5071C Performance Test Record

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
2.05 G	± 1.0		± 0.23
2.55 G	± 1.0		± 0.23
3 G	± 1.0		± 0.23
3.025 G	± 1.0		± 0.24
3.525 G	± 1.0		± 0.24
4.025 G	± 1.0		± 0.24
4.525 G	± 1.0		± 0.24
5.025 G	± 1.0		± 0.24
5.525 G	± 1.0		± 0.24
6.025 G	± 1.0		± 0.28
6.525 G	± 1.0		± 0.28
7.025 G	± 1.0		± 0.28
7.525 G	± 1.0		± 0.28
8.025 G	± 1.0		± 0.28
8.5 G	± 1.0		± 0.28

Option 285, 485

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k	± 1.0		± 0.27
300 k	± 1.0		± 0.27
1 M	± 1.0		± 0.23
68 M	± 1.0		± 0.23
68M + 1	± 1.0		± 0.23
550 M	± 1.0		± 0.24
1.05 G	± 1.0		± 0.24
1.55 G	± 1.0		± 0.23
2.05 G	± 1.0		± 0.23
2.55 G	± 1.0		± 0.23
3 G	± 1.0		± 0.23

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
3.025 G	± 1.0		± 0.24
3.525 G	± 1.0		± 0.24
4.025 G	± 1.0		± 0.24
4.525 G	± 1.0		± 0.24
5.025 G	± 1.0		± 0.24
5.525 G	± 1.0		± 0.24
6.025 G	± 1.0		± 0.28
6.525 G	± 1.0		± 0.28
7.025 G	± 1.0		± 0.28
7.525 G	± 1.0		± 0.28
8.025 G	± 1.0		± 0.28
8.5 G	± 1.0		± 0.28

RF Output Level Accuracy and Flatness Test

2. Power Sensor: E9304A Option H19

Level Accuracy Test (@ Port 1)

Power level [dBm]	Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
0	50 M	± 0.65		± 0.19

Level Flatness Test (@ Port 1) (at 0 dBm, relative to 50 MHz reference)

Option 230, 430

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k	± 1.0		± 0.28
20 k	± 1.0		± 0.28
70 k	± 1.0		± 0.28
100 k	± 1.0		± 0.28

Performance Test
E5071C Performance Test Record

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
300 k	± 1.0		± 0.28
1 M	± 1.0		± 0.25
68 M	± 1.0		± 0.25
68M + 1	± 1.0		± 0.25
550 M	± 1.0		± 0.26
1.05 G	± 1.0		± 0.26
1.55 G	± 1.0		± 0.25
2.05 G	± 1.0		± 0.25
2.55 G	± 1.0		± 0.25
3 G	± 1.0		± 0.25

Option 235, 435

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k	± 1.0		± 0.28
300 k	± 1.0		± 0.28
1 M	± 1.0		± 0.25
68 M	± 1.0		± 0.25
68M + 1	± 1.0		± 0.25
550 M	± 1.0		± 0.26
1.05 G	± 1.0		± 0.26
1.55 G	± 1.0		± 0.25
2.05 G	± 1.0		± 0.25
2.55 G	± 1.0		± 0.25
3 G	± 1.0		± 0.25

Option 240, 440

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k	± 1.0		± 0.28
20 k	± 1.0		± 0.28

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
70 k	± 1.0		± 0.28
100 k	± 1.0		± 0.28
300 k	± 1.0		± 0.28
1 M	± 1.0		± 0.25
68 M	± 1.0		± 0.25
68M + 1	± 1.0		± 0.25
550 M	± 1.0		± 0.26
1.05 G	± 1.0		± 0.26
1.55 G	± 1.0		± 0.25
2.05 G	± 1.0		± 0.25
2.55 G	± 1.0		± 0.25
3 G	± 1.0		± 0.25
3.025 G	± 1.0		± 0.25
3.525 G	± 1.0		± 0.25
4.025 G	± 1.0		± 0.25
4.5 G	± 1.0		± 0.25

Option 245, 445

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k	± 1.0		± 0.28
300 k	± 1.0		± 0.28
1 M	± 1.0		± 0.25
68 M	± 1.0		± 0.25
68M + 1	± 1.0		± 0.25
550 M	± 1.0		± 0.26
1.05 G	± 1.0		± 0.26
1.55 G	± 1.0		± 0.25
2.05 G	± 1.0		± 0.25
2.55 G	± 1.0		± 0.25

Performance Test
E5071C Performance Test Record

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
3 G	± 1.0		± 0.25
3.025 G	± 1.0		± 0.25
3.525 G	± 1.0		± 0.25
4.025 G	± 1.0		± 0.25
4.5 G	± 1.0		± 0.25

Option 280, 480

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k	± 1.0		± 0.28
20 k	± 1.0		± 0.28
70 k	± 1.0		± 0.28
100 k	± 1.0		± 0.28
300 k	± 1.0		± 0.28
1 M	± 1.0		± 0.25
68 M	± 1.0		± 0.25
68M + 1	± 1.0		± 0.25
550 M	± 1.0		± 0.26
1.05 G	± 1.0		± 0.26
1.55 G	± 1.0		± 0.25
2.05 G	± 1.0		± 0.25
2.55 G	± 1.0		± 0.25
3 G	± 1.0		± 0.25
3.025 G	± 1.0		± 0.25
3.525 G	± 1.0		± 0.25
4.025 G	± 1.0		± 0.25
4.525 G	± 1.0		± 0.25
5.025 G	± 1.0		± 0.25
5.525 G	± 1.0		± 0.25
6.025 G	± 1.0		± 0.30

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
6.525 G	± 1.0		± 0.30
7.025 G	± 1.0		± 0.30
7.525 G	± 1.0		± 0.30
8.025 G	± 1.0		± 0.30
8.5 G	± 1.0		± 0.30

Option 285, 485

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k	± 1.0		± 0.28
300 k	± 1.0		± 0.28
1 M	± 1.0		± 0.25
68 M	± 1.0		± 0.25
68M + 1	± 1.0		± 0.25
550 M	± 1.0		± 0.26
1.05 G	± 1.0		± 0.26
1.55 G	± 1.0		± 0.25
2.05 G	± 1.0		± 0.25
2.55 G	± 1.0		± 0.25
3 G	± 1.0		± 0.25
3.025 G	± 1.0		± 0.25
3.525 G	± 1.0		± 0.25
4.025 G	± 1.0		± 0.25
4.525 G	± 1.0		± 0.25
5.025 G	± 1.0		± 0.25
5.525 G	± 1.0		± 0.25
6.025 G	± 1.0		± 0.30
6.525 G	± 1.0		± 0.30
7.025 G	± 1.0		± 0.30
7.525 G	± 1.0		± 0.30

Performance Test
E5071C Performance Test Record

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
8.025 G	± 1.0		± 0.30
8.5 G	± 1.0		± 0.30

RF Output Level Accuracy and Flatness Test

3. Power Sensor: 8482A

Level Accuracy Test (@ Port 1)

Powerlevel [dBm]	Frequency [Hz]	Test limit [dB]	Testresult [dB]	Measurement uncertainty [dB]	TAR
-5	50 M	± 0.65		± 0.13	5.3

Level Flatness Test (@ Port 1) (at -5dBm, relative to 50 MHz reference)

Option 2K5, 4K5

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
300 k	± 1.0		± 0.19	13.2
1 M	± 1.0		± 0.19	13.2
68 M	± 1.0		± 0.15	7.6
68 M + 1	± 1.0		± 0.15	7.6
550 M	± 1.0		± 0.17	6.5
1.05 G	± 1.0		± 0.17	6.5
1.55 G	± 1.0		± 0.17	6.5
2.05 G	± 1.0		± 0.15	7.4
2.55 G	± 1.0		± 0.15	7.4
3.025 G	± 1.0		± 0.16	6.9
3.525 G	± 1.0		± 0.16	6.9
4.025 G	± 1.0		± 0.16	6.9
4.525 G	± 1.0		± 0.16	6.9
5.025 G	± 1.0		± 0.16	6.9
5.525 G	± 1.0		± 0.16	6.9

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
6.025 G	± 1.0		± 0.18	6.2
6.525 G	± 1.0		± 0.18	6.2
7.025 G	± 1.0		± 0.18	6.2
7.525 G	± 1.0		± 0.18	6.2
8.025 G	± 1.0		± 0.18	6.1
8.525 G	± 2.5		± 0.21	16.0
9.025 G	± 2.5		± 0.21	16.0
9.525 G	± 2.5		± 0.21	16.0
10.025 G	± 2.5		± 0.20	16.4
10.525 G	± 2.5		± 0.20	16.4
11.025 G	± 2.5		± 0.20	16.4
11.525 G	± 2.5		± 0.20	16.4
12.025 G	± 2.5		± 0.26	12.7
12.525 G	± 2.5		± 0.26	12.7
13.025 G	± 2.5		± 0.26	12.7
13.525 G	± 2.5		± 0.26	12.7
14.025 G	± 2.5		± 0.26	12.7
14.525 G	± 2.5		± 0.26	12.7
15.025 G	± 2.5		± 0.26	12.7
15.525 G	± 2.5		± 0.26	12.7
16.025 G	± 2.5		± 0.26	12.7
16.525 G	± 2.5		± 0.26	12.7
17.025 G	± 2.5		± 0.26	12.7
17.525 G	± 2.5		± 0.26	12.7
18.025 G	± 2.5		± 0.27	12.0
18.525 G	± 2.5		± 0.27	12.0
19.025 G	± 2.5		± 0.27	12.0
19.525 G	± 2.5		± 0.27	12.0
20.0 G	± 2.5		± 0.27	12.0

2. Performance Test

RF Output Level Accuracy and Flatness Test

4. Power Sensor: E4413A

Level Accuracy Test (@ Port 1)

Powerlevel [dBm]	Frequency [Hz]	Test limit [dB]	Testresult [dB]	Measurement uncertainty [dB]	TAR
-5	50 M	± 0.65		± 0.13	5.3

Level Flatness Test (@ Port 1) (at -5dBm, relative to 50 MHz reference)

Option 2K5, 4K5

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
300 k	± 1.0		± 0.19	13.2
1 M	± 1.0		± 0.19	13.2
68 M	± 1.0		± 0.15	7.6
68 M + 1	± 1.0		± 0.15	7.6
550 M	± 1.0		± 0.17	6.5
1.05 G	± 1.0		± 0.17	6.5
1.55 G	± 1.0		± 0.17	6.5
2.05 G	± 1.0		± 0.15	7.4
2.55 G	± 1.0		± 0.15	7.4
3.025 G	± 1.0		± 0.16	6.9
3.525 G	± 1.0		± 0.16	6.9
4.025 G	± 1.0		± 0.16	6.9
4.525 G	± 1.0		± 0.16	6.9
5.025 G	± 1.0		± 0.16	6.9
5.525 G	± 1.0		± 0.16	6.9
6.025 G	± 1.0		± 0.18	6.2
6.525 G	± 1.0		± 0.18	6.2
7.025 G	± 1.0		± 0.18	6.2
7.525 G	± 1.0		± 0.18	6.2

Frequency [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
8.025 G	± 1.0		± 0.18	6.1
8.525 G	± 2.5		± 0.21	16.0
9.025 G	± 2.5		± 0.21	16.0
9.525 G	± 2.5		± 0.21	16.0
10.025 G	± 2.5		± 0.20	16.4
10.525 G	± 2.5		± 0.20	16.4
11.025 G	± 2.5		± 0.20	16.4
11.525 G	± 2.5		± 0.20	16.4
12.025 G	± 2.5		± 0.26	12.7
12.525 G	± 2.5		± 0.26	12.7
13.025 G	± 2.5		± 0.26	12.7
13.525 G	± 2.5		± 0.26	12.7
14.025 G	± 2.5		± 0.26	12.7
14.525 G	± 2.5		± 0.26	12.7
15.025 G	± 2.5		± 0.26	12.7
15.525 G	± 2.5		± 0.26	12.7
16.025 G	± 2.5		± 0.26	12.7
16.525 G	± 2.5		± 0.26	12.7
17.025 G	± 2.5		± 0.26	12.7
17.525 G	± 2.5		± 0.26	12.7
18.025 G	± 2.5		± 0.27	12.0
18.525 G	± 2.5		± 0.27	12.0
19.025 G	± 2.5		± 0.27	12.0
19.525 G	± 2.5		± 0.27	12.0
20.0 G	± 2.5		± 0.27	12.0

2. Performance Test

RF Output Level Linearity Test (@ Port1)

1. Power Sensor: E9304A Option H18

CW Frequency: 9 kHz (relative to 0 dBm reference)

Option 230, 240, 280, 430, 440, 480

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.23
-17.5	± 0.75		± 0.23
-15	± 0.75		± 0.23
-12.5	± 0.75		± 0.23
-10	± 0.75		± 0.23
-7.5	± 0.75		± 0.22
-5	± 0.75		± 0.22
-2.5	± 0.75		± 0.22
2.5	± 0.75		± 0.21
5	± 0.75		± 0.21
7.5	± 0.75		± 0.21
10	± 0.75		± 0.21

CW Frequency: 100 kHz (relative to 0 dBm reference)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.23
-17.5	± 0.75		± 0.23
-15	± 0.75		± 0.23
-12.5	± 0.75		± 0.23
-10	± 0.75		± 0.23
-7.5	± 0.75		± 0.22
-5	± 0.75		± 0.22
-2.5	± 0.75		± 0.22
2.5	± 0.75		± 0.21
5	± 0.75		± 0.21
7.5	± 0.75		± 0.21

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
10	± 0.75		± 0.21

CW Frequency: 50 MHz (relative to 0 dBm reference)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.23
-17.5	± 0.75		± 0.23
-15	± 0.75		± 0.23
-12.5	± 0.75		± 0.23
-10	± 0.75		± 0.23
-7.5	± 0.75		± 0.22
-5	± 0.75		± 0.22
-2.5	± 0.75		± 0.22
2.5	± 0.75		± 0.21
5	± 0.75		± 0.21
7.5	± 0.75		± 0.21
10	± 0.75		± 0.21

CW Frequency: 3 GHz (relative to 0 dBm reference)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.23
-17.5	± 0.75		± 0.23
-15	± 0.75		± 0.23
-12.5	± 0.75		± 0.23
-10	± 0.75		± 0.23
-7.5	± 0.75		± 0.22
-5	± 0.75		± 0.22
-2.5	± 0.75		± 0.22
2.5	± 0.75		± 0.21
5	± 0.75		± 0.21

Performance Test
E5071C Performance Test Record

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
7.5	± 0.75		± 0.21
10	± 0.75		± 0.21

CW Frequency: 4.5 GHz (relative to 0 dBm reference)

Option 240, 245, 440, 445

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.23
-17.5	± 0.75		± 0.23
-15	± 0.75		± 0.23
-12.5	± 0.75		± 0.23
-10	± 0.75		± 0.23
-7.5	± 0.75		± 0.23
-5	± 0.75		± 0.23
-2.5	± 0.75		± 0.23
2.5	± 0.75		± 0.23
5	± 0.75		± 0.23
7.5	± 0.75		± 0.23
10	± 0.75		± 0.23

CW Frequency: 5 GHz (relative to 0 dBm reference)

Option 280, 285, 480, 485

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.22
-17.5	± 0.75		± 0.22
-15	± 0.75		± 0.22
-12.5	± 0.75		± 0.22
-10	± 0.75		± 0.22
-7.5	± 0.75		± 0.22
-5	± 0.75		± 0.22

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-2.5	± 0.75		± 0.22
2.5	± 0.75		± 0.21
5	± 0.75		± 0.21
7.5	± 0.75		± 0.21
10	± 0.75		± 0.21

CW Frequency: 6 GHz (relative to 0 dBm reference)

Option 280, 285, 480, 485

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.23
-17.5	± 0.75		± 0.23
-15	± 0.75		± 0.23
-12.5	± 0.75		± 0.23
-10	± 0.75		± 0.23
-7.5	± 0.75		± 0.22
-5	± 0.75		± 0.22
-2.5	± 0.75		± 0.22
2.5	± 0.75		± 0.21
5	± 0.75		± 0.21
7.5	± 0.75		± 0.21
9	± 0.75		± 0.21

CW Frequency: 7 GHz (relative to 0 dBm reference)

Option 280, 285, 480, 485

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.23
-17.5	± 0.75		± 0.23
-15	± 0.75		± 0.23
-12.5	± 0.75		± 0.23

Performance Test
E5071C Performance Test Record

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-10	± 0.75		± 0.23
-7.5	± 0.75		± 0.22
-5	± 0.75		± 0.22
-2.5	± 0.75		± 0.22
2.5	± 0.75		± 0.21
5	± 0.75		± 0.21
7.5	± 0.75		± 0.21
8	± 0.75		± 0.21

CW Frequency: 8.5 GHz (relative to 0 dBm reference)

Option 280, 285, 480, 485

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.23
-17.5	± 0.75		± 0.23
-15	± 0.75		± 0.23
-12.5	± 0.75		± 0.23
-10	± 0.75		± 0.23
-7.5	± 0.75		± 0.22
-5	± 0.75		± 0.22
-2.5	± 0.75		± 0.22
2.5	± 0.75		± 0.21
5	± 0.75		± 0.21
7	± 0.75		± 0.21

RF Output Level Linearity Test (@ Port1)

2. Power Sensor: E9304A Option H19

CW Frequency: 9 kHz (relative to 0 dBm reference)

Option 230, 240, 280, 430, 440, 480

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.24
-17.5	± 0.75		± 0.24
-15	± 0.75		± 0.24
-12.5	± 0.75		± 0.24
-10	± 0.75		± 0.24
-7.5	± 0.75		± 0.23
-5	± 0.75		± 0.23
-2.5	± 0.75		± 0.23
2.5	± 0.75		± 0.22
5	± 0.75		± 0.22
7.5	± 0.75		± 0.22
10	± 0.75		± 0.22

CW Frequency: 100 kHz (relative to 0 dBm reference)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.24
-17.5	± 0.75		± 0.24
-15	± 0.75		± 0.24
-12.5	± 0.75		± 0.24
-10	± 0.75		± 0.24
-7.5	± 0.75		± 0.23
-5	± 0.75		± 0.23
-2.5	± 0.75		± 0.23
2.5	± 0.75		± 0.22
5	± 0.75		± 0.22
7.5	± 0.75		± 0.22

Performance Test
E5071C Performance Test Record

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
10	± 0.75		± 0.22

CW Frequency: 50 MHz (relative to 0 dBm reference)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.24
-17.5	± 0.75		± 0.24
-15	± 0.75		± 0.24
-12.5	± 0.75		± 0.24
-10	± 0.75		± 0.24
-7.5	± 0.75		± 0.23
-5	± 0.75		± 0.23
-2.5	± 0.75		± 0.23
2.5	± 0.75		± 0.22
5	± 0.75		± 0.22
7.5	± 0.75		± 0.22
10	± 0.75		± 0.22

CW Frequency: 3 GHz (relative to 0 dBm reference)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.24
-17.5	± 0.75		± 0.24
-15	± 0.75		± 0.24
-12.5	± 0.75		± 0.24
-10	± 0.75		± 0.24
-7.5	± 0.75		± 0.23
-5	± 0.75		± 0.23
-2.5	± 0.75		± 0.23
2.5	± 0.75		± 0.22
5	± 0.75		± 0.22

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
7.5	± 0.75		± 0.22
10	± 0.75		± 0.22

CW Frequency: 4.5 GHz (relative to 0 dBm reference)

Option 240, 245, 440, 445

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.24
-17.5	± 0.75		± 0.24
-15	± 0.75		± 0.24
-12.5	± 0.75		± 0.24
-10	± 0.75		± 0.24
-7.5	± 0.75		± 0.24
-5	± 0.75		± 0.24
-2.5	± 0.75		± 0.24
2.5	± 0.75		± 0.24
5	± 0.75		± 0.24
7.5	± 0.75		± 0.24
10	± 0.75		± 0.24

CW Frequency: 5 GHz (relative to 0 dBm reference)

Option 280, 285, 480, 485

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.24
-17.5	± 0.75		± 0.24
-15	± 0.75		± 0.24
-12.5	± 0.75		± 0.24
-10	± 0.75		± 0.24
-7.5	± 0.75		± 0.24
-5	± 0.75		± 0.24

Performance Test
E5071C Performance Test Record

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-2.5	± 0.75		± 0.24
2.5	± 0.75		± 0.23
5	± 0.75		± 0.23
7.5	± 0.75		± 0.23
10	± 0.75		± 0.23

CW Frequency: 6 GHz (relative to 0 dBm reference)

Option 280, 285, 480, 485

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.24
-17.5	± 0.75		± 0.24
-15	± 0.75		± 0.24
-12.5	± 0.75		± 0.24
-10	± 0.75		± 0.24
-7.5	± 0.75		± 0.24
-5	± 0.75		± 0.24
-2.5	± 0.75		± 0.24
2.5	± 0.75		± 0.23
5	± 0.75		± 0.23
7.5	± 0.75		± 0.23
9	± 0.75		± 0.23

CW Frequency: 7 GHz (relative to 0 dBm reference)

Option 280, 285, 480, 485

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.24
-17.5	± 0.75		± 0.24
-15	± 0.75		± 0.24
-12.5	± 0.75		± 0.24

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-10	± 0.75		± 0.24
-7.5	± 0.75		± 0.24
-5	± 0.75		± 0.24
-2.5	± 0.75		± 0.24
2.5	± 0.75		± 0.23
5	± 0.75		± 0.23
7.5	± 0.75		± 0.23
8	± 0.75		± 0.23

CW Frequency: 8.5 GHz (relative to 0 dBm reference)

Option 280, 285, 480, 485

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-20	± 0.75		± 0.24
-17.5	± 0.75		± 0.24
-15	± 0.75		± 0.24
-12.5	± 0.75		± 0.24
-10	± 0.75		± 0.24
-7.5	± 0.75		± 0.24
-5	± 0.75		± 0.24
-2.5	± 0.75		± 0.24
2.5	± 0.75		± 0.23
5	± 0.75		± 0.23
7	± 0.75		± 0.23

RF Output Level Linearity Test (@ Port1)

3. Power Sensor: 8482A

CW Frequency: 300 kHz (relative to 0 dBm reference)

Option 2K5, 4K5

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
-25	± 0.75		± 0.23	3.5
-22.5	± 0.75		± 0.23	3.5
-20	± 0.75		± 0.23	3.5
-17.5	± 0.75		± 0.23	3.5
-15	± 0.75		± 0.23	3.5
-12.5	± 0.75		± 0.23	3.5
-10	± 0.75		± 0.23	3.5
-7.5	± 0.75		± 0.23	3.5
-2.5	± 0.75		± 0.23	3.5
0	± 0.75		± 0.23	3.5
2.5	± 0.75		± 0.23	3.5
5	± 0.75		± 0.23	3.5
7.5	± 0.75		± 0.23	3.5
8	± 0.75		± 0.23	3.5

CW Frequency: 1 MHz (relative to 0 dBm reference)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
-25	± 0.75		± 0.23	3.5
-22.5	± 0.75		± 0.23	3.5
-20	± 0.75		± 0.23	3.5
-17.5	± 0.75		± 0.23	3.5
-15	± 0.75		± 0.23	3.5
-12.5	± 0.75		± 0.23	3.5
-10	± 0.75		± 0.23	3.5
-7.5	± 0.75		± 0.23	3.5
-2.5	± 0.75		± 0.23	3.5

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
0	± 0.75		± 0.23	3.5
2.5	± 0.75		± 0.23	3.5
5	± 0.75		± 0.23	3.5
7.5	± 0.75		± 0.23	3.5
10	± 0.75		± 0.23	3.5

CW Frequency: 50 MHz (relative to 0 dBm reference)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
-25	± 0.75		± 0.22	3.6
-22.5	± 0.75		± 0.22	3.6
-20	± 0.75		± 0.22	3.6
-17.5	± 0.75		± 0.22	3.6
-15	± 0.75		± 0.22	3.6
-12.5	± 0.75		± 0.22	3.6
-10	± 0.75		± 0.22	3.6
-7.5	± 0.75		± 0.22	3.6
-2.5	± 0.75		± 0.22	3.6
0	± 0.75		± 0.22	3.6
2.5	± 0.75		± 0.22	3.6
5	± 0.75		± 0.22	3.6
7.5	± 0.75		± 0.22	3.6
10	± 0.75		± 0.22	3.6

CW Frequency: 3 GHz (relative to 0 dBm reference)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
-25	± 0.75		± 0.25	3.2
-22.5	± 0.75		± 0.25	3.2
-20	± 0.75		± 0.25	3.2
-17.5	± 0.75		± 0.25	3.2

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Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
-15	± 0.75		± 0.25	3.2
-12.5	± 0.75		± 0.25	3.2
-10	± 0.75		± 0.25	3.2
-7.5	± 0.75		± 0.25	3.2
-2.5	± 0.75		± 0.25	3.2
0	± 0.75		± 0.25	3.2
2.5	± 0.75		± 0.25	3.2
5	± 0.75		± 0.25	3.2
7.5	± 0.75		± 0.25	3.2
10	± 0.75		± 0.25	3.2

CW Frequency: 6 GHz (relative to 0 dBm reference)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
-25	± 0.75		± 0.25	3.2
-22.5	± 0.75		± 0.25	3.2
-20	± 0.75		± 0.25	3.2
-17.5	± 0.75		± 0.25	3.2
-15	± 0.75		± 0.25	3.2
-12.5	± 0.75		± 0.25	3.2
-10	± 0.75		± 0.25	3.2
-7.5	± 0.75		± 0.25	3.2
-2.5	± 0.75		± 0.25	3.2
0	± 0.75		± 0.25	3.2
2.5	± 0.75		± 0.25	3.2
5	± 0.75		± 0.25	3.2
7.5	± 0.75		± 0.25	3.2
10	± 0.75		± 0.25	3.2

CW Frequency: 8 GHz (relative to 0 dBm reference)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
-25	± 0.75		± 0.25	3.2
-22.5	± 0.75		± 0.25	3.2
-20	± 0.75		± 0.25	3.2
-17.5	± 0.75		± 0.25	3.2
-15	± 0.75		± 0.25	3.2
-12.5	± 0.75		± 0.25	3.2
-10	± 0.75		± 0.25	3.2
-7.5	± 0.75		± 0.25	3.2
-2.5	± 0.75		± 0.25	3.2
0	± 0.75		± 0.25	3.2
2.5	± 0.75		± 0.25	3.2
5	± 0.75		± 0.25	3.2
7.5	± 0.75		± 0.25	3.2
9	± 0.75		± 0.25	3.2

CW Frequency: 10.5 GHz (relative to 0 dBm reference)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
-25	± 0.75		± 0.25	3.2
-22.5	± 0.75		± 0.25	3.2
-20	± 0.75		± 0.25	3.2
-17.5	± 0.75		± 0.25	3.2
-15	± 0.75		± 0.25	3.2
-12.5	± 0.75		± 0.25	3.2
-10	± 0.75		± 0.25	3.2
-7.5	± 0.75		± 0.25	3.2
-2.5	± 0.75		± 0.25	3.2
0	± 0.75		± 0.25	3.2
2.5	± 0.75		± 0.25	3.2
5	± 0.75		± 0.25	3.2

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Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
7	± 0.75		± 0.25	3.2

CW Frequency: 15 GHz (relative to 0 dBm reference)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
-25	± 0.75		± 0.25	3.2
-22.5	± 0.75		± 0.25	3.2
-20	± 0.75		± 0.25	3.2
-17.5	± 0.75		± 0.25	3.2
-15	± 0.75		± 0.25	3.2
-12.5	± 0.75		± 0.25	3.2
-10	± 0.75		± 0.25	3.2
-7.5	± 0.75		± 0.25	3.2
-2.5	± 0.75		± 0.25	3.2
0	± 0.75		± 0.25	3.2
2.5	± 0.75		± 0.25	3.2
3	± 0.75		± 0.25	3.2

CW Frequency: 20 GHz (relative to 0 dBm reference)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
-25	± 0.75		± 0.25	3.2
-22.5	± 0.75		± 0.25	3.2
-20	± 0.75		± 0.25	3.2
-17.5	± 0.75		± 0.25	3.2
-15	± 0.75		± 0.25	3.2
-12.5	± 0.75		± 0.25	3.2
-10	± 0.75		± 0.25	3.2
-7.5	± 0.75		± 0.25	3.2
-2.5	± 0.75		± 0.25	3.2
0	± 0.75		± 0.25	3.2

Trace Noise Test

Option 230

Direction: S11 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S11 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S22 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S22 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S21 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009

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Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S21 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S12 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S12 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Option 235

Direction: S11 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S11 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S22 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S22 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S21 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S21 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S12 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

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Direction: S12 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Option 240

Direction: S11 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S11 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.05		0.0023

Direction: S22 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S22 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.05		0.0023

Direction: S21 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S21 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.05		0.0023

Direction: S12 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S12 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006

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Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
10 M - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.05		0.0023

Option 245

Direction: S11 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S11 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.05		0.0023

Direction: S22 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S22 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.05		0.0023

Direction: S21 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S21 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.05		0.0023

Direction: S12 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S12 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.050		0.0023

Option 280

Direction: S11 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

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Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S11 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S22 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S22 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S21 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S21 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S12 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S12 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001

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Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Option 285

Direction: S11 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S11 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
10 M - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S22 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S22 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.004
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertaintiy [deg]
4.38 G - 8.5 G	70 k	< 0.05		0.007

Direction: S21 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S21 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertaintiy [deg]
100 k - 10 M	3 k	< 0.02		0.004
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.007

Direction: S12 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S12 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertaintiy [deg]
100 k - 10 M	3 k	< 0.02		0.004
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.007

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Option 2K5

Direction: S11 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
300 k - 1 M	3 k	< 0.006		0.00011
1 M - 10 M	3 k	< 0.003		0.00016
10 M - 4.38 G	70 k	< 0.004		0.00007
4.38 G - 8.5G	70 k	< 0.006		0.00021
8.5 G - 13.137 G	70 k	< 0.009		0.00074
13.137 G - 17 G	70 k	< 0.013		0.00219
17 G - 20 G	70 k	< 0.023		0.00151

Direction: S11 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [deg]
300 k - 1 M	3 k	< 0.040		0.0008
1 M - 10 M	3 k	< 0.020		0.0007
10 M - 4.38 G	70 k	< 0.035		0.0019
4.38 G - 8.5G	70 k	< 0.050		0.0047
8.5 G - 13.137 G	70 k	< 0.064		0.0060
13.137 G - 17 G	70 k	< 0.095		0.0234
17 G - 20 G	70 k	< 0.165		0.0155

Direction: S22 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
300 k - 1 M	3 k	< 0.006		0.00011
1 M - 10 M	3 k	< 0.003		0.00016
10 M - 4.38 G	70 k	< 0.004		0.00007
4.38 G - 8.5G	70 k	< 0.006		0.00021
8.5 G - 13.137 G	70 k	< 0.009		0.00074
13.137 G - 17 G	70 k	< 0.013		0.00219
17 G - 20 G	70 k	< 0.023		0.00151

Direction: S22 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [deg]
300 k - 1 M	3 k	< 0.040		0.0008
1 M - 10 M	3 k	< 0.020		0.0007
10 M - 4.38 G	70 k	< 0.035		0.0019
4.38 G - 8.5G	70 k	< 0.050		0.0047
8.5 G - 13.137 G	70 k	< 0.064		0.0060
13.137 G - 17 G	70 k	< 0.095		0.0234
17 G - 20 G	70 k	< 0.165		0.0155

Direction: S21 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
300 k - 1 M	3 k	< 0.006		0.00011
1 M - 10 M	3 k	< 0.003		0.00016
10 M - 4.38 G	70 k	< 0.004		0.00007
4.38 G - 8.5G	70 k	< 0.006		0.00021
8.5 G - 13.137 G	70 k	< 0.009		0.00074
13.137 G - 17 G	70 k	< 0.013		0.00219
17 G - 20 G	70 k	< 0.023		0.00151

Direction: S21 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [deg]
300 k - 1 M	3 k	< 0.040		0.0008
1 M - 10 M	3 k	< 0.020		0.0007
10 M - 4.38 G	70 k	< 0.035		0.0019
4.38 G - 8.5G	70 k	< 0.050		0.0047
8.5 G - 13.137 G	70 k	< 0.064		0.0060
13.137 G - 17 G	70 k	< 0.095		0.0234
17 G - 20 G	70 k	< 0.165		0.0155

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Direction: S12 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
300 k - 1 M	3 k	< 0.006		0.00011
1 M - 10 M	3 k	< 0.003		0.00016
10 M - 4.38 G	70 k	< 0.004		0.00007
4.38 G - 8.5G	70 k	< 0.006		0.00021
8.5 G - 13.137 G	70 k	< 0.009		0.00074
13.137 G - 17 G	70 k	< 0.013		0.00219
17 G - 20 G	70 k	< 0.023		0.00151

Direction: S12 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [deg]
300 k - 1 M	3 k	< 0.040		0.0008
1 M - 10 M	3 k	< 0.020		0.0007
10 M - 4.38 G	70 k	< 0.035		0.0019
4.38 G - 8.5G	70 k	< 0.050		0.0047
8.5 G - 13.137 G	70 k	< 0.064		0.0060
13.137 G - 17 G	70 k	< 0.095		0.0234
17 G - 20 G	70 k	< 0.165		0.0155

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Direction: S11 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S11 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S22 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S22 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S33 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S33 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

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Direction: S44 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S44 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S21 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S21 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S12 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S12 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S43 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S43 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S34 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S34 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

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Direction: S11 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S11 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S22 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S22 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S33 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S33 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
10 M - 3 G	70 k	< 0.035		0.001

Direction: S44 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S44 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S21 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S21 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S12 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

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Direction: S12 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S43 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S43 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Direction: S34 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033

Direction: S34 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

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Direction: S11 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S11 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.050		0.0023

Direction: S22 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S22 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.050		0.0023

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Direction: S33 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S33 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.050		0.0023

Direction: S44 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S44 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertaintiy [deg]
4.38 G - 4.5 G	70 k	< 0.050		0.0023

Direction: S21 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S21 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertaintiy [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.050		0.0023

Direction: S12 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S12 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertaintiy [deg]
9 k - 30 k	3 k	< 0.035		0.00077

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Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.050		0.0023

Direction: S43 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S43 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.050		0.0023

Direction: S34 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S34 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.050		0.0023

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Direction: S11 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S11 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.050		0.0023

Direction: S22 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

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Direction: S22 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.050		0.0023

Direction: S33 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S33 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.050		0.0023

Direction: S44 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S44 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.050		0.0023

Direction: S21 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S21 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.050		0.0023

Direction: S12 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

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Direction: S12 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.050		0.0023

Direction: S43 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S43 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.050		0.0023

Direction: S34 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 4.5 G	70 k	< 0.006		0.00023

Direction: S34 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 4.5 G	70 k	< 0.050		0.0023

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Direction: S11 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S11 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S22 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033

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Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S22 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S33 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S33 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S44 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S44 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S21 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S21 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

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Direction: S12 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S12 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S43 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S43 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S34 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
9 k - 30 k	3 k	< 0.004		0.00009
30 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S34 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
9 k - 30 k	3 k	< 0.035		0.00077
30 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

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Direction: S11 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S11 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006

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Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S22 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S22 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S33 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S33 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertaintiy [deg]
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S44 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S44 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertaintiy [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S21 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S21 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertaintiy [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001

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Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S12 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S12 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S43 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S43 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

Direction: S34 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
100 k - 10 M	3 k	< 0.003		0.00009
10 M - 3 G	70 k	< 0.004		0.00033
3 G - 4.38 G	70 k	< 0.004		0.00033
4.38 G - 8.5 G	70 k	< 0.006		0.00023

Direction: S34 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [deg rms]	Test result [deg rms]	Measurement Uncertainty [deg]
100 k - 10 M	3 k	< 0.02		0.0006
10 M - 3 G	70 k	< 0.035		0.001
3 G - 4.38 G	70 k	< 0.035		0.001
4.38 G - 8.5 G	70 k	< 0.05		0.0023

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Direction: S11 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
300 k - 1 M	3 k	< 0.006		0.00011
1 M - 10 M	3 k	< 0.003		0.00016
10 M - 4.38 G	70 k	< 0.004		0.00007
4.38 G - 8.5G	70 k	< 0.006		0.00021
8.5 G - 13.137 G	70 k	< 0.009		0.00074
13.137 G - 17 G	70 k	< 0.013		0.00219
17 G - 20 G	70 k	< 0.023		0.00151

Direction: S11 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [deg]
300 k - 1 M	3 k	< 0.040		0.0008
1M - 10 M	3 k	< 0.020		0.0007
10 M - 4.38 G	70 k	< 0.035		0.0019

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Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [deg]
4.38 G - 8.5G	70 k	< 0.050		0.0047
8.5 G - 13.137 G	70 k	< 0.064		0.0060
13.137 G - 17 G	70 k	< 0.095		0.0234
17 G - 20 G	70 k	< 0.165		0.0155

Direction: S22 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
300 k - 1 M	3 k	< 0.006		0.00011
1 M - 10 M	3 k	< 0.003		0.00016
10 M - 4.38 G	70 k	< 0.004		0.00007
4.38 G - 8.5G	70 k	< 0.006		0.00021
8.5 G - 13.137 G	70 k	< 0.009		0.00074
13.137 G - 17 G	70 k	< 0.013		0.00219
17 G - 20 G	70 k	< 0.023		0.00151

Direction: S22 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [deg]
300 k - 1 M	3 k	< 0.040		0.0008
1M - 10 M	3 k	< 0.020		0.0007
10 M - 4.38 G	70 k	< 0.035		0.0019
4.38 G - 8.5G	70 k	< 0.050		0.0047
8.5 G - 13.137 G	70 k	< 0.064		0.0060
13.137 G - 17 G	70 k	< 0.095		0.0234
17 G - 20 G	70 k	< 0.165		0.0155

Direction: S33 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
300 k - 1 M	3 k	< 0.006		0.00011
1 M - 10 M	3 k	< 0.003		0.00016

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
10 M - 4.38 G	70 k	< 0.004		0.00007
4.38 G - 8.5G	70 k	< 0.006		0.00021
8.5 G - 13.137 G	70 k	< 0.009		0.00074
13.137 G - 17 G	70 k	< 0.013		0.00219
17 G - 20 G	70 k	< 0.023		0.00151

Direction: S33 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [deg]
300 k - 1 M	3 k	< 0.040		0.0008
1M - 10 M	3 k	< 0.020		0.0007
10 M - 4.38 G	70 k	< 0.035		0.0019
4.38 G - 8.5G	70 k	< 0.050		0.0047
8.5 G - 13.137 G	70 k	< 0.064		0.0060
13.137 G - 17 G	70 k	< 0.095		0.0234
17 G - 20 G	70 k	< 0.165		0.0155

Direction: S44 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
300 k - 1 M	3 k	< 0.006		0.00011
1 M - 10 M	3 k	< 0.003		0.00016
10 M - 4.38 G	70 k	< 0.004		0.00007
4.38 G - 8.5G	70 k	< 0.006		0.00021
8.5 G - 13.137 G	70 k	< 0.009		0.00074
13.137 G - 17 G	70 k	< 0.013		0.00219
17 G - 20 G	70 k	< 0.023		0.00151

Direction: S44 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [deg]
300 k - 1 M	3 k	< 0.040		0.0008

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Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [deg]
1M - 10 M	3 k	< 0.020		0.0007
10 M - 4.38 G	70 k	< 0.035		0.0019
4.38 G - 8.5G	70 k	< 0.050		0.0047
8.5 G - 13.137 G	70 k	< 0.064		0.0060
13.137 G - 17 G	70 k	< 0.095		0.0234
17 G - 20 G	70 k	< 0.165		0.0155

Direction: S21 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
300 k - 1 M	3 k	< 0.006		0.00011
1 M - 10 M	3 k	< 0.003		0.00016
10 M - 4.38 G	70 k	< 0.004		0.00007
4.38 G - 8.5G	70 k	< 0.006		0.00021
8.5 G - 13.137 G	70 k	< 0.009		0.00074
13.137 G - 17 G	70 k	< 0.013		0.00219
17 G - 20 G	70 k	< 0.023		0.00151

Direction: S21 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [deg]
300 k - 1 M	3 k	< 0.040		0.0008
1M - 10 M	3 k	< 0.020		0.0007
10 M - 4.38 G	70 k	< 0.035		0.0019
4.38 G - 8.5G	70 k	< 0.050		0.0047
8.5 G - 13.137 G	70 k	< 0.064		0.0060
13.137 G - 17 G	70 k	< 0.095		0.0234
17 G - 20 G	70 k	< 0.165		0.0155

Direction: S12 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
300 k - 1 M	3 k	< 0.006		0.00011
1 M - 10 M	3 k	< 0.003		0.00016
10 M - 4.38 G	70 k	< 0.004		0.00007
4.38 G - 8.5G	70 k	< 0.006		0.00021
8.5 G - 13.137 G	70 k	< 0.009		0.00074
13.137 G - 17 G	70 k	< 0.013		0.00219
17 G - 20 G	70 k	< 0.023		0.00151

Direction: S12 (Phase)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [deg]
300 k - 1 M	3 k	< 0.040		0.0008
1M - 10 M	3 k	< 0.020		0.0007
10 M - 4.38 G	70 k	< 0.035		0.0019
4.38 G - 8.5G	70 k	< 0.050		0.0047
8.5 G - 13.137 G	70 k	< 0.064		0.0060
13.137 G - 17 G	70 k	< 0.095		0.0234
17 G - 20 G	70 k	< 0.165		0.0155

Direction: S43 (Magnitude)

Frequency Range[Hz]	IF bandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
300 k - 1 M	3 k	< 0.006		0.00011
1 M - 10 M	3 k	< 0.003		0.00016
10 M - 4.38 G	70 k	< 0.004		0.00007
4.38 G - 8.5G	70 k	< 0.006		0.00021
8.5 G - 13.137 G	70 k	< 0.009		0.00074
13.137 G - 17 G	70 k	< 0.013		0.00219
17 G - 20 G	70 k	< 0.023		0.00151

Performance Test
E5071C Performance Test Record

Direction: S43 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [deg]
300 k - 1 M	3 k	< 0.040		0.0008
1M - 10 M	3 k	< 0.020		0.0007
10 M - 4.38 G	70 k	< 0.035		0.0019
4.38 G - 8.5G	70 k	< 0.050		0.0047
8.5 G - 13.137 G	70 k	< 0.064		0.0060
13.137 G - 17 G	70 k	< 0.095		0.0234
17 G - 20 G	70 k	< 0.165		0.0155

Direction: S34 (Magnitude)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [dB]
300 k - 1 M	3 k	< 0.006		0.00011
1 M - 10 M	3 k	< 0.003		0.00016
10 M - 4.38 G	70 k	< 0.004		0.00007
4.38 G - 8.5G	70 k	< 0.006		0.00021
8.5 G - 13.137 G	70 k	< 0.009		0.00074
13.137 G - 17 G	70 k	< 0.013		0.00219
17 G - 20 G	70 k	< 0.023		0.00151

Direction: S34 (Phase)

Frequency Range[Hz]	IFbandwidth [Hz]	Test limit [dB rms]	Test result [dB rms]	Measurement uncertainty [deg]
300 k - 1 M	3 k	< 0.040		0.0008
1M - 10 M	3 k	< 0.020		0.0007
10 M - 4.38 G	70 k	< 0.035		0.0019
4.38 G - 8.5G	70 k	< 0.050		0.0047
8.5 G - 13.137 G	70 k	< 0.064		0.0060
13.137 G - 17 G	70 k	< 0.095		0.0234
17 G - 20 G	70 k	< 0.165		0.0155

Crosstalk Test

Option 230

Direction: S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95

Direction: S12

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95

Option 235

Direction: S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95

Direction: S12

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95

Performance Test
E5071C Performance Test Record

Option 240

Direction: S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 4.5 G	10	< -110		3.32

Direction: S12

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 4.5 G	10	< -110		3.32

Option 245

Direction: S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 4.5 G	10	< -110		3.32

Direction: S12

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
3 G - 4.5 G	10	< -110		3.32

Option 280

Direction: S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 5 G	10	< -110		3.32
5 G - 6G	10	< -110		3.33
6 G - 7 G	10	< -100		2.41
7 G - 8.5 G	10	< -100		2.41

Direction: S12

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 5 G	10	< -110		3.32
5 G - 6G	10	< -110		3.33
6 G - 7 G	10	< -100		2.41
7 G - 8.5 G	10	< -100		2.41

Option 285

Direction: S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73

Performance Test
E5071C Performance Test Record

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 5 G	10	< -110		3.32
5 G - 6G	10	< -110		3.33
6 G - 7 G	10	< -100		2.41
7 G - 8.5 G	10	< -100		2.41

Direction: S12

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 5 G	10	< -110		3.32
5 G - 6G	10	< -110		3.33
6 G - 7 G	10	< -100		2.41
7 G - 8.5 G	10	< -100		2.41

Option 2K5

Direction: S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
300 k - 1 M	10	< -68		0.10
1 M - 5 M	10	< -70		0.20
5 M - 10 M	10	< -100		0.50
10 M - 45 M	10	< -110		1.30
45 M - 4 G	10	< -118		2.50
4 G - 6 G	10	< -123		3.30
6 G - 8.5 G	10	< -120		3.30
8.5 G - 15 G	10	< -115		2.10
15 G - 20 G	10	< -110		2.20

Direction: S12

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
300 k - 1 M	10	< -68		0.10
1 M - 5 M	10	< -70		0.20
5 M - 10 M	10	< -100		0.50
10 M - 45 M	10	< -110		1.30
45 M - 4 G	10	< -118		2.50
4 G - 6 G	10	< -123		3.30
6 G - 8.5 G	10	< -120		3.30
8.5 G - 15 G	10	< -115		2.10
15 G - 20 G	10	< -110		2.20

Option 430

Direction: S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95

Direction: S32

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95

Direction: S43

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73

Performance Test
E5071C Performance Test Record

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95

Direction: S14

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95

Option 435

Direction: S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95

Direction: S32

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95

Direction: S43

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95

Direction: S14

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95

Option 440

Direction: S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 4.5 G	10	< -110		3.32

Direction: S32

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 4.5 G	10	< -110		3.32

Direction: S43

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 4.5 G	10	< -110		3.32

Performance Test
E5071C Performance Test Record

Direction: S14

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 4.5 G	10	< -110		3.32

Option 445

Direction: S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 4.5 G	10	< -110		3.32

Direction: S32

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 4.5 G	10	< -110		3.32

Direction: S43

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 4.5 G	10	< -110		3.32

Direction: S14

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 4.5 G	10	< -110		3.32

Option 480

Direction: S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 5 G	10	< -110		3.32
5 G - 6G	10	< -110		3.33
6 G - 7 G	10	< -100		2.41
7 G - 8.5 G	10	< -100		2.41

Direction: S32

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 5 G	10	< -110		3.32
5 G - 6G	10	< -110		3.33
6 G - 7 G	10	< -100		2.41
7 G - 8.5 G	10	< -100		2.41

Performance Test
E5071C Performance Test Record

Direction: S43

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 5 G	10	< -110		3.63
5 G - 6G	10	< -110		3.59
6 G - 7 G	10	< -100		2.61
7 G - 8.5 G	10	< -100		2.57

Direction: S14

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -100		1.73
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 5 G	10	< -110		3.32
5 G - 6G	10	< -110		3.33
6 G - 7 G	10	< -100		2.41
7 G - 8.5 G	10	< -100		2.41

Option 485

Direction: S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 5 G	10	< -110		3.32
5 G - 6G	10	< -110		3.33

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
6 G - 7 G	10	< -100		2.41
7 G - 8.5 G	10	< -100		2.41

Direction: S32

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 5 G	10	< -110		3.32
5 G - 6G	10	< -110		3.33
6 G - 7 G	10	< -100		2.41
7 G - 8.5 G	10	< -100		2.41

Direction: S43

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 5 G	10	< -110		3.32
5 G - 6G	10	< -110		3.33
6 G - 7 G	10	< -100		2.41
7 G - 8.5 G	10	< -100		2.41

Direction: S14

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -100		1.73
300 k - 10 M	10	< -110		3.63
10 M - 3 G	10	< -120		4.95
3 G - 5 G	10	< -110		3.32

Performance Test
E5071C Performance Test Record

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
5 G - 6G	10	< -110		3.33
6 G - 7 G	10	< -100		2.41
7 G - 8.5 G	10	< -100		2.41

Option 4K5

Direction: S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
300 k - 1 M	10	< -68		0.10
1 M - 5 M	10	< -70		0.20
5 M - 10 M	10	< -100		0.50
10 M - 45 M	10	< -110		1.30
45 M - 4 G	10	< -118		2.50
4 G - 6 G	10	< -123		3.30
6 G - 8.5 G	10	< -120		3.30
8.5 G - 15 G	10	< -115		2.10
15 G - 20 G	10	< -110		2.20

Direction: S32

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
300 k - 1 M	10	< -68		0.10
1 M - 5 M	10	< -70		0.20
5 M - 10 M	10	< -100		0.50
10 M - 45 M	10	< -110		1.30
45 M - 4 G	10	< -118		2.50
4 G - 6 G	10	< -123		3.30
6 G - 8.5 G	10	< -120		3.30
8.5 G - 15 G	10	< -115		2.10
15 G - 20 G	10	< -110		2.20

Direction: S43

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
300 k - 1 M	10	< -68		0.10
1 M - 5 M	10	< -70		0.20
5 M - 10 M	10	< -100		0.50
10 M - 45 M	10	< -110		1.30
45 M - 4 G	10	< -118		2.50
4 G - 6 G	10	< -123		3.30
6 G - 8.5 G	10	< -120		3.30
8.5 G - 15 G	10	< -115		2.10
15 G - 20 G	10	< -110		2.20

Direction: S14

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
300 k - 1 M	10	< -68		0.10
1 M - 5 M	10	< -70		0.20
5 M - 10 M	10	< -100		0.50
10 M - 45 M	10	< -110		1.30
45 M - 4 G	10	< -118		2.50
4 G - 6 G	10	< -123		3.30
6 G - 8.5 G	10	< -120		3.30
8.5 G - 15 G	10	< -115		2.10
15 G - 20 G	10	< -110		2.20

System Dynamic Range Test

Option 230

Direction S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08

Direction S12

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08

Option 235

Direction S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08

Direction S12

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08

Option 240

Direction S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 4.5 G	10	< -123		1.24
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 4.5 G	3 k	< -98		1.08

Performance Test
E5071C Performance Test Record

Direction S12

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 4.5 G	10	< -123		1.24
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 4.5 G	3 k	< -98		1.08

Option 245

Direction S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 4.5 G	10	< -123		1.24
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 4.5 G	3 k	< -98		1.08

Direction S12

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
3 G - 4.5 G	10	< -123		1.24
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 4.5 G	3 k	< -98		1.08

Option 280

Direction S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 5 G	10	< -123		1.24
5 G - 6 G	10	< -123		1.16
6 G - 7 G	10	< -117		1.08
7 G - 8.5 G	10	< -117		1.13
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 5 G	3 k	< -98		1.08
5 G - 6 G	3 k	< -98		1.08
6 G - 7 G	3 k	< -92		1.10
7 G - 8.5 G	3 k	< -92		1.10

Direction S12

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52

Performance Test
E5071C Performance Test Record

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 5 G	10	< -123		1.24
5 G - 6 G	10	< -123		1.16
6 G - 7 G	10	< -117		1.08
7 G - 8.5 G	10	< -117		1.13
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 5 G	3 k	< -98		1.08
5 G - 6 G	3 k	< -98		1.08
6 G - 7 G	3 k	< -92		1.10
7 G - 8.5 G	3 k	< -92		1.10

Option 285

Direction S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 5 G	10	< -123		1.24
5 G - 6 G	10	< -123		1.16
6 G - 7 G	10	< -117		1.08
7 G - 8.5 G	10	< -117		1.13
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 5 G	3 k	< -98		1.08

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
5 G - 6 G	3 k	< -98		1.08
6 G - 7 G	3 k	< -92		1.10
7 G - 8.5 G	3 k	< -92		1.10

Direction S12

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 5 G	10	< -123		1.24
5 G - 6 G	10	< -123		1.16
6 G - 7 G	10	< -117		1.08
7 G - 8.5 G	10	< -117		1.13
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 5 G	3 k	< -98		1.08
5 G - 6 G	3 k	< -98		1.08
6 G - 7 G	3 k	< -92		1.10
7 G - 8.5 G	3 k	< -92		1.10

Option 2K5

Direction S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
300 k - 1 M	10	< -100		1.07
1 M - 10 M	10	< -107		1.39
10 M - 100 M	10	< -120		2.92
100 M - 6 G	10	< -123		3.35
6 G - 8.5 G	10	< -117		2.93

Performance Test
E5071C Performance Test Record

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
8.5 G - 10.5 G	10	< -107		1.48
10.5 G - 15 G	10	< -103		1.40
15 G - 20 G	10	< -100		1.34
300 k - 1 M	3 k	< -75		1.01
1 M - 10 M	3 k	< -82		1.02
10 M - 100 M	3 k	< -95		1.05
100 M - 6 G	3 k	< -98		1.08
6 G - 8.5 G	3 k	< -92		1.08
8.5 G - 10.5 G	3 k	< -85		1.04
10.5 G - 15 G	3 k	< -82		1.04
15 G - 20 G	3 k	< -75		1.04

Direction S12

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
300 k - 1 M	10	< -100		1.07
1 M - 10 M	10	< -107		1.39
10 M - 100 M	10	< -120		2.92
100 M - 6 G	10	< -123		3.35
6 G - 8.5 G	10	< -117		2.93
8.5 G - 10.5 G	10	< -107		1.48
10.5 G - 15 G	10	< -103		1.40
15 G - 20 G	10	< -100		1.34
300 k - 1 M	3 k	< -75		1.01
1 M - 10 M	3 k	< -82		1.02
10 M - 100 M	3 k	< -95		1.05
100 M - 6 G	3 k	< -98		1.08
6 G - 8.5 G	3 k	< -92		1.08
8.5 G - 10.5 G	3 k	< -85		1.04
10.5 G - 15 G	3 k	< -82		1.04

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
15 G - 20 G	3 k	< -75		1.04

Option 430

Direction S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08

Direction S32

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08

Direction S43

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52
100 k - 300 k	10	< -97		1.52

Performance Test
E5071C Performance Test Record

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08

Direction S14

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08

Option 435

Direction S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08

Direction S32

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08

Direction S43

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08

Direction S14

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08

Performance Test
E5071C Performance Test Record

Option 440

Direction S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 4.5 G	10	< -123		1.24
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 4.5 G	3 k	< -98		1.08

Direction S32

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 4.5 G	10	< -123		1.24
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 4.5 G	3 k	< -98		1.08

Direction S43

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 4.5 G	10	< -123		1.24
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 4.5 G	3 k	< -98		1.08

Direction S14

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 4.5 G	10	< -123		1.24
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 4.5 G	3 k	< -98		1.08

Option 445

Direction S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24

Performance Test
E5071C Performance Test Record

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
3 G - 4.5 G	10	< -123		1.24
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 4.5 G	3 k	< -98		1.08

Direction S32

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 4.5 G	10	< -123		1.24
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 4.5 G	3 k	< -98		1.08

Direction S43

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 4.5 G	10	< -123		1.24
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 4.5 G	3 k	< -98		1.08

Direction S14

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 4.5 G	10	< -123		1.24
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 4.5 G	3 k	< -98		1.08

Option 480

Direction S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 5 G	10	< -123		1.24
5 G - 6 G	10	< -123		1.16
6 G - 7 G	10	< -117		1.08
7 G - 8.5 G	10	< -117		1.13
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 5 G	3 k	< -98		1.08
5 G - 6 G	3 k	< -98		1.08
6 G - 7 G	3 k	< -92		1.10
7 G - 8.5 G	3 k	< -92		1.10

Performance Test
E5071C Performance Test Record

Direction S32

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 5 G	10	< -123		1.24
5 G - 6 G	10	< -123		1.16
6 G - 7 G	10	< -117		1.08
7 G - 8.5 G	10	< -117		1.13
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 5 G	3 k	< -98		1.08
5 G - 6 G	3 k	< -98		1.08
6 G - 7 G	3 k	< -92		1.10
7 G - 8.5 G	3 k	< -92		1.10

Direction S43

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 5 G	10	< -123		1.24
5 G - 6 G	10	< -123		1.16
6 G - 7 G	10	< -117		1.08
7 G - 8.5 G	10	< -117		1.13
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 5 G	3 k	< -98		1.08
5 G - 6 G	3 k	< -98		1.08
6 G - 7 G	3 k	< -92		1.10
7 G - 8.5 G	3 k	< -92		1.10

Direction S14

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
9 k - 100 k	10	< -97		1.52
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 5 G	10	< -123		1.24
5 G - 6 G	10	< -123		1.16
6 G - 7 G	10	< -117		1.08
7 G - 8.5 G	10	< -117		1.13
9 k - 100 k	3 k	< -72		1.52
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 5 G	3 k	< -98		1.08
5 G - 6 G	3 k	< -98		1.08
6 G - 7 G	3 k	< -92		1.10
7 G - 8.5 G	3 k	< -92		1.10

Performance Test
E5071C Performance Test Record

Option 485

Direction S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 5 G	10	< -123		1.24
5 G - 6 G	10	< -123		1.16
6 G - 7 G	10	< -117		1.08
7 G - 8.5 G	10	< -117		1.13
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 5 G	3 k	< -98		1.08
5 G - 6 G	3 k	< -98		1.08
6 G - 7 G	3 k	< -92		1.10
7 G - 8.5 G	3 k	< -92		1.10

Direction S32

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 5 G	10	< -123		1.24
5 G - 6 G	10	< -123		1.16
6 G - 7 G	10	< -117		1.08
7 G - 8.5 G	10	< -117		1.13
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
3 G - 5 G	3 k	< -98		1.08
5 G - 6 G	3 k	< -98		1.08
6 G - 7 G	3 k	< -92		1.10
7 G - 8.5 G	3 k	< -92		1.10

Direction S43

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 5 G	10	< -123		1.24
5 G - 6 G	10	< -123		1.16
6 G - 7 G	10	< -117		1.08
7 G - 8.5 G	10	< -117		1.13
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 5 G	3 k	< -98		1.08
5 G - 6 G	3 k	< -98		1.08
6 G - 7 G	3 k	< -92		1.10
7 G - 8.5 G	3 k	< -92		1.10

Direction S14

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
100 k - 300 k	10	< -97		1.52
300 k - 10 M	10	< -107		1.26
10 M - 3 G	10	< -123		1.24
3 G - 5 G	10	< -123		1.24
5 G - 6 G	10	< -123		1.16

Performance Test
E5071C Performance Test Record

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
6 G - 7 G	10	< -117		1.08
7 G - 8.5 G	10	< -117		1.13
100 k - 300 k	3 k	< -72		1.52
300 k - 10 M	3 k	< -82		1.13
10 M - 3 G	3 k	< -98		1.08
3 G - 5 G	3 k	< -98		1.08
5 G - 6 G	3 k	< -98		1.08
6 G - 7 G	3 k	< -92		1.10
7 G - 8.5 G	3 k	< -92		1.10

Option 4K5

Direction S21

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
300 k - 1 M	10	< -100		1.07
1 M - 10 M	10	< -107		1.39
10 M - 100 M	10	< -120		2.92
100 M - 6 G	10	< -123		3.35
6 G - 8.5 G	10	< -117		2.93
8.5 G - 10.5 G	10	< -107		1.48
10.5 G - 15 G	10	< -103		1.40
15 G - 20 G	10	< -100		1.34
300 k - 1 M	3 k	< -75		1.01
1 M - 10 M	3 k	< -82		1.02
10 M - 100 M	3 k	< -95		1.05
100 M - 6 G	3 k	< -98		1.08
6 G - 8.5 G	3 k	< -92		1.08
8.5 G - 10.5 G	3 k	< -85		1.04
10.5 G - 15 G	3 k	< -82		1.04
15 G - 20 G	3 k	< -75		1.04

Direction S32

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
300 k - 1 M	10	< -100		1.07
1 M - 10 M	10	< -107		1.39
10 M - 100 M	10	< -120		2.92
100 M - 6 G	10	< -123		3.35
6 G - 8.5 G	10	< -117		2.93
8.5 G - 10.5 G	10	< -107		1.48
10.5 G - 15 G	10	< -103		1.40
15 G - 20 G	10	< -100		1.34
300 k - 1 M	3 k	< -75		1.01
1 M - 10 M	3 k	< -82		1.02
10 M - 100 M	3 k	< -95		1.05
100 M - 6 G	3 k	< -98		1.08
6 G - 8.5 G	3 k	< -92		1.08
8.5 G - 10.5 G	3 k	< -85		1.04
10.5 G - 15 G	3 k	< -82		1.04
15 G - 20 G	3 k	< -75		1.04

Direction S43

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
300 k - 1 M	10	< -100		1.07
1 M - 10 M	10	< -107		1.39
10 M - 100 M	10	< -120		2.92
100 M - 6 G	10	< -123		3.35
6 G - 8.5 G	10	< -117		2.93
8.5 G - 10.5 G	10	< -107		1.48
10.5 G - 15 G	10	< -103		1.40
15 G - 20 G	10	< -100		1.34
300 k - 1 M	3 k	< -75		1.01
1 M - 10 M	3 k	< -82		1.02

Performance Test
E5071C Performance Test Record

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
10 M - 100 M	3 k	< -95		1.05
100 M - 6 G	3 k	< -98		1.08
6 G - 8.5 G	3 k	< -92		1.08
8.5 G - 10.5 G	3 k	< -85		1.04
10.5 G - 15 G	3 k	< -82		1.04
15 G - 20 G	3 k	< -75		1.04

Direction S14

Frequency range [Hz]	IF bandwidth [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
300 k - 1 M	10	< -100		1.07
1 M - 10 M	10	< -107		1.39
10 M - 100 M	10	< -120		2.92
100 M - 6 G	10	< -123		3.35
6 G - 8.5 G	10	< -117		2.93
8.5 G - 10.5 G	10	< -107		1.48
10.5 G - 15 G	10	< -103		1.40
15 G - 20 G	10	< -100		1.34
300 k - 1 M	3 k	< -75		1.01
1 M - 10 M	3 k	< -82		1.02
10 M - 100 M	3 k	< -95		1.05
100 M - 6 G	3 k	< -98		1.08
6 G - 8.5 G	3 k	< -92		1.08
8.5 G - 10.5 G	3 k	< -85		1.04
10.5 G - 15 G	3 k	< -82		1.04
15 G - 20 G	3 k	< -75		1.04

Dynamic Accuracy Test

@ Reference power level: -10 dBm

Direction: S21

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
10	± 0.207		± 0.010
5	± 0.075		± 0.010
0	± 0.041		± 0.007
-5	± 0.031		± 0.009
-15	± 0.030		± 0.006
-20	± 0.035		± 0.007
-25	± 0.040		± 0.010
-30	± 0.045		± 0.011
-35	± 0.056		± 0.015
-40	± 0.067		± 0.019
-45	± 0.078		± 0.021
-50	± 0.091		± 0.021
-55	± 0.106		± 0.024
-60	± 0.125		± 0.024
-65	± 0.151		± 0.026
-70	± 0.189		± 0.025
-75	± 0.248		± 0.011
-80	± 0.346		± 0.014
-85	± 0.509		± 0.021
-90	± 0.785		± 0.033
-95	± 1.248		± 0.069
-100	±2.008		± 0.060

Direction: S12

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
10	± 0.207		± 0.010
5	± 0.075		± 0.010

Performance Test
E5071C Performance Test Record

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
0	± 0.041		± 0.007
-5	± 0.031		± 0.009
-15	± 0.030		± 0.006
-20	± 0.035		± 0.007
-25	± 0.040		± 0.010
-30	± 0.045		± 0.011
-35	± 0.056		± 0.015
-40	± 0.067		± 0.019
-45	± 0.078		± 0.021
-50	± 0.091		± 0.021
-55	± 0.106		± 0.024
-60	± 0.125		± 0.024
-65	± 0.151		± 0.026
-70	± 0.189		± 0.025
-75	± 0.248		± 0.011
-80	± 0.346		± 0.014
-85	± 0.509		± 0.021
-90	± 0.785		± 0.033
-95	± 1.248		± 0.069
-100	± 2.008		± 0.060

Direction: S31 (Options 430, 435, 440, 445, 480 and 485 only)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
10	± 0.207		± 0.010
5	± 0.075		± 0.010
0	± 0.041		± 0.007
-5	± 0.031		± 0.009
-15	± 0.030		± 0.006
-20	± 0.035		± 0.007

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-25	± 0.040		± 0.010
-30	± 0.045		± 0.011
-35	± 0.056		± 0.015
-40	± 0.067		± 0.019
-45	± 0.078		± 0.021
-50	± 0.091		± 0.021
-55	± 0.106		± 0.024
-60	± 0.125		± 0.024
-65	± 0.151		± 0.026
-70	± 0.189		± 0.025
-75	± 0.248		± 0.011
-80	± 0.346		± 0.014
-85	± 0.509		± 0.021
-90	± 0.785		± 0.033
-95	± 1.248		± 0.069
-100	±2.008		± 0.060

Direction: S41 (Options 430, 435, 440, 445, 480 and 485 only)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
10	± 0.207		± 0.010
5	± 0.075		± 0.010
0	± 0.041		± 0.007
-5	± 0.031		± 0.009
-15	± 0.030		± 0.006
-20	± 0.035		± 0.007
-25	± 0.040		± 0.010
-30	± 0.045		± 0.011
-35	± 0.056		± 0.015
-40	± 0.067		± 0.019

Performance Test
E5071C Performance Test Record

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
-45	± 0.078		± 0.021
-50	± 0.091		± 0.021
-55	± 0.106		± 0.024
-60	± 0.125		± 0.024
-65	± 0.151		± 0.026
-70	± 0.189		± 0.025
-75	± 0.248		± 0.011
-80	± 0.346		± 0.014
-85	± 0.509		± 0.021
-90	± 0.785		± 0.033
-95	± 1.248		± 0.069
-100	± 2.008		± 0.060

Absolute measurement: A (Options 2K5 and 4K5 only)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
10	± 2.4972		± 0.010	434.65
5	± 0.3936		± 0.010	54.38
0	± 0.0948		± 0.004	22.87
-5	± 0.0384		± 0.004	9.60
-15	± 0.030		± 0.004	7.95
-20	± 0.035		± 0.005	7.20
-25	± 0.040		± 0.010	4.60
-30	± 0.045		± 0.010	4.62
-35	± 0.056		± 0.010	3.29
-40	± 0.067		± 0.020	4.40
-45	± 0.078		± 0.010	5.38
-50	± 0.091		± 0.020	4.32
-55	± 0.106		± 0.030	4.03
-60	± 0.125		± 0.030	4.49

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
-65	± 0.151		± 0.030	4.42
-70	± 0.189		± 0.040	5.34
-75	± 0.248		± 0.040	6.31
-80	± 0.346		± 0.050	7.90
-85	± 0.509		± 0.060	9.20
-90	± 0.785		± 0.060	14.27
-95	± 1.248		± 0.100	14.77
-100	± 2.008		± 0.130	19.39

Absolute measurement: B (Options 2K5 and 4K5 only)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
10	± 2.4972		± 0.010	434.65
5	± 0.3936		± 0.010	54.38
0	± 0.0948		± 0.004	22.87
-5	± 0.0384		± 0.004	9.60
-15	± 0.030		± 0.004	7.95
-20	± 0.035		± 0.005	7.20
-25	± 0.040		± 0.010	4.60
-30	± 0.045		± 0.010	4.62
-35	± 0.056		± 0.010	3.29
-40	± 0.067		± 0.020	4.40
-45	± 0.078		± 0.010	5.38
-50	± 0.091		± 0.020	4.32
-55	± 0.106		± 0.030	4.03
-60	± 0.125		± 0.030	4.49
-65	± 0.151		± 0.030	4.42
-70	± 0.189		± 0.040	5.34
-75	± 0.248		± 0.040	6.31
-80	± 0.346		± 0.050	7.90

Performance Test
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Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
-85	± 0.509		± 0.060	9.20
-90	± 0.785		± 0.060	14.27
-95	± 1.248		± 0.100	14.77
-100	± 2.008		± 0.130	19.39

Absolute measurement: C (Option 4K5 only)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
10	± 2.4972		± 0.010	434.65
5	± 0.3936		± 0.010	54.38
0	± 0.0948		± 0.004	22.87
-5	± 0.0384		± 0.004	9.60
-15	± 0.030		± 0.004	7.95
-20	± 0.035		± 0.005	7.20
-25	± 0.040		± 0.010	4.60
-30	± 0.045		± 0.010	4.62
-35	± 0.056		± 0.010	3.29
-40	± 0.067		± 0.020	4.40
-45	± 0.078		± 0.010	5.38
-50	± 0.091		± 0.020	4.32
-55	± 0.106		± 0.030	4.03
-60	± 0.125		± 0.030	4.49
-65	± 0.151		± 0.030	4.42
-70	± 0.189		± 0.040	5.34
-75	± 0.248		± 0.040	6.31
-80	± 0.346		± 0.050	7.90
-85	± 0.509		± 0.060	9.20
-90	± 0.785		± 0.060	14.27
-95	± 1.248		± 0.100	14.77
-100	± 2.008		± 0.130	19.39

Absolute measurement: D (Option 4K5 only)

Power level [dBm]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]	TAR
10	± 2.4972		± 0.010	434.65
5	± 0.3936		± 0.010	54.38
0	± 0.0948		± 0.004	22.87
-5	± 0.0384		± 0.004	9.60
-15	± 0.030		± 0.004	7.95
-20	± 0.035		± 0.005	7.20
-25	± 0.040		± 0.010	4.60
-30	± 0.045		± 0.010	4.62
-35	± 0.056		± 0.010	3.29
-40	± 0.067		± 0.020	4.40
-45	± 0.078		± 0.010	5.38
-50	± 0.091		± 0.020	4.32
-55	± 0.106		± 0.030	4.03
-60	± 0.125		± 0.030	4.49
-65	± 0.151		± 0.030	4.42
-70	± 0.189		± 0.040	5.34
-75	± 0.248		± 0.040	6.31
-80	± 0.346		± 0.050	7.90
-85	± 0.509		± 0.060	9.20
-90	± 0.785		± 0.060	14.27
-95	± 1.248		± 0.100	14.77
-100	± 2.008		± 0.130	19.39

Uncorrected System Performance Test

@ Correction: Off, System Correction: On

Option 230

Port 1

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k -3 G	≤ -25		0.81
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k -3 G	≤ -25		3.00
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Reflection Tracking	9 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3G	± 1.0		± 0.04

Port 2

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k -3 G	≤ -25		0.81
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k -3 G	≤ -25		3.00
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Reflection Tracking	9 k - 300 k	± 1.5		± 0.03
Reflection Tracking	300 k - 3G	± 1.0		± 0.03

Option 235

Port 1

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3G	± 1.0		± 0.04

Port 2

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59

Performance Test
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System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3G	± 1.0		± 0.04

Option 240

Port 1

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 4.5 G	≤ -20		0.40
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 4.5 G	≤ -20		1.99
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 4.5 G	≤ -12		0.66
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 4.5 G	± 1.0		± 0.24
Reflection Tracking	9 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3G	± 1.0		± 0.04
Reflection Tracking	3 G - 4.5 G	± 1.0		± 0.66

Port 2

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 4.5 G	≤ -20		0.40
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 4.5 G	≤ -20		1.99
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 4.5 G	≤ -12		0.66
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 4.5 G	± 1.0		± 0.24
Reflection Tracking	9 k - 300 k	± 1.5		± 0.03
Reflection Tracking	300 k - 3G	± 1.0		± 0.03
Reflection Tracking	3 G - 4.5 G	± 1.0		± 0.66

Option 245

Port 1

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 4.5 G	≤ -20		0.40
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 4.5 G	≤ -20		1.99

Performance Test
E5071C Performance Test Record

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 4.5 G	≤ -12		0.66
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 4.5 G	± 1.0		± 0.24
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3G	± 1.0		± 0.04
Reflection Tracking	3 G - 4.5 G	± 1.0		± 0.66

Port 2

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 4.5 G	≤ -20		0.40
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 4.5 G	≤ -20		1.99
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 4.5 G	≤ -12		0.66
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 4.5 G	± 1.0		± 0.24

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3G	± 1.0		± 0.04
Reflection Tracking	3 G - 4.5 G	± 1.0		± 0.66

Option 280

Port 1

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 6 G	≤ -20		0.40
Directivity	6 G - 8.5 G	≤ -15		0.67
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 6 G	≤ -20		1.94
Source match	6 G - 8.5 G	≤ -15		0.57
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 6 G	≤ -12		0.66
Load match	6 G - 8.5 G	≤ -10		0.64
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 6 G	± 1.0		± 0.24
Transmission Tracking	6 G - 8.5 G	± 1.0		± 0.35
Reflection Tracking	9 k - 300 k	± 1.5		± 0.04

Performance Test
E5071C Performance Test Record

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04
Reflection Tracking	3 G - 6 G	± 1.0		± 0.66
Reflection Tracking	6 G - 8.5 G	± 1.0		± 0.64

Port 2

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 6 G	≤ -20		0.40
Directivity	6 G - 8.5 G	≤ -15		0.67
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 6 G	≤ -20		1.94
Source match	6 G - 8.5 G	≤ -15		0.57
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 6 G	≤ -12		0.66
Load match	6 G - 8.5 G	≤ -10		0.64
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 6 G	± 1.0		± 0.24
Transmission Tracking	6 G - 8.5 G	± 1.0		± 0.35
Reflection Tracking	9 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Reflection Tracking	3 G - 6 G	± 1.0		± 0.66
Reflection Tracking	6 G - 8.5 G	± 1.0		± 0.64

Option 285

Port 1

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 6 G	≤ -20		0.40
Directivity	6 G - 8.5 G	≤ -15		0.67
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 6 G	≤ -20		1.94
Source match	6 G - 8.5 G	≤ -15		0.57
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 6 G	≤ -12		0.66
Load match	6 G - 8.5 G	≤ -10		0.64
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 6 G	± 1.0		± 0.24
Transmission Tracking	6 G - 8.5 G	± 1.0		± 0.35
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04

Performance Test
E5071C Performance Test Record

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Reflection Tracking	3 G- 6 G	± 1.0		± 0.66
Reflection Tracking	6 G- 8.5 G	± 1.0		± 0.64

Port 2

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 6 G	≤ -20		0.40
Directivity	6 G - 8.5 G	≤ -15		0.67
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 6 G	≤ -20		1.94
Source match	6 G - 8.5 G	≤ -15		0.57
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 6 G	≤ -12		0.66
Load match	6 G - 8.5 G	≤ -10		0.64
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 6 G	± 1.0		± 0.24
Transmission Tracking	6 G - 8.5 G	± 1.0		± 0.35
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04
Reflection Tracking	3 G - 6 G	± 1.0		± 0.66

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Reflection Tracking	6 G - 8.5 G	± 1.0		± 0.64

Option 2K5

Port 1

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	300 k - 3 G	≤ -25		2.00
Directivity	3 G - 6 G	≤ -20		1.18
Directivity	6 G - 20 G	≤ -15		0.90
Source match	300 k - 3 G	≤ -25		3.97
Source match	3 G - 6 G	≤ -20		2.45
Source match	6 G - 20 G	≤ -15		2.01
Load match	300 k - 1 M	≤ -10		0.23
Load match	1 M - 1 G	≤ -19		0.55
Load match	1 G - 3 G	≤ -17		0.72
Load match	3 G - 6 G	≤ -13		0.48
Load match	6 G - 8.5 G	≤ -11		0.52
Load match	8.5 G - 11 G	≤ -10		0.49
Load match	11 G - 20 G	≤ -9		0.47
Transmission Tracking	300 k - 20 G	± 1.0		± 0.37
Reflection Tracking	300 k - 20 G	± 1.0		± 0.28

Port 2

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	300 k - 3 G	≤ -25		2.00
Directivity	3 G - 6 G	≤ -20		1.18
Directivity	6 G - 20 G	≤ -15		0.90
Source match	300 k - 3 G	≤ -25		3.97

Performance Test
E5071C Performance Test Record

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Source match	3 G - 6 G	≤ -20		2.45
Source match	6 G - 20 G	≤ -15		2.01
Load match	300 k - 1 M	≤ -10		0.23
Load match	1 M - 1 G	≤ -19		0.55
Load match	1 G - 3 G	≤ -17		0.72
Load match	3 G - 6 G	≤ -13		0.48
Load match	6 G - 8.5 G	≤ -11		0.52
Load match	8.5 G - 11 G	≤ -10		0.49
Load match	11 G - 20 G	≤ -9		0.47
Transmission Tracking	300 k - 20 G	± 1.0		± 0.37
Reflection Tracking	300 k - 20 G	± 1.0		± 0.28

Option 430

Port 1

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Reflection Tracking	9 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04

Port 2

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.2
Reflection Tracking	9 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04

Port 3

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Reflection Tracking	9 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04

Performance Test
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Port 4

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Reflection Tracking	9 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04

Option 435

Port 1

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04

Port 2

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04

Port 3

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04

Performance Test
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Port 4

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04

Option 440

Port 1

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 4.5 G	≤ -20		0.40
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 4.5 G	≤ -20		1.94
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 4.5 G	≤ -12		0.66
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Transmission Tracking	3 G - 4.5 G	± 1.0		± 0.24
Reflection Tracking	9 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04
Reflection Tracking	3 G - 4.5 G	± 1.0		± 0.66

Port 2

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 4.5 G	≤ -20		0.40
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 4.5 G	≤ -20		1.94
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 4.5 G	≤ -12		0.66
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.2
Transmission Tracking	3 G - 4.5 G	± 1.0		± 0.24
Reflection Tracking	9 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3G	± 1.0		± 0.04
Reflection Tracking	3 G - 4.5 G	± 1.0		± 0.66

Performance Test
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Port 3

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 4.5 G	≤ -20		0.40
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 4.5 G	≤ -20		1.94
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 4.5 G	≤ -12		0.66
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 4.5 G	± 1.0		± 0.24
Reflection Tracking	9 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3G	± 1.0		± 0.04
Reflection Tracking	3 G - 4.5 G	± 1.0		± 0.66

Port 4

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 4.5 G	≤ -20		0.40
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 4.5 G	≤ -20		1.94
Load match	9 k - 300 k	≤ -12		0.04

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 4.5 G	≤ -12		0.66
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 4.5 G	± 1.0		± 0.24
Reflection Tracking	9 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3G	± 1.0		± 0.04
Reflection Tracking	3 G - 4.5 G	± 1.0		± 0.66

Option 445

Port 1

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 4.5 G	≤ -20		0.40
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 4.5 G	≤ -20		1.94
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 4.5 G	≤ -12		0.66
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 4.5 G	± 1.0		± 0.24

Performance Test
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System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3G	± 1.0		± 0.04
Reflection Tracking	3 G - 4.5 G	± 1.0		± 0.66

Port 2

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 4.5 G	≤ -20		0.40
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 4.5 G	≤ -20		1.94
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 4.5 G	≤ -12		0.66
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 4.5 G	± 1.0		± 0.24
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3G	± 1.0		± 0.04
Reflection Tracking	3 G - 4.5 G	± 1.0		± 0.66

Port 3

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 4.5 G	≤ -20		0.40
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 4.5 G	≤ -20		1.94
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 4.5 G	≤ -12		0.66
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 4.5 G	± 1.0		± 0.24
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3G	± 1.0		± 0.04
Reflection Tracking	3 G - 4.5 G	± 1.0		± 0.66

Port 4

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 4.5 G	≤ -20		0.40
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 4.5 G	≤ -20		1.94
Load match	100 k - 300 k	≤ -12		0.04

Performance Test
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System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 4.5 G	≤ -12		0.66
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 4.5 G	± 1.0		± 0.24
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3G	± 1.0		± 0.04
Reflection Tracking	3 G - 4.5 G	± 1.0		± 0.66

Option 480

Port 1

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k -3 G	≤ -25		0.81
Directivity	3 G - 6 G	≤ -20		0.40
Directivity	6 G - 8.5 G	≤ -15		0.67
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k -3 G	≤ -25		3.00
Source match	3 G - 6 G	≤ -20		1.94
Source match	6 G - 8.5 G	≤ -15		0.57
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 6 G	≤ -12		0.66
Load match	6 G - 8.5 G	≤ -10		0.64
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Transmission Tracking	300 k - 3 G	± 1.0		± 0.19
Transmission Tracking	3 G - 6 G	± 1.0		± 0.24
Transmission Tracking	6 G - 8.5 G	± 1.0		± 0.35
Reflection Tracking	9 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04
Reflection Tracking	3 G - 6 G	± 1.0		± 0.66
Reflection Tracking	6 G - 8.5 G	± 1.0		± 0.64

Port 2

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 6 G	≤ -20		0.40
Directivity	6 G - 8.5 G	≤ -15		0.67
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 6 G	≤ -20		1.94
Source match	6 G - 8.5 G	≤ -15		0.57
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 6 G	≤ -12		0.66
Load match	6 G - 8.5 G	≤ -10		0.64
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20

Performance Test
E5071C Performance Test Record

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Transmission Tracking	3 G - 6 G	± 1.0		± 0.24
Transmission Tracking	6 G- 8.5 G	± 1.0		± 0.35
Reflection Tracking	9 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04
Reflection Tracking	3 G - 6 G	± 1.0		± 0.66
Reflection Tracking	6 G- 8.5 G	± 1.0		± 0.64

Port 3

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k -3 G	≤ -25		0.81
Directivity	3 G - 6 G	≤ -20		0.40
Directivity	6 G - 8.5 G	≤ -15		0.67
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k -3 G	≤ -25		3.00
Source match	3 G - 6 G	≤ -20		1.94
Source match	6 G - 8.5 G	≤ -15		0.57
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 6 G	≤ -12		0.66
Load match	6 G - 8.5 G	≤ -10		0.64
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 6 G	± 1.0		± 0.24

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Transmission Tracking	6 G - 8.5 G	± 1.0		± 0.35
Reflection Tracking	9 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04
Reflection Tracking	3 G - 6 G	± 1.0		± 0.66
Reflection Tracking	6 G - 8.5 G	± 1.0		± 0.64

Port 4

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	9 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 6 G	≤ -20		0.40
Directivity	6 G - 8.5 G	≤ -15		0.67
Source match	9 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 6 G	≤ -20		1.94
Source match	6 G - 8.5 G	≤ -15		0.57
Load match	9 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 6 G	≤ -12		0.66
Load match	6 G - 8.5 G	≤ -10		0.64
Transmission Tracking	9 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 6 G	± 1.0		± 0.24
Transmission Tracking	6 G - 8.5 G	± 1.0		± 0.35

Performance Test
E5071C Performance Test Record

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Reflection Tracking	9 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04
Reflection Tracking	3 G - 6 G	± 1.0		± 0.66
Reflection Tracking	6 G - 8.5 G	± 1.0		± 0.64

Option 485

Port 1

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 6 G	≤ -20		0.40
Directivity	6 G - 8.5 G	≤ -15		0.67
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 6 G	≤ -20		1.94
Source match	6 G - 8.5 G	≤ -15		0.57
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 6 G	≤ -12		0.66
Load match	6 G - 8.5 G	≤ -10		0.64
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 6 G	± 1.0		± 0.24
Transmission Tracking	6 G - 8.5 G	± 1.0		± 0.35

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04
Reflection Tracking	3 G - 6 G	± 1.0		± 0.66
Reflection Tracking	6 G - 8.5 G	± 1.0		± 0.64

Port 2

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 6 G	≤ -20		0.40
Directivity	6 G - 8.5 G	≤ -15		0.67
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 6 G	≤ -20		1.94
Source match	6 G - 8.5 G	≤ -15		0.57
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 6 G	≤ -12		0.66
Load match	6 G - 8.5 G	≤ -10		0.64
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 6 G	± 1.0		± 0.24
Transmission Tracking	6 G - 8.5 G	± 1.0		± 0.35
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04

Performance Test
E5071C Performance Test Record

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04
Reflection Tracking	3 G - 6 G	± 1.0		± 0.66
Reflection Tracking	6 G - 8.5 G	± 1.0		± 0.64

Port 3

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 6 G	≤ -20		0.40
Directivity	6 G - 8.5 G	≤ -15		0.67
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 6 G	≤ -20		1.94
Source match	6 G - 8.5 G	≤ -15		0.57
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 6 G	≤ -12		0.66
Load match	6 G - 8.5 G	≤ -10		0.64
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 6 G	± 1.0		± 0.24
Transmission Tracking	6 G - 8.5 G	± 1.0		± 0.35
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Reflection Tracking	3 G- 6 G	± 1.0		± 0.66
Reflection Tracking	6 G- 8.5 G	± 1.0		± 0.64

Port 4

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	100 k - 300 k	≤ -20		0.09
Directivity	300 k - 3 G	≤ -25		0.81
Directivity	3 G - 6 G	≤ -20		0.40
Directivity	6 G - 8.5 G	≤ -15		0.67
Source match	100 k - 300 k	≤ -20		0.05
Source match	300 k - 3 G	≤ -25		3.00
Source match	3 G - 6 G	≤ -20		1.94
Source match	6 G - 8.5 G	≤ -15		0.57
Load match	100 k - 300 k	≤ -12		0.04
Load match	300 k - 3 G	≤ -17		0.59
Load match	3 G - 6 G	≤ -12		0.66
Load match	6 G - 8.5 G	≤ -10		0.64
Transmission Tracking	100 k - 300 k	± 1.5		± 0.03
Transmission Tracking	300 k - 3 G	± 1.0		± 0.20
Transmission Tracking	3 G - 6 G	± 1.0		± 0.24
Transmission Tracking	6 G- 8.5 G	± 1.0		± 0.35
Reflection Tracking	100 k - 300 k	± 1.5		± 0.04
Reflection Tracking	300 k - 3 G	± 1.0		± 0.04
Reflection Tracking	3 G- 6 G	± 1.0		± 0.66

Performance Test
E5071C Performance Test Record

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Reflection Tracking	6 G - 8.5 G	± 1.0		± 0.64

Option 4K5

Port 1

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	300 k - 3 G	≤ -25		2.00
Directivity	3 G - 6 G	≤ -20		1.18
Directivity	6 G - 20 G	≤ -15		0.90
Source match	300 k - 3 G	≤ -25		3.97
Source match	3 G - 6 G	≤ -20		2.45
Source match	6 G - 20 G	≤ -15		2.01
Load match	300 k - 1 M	≤ -10		0.23
Load match	1 M - 1 G	≤ -19		0.55
Load match	1 G - 3 G	≤ -17		0.72
Load match	3 G - 6 G	≤ -13		0.48
Load match	6 G - 8.5 G	≤ -11		0.52
Load match	8.5 G - 11 G	≤ -10		0.49
Load match	11 G - 20 G	≤ -9		0.47
Transmission Tracking	300 k - 20 G	± 1.0		± 0.37
Reflection Tracking	300 k - 20 G	± 1.0		± 0.28

Port 2

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	300 k - 3 G	≤ -25		2.00
Directivity	3 G - 6 G	≤ -20		1.18
Directivity	6 G - 20 G	≤ -15		0.90
Source match	300 k - 3 G	≤ -25		3.97

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Source match	3 G - 6 G	≤ -20		2.45
Source match	6 G - 20 G	≤ -15		2.01
Load match	300 k - 1 M	≤ -10		0.23
Load match	1 M - 1 G	≤ -19		0.55
Load match	1 G - 3 G	≤ -17		0.72
Load match	3 G - 6 G	≤ -13		0.48
Load match	6 G - 8.5 G	≤ -11		0.52
Load match	8.5 G - 11 G	≤ -10		0.49
Load match	11 G - 20 G	≤ -9		0.47
Transmission Tracking	300 k - 20 G	± 1.0		± 0.37
Reflection Tracking	300 k - 20 G	± 1.0		± 0.28

Port 3

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	300 k - 3 G	≤ -25		2.00
Directivity	3 G - 6 G	≤ -20		1.18
Directivity	6 G - 20 G	≤ -15		0.90
Source match	300 k - 3 G	≤ -25		3.97
Source match	3 G - 6 G	≤ -20		2.45
Source match	6 G - 20 G	≤ -15		2.01
Load match	300 k - 1 M	≤ -10		0.23
Load match	1 M - 1 G	≤ -19		0.55
Load match	1 G - 3 G	≤ -17		0.72
Load match	3 G - 6 G	≤ -13		0.48
Load match	6 G - 8.5 G	≤ -11		0.52
Load match	8.5 G - 11 G	≤ -10		0.49
Load match	11 G - 20 G	≤ -9		0.47
Transmission Tracking	300 k - 20 G	± 1.0		± 0.37

Performance Test
E5071C Performance Test Record

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Reflection Tracking	300 k - 20 G	± 1.0		± 0.28

Port 4

System performance	Frequency range [Hz]	Test limit [dB]	Test result [dB]	Measurement uncertainty [dB]
Directivity	300 k - 3 G	≤ -25		2.00
Directivity	3 G - 6 G	≤ -20		1.18
Directivity	6 G - 20 G	≤ -15		0.90
Source match	300 k - 3 G	≤ -25		3.97
Source match	3 G - 6 G	≤ -20		2.45
Source match	6 G - 20 G	≤ -15		2.01
Load match	300 k - 1 M	≤ -10		0.23
Load match	1 M - 1 G	≤ -19		0.55
Load match	1 G - 3 G	≤ -17		0.72
Load match	3 G - 6 G	≤ -13		0.48
Load match	6 G - 8.5 G	≤ -11		0.52
Load match	8.5 G - 11 G	≤ -10		0.49
Load match	11 G - 20 G	≤ -9		0.47
Transmission Tracking	300 k - 20 G	± 1.0		± 0.37
Reflection Tracking	300 k - 20 G	± 1.0		± 0.28

3 Adjustment

This chapter provides the adjustment information for the E5071C ENA Series Network Analyzer to ensure that it is within its specifications. The adjustment must be performed Agilent's qualified service personnel. If you need the adjustment for your E5071C, it should be sent to the nearest Agilent Technologies service office.

Safety Considerations

This manual contains NOTES, CAUTIONs, and WARNINGs that must be followed to ensure the safety of the operator and to keep the instrument in a safe and serviceable condition. The adjustment must be performed by Agilent's qualified service personnel.

WARNING

Any interruption of the protective ground conductor (inside or outside the equipment) or disconnection of the protective ground terminal can make the instrument dangerous. Intentional interruption of the protective ground system for any reason is prohibited.

Warm-up for Adjustment

Warm-up the E5071C for at least 90 minutes before performing any of the following adjustment procedures to ensure proper results and correct instrument operation.

Required Equipment

Table 1-1 on page 22 lists the equipment required to perform the adjustment procedures described in this chapter. Use only calibrated test equipment when adjusting the E5071C.

Required Adjustment after Replacing Assembly

After replacing the following assembly, the adjustment items described in Table 3-1 must be required. The adjustment must be performed Agilent's qualified service personnel. If you need the adjustment for your E5071C, it should be sent to the nearest Agilent Technologies service office.

Required Adjustment Item after Replacing Assembly

Table 3-1 **Option 230/235/430/435/280/285/480/485/240/245/440/445**

Replaced Assembly	Adjustment Item										
	Writing ID	OCXO	Frequency Reference	AUX Input	Synthesizer Gain	Virtual Bridge Coefficient	Source Output Power	Receiver IF Range	Receiver Port Characteristics	Receiver Absolute Gain	Receiver RF Range
OCXO Board		√									
Analog Base Module		√		√							
Synthesizer Module for Source					√		√				
Synthesizer Module for Local					√		√				
Level Vernier Module							√				
Receiver Module						√	√	√	√	√	√
Hard Disk Drive	√										
Distributor Module							√		√	√	
RF Switch							√		√	√	

3. Adjustment

Adjustment
Required Adjustment after Replacing Assembly

Table 3-2 Option 2K5/4K5

Replaced Assembly	Adjustment Item								
	Writing ID	OCXO	Frequency Reference	AUX Input	Synthesizer Gain	Source Output Power	Receiver IF Range	Receiver Port Characteristics	Receiver Absolute Gain
Analogue IF Board	√								
Reference Oven Board		√							
Analogue Base Module			√	√					
Synthesizer Module					√	√		√	√
Receiver Module						√	√	√	√
Doubler Module						√			√
Distributor Module							√	√	√
Imix						√		√	√
Front End Module						√		√	√
Hark Disk Drive		√							
Cobra Bridge						√		√	√

Writing ID

This item writes the serial number and the option structure into the E5071C.

Required equipment for the writing ID

None

OCXO Adjustment

The purpose of this procedure is to adjust the 10 MHz OCXO.

Required equipment for OCXO adjustment

Description	Recommended Model
Frequency Counter	Agilent 53181A with Opt. 010 and 124 or Agilent 53131/2A with Opt. 010 and 124
Frequency Standard	Agilent 5071A
BNC(m)-BNC(m) Cable, 61 cm	Agilent p/n 8120-1839

Frequency Reference Adjustment

The purpose of this procedure is to adjust the 10 MHz frequency reference on the source board.

Required equipment for frequency reference adjustment

Description	Recommended Model
Frequency Counter	Agilent 53181A with Opt. 010 and 124 or Agilent 53131/2A with Opt. 010 and 124
Frequency Standard	Agilent 5071A
BNC(m)-BNC(m) Cable, 61 cm	Agilent p/n 8120-1839

AUX Input Adjustment

The purpose of this procedure is to adjust the offset error and proportional error of AUX Input.

Required equipment for the AUX input adjustment

Description	Recommended Model
Function Generator	Agilent 33120A or 33250A
Multi Meter	Agilent 34401, 34410, 34411 or 3458A
BNC(m)-BNC(m) Cable, 61 cm x 4 ea	Agilent p/n 8120-1839
BNC T Adapter x 2ea	Common Parts
Banana BNC	Common Parts

Synthesizer Gain Adjustment

The purpose of this procedure is to adjust 2Bit ATT of RF Path in Synthesizer for Source.

Required equipment for the synthesizer gain adjustment

None

Virtual Bridge Coefficient Adjustment

This item writes the coefficient factors to the E5071C.

Required equipment for the virtual bridge coefficient adjustment

None

NOTE

This item is for option 230/235/240/245/280/285/430/435/440/445/480/485

Source Output Power Adjustment

For Option 230/235/240/245/280/285/430/435/440/445/480/485, the purpose of this procedure is to adjust the variable attenuator in Level Vernier board, and the gains among Level Vernier, Distributor and Receiver.

For Option 2K5/4K5, the purpose of this procedure is to adjust the characteristic fluctuation of TC709C variable attenuator used in A86 Doubler Board.

Required equipment for the source output power adjustment

1) Option 230/235/430/435/240/245/440/445/280/285/480/485

Description	Recommended Model
Power Meter	Agilent E4419A/B
Power Sensor	Agilent E9304A Opt H18

2) Option2K5/4K5

Description	Recommended Model
Power Meter	Agilent E4419A/B
Power Sensor	Agilent 8482A
Power Sensor	Agilent E4413A
APC 3.5(m) - N(f)Adapter	Agilent p/n 1250-1811
APC 3.5(f) -(m) Adapter	Agilent p/n 85027-60005

Receiver IF Range Adjustment

The purpose of this procedure is to adjust IF Range.

Required equipment for the receiver IF range adjustment

1) Option 230/235/430/435/240/245/440/445/280/285/480/485

Description	Recommended Model
N(m)-N(m) Cable	Agilent N6314A (p/n 8120-8862)

2) Option 2K5/4K5

Description	Recommended Model
SMA Cable	Agilent p/n 5062-6693

Receiver Ports Characteristics Adjustment

The purpose of this procedure is to adjust source match, directivity and tracking.

Required equipment for the receiver ports characteristics adjustment

1) Option 230/235/430/435/240/245/440/445/280/285/480/485

Description	Recommended Model
Calibration Kit	Agilent 85032F
N(m)-N(m) Cable	Agilent N6314A (p/n 8120-8862)

2) Option 2K5/4K5

Description	Recommended Model
Calibration Kit	Agilent 85052D
SMA Cable	Agilent p/n 5062-6693

Receiver Absolute Gain Adjustment

This item writes the coefficient in Absolute measurement.

Required equipment for the receiver absolute gain adjustment

None

Receiver RF Range Adjustment

This item writes the coefficient of RF Range.

Required equipment for the receiver RF range adjustment

None

NOTE

This item is for option 230/235/240/245/280/285/430/435/440/445/480/485

Adjustment
Required Adjustment after Replacing Assembly

4 Troubleshooting

This chapter provides procedure to isolate a faulty assembly in the E5071C Network Analyzer.

Introduction

WARNING These servicing instructions are for use by qualified personnel only. To avoid possible electrical shock, do not perform any servicing unless you are qualified to do so.

WARNING The opening of covers or removal of parts is likely to expose dangerous voltages. Disconnect the instrument from its power supply beforehand.

CAUTION Many of the assemblies in the instrument are very susceptible to damage from ESD (electrostatic discharge). Perform the following procedures only at a static-safe workstation and wear a grounding strap.

CAUTION DO NOT operate without following instructions. Programs or files in the instrument may be broken.

How to exit from the E5071C Measurement View

You need to exit from the E5071C Measurement View to perform some troubleshooting. The following is the procedure to exit from the E5071C Measurement View.

- Step 1.** Connect the mouse and external keyboard to the connectors on the E5071C rear panel.
- Step 2.** Turn the instrument on.
- Step 3.** Press **System** key.
- Step 4.** Click **Service Menu - Service Function**. Password dialog box opens as shown in Figure 4-1.

Figure 4-1 Password dialog box



- Step 5.** Enter the password **kid** in the Password box and then click "OK" button.
- Step 6.** Click **Exit** in Service Functions Menu. Then the E5071C exit the Measurement View, then windows desktop screen appears with 3 icons (Network Analyzer, Recycle Bin, and Internet Explorer.)

NOTE If you wish to return to the Measurement View, double-click "Network Analyzer" icon.

NOTE If you need to shut down the E5071C and again turn on, perform in accordance with the following procedure.

- a. To get "Start" menu bar displayed, move the pointer to the bottom of the screen with mouse.
- b. Click "Start" and "Turn off Computer" in the pull down menu. "Turn off Computer" dialog box opens.
- c. Click "Turn off" button in the dialog box.

To Troubleshoot the Instrument

This section describes basic procedural flow of troubleshooting when servicing the E5071C. The primary procedural tool in this section is the flowchart. The flowchart contains entire troubleshooting path from a failure symptom to the isolation of faulty assembly, and will direct you to the completion of repair in an ordinary manner through the possible failure symptoms. Reference letters (Yes/No) on the flowcharts point to procedural steps that briefly explain the troubleshooting method to be performed next.

Primary Trouble Isolation

The primary trouble isolation procedure can be performed without disassembling the E5071C. Figure 4-2 shows the trouble isolation flow chart.

Step 1. Turn the instrument power on

About a few minutes after the E5071C is turned on, the measurement view is displayed on the screen. The display on the screen should be similar to Figure 4-8, “Measurement view,” on page 235.

Step 2. Check the display

- If no display appears on the LCD after the E5071C is turned on, go to “No Display troubleshooting” on page 230.
- If the E5071C stops in booting process despite something being displayed on the LCD, go to “Boot Process Troubleshooting” on page 232.
- The power-on self test is performed once automatically after the E5071C measurement view is displayed. If the power-on self test fails, go to “Troubleshooting Using Diagnostics Test” on page 236.

Step 3. Check the basic function

If the front-panel/keyboard/mouse controls, LCD display, data storage, remote interface or another function (except for measurement part) does not work correctly, go to “Function Specific Troubleshooting” on page 247.

Step 4. Check the measurement function

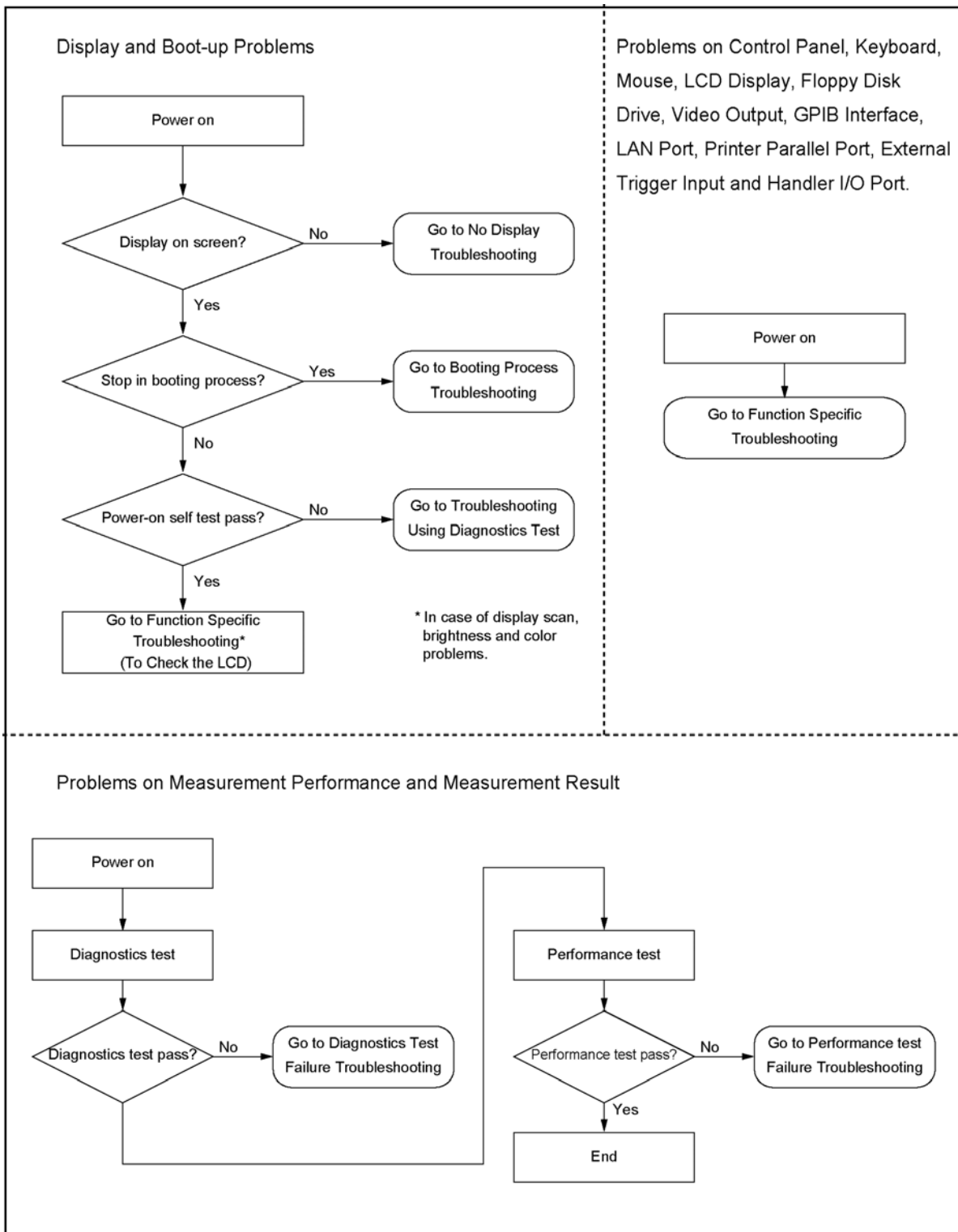
If the instrument fails on performance test, go to “Performance test failure troubleshooting” on page 254.

If the measurement function does not work correctly, perform the diagnostics test provided in the E5071C's service function. When the diagnostics test fails, go to “Troubleshooting Using Diagnostics Test” on page 236.

NOTE

The diagnostics test includes some unique measurement function tests in addition to the tests that are common to the power-on self test. Thus, it is necessary to perform this test even if the power-on self test passed.

Figure 4-2 Primary trouble isolation flowchart



e5071cse1118

4. Troubleshooting

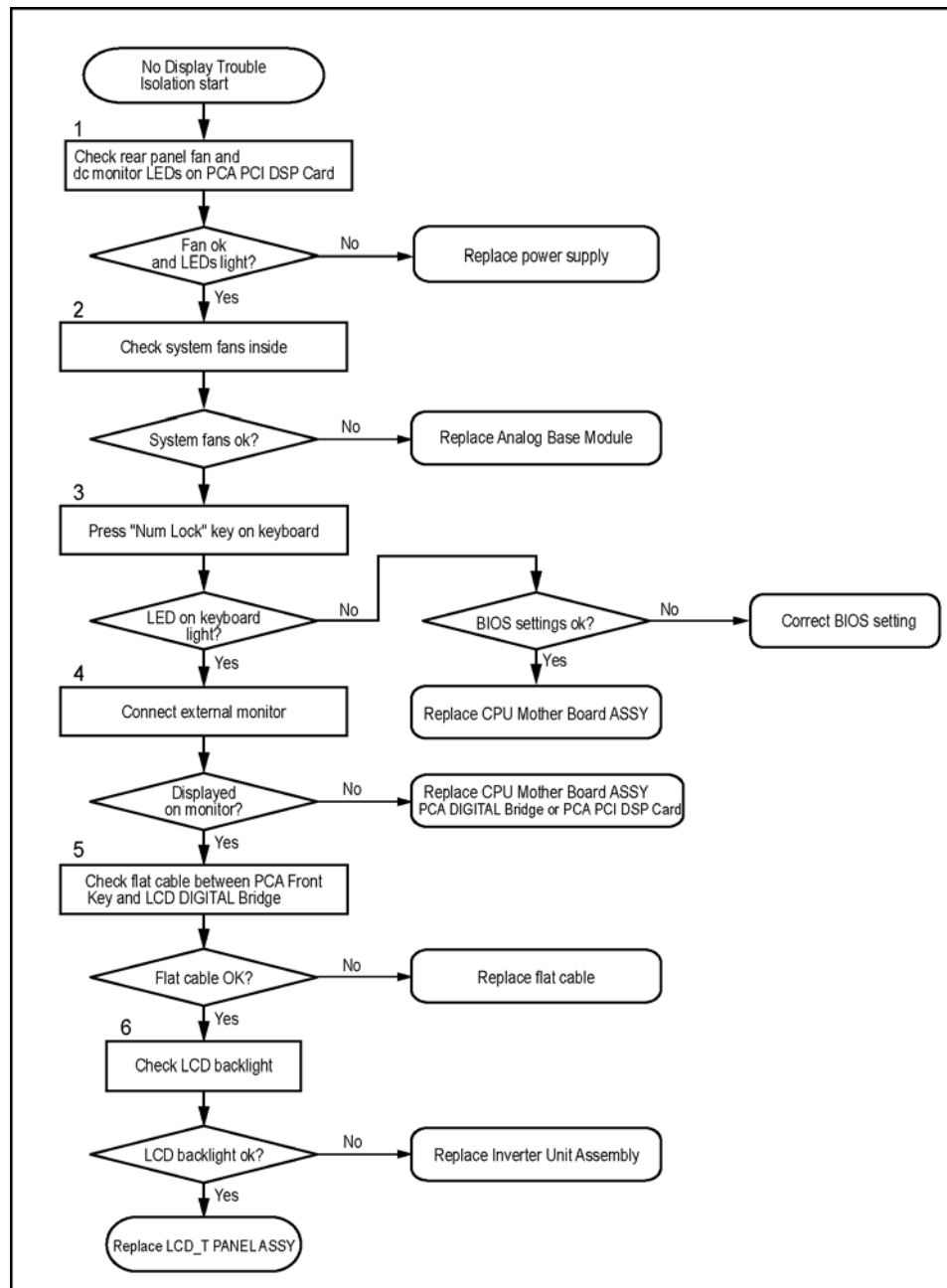
No Display troubleshooting

If the E5071C displays nothing despite it is powered from proper ac power line, isolate the failure in accordance with the procedure shown in Figure 4-3.

Connect the keyboard to the E5071C rear panel USB connector, turn the power on and start trouble isolation. The methods of trouble isolation are described in the procedural step 1 to 5.

Figure 4-3

No display trouble isolation procedure



e5071cse1119

Step 1. Check fan operation and DC monitor LED

If the rear panel fan (blower) doesn't run, a failure in the power supply is assumed. Remove the E5071C outer cover and check if the following LEDs light:

- +3.3 V and +5 V dc monitor LED on the PCA PCI DSP Card.

NOTE

To check all the outputs of the power supply, measure the dc voltages at the output lead connectors with a DMM. The dc output voltages and lead color information is provided in the module cover label of the power supply.

Step 2. Check system fans inside.

If the system fans on the chassis inside the E5071C don't run, problem seems in the analog base module. In this case, remove the E5071C outer cover and make sure whether the fans run or not.

NOTE

If the power shutdown occurs without a beep, the problem seems in the analog base module or the CPU Mother Board Assembly. Check BIOS status of CPU Mother Board Assembly is correct as described in “To configure the CPU Mother Board Assembly and BIOS” on page 265.

Step 3. Checking with the external monitor

Connect an external XGA monitor to the VIDEO output on the E5071C rear panel.

- If something is displayed on the external monitor, the problem is present around the LCD. Also check the PCA Front Key and PCA Digital Bridge because the ON/OFF setting of the LCD backlight is controlled by the PCA Front Key through the PCA Digital Bridge.
- If nothing is displayed even on the external monitor, the problem seems in the CPU Mother Board Assembly or PCA Digital Bridge.

NOTE

Check if the PCA Digital Bridge and PCA PCI DSP Board are securely connected to the CPU Mother Board Assembly.

Step 4. Checking flat cable

Check a flat cable between the PCA Front Key and the PCA Digital Bridge.

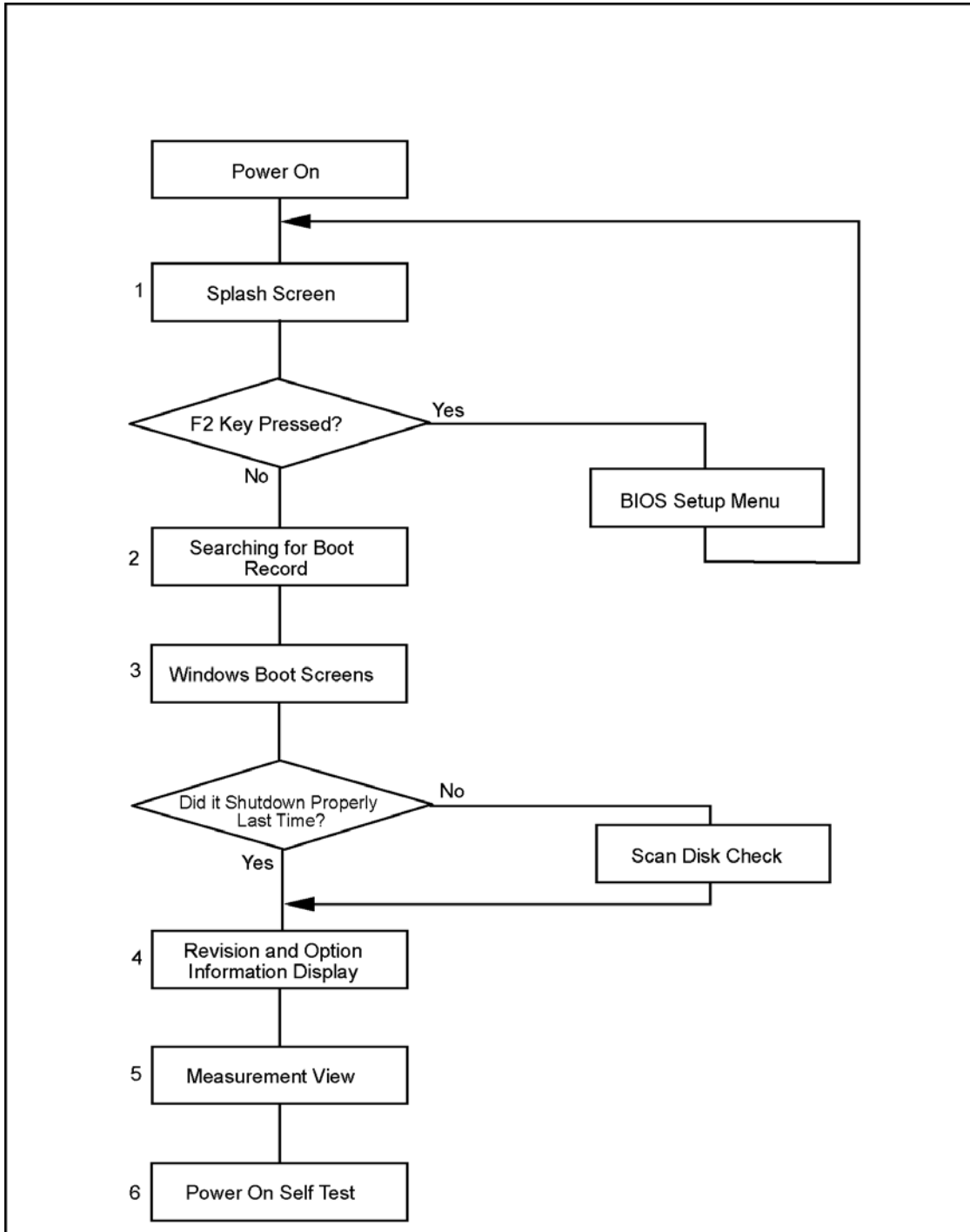
Step 5. Check around the backlight

Check Inverter Unit Assembly and a cable between the Inverter Unit Assembly and the PCA Front Key. Also check the cables between the LCD-TPANEL ASSY and PCA Front Key. If the cables are normal, check the LCD-TPANEL ASSY.

Boot Process Troubleshooting

Figure 4-4 represents the booting process flow in the E5071C. If the E5071C stops in the booting process, troubleshoot using the following step-by-step procedure.

Figure 4-4 Booting process flowchart



e50071cse1120

Step 1. Splash Screen

The splash screen is displayed with Agilent logo as shown in Figure 4-5.

If the splash screen is displayed, you can assume that the CPU Mother Board Assembly is functioning correctly.

NOTE While the splash screen is displayed, if you want to run the BIOS setup utility, push F2 key as soon as in the screen.

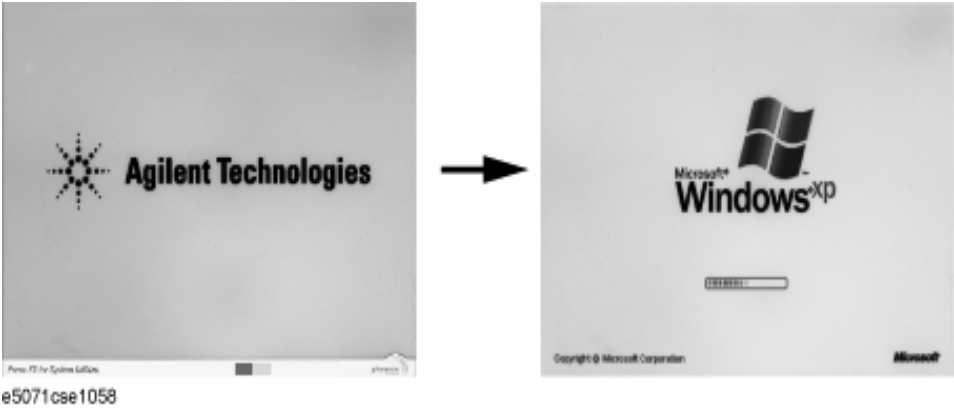
Figure 4-5 Splash Screen



Step 2. Windows boot screens

The Windows boot screens are displayed. The Windows boot screens consists of two screens. Each screen is displayed in the order as shown in Figure 4-6. If the Windows boot screens are displayed, it is assumed that the Hard Disk Drive works. While the Window screens are displayed, Windows operating system is starting up.

Figure 4-6 Windows boot screens



If you encounter the following problems, try to reinstall the operating system before replacing the Hard Disk Drive.

- "xxx file is missing" is displayed on DOS screen.

Troubleshooting

Boot Process Troubleshooting

- The Windows boot screen is not displayed after the splash screen is displayed.
- Windows always boots up with Safe Mode.

NOTE If the E5071C was turned off without shutdown process, Microsoft Scandisk runs while the windows boot screens are displayed. If a serious problem is found in the scandisk, reinstall the operating system. For details of the operating system installation, refer to Appendix B, “System Recovery,” on page 421. If the operating system still doesn't boot up properly after reinstallation, replace the Hard Disk Drive.

NOTE The operating system automatically checks the device drivers, which are necessary to use the E5071C functions and are installed in the system before the E5071C is shipped from Agilent factory. If the operating system doesn't detect them, a message box is displayed. In this case, install the device driver.

Step 3. Revision and option information

The firmware revision and hardware option information along with copyright declaration is displayed as shown in Figure 4-7. The E5071C firmware quickly starts up just before this display appears. While the revision and option information is displayed, the applications of various devices in the system are initialized.

Figure 4-7 Firmware revision and option information



If the display whited out, entirely blued or appeared with a dialog box, a mass storage problem is suspected. Try to perform the mass storage recovery procedure.

NOTE

If a message of "Will Shut Down in Five Seconds" is displayed in place of "Initializing.." and the shutdown occurs, the PCA PCI DSP card fails in starting up. The following message may be displayed before the shutdown occurs:

"Fatal Error: Failed to Initialize DSP Driver":

or "Fatal Error: Failed to Initialize DSP":

This message indicates that the PCA PCI DSP Card doesn't work or is not properly connected to the CPU Mother Board Assembly.

"Fatal Error: Failed to Update DSP Code":

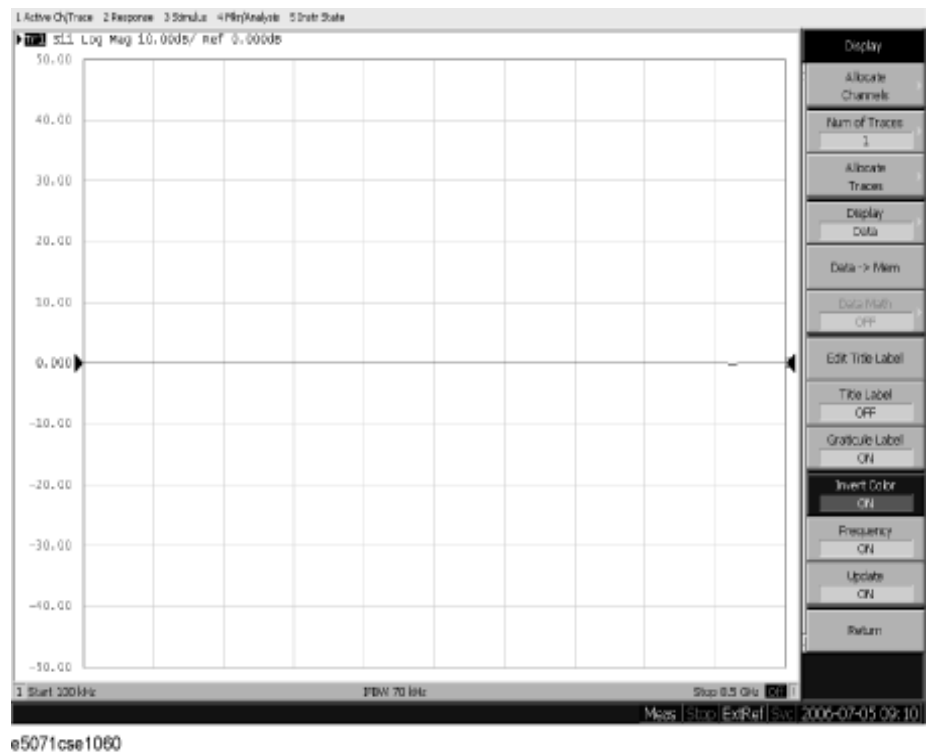
If this happened, the PCA PCI DSP Card failed in writing DSP program into flash ROM when the firmware was installed first or updated to the newest version. A problem in the PCA PCI DSP Card or CPU Mother Board Assembly is suspected.

Step 4. Measurement view

The measurement view as shown in Figure 4-8 is displayed after the system initialization is completed without problem.

Figure 4-8

Measurement view



Step 5. Power-on self test

The power-on self test is executed once automatically before the measurement starts. While the power-on self test is in progress, "Power on test" is displayed at the left in the instrument status bar. If the power-on test fails, an error message is displayed there. For more details, refer to "Troubleshooting Using Diagnostics Test" on page 236.

Troubleshooting Using Diagnostics Test

The Agilent E5071C has the diagnostics test function to diagnose the analog measurement section and internal dc power supply voltages. The diagnostics test makes it possible to isolate a faulty board assembly without need of external test equipment. The following paragraphs describe the procedure to perform the internal test.

Power On Self Test

Power-on self-test always takes place once after the E5071C is turned on. When a failure is detected, a message of the "Power on self test failed" is displayed. The content of the power-on self-test is the same as a portion of the diagnostics test program and includes the dc power supply voltage, source PLL synthesizer and level controller (ALC) tests. When the self-test failed, perform the diagnostics test to break down into the individual tests and narrow down failure possibilities.

NOTE

The following procedure can be used to restart the power-on self test as required.

- a. Press **System** key.
- b. Click **Service Menu** and, then, **Test Menu** in the softkeys.
- c. Click **Power On Test** to restart the test. Wait until the power-on test ends.
- d. The test result (OK or Failed) is displayed in the **Power On Test** key.

PLL unlock

When a PLL of the frequency synthesizers is unlocked, not the "Power on self test failed" but "Phase lock loop unlocked" message is displayed. If it occurs, Synthesizer Module may be faulty.

External reference signal phase unlock (Opt. 1E5)

If the "ExtRef" in the instrument status bar is displayed in gray, not turning blue, in using the high stability time base (Opt. 1E5), Crystal Oven board or the interconnection cable between rear panel Ref Oven and Ref In connectors may be faulty. Also check whether the "Ready" in the instrument status bar is displayed in blue (the warm-up in the instrument is completed). If it is in gray, wait until the "Ready" turns blue.

Contents of the diagnostics test

The diagnostics test contains 7 test groups shown in Table 4-1. Each test group can be performed independently and verifies one of various operating characteristics of the analog measurement section.

Table 4-1 Diagnostic test group menu

Number	Test Name
1	DCBUS TEST

Table 4-1 Diagnostic test group menu

Number	Test Name
2	INTERNAL LEVEL MONITOR TEST
3	RF OUTPUT LEVEL POWER SEEP
4	RF OUTPUT LEVEL RANGE TEST
5	RECEIVER ABSOLUTE MEASUREMENT TEST
6	RECEIVER COMPRESSION TEST
7	RECEIVER IF RANGING TEST

Required Test Equipment

Table 4-2 shows the equipment required for performing the diagnostic test.

Table 4-2 Required Equipment

Required Test Equipment	Qty	Recommended Model
24 inch 50 Ohm cable	1	Agilent p/n 8120-8862

To Execute the diagnostics Test

To isolate faulty board assembly in analog section, execute the diagnostics test in accordance with the following procedure. The test procedure needs to be performed using a mouse in addition to the front panel keys.

NOTE

To perform the diagnostics test properly, the following conditions must be met:

1. Environmental temperature: 23°C ± 5°C
2. Warm-up status indicator in the instrument status bar exhibits "Ready" in blue.

NOTE

Do not operate front panel keys, keyboard and mouse during the diagnostics test. Changing the instrument settings while the diagnostics test is in progress will cause incorrect test results.

- Step 1.** Connect a mouse to the rear panel USB connector
- Step 2.** Press **Macro Setup** key.
- Step 3.** Press **Load Project** to select **Load Project** function. "Open" dialog box will be displayed as shown in Figure 4-9.

Figure 4-9

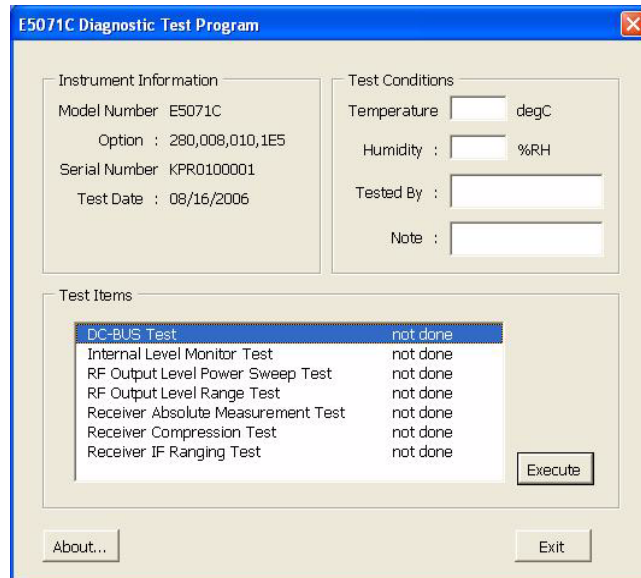
Open dialog box



- Step 4.** Select "User [D]" (preset state) from menu in the "Lock in:" box.
- Step 5.** Double-click "Agilent" folder to open it and to access its menu.
- Step 6.** Double-click "Service" folder to open it.
- Step 7.** Click "DiagnosticsTest.vba" program file to select it from program menu.
- Step 8.** Click "Open" button to download the internal test program.
- Step 9.** Press **Select Macro** to select function.
- Step 10.** Press (or click **Module1 main**) to open the **Module1 main** program file. "Diagnostics Test" dialog box will appear as shown in Figure 4-10. The dialog box shows the menu of test groups to choose from.

Figure 4-10

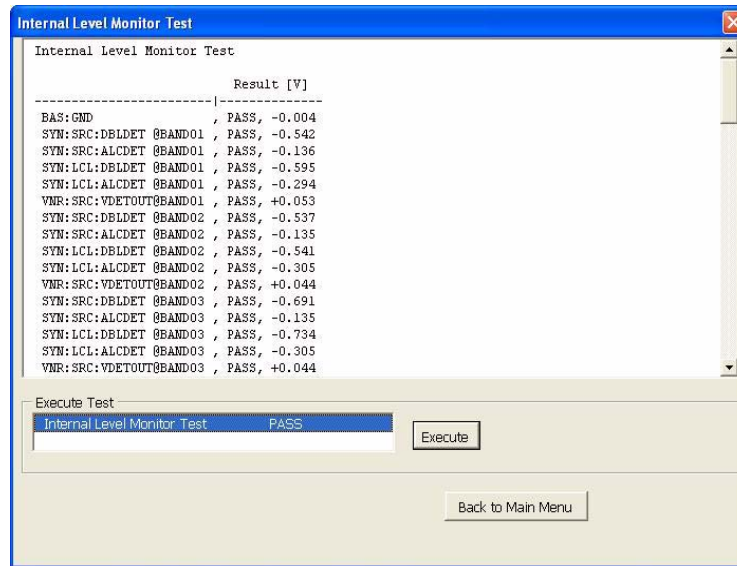
Diagnostics Test dialog box



- Step 11.** Select the Test item and Click "Execute" button to run the test program. The dialog box displays "In process..." while the test is in progress.

Step 12. When the diagnostics test is completed, the dialog box displays Pass or Fail for each test group as an example shown in Figure 4-11.

Figure 4-11 Diagnostics test result display example (Pass)



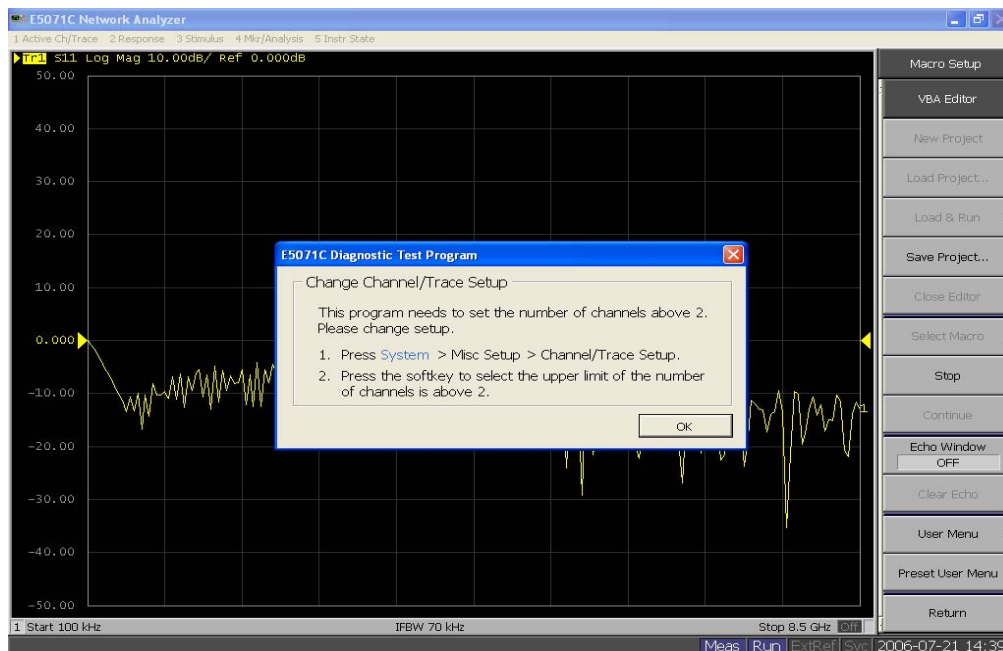
Step 13. To exit the diagnostics test, click "Exit" button.

NOTE

Test result is stocked as "resultDT.txt" in Log folder under D:\Agilent\Service.

This test is cannot be executed under 1ch/4tr (20001 points mode). If it is executed with this mode, error message is displayed shown in Figure 4-12.

Figure 4-12 Error message on Diagnostic



4. Troubleshooting

Diagnostics Test Failure Troubleshooting

Table 4-3 represents the contents of the diagnostics tests and the relationships of failed tests to probable faulty board assemblies. If the instrument fails the diagnostics test, replace the faulty board assembly as shown in Table 4-3.

It is recommended to perform the diagnostic test in accordance with the main menu. Also if it is failed on DCBUS TEST, troubleshooting is refer to Figure 4-17, and if it is failed on Internal Level Monitor, troubleshooting is refer to Figure 4-18.

Table 4-3 Diagnostic Test Failure Troubleshooting

Test No.	Group	Failed Test	Probable faulty Board Assembly								
			BAS	SRC	LCL	DBL	VNR	REC	IMX	FEM	T2
1	DC-BUS	ALL	###			##		#			
		BAS	###			##		#			
		SRC	#	###		##					
		LCL	#		###	##					
		VNR	#			##	###				
2	Internal Level Monitor	ALL	###	#	#		#	##			
		SRC	#	###				##			
		LCL	#		###			##			
		VNR	#	##			###	##			#
3	RF Output Level Power Sweep	Port 1	#	#	#	##	###	#	###	##	#
4	RF Output Level Range	Each B'd						###			#
		All	#	##	#		###	#			#
5	Receiver Absolute Measurement	Each B'd						###			#
		All	#	#	#		#	#			#
6	Receiver Compression	Each B'd						###			#
		All	#	#	#		#	#			#
7	Receiver IF Ranging	Each B'd						###			#
		All	#	#	#		#	#			#

###: Most suspicious assembly

##: Suspicious assembly

#: Possible faulty assembly

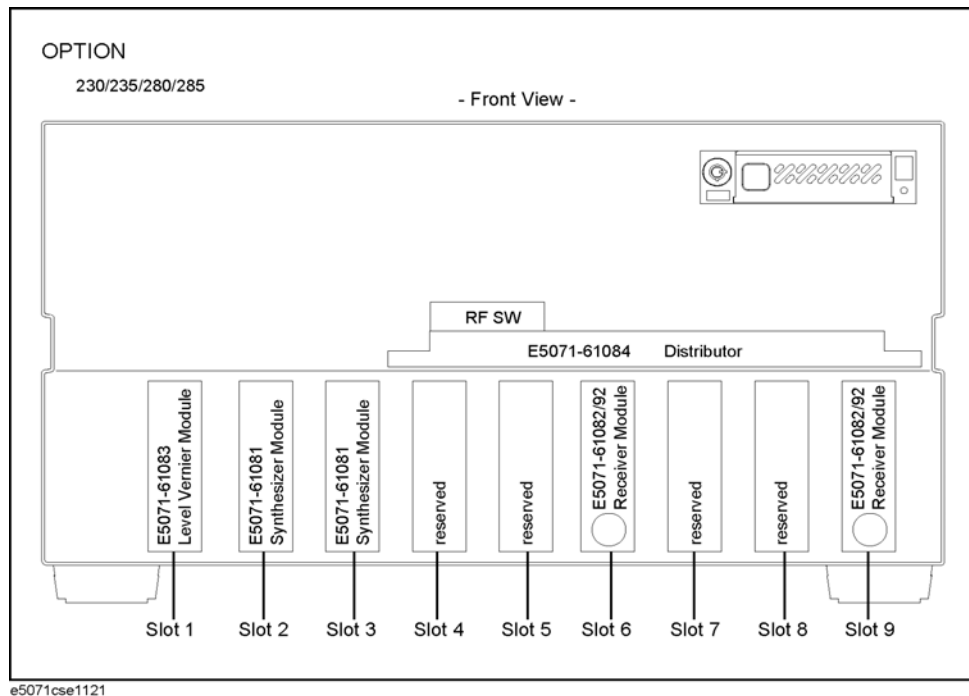
NOTE The meaning of abbreviations are shown in Table 4-4.

Table 4-4 The meaning of abbreviations

Abbreviation	Meaning (Description)
BAS	Analog Base Board
SRC	TESTED Synthesizer Module (Source)
LCL	TESTED Synthesizer Module (Local)
DBL	TESTED Doubler Module (For Option 2K5/4K5)
VNR	TESTED Level Vervier Module
REC	TESTED Receiver Module
IMX	IMIX (For Option 2K5/4K5)
FEM	Front End Module (For Option 2K5/4K5)

NOTE Module configuration is shown Figure 4-13 for 2-port, and Figure 4-15 for 4-port.

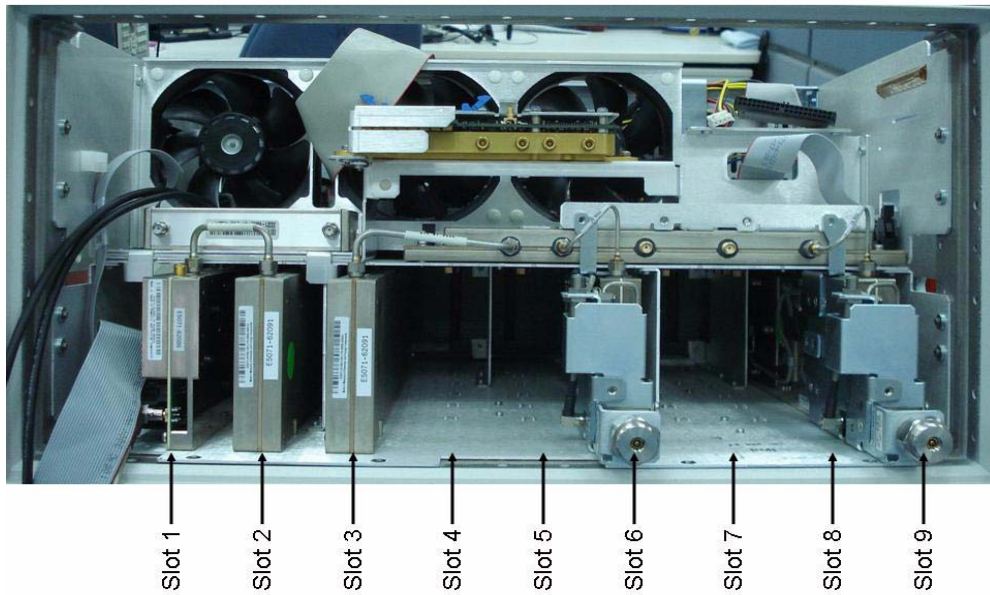
Figure 4-13 Module configuration for 2-port



- Slot 2: Synthesizer Module for Source
- Slot 3: Synthesizer Module for Local
- Slot 6: Receiver Module for Port 1
- Slot 9: Receiver Module for Port 2

Figure 4-14 Module configuration for 2-port of option 2K5

Option 2K5



Slot 1: TBR Tested Level Doubler Module

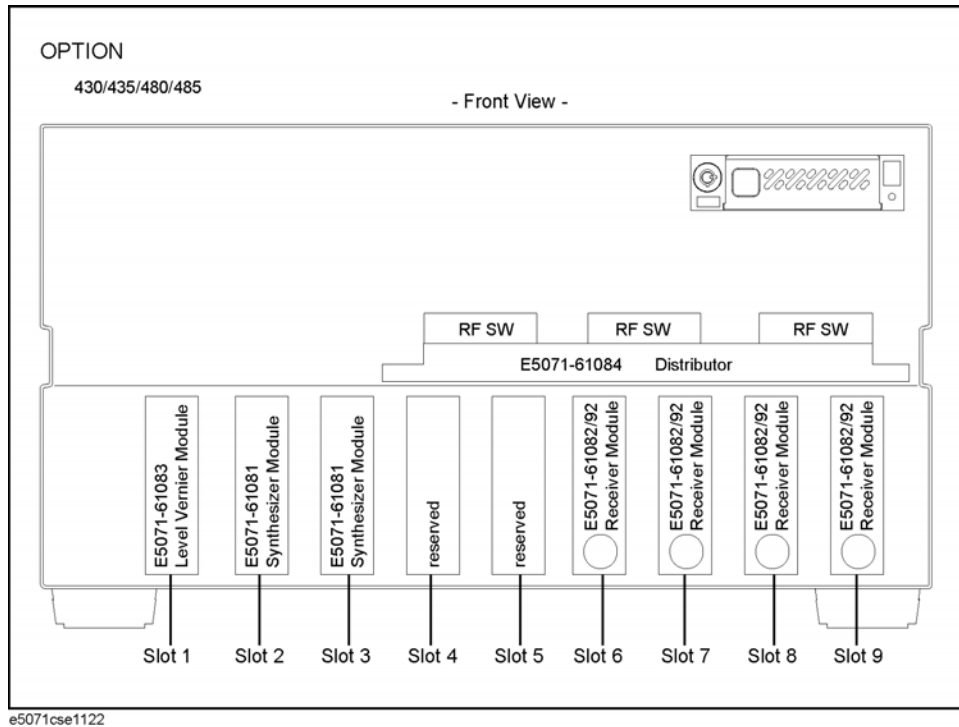
Slot 2: Synthesizer Module for Source

Slot 3: Synthesizer Module for Local

Slot 6: Receiver Board of port 1

Slot 9: Receiver Board of port 2

Figure 4-15 Module configuration for 4-port



Slot 2: Synthesizer Module for Source

Slot 3: Synthesizer Module for Local

Slot 6: Receiver Module for Port 1

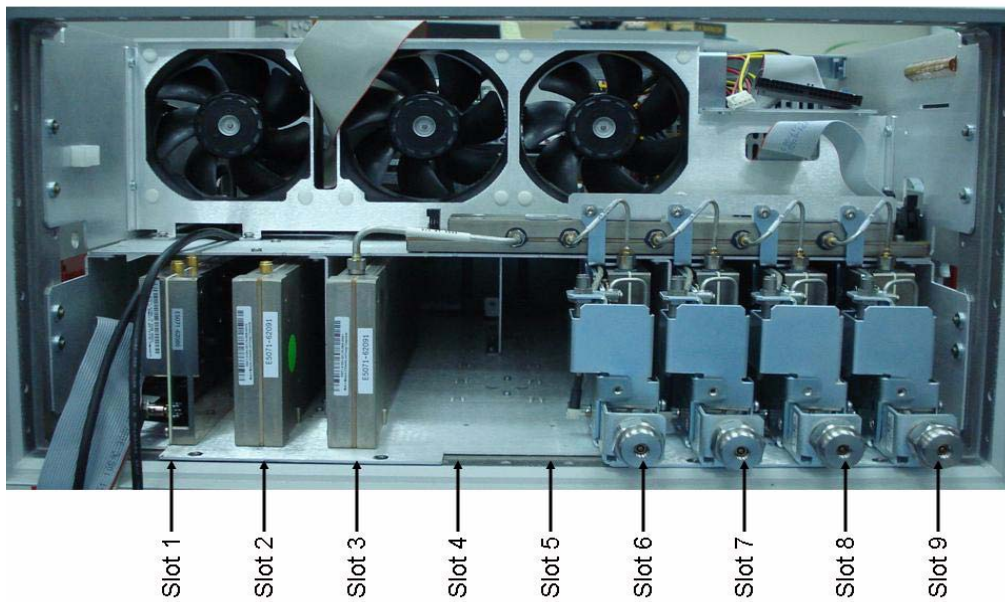
Slot 7: Receiver Module for Port 2

Slot 8: Receiver Module for Port 3

Slot 9: Receiver Module for Port 4

Figure 4-16 Module configuration for 4-port of option 4K5

Option 4K5



Slot 1: TBR Tested Level Doubler Module

Slot 2: Synthesizer Module for Source

Slot 3: Synthesizer Module for Local

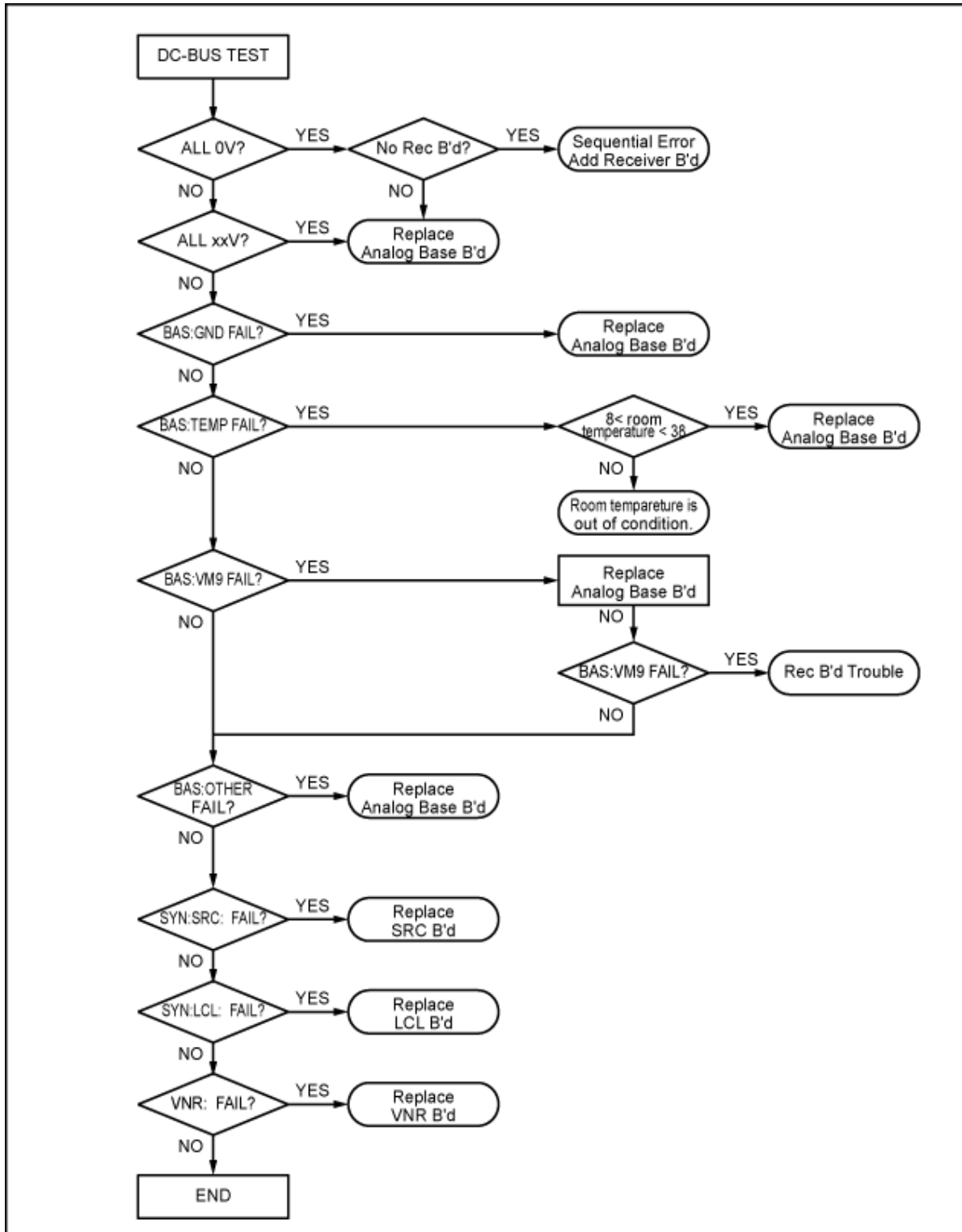
Slot 6: Receiver Board of port 1

Slot 7: Receiver Board of port 2

Slot 8: Receiver Board of port 3

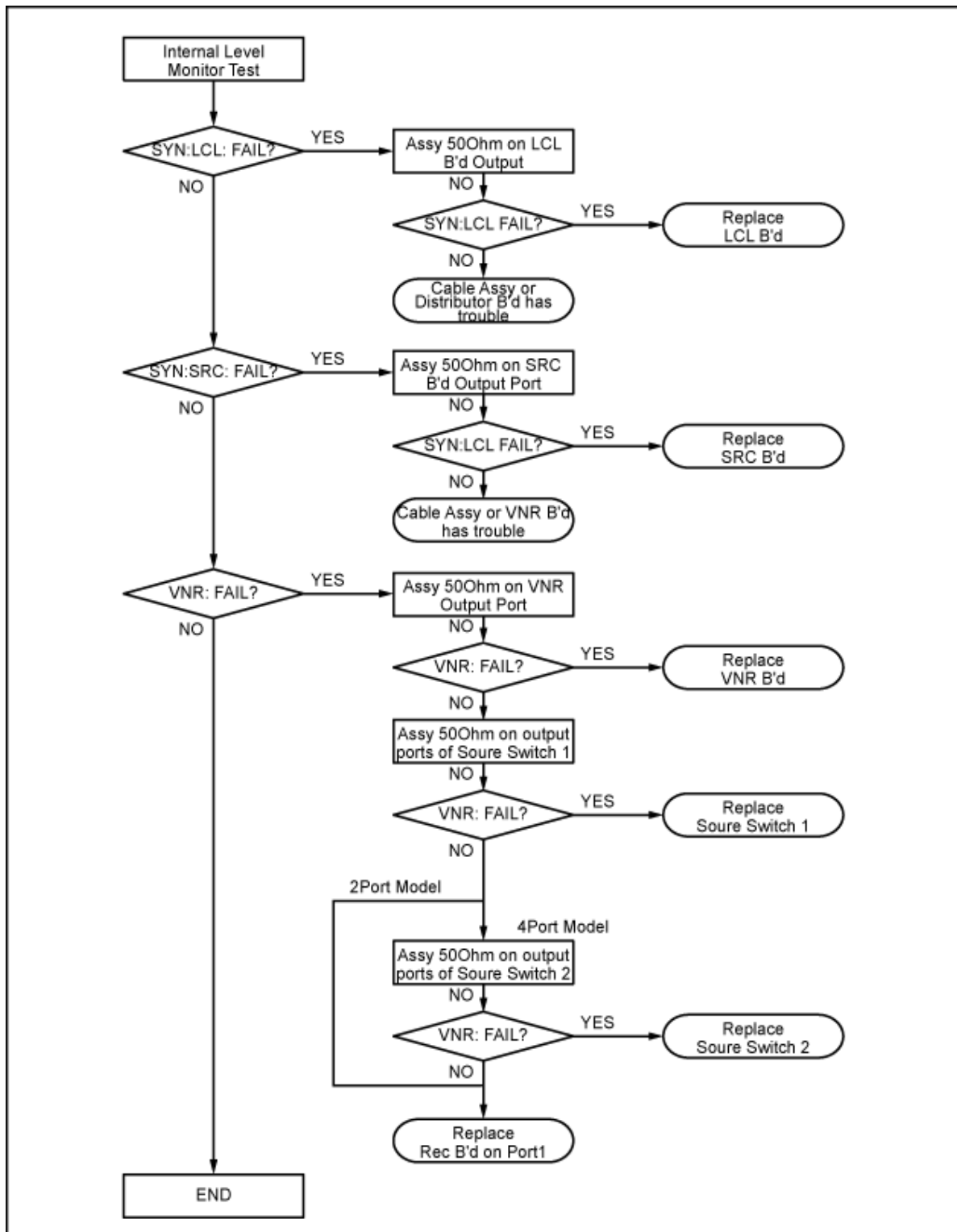
Slot 9: Receiver Board of port 4

Figure 4-17 Flowchart for troubleshooting on DC-BUS Test



e5071cse2001

Figure 4-18 Flowchart for troubleshooting on Internal Level Monitor Test



e5071cse2002

Function Specific Troubleshooting

If the E5071C exhibits a failure symptom that is related to a specific function or control such as a front panel key control, display, data storage, remote control interface, external trigger, external keyboard or mouse, isolate the trouble using the Function Specific Troubleshooting procedures described below. The major functions of the E5071C and the troubleshooting procedure for each function are shown in Table 4-5.

Table 4-5 Major functions and troubleshooting procedures

Function	Description	Troubleshooting
Front panel keys	All the E5071C functions except for VBA and service functions can be set and controlled via the front panel keys.	Refer to “To Check the Front Panel” on page 250.
Touch panel	The E5071C equipped with standard option has a touch screen display that allows all the functions in the menu bars, setup windows and dialog boxes to be set by a touch to the screen panel.	Refer to “To Check the Touch Panel” on page 250.
LCD display	Almost all the information including the measurement value, setup state, result data processing, menu bar, softkey label and others are indicated on the 10.4-inch color LCD display.	Refer to “To Check the LCD” on page 251.
External keyboard	The external keyboard can be used for the entry of numerical and character data when it is connected to the keyboard interface connector (USB) on the rear panel.	Refer to “To Check the External Keyboard” on page 251.
Mouse	The mouse can be used to move the pointer on the LCD display, select a function and change a setting, when it is connected to the mouse interface connector (USB) on the rear panel.	Refer to “To Check the Mouse” on page 251.
Video output	An external color monitor can be used to display the same information as the E5071C LCD display, when it is connected to the Video output connector (24-pin D-Sub) on the rear panel.	Refer to “To Check the Video Output” on page 252.
External trigger input	The external trigger input terminal (BNC) on the rear panel allows an external trigger source to be used for measurement trigger.	Refer to “To Check the External Trigger Input” on page 252.
GPIB interface	The GPIB compatibility allows the E5071C to be operated as a talker/listener or system controller on IEEE 488 interface bus.	Refer to “To Check the GPIB” on page 252.
Removable Hard disk drive ^{*1}	The removable hard disk drive on the front panel is used to save the E5071C setup state and measurement data.	Refer to “To Check the Removable Hard Disk Drive” on page 253.

*1. Removable hard disk use only.

To Check the Device Driver

Make sure first whether the E5071C device drivers are installed properly or not by the following procedure, if a function of specific device in the E5071C doesn't work.

- Step 1.** Exit from the E5071C measurement view in accordance with the procedure described in “How to exit from the E5071C Measurement View” on page 227. Then, Windows desktop screen is displayed.
- Step 2.** Click "My Computer" with the right button and select "Properties" as shown in Figure 4-19. Then, the System Properties(Figure 4-20) will appear.

Figure 4-19 Opening System Property Window



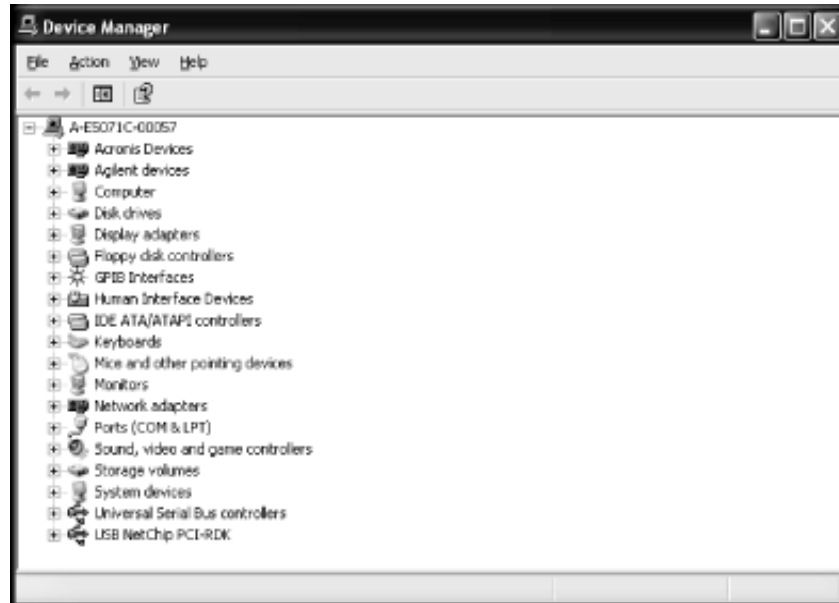
Figure 4-20 System Properties Window (General)



Step 3. Click Hardware tab and Device Manager button. The operating system detects all the necessary device drivers and displays the device names as shown in Figure 4-21.

Figure 4-21

System Properties Window (Hardware)

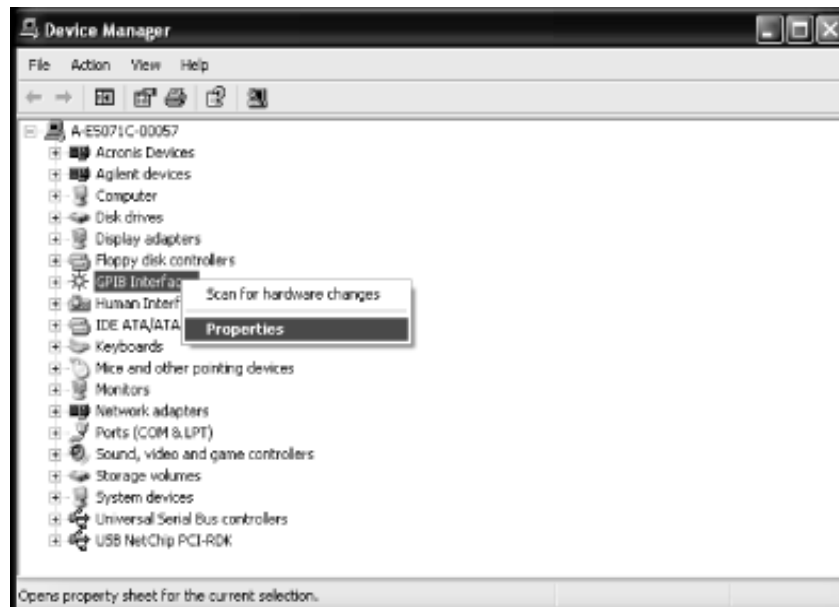


e5071cse1065

Click the icon with the right button and click Property to show the detail of the status, as shown in Figure 4-22.

Figure 4-22

Opening Device Driver Property



e5071cse1066

4. Troubleshooting

To Check the Front Panel

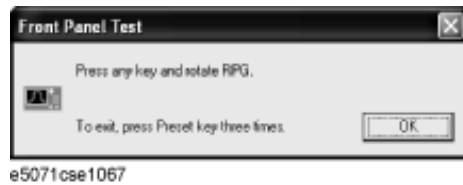
Procedure

Randomly press the front panel keys and rotate the knob to verify that they work normally.

- Step 1.** Press **System** key.
- Step 2.** Click **Service Menu** and, then, **Test Menu** in the softkeys.
- Step 3.** Click **Front Panel** in the test menu. This opens "Front Panel Test" dialog box as shown in Figure 4-23.

Figure 4-23

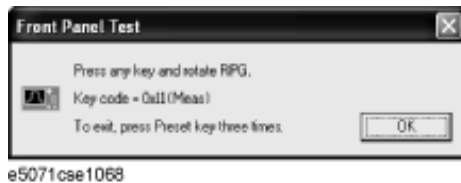
Front Panel Test dialog box



- Step 4.** Randomly press the front panel keys. The key code along with the name of the pressed key are displayed in the dialog box as shown in Figure 4-24. Turn the rotary knob clockwise or counterclockwise. The dialog box indicates the direction of the turned knob and a count of RPG output.

Figure 4-24

Key code and key name display example



- Step 5.** To exit the front panel test, press **Preset** key three times.
 - If multiple keys fail to work, a problem in PCA Front Key is suspected. Also check the flat cable between the PCA Front Key and PCA Digital Bridge.
 - If only a specific key doesn't work, check first if the key is subsided in the panel.
 - If the rotary knob doesn't work, check the PCA Front Key involving the RPG.

To Check the Touch Panel

Procedure

By touching the LCD display panel, select or change the setting of a function in the softkey menu and, then, perform the same operation with hardkeys.

- If the touch panel doesn't work correctly whereas the hardkeys function normally, a failure seems in the touch screen controller assembly (5183-4184) or touch-panel LCD assembly (E5070-60112). (The touch panel is not replaceable independently of the

LCD.)

- Check the cable between the touch screen controller and the serial interface connector on the CPU Mother Board Assembly.
- If no problem is found in the above checks, a failure in the CPU Mother Board Assembly is suspected.

To Check the LCD

Procedure

- Step 1.** Press **System** key.
- Step 2.** Click **Service Menu** and, then, **Test Menu** in the softkeys menu.
- Step 3.** Click **Display** in the test menu. The whole of the LCD screen turns Red, Green, Blue, White and Black every 2 seconds and returns to the measurement view. If the color test screen doesn't appear correctly, perform step 4.
- Step 4.** Connect an external VGA monitor to the VIDEO output port on the E5071C rear panel.
- If the monitor screen view is the same as the LCD display, the problem seems in the PCA PCI DSP Card. Check first if the PCA PCI DSP Card is securely connected to the CPU Mother Board Assembly.
 - If only the LCD display has a problem, check the flat cable between the PCA Front Key and PCA Digital Bridge.
 - If the LCD is not illuminated with backlight, check the Inverter Unit Assembly and the cable between the Inverter Unit Assembly and PCA Front Key. Also check the cables between the LCD-TPANEL Assembly and Inverter Unit Assembly.
 - If the cables are normal, check the LCD-TPANEL Assembly.

To Check the External Keyboard

Procedure

- Step 1.** Connect the external keyboard to the E5071C rear panel USB connector.
- Step 2.** Turn the instrument on.
- Step 3.** Press **Meas** key.
- Step 4.** Press **↑** and **↓** keys on the external keyboard, and verify that the cursor on the menu bar moves up and down. If it doesn't work, the external keyboard or the CPU Mother Board Assembly may be faulty.

To Check the Mouse

Procedure

- Step 1.** Connect the mouse to the E5071C rear panel USB connector.
- Step 2.** Turn the instrument on.

Troubleshooting

Function Specific Troubleshooting

- Step 3.** Move the mouse and verify that the mouse pointer moves smoothly. If it doesn't move smoothly, check first whether a foreign substance (dust, lint, etc.) is in the track ball hole of the mouse or not.
- Step 4.** Verify that the mouse buttons work normally. If any button doesn't work or the mouse pointer doesn't move, a failure in the mouse or the CPU Mother Board Assembly is suspected.

To Check the Video Output

Procedure

- Step 1.** Connect an external XGA color monitor to the Video output port on the E5071C rear panel.
- Step 2.** Turn the external monitor on.
- Step 3.** Verify that the monitor screen view is the same as the display on the LCD. If the monitor screen view is abnormal, a failure seems in the PCA PCI DSP Card.

To Check the External Trigger Input

Procedure

- Step 1.** Press **Preset** and **Enter** to initialize the E5071C.
- Step 2.** Press **Trigger** key.
- Step 3.** Click **Trigger Source** and, then, **External** in the menu bar to set the trigger mode to "External".
- Step 4.** Connect a BNC Short or 50 Ω termination to the Ext Trig connector on the rear panel and disconnect it. Thereby a measurement trigger should be generated and a measurement result (trace) should be refreshed.
- Step 5.** If no trigger occurs, a failure in the PCA PCI DSP Card is suspected.

To Check the GPIB

Procedure

Perform the E5071C performance test program. If the controller cannot detect the E5071C, the problem seems in the GPIB card or the connection of the GPIB cable.

To Check the USB Interface Card

Procedure

Connect the USB cable between the controller PC and the E5071C. Turn the controller PC on. If the E5071C cannot detect the controller PC, the problem seems in the USB Interface Card or the CPU Mother Board Assembly is suspected.

To Check the Removable Hard Disk Drive

Procedure

When the power is turned on, it is required to confirm the notch geometry is set as follows.

NOTE

If the notch geometry is not set as follows, the error message “OS not found” will be shown when you turn on the power.

Figure 4-25 Removable Hard Disk Drive



e5071cse3009

Figure 4-26 Removable Hard Disk Drive for Option 017



e5071cse3008

Performance test failure troubleshooting

This section describes the adjustment and troubleshooting procedures when the E5071C fails the performance tests. If the performance of the instrument is critical for the test limits and seems to be adjustable, perform first the adjustment(s) related to the failed test. When the test result is far from the tolerance of the test or the performance is not adjustable, isolate the faulty assembly in accordance with the "Performance tests failure troubleshooting procedure". This is for the purpose to find the parts should be replaced on the fail of the performance test, so it is recommended to execute all of the adjustment and performance test as final step, in the case of finishing the troubleshooting.

Recommended adjustment for performance test failure

Table 4-6 and Table 4-7 show the recommended adjustments when the performance test fails. Select the adjustment program corresponding to the recommended adjustment and perform the adjustment.

NOTE There are no adjustment related to trace noise, crosstalk and system dynamic range.

Table 4-6 Recommended adjustment for performance test failure

First Failed Test	Recommended Adjustment									
	OCXO	Frequency Reference	AUX Input	Synthesizer Gain	Virtual Bridge Coefficient	Source Output Power	Receiver IF Range	Receiver Port Characteristics	Receiver Absolute Gain	Receiver RF Range
AUX Input			###							
Frequency Accuracy (Standard)		###								
Frequency Accuracy (1E5)	###									
RF Output Level Accuracy&Flatness						###			###	
RF Output Level Linearity						###			###	
Trace Noise										
Crosstalk										
System Dynamic Range										
Dynamic Accuracy							###			
Uncorrected System Performance								###	###	

Table 4-7 Recommended adjustment for performance test failure (Option 2K5/4K5)

First Failed Test	Recommended Adjustment							
	OCXO	Frequency Reference	AUX Input	Synthesizer Gain	Source Output Power	Receiver IF Range	Receiver Port Characteristics	Receiver Absolute Gain
AUX Input			###					
Frequency Accuracy (Standard)		###						
Frequency Accuracy (1E5)	###							
RF Output Level Accuracy&Flatness					###			###
RF Output Level Linearity					###			###
Trace Noise								
Crosstalk								
System Dynamic Range								
Dynamic Accuracy						###		
Uncorrected System Performance							###	###

###: Most suspicious assembly

##: Suspicious assembly

#: Possible faulty assembly

Performance test failure troubleshooting

Table 4-8 and Table 4-9 represent the relationships between the failed test and probable faulty assembly. If the performance test failure cannot be removed by a proper adjustment, replace the assembly shown in this table.

Note that this table lists some typical cases. There are possibilities that other assembly may be faulty. To troubleshoot further, perform the diagnostics test procedures.

NOTE

When Crosstalk, System dynamic range or Uncorrected system performance test fails, check first whether the connections of the RF semi-rigid cables between the suspicious assembly and others are tight or loose. Also check for possible disconnection (impairment)

Troubleshooting
Performance test failure troubleshooting

of the cables and connectors.

Table 4-8 Performance test failure troubleshooting information (Option 230,235,240,245,280,285,430,435,440,445,480 and 485)

First failed test	Probable faulty board assembly or parts										
	OCXO	BAS	SYN -SRC	SYN -LCL	VNR	RCV -1	RCV -2	RCV -3	RCV -4	T2 -SW	CBL
AUX Input		###									
Frequency Accuracy (Standard)		#	###		##					#	
Frequency Accuracy (1E5)	#	#	###		##					#	
RF Output Level Accuracy & Flatness			##		###					#	
RF Output Level Linearity			##		###					#	
Trace Noise (S11)			##	##	#	###				#	
Trace Noise (S22)			##	##	#		###			#	
Trace Noise (S33)			##	##	#			###		#	
Trace Noise (S44)			##	##	#				###	#	
Trace Noise (S21, S12)			##	##	#	###	###			#	
Trace Noise (S43, S34)			##	##	#			###	###	#	
Crosstalk (S21, S12)			#	#	#	##	##			###	###
Crosstalk (S32)			#	#	#		##	##		###	###
Crosstalk (S43)			#	#	#			##	##	###	###
Crosstalk (S14)			#	#	#	##			##	###	###
System Dynamic Range (S21)			##	##	#		###			#	
System Dynamic Range (S32)			##	##	#			###		#	
System Dynamic Range (S43)			##	##	#				###	#	
System Dynamic Range (S14, S12)			##	##	#	###				#	
Dynamic Accuracy (T1)			#	#	#	###				#	
Dynamic Accuracy (T2)			#	#	#		###			#	
Dynamic Accuracy (T3)			#	#	#			###		#	
Dynamic Accuracy (T4)			#	#	#				###	#	
Uncorrected System Performance (S1, D1, R1)			##	##	#	###				#	
Uncorrected System Performance (S2, D2, R2)			##	##	#		###			#	

Table 4-8 Performance test failure troubleshooting information (Option 230,235,240,245,280,285,430,435,440,445,480 and 485)

First failed test	Probable faulty board assembly or parts										
	OCXO	BAS	SYN -SRC	SYN -LCL	VNR	RCV -1	RCV -2	RCV -3	RCV -4	T2 -SW	CBL
Uncorrected System Performance (S3, D3, R3)			##	##	#			###		#	
Uncorrected System Performance (S4, D4, R4)			##	##	#				###	#	
Uncorrected System Performance (L21,L12,T21,T12)			#	#		###	###			##	
Uncorrected System Performance (L31,L13,T31,T13)			#	#		###		###		##	
Uncorrected System Performance (L41,L14,T41,T14)			#	#		###			###	##	
Uncorrected System Performance (L32,L23,T32,T23)			#	#			###	###		##	
Uncorrected System Performance (L42,L24,T42,T24)			#	#			###		###	##	
Uncorrected System Performance (L43,L34,T43,T34)			#	#				###	###	##	

Table 4-9 Performance test failure troubleshooting information (Option 2K5/4K5)

First failed test	Probable faulty board assembly or parts														
	OCXO	BAS	SYN -SRC	SYN -LCL	DBL	RCV -1	RCV -2	RCV -3	RCV -4	DIS	DCB	IMX	FEM	FUSE	CBL
AUX Input		###													
Frequency Accuracy (Standard)		#	###		##							#			
Frequency Accuracy (1E5)	#	#	###		##							#			
RF Output Level Accuracy & Flatness			#		##							###			
RF Output Level Linearity			#		##							###			
Trace Noise (S11)			##	##	#	###						#			

Table 4-9 Performance test failure troubleshooting information (Option 2K5/4K5)

First failed test	Probable faulty board assembly or parts														
	OCXO	BAS	SYN -SRC	SYN -LCL	DBL	RCV -1	RCV -2	RCV -3	RCV -4	DIS	DCB	IMX	FEM	FUSE	CBL
Trace Noise (S22)			##	##	#		###					#			
Trace Noise (S33)			##	##	#			###				#			
Trace Noise (S44)			##	##	#				###			#			
Trace Noise (S21, S12)			##	##	#	###	###					#			
Trace Noise (S43, S34)			##	##	#			###	###			#			
Crosstalk (S21, S12)			#	#	#	##	##					###			###
Crosstalk (S32)			#	#	#		##	##				###			###
Crosstalk (S43)			#	#	#			##	##			###			###
Crosstalk (S14)			#	#	#	##			##			###			###
System Dynamic Range (S21)			##	##	#		###					#			
System Dynamic Range (S32)			##	##	#			###				#			
System Dynamic Range (S43)			##	##	#				###			#			
System Dynamic Range (S14, S12)			##	##	#	###						#			
Dynamic Accuracy (T1)			#	#	#	###						#			
Dynamic Accuracy (T2)			#	#	#		###					#			
Dynamic Accuracy (T3)			#	#	#			###				#			
Dynamic Accuracy (T4)			#	#	#				###			#			
Uncorrected System Performance (Sx)													##		
Uncorrected System Performance (D1)						#							##		
Uncorrected System Performance (D2)							#						##		
Uncorrected System Performance (D3)								#					##		
Uncorrected System Performance (D4)									#				##		
Uncorrected System Performance (R1)						##							#		

Table 4-9 Performance test failure troubleshooting information (Option 2K5/4K5)

First failed test	Probable faulty board assembly or parts														
	OCXO	BAS	SYN -SRC	SYN -LCL	DBL	RCV -1	RCV -2	RCV -3	RCV -4	DIS	DCB	IMX	FEM	FUSE	CBL
Uncorrected System Performance (R2)							##						#		
Uncorrected System Performance (R3)								##					#		
Uncorrected System Performance (R4)									##				#		
Uncorrected System Performance (L21,L12)												#	##		
Uncorrected System Performance (L31,L13)												#	##		
Uncorrected System Performance (L41,L14)												#	##		
Uncorrected System Performance (L32,L23)												#	##		
Uncorrected System Performance (L42,L24)												#	##		
Uncorrected System Performance (L43,L34)												#	##		
Uncorrected System Performance (T21,T12)						##	##					#	#		
Uncorrected System Performance (T31,T13)						##		##				#	#		
Uncorrected System Performance (T41,T14)						##			##			#	#		
Uncorrected System Performance (T32,T23)							##	##				#	#		
Uncorrected System Performance (T42,T24)							##		##			#	#		
Uncorrected System Performance (T43,T34)								##	##			#	#		

###: Most suspicious assembly

##: Suspicious assembly

#: Possible faulty assembly

NOTE The meaning of abbreviations are shown in Table 4-10.

Table 4-10 The meaning of abbreviations

Abbreviation	Meaning (Description)
OCXO	OCXO Board
BAS	Analog Base Module
SYN -SRC	TESTED Synthesizer Module for Source
SYN -LCL	TESTED Synthesizer Module for Local
BDL	Doubler Module (For Option 2K5/4K5)
VNR	TESTED Level Vervier Module
RCV -1	TESTED Receiver Module Port 1
RCV -2	TESTED Receiver Module Port 2
RCV -3	TESTED Receiver Module Port 3
RCV -4	TESTED Receiver Module Port 4
DIS	Distributer Module (For Option 2K5/4K5)
DCB	DC Bias Board (For Option 2K5/4K5)
IMIX	Imix (For Option 2K5/4K5)
FEM	Front End Module (For Option 2K5/4K5)
FUSE	Fuse of DC Bias Input (For Option 2K5/4K5)
T2 -SW	T2 Switch
CBL	Test Cable connection, Semi-Rgd Cable

NOTE Module configuration is shown Figure 4-13 for 2-port, and Figure 4-15 for 4-port.

Probable faulty board assembly or parts on Adjustment failure

Table 4-11 and Table 4-12 represent the relationships between the failed adjustment and probable faulty assembly. If the adjustment failures in this troubleshooting, replace the assembly shown in this table.

Note that this table lists some typical cases. There are possibilities that other assembly may be faulty. To troubleshoot further, perform the diagnostics test procedures.

Table 4-11 Adjustment failure troubleshooting information (Option 230,235,240,245,280,285,430,435,440,445,480 and 485)

Failed Adjustment	Failed test item	Probable faulty board assembly or parts											
		OCXO	BAS	SYN-SRC	SYN-LCL	VNR	RCV-1	RCV-2	RCV-3	RCV-4	DIS	T2-SW	CONN
OCXO		###											
Frequency Reference			##										###
AUX Input			###										
Synthesizer Gain	vSrcDblDet / vSrcAlcDet			###									
	vLrcDblDet / vLrcAlcDet			###									
Source Output Power	ccSrcVnr{ 1 2}Vref					###							
	RchGain		#	#	#	##	###				#	#	
	ccSrcATT{ 1 2 }					###	#					##	
	matPowSrc[1000]					###							
	matPowSrc[4000]					###	#					##	
Receiver IF Range	ccIFRange[{R1 T1}]		#				###				#	##	
	ccIFRange[{21 T2}]		#					###			#	##	
	ccIFRange[{R3 T3}]		#						###		#	##	
	ccIFRange[{R4 T4}]		#							###	#	##	
Receiver Port Characteristics	S1,D1,R1						##						###
	S2,D2,R2							##					###
	S3,D3,R3								##				###
	S4,D4,R4									##			###
	L21,L12,T21,T12						##	##				#	###
	L31,L13,T31,T13						##		##			#	###
	L41,L14,T41,T14						##			##		#	###
	L32,L23,T32,T23							##	##			#	###
	L42,L24,T42,T24							##		##		#	###
L43,L34,T43,T34								##	##		#	###	

Table 4-12 Adjustment failure troubleshooting information (Option 2K5/4K5)

Failed Adjustment	Failed test item	Probable faulty board assembly or parts												
		OCXO	BAS	SYN-SRC	SYN-LCL	DBL	RCV-1	RCV-2	RCV-3	RCV-4	DIS	IMIX	FEM	CONN
OCXO		###												
Frequency Reference			##											###
AUX Input			###											
Synthesizer Gain	vSrcDbIvDet / vSrcAlcDet			###										
	vLrcDbIvDet / vLrcAlcDet				##									
Source Output Power	ccSrcDbIvref			##		###						#		
	ccSrcDbIvctrl			##		###						#		
	ccSrcMasVofs					###								
	RchGain		#	#	#	##					#	#		
	matPowSrc[1000]					###								
	matPowSrc[4000]					###						##		
Receiver IF Range	ccIFRange[{R1 T1}]		#				###				#	##		
	ccIFRange[{R1 T2}]		#					###			#	##		
	ccIFRange[{R3 T3}]		#						###		#	##		
	ccIFRange[{R4 T4}]		#							###	#	##		

Table 4-12 Adjustment failure troubleshooting information (Option 2K5/4K5)

Failed Adjustment	Failed test item	Probable faulty board assembly or parts													
		OCXO	BAS	SYN-SRC	SYN-LCL	DBL	RCV-1	RCV-2	RCV-3	RCV-4	DIS	IMIX	FEM	CONN	
Receiver Port Characteristics	SX												##	###	
	D1						#						##	###	
	D2							#					##	###	
	D3								#				##	###	
	D4									#			##	###	
	R1						##						#	###	
	R2							##					#	###	
	R3								##				#	###	
	R4									##			#	###	
	L21, L12											#	##	###	
	L31, L13											#	##	###	
	L41, L14											#	##	###	
	L32, L23											#	##	###	
	L42, L24											#	##	###	
	L43, L34											#	##	###	
	T21, T12							##	##				#	##	###
	T31, T13							##		##			#	##	###
	T41, T14							##			##		#	##	###
	T32, T23								##	##			#	##	###
	T42, T24								##		##		#	##	###
T43, T34									##	##		#	##	###	

###: Most suspicious assembly

##: Suspicious assembly

#: Possible faulty assembly

NOTE The meaning of abbreviations are shown in Table 4-13.

Table 4-13 The meaning of abbreviations

Abbreviation	Meaning (Description)
OCXO	OCXO Board
BAS	Analog Base Module
SYN -SRC	TESTED Synthesizer Module for Source
SYN -LCL	TESTED Synthesizer Module for Local
DBL	Doubler Module (For Option 2K5/2K4)
VNR	TESTED Level Vervier Module
RCV -1	TESTED Receiver Module Port 1
RCV -2	TESTED Receiver Module Port 2
RCV -3	TESTED Receiver Module Port 3
RCV -4	TESTED Receiver Module Port 4
DIS	Distributer Module
IMIX	Imix (For Option 2K5/4K5)
FEM	Front End Module (For Option 2K5/4K5)
T2 -SW	T2 Switch
CONN	Connection Error on the system calibration

NOTE Module configuration is shown Figure 4-13 for 2-port, and Figure 4-15 for 4-port.

To configure the CPU Mother Board Assembly and BIOS

When you replace the CPU Mother Board Assembly, you need to confirm the BIOS options using the BIOS setup utility procedure. The BIOS setup procedure is described in “To Confirm or Set the BIOS Options” on page 266.

To Identify the Motherboard Installed

Confirm the splash screen is displayed in the beginning of the boot process as shown in Figure 4-5.

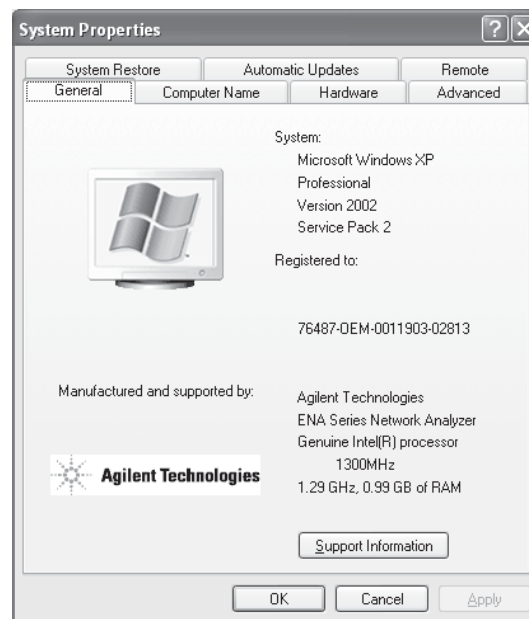
Testing DRAM on the Motherboard

When the CPU Mother Board Assembly is replaced with a new one, it is advisable to perform the DRAM test before proceeding to the BIOS setup utility procedure. Confirm the DRAM count in accordance with the following procedure.

- Step 1.** Connect the external keyboard and mouse to the E5071C rear panel connectors.
- Step 2.** Turn the instrument on. Wait until the E5071C boots up. Do not press any key until the E5071C measurement view appears.
- Step 3.** Press **[System]** key on the front panel.
- Step 4.** Click **Misc Setup** in the softkey menu.
- Step 5.** Click **Control Panel...** in the softkey menu.
- Step 6.** Scroll the function viewer to find "System" icon and double-click "System". This opens "System Properties" window as shown in Figure 4-27.

Figure 4-27

System Properties window



e5071cse1170

To configure the CPU Mother Board Assembly and BIOS

- Step 7.** Verify that "0.99 GB RAM" is displayed in the Computer profile as shown in Figure 4-27. If it is not correct, the CPU Mother Board Assembly is faulty.
- Step 8.** Click "OK" button to close the window.
- Step 9.** Turn the E5071C off before proceeding to the next step "To Confirm or Set the BIOS Options".

To Confirm or Set the BIOS Options

BIOS is the PC's built-in program describing the standard procedure of basic inputs and outputs for the system hardware. BIOS involves the system BIOS, start-up program and BIOS setup utility. The E5071C starts up first with the BIOS when the power is turned on. Use the following procedure to confirm or set the BIOS options, known as the BIOS setup utility.

Run the BIOS setup utility

Use the external keyboard to select and set various options in the BIOS setup utility. Do not operate the E5071C front panel until you exit the BIOS option setup procedure.



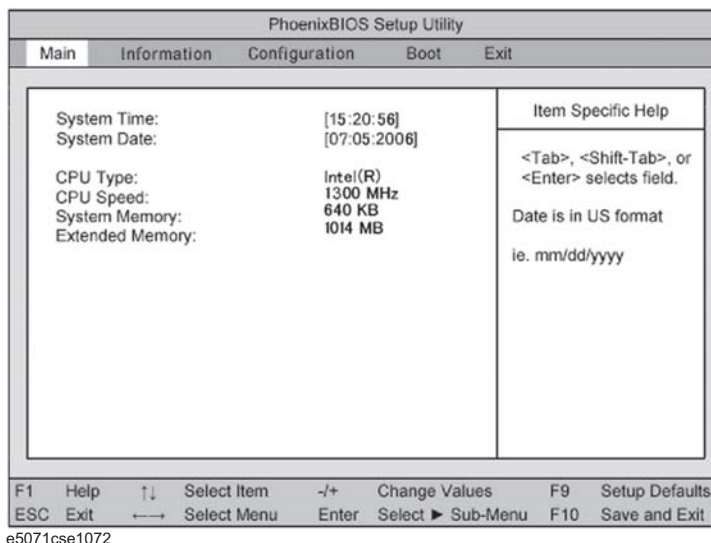
- Procedure**
- Step 1.** Connect the external keyboard to the E5071C rear panel USB connector.
 - Step 2.** Turn the instrument on.
 - Step 3.** Press [F2] key as soon as the splash screen as shown in Figure 4-5 is displayed. Wait a few seconds until the message "Enter CURRENT Password:" appears.
 - Step 4.** Press  key (The LED in the key lights.)
 - Step 5.** Enter password "e507xa" and press . Then BIOS setup utility main menu is displayed as shown in Figure 4-28.

Figure 4-28 BIOS setup utility main menu



To configure the CPU Mother Board Assembly and BIOS

- Step 6.** The BIOS setup utility has primary menus, most of which have sub-menus. Brief descriptions for these menus are provided in Table 4-14. It is recommended not to change any value except for the case of replacing CPU Mother board assembly..
- Step 7.** Select a desired menu using **←** **→** keys. Select an item in the menu or sub-menu window using **↑** **↓** keys. To perform an operation, use **Enter** key.

NOTE

If you want to exit the BIOS option setting and exit the BIOS setup utility without saving changes in the setup, select "Exit Discarding Changes" and press **Enter** key at the Exit Menu.

Table 4-14 BIOS setup utility primary menus

Menu	Options
Main	System Time System Date CPU Type CPU Speed System Memory Extended Memory
Information	Version Information System Monitors
Configuration	IDE Devices Configuration Diskette Options Video Configuration USB Configuration LAN Configuration PCI Expansion Slot Configuration Peripheral Configuration Power Control Configuration Security Configuration System Monitors Configuration Console Redirection

Table 4-14 BIOS setup utility primary menus

Menu	Options
Boot	Floppy check Summary screen Boot-time Diagnostics Logo Video Mode Installed OS Enable ACPI POST Errors
Exit	Exit Saving Changes Exit Discarding Changes Load setup Defaults Discard Changes Save Changes CMOS Restore Condition Save CMOS to Flash Erace CMOS from Flash Restore CMOS from Flash

Load Setup Defaults**NOTE**

Perform the following procedure only when the CPU Mother Board Assembly is replaced.

Exit menu shown below is displayed by choosing "Exit" using keys and by pressing key at the BIOS Setup Utility main menu. Select "Load Setup Defaults" using keys. The dialog box "Setup Confirmation" prompts you to select Y (Yes) or N (No). Press and to load the manufacture Setup Defaults into the BIOS ROM. As a result, almost all of the BIOS options are automatically configured to the optimal settings for the E5071C.

Exit Without Saving

If you cancel the changes in the BIOS option settings, select "Exit Discarding Changes" using keys at the Exit Menu and press key. Then, a message of "Quit Without Saving (Y/N)?" is displayed. Press and keys.

The BIOS setup utility is closed without saving the current settings.

5 **Replaceable Parts**

This chapter contains information for ordering replacement parts for the E5071C ENA Series RF Network Analyzers.

Ordering Information

To order part listed in the replaceable part lists, quote the Agilent part number, indicate the quantity required, and address the order to the nearest Agilent office. The check digit will ensure accurate and timely processing of the order.

<https://onlinestore.tm.agilent.com/Agilent/en/US/direct/onlinestore>

To order a part not listed in the replaceable part table, include the instrument model number, the description and function of the part, and the quantity of parts required. Address the order to the nearest Agilent office.

Direct Mail Order System

Within the USA, Agilent can supply parts through a direct mail order system. There are several advantages to this system:

- Direct ordering and shipping from the Agilent Parts Center in Mountain View, California.
- No maximum or minimum on any mail order (there is a minimum order amount for parts ordered through a local Agilent office when the orders require billing and invoicing)
- Prepaid transportation (there is a small handling charge for each order).
- No invoices.

In order for Agilent to provide these advantages, please send a check or money order with each order.

Mail order forms and specific ordering information are available through your local Agilent sales office. Addresses and telephone numbers are located in a separate document shipped with the manuals.

Exchange Assemblies

Under the rebuilt-exchange assembly program, certain factory-repaired and tested assemblies are available on a trade-in basis. These assemblies are offered at lower cost than a new assembly, but meet all factory specifications required of a new assembly.

The defective assembly must be returned for credit under the terms of the rebuilt-exchange assembly program. Any spare assembly stock desired should be ordered using the new assembly part number.

Replaceable Parts List

Top View (Major Assemblies)

Figure 5-1 Top View (Major Assemblies)



Table 5-1 Top View (Major Assemblies)

Ref. Desig.	Agilent Part Number	Qty.	Description
1	See Table 5-32	1	POWER SUPPLY ASSEMBLY
2	E5070-66525	1	HANDLER I/O BOARD
3	See Table 5-27	1	PCA DIGITAL BOARD
4	See Table 5-26	1	GPIB CARD ASSEMBLY
5	See Table 5-26	1	PCA PCI DSP CARD ASSEMBLY
6	See Table 5-26	1	USB (USBTMC) INTERFACE CARD ASSEMBLY
7	E5071-62001	1	DIGITAL MOTHERBOARD
8	See Table 5-31	1	FAN ASSEMBLY
9	See Table 5-23	1	REMOVABLE HARD DISK DRIVE ASSEMBLY

**Top View Opt. 230/235/240/245/280/285/430/435/440/445/480/485
(Cables)**

Figure 5-2 Top View Opt. 230/235/240/245/280/285/430/435/440/445/480/485 (Cables)

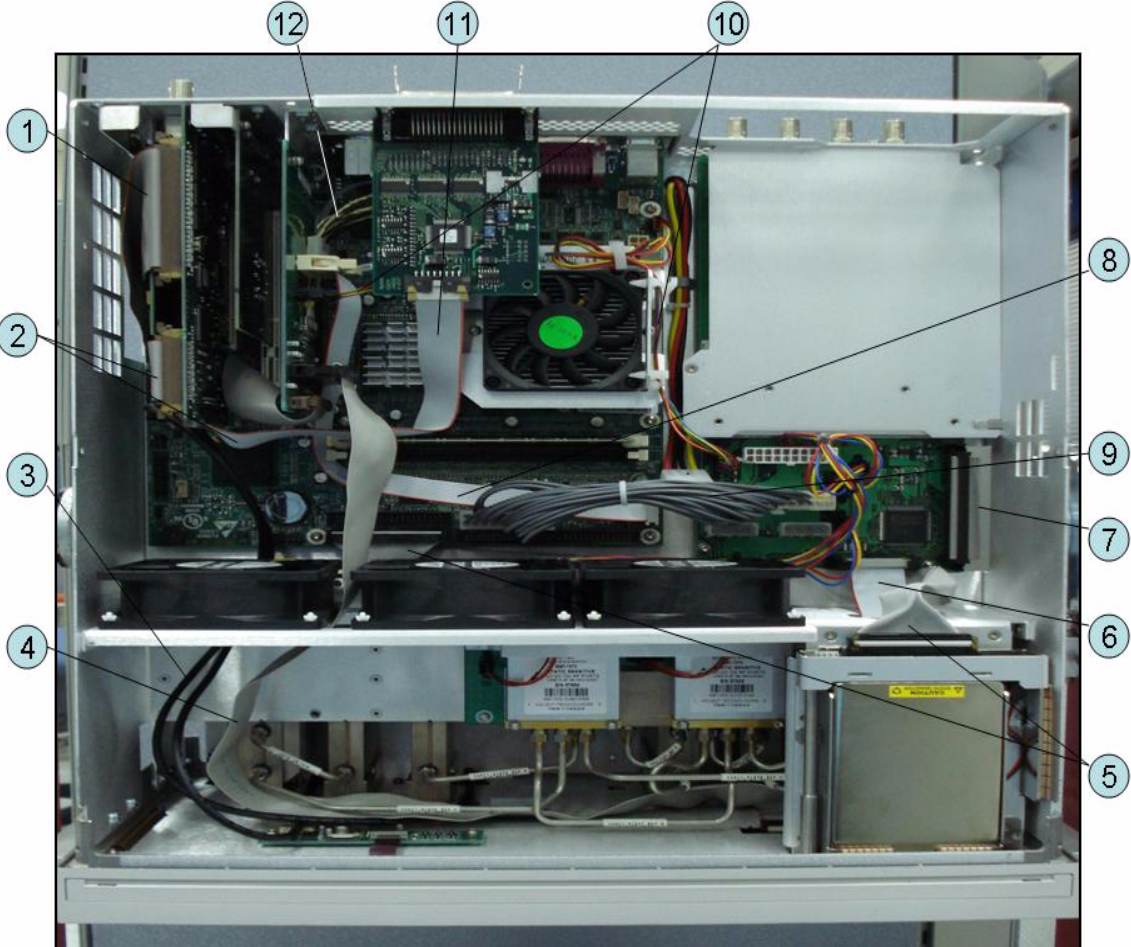


Table 5-2 Top View Opt. 230/235/240/245/280/285/430/435/440/445/480/485 (Cables)

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-61603	1	FLAT CABLE ASSY
2	E5071-61601	1	FLAT CABLE ASSY
3	E5071-61609	2	CABLE ASSY
4	E5071-61605	1	FLAT CABLE ASSY
5	E5071-61612	1	FLAT CABLE ASSY
6	E5071-61620	1	FLAT CABLE ASSY
7	E5071-61604	1	FLAT CABLE ASSY
8	E5071-61614	1	FLAT CABLE ASSY
9	E5071-61615	1	WIRE ASSY
10	E5071-61610	1	WIRE ASSY
11	E5070-61616	1	FLAT CABLE ASSY
12	E5071-61617	1	FLAT CABLE ASSY

Top View Opt. 2K5/4K5 (Cables)

Figure 5-3 Top View Opt. 2K5/4K5 (Cables)

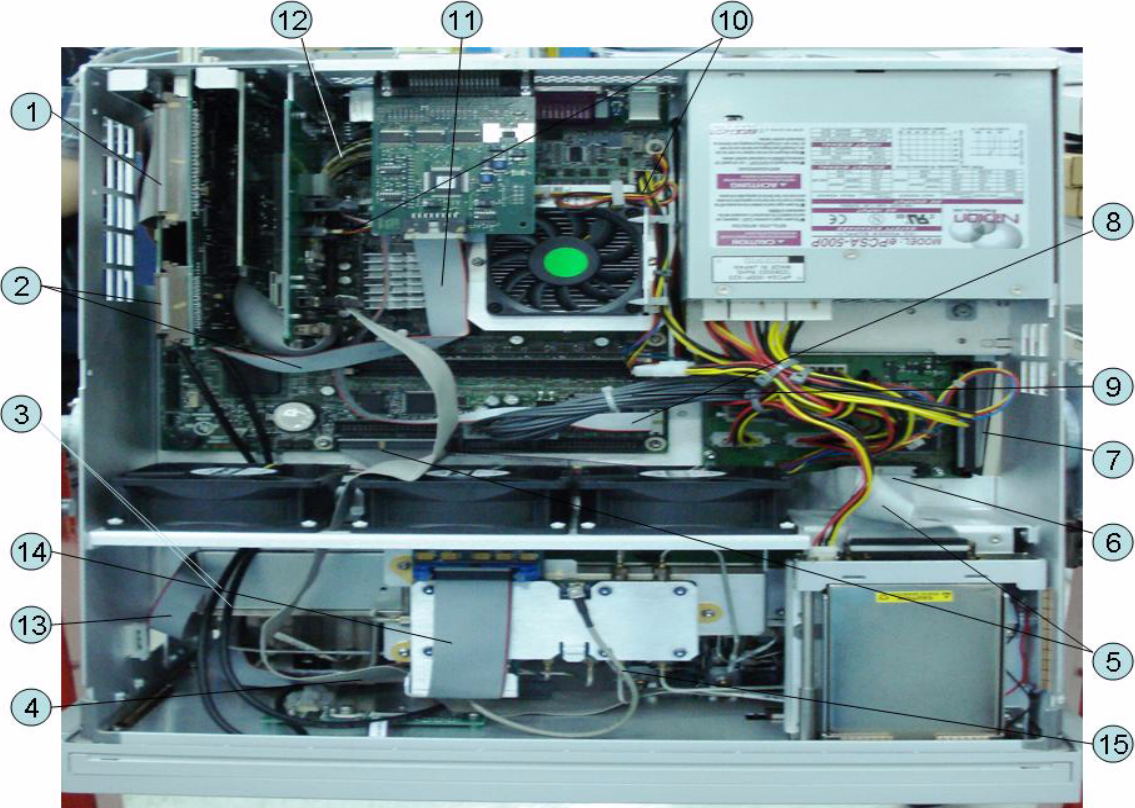


Table 5-3 Top View Opt. 2K5/4K5(Cables)

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-61603	1	FLAT CABLE ASSY
2	E5071-61601	1	FLAT CABLE ASSY
3	E5071-61609	2	CABLE ASSY
4	E5071-61605	1	FLAT CABLE ASSY
5	E5071-61612	1	FLAT CABLE ASSY
6	E5071-61620	1	FLAT CABLE ASSY
7	E5071-61604	1	FLAT CABLE ASSY
8	E5071-61614	1	FLAT CABLE ASSY
9	E5071-61615	1	WIRE ASSY
10	E5071-61610	1	WIRE ASSY
11	E5070-61616	1	FLAT CABLE ASSY
12	E5071-61617	1	FLAT CABLE ASSY
13	E5071-61665	1	FLAT CABLE ASSY
14	E5071-61664	1	FLAT CABLE ASSY
15	5188-1257	1	RF CABLE ASSY

Replaceable Parts
Replaceable Parts List

Top View (Miscellaneous Parts)

Figure 5-4

Top View (Miscellaneous Parts)

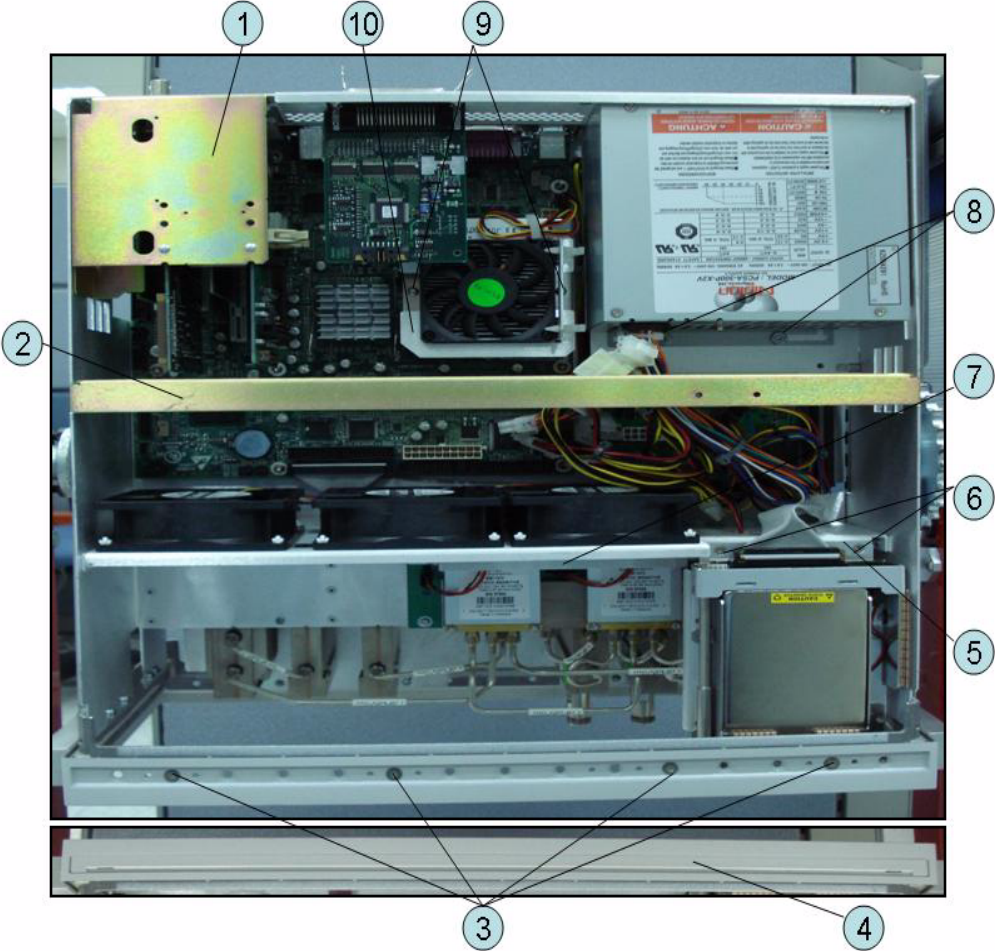


Table 5-4 Top View (Miscellaneous Parts)

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-01224	1	ANGLE PCI CARD
2	E5071-01205	1	GUIDE BAR
3	0515-1382	4	SCREW-MACH M3.5 x L6 FL T15
4	5041-9176	1	TRIM STRIP
5	E5071-01201	1	BRACKET
6	0515-1946	2	SCREW-MACH M3.0 x L6 FL T10
7	E5071-01212	1	GUARD
8	0515-1946	2	SCREW-MACH M3.0 x L6 FL T10
	3050-2247	2	WASHER
9	0515-0430	2	SCREW-MACH M3.0 x L6 PN T10
	E5071-01206	2	HOOK
10	E5071-00605	2	PLATE

**Top View Opt. 230/235/240/245/280/285/430/435/440/445/480/485
 (Under Power Supply)**

Figure 5-5 Top View Opt. 230/235/240/245/280/285/430/435/440/445/480/485 (Under Power Supply)

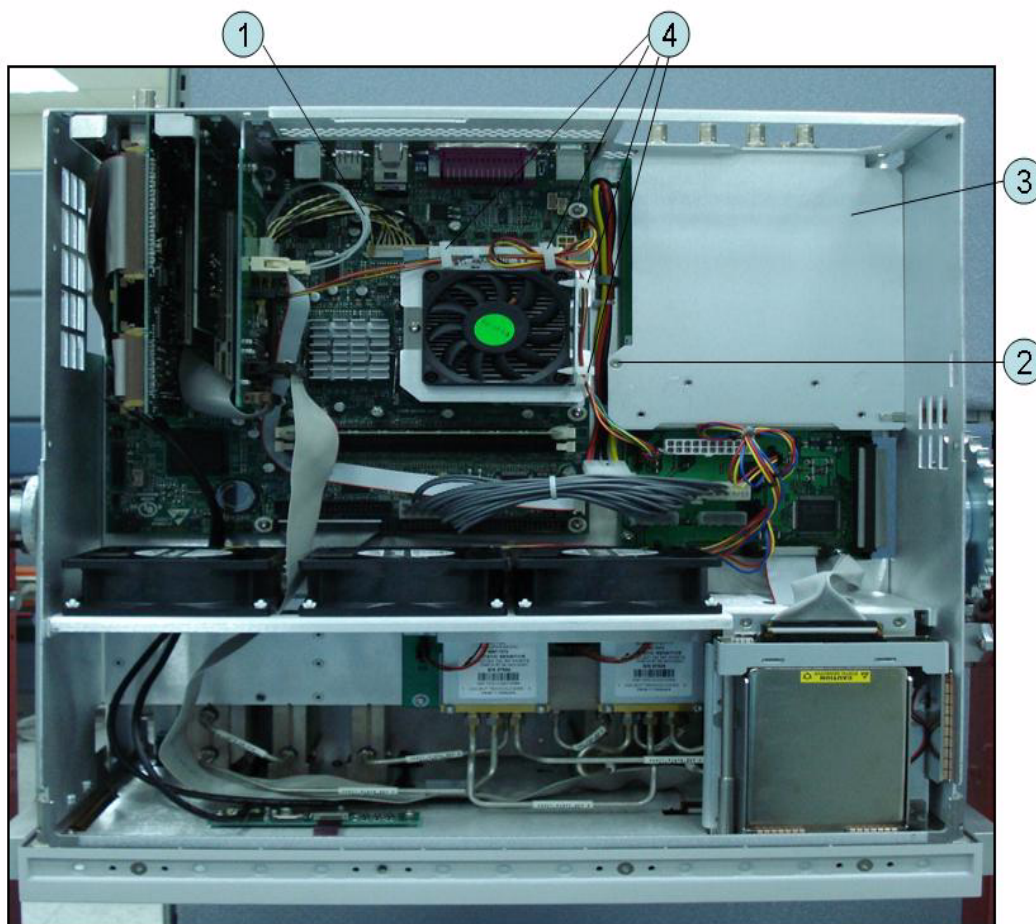


Table 5-5 Top View Opt. 230/235/240/245/280/285/430/435/440/445/480/485 (Under Power Supply)

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-61606	1	WIRE ASSY
2	0515-1946	1	SCREW-MACH M3.0 x L6 FL T10
3	E5071-00600	1	BLACKET
4	1400-0866	4	CLAMP-CABLE

**Top View Opt. 230/235/240/245/280/285/430/435/440/445/480/485
(Motherboard and Other Parts)**

Figure 5-6 Top View Opt. 230/235/240/245/280/285/430/435/440/445/480/485 (Motherboard and Other Parts)



Replaceable Parts
 Replaceable Parts List

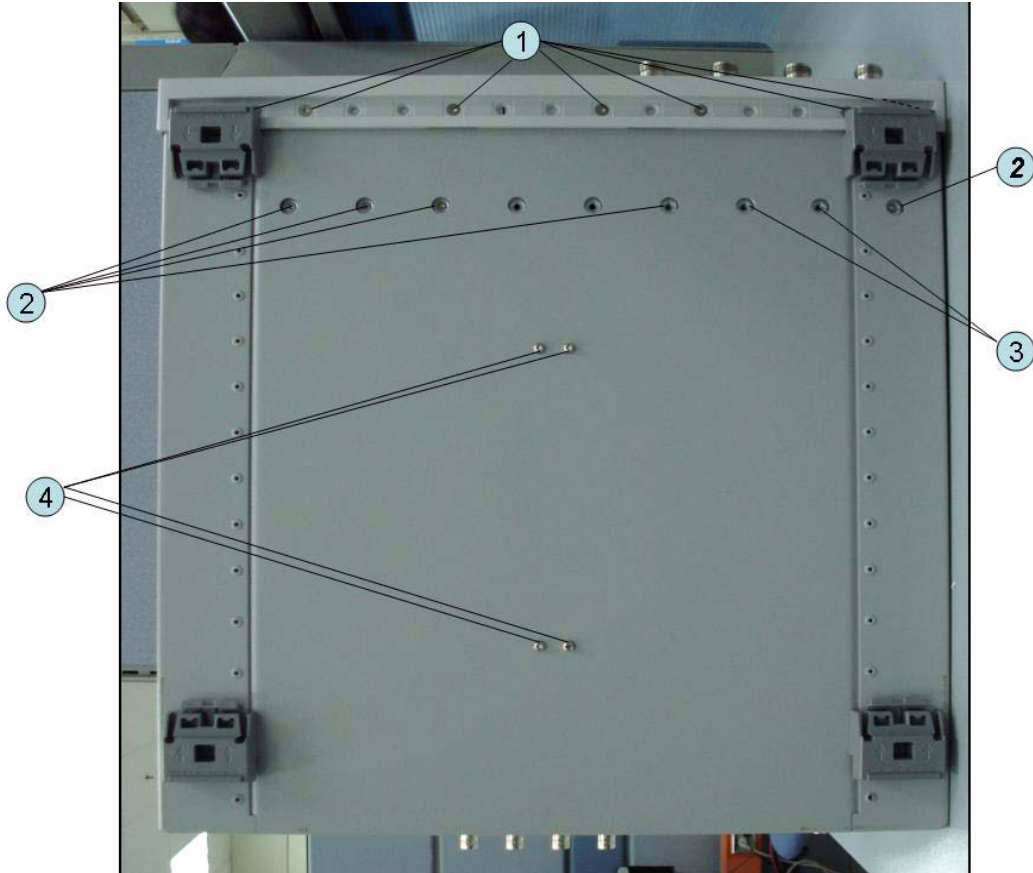
**Table 5-6 Top View Opt. 230/235/240/245/280/285/430/435/440/445/480/485
 (Motherboard and Other Parts)**

Ref. Desig.	Agilent Part Number	Qty.	Description
1	1420-0356	1	BATTERY LITHIUM (CR2032), 3V, .22A-HR
2	0515-0430	2	SCREW-MACH M3.0 x L6 PN T10
3	0363-0170	1	GASKET 10 UNITS
4	0515-0664	5	SCREW-MACH M3.0 x L12 PN T10
5	0515-0430	3	SCREW-MACH M3.0 x L6 PN T10
6	E5071-61080	1	ANALOG BASE MODULE
7	E5071-06001	1	SPACER
8	1400-1334	2	CLAMP CABLE
9	0515-0430	7	SCREW-MACH M3.0 x L6 PN T10
10	0515-0372	1	SCREW-MACH M3.0 x L8 PN T10

Bottom View

Figure 5-7

Bottom View



Replaceable Parts
Replaceable Parts List

Table 5-7 **Bottom View**

Ref. Desig.	Agilent Part Number	Qty.	Description
1	0515-1382	7	SCREW-MACH M3.5 x L6 FL T15
2	0515-1946	5	SCREW-MACH M3.0 x L6 FL T10
3	0515-1946	2	SCREW-MACH M3.0 x L6 FL T10 (Opt. 430, 435,480,485)
4	0515-0430	4	SCREW-MACH M3.0 x L6 PN T10

**Front View Opt. 230/235/240/245/280/285/430/435/440/445/480/485
(Analog)**

Figure 5-8 Front View Opt. 230/235/240/245/280/285/430/435/440/445/480/485 (Analog)

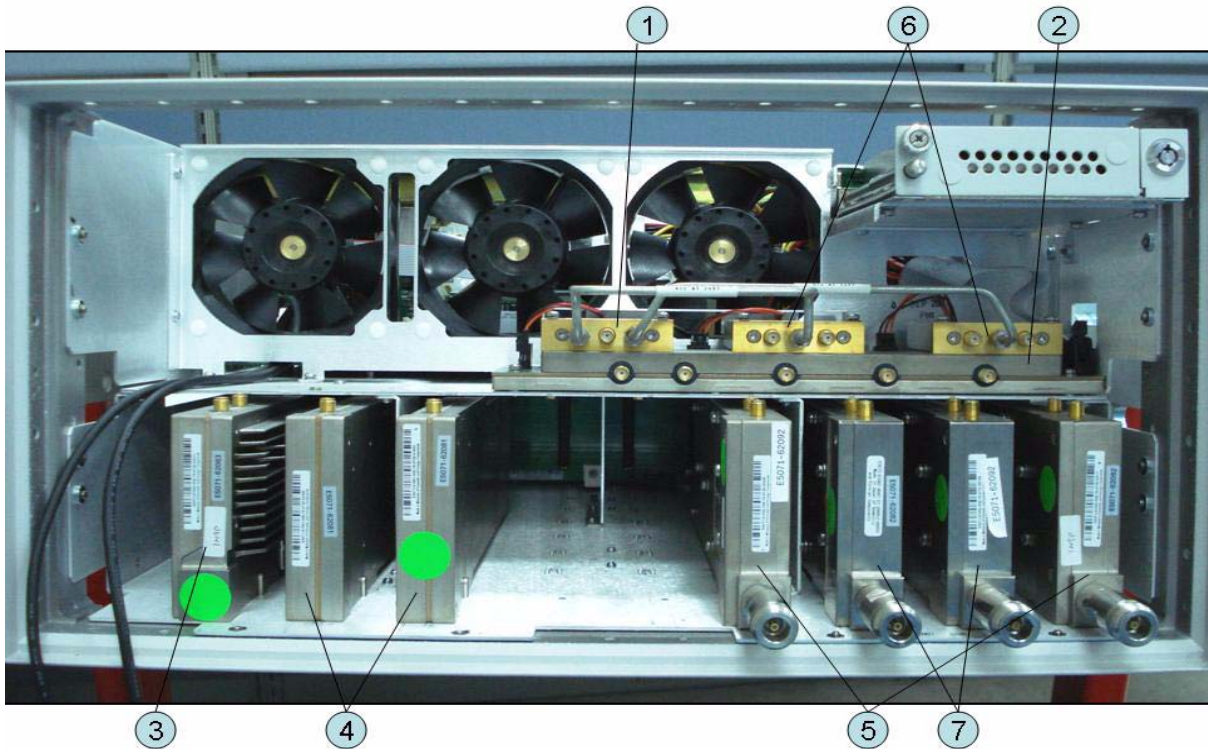


Table 5-8 Front View Opt. 230/235/240/245/280/285/430/435/440/445/480/485 (Analog)

Ref. Desig.	Agilent Part Number	Qty.	Description
1	5087-7272	1	SWITCH RF SPDT
2	E5071-61084 (A4)	1	DISTRIBUTOR MODULE
3	E5071-62083 (A3)	1	LEVEL VERNIER BOARD
	E5071-69083	1	LEVEL VERNIER BOARD (Exchange)
4	E5071-62091 (A1)	2	SYNTHESIZER BOARD
	E5071-69091	2	SYNTHESIZER BOARD (Exchange)
5	E5071-62182 (A2)	2	RECEIVER BOARD (Opt. 230, 280, 430, 480)
	E5071-69182	2	RECEIVER BOARD (Exchange Opt. 230, 280, 430, 480)
	E5071-62192 (A2)	2	RECEIVER BOARD (Opt. 235, 285, 435, 485)
	E5071-69192	2	RECEIVER BOARD (Exchange Opt. 235, 285, 435, 485)
6	5087-7272	2	SWITCH RF SPDT (Opt. 430, 435, 480, 485)

Replaceable Parts
Replaceable Parts List

Table 5-8 **Front View Opt. 230/235/240/245/280/285/430/435/440/445/480/485 (Analog)**

Ref. Desig.	Agilent Part Number	Qty.	Description
7	E5071-62182 (A2)	2	RECEIVER BOARD (Opt. 430, 480)
	E5071-69182	2	RECEIVER BOARD (Exchange Opt. 430, 480)
	E5071-62192 (A2)	2	RECEIVER BOARD (Opt. 435, 485)
	E5071-69192	2	RECEIVER BOARD (Exchange Opt. 435, 485)

Front View Opt. 2K5/4K5 (Analog)

Figure 5-9 Front View Opt, 2K5/4K5 (Analog)

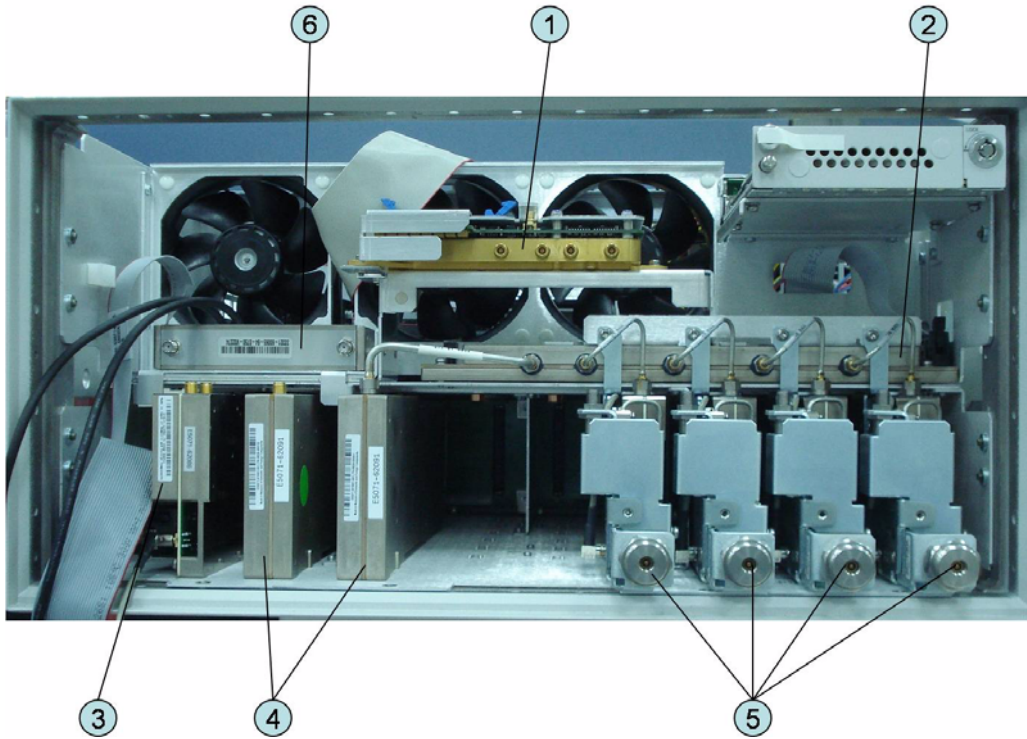


Table 5-9 Front View Opt. 2K5/4K5 (Analog)

Ref. Desig.	Agilent Part Number	Qty.	Description
1	5087-7719	1	IMIX
2	E5071-61084 (A84)	1	DISTRIBUTOR MODULE
3	E5071-62086 (A86)	1	TESTED LEVEL DOUBLER MODULE
	E5071-69086	1	TESTED LEVEL DOUBLER MODULE (Exchange)
4	E5071-62091 (A1)	2	SYNTHESIZER BOARD
	E5071-69091	2	SYNTHESIZER BOARD (Exchange)
5	See Table 5-29	1	RECEIVER MODULE ASSEMBLY (Opt. 2K5)
6	33321-60065	1	ATTENUATOR 60 dB 20 GHz

Front View Opt. 2K5/4K5 (Miscellaneous Parts)

Figure 5-10 Front View Opt, 2K5/4K5 (Miscellaneous Parts)

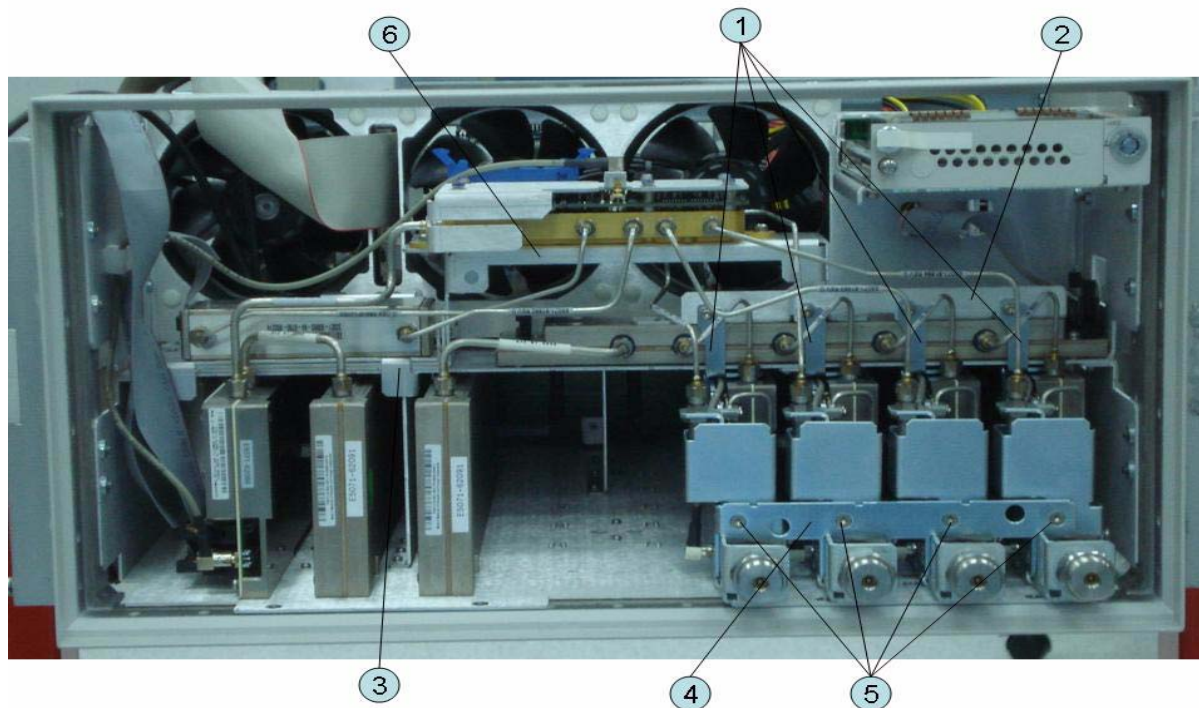


Table 5-10 Front View Opt. 2K5/4K5 (Miscellaneous Parts)

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5070-01296	2	ANGLE (Opt. 2K5)
	E5070-01296	4	ANGLE (Opt. 4K5)
2	E5070-01295	1	ANGLE
3	E5070-01292	1	ANGLE ATTENUATOR
4	E5071-00614	1	PLATE
5	0515-1946	2	SCREW -MACH FLT -HD (Opt. 2K5)
	0515-1946	4	SCREW -MACH FLT -HD (Opt. 4K5)
6	E5070-01268	1	BRACKET MASSQUAD

Front View (Semirigid Cables) (Opt. 230/235/240/245/280/285)

Figure 5-11

Front View (Semirigid Cables) (Opt. 230/235/240/245/280/285)

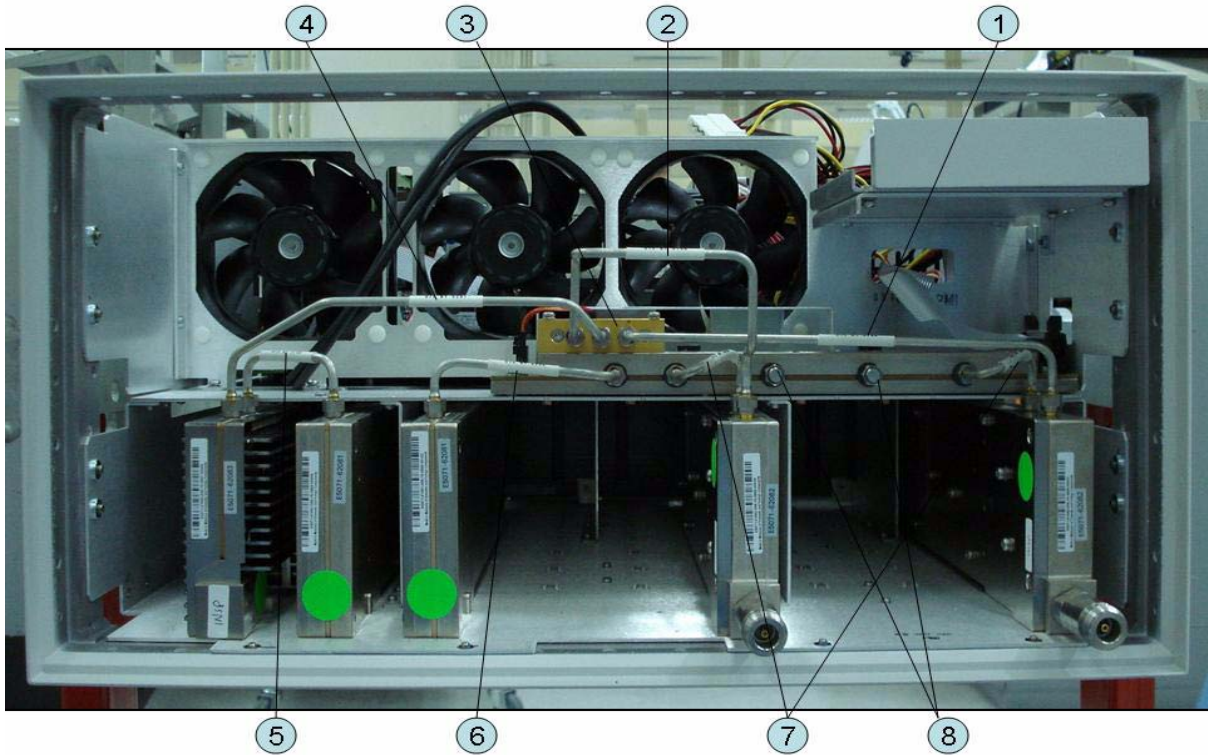


Table 5-11

Front View (Semirigid Cables) (Opt. 230/235/240/245/280/285)

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-61641	1	RF CABLE ASSY SRGD
2	E5071-61640	1	RF CABLE ASSY SRGD
3	0955-0301	1	ATTENUATOR
4	E5071-61639	1	RF CABLE ASSY SRGD
5	E5071-61635	1	RF CABLE ASSY SRGD
6	E5071-61634	1	RF CABLE ASSY SRGD
7	E5071-61631	2	RF CABLE ASSY SRGD
8	1810-0118	2	TERMINATION

Front View (Semirigid Cables) (Opt. 430/435/440/445/480/485)

Figure 5-12

Front View (Semirigid Cables) (Opt. 430/435/440/445/480/485)

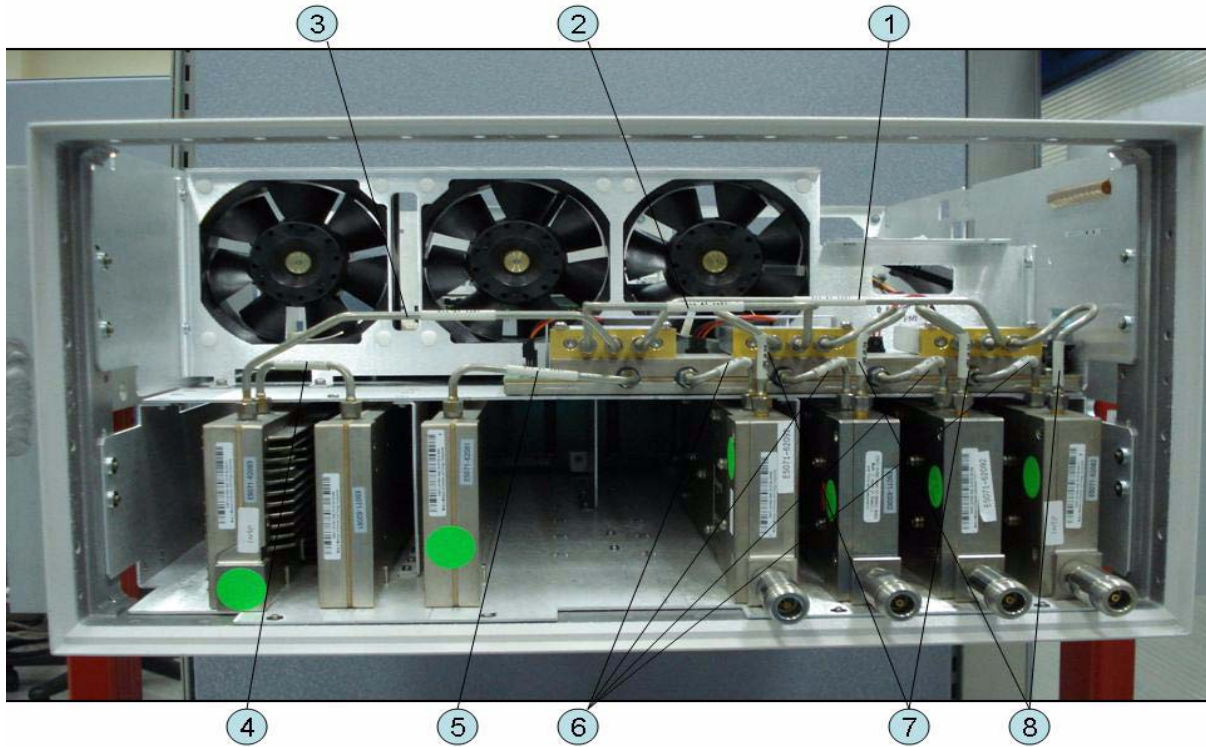


Table 5-12

Front View (Semirigid Cables) (Opt. 430/435/440/445/480/485)

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-61638	1	RF CABLE ASSY SRGD
2	E5071-61637	1	RF CABLE ASSY SRGD
3	E5071-61636	1	RF CABLE ASSY SRGD
4	E5071-61635	1	RF CABLE ASSY SRGD
5	E5071-61634	1	RF CABLE ASSY SRGD
6	E5071-61631	4	RF CABLE ASSY SRGD
7	E5071-61632	2	RF CABLE ASSY SRGD
8	E5071-61633	2	RF CABLE ASSY SRGD

Front View (Semirigid Cables) (Opt. 2K5)

Figure 5-13

Front View (Semirigid Cables) (Opt. 2K5)

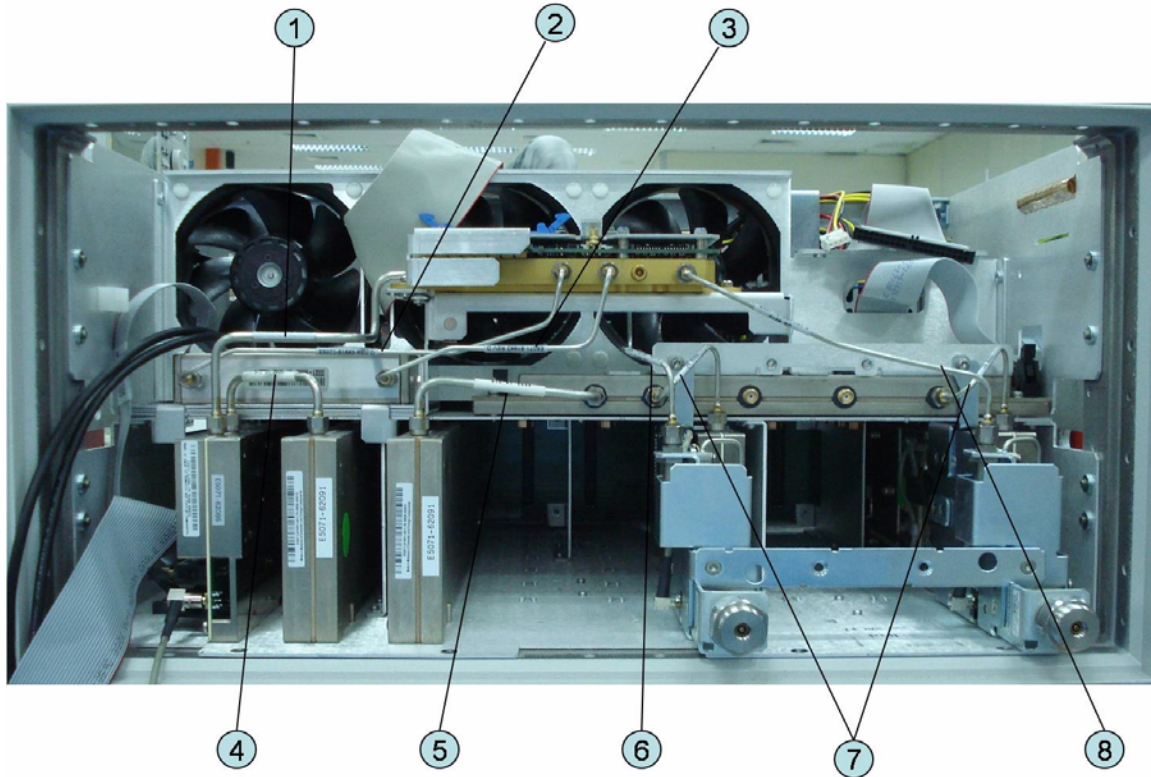


Table 5-13

Front View (Semirigid Cables) (Opt. 2K5)

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-61661	1	RF CABLE ASSY SRGD
2	E5071-61663	1	RF CABLE ASSY SRGD
3	E5071-61662	1	RF CABLE ASSY SRGD
4	E5071-61635	1	RF CABLE ASSY SRGD
5	E5071-61634	1	RF CABLE ASSY SRGD
6	E5071-61691	1	RF CABLE ASSY SRGD
7	E5071-61643	2	RF CABLE ASSY SRGD
8	E5071-61694	1	RF CABLE ASSY SRGD

Front View (Semirigid Cables) (Opt. 4K5)

Figure 5-14 Front View (Semirigid Cables) (Opt. 4K5)

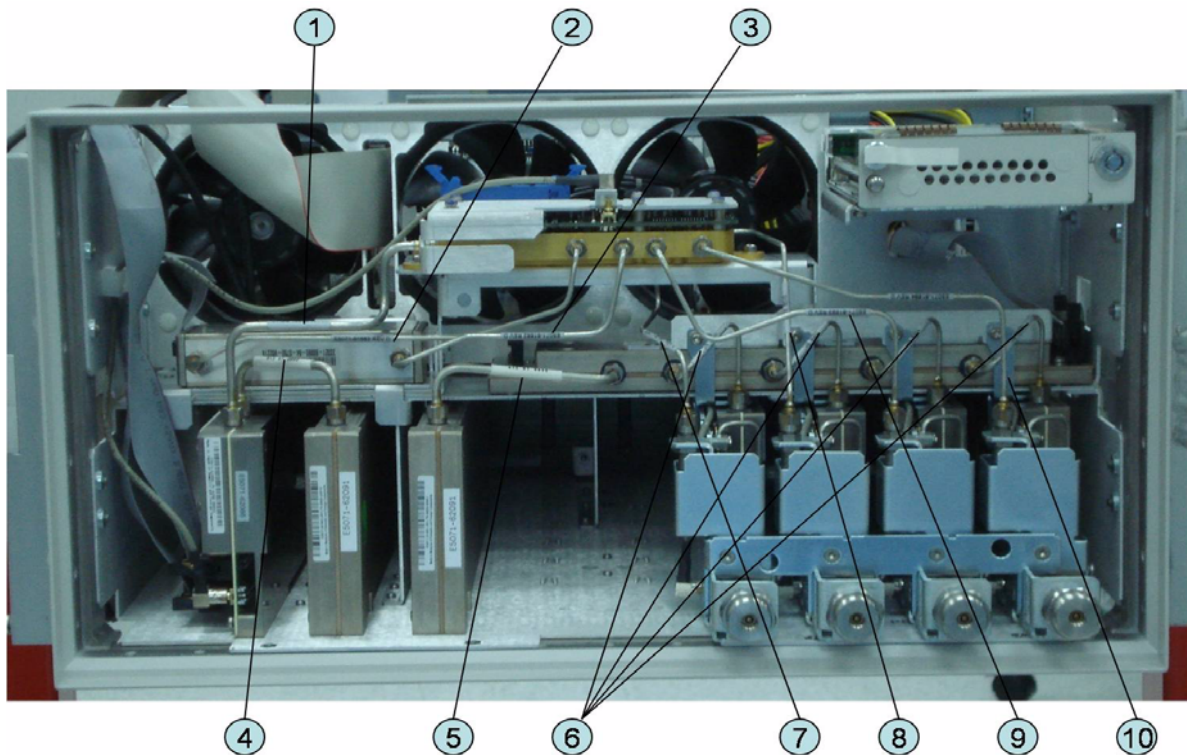
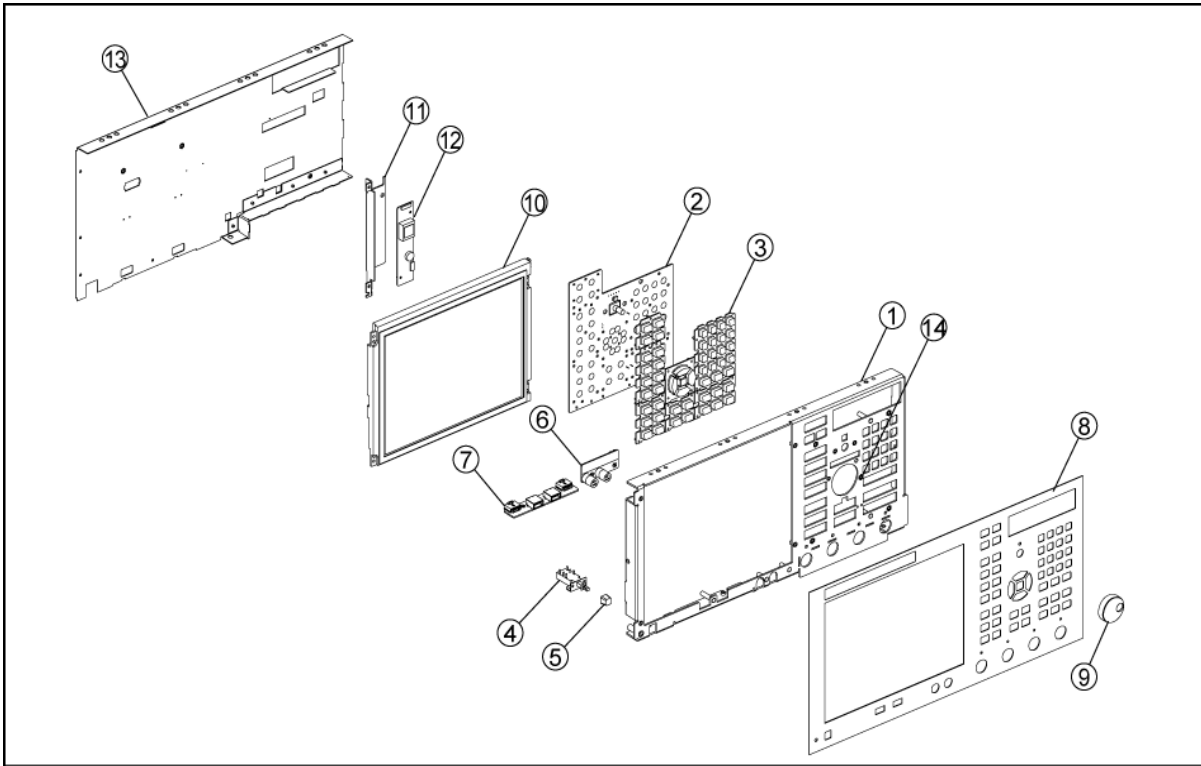


Table 5-14 Front View (Semirigid Cables) (Opt. 4K5)

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-61661	1	RF CABLE ASSY SRGD
2	E5071-61663	1	RF CABLE ASSY SRGD
3	E5071-61662	1	RF CABLE ASSY SRGD
4	E5071-61635	1	RF CABLE ASSY SRGD
5	E5071-61634	1	RF CABLE ASSY SRGD
6	E5071-61643	4	RF CABLE ASSY SRGD
7	E5071-61691	1	RF CABLE ASSY SRGD
8	E5071-61692	1	RF CABLE ASSY SRGD
9	E5071-61693	1	RF CABLE ASSY SRGD
10	E5071-61694	1	RF CABLE ASSY SRGD

Front Panel

Figure 5-15 Front Panel



e5071cse1012

Replaceable Parts
Replaceable Parts List

Table 5-15 Front Panel

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-00222	1	PANEL SUB
2	E5070-66552	1	FRONT PANEL KEYBOARD
3	E5071-25101	1	KEYPAD RUBBER
4	See Table 5-40	1	STANDBY SWITCH ASSEMBLY
5	0371-3953	1	KEY CAP
6	See Table 5-40	1	PCA PROBE POWER
7	See Table 5-40	1	PCA FRONT USB
8	E5071-00252	1	PANEL FRONT (Opt. 23x, 28x)
	E5071-00254	1	PANEL FRONT (Opt. 43x, 48x)
9	5182-7594	1	KNOB
10	E5070-60112	1	LCD-TPANEL ASSY
		1	BACKLIGHT (included in LCD-TPANEL ASSY)
11	See Table 5-39	1	BRACKET INVERTER
12	See Table 5-39	1	INVERTER LS700
13	E5071-00621	1	COVER SHIELD
14	04191-08000	1	SPRING

NOTE

The following parts in the table below can be combined as a single sub-assembly under part number E5071-60021 (Opt. 230/234/240/245/280/285/430/435/440/445/480/485) and E5071-60022 (Opt. 2K5/4K5).

Table 5-16

**E5071-60021 Sub-Assembly
Opt.230/235/240/245/280/285/430/435/440/445/480/485**

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-00222	1	PANEL SUB
2	E5070-66552	1	FRONT PANEL KEYBOARD
3	E5071-25101	1	KEYPAD RUBBER
4	See Table 5-40	1	STANDBY SWITCH ASSEMBLY
5	0371-3953	1	KEY CAP
6	See Table 5-40	1	PCA PROBE POWER
7	See Table 5-40	1	PCA FRONT USB

Table 5-16

**E5071-60021 Sub-Assembly
 Opt.230/235/240/245/280/285/430/435/440/445/480/485**

Ref. Desig.	Agilent Part Number	Qty.	Description
10	E5070-60112	1	LCD-TPANEL ASSY
		1	BACKLIGHT (included in LCD-TPANEL ASSY)
11	See Table 5-39	1	BRACKET INVERTER
12	See Table 5-39	1	INVERTER LS700
13	E5071-00621	1	COVER SHIELD

Table 5-17

E5071-60022 Sub-Assembly Opt. 2K5/4K5

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-00272	1	PANEL SUB
2	E5070-66552	1	FRONT PANEL KEYBOARD
3	E5071-25101	1	KEYPAD RUBBER
4	See Table 5-40	1	STANDBY SWITCH ASSEMBLY
5	0371-3953	1	KEY CAP
6	See Table 5-40	1	PCA PROBE POWER
7	See Table 5-40	1	PCA FRONT USB
10	E5070-60112	1	LCD-TPANEL ASSY
		1	BACKLIGHT (included in LCD-TPANEL ASSY)
11	See Table 5-39	1	BRACKET INVERTER
12	See Table 5-39	1	INVERTER LS700
13	E5070-00672	1	COVER SHIELD

Replaceable Parts
 Replaceable Parts List

Rear View (1)

Figure 5-16

Rear View (1)



Table 5-18 Rear View (1)

Ref. Desig.	Agilent Part Number	Qty.	Description
1	0515-0372	6	SCREW-MACH M3.0 x L8 PN T10
2	8160-1677	1	I/O SHIELD
3	0515-0372	2	SCREW-MACH M3.0 x L8 PN T10
4	2950-0054	4	NUT
	2190-0054	4	WASHER-LK INTL T
5	1250-0252	1	BNC CONNECTOR (Opt. 1E5)
	2950-0035	1	NUT-HEX-DBL-CHAM (Opt. 1E5)
	2190-0102	1	WSHR-LK INTL T (Opt. 1E5)
	E5071-00610	1	SPACER (Opt. 1E5)
	6960-0041	1	PLUG HOLE (Opt. UNQ)
6	0515-1402	3	SCREW-MACH M3.5 x L8 PN T15
7	0515-1402	2	SCREW-MACH M3.5 x L8 PN T15
8	5185-3720	1	LABEL

Rear View (2)

Figure 5-17

Rear View (2)



Table 5-19 Rear View (2)

Ref. Desig.	Agilent Part Number	Qty.	Description
1	0515-1946	3	SCREW-MACH M3.0 x L6 FL T10
2	0515-0430	6	SCREW-MACH M3.0 x L6 PN T10
3	0515-1946	3	SCREW-MACH M3.0 x L6 FL T10
4	2950-0035	2	NUT (Opt. 235, 285)
	2190-0102	2	WASHER (Opt. 235, 285)
	6960-0524	2	PLUG-HOLE (Opt. 235, 285)
	2950-0035	4	NUT (Opt. 435, 485)
5	2190-0102	4	WASHER (Opt. 435, 485)
	6960-0524	4	PLUG-HOLE (Opt. 230, 280, 430, 480)
	2110-0046	2	FUSE 0.5A 125V (Opt. 235, 285)
	1400-0112	2	FUSE HOLDER CAP (Opt. 235, 285)
	6960-0309	2	PLUG-HOLE (Opt. 235, 285)
	2110-0046	4	FUSE 0.5A 125V (Opt. 435, 485)
	1400-0112	4	FUSE HOLDER CAP (Opt. 435, 485)
	6960-0309	4	PLUG-HOLE (Opt. 430, 480)

Cover Assembly

Figure 5-18 Cover Assembly



Table 5-20 Cover Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-04002	1	COVER ASSY
2	5041-9186	2	STRAP HANDLE FRT
	0515-2049	2	SCREW-MACH M5.0 x L16 FL T20
3	5041-9173	2	SIDE TRIM 221.5
4	5041-9167	4	FOOT FL
	1460-1345	2	WIREFORM
	5021-2840	4	KEY LOCK
5	E5100-40002	4	STANDOFF
	0515-1402	4	SCREW-MACH M3.5 x L8 PN T15
6	5041-9187	2	STRAP HANDLE REAR
	0515-2049	2	SCREW-MACH M5.0 x L16 FL T20
7	08720-00081	2	STRAP HANDLE

Left Side View

Figure 5-19

Left Side View

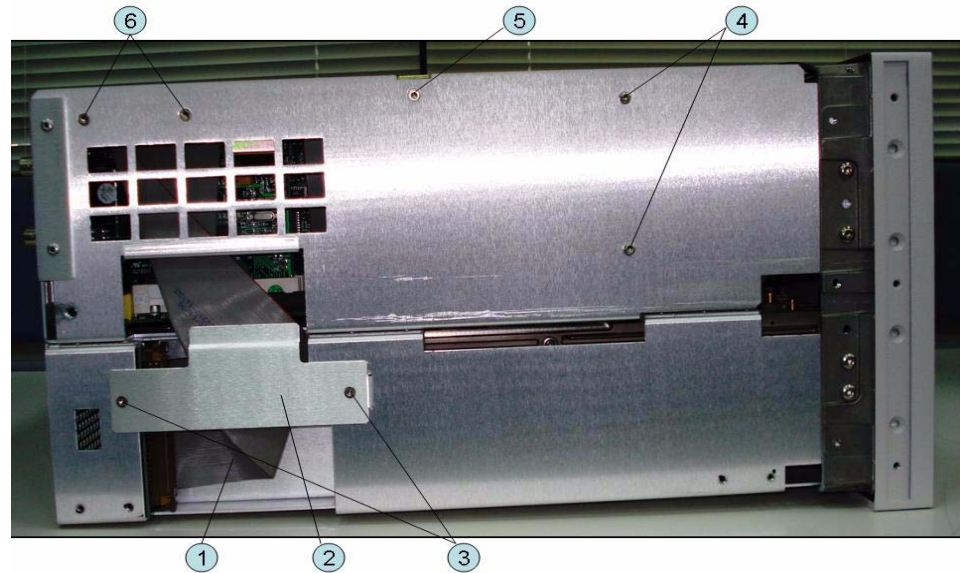


Table 5-21 **Left Side View**

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-61603	1	FLAT CABLE ASSY
2	E5071-00607	1	PLATE
3	0515-1946	2	SCREW-MACH M3.0 x L6 FL T10
4	0515-0430	2	SCREW-MACH M3.0 x L6 PN T10
5	0515-2146	1	SCREW-MACH M3.0 x L4 FL T10
6	0515-1946	2	SCREW-MACH M3.0 x L6 FL T10

Right Side View

Figure 5-20

Right Side View

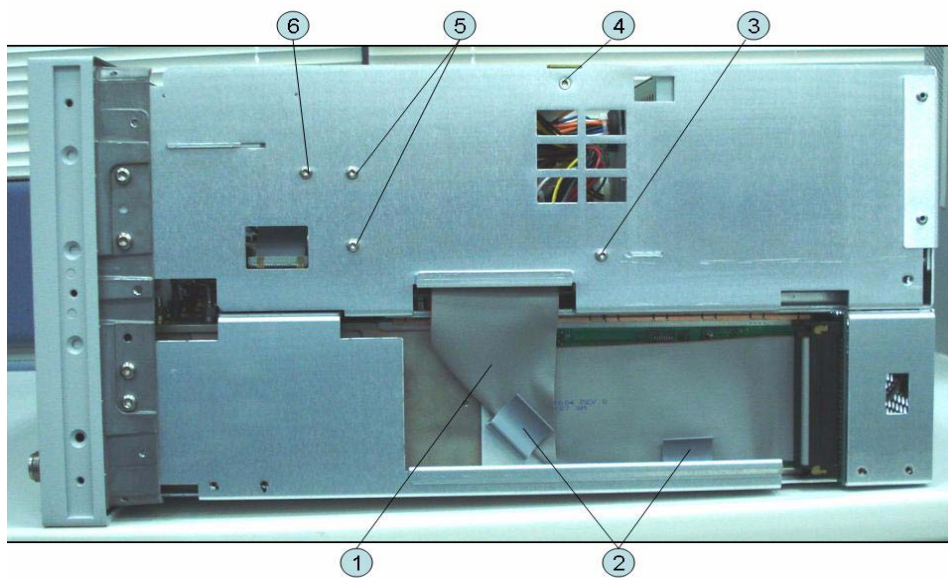


Table 5-22 **Right Side View**

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-61604	1	FLAT CABLE ASSY
2	1400-0611	2	CLAMP CABLE
3	0515-0430	1	SCREW-MACH M3.0 x L6 PN T10
4	0515-2146	1	SCREW-MACH M3.0 x L4 FL T10
5	0515-0430	2	SCREW-MACH M3.0 x L6 PN T10
6	0515-0372	1	SCREW-MACH M3.0 x L8 PN T10

Removable Hard Disk Drive Assembly (Obsolete)

Figure 5-21

Removable Hard Disk Drive Assembly (Obsolete)

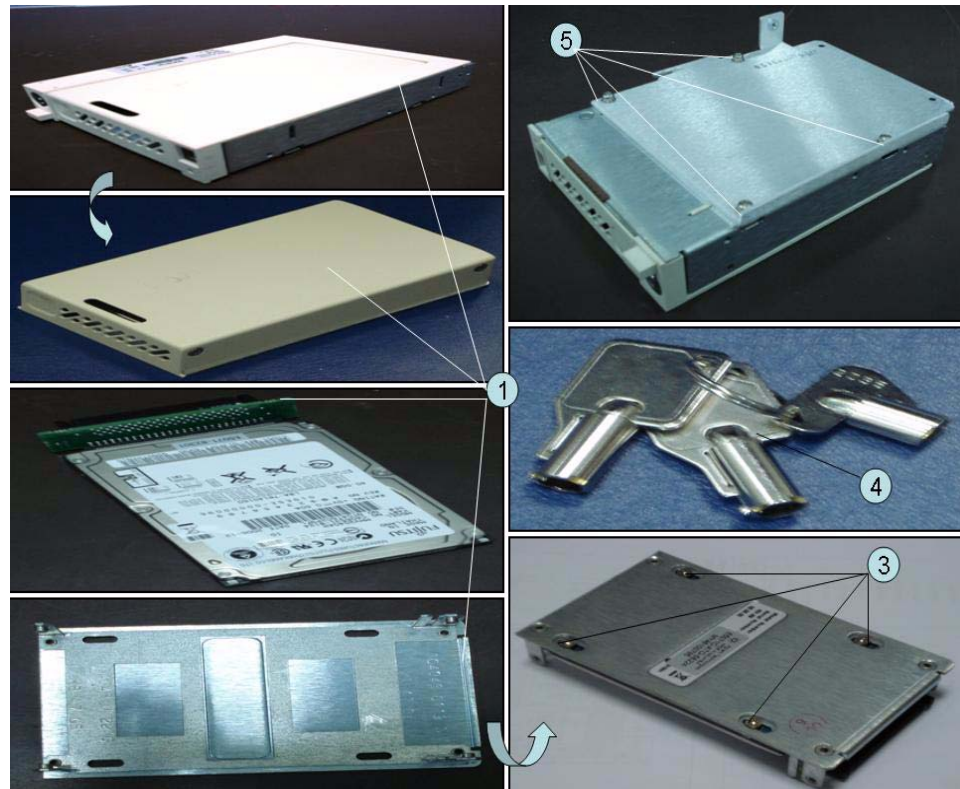


Table 5-23

Removable Hard Disk Drive Assembly (Obsolete)

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5052-60101	1	HDD CARRIER (Service Center Only)
2	E5071-82301	1	HDD INSTALLED (Service Center Only)
3	0515-4353	4	SCREW-MACH M3.0 x L3 PN T10 (Service Center Only)
4	0960-2562	1	HDD KEYS
5	0515-0430	4	SCREW-MACH M3.0 x L6 PN T10

Removable Hard Disk Drive Assembly Option 017

Figure 5-22

Removable Hard Disk Drive Assembly Option 017

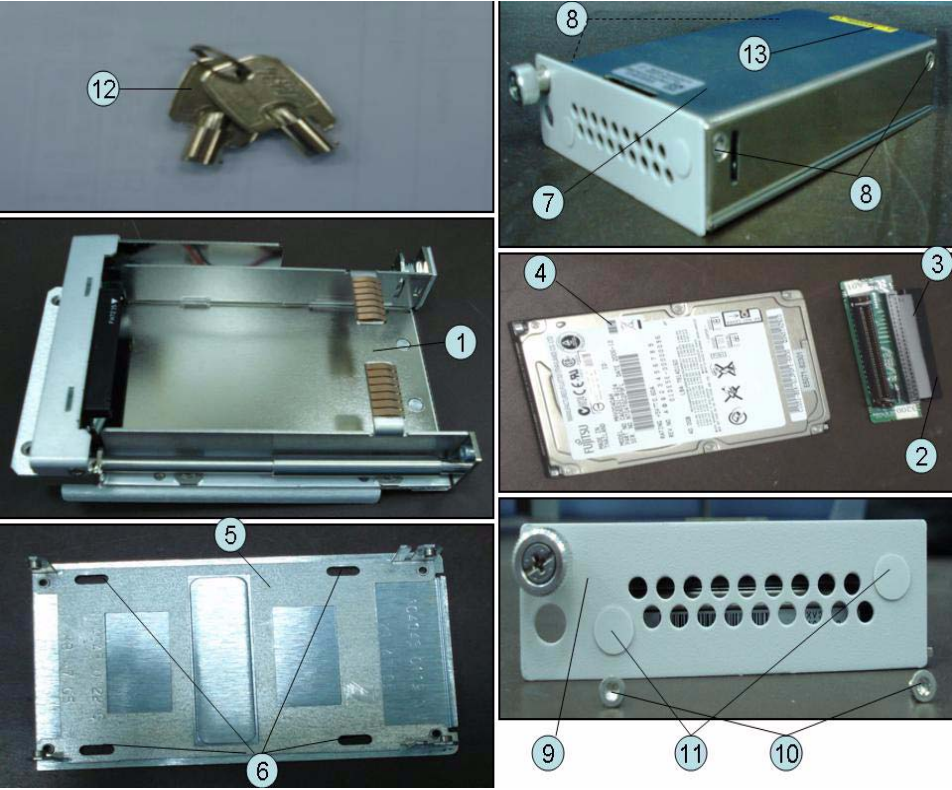


Table 5-24 Removable Hard Disk Drive Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5052-60101	1	REMOVABLE HDD 2.5INCH RECEIVING FRAME ASSY
2	E5070-66538	1	CONNECTOR BD PCA
3	E5070-61668	1	FLAT CBL ASSY
4	E5071-82301	1	HDD INSTALLED (Service Center Only)
5	E5070-00650	1	PLATE BOTTOM
6	0515-2146	4	SCREW-MACH M3.0 x L4 FL T10
7	E5070-04006	2	COVER
8	0515-1946	4	SCREW-MACH M3.0 x L6 FL T10
9	E5070-00655	1	PLATE FRONT
10	0515-2146	2	SCREW-MACH M3.0 x L4 FL T10
11	E5070-87301	2	LABEL
12	1390-1375	1	HDD KEYS
13	7121-5441	1	LABEL (Service Center Only)

Hard Disk Drive Assembly Option 019

Figure 5-23

Hard Disk Drive Assembly Option 019

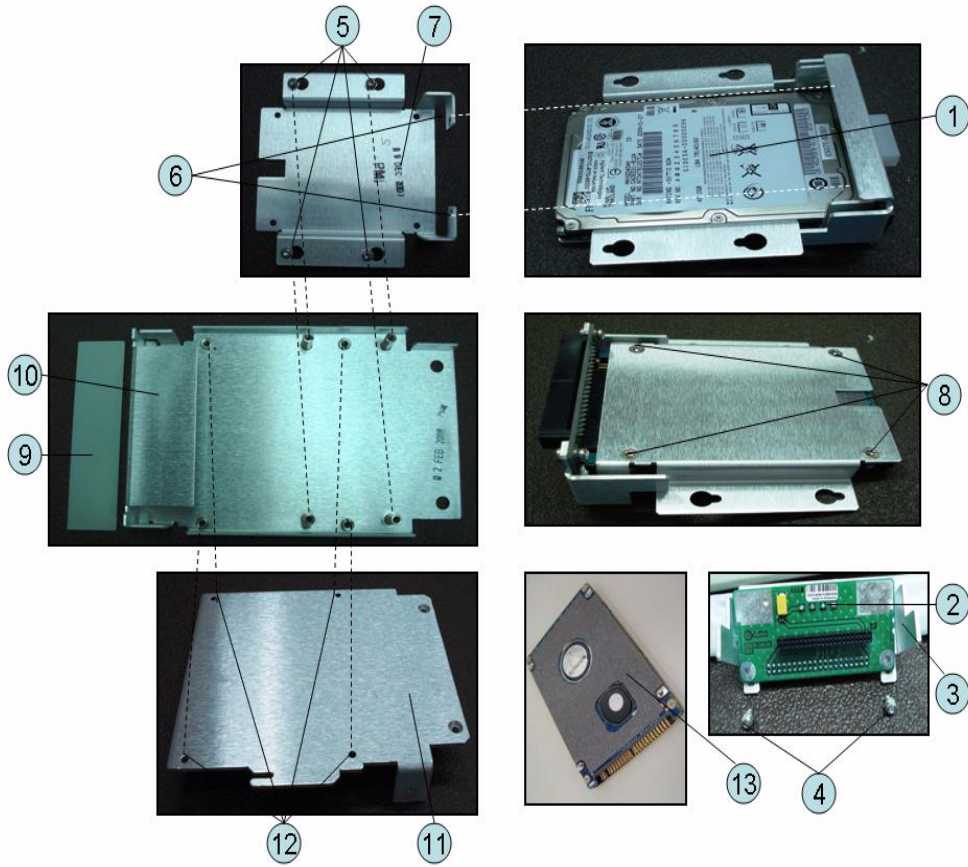


Table 5-25 Hard Disk Drive Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-82301	1	HDD INSTALLED (Service Center Only)
2	E5070-66536	1	CONNECTOR BD PCA
3	E5071-01222	1	HDD BRACKET
4	0515-0430	2	SCREW-MACH M3.0 x L6 PN T10
5	0515-0374	4	SCREW-MACH M3.0 x L10 PN T10
6	0515-2028	2	SCREW-MACH M2.5 x L6 FL T8
7	E5070-01255	1	BRACKET HDD
8	0515-2146	4	SCREW-MACH M3.0 x L4 FL T10
9	E5071-01220	1	HDD BRACKET
10	E5071-01223	1	HDD BRACKET
11	E5071-01201	1	HDD BRACKET
12	0515-0430	4	SCREW-MACH M3.0 x L6 PN T10
13	E5070-25061	1	TM SHEET 0.5T

PCI DSP Card, GPIB Card and USB Card Assembly

Figure 5-24 PCI DSP Card, GPIB Card AND USB Card Assembly

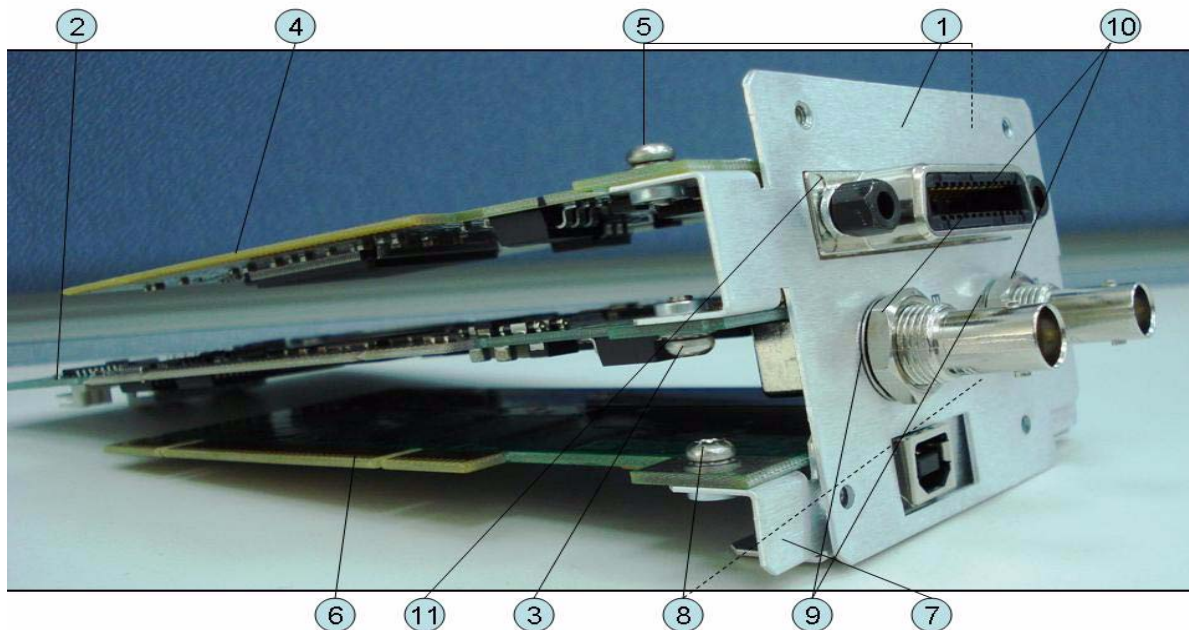


Table 5-26 PCI DSP Card, GPIB Card AND USB Card Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-01204	1	BRACKET BOARD
2	E5070-66551	1	PCI DSP CARD
3	0515-0430	1	SCREW-MACH M3.0 x 6 PN T10
4	82350-66512	1	PCI GPIB CARD (Service Center Only)
5	0515-0430	2	SCREW-MACH M3.0 x 6 PN T10
6	0960-2357	1	USB ADAPTER CARD
7	E5071-01218	1	BRACKET USB
8	0515-0430	2	SCREW-MACH M3.0 x 6 PN T10
9	2190-0054	2	WSHR-LK INTL T
10	2950-0054	2	NUT-HEX-DBL-CHAM
11	1253-6142	1	SHIELD

PCA Digital Board Assembly

Figure 5-25

PCA Digital Board Assembly

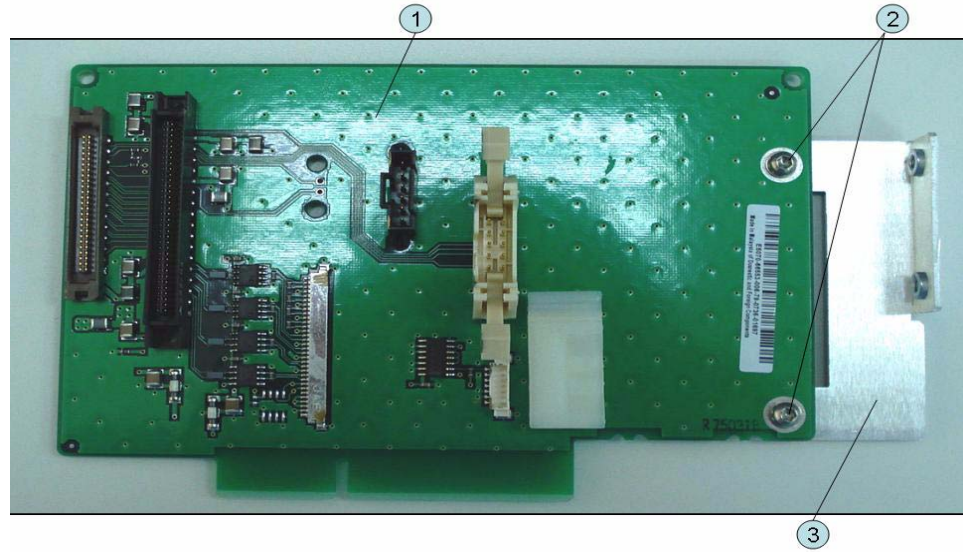


Table 5-27

PCA Digital Board Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5070-66553	1	PCA DIGITAL BRIDGE
2	0515-0430	2	SCREW-MACH M3.0 x 6 PN T10
3	E5071-01210	1	STAY

Replaceable Parts
 Replaceable Parts List

**T2 Switch (Opt. 230/235/240/245/280/285/430/435/440/445/480/485)
 Assembly**

Figure 5-26 T2 Switch Opt. (230/235/240/245//280/285/430/435/440/445/480/485) Assembly

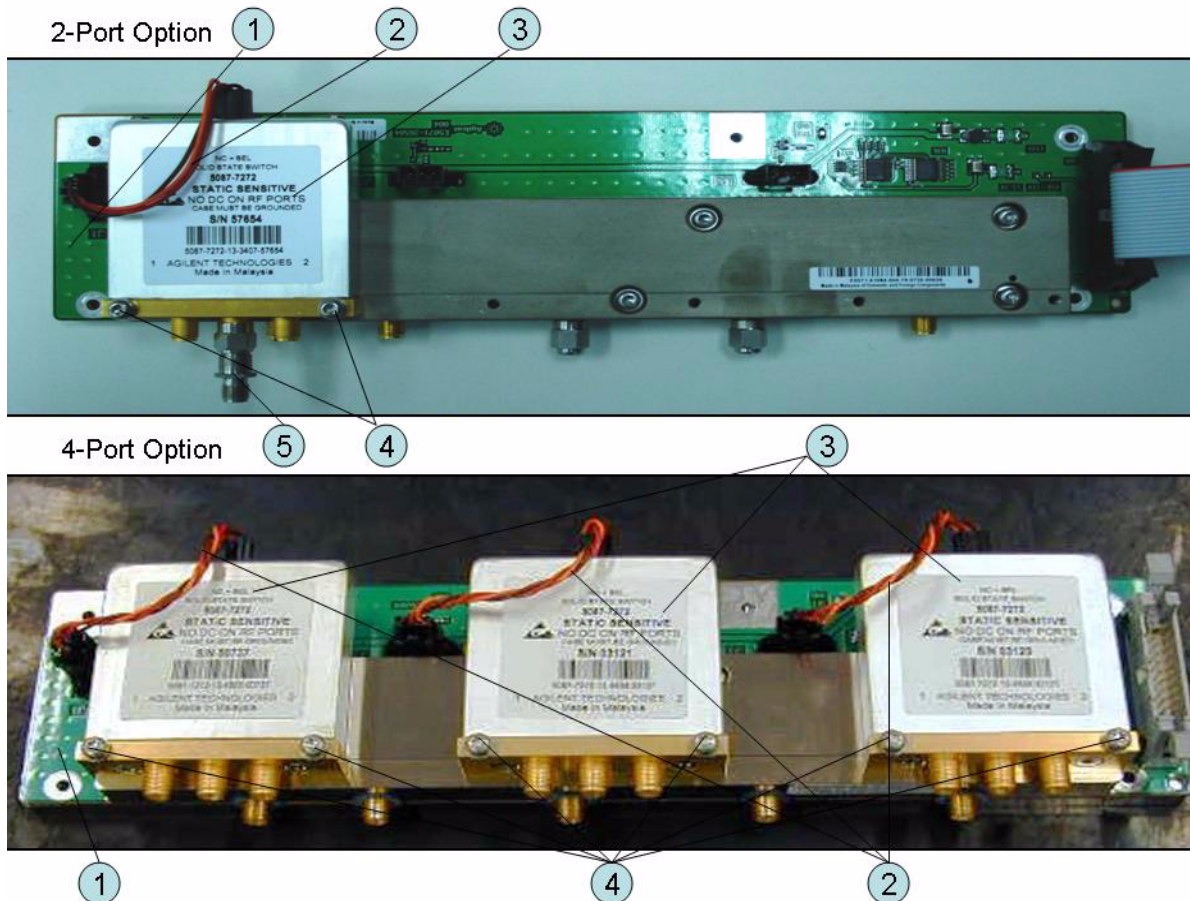


Table 5-28 T2 Switch (Opt. 230/235/240/245/280/285/430/435/440/445/480/485) Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-61084	1	DISTRIBUTOR MODULE
2	E5071-61619	1	WIRE ASSY (Opt.2xx)
		3	WIRE ASSY (Opt.4xx)
3	5087-7272	1	SWITCH RF SPDT (Opt.2xx)
		3	SWITCH RF SPDT (Opt.4xx)
4	0515-1410	2	SCREW-MACH M3.0 x L20 PN T10 (Opt.2xx)
		6	SCREW-MACH M3.0 x L20 PN T10 (Opt.4xx)
5	0955-0301	1	ATTENUATOR (Opt.2xx)

Receiver Module (Opt. 2K5/4K5) Assembly

Figure 5-27 Receiver (Opt. 2K5/4K5) Assembly

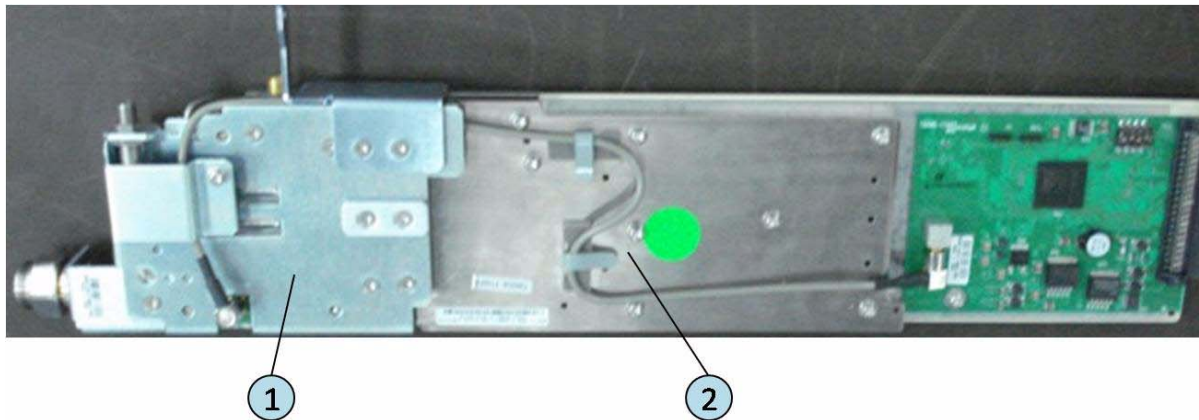


Table 5-29 Receiver (Opt. 2K5/4K5) Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-62097 (A87)	2	TESTED RECEIVER BOARD (Opt. 2K5)
	E5071-69097	2	TESTED RECEIVER BOARD (Opt. 2K5) (Exchange)
	E5071-62097 (A87)	4	TESTED RECEIVER BOARD (Opt. 4K5)
	E5071-69097	4	TESTED RECEIVER BOARD (Opt. 4K5) (Exchange)
2	E5071-62089 (A89)	2	TESTED LEVEL POWER SPLITTER & BIAS TEE MODULE (Opt. 2K5)
	E5071-69089	2	TESTED LEVEL POWER SPLITTER & BIAS TEE MODULE (Opt. 2K5) (Exchange)
	E5071-62089 (A89)	4	TESTED LEVEL POWER SPLITTER & BIAS TEE MODULE (Opt. 4K5)
	E5071-69089	4	TESTED LEVEL POWER SPLITTER & BIAS TEE MODULE (Opt. 4K5) (Exchange)

Attenuator (Opt. 2K5/4K5) Assembly

Figure 5-28

Attenuator (Opt. 2K5/4K5) Assembly



Table 5-30 Attenuator (Opt. 2K5/4K5) Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	33321-60065	1	ATTENUATOR 60 dB 20 GHz
2	E5070-01292	1	ANGLE ATTENUATOR
3	0515-1946	2	SCREW -MACH FLT -HD M3X0.5 6MM -LG SST

Fan Assembly

Figure 5-29 Fan Assembly

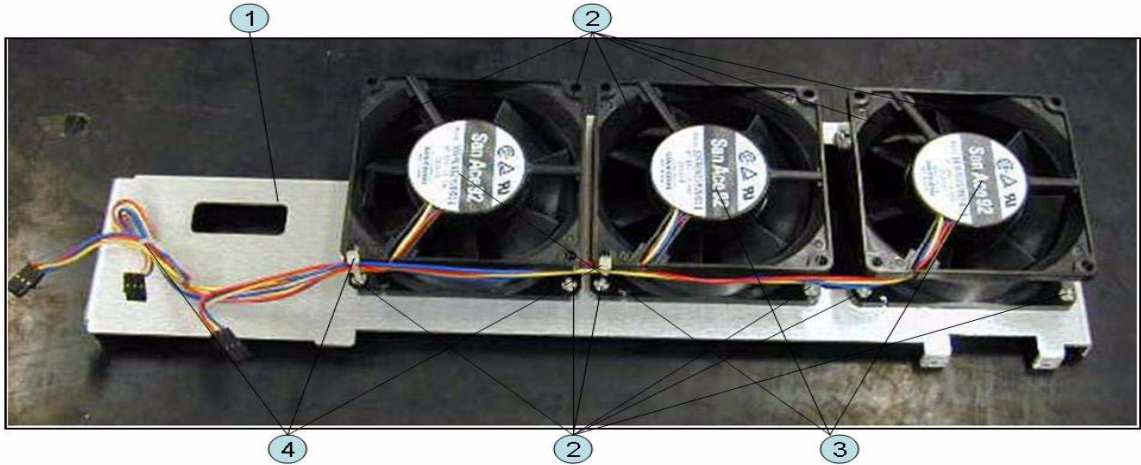


Table 5-31 Fan Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-01200	1	BRACKET FAN
2	0361-1885	12	RIVET PLASTIC
3	E5071-61618	3	FAN ASSY
4	1400-0249	3	CABLE TIE

**Power Supply (Opt. 230/235/240/245/280/285/430/435/440/445/480/485)
 Assembly**

Figure 5-30 Power Supply (Opt. 230/235/240/245/280/285/430/435/440/445/480/485) Assembly

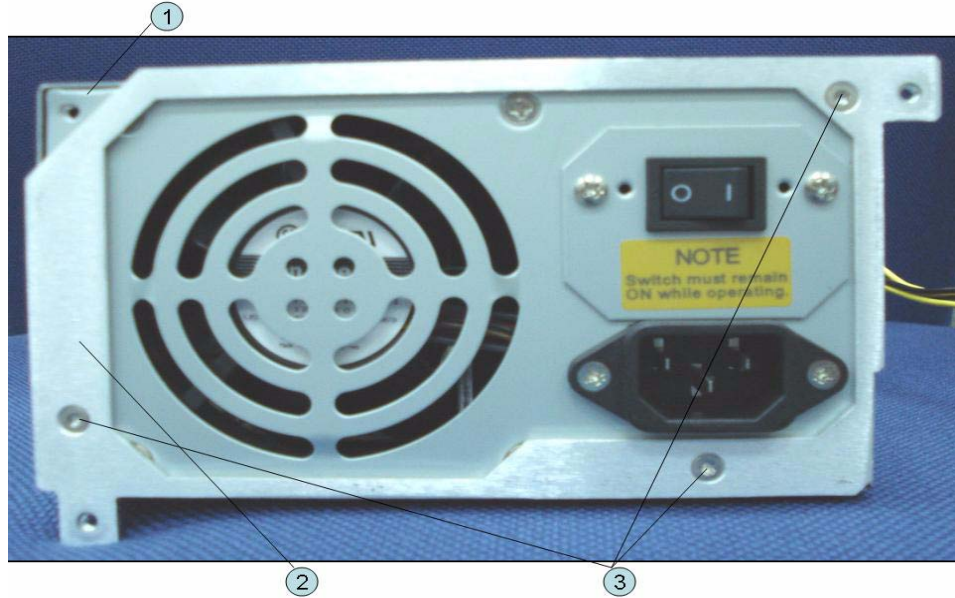


Table 5-32 Power Supply (Opt. 230/235/240/245/280/285/430/435/440/445/480/485)
 Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	0950-4773	1	POWER SUPPLY
2	E5071-00601	1	PLATE
3	0515-1946	3	SCREW-MACH M3.0 x L6 FL T10

Power Supply (Opt. 2K5/4K5) Assembly

Figure 5-31

Power Supply (Opt. 2K5/4K5) Assembly



Table 5-33

Power Supply (Opt.2K5/4K5) Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	0950-4989	1	POWER SUPPLY
2	E5071-00601	1	PLATE
3	0515-1946	3	SCREW-MACH M3.0 x L6 FL T10

PCA DC Bias and Oven Assembly

Figure 5-32 PCA DC Bias and Oven Assembly

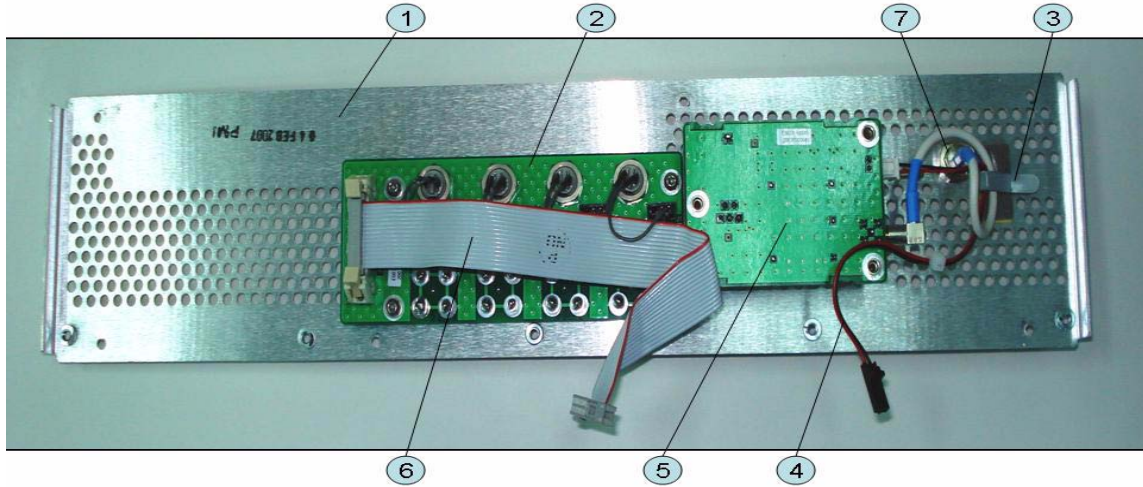


Table 5-34 PCA DC Bias and Oven Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-00200	1	PANEL REAR
2	E5070-66557	1	PCA DC BIAS 2-PORT (Opt.235, 285)
	E5070-66558	1	PCA DC BIAS 4-PORT (Opt.435, 485)
3	1400-1391	1	CLAMP CABLE (Opt.1E5)
4	E5071-61602	1	WIRE ASSY (Opt.1E5)
5	E5071-66505	1	OVEN PCA (Opt.1E5)
6	E5070-61616	1	FLAT CBL ASSY
7	43521-61622	1	RF CABLE ASSY

Analog Motherboard Assembly

Figure 5-33

Analog Motherboard Assembly

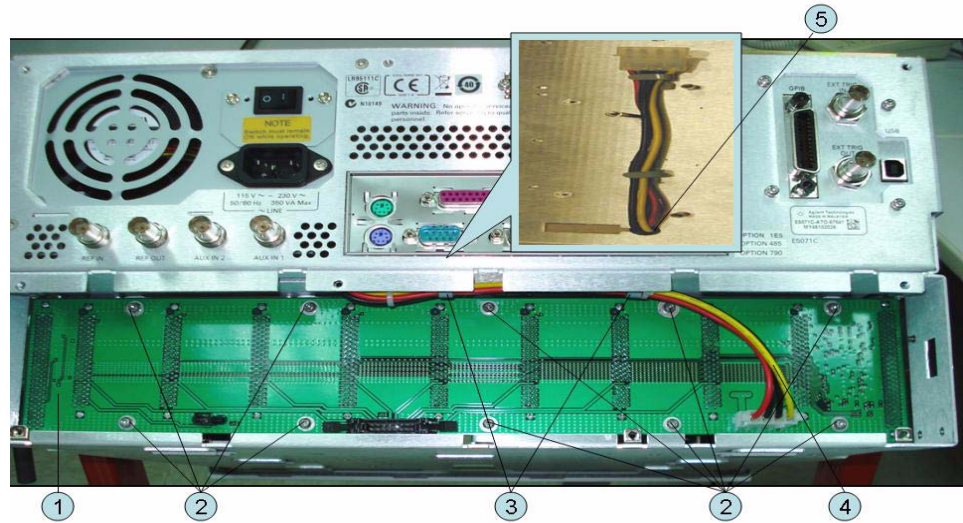


Table 5-35

Analog Motherboard Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5070-66550	1	ANALOG MOTHER BOARD
2	0515-0430	10	SCREW-MACH M3.0 x 6 PN T10
3	1400-1334	2	CLAMP CABLE
4	E5071-61613	1	WIRE ASSY
5	0340-1259	1	GROMMET

Chassis Assembly

Figure 5-34 Chassis Assembly

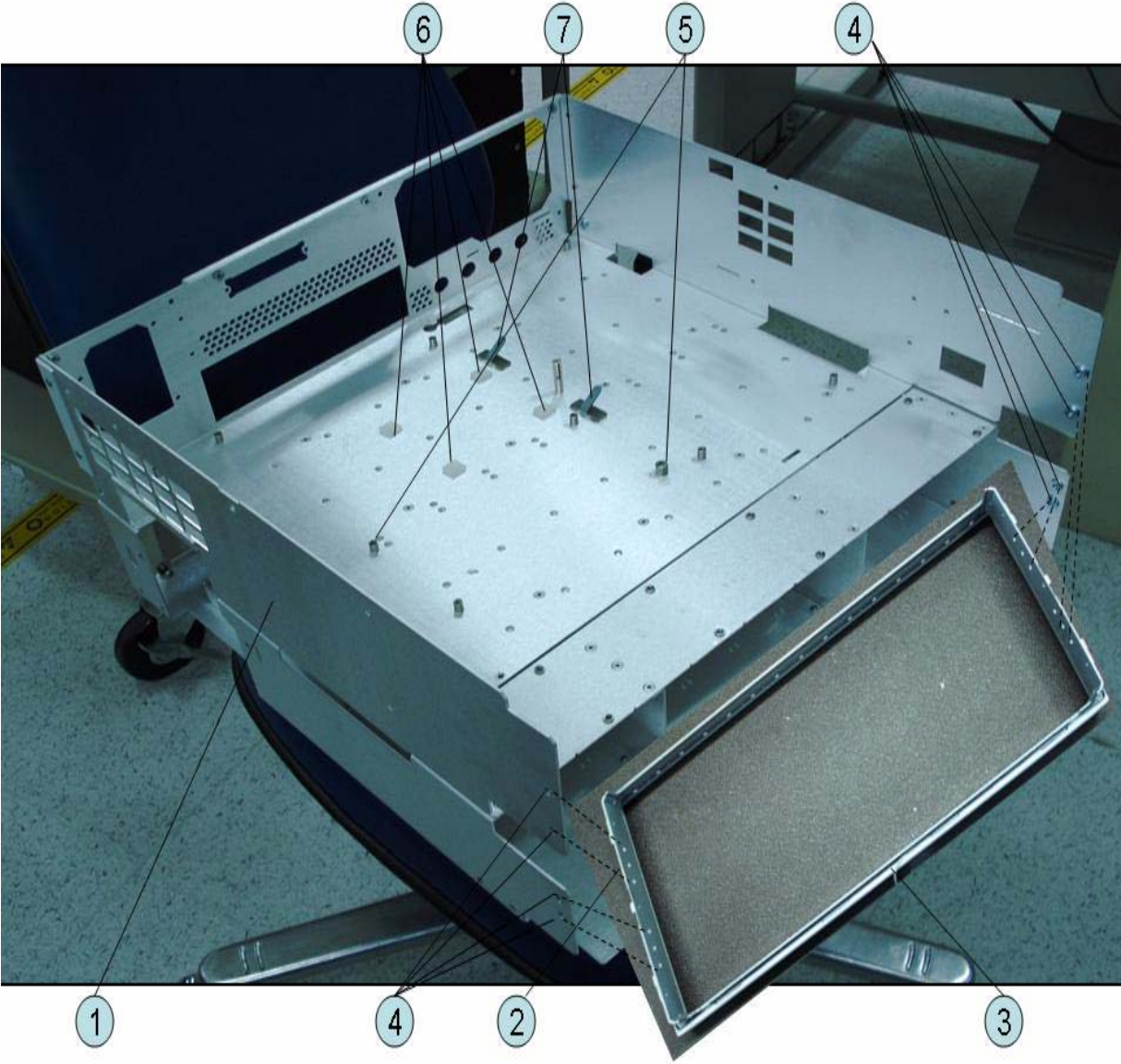


Table 5-36 Chassis Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-60001	1	CHASSIS
2	5022-1190	1	FRONT FRAME
3	8160-0641	1	GASKET (125 cm)
4	0515-2113	8	SCREW-MACH M4.0 x L8 PN T20
5	E5071-24007	2	SPACER
6	1520-0685	4	DAMPER
7	1400-1334	2	CLAMP CABLE

Keyboard Assembly

Figure 5-35

Keyboard Assembly

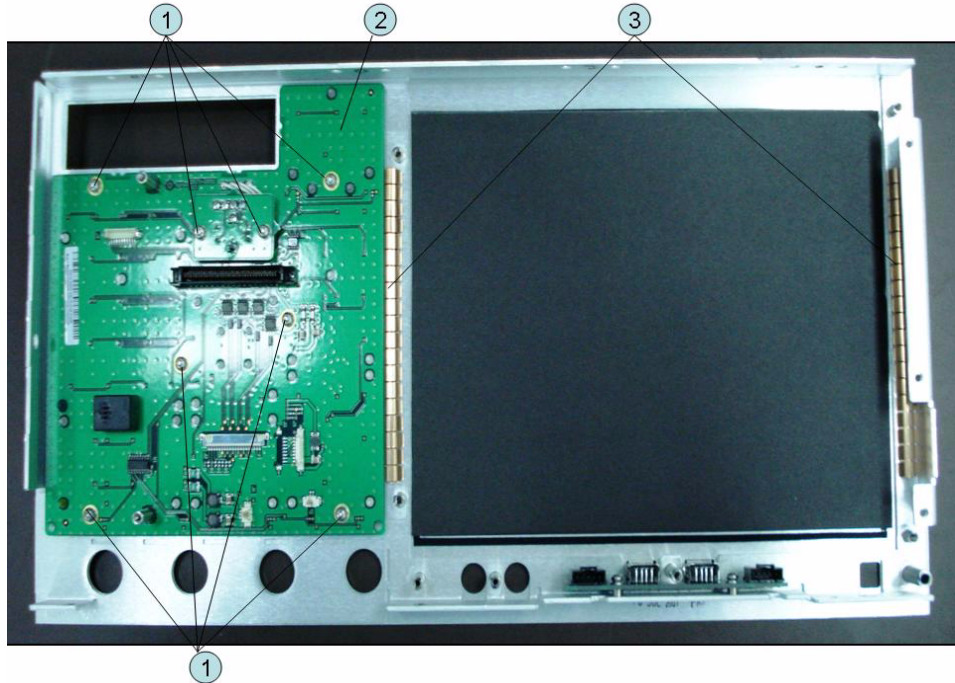


Table 5-37

Keyboard Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	0515-0430	8	SCREW-MACH M3.0 x 6 PN T10
2	E5070-66552	1	PCA FRONT KEY
3	0363-0170	2	GASKET 19-UNITS

LCD Assembly

Figure 5-36 LCD Assembly

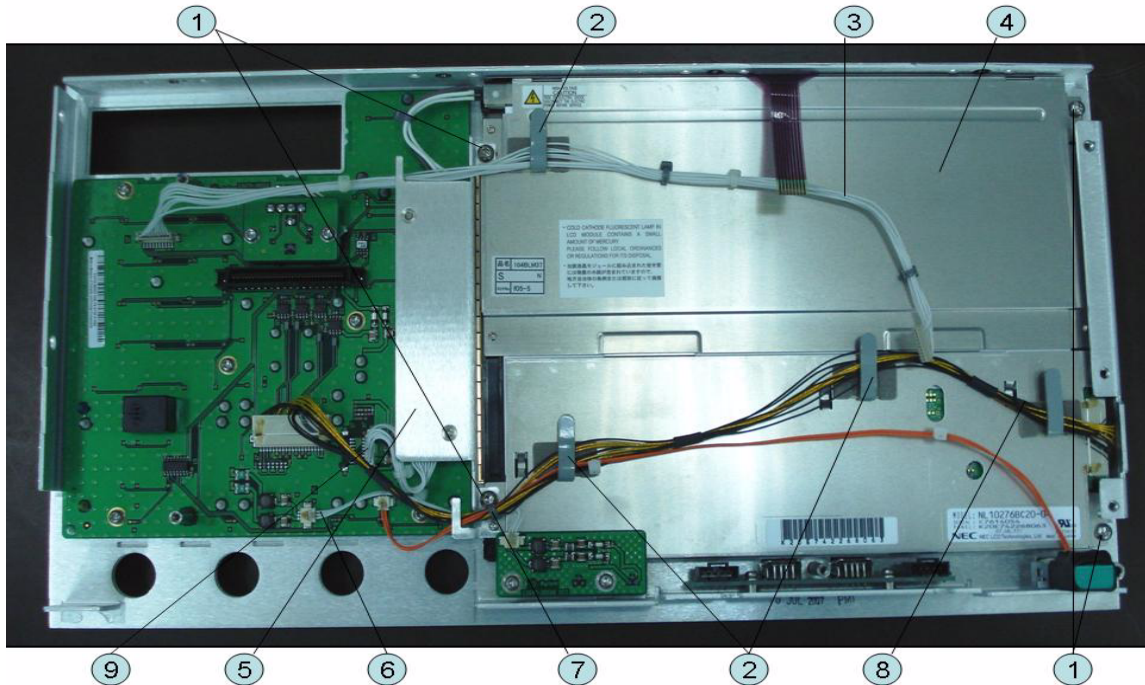


Table 5-38 LCD Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	0515-1402	4	SCREW-MACH M3.5 x L8 PN T15
2	1400-1391	3	CLANP CABLE
3	E5070-61628	1	WIRE ASSY
4	E5070-60112	1	LCD-TPANEL ASSY
5	See Table 5-37	1	INVERTER ASSY
6	E5071-61611	1	WIRE ASSY
7	1400-0249	1	CABLE TIE
8	E5071-61616	1	FLAT CBL ASSY
9	E5071-61608	1	WIRE ASSY

Inverter Assembly

Figure 5-37 Inverter Assembly

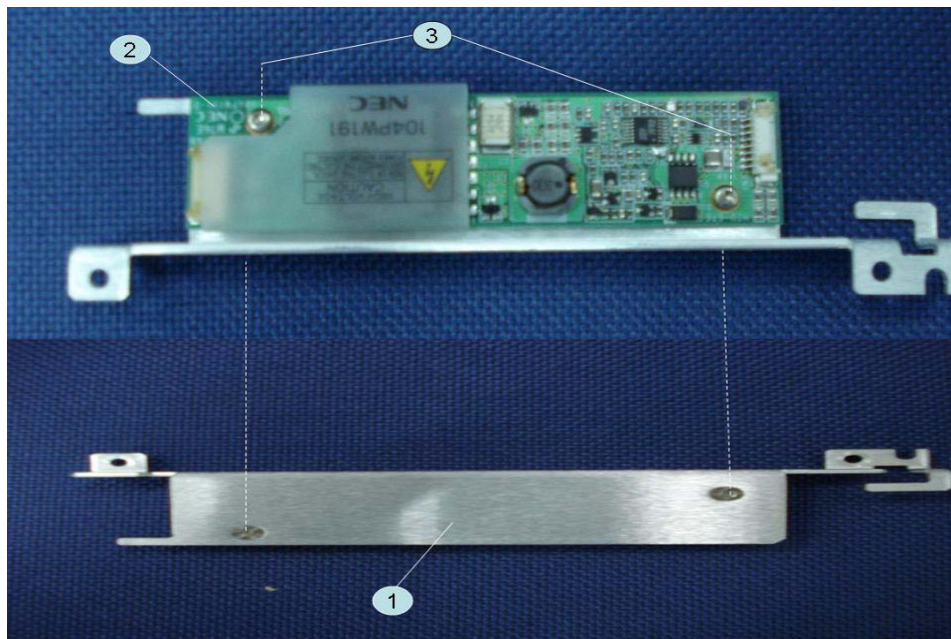


Table 5-39 Inverter Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5071-01211	1	BRACKET (Opt.230/235/240/245/280/285/430/435/440/445/480/485)
	E5071-01278	1	BRACKET (Opt. 2K5/4K5)
2	0950-4420	1	INVERTER
3	0515-1974	2	SCREW-MACH M2.5 x L4 PN T8

Standby Switch Assembly

Figure 5-38

Standby Switch Assembly

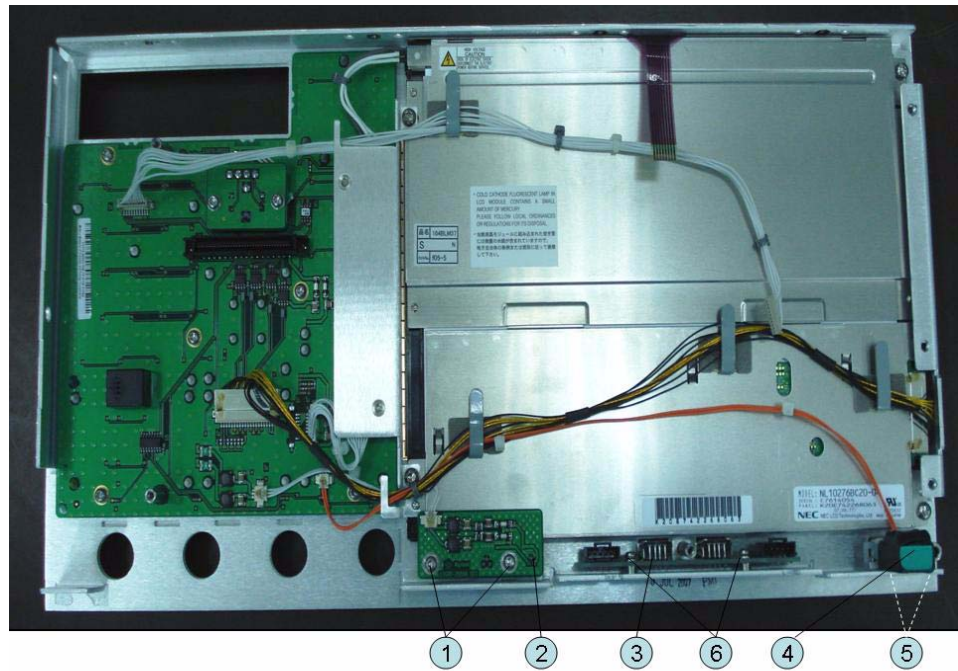


Table 5-40 Standby Switch Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	0515-0430	2	SCREW-MACH M3.0 x L6 PN T10
2	E5070-66556	1	PCA PROBE POWER
3	E5070-66555	1	PCA FRONT USB
4	E5070-61901	1	WIRE ASSY W/STANDBY SWITCH
5	0515-2028	2	SCREW-MACH M2.5 x L6 FL T8
6	0515-0430	2	SCREW-MACH M3.0 x L6 PN T10

Replaceable Parts
 Replaceable Parts List

Cover (Opt. 230/235/240/245/280/285/430/435/440/445/480/485)
 Assembly

Figure 5-39 Cover (Opt. 230/235/240/245/280/285/430/435/440/445/480/485) Assembly

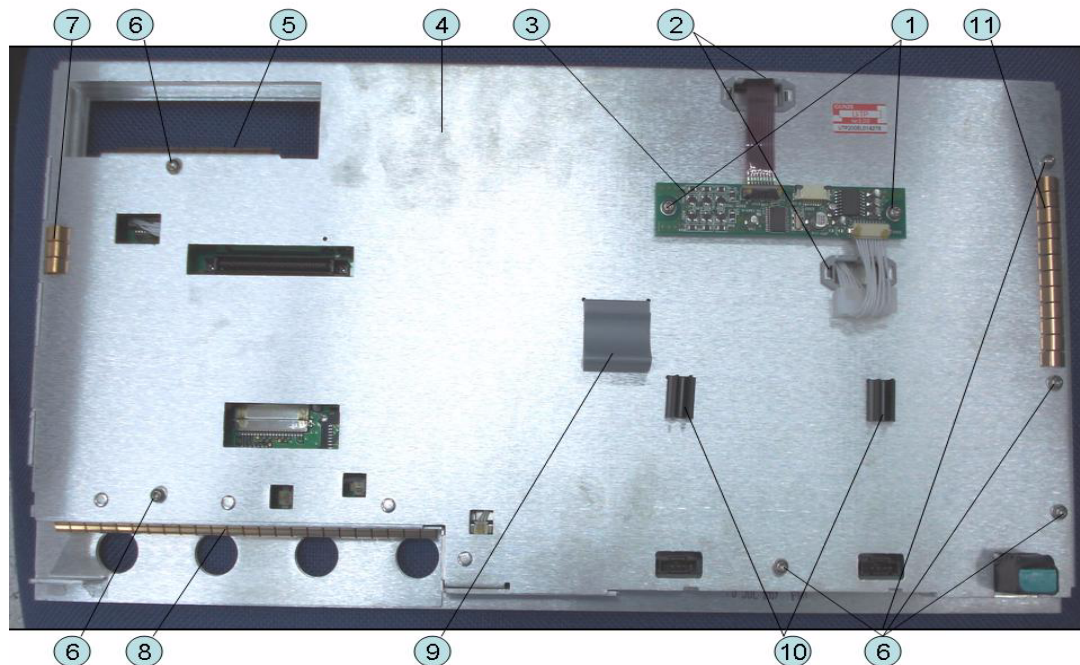


Table 5-41 Cover (Opt. 230/235/240/245/280/285/430/435/440/445/480/485) Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	0515-0430	2	SCREW-MACH M3.0 x L6 PN T10
2	1400-3156	2	CLAMP-CABLE NYLON 6/6
3	5183-4184	1	CNTR TOUCH PANEL
4	E5071-00621	1	COVER
5	0363-0170	1	GASKET 10-UNITS
6	0515-0430	6	SCREW-MACH M3.0 x L6 PN T10
7	0363-0170	1	GASKET 3-UNITS
8	0363-0170	1	GASKET 24-UNITS
9	1400-0611	1	CLAMP CABLE
10	1400-3337	2	CLAMP CABLE
11	0363-0170	1	GASKET 12-UNITS

Cover (Opt. 2K5/4K5) Assembly

Figure 5-40 Cover (Opt. 2K5/4K5) Assembly

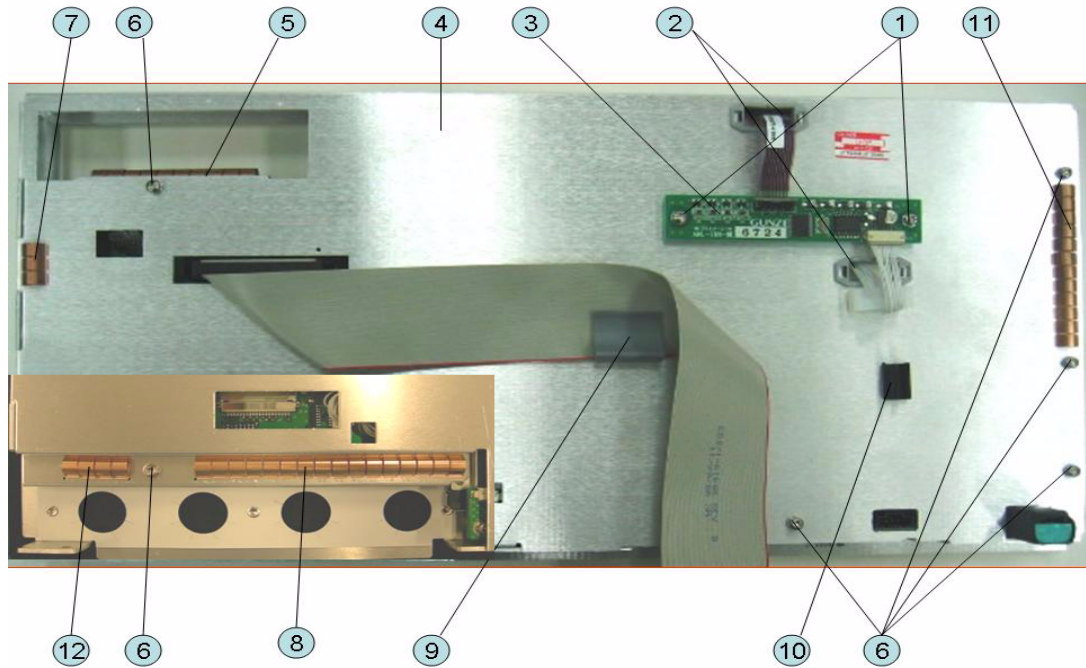


Table 5-42 Cover Opt. 2K5/4K5 Assembly

Ref. Desig.	Agilent Part Number	Qty.	Description
1	0515-0430	2	SCREW-MACH M3.0 x L6 PN T10
2	1400-3156	2	CLAMP-CABLE NYLON 6/6
3	5183-4184	1	CNTR TOUCH PANEL
4	E5070-00672	1	FRONT COVER SHIELD
5	0363-0170	1	GASKET 10-UNITS
6	0515-0430	6	SCREW-MACH M3.0 x L6 PN T10
7	0363-0170	1	GASKET 3-UNITS
8	0363-0170	1	GASKET 16-UNITS
9	1400-0611	1	CLAMP CABLE
10	1400-3337	2	CLAMP CABLE
11	0363-0170	1	GASKET 12-UNITS
12	0363-0170	1	GASKET 4-UNITS

Replaceable Parts
 Replaceable Parts List

Label on Front Face

Figure 5-41 Label on Front Face



Table 5-43 Label on Front Face

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5070-87125	1	LABEL (CAUTION)
2	1401-0247	2	CAP-PROT (Opt. 2xx)
		4	CAP-PROT (Opt. 4xx)
3	E5070-87009	1	LABEL (Opt. 230, 430)
	E5070-87010	1	LABEL (Opt. 235, 435)
	E5071-87309	1	LABEL (Opt. 240, 440)
	E5071-87310	1	LABEL (Opt. 245, 445)
	E5071-87110	1	LABEL (Opt. 285, 485)
	E5071-87119	1	LABEL (Opt. 280, 480)

Label on Rear Face

Figure 5-42 Label on Rear Face



Table 5-44 Label on Rear Face

Ref. Desig.	Agilent Part Number	Qty.	Description
1	E5070-87103	1	LABEL (NOTE for Switch)
	E5071-87107	1	LABEL (Opt. 235, 285)
	E5071-87109	1	LABEL (Opt. 435, 485)
3	5188-1387	1	LABEL (Opt. 230)
	5188-1388	1	LABEL (Opt. 235)
	5188-1391	1	LABEL (Opt. 430)
	5188-1392	1	LABEL (Opt. 435)
	5188-4421	1	LABEL (Opt. 240)
	5188-4422	1	LABEL (Opt. 245)
	5188-4423	1	LABEL (Opt. 440)
	5188-4424	1	LABEL (Opt. 445)
	5188-1394	1	LABEL (Opt. 280)
	5188-1395	1	LABEL (Opt. 285)

Replaceable Parts
Replaceable Parts List

Table 5-44 **Label on Rear Face**

Ref. Desig.	Agilent Part Number	Qty.	Description
	5188-1398	1	LABEL (Opt. 480)
	5188-1399	1	LABEL (Opt. 485)
	5185-3795	1	LABEL (Opt. 008) (Service Center Only)
	5080-3939	1	LABEL (Opt. 010) (Service Center Only)
	5185-3722	1	LABEL (Opt. 1E5)
	5188-4412	1	LABEL (Opt. 790) (Service Center Only)
	5185-3721	1	LABEL (Opt. UNQ)
	5185-3775	1	LABEL (Opt. 017)
	5185-3777	1	LABEL (Opt. 019)

Other Parts

Table 5-45 Other Parts

Agilent Part Number	Qty.	Description
E5071-901x0 ^{*1}	1	SERVICE GUIDE ^{*2}
1150-7799	1	MOUSE
5188-4407	1	KEYBOARD
1250-1859	1	ADAPTER-COAX RTANG M-BNC M-BNC

*1. The number indicated by “x” in the part number of each manual, sample program disk, or CD-ROM, 0 for the first edition, is incremented by 1 each time a revision is made. The latest edition comes with the product.

*2. Opt. 0BW only

Replaceable Parts
Replaceable Parts List

6 Replacement Procedure

This chapter provides procedure for removing and replacing the major assemblies in the E5071C ENA Series Network Analyzer.

Replacing an Assembly

The following steps show the sequence for replacing an assembly in a E5071C RF Network Analyzer.

1. Identify the faulty group. Refer to Chapter 4, “Troubleshooting.”
2. Order a replacement assembly. Refer to Chapter 5, “Replaceable Parts.”
3. Replace the faulty assembly and determine what adjustments are necessary. Refer to this chapter and Chapter 7, “Post-Repair Procedures.”
4. Perform the necessary adjustments. Refer to Chapter 3, “Adjustment.”
5. Perform the necessary performance tests. Refer to Chapter 2, “Performance Test.”

WARNING These servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.

WARNING The opening of covers or removal of parts is likely to expose dangerous voltages. Disconnect the instrument from its power supply.

CAUTION Many of the assemblies in this instrument are very susceptible to damage from ESD (electrostatic discharge). Perform the following procedures only at a static-safe workstation and wear a grounding strap.

Please refer to the following table for the tightening torque of screws if no torque is specified by this chapter.

Screw	Driver	Recommended Torque
M2.5	T8	0.56 N-m (5.0 lb-in)
M3	T10	1.02 N-m (9.0 lb-in)
M3.5	T15	1.58 N-m (14.0 lb-in)
M4	T20	2.37N-m (21.0 lb-in)

Required Tools

The following tools are required for repair of E5071C.

Table 6-1 Required Tools

Assembly	TORX screwdriver				flat edge screwdriver	torque screwdriver TORX T10	cutting plier	hex key	open torque wrench			open torque driver set*1
	T8	T10	T15	T20					1.5 mm	9/16 in.	5/8 in.	
Outer Cover		√	√	√								
Front Panel		√	√	√	√							
Removable Hard Disk Assembly Removal		√	√	√	√							
Removable Hard Disk Drive Replacement		√				√						
Removable Hard Disk Assembly Removal Opt.017		√	√	√	√							
Removable Hard Disk Drive Replacement Opt.017		√				√						
Hard Disk Assembly Removal Opt.019		√	√	√	√							
Hard Disk Drive Replacement Opt.019		√				√						
Power Supply		√	√	√		√						
Digital Bridge		√	√	√								
Handler I/O		√	√	√								
USB (USBTMC) Interface Card		√	√	√								
PCI DSP Card and GPIB Card		√	√	√					√			
Digital Motherboard		√	√	√								
Analog Base Module		√	√	√					√			
Level Vernier Module		√	√	√	√					√	√	
Synthesizer Module		√	√	√	√					√	√	
Receiver Module		√	√	√	√				√	√	√	
Switch		√	√	√	√				√	√	√	
Fan		√	√	√	√		√	√				
PCA DC Bias Board		√	√	√				√				
Crystal Oven Board		√	√	√								
Analog Motherboard		√	√	√	√				√	√	√	
Front Panel		√	√	√	√							
Control Touch Panel		√	√	√	√							
Inverter	√	√	√	√	√							
LCD		√	√	√	√							

Replacement Procedure
Required Tools

Table 6-1 Required Tools

Assembly	TORX screwdriver				flat edge screwdriver	torque screwdriver TORX T10	cutting plier	hex key	open torque wrench			open torque driver set ^{*1}
	T8	T10	T15	T20					1.5 mm	9/16 in.	5/8 in.	
Front Panel Keyboard		√	√	√	√			√				
Front USB Board		√	√	√	√			√				
Probe Power and Power Switch Board	√	√	√	√	√		√					

*1. It's recommended to use E5070-65100.

Outer Cover Removal

Tools Required

- TORX screwdriver, T10, T15, and T20

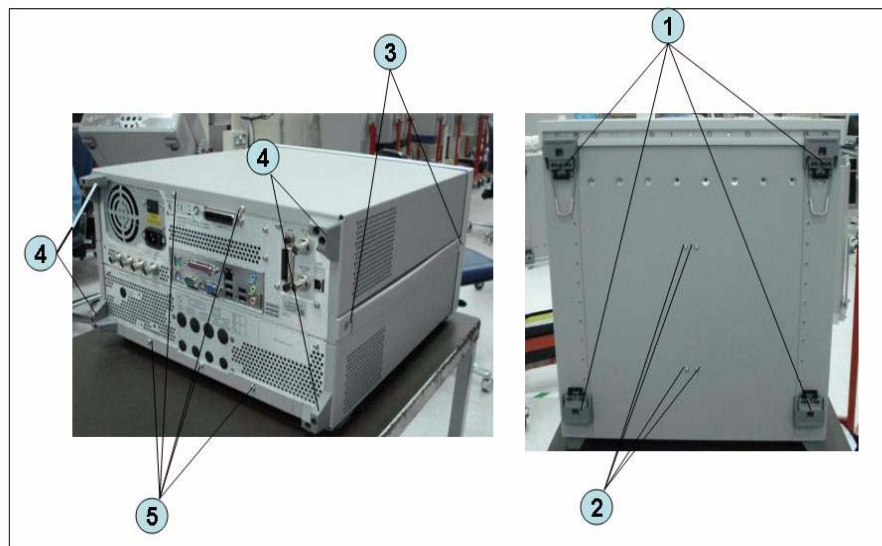
Procedure

Refer to Figure 6-1 for this procedure.

- Step 1.** Disconnect the power cable from the E5071C.
- Step 2.** Remove the four bottom feet (item 1).
- Step 3.** Remove the four TORX T10 screws (item 2) from the bottom.
- Step 4.** Remove the four TORX T20 screws (item 3) fastening the side strap handles.
- Step 5.** Remove the four TORX T15 screws (item 4) fastening the four rear foot
- Step 6.** Remove the five TORX T15 screws (item 5) fastening the cover.
- Step 7.** Slide up the outer cover and remove it carefully.

Figure 6-1

Outer Cover Removal



Front Panel Removal

Tools required

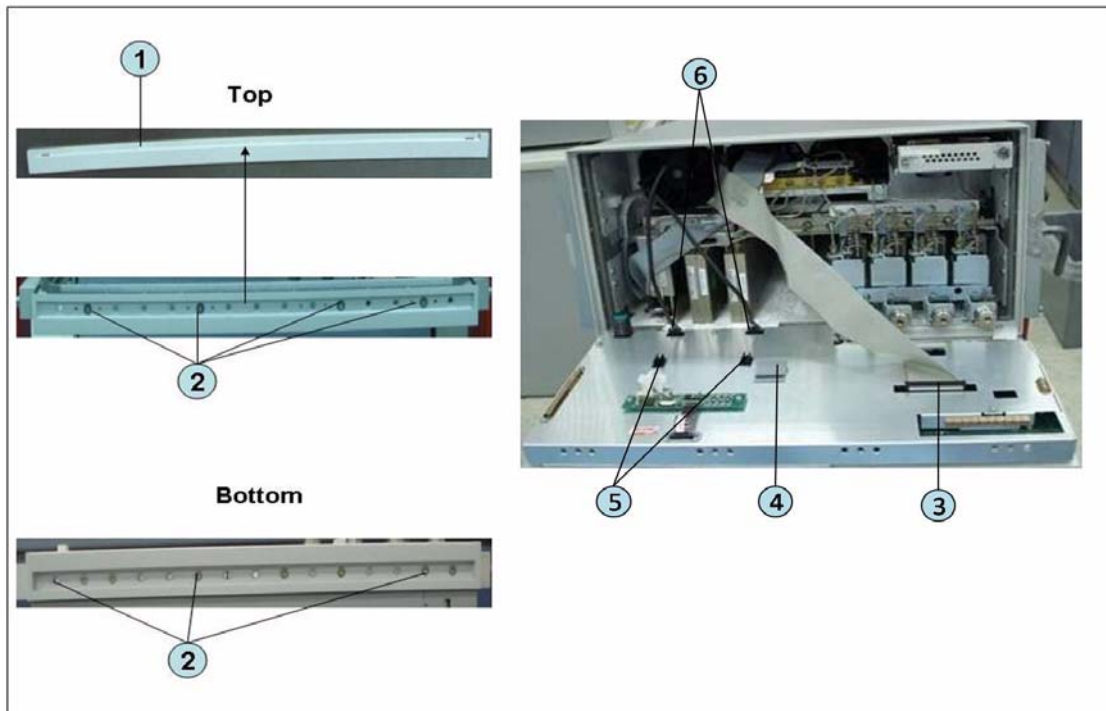
- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver

Procedure

Refer to Figure 6-2 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the top trim (item 1) using a flat edge driver.
- Step 3.** Remove the seven TORX T15 screws (item 2) fastening front panel.
- Step 4.** Release the cable (item 3) from the cable clamp (item 4).
- Step 5.** Release the two cable (item 6) from the cable clamp (item 5).
- Step 6.** Gradually push the front panel assembly towards the outside.

Figure 6-2 Front Panel Removal



Removable Hard Disk Assembly Removal (Obsolete)

Tools Required

- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver

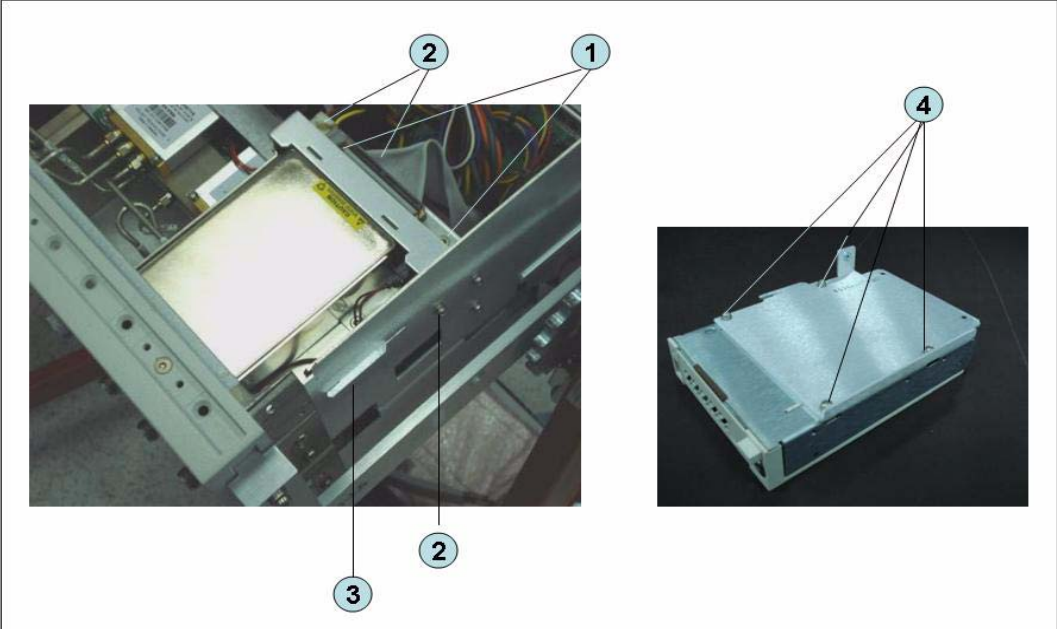
Removal Procedure

Refer to Figure 6-3 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Disconnect the two cables (item 1).
- Step 4.** Remove the three TORX T10 screws (item 2) fastening the removable hard disk assembly.
- Step 5.** Be careful to release the hook from chassis (item3) and lift the removable hard disk assembly.
- Step 6.** Remove the four TORX T10 screws (item 4) fastening the bracket.

Replacement Procedure
Removable Hard Disk Assembly Removal (Obsolete)

Figure 6-3 Removable Hard Disk Assembly Replacement (Obsolete)



Removable Hard Disk Drive Replacement (Obsolete)

Tools Required

- TORX screwdriver, T10
- Torque screwdriver, TORX T10 (set to 0.29 N-m / 2.6 lb-in)

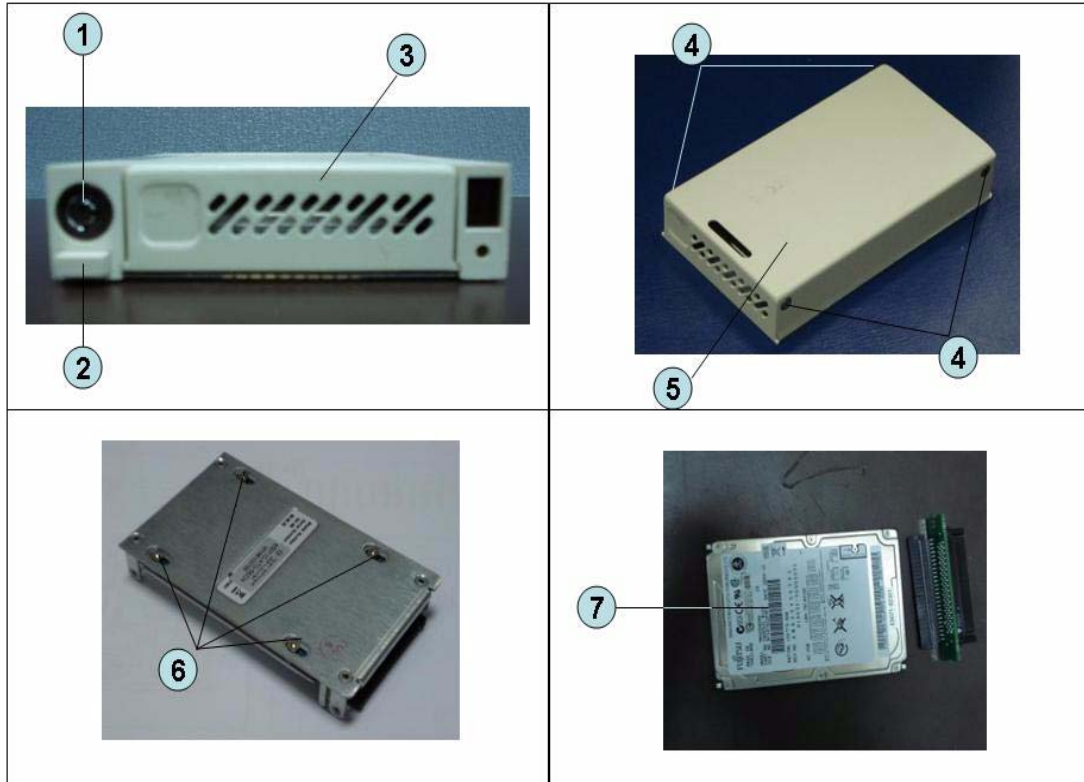
Removal procedure

Refer to Figure 6-4 for this procedure.

- Step 1.** Insert the key (P/N 0960-2562) in the lock and turn clockwise (item 1).
- Step 2.** Press the button under the lock (item 2) and remove the hard disk (item 3).
- Step 3.** Remove the four TORX T10 screws (item 4), and remove the removable hard disk drive's lid (item 5).
- Step 4.** Remove the four TORX T10 screws (item 6) fastening the HDD bracket and remove it.
- Step 5.** Remove the hard disk drive (item 7) from the connector board.

Replacement Procedure
Removable Hard Disk Drive Replacement (Obsolete)

Figure 6-4 Removable Hard Disk Drive Removal (Obsolete)



Replacement Procedure

Step 1. Replace the removable hard disk drive by inverse procedure of removal.

NOTE Fasten the TORX T10 screws (item 6) using a torque screwdriver.

Step 2. Insert the hard disk into the slot.

Step 3. Turn the key to the left until it is locked, then remove the key.

NOTE The “U” is displayed at the 8 segment LED on next to the removal hard disk when E5071C is turned on without key lock.

Step 4. Restore backup files onto the new removable hard disk drive as described in “Restore Backup Files onto the New Hard Disk Drive” on page 339.

Step 5. Calibrate the touch screen as described in “Calibration of the Touch Screen” on page 339.

Restore Backup Files onto the New Hard Disk Drive

The following procedure shows how to write the system correction data stored in the backup memory to the newly mounted hard disk.

Step 1. Turn on the E5071C.

Step 1. Press **Macro Setup**.

Step 2. Click **Load Project...** in the softkey menu.

Step 3. Select **RestoreSysCorFile.vba** from the **D:\Agilent\Service** folder and then press the **Open** button.

Step 1. Press **Macro Run**.

Step 2. The RestoreSysCorFile dialog box appears.

Step 3. Click **OK**.

NOTE

Once the program has terminated, restart the E5071C to enable the system correction data.

Calibration of the Touch Screen

When you have replaced the HDD on a E5071C equipped, 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 6-5) appears.

Replacement Procedure
Removable Hard Disk Drive Replacement (Obsolete)

Figure 6-5

Touch Panel Calibration Screen



Step 5. Touch the x mark on the upper left with your finger. The mark x appears also on the lower left, upper right, and lower right. Touch the x marks in that order with your finger.

Touching the four locations described above with your finger automatically concludes the touch screen calibration.

NOTE

With no operation on the touch screen calibration screen for a preset time, it automatically closes and the previous measurement screen reappears.

Removable Hard Disk Assembly Removal (Option 017)

Tools Required

- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver

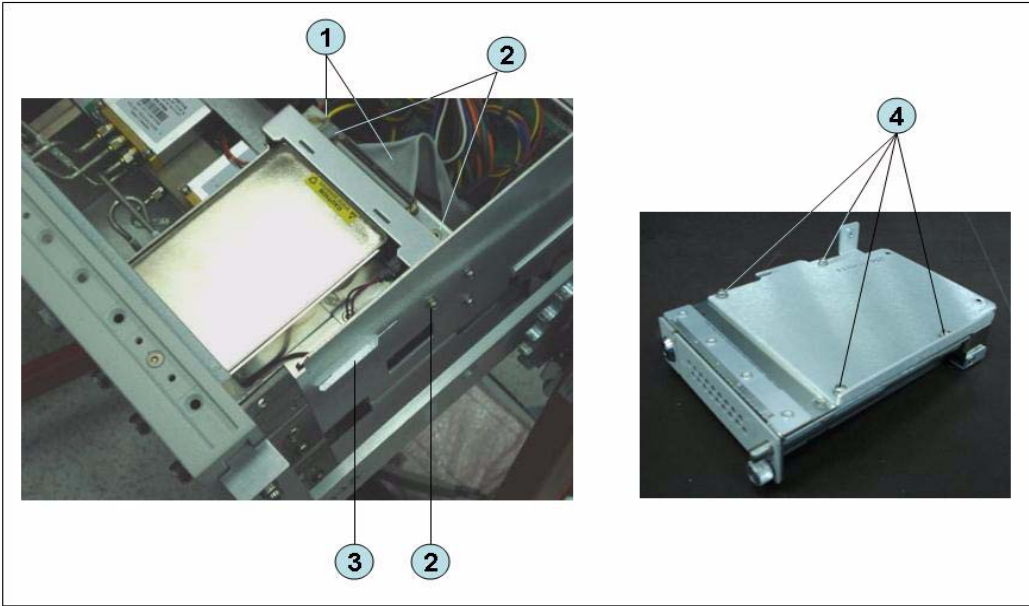
Removal Procedure

Refer to Figure 6-6 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Disconnect the two cables (item 1).
- Step 4.** Remove the three TORX T10 screws (item 2) fastening the removable hard disk assembly.
- Step 5.** Be careful to release the hook from chassis (item3) and lift the removable hard disk assembly.
- Step 6.** Remove the four TORX T10 screws (item 4) fastening the bracket.

Replacement Procedure
Removable Hard Disk Assembly Removal (Option 017)

Figure 6-6 Removable Hard Disk Assembly Replacement Opton 017



Removable Hard Disk Drive Replacement Option 017

Tools Required

- TORX screwdriver, T10
- Torque screwdriver, TORX T10 (set to 0.50 N-m / 4.4 lb-in)

Removal procedure

Refer to Figure 6-7 for this procedure.

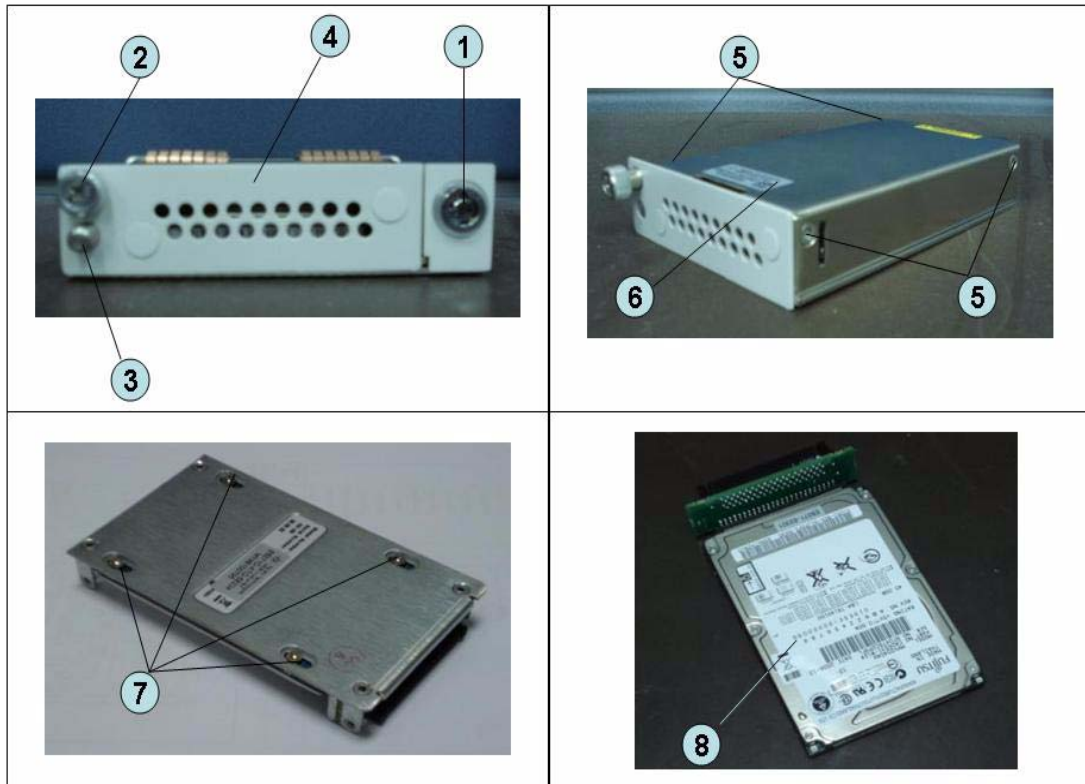
- Step 1.** Insert the key (P/N 1390-1375) in the lock and turn clockwise (item 1).
- Step 2.** Slacken a screw (item 2), then press the button (item 3) and remove the hard disk (item 4).
- Step 3.** Remove the four TORX T10 screws (item 5), and remove the removable hard disk drive's lid (item 6).
- Step 4.** Remove the four TORX T10 screws (item 7) fastening the HDD bracket and remove it.
- Step 5.** Remove the hard disk drive (item 8) from the connector board.

WARNING

From the volume label CN925, user recovery function is not prepared. It is required to inform this change to user before replacing the hard disk drive.

Replacement Procedure
Removable Hard Disk Drive Replacement Option 017

Figure 6-7 Removable Hard Disk Drive Removal Option 017



Replacement Procedure

Step 1. Replace the removable hard disk drive by inverse procedure of removal.

NOTE Fasten the TORX T10 screws (item 7) using a torque screwdriver.

Step 2. Insert the hard disk into the slot.

Step 3. Turn the key to the left until it is locked, then remove the key.

Step 4. Restore backup files onto the new removable hard disk drive as described in “Restore Backup Files onto the New Hard Disk Drive” on page 339.

Step 5. Calibrate the touch screen as described in “Calibration of the Touch Screen” on page 339.

Hard Disk Assembly Removal Option 019

Tools Required

- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver

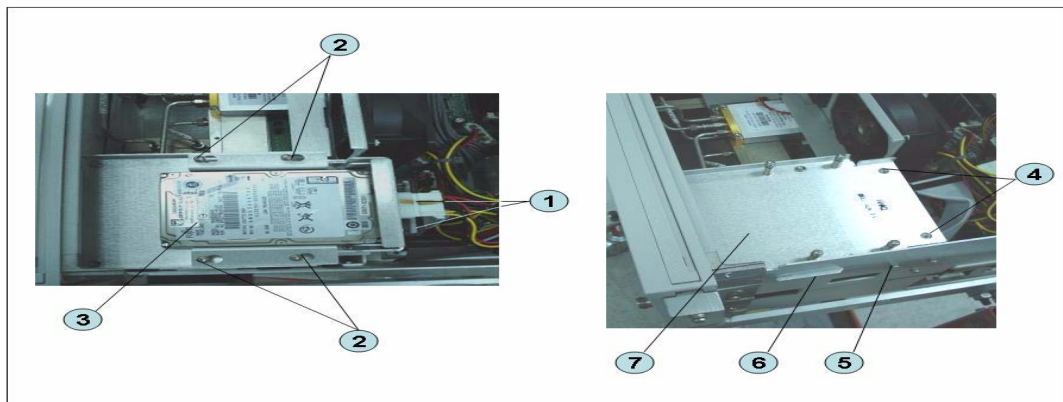
Removal Procedure

Refer to Figure 6-8 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Disconnect the two cables (item 1).
- Step 4.** Remove the four TORX T10 screws (item 2) fastening the hard disk assembly.
- Step 5.** Lift the hard disk assembly (item 3).
- Step 6.** Remove the two TORX T10 screws (item 4) fastening the bracket.
- Step 7.** Remove a TORX T10 screw (item 5) fastening the bracket.
- Step 8.** Be careful to release the hook from chassis (item 6) and lift the bracket (item 7).

Figure 6-8

Removable Hard Disk Assembly Replacement Option 019



Hard Disk Drive Replacement Option 019

Tools Required

- TORX screwdriver, T10
- Torque screwdriver, TORX T10 (set to 0.50 N-m / 4.4 lb-in)

Removal procedure

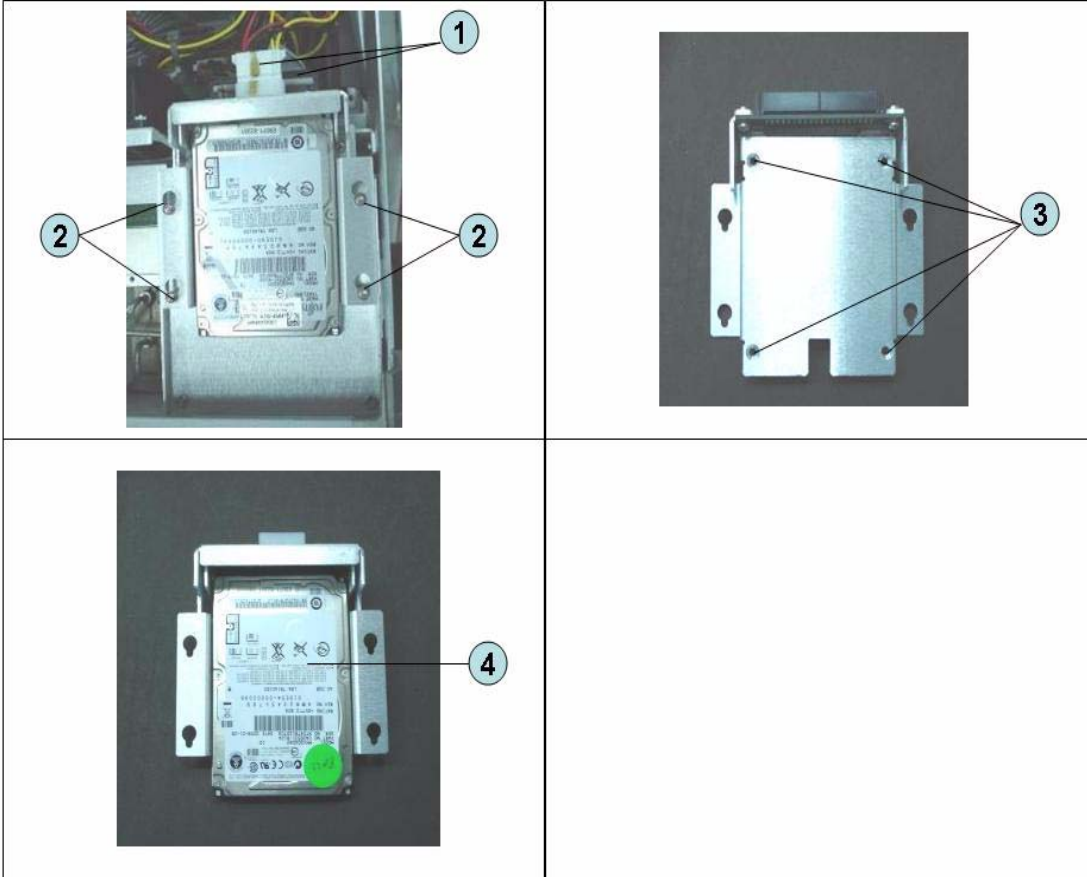
Refer to Figure 6-9 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Disconnect the two cables (item 1).
- Step 3.** Remove the four TORX T10 screws (item 2) fastening the hard disk assembly.
- Step 4.** Remove the four TORX T10 screws (item 3) fastening the hard disk bracket.
- Step 5.** Remove the hard disk drive (item 4) from the connector board.

WARNING

From the volume label CN925, user recovery function is not prepared. It is required to inform this change to user before replacing the hard disk drive.

Figure 6-9 Removable Hard Disk Drive Removal Option 019

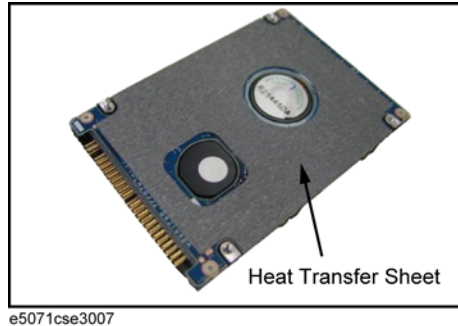


Replacement Procedure

Step 1. Paste the heat transfer sheet to the hard disk drive rear side.

Figure 6-10

Removable Hard Disk Drive Removal Option 019



Step 2. Replace the hard disk drive by inverse procedure of removal.

NOTE Fasten the TORX T10 screws (item 3) using a torque driver.

Step 3. Restore backup files onto the new removable hard disk drive as described in “Restore Backup Files onto the New Hard Disk Drive” on page 339.

Step 4. Calibrate the touch screen as described in “Calibration of the Touch Screen” on page 339.

Power Supply Assembly Replacement

Tools Required

- TORX screwdriver, T10, T15, and T20
- Torque screwdriver, TORX T10 (set to 0.79 N-m / 7 lb-in)

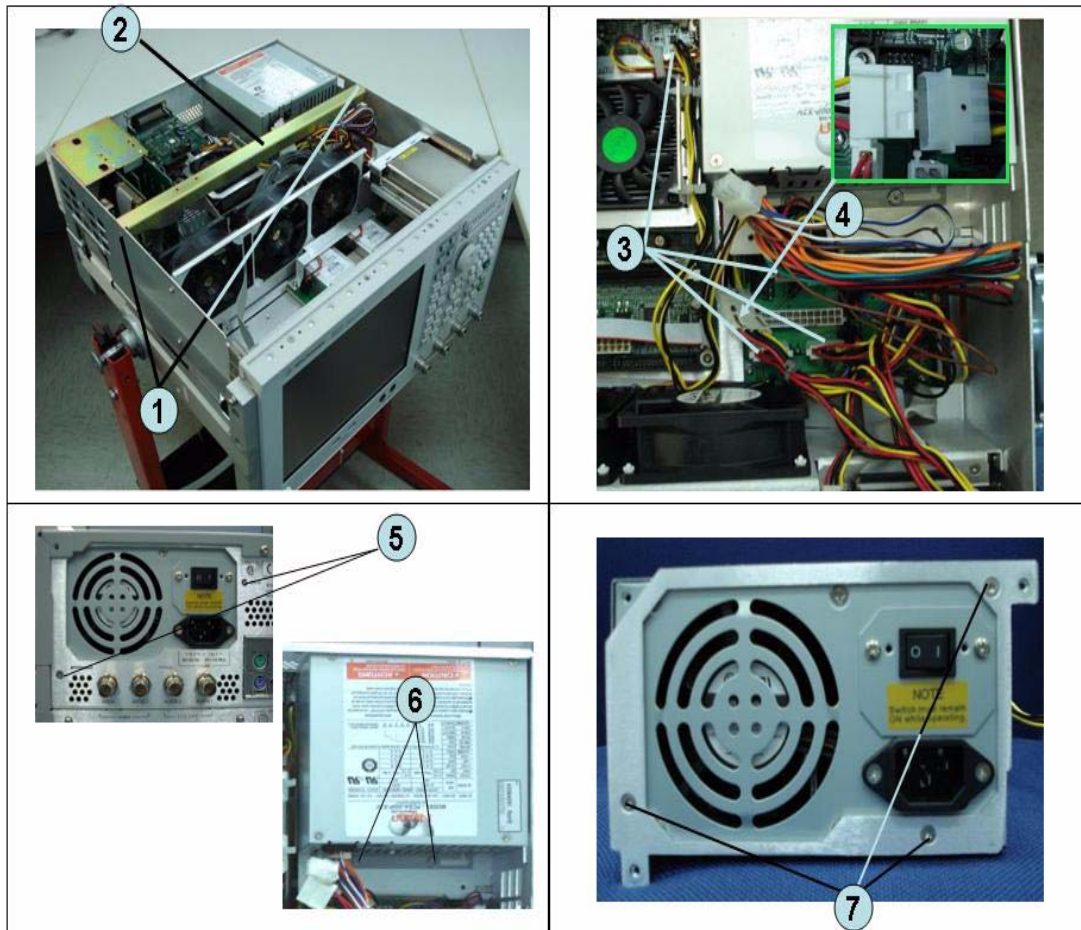
Removal Procedure

Refer to Figure 6-11 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the two TORX T10 screws (item 1) fastening the angle (item 2) and lift it.
- Step 3.** Disconnect the power supply cables (item 3).
- Step 4.** Disconnect the cable from analog motherboard (item 4).
- Step 5.** Remove the two TORX T10 screws (item 5) from the rear panel.
- Step 6.** Remove the two TORX T10 screws and washers (item 6) fastening the power supply holder.
- Step 7.** Lift the power supply assembly toward front side.
- Step 8.** Remove the three TORX T10 screws (item 7) fastening the angle.

Replacement Procedure
Power Supply Assembly Replacement

Figure 6-11 Power Supply Assembly Removal



Replacement Procedure

Step 1. Replace the power supply assembly by inverse procedure of removal.

NOTE Fasten the TORX T10 screws (item 7) using a torque screwdriver.

Power Supply Assembly (Opt. 2K5/4K5) Replacement

Tools Required

- TORX screwdriver, T10, T15, and T20
- Torque screwdriver, TORX T10 (set to 0.79 N-m / 7 lb-in)

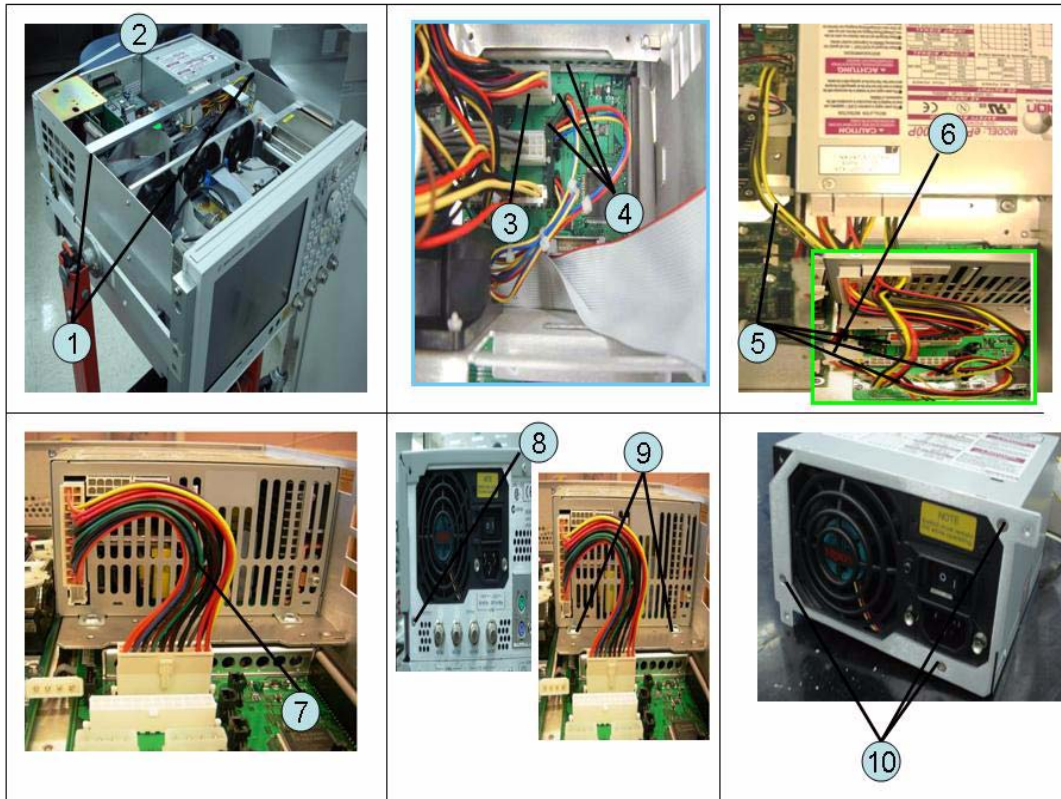
Removal Procedure

Refer to Figure 6-12 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the two TORX T10 screws (item 1) fastening the angle (item 2) and lift it.
- Step 3.** Disconnect the power supply cables (item 3).
- Step 4.** Disconnect the cable from fan on the analog base board (item 4).
- Step 5.** Disconnect the power supply cables (item 5).
- Step 6.** Disconnect the cable from analog motherboard (item 6 and item 7).
- Step 7.** Remove the two TORX T10 screws (item 8) from the rear panel.
- Step 8.** Remove the two TORX T10 screws and washers (item 9) fastening the power supply holder.
- Step 9.** Lift the power supply assembly toward front side.
- Step 10.** Remove the three TORX T10 screws (item 10) fastening the angle.

Replacement Procedure
Power Supply Assembly (Opt. 2K5/4K5) Replacement

Figure 6-12 Power Supply Assembly (Opt. 2K5/4K5) Removal



Replacement Procedure

Step 1. Replace the power supply assembly by inverse procedure of removal.

NOTE Fasten the TORX T10 screws (item 10) using a torque screwdriver.

Digital Bridge Board Replacement (A53)

Tools Required

- TORX screwdriver, T10, T15, and T20

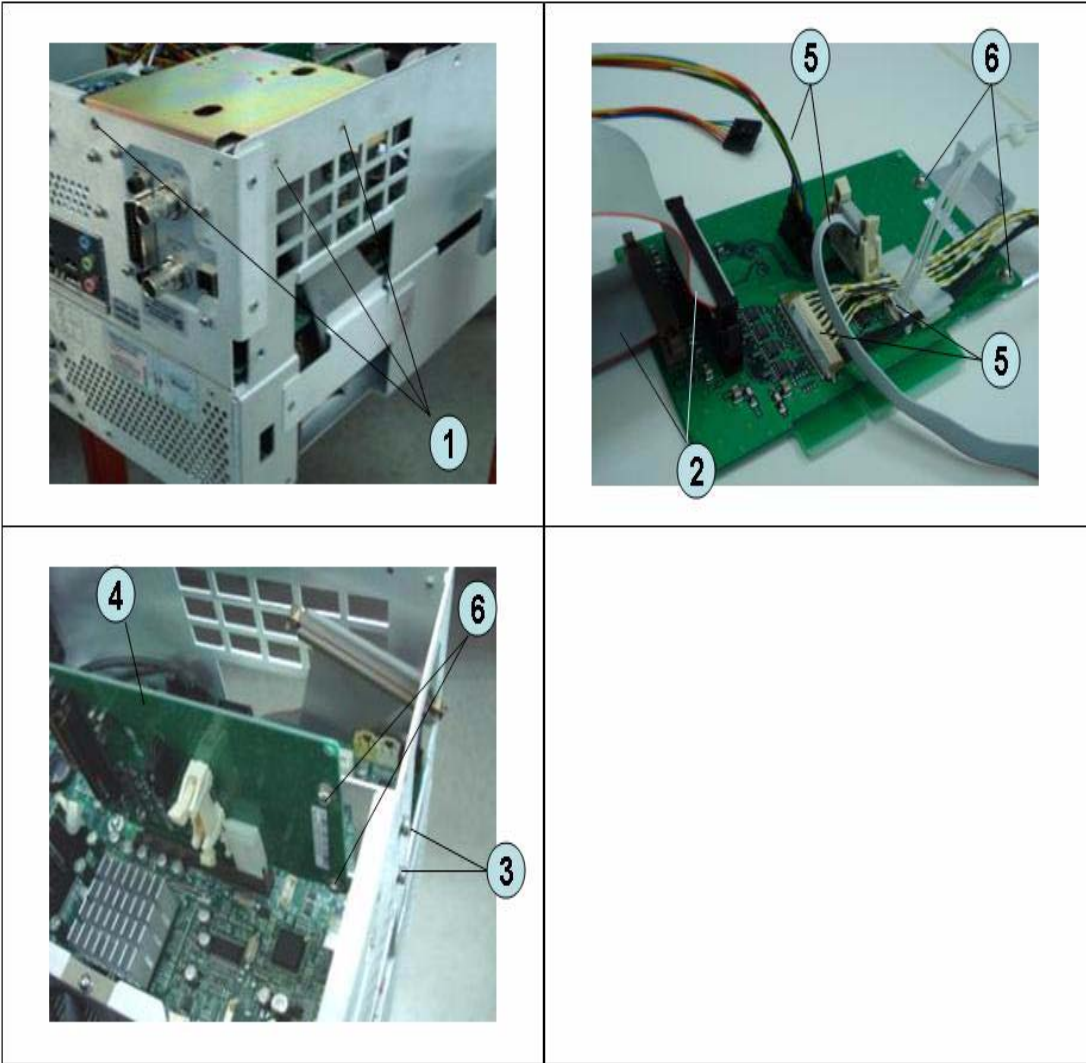
Removal Procedure

Refer to Figure 6-13 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the three TORX T10 screws (item 1) fastening the angle.
- Step 3.** Disconnect the flat cables (item 2) from the digital bridge board.
- Step 4.** Remove the two TORX T10 screws (item 3) fastening the board to the rear panel.
- Step 5.** Lift the digital bridge board (item 4).
- Step 6.** Disconnect the cables (item 5) from the digital bridge board.
- Step 7.** Remove the two TORX T10 screw (item 6) fastening the angle.

Replacement Procedure
Digital Bridge Board Replacement (A53)

Figure 6-13 Digital Bridge Board Removal



Replacement Procedure

Step 1. Replace the digital bridge board by inverse procedure of removal.

Handler I/O Board Replacement (A25)

Tools Required

- TORX screwdriver, T10, T15, and T20

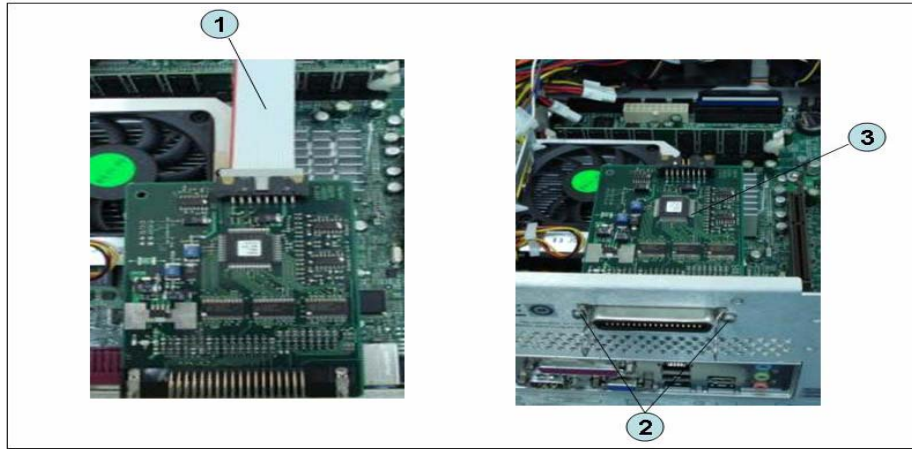
Removal Procedure

Refer to Figure 6-14 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Disconnect the flat cable (item 1) from the handler I/O board.
- Step 3.** Remove the two TORX T10 screws (item 2) fastening the handler I/O board.
- Step 4.** Slide the handler I/O board toward backward (item 3).

Replacement Procedure
Handler I/O Board Replacement (A25)

Figure 6-14 Handler I/O Board Removal



Replacement Procedure

Step 1. Replace the handler I/O board by inverse procedure of removal.

USB (USBTMC) Interface Card Replacement

Tools Required

- TORX screwdriver, T10, T15, and T20

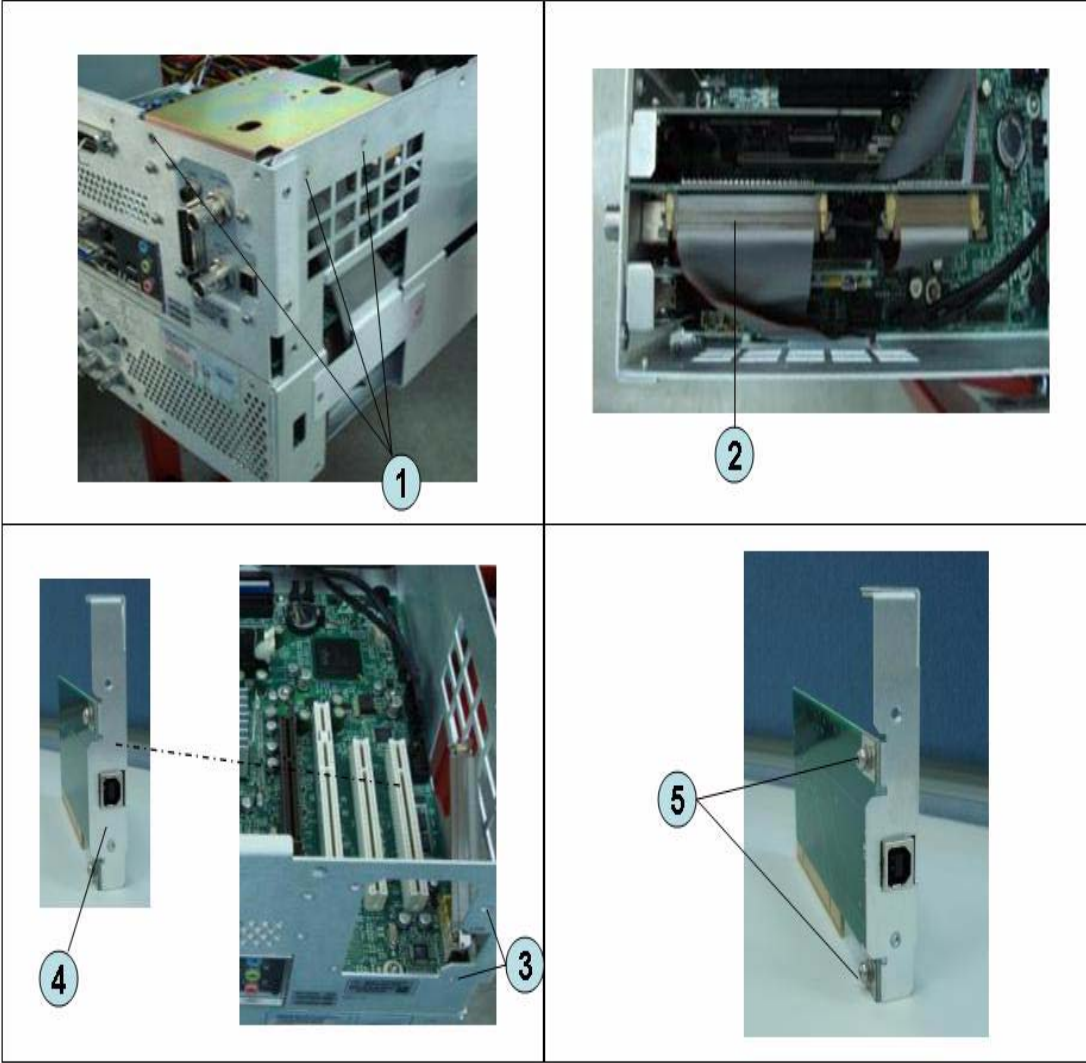
Removal Procedure

Refer to Figure 6-15 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the three TORX T10 screw (item 1) fastening the angle and lift it.
- Step 3.** Disconnect the flat cable (item 2) from the PCI DSP card.
- Step 4.** Remove the two TORX T10 screws (item 3) fastening the card to the rear panel.
- Step 5.** Disconnect the assembly (item 4) from the Digital Motherboard and lift it.
- Step 6.** Remove the two TORX T10 screws (item 5) fastening the angle.

Replacement Procedure
USB (USBTMC) Interface Card Replacement

Figure 6-15 USB (USBTMC) Interface Card Removal



Replacement Procedure

Step 1. Replace the USB (USBTMC) interface card by inverse procedure of removal.

PCI DSP Card and GPIB Card Replacement (A51)

Tools Required

- TORX screwdriver, T10, T15, and T20
- Open-end torque wrench, 5/8 inch (set to 1.97 N-m / 17.4 lb-in)

Removal Procedure

Refer to Figure 6-16 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the three TORX T10 screw (item 1) fastening the angle and lift it.
- Step 3.** Remove the two TORX T10 screw (item 2) fastening the stay and lift it.
- Step 4.** Disconnect the flat cables (item 3).
- Step 5.** Disconnect the flat cable (item 4) from the handler I/O board.
- Step 6.** Remove the four TORX T10 screw (item 5) fastening the card to the rear panel.
- Step 7.** Disconnect the USB(USBTMC) interface card (item 6) from the Digital Motherboard and lift it.
- Step 8.** Disconnect the assembly (item 7) from the Digital Motherboard and lift it.
- Step 9.** Remove the PCI DSP Card or GPIB Card.

For removing the PCI DSP Card.

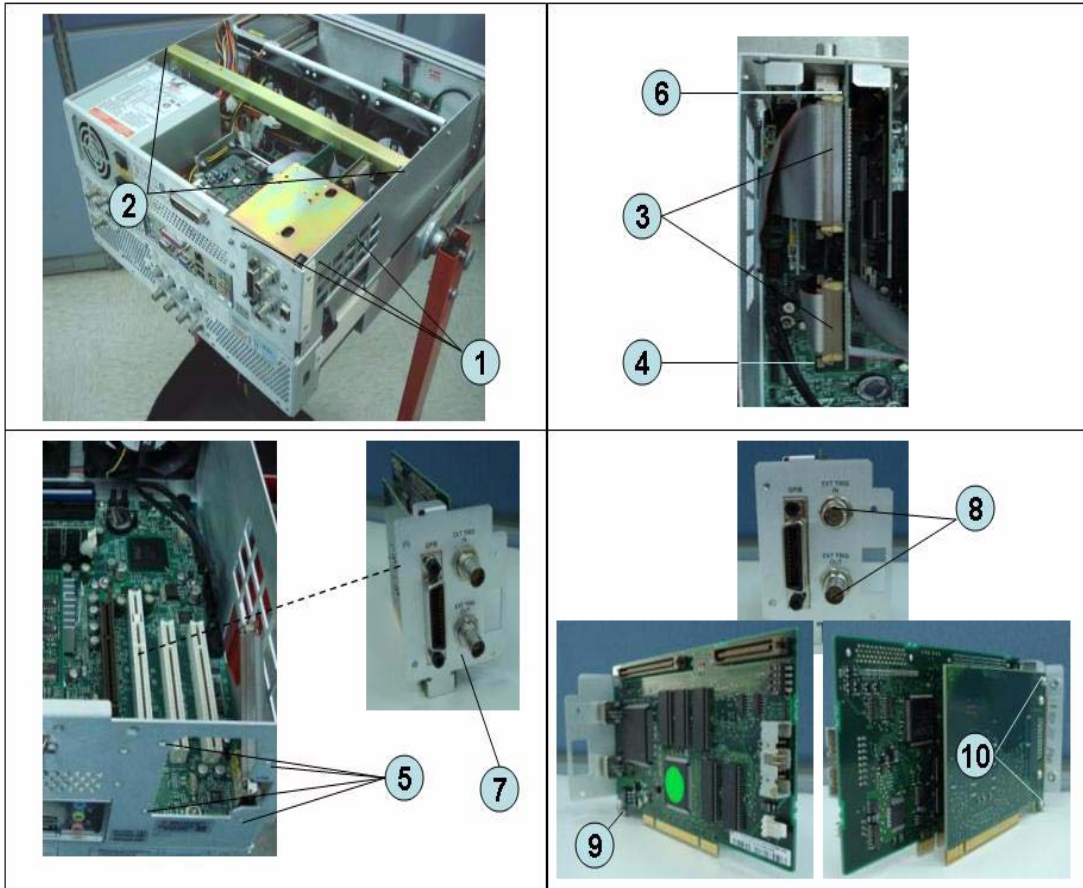
- Remove the two 5/8 inch nuts (item 8) fastening the angle.
- Remove a TORX T10 screw (item 9) fastening the angle.

For removing the GPIB Card.

- Remove the two TORX T10 screws (item 10) fastening the angle.

Replacement Procedure
PCI DSP Card and GPIB Card Replacement (A51)

Figure 6-16 PCI DSP Card and GPIB Card Removal



Replacement Procedure

Step 1. Replace the PCI DSP card and GPIB card by inverse procedure of removal.

NOTE Fasten the 5/8 inch nuts (item 8) using an open-end torque wrench.

Digital Motherboard Replacement (A01)

Tools Required

- TORX screwdriver, T10, T15, and T20

Removal Procedure

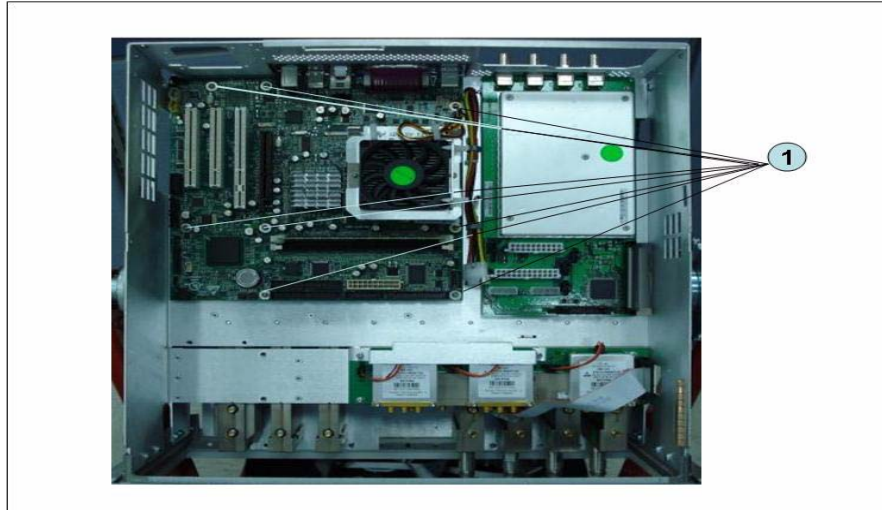
Refer to Figure 6-17 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333
- Step 2.** Remove the following assemblies.
- Front Panel (refer to “Front Panel Removal” on page 334.)
 - Removable Hard Disk Assembly (refer to “Removable Hard Disk Assembly Removal (Obsolete)” on page 335.)
 - Power Supply Assembly (refer to “Power Supply Assembly Replacement” on page 349.)
 - Handler I/O board (refer to “Handler I/O Board Replacement (A25)” on page 355.)
 - Digital Bridge board (refer to “Digital Bridge Board Replacement (A53)” on page 353.)
 - PCI DSP Card and GPIB Card (refer to “PCI DSP Card and GPIB Card Replacement (A51)” on page 359.)
 - Fan Assembly (refer to “Fan Replacement” on page 390.)
- Step 3.** Disconnect all cables from the digital motherboard.
- Step 4.** Remove the eight TORX T10 screws (item 1) fastening the digital motherboard.
- Step 5.** Lift the digital motherboard slowly.

NOTE Don't remove the CPU fan assembly and the DIMM memory from digital motherboard.

Replacement Procedure
Digital Motherboard Replacement (A01)

Figure 6-17 Digital Motherboard Removal



Replacement Procedure

Step 1. Replace the digital motherboard by inverse procedure of removal.

Analog Base Module Replacement (A80)

Tools Required

- TORX screwdriver, T10, T15, and T20
- Open-end torque wrench, 5/8 inch (set to 1.97 N-m / 17.4 lb-in)

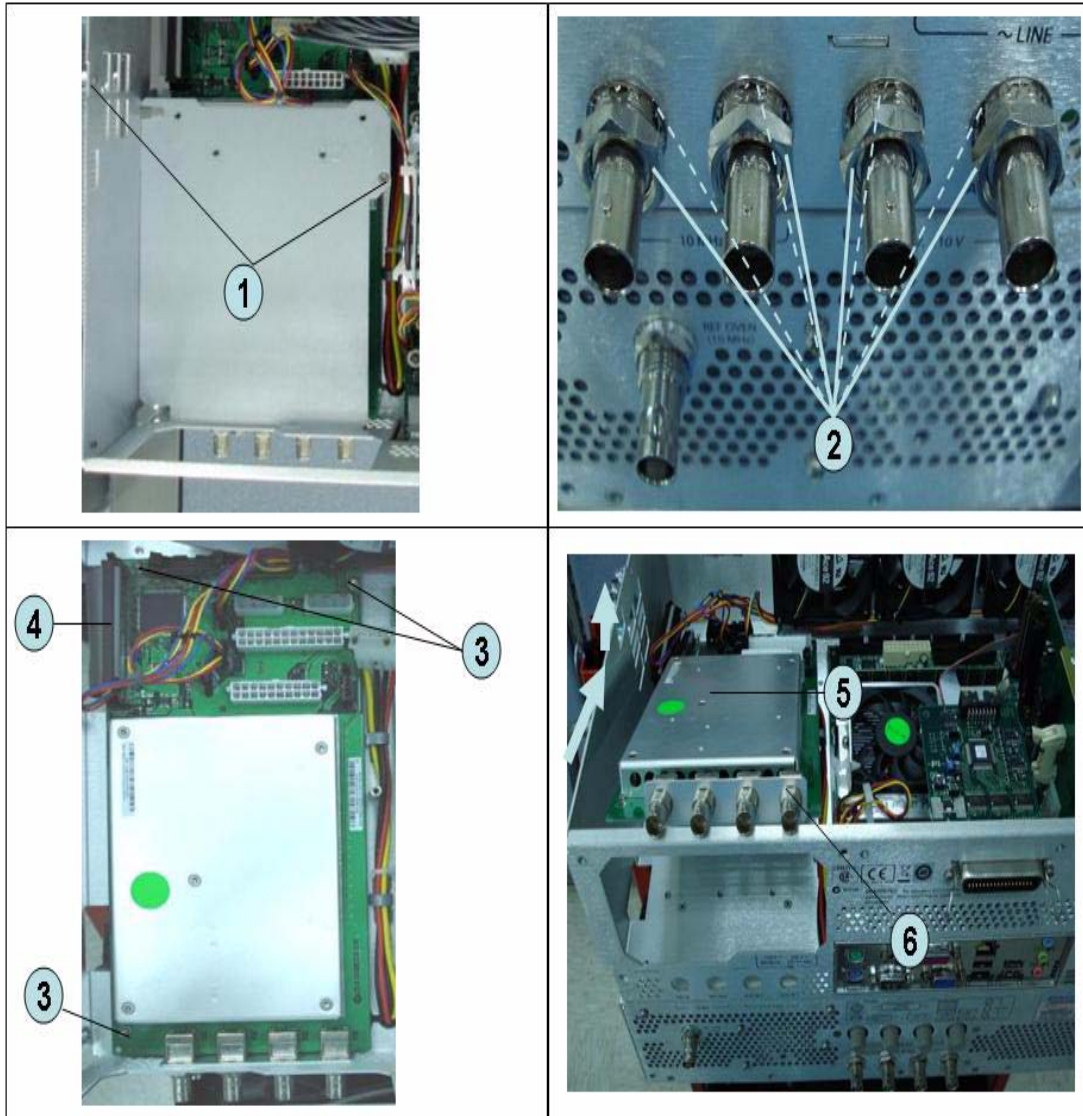
Removal Procedure

Refer to Figure 6-18 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333
- Step 2.** Remove the Power Supply as described in “Power Supply Assembly Replacement” on page 349
- Step 3.** Remove the two TORX T10 screws (item 1) fastening the plate and lift it.
- Step 4.** Remove the four 5/8 inch nut (item 2) fastening the rear panel.
- Step 5.** Disconnect the flat cable (item 4) from analog motherboard.
- Step 6.** Remove the three TORX T10 screws (item 3) fastening the analog base module.
- Step 7.** Push the analog base module (item 5) till the end of the wall. Carefully lift it when the height of BNC connectors are higher than rear chassis wall.
- Step 8.** Remove the spacer (item 6) from analog base module.

Replacement Procedure
Analog Base Module Replacement (A80)

Figure 6-18 Analog Base Module Removal



Replacement Procedure

Step 1. Replace the analog base module by inverse procedure of removal.

NOTE Fasten the 5/8 inch nuts (item 2) using an open-end torque wrench.

Level Vernier Module Replacement (A83)

Opt. 230/235/240/245/280/285/430/435/440/445/480/485

Tools Required

- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver
- Open-end wrench, 5/8 inch
- Open-end torque wrench, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)
- Torque driver set, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)

Removal Procedure

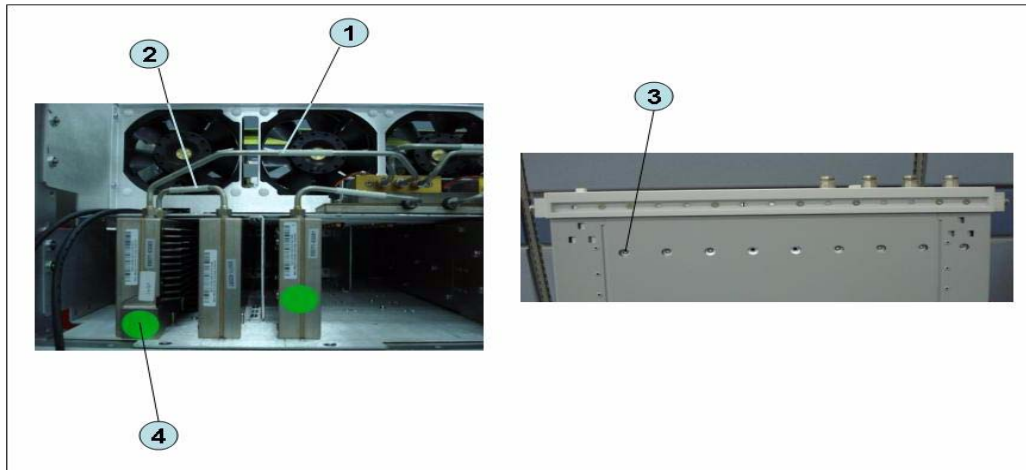
Refer to Figure 6-19 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Disconnect the semi-rigid cable (item 1).
- Step 4.** Disconnect the semi-rigid cable (item 2).
- Step 5.** Remove a TORX T10 screw fastening the module to the bottom. (item 3)
- Step 6.** Slide the level vernier module.

Replacement Procedure
Level Vernier Module Replacement (A83)

Figure 6-19

Level Vernier Module Removal Opt.
230/235/240/245/280/285/430/435/440/445/480/485



Replacement Procedure

Step 1. Replace the level vernier module by inverse procedure of removal.

NOTE Fasten the semi rigid cables using a torque wrench or torque driver set for replacement.

Doubler Module Replacement (A86)

Tools Required

- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver
- Open-end wrench, 5/8 inch
- Open-end torque wrench, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)
- Torque driver set, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)

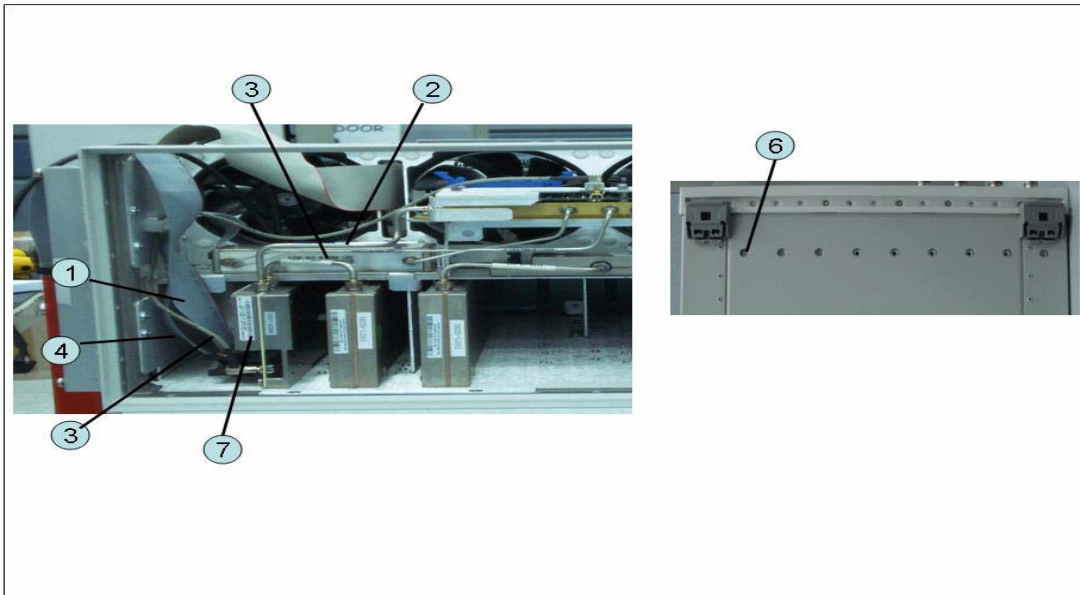
Removal Procedure

Refer to Figure 6-20 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Disconnect the flat cable assembly from Imix board (item 1).
- Step 4.** Disconnect the semi-rigid cable (item 1).
- Step 5.** Disconnect the semi-rigid cable (item 2).
- Step 6.** Remove a TORX T10 screw fastening the module to the bottom. (item 3)
- Step 7.** Slide the level vernier module.

Replacement Procedure
Doubler Module Replacement (A86)

Figure 6-20 **Doubler Module Removal**



Replacement Procedure

Step 1. Replace the level vernier module by inverse procedure of removal.

NOTE Fasten the semi rigid cables using a torque wrench or torque driver set for replacement.

Synthesizer Module Replacement (A91)

Tools Required

- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver
- Open-end wrench, 5/8 inch
- Open-end torque wrench, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)
- Torque driver set, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)

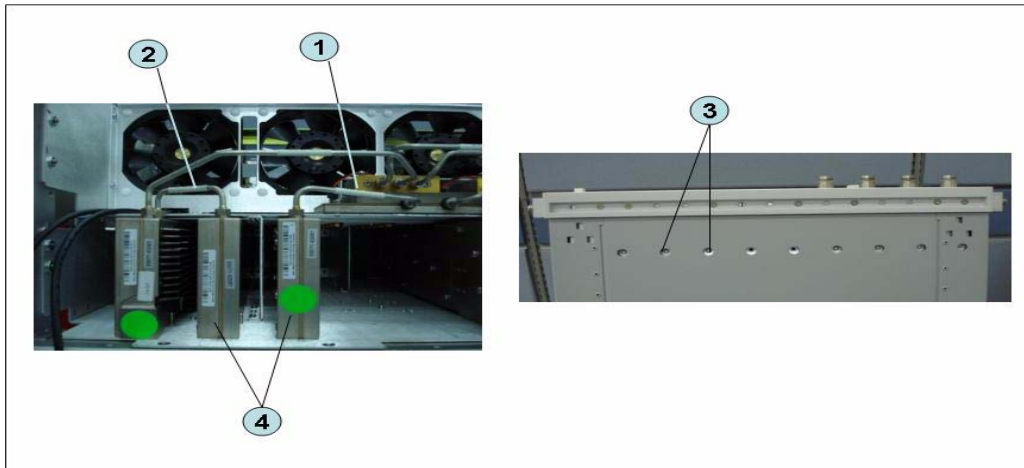
Removal Procedure

Refer to Figure 6-21 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Disconnect the semi-rigid cable (item 1).
- Step 4.** Disconnect the semi-rigid cable (item 2).
- Step 5.** Remove the two TORX T10 screws fastening the module to the bottom. (item 3)
- Step 6.** Slide the synthesizer module (item 4).

Replacement Procedure
Synthesizer Module Replacement (A91)

Figure 6-21 **Synthesizer Module Removal**



Replacement Procedure

Step 1. Replace the synthesizer module by inverse procedure of removal.

NOTE Fasten the semi rigid cables using a torque wrench or torque driver set for replacement.

Receiver Module Replacement for 2-Port model (A82/A87)

1) Option 230/235/240/245/280/285 (A82)

Tools Required

- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver
- Open-end wrench, 5/8 inch
- Open-end torque wrench, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)
- Torque driver set, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)

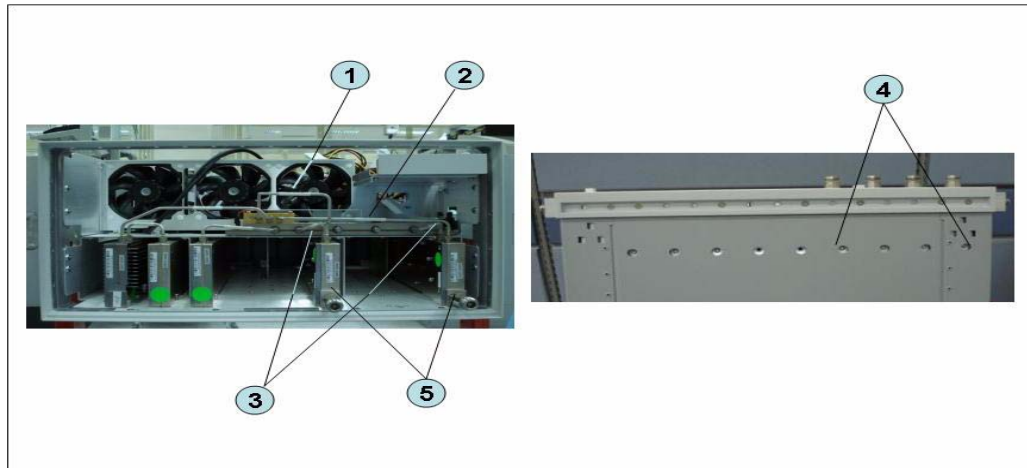
Removal Procedure

Refer to Figure 6-22 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Disconnect the semi-rigid cable (item 1).
- Step 4.** Disconnect the semi-rigid cable (item 2).
- Step 5.** Disconnect the two semi-rigid cables (item 3).
- Step 6.** Remove the two TORX T10 screws fastening the module to the bottom. (item 4)
- Step 7.** Slide the receiver module (item 5).

Replacement Procedure
Receiver Module Replacement for 2-Port model (A82/A87)

Figure 6-22 Receiver Module Removal for 2-port model



Replacement Procedure

Step 1. Replace the receiver module by inverse procedure of removal.

NOTE Fasten the semi rigid cables using a torque wrench or torque driver set for replacement.

2) Option 2K5 (A87)

Tools Required

- TORX screwdriver, T10
- Open-end wrench, 5/8 inch
- Open-end torque wrench, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)
- Torque driver set, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)

Removal Procedure

Refer to Figure 6-23 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Remove the hard disk assembly as described in “Removable Hard Disk Assembly Removal (Option 017)” on page 341.
- Step 4.** Remove the imix and distributor modules as described in “Imix, Attenuator and Distributor Module Replacement (Opt. 2K5/4K5)” on page 385.

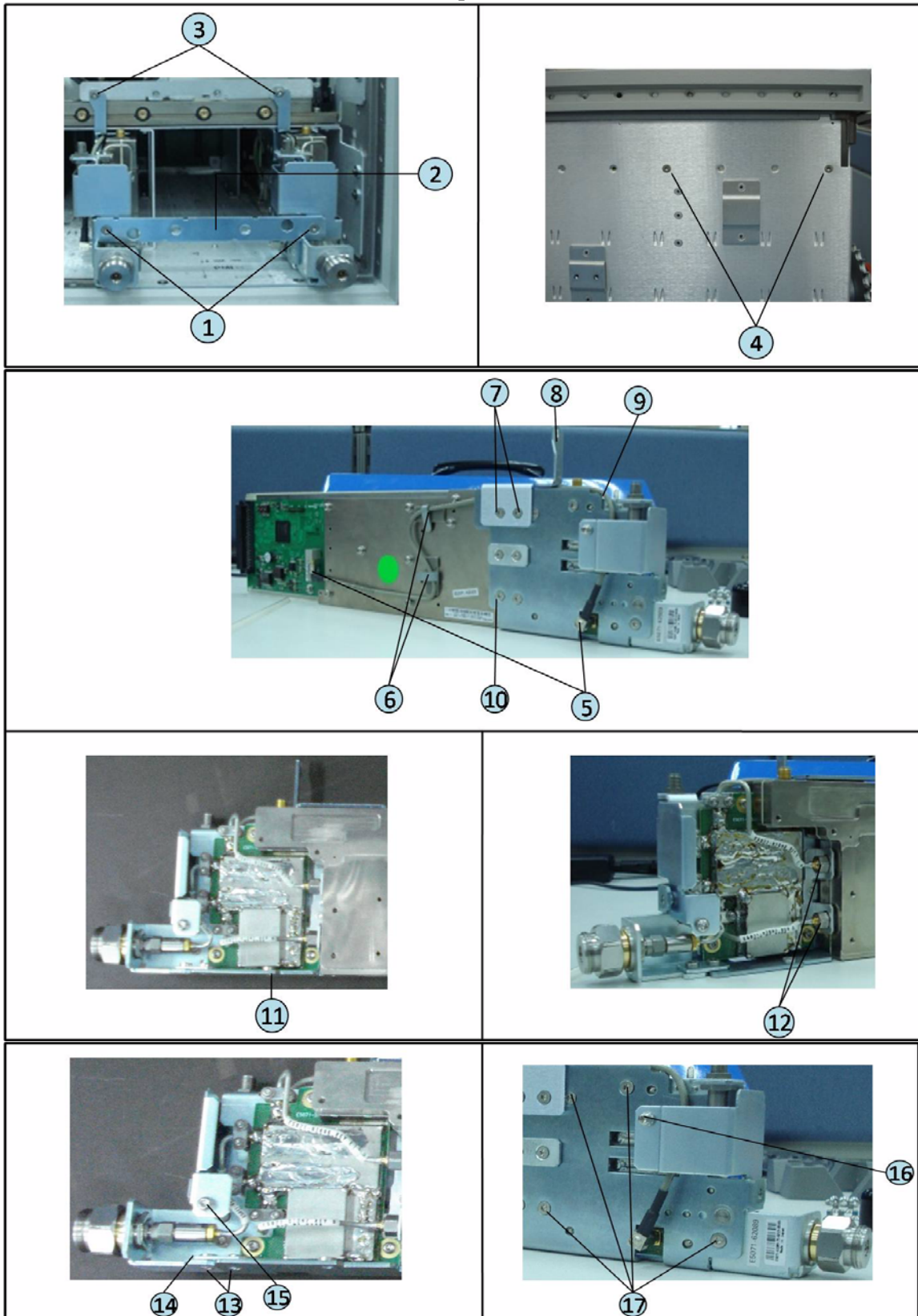
NOTE

The attenuator module does not need to be removed.

- Step 5.** Remove the two TORX T10 screws (item 1).
- Step 6.** Remove the plate (item 2).
- Step 7.** Remove the two TORX T10 screws (item 3)
- Step 8.** Remove the two TORX T10 screws fastening the module (item 4)
- Step 9.** Slide out the receiver module.
- Step 10.** Unplug the two ends of the RF cable (item 5)
- Step 11.** Unclip the RF cable (item 6).
- Step 12.** Remove the two TORX T10 screws fastening the angle (item 7).
- Step 13.** Remove the angle (item 8).
- Step 14.** Remove the RF cable (item 9).
- Step 15.** Remove the two TORX T10 screws fastening the front end module from the receiver module (item 10 and item 11).
- Step 16.** Unfasten the two semi-rigid cables (item 12).
- Step 17.** Separate the front end module from the receiver module.
- Step 18.** Remove the two TORX T10 screws (item 13) and remove the plate (item 14).
- Step 19.** Remove the six TORX T10 screws (item 15, item 16 and item 17).
- Step 20.** Separate the plate from the front end module.

Replacement Procedure
Receiver Module Replacement for 2-Port model (A82/A87)

Figure 6-23 Receiver Module Removal for 2-port model



Replacement Procedure

Step 1. Replace the receiver module by inverse procedure of removal.

NOTE

Fasten the semi rigid cables using a torque wrench or torque driver set for replacement.

Receiver Module Replacement for 4-Port model (A82/A87)

1) Option 430/435/440/445/480/485 (A82)

Tools Required

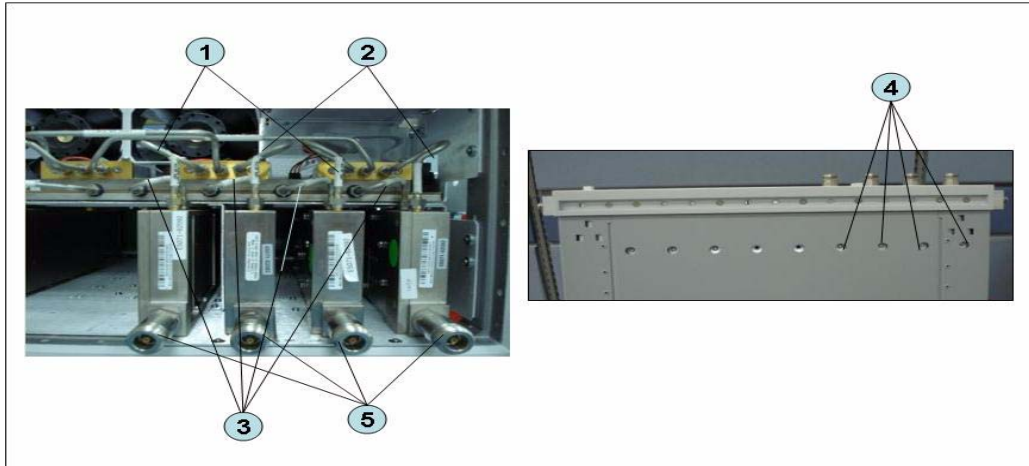
- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver
- Open-end wrench, 5/8 inch
- Open-end torque wrench, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)
- Torque driver set, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)

Removal Procedure

Refer to Figure 6-24 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Disconnect the two semi-rigid cable (item 1).
- Step 4.** Disconnect the two semi-rigid cable (item 2).
- Step 5.** Disconnect the four semi-rigid cables (item 3).
- Step 6.** Remove the four TORX T10 screws fastening the module to the bottom. (item 4)
- Step 7.** Slide the receiver module (item 5).

Figure 6-24 Receiver Module Removal for 4-port model



Replacement Procedure

Step 1. Replace the receiver module by inverse procedure of removal.

NOTE

Fasten the semi rigid cables using a torque wrench or torque driver set for replacement.

2) Option 4K5 (A87)

Tools Required

- TORX screwdriver, T10
- Open-end wrench, 5/8 inch
- Open-end torque wrench, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)
- Torque driver set, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)

Removal Procedure

Refer to Figure 6-25 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Remove the hard disk assembly as described in “Removable Hard Disk Assembly Removal (Option 017)” on page 341.
- Step 4.** Remove the imix and distributor modules as described in “Imix, Attenuator and Distributor Module Replacement (Opt. 2K5/4K5)” on page 385.

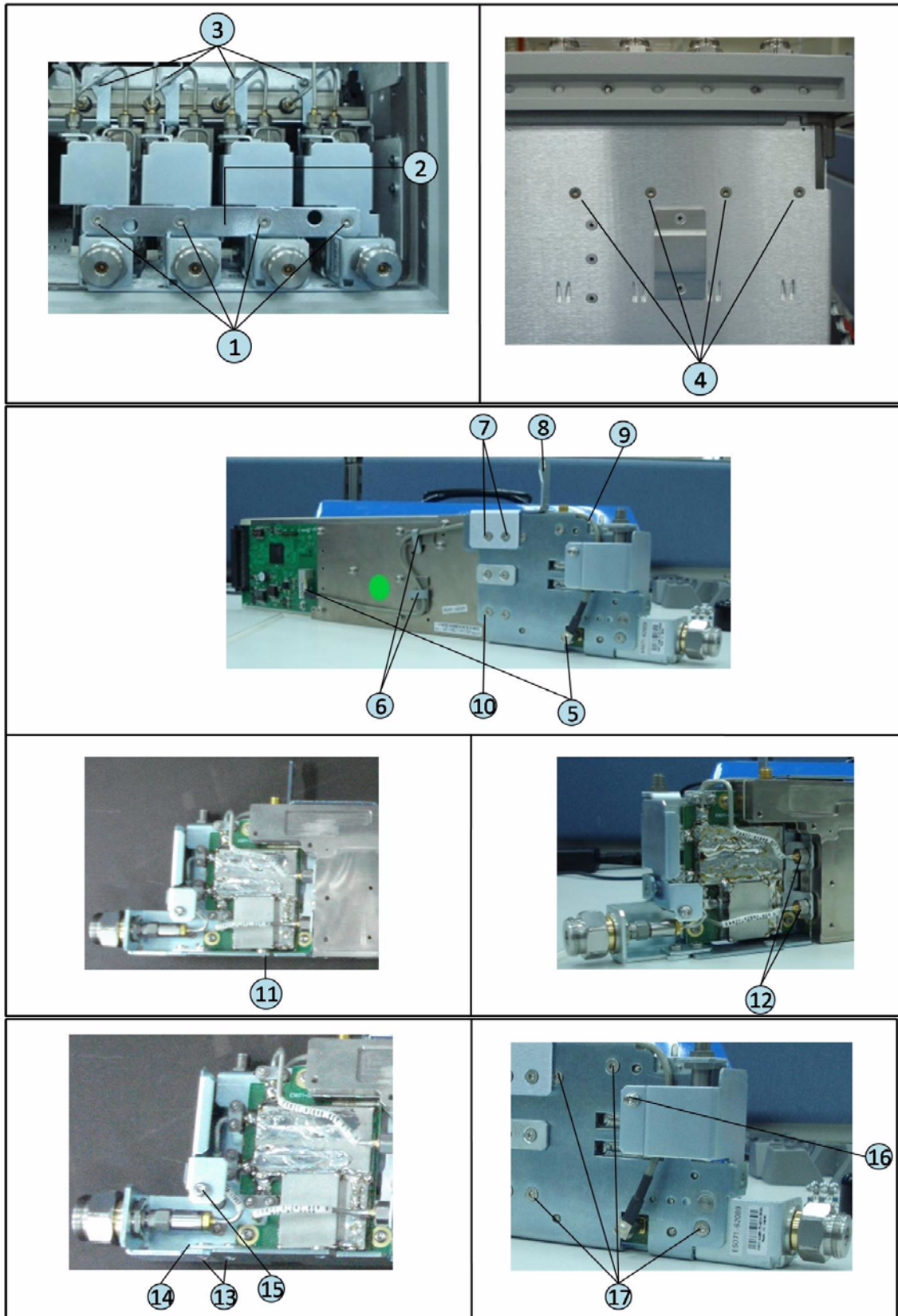
NOTE

The attenuator module does not need to be removed.

- Step 5.** Remove the four TORX T10 screws (item 1).
- Step 6.** Remove the plate (item 2).
- Step 7.** Remove the four TORX T10 screws (item 3)
- Step 8.** Remove the four TORX T10 screws fastening the module (item 4)
- Step 9.** Slide the receiver module.
- Step 10.** Unplug the two ends of the RF cable (item 5)
- Step 11.** Unclip the RF cable (item 6).
- Step 12.** Remove the two TORX T10 screws fastening the angle (item 7).
- Step 13.** Remove the angle (item 8).
- Step 14.** Remove the RF cable (item 9).
- Step 15.** Remove the two TORX T10 screws fastening the front end module from the receiver module (item 10 and item 11).
- Step 16.** Unfasten the two semi-rigid cables (item 12).
- Step 17.** Separate the front end module from the receiver module.
- Step 18.** Remove the two TORX T10 screws (item 13) and remove the plate (item 14).
- Step 19.** Remove the six TORX T10 screws (item 15, item 16 and item 17).
- Step 20.** Separate the plate from the front end module.

Replacement Procedure
Receiver Module Replacement for 4-Port model (A82/A87)

Figure 6-25 Receiver Module Removal for 4-port model



Replacement Procedure
Receiver Module Replacement for 4-Port model (A82/A87)

Replacement Procedure

Step 1. Replace the receiver module by inverse procedure of removal.

NOTE Fasten the semi rigid cables using a torque wrench or torque driver set for replacement.

RF Switch and Distributor Module Replacement for 2-Port model (A84)

Opt. 230/235/240/245/280/285/430/435/440/445/480/485

Tools Required

- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver
- Open-end wrench, 5/8 inch
- Open-end torque wrench, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)
- Torque driver set, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)

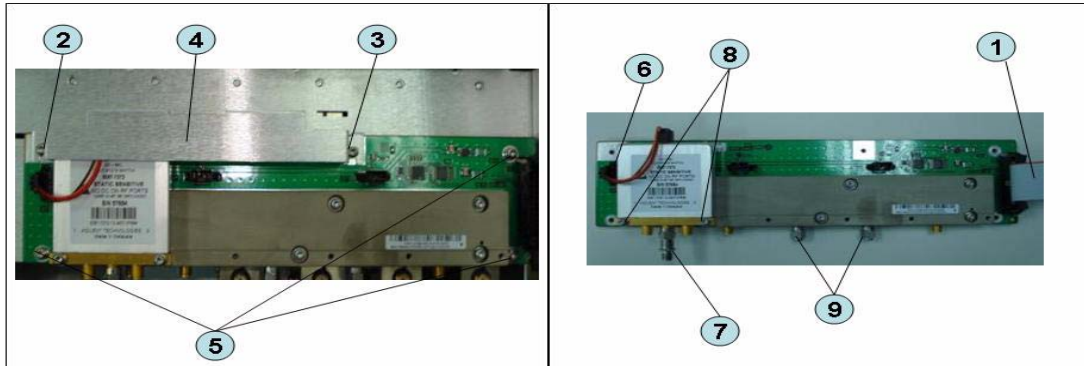
Removal Procedure

Refer to Figure 6-26 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the following assemblies.
 - Front Panel Assembly (refer to “Front Panel Removal” on page 334.)
 - Removable Hard Disk Assembly (refer to “Removable Hard Disk Assembly Removal (Obsolete)” on page 335.)
 - Disconnect all semi-rigid cables.
- Step 3.** Disconnect the flat cable (item 1) from the distributor module.
- Step 4.** Remove a TORX T10 screws (item 2) fastening the guard.
- Step 5.** Remove a TORX T10 screws (item 3) fastening the guard.
- Step 6.** Lift the guard from the distributor module (item 4).
- Step 7.** Remove the three TORX T10 screws (item 5) fastening the plate.
- Step 8.** Disconnect the switch cable (item 6) from the switch.
- Step 9.** Remove the attenuator (item 7) fastening the switch.
- Step 10.** Remove the two TORX T10 screws (item 8) fastening the switch.
- Step 11.** Remove the two terminations (item 9) fastening the distributor module when replaced the distributor module.

Replacement Procedure
RF Switch and Distributor Module Replacement for 2-Port model (A84)

Figure 6-26 RF Switch and Distributor Module Replacement for 2-port model



Replacement Procedure

Step 1. Replace the switch and distributor module by inverse procedure of removal.

NOTE Be careful screw (item 2) and screw (item 3) are different.

NOTE Fasten the semi rigid cables, attenuator and terminations using a torque wrench or torque driver set for replacement.

RF Switch and Distributor Module Replacement for 4-Port model (A84)

Opt. 230/235/240/245/280/285/430/435/440/445/480/485

Tools Required

- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver
- Open-end wrench, 5/8 inch
- Open-end torque wrench, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)
- Torque driver set, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)

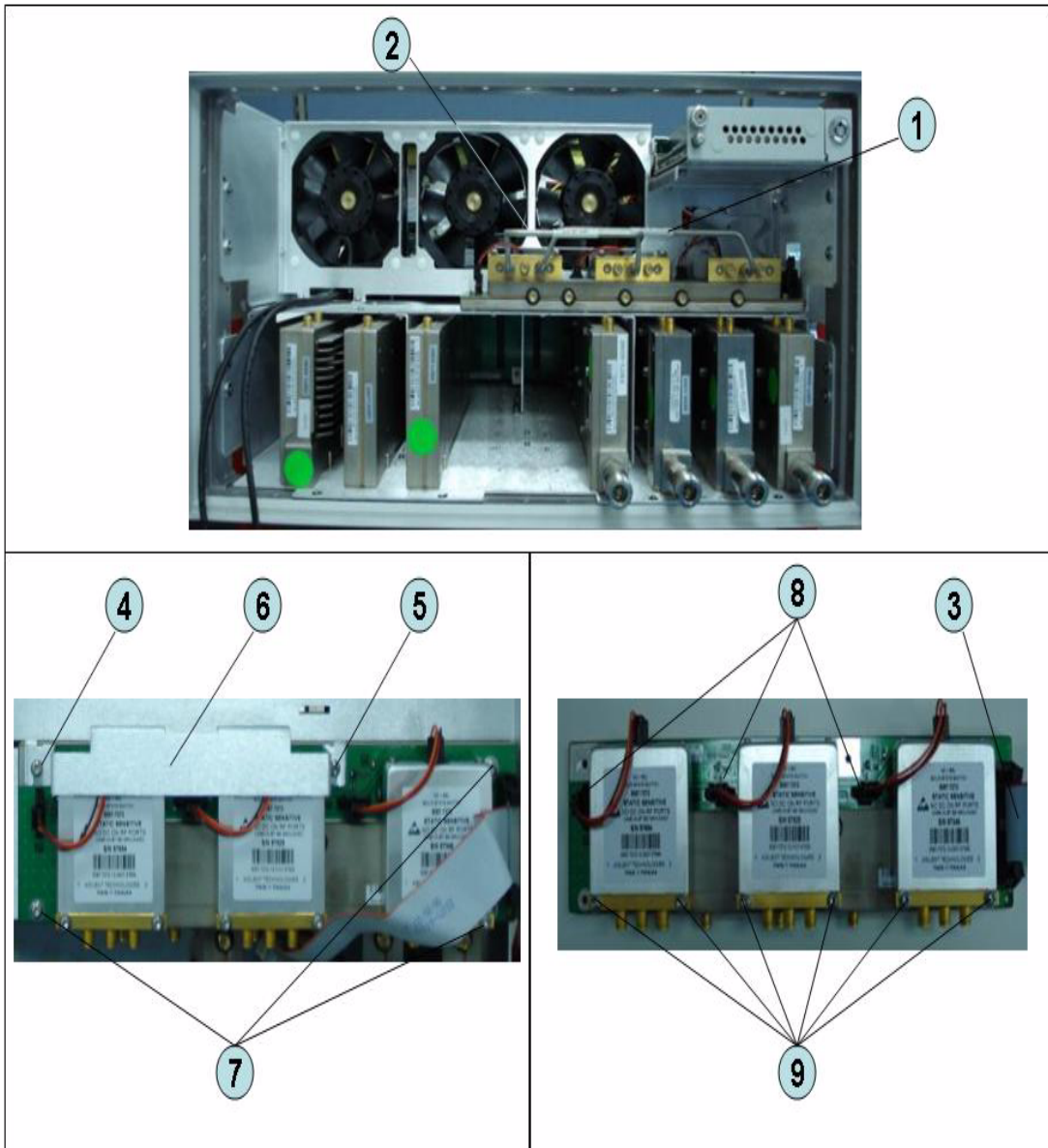
Removal Procedure

Refer to Figure 6-27 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the following assemblies.
 - Front Panel Assembly (refer to “Front Panel Removal” on page 334.)
 - Removable Hard Disk Assembly (refer to “Removable Hard Disk Assembly Removal (Obsolete)” on page 335.)
 - Disconnect all semi-rigid cables.
- Step 3.** Disconnect the semi-rigid cable (item 1).
- Step 4.** Disconnect the semi-rigid cable (item 2).
- Step 5.** Disconnect the flat cable (item 3) from the distributor module.
- Step 6.** Remove a TORX T10 screws (item 4) fastening the guard.
- Step 7.** Remove a TORX T10 screws (item 5) fastening the guard.
- Step 8.** Lift the guard from the distributor module (item 6).
- Step 9.** Remove the three TORX T10 screws (item 7) fastening the plate.
- Step 10.** Disconnect the three switch cables (item 8) from the switch.
- Step 11.** Remove the six TORX T10 screws (item 9) fastening the switch.

Replacement Procedure
RF Switch and Distributor Module Replacement for 4-Port model (A84)

Figure 6-27 RF Switch and Distributor Module Replacement for 4-port model



Replacement Procedure

Step 1. Replace the switch by inverse procedure of removal.

NOTE Be careful screw (item 4) and screw (item 5) are different.

NOTE Fasten the semi rigid cables using a torque wrench or torque driver set for replacement.

Imix, Attenuator and Distributor Module Replacement (Opt. 2K5/4K5)

1) Option 2K5

Tools Required

- TORX screwdriver, T10
- Open-end wrench, 5/8 inch
- Open-end torque wrench, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)
- Torque driver set, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)

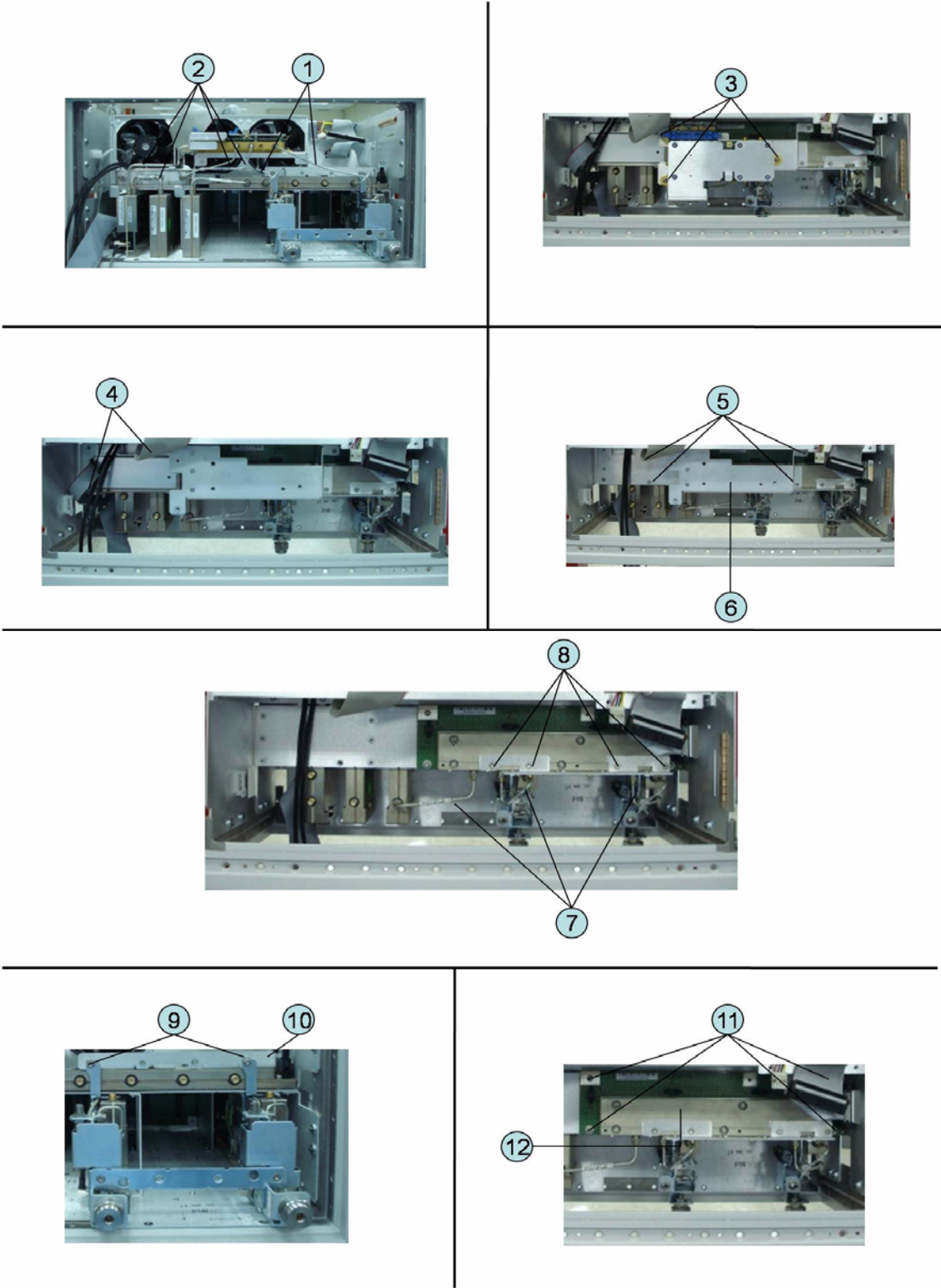
Removal Procedure

Refer to Figure 6-28 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the following assemblies.
 - Front Panel Assembly (refer to “Front Panel Removal” on page 334.)
 - Removable Hard Disk Assembly (refer to “Removable Hard Disk Assembly Removal (Obsolete)” on page 335.)
 - Disconnect all semi-rigid cables.
- Step 3.** Disconnect the two semi-rigid cables (item 1).
- Step 4.** Disconnect the four semi-rigid cables (item 2).
- Step 5.** Remove three TORX T10 screws (item 3) fastening the Imix module.
- Step 6.** Lift the Imix module.
- Step 7.** Remove two TORX T10 screws (item 4) fastening the distributor module to the plate.
- Step 8.** Lift the attenuator module.
- Step 9.** Remove four TORX T10 screws (item 5) fastening the guard.
- Step 10.** Lift the guard from the attenuator module (item 6).
- Step 11.** Disconnect the three semi-rigid cables (item 7).
- Step 12.** Remove the four TORX T10 screws (item 8) fastening the plate.
- Step 13.** Remove the two TORX T10 screws (item 9) fastening the plate.
- Step 14.** Lift the plate (item 10).
- Step 15.** Remove the four TORX T10 screws (item 11) fastening the attenuator module.
- Step 16.** Lift the distributor module (item 12).

Replacement Procedure
Imix, Attenuator and Distributor Module Replacement (Opt. 2K5/4K5)

Figure 6-28 Imix, Attenuator and Distributor Module Replacement (Opt. 2K5)



Replacement Procedure

Imix, Attenuator and Distributor Module Replacement (Opt. 2K5/4K5)

Replacement Procedure

Step 1. Replace the switch by inverse procedure of removal.

NOTE

Fasten the semi rigid cables using a torque wrench or torque driver set for replacement.

2) Option 4K5

Tools Required

- TORX screwdriver, T10
- Open-end wrench, 5/8 inch
- Open-end torque wrench, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)
- Torque driver set, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)

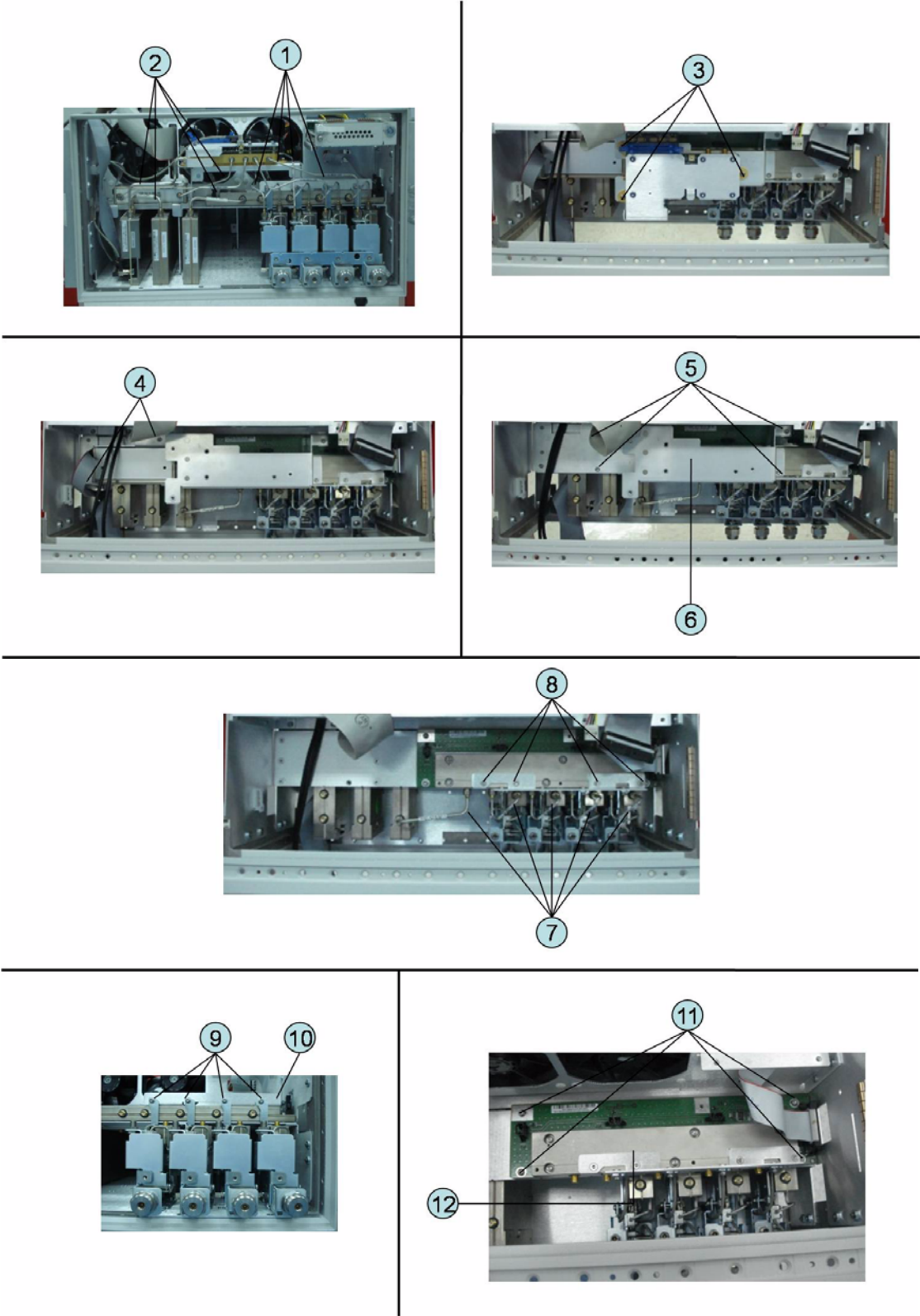
Removal Procedure

Refer to Figure 6-28 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the following assemblies.
- Front Panel Assembly (refer to “Front Panel Removal” on page 334.)
 - Removable Hard Disk Assembly (refer to “Removable Hard Disk Assembly Removal (Obsolete)” on page 335.)
 - Disconnect all semi-rigid cables.
- Step 3.** Disconnect the four semi-rigid cables (item 1).
- Step 4.** Disconnect the four semi-rigid cables (item 2).
- Step 5.** Remove three TORX T10 screws (item 3) fastening the plate.
- Step 6.** Lift the Imix module.
- Step 7.** Remove two TORX T10 screws (item 4) fastening the distributor module to the plate.
- Step 8.** Lift the distributor module.
- Step 9.** Remove four TORX T10 screws (item 5) fastening the guard.
- Step 10.** Lift the guard from the distributor module (item 6).
- Step 11.** Disconnect the five semi-rigid cables (item 7).
- Step 12.** Remove the four TORX T10 screws (item 8) fastening the plate.
- Step 13.** Remove the four TORX T10 screws (item 9) fastening the plate.
- Step 14.** Lift the plate (item 10).
- Step 15.** Remove the four TORX T10 screws (item 11) fastening the attenuator module.
- Step 16.** Lift the attenuator module (item 12).

Replacement Procedure
Imix, Attenuator and Distributor Module Replacement (Opt. 2K5/4K5)

Figure 6-29 Imix, Attenuator and Distributor Module Replacement (Opt. 4K5)



Replacement Procedure

Step 1. Replace the switch by inverse procedure of removal.

NOTE

Fasten the semi rigid cables using a torque wrench or torque driver set for replacement.

Fan Replacement

Tools Required

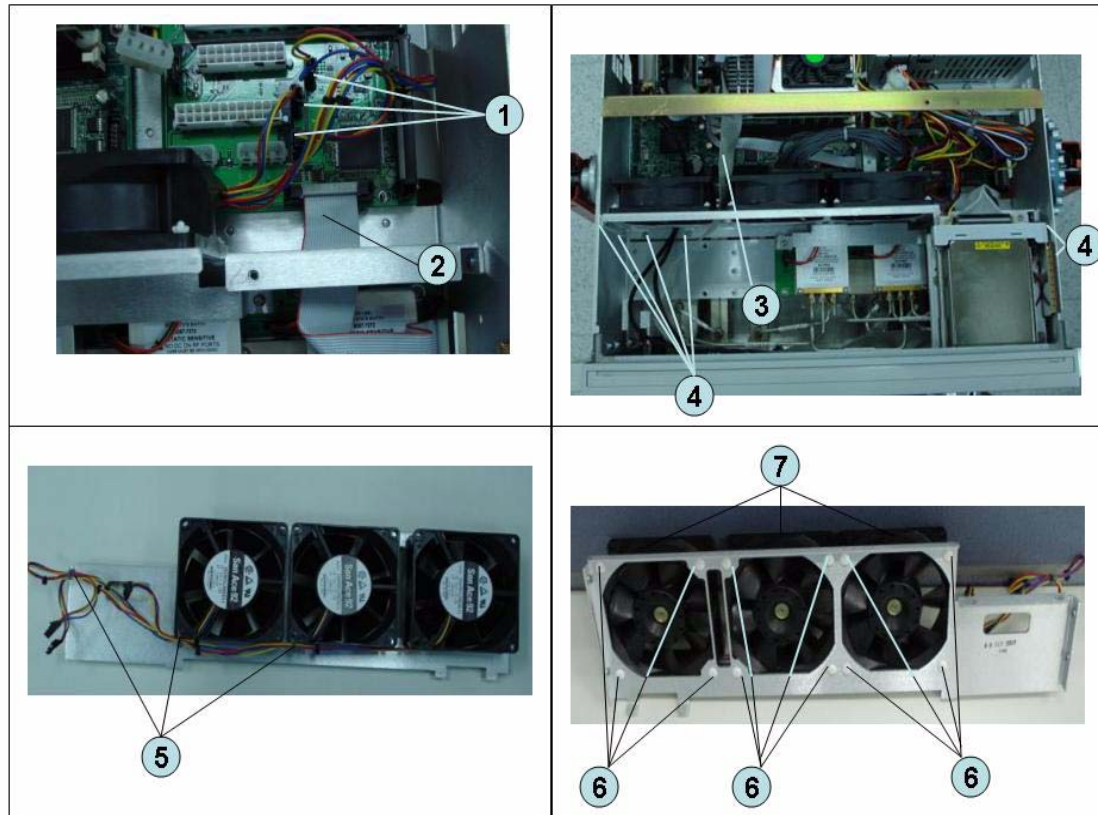
- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver
- A fine stick such as Hex key, 1.5 mm
- Cutting plier or scissors

Removal Procedure

Refer to Figure 6-30 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the removal hard disk assembly as described in “Removable Hard Disk Assembly Removal (Obsolete)” on page 335.
- Step 3.** Disconnect the fan cables (item 1) from the analog base module.
- Step 4.** Disconnect the flat cable (item 2) from the analog base module.
- Step 5.** Disconnect the flat cable (item 3) from the digital bridge board.
- Step 6.** Remove the six TORX T10 screws (item 4) fastening the fan plate.
- Step 7.** Cut the cable tie (item 5).
- Step 8.** Remove the twelve rivet (plastic)(item 6) fastening the fan.
- Step 9.** Remove the fan (item 7) from fan plate.

Figure 6-30 Fan Removal



Replacement Procedure

Step 1. Replace the fan by inverse procedure of removal.

NOTE

Connecting the cables (item 1) as described below.

- Connect the short cable to “J5” connector.
 - Connect the middle cable to “J6” connector.
 - Connect the long cable to “J7” connector.
-

PCA DC Bias Board (Opt.xx5) Replacement (A57/A58)

Tools Required

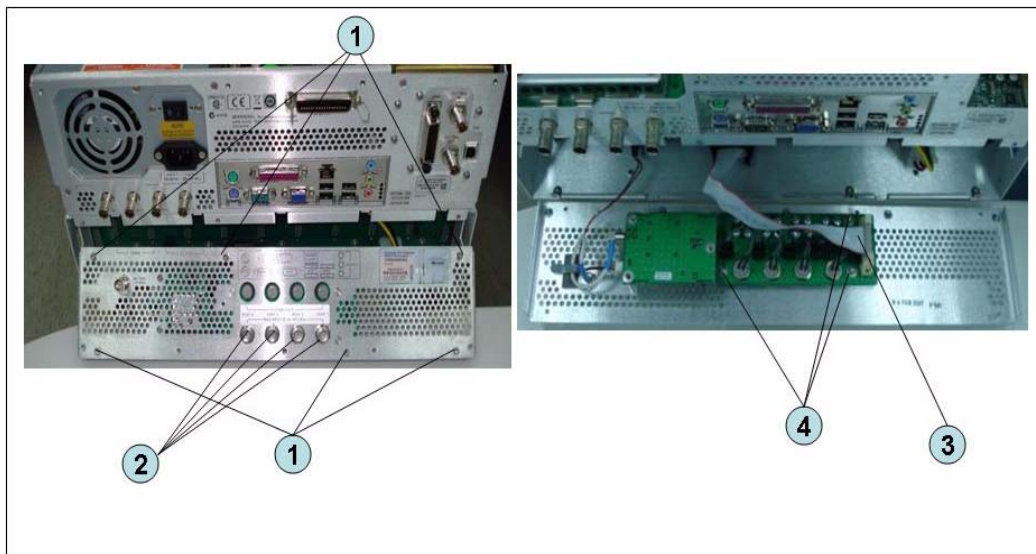
- TORX screwdriver, T10, T15, and T20
- Open-end torque wrench, 9/16 inch (set to 3.46 N-m / 30.5 lb-in)

Removal Procedure

Refer to Figure 6-30 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the 9/16 inch nut (item 2) fastening the rear cover.
- Step 3.** Remove the six TORX T10 screws (item 1) fastening the rear cover.
- Step 4.** Disconnect the cable (item 3) from the analog motherboard.
- Step 5.** Remove the three TORX T10 screw (item 4) fastening the DC Bias board.

Figure 6-31 PCA DC Bias Board Removal



Replacement Procedure

- Step 1.** Replace the PCA DC bias board by inverse procedure of removal.

NOTE

Fasten the 9/16 inch nuts (item 2) using an open-end torque wrench.

10 MHz Oven Board (Opt. 1E5) Replacement (A05)

Tools Required

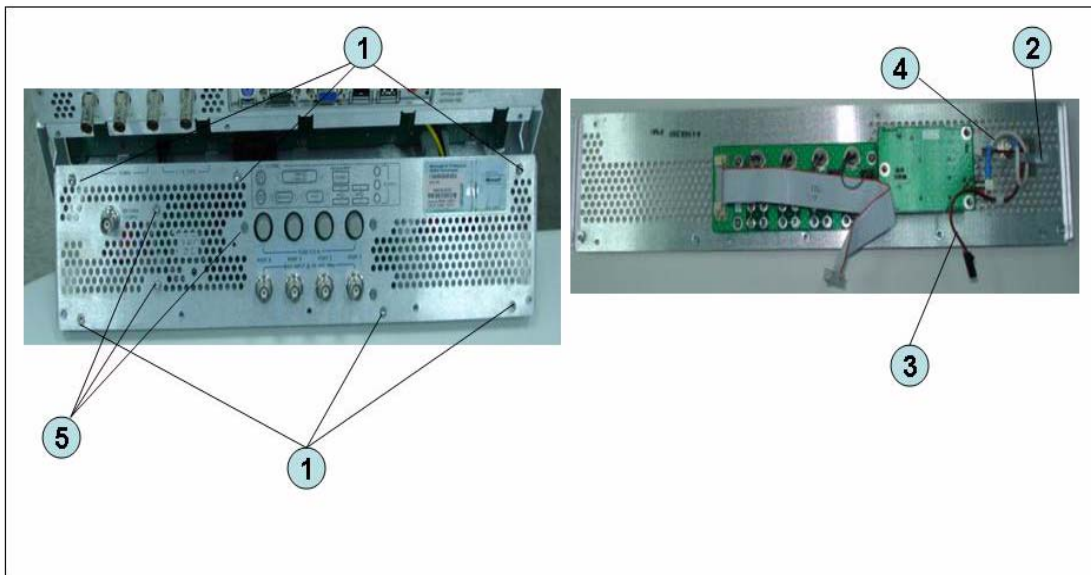
- TORX screwdriver, T10, T15, and T20

Removal Procedure

Refer to Figure 6-32 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the six TORX T10 screws (item 1) fastening the rear cover.
- Step 3.** Release the clamped cables from the clamps (item 2) on the rear cover.
- Step 4.** Disconnect the cables (item 3, 4) from the oven.
- Step 5.** Remove the three TORX T10 screws (item 5) fastening the oven.

Figure 6-32 10 MHz Oven Board Removal



Replacement Procedure

- Step 1.** Replace the 10 MHz oven board by inverse procedure of removal.

Analog Motherboard Replacement (A50)

Tools Required

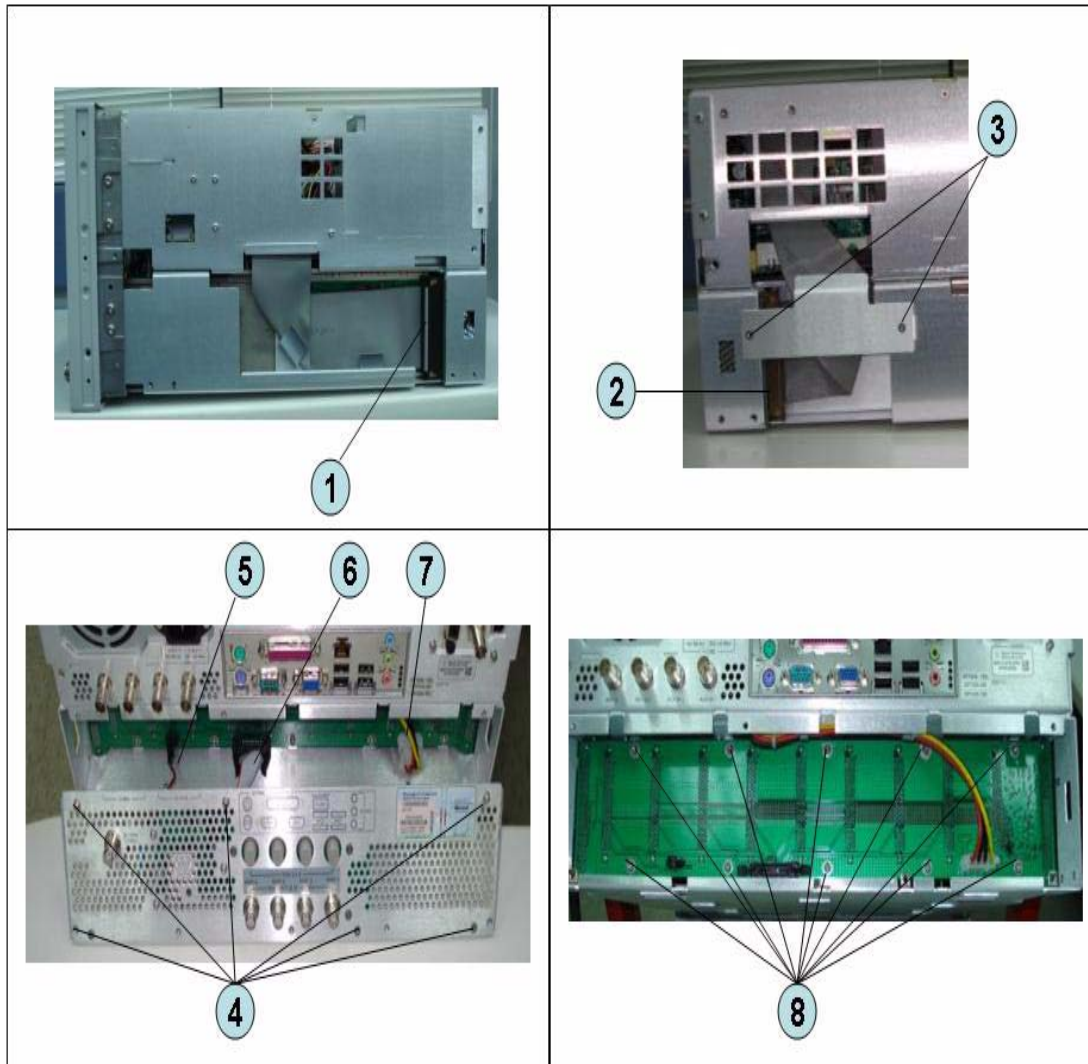
- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver
- Open-end wrench, 5/8 inch
- Open-end torque wrench, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)
- Torque driver set, 5/16 inch (set to 1.08 N-m / 9.5 lb-in) (for reconnecting SMA connector)

Removal Procedure

Refer to Figure 6-33 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the following assemblies.
- Front Panel Assembly (refer to “Front Panel Removal” on page 334.)
 - Removable Hard Disk Assembly (refer to “Removable Hard Disk Assembly Removal (Obsolete)” on page 335.)
 - Level Vernier Module (refer to “Level Vernier Module Replacement (A83)” on page 365.)
 - Synthesizer Module (refer to “Synthesizer Module Replacement (A91)” on page 369.)
 - Receiver Module (refer to “Receiver Module Replacement for 2-Port model (A82/A87)” on page 371 or “Receiver Module Replacement for 4-Port model (A82/A87)” on page 376.)
- Step 3.** Remove the two TORX T10 screws (item 3) fastening the plate and remove it.
- Step 4.** Disconnect the flat cables connected to the analog motherboard (item 1, 2).
- Step 5.** Remove the six TORX T10 screws (item 4) fastening the rear cover.
- Step 6.** Disconnect the cable (item 5) connected to the analog motherboard when with option 1E5.
- Step 7.** Disconnect the cables (item 6, 7) connected to the analog motherboard.
- Step 8.** Remove the ten TORX T10 screws (item 8) fastening the analog mother board.

Figure 6-33 Analog Motherboard Removal



Replacement Procedure

Step 1. Replace the analog motherboard by inverse procedure of removal.

Front Panel Cover Removal

Tools Required

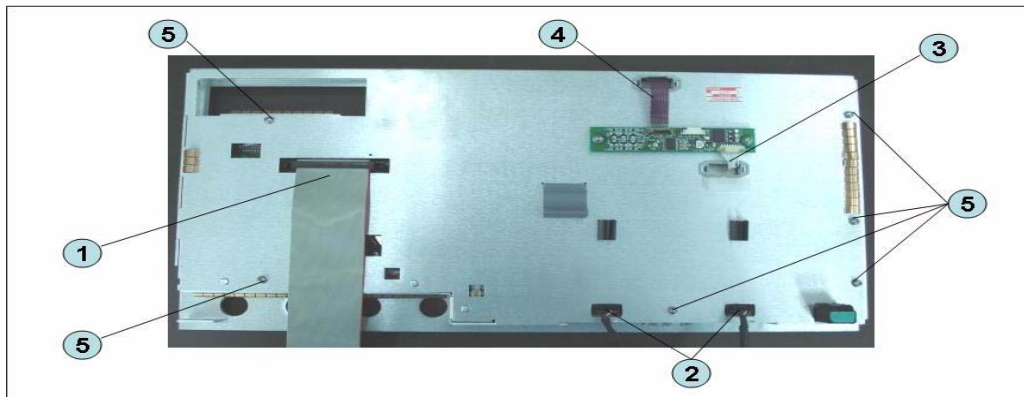
- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver

Removal Procedure

Refer to Figure 6-34 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Disconnect the cables (item 1, 2, 3, 4) connected through the cover.
- Step 4.** Remove the six TORX T10 screws (item 5) fastening the cover.

Figure 6-34 Front Panel Cover Removal



Control Touch Panel Replacement

Tools Required

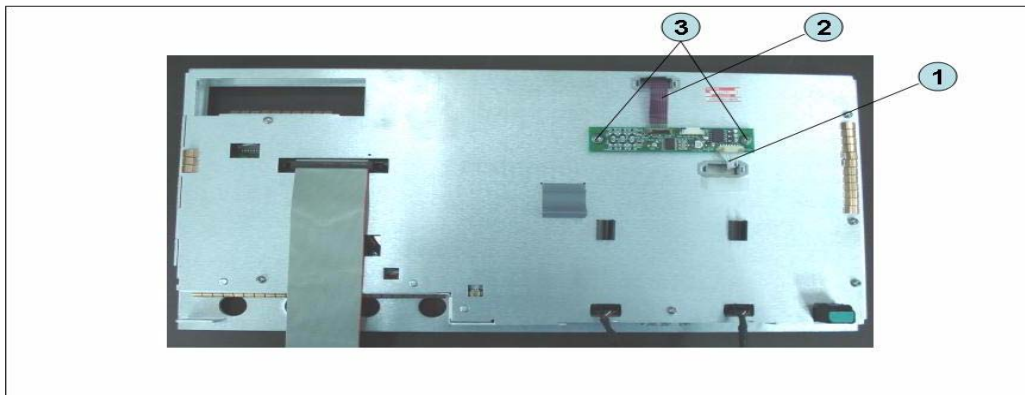
- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver

Removal Procedure

Refer to Figure 6-35 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Disconnect the cables (item 1, 2) connected through the cover.
- Step 4.** Remove the two TORX T10 screws (item 3) fastening the control touch panel.

Figure 6-35 Control Touch Panel Replacement



Replacement Procedure

- Step 1.** Replace the control touch panel by inverse procedure of removal.

Inverter Board Replacement

Tools Required

- TORX screwdriver, T8, T10, T15, and T20
- Flat edge screwdriver

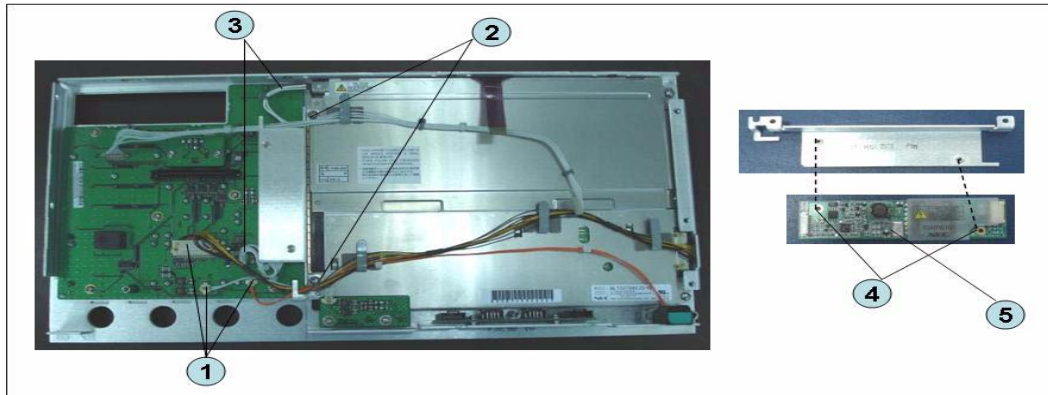
Removal Procedure

Refer to Figure 6-36 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Remove the front panel cover as described in “Front Panel Cover Removal” on page 396.
- Step 4.** Disconnect the three cables (item 1) connected front panel keyboard.

NOTE Be careful to remove the cables (item 1), and not apply any scratches on the cables.

- Step 5.** Remove the two TORX T15 screws (item 2) fastening the inverter assembly.
- Step 6.** Disconnect the two cables (item 3) connected inverter assembly.
- Step 7.** Remove the two TORX T8 screws (item 4) fastening the inverter to the bracket and lift it (item 5).

Figure 6-36 Inverter Board Removal

Replacement Procedure

Step 1. Replace the inverter assembly by inverse procedure of removal.

NOTE Fasten the TORX T15 screws (item 2) using a torque screwdriver (set to 1.02 N-m / 9.0 lb-in).

LCD Replacement

Tools Required

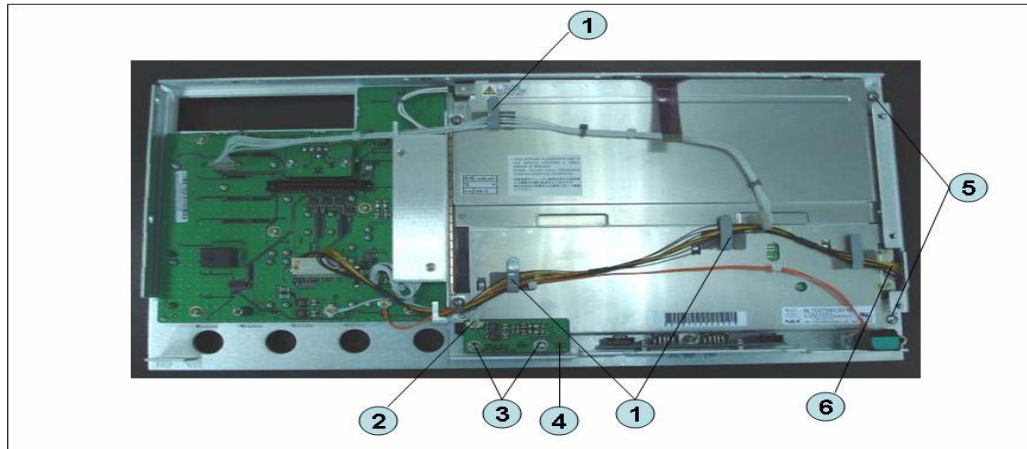
- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver

Removal Procedure

Refer to Figure 6-37 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Remove the front panel cover as described in “Front Panel Cover Removal” on page 396.
- Step 4.** Remove the inverter board as described in “Inverter Board Replacement” on page 398.
- Step 5.** Release the clamped cables from the clamps (item 1) on the LCD.
- Step 6.** Disconnect the cable (item 2) from the probe power.
- Step 7.** Remove the two TORX T10 screws (item 3) fastening the probe power and lift it (item 4).
- Step 8.** Remove the two TORX T15 screws (item 5) fastening the LCD to the front panel.
- Step 9.** Disconnect the cable (item 6) from the front panel keyboard.

Figure 6-37 LCD Removal



Replacement Procedure

Step 1. Replace the LCD by inverse procedure of removal.

NOTE

Fasten the TORX T15 screws (item 5) using a torque screwdriver (set to 1.02 N-m / 9.0 lb-in).

Step 2. You have to calibrate the touch screen. Follow the procedure described on “Calibration of the Touch Screen” on page 339.

Front Panel Keyboard Replacement

Tools Required

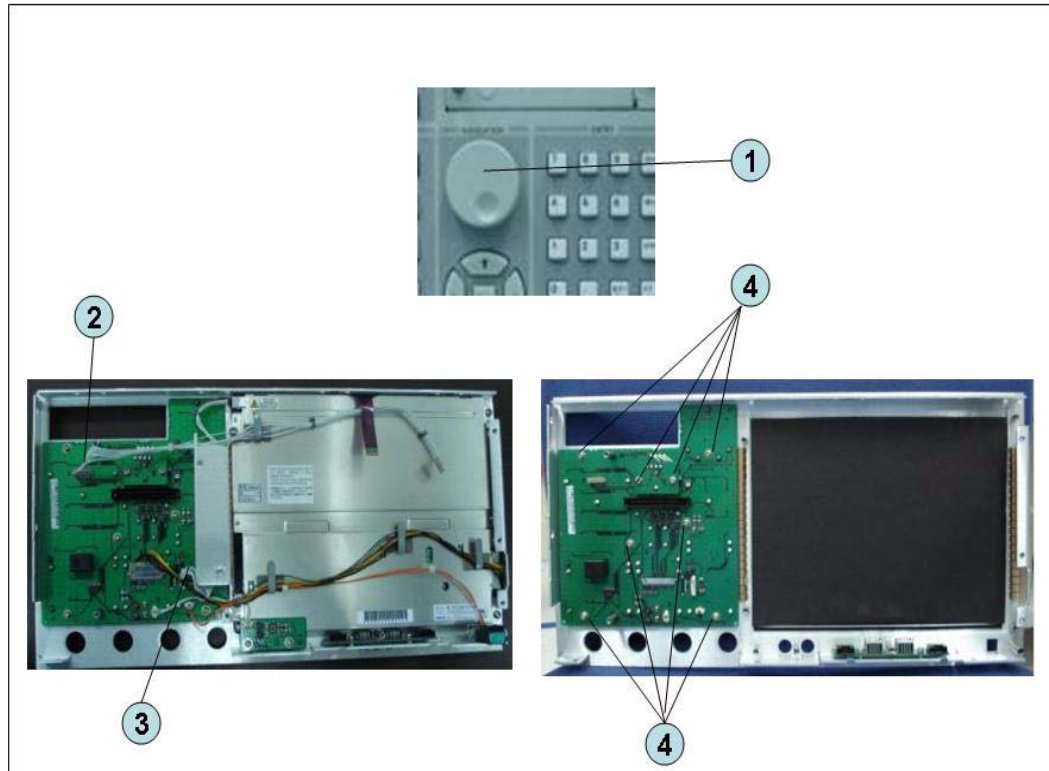
- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver
- Hex key, 1.5 mm

Removal Procedure

Refer to Figure 6-38 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Remove the front panel cover as described in “Front Panel Cover Removal” on page 396.
- Step 4.** Remove the inverter board as described in “Inverter Board Replacement” on page 398.
- Step 5.** Remove the knob (item 1) from switch rotary using the hex key.
- Step 6.** Disconnect the cables (item 2 and 3) from the LCD.
- Step 7.** Remove the eight TORX T10 screws (item 4) fastening the front panel.
- Step 8.** Remove the keyboard rubber from front panel keyboard.

Figure 6-38 Front Panel Keyboard Removal



Replacement Procedure

- Step 1.** Insert the whole jut of the rubber key into the hole on the new front panel keyboard.
- Step 2.** Replace the front panel keyboard by inverse procedure of removal.

NOTE

Replace the keyboard rubber to new one, if it's pulled the keyboard rubber from the front panel keyboard.

Front USB Board Replacement (A55)

Tools Required

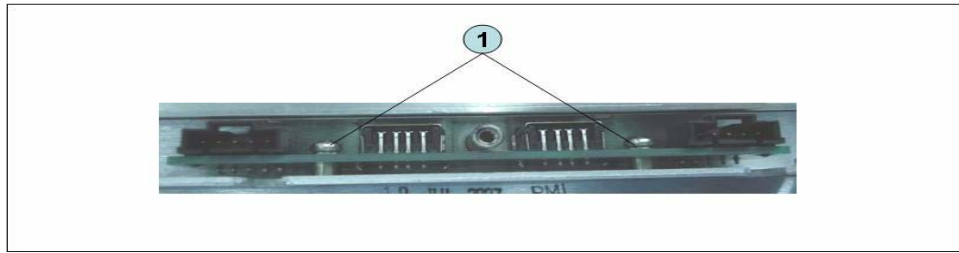
- TORX screwdriver, T10, T15, and T20
- Flat edge screwdriver
- Hex key, 1.5 mm

Removal Procedure

Refer to Figure 6-39 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Remove the front panel cover as described in “Front Panel Cover Removal” on page 396.
- Step 4.** Remove the inverter board as described in “Inverter Board Replacement” on page 398.
- Step 5.** Remove the LCD as described in “LCD Replacement” on page 400.
- Step 6.** Remove the two TORX T10 screws (item 1) fastening the front panel.

Figure 6-39 **Front USB Board Replacement**



Replacement Procedure

Step 1. Replace the USB board by inverse procedure of removal.

Probe Power and Power Switch Board Replacement (A56)

Tools Required

- TORX screwdriver, T8, T10, T15, and T20
- Flat edge screwdriver
- Cutting plier or scissors

Removal Procedure

Refer to Figure 6-40 for this procedure.

- Step 1.** Remove the outer cover as described in “Outer Cover Removal” on page 333.
- Step 2.** Remove the front panel as described in “Front Panel Removal” on page 334.
- Step 3.** Remove the front panel cover as described in “Front Panel Cover Removal” on page 396.
- Step 4.** Remove the Prove Power Board or Switch Board.

For removing the Prove Power Board.

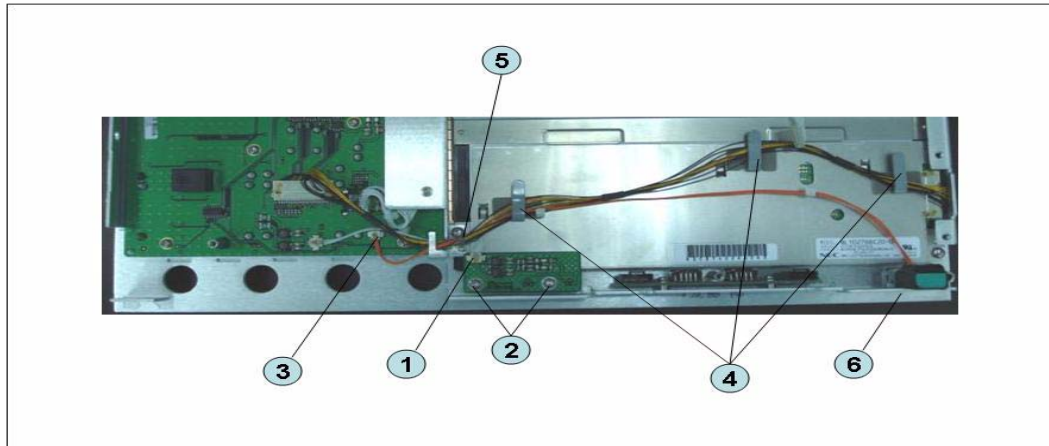
- Disconnect the cable (item 1) from the front panel keyboard.
- Remove the two TORX T10 screws (item 2) fastening the front panel.

For removing the Switch Board.

- Disconnect the cable (item 3) connected the front panel keyboard.
- Release the clamped cables from the clamps (item 4) on the LCD.
- Cut the cable tie (item 5).
- Remove the two TORX T8 screws (item 6) fastening the angle.

Figure 6-40

Probe Power and Power Switch Board Removal



Replacement Procedure

Step 1. Replace the prove power board or switch board by inverse procedure of removal.

Replacement Procedure
Probe Power and Power Switch Board Replacement (A56)

7

Post-Repair Procedures

This chapter lists the procedures required to verify the E5071C operation after an assembly is replaced with a new one.

Post-Repair Procedures

Table 7-1 *Post Repair Procedures* lists the required procedures that must be performed after the replacement of an assembly or CPU. These are the recommended minimum procedures to ensure that the replacement is successfully completed.

It is recommended to confirm the performance executing with all of adjustment and performance tests as final step.

Table 7-1 Post-Repair Procedures for Analog Assemblies for Option 230/235/430/435/240/245/440/445/280/285/480/485

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
Analog I/F Board (A51)	Perform the following required adjustment. - Write ID - Save to Flash memory	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - AUX Input Test - Frequency Accuracy Test - RF Output Level Accuracy and Flatness Test - RF Output Level Linearity Test - Trace Noise Test - Crosstalk Test - System Dynamic Range Test - Dynamic Accuracy Test - Uncorrected System Performance Test
Reference Oven Board	Perform the following required adjustment. - OCXO	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - Frequency Accuracy Test
Analog Base Module (A80)	Perform the following required adjustment. - AUX Input - Frequency Reference	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - AUX Input Test - Frequency Accuracy Test

**Table 7-1 Post-Repair Procedures for Analog Assemblies for Option
 230/235/430/435/240/245/440/445/280/285/480/485**

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
Synthesizer Module (A91)	Perform the following required adjustment. - Synthesizer Gain - Source Output Power - Receiver Port Characteristics - Receiver Absolute Gain	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - Frequency Accuracy Test - RF Output Level Accuracy and Flatness Test - RF Output Level Linearity Test - Trace Noise Test - Crosstalk Test - System Dynamic Range Test - Dynamic Accuracy test - Uncorrected System Performance Test
Receiver Module (A82)	Perform the following required adjustments. - Source Output Power - Receiver IF Range - Receiver Port Characteristics - Receiver Absolute Gain	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - Trace Noise Test - Crosstalk Test - System Dynamic Range Test - Dynamic accuracy test - Uncorrected system performance

**Table 7-1 Post-Repair Procedures for Analog Assemblies for Option
 230/235/430/435/240/245/440/445/280/285/480/485**

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
Level Vernier Module (A83)	Perform the following required adjustments. - Source Output Power - Receiver Absolute Gain	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - Frequency Accuracy Test - RF Output Level Accuracy and Flatness Test - RF Output Level Linearity Test - Trace Noise Test - Crosstalk Test - System Dynamic Range Test - Dynamic Accuracy test - Uncorrected System Performance Test
Distributor Module (A84)	Perform the following required adjustments. - Source Output Power - Receiver Port Characteristics - Receiver Absolute Gain	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - Frequency Accuracy Test - RF Output Level Accuracy and Flatness Test - RF Output Level Linearity Test - Trace Noise Test - Crosstalk Test - System Dynamic Range Test - Dynamic Accuracy test - Uncorrected System Performance Test

Table 7-1 Post-Repair Procedures for Analog Assemblies for Option 230/235/430/435/240/245/440/445/280/285/480/485

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
T2 Switch	Perform the following required adjustments - Source Output Power - Receiver Port Characteristics - Receiver Absolute Gain	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - Frequency Accuracy Test - RF Output Level Accuracy and Flatness Test - RF Output Level Linearity Test - Trace Noise Test - Crosstalk Test - System Dynamic Range Test - Dynamic Accuracy test - Uncorrected System Performance Test

7. Post-Repair Procedures

Table 7-2 Post-Repair Procedures for Analog Assemblies for Option 2K5/4K5

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
Analog I/F Board (A51)	Perform the following required adjustment. - Write ID - Save to Flash memory	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - AUX Input Test - Frequency Accuracy Test - RF Output Level Accuracy and Flatness Test - RF Output Level Linearity Test - Trace Noise Test - Crosstalk Test - System Dynamic Range Test - Dynamic Accuracy Test - Uncorrected System Performance Test

Table 7-2 Post-Repair Procedures for Analog Assemblies for Option 2K5/4K5

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
Reference Oven Board	Perform the following required adjustment. - OCXO	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - Frequency Accuracy Test
Analog Base Module (A80)	Perform the following required adjustment. - AUX Input - Frequency Reference	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - AUX Input Test - Frequency Accuracy Test
Synthesizer Module (A91)	Perform the following required adjustment. - Synthesizer Gain - Source Output Power - Receiver Port Characteristics - Receiver Absolute Gain	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - Frequency Accuracy Test - RF Output Level Accuracy and Flatness Test - RF Output Level Linearity Test - Trace Noise Test - Crosstalk Test - System Dynamic Range Test - Dynamic Accuracy test - Uncorrected System Performance Test
Receiver Module (A87)	Perform the following required adjustments. - Source Output Power - Receiver IF Range - Receiver Port Characteristics - Receiver Absolute Gain	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - Trace Noise Test - Crosstalk Test - System Dynamic Range Test - Dynamic accuracy test - Uncorrected system performance

Table 7-2 Post-Repair Procedures for Analog Assemblies for Option 2K5/4K5

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
Front End Module (A89)	Perform the following required adjustments - Source Output Power - Receiver Port Characteristics - Receiver Absolute Gain	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - Uncorrected System Performance Test
Doubler Module (A86)	Perform the following required adjustments. - Source Output Power - Receiver Absolute Gain	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - Frequency Accuracy Test - RF Output Level Accuracy and Flatness Test - RF Output Level Linearity Test - Trace Noise Test - Crosstalk Test - System Dynamic Range Test - Dynamic Accuracy Test
Distributer Module (A84)	Perform the following required adjustments. - Receiver IF Range - Receiver Port Characteristics - Receiver Absolute Gain	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - Frequency Accuracy Test - RF Output Level Accuracy and Flatness Test - RF Output Level Linearity Test - Trace Noise Test - Crosstalk Test - System Dynamic Range Test - Dynamic Accuracy test - Uncorrected System Performance Test

7. Post-Repair Procedures

Table 7-2 Post-Repair Procedures for Analog Assemblies for Option 2K5/4K5

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
Imix	Perform the following required adjustments - Source Output Power - Receiver Port Characteristics - Receiver Absolute Gain	Perform “To Execute the diagnostics Test” on page 237 Perform the following performance test. - Frequency Accuracy Test - RF Output Level Accuracy and Flatness Test - RF Output Level Linearity Test - Trace Noise Test - Crosstalk Test - System Dynamic Range Test - Dynamic Accuracy test - Uncorrected System Performance Test

Table 7-3 Post-Repair Procedures for Digital Assemblies

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
CPU Mother board Assembly (A01)	Perform “To configure the CPU Mother Board Assembly and BIOS” on page 265.	Inspect the Booting Process
PCA Front Key (A52)	No adjustment needed	Perform “To Execute the diagnostics Test” on page 237 Perform “To Check the Front Panel” on page 250
Handler I/O Board (A25)	No adjustment needed	Perform “To Execute the diagnostics Test” on page 237
GPIB Board	No adjustment needed	Perform “To Check the GPIB” on page 252
USB Interface Card	No adjustment needed	Perform “To Check the USB Interface Card” on page 252

Table 7-3 Post-Repair Procedures for Digital Assemblies

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
PCA CPI DSP Card (A51)	No adjustment needed	Inspect the Booting Process Perform “To Execute the diagnostics Test” on page 237 Perform “To Check the Video Output” on page 252
Removable Hard Disk Drive (A27)	Calibration of the Touch Screen.	Inspect the Booting Process
Power Supply Assembly (A50)	No adjustment needed	Inspect the Booting Process
LCD TPANEL Assembly (A12)	Calibration of the Touch Screen	Inspect the Booting Process Perform “To Execute the diagnostics Test” on page 237 Perform “To Check the LCD” on page 251

7. Post-Repair Procedures

Post-Repair Procedures
Post-Repair Procedures

A **Manual Changes**

This appendix contains the information required to adapt this manual to versions or configurations of the E5071C manufactured earlier than the current printing date of this manual. The information in this manual applies directly to E5071C units with the serial number that is printed on the title page of this manual.

Manual Changes

To adapt this manual to your E5071C, refer to Table A-1 and Table A-2.

Table A-1 Manual Changes by Serial Number

Serial Prefix or Number	Make Manual Changes

Table A-2 Manual Changes by Firmware Version

Version	Make Manual Changes

The ten-character serial number is stamped on the serial number plate (Figure A-1) on the rear panel.

Figure A-1 Serial Number Plate



e5071cse1001

B **System Recovery**

This appendix describes how to recover the operating system (Windows operating system) when the operating system has been damaged.

System Recovery

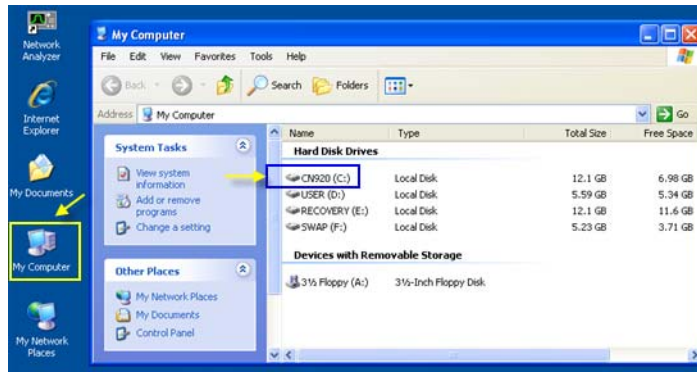
By executing system recovery, you can return the system of the E5071C (the Windows operating system) to the factory state (at the time of purchase^{*1}).

NOTE System recovery is a function of Windows and not a function of the E5071C Firmware.

The system recovery procedure is different in accordance with the HDD revision. The HDD revision can be checked using the following procedure:

Step 1. In E5071C, from Windows Start Menu, click on My Computer.

Step 2. The volume label for C: drive is displayed in Hard Disc Drive area.



CAUTION Strictly follow the steps described below. If you do any operation other than the following steps, the system may not be recovered.

Types of system recoveries

The following 2 types of system recoveries are available.

- o Factory recovery
 - Returns the contents of the C drive to the factory state.
- o User recovery (available only when HDD revision is CN924 or below)
 - Returns the contents of the C and D drives to a user-specified state. To use this function, you must prepare for recovery in advance. For information on the preparation, see “Procedure to execute the factory recovery (HDD Revision: CN924 or below)” on page 426 for information on the execution, see “Procedure to execute the factory recovery (HDD Revision: CN924 or below)” on page 426.

*1. If the hard disk failed and has been replaced after purchase, the state when the replacement was performed is recovered.

Notes on executing the factory recovery function

Executing the factory recovery function causes the following conditions:

- o In addition to the Windows operating system, the following settings of the E5071C are returned to the factory state.
 - Network setting
 - GPIB setting
 - Printer setting
- o The driver for the supported printer installed after purchase is deleted.
- o You need to execute initial registration again.
- o The firmware revision you installed remains even if you perform factory recovery.

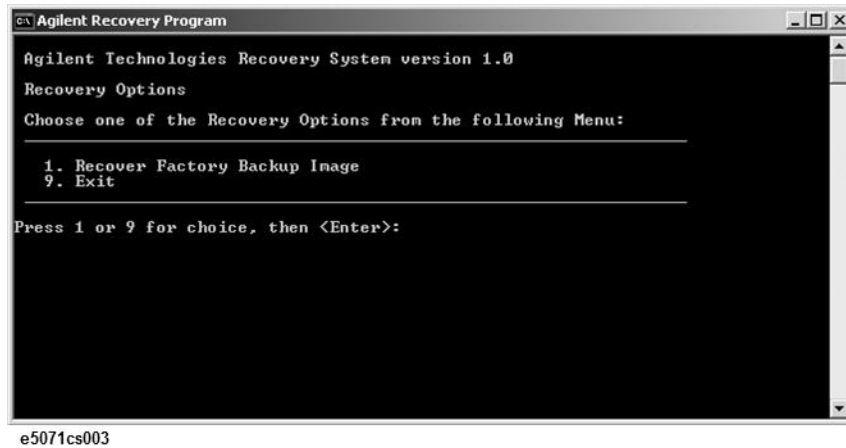
Files you created using the save function (files in the D drive) are not affected, but we recommend backing them up before executing system recovery for precautionary purposes. For more information on backup, refer to “Backing Up the Data” as described in E5071C Online Help.

Procedure to execute the factory recovery (HDD Revision: CN925 or above)

NOTE The recovery function for Factory image is only loaded.
The User back up function is not available.

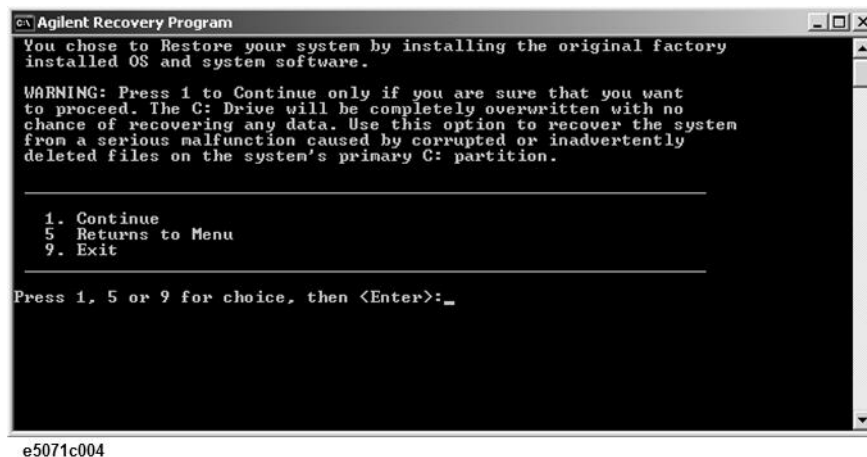
- Step 1.** Turn ON the E5071C.
- Step 2.** The boot option is displayed. Use the downward arrow key to select the “Agilent Recovery Solution” and press Enter
- Step 3.** Windows PE starts up and “Agilent Recovery Program” window is displayed. Press 1, and then press Enter.

Figure B-1 Agilent Recovery Program(1/1)



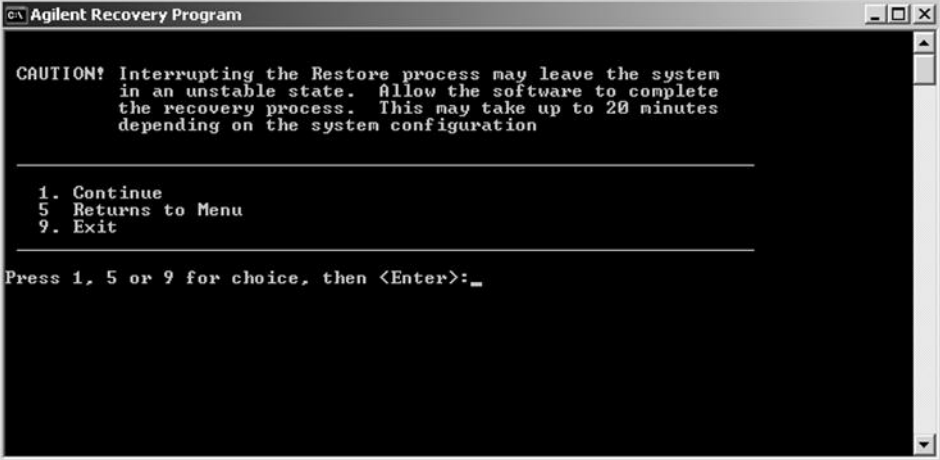
- Step 4.** A warning message is displayed. Press 1, and then press Enter.

Figure B-2 Agilent Recovery Program(1/2)



- Step 5.** Caution is displayed. Press 1, and then press Enter.

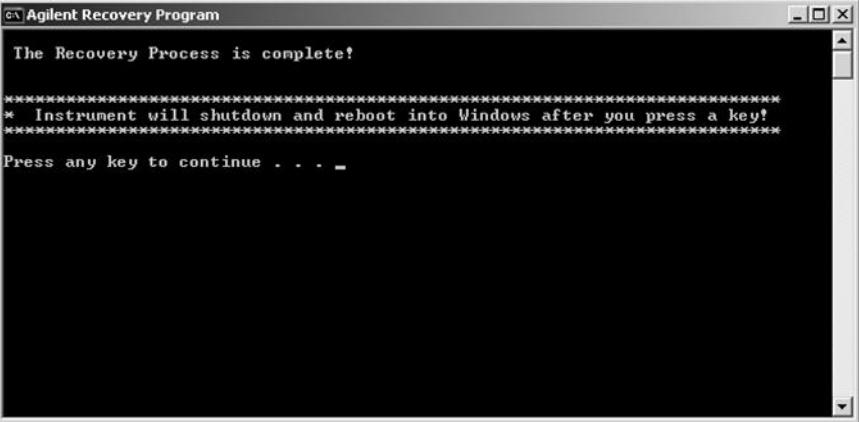
Figure B-3 Agilent Recovery Program(1/3)



e5071c005

- Step 6. Recovery function is performed.
- Step 7. A message box appears after the completion of recovery process. Press any key to continue.

Figure B-4 Agilent Recovery Program(1/4)



e5071cs006

- Step 8. When the recovery is finished, E5071C restarts.
- Step 9. After restart, the screen for initial registration appears. Execute initial registration. For information on the execution procedure, refer to “Initial Registration Procedure (HDD Revision: CN925 or above)” on page 445.

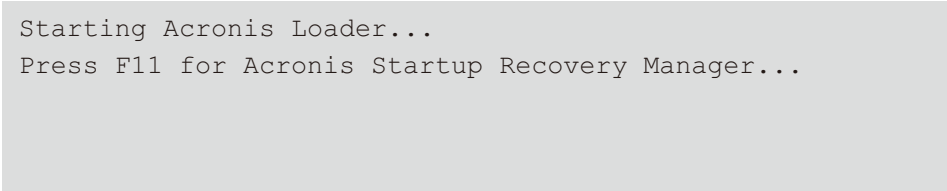
NOTE If the touch screen does not work after System Recovery, refer to “Reconfiguring Touch Panel Settings” on page 447.

Procedure to execute the factory recovery (HDD Revision: CN924 or below)

This section describes how to return the contents of the C drive to the factory state.

NOTE You need a keyboard for this operation.

- Step 1.** Shut down the E5071C.
- Step 2.** Disconnect all of the USB device from the USB ports.
- Step 3.** Connect the keyboard to the E5071C.
- Step 4.** Press the standby switch of the E5071C to turn it on.
- Step 5.** When the screen as shown in the figure below appears, press **F11** of the keyboard.



```
Starting Acronis Loader...  
Press F11 for Acronis Startup Recovery Manager...
```

e5071cse1055

CAUTION Press F11 only once. If you press F11 twice or more and a screen which is not mentioned in this manual appears, reboot the instrument and restart the process from the first.

NOTE After several seconds, the next screen appears automatically even if you do not press any key, so do not miss it.

NOTE After Step 5, if the E5071C freezes with the cursor does not blink, turn the off and remove unnecessary USB devices. Then, replace the keyboard with a PS/2 keyboard to execute the process again.

- Step 6.** Select **Restore**.

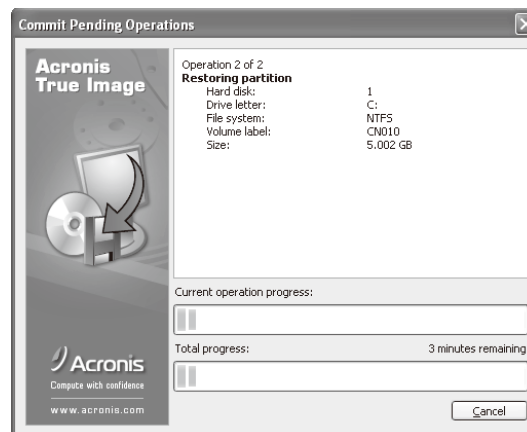
Figure 0-1 **Activate Acronis Startup Recovery Manager**



e5071cse1079

Step 7. A confirmation dialog box is displayed. Push the enter to select **Yes** to start the recovery of the factory backup. The recovery takes a few minutes depending on the amount of data.

Figure 0-2 **Recover Factory Backup**



e5071cse1034

- Step 8.** When the recovery is finished, push the enter select OK. The E5071C restarts automatically.
- Step 9.** After restart, the screen for initial registration appears. Execute initial registration. For information on the execution procedure, refer to “Initial Registration Procedure (HDD Revision: CN924 or below)” on page 449.
- Step 10.** Execute the calibration of the touch screen. For information on the execution procedure, refer to “Calibration of the Touch Screen” on page 451.

CAUTION

Never turn off the power during the system recovery because doing so may cause serious damage to the E5071C.

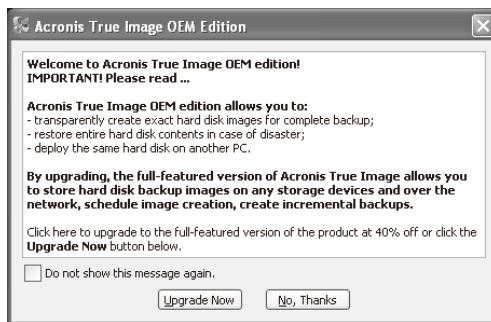
Procedure to create the user backup image (HDD Revision: CN924 or below)

This section describes how to create the user backup image. The C and D drives' contents saved in this procedure are recalled when the user recovery function is executed.

- Step 1.** Close the E5071C application by pressing **System** > Service Menu > Exit.
- Step 2.** Close all other applications you currently open.
- Step 3.** From the Windows start menu, select All Programs > Acronis > Acronis True Image.
- Step 4.** Click “No, Thanks” button.

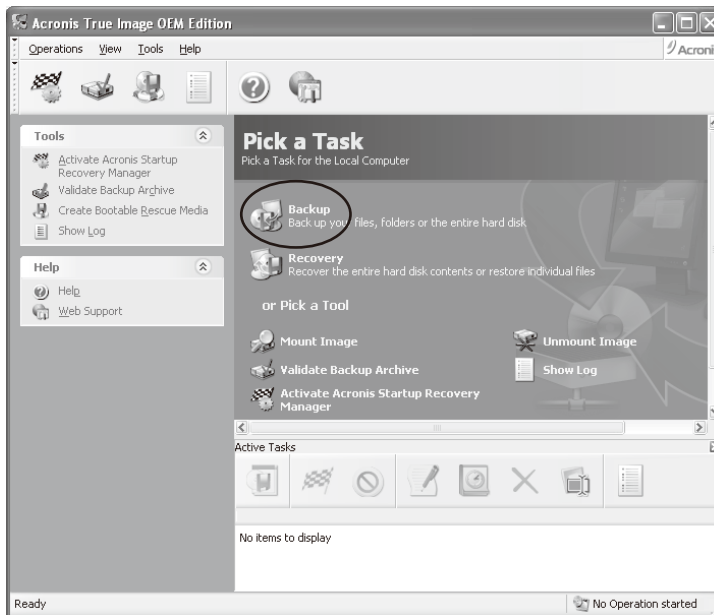
Figure 0-3

Recover User Backup



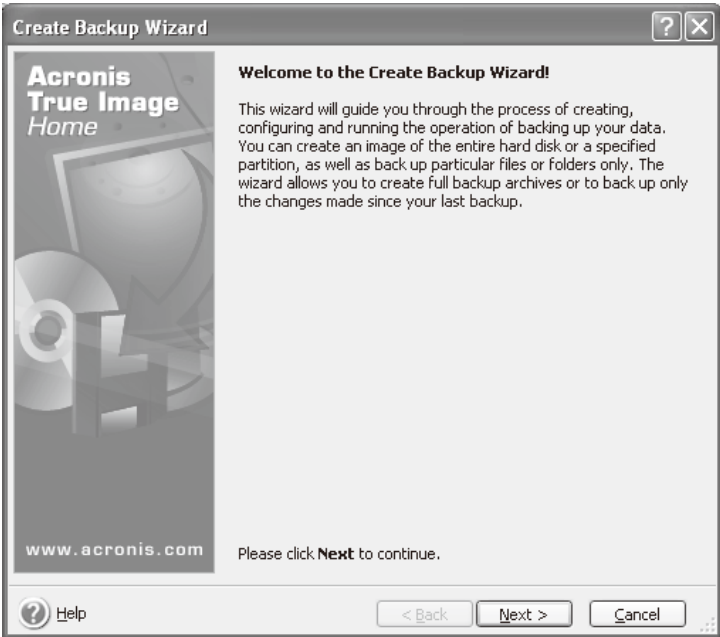
e5071cse1080

- Step 5.** Click **Backup**



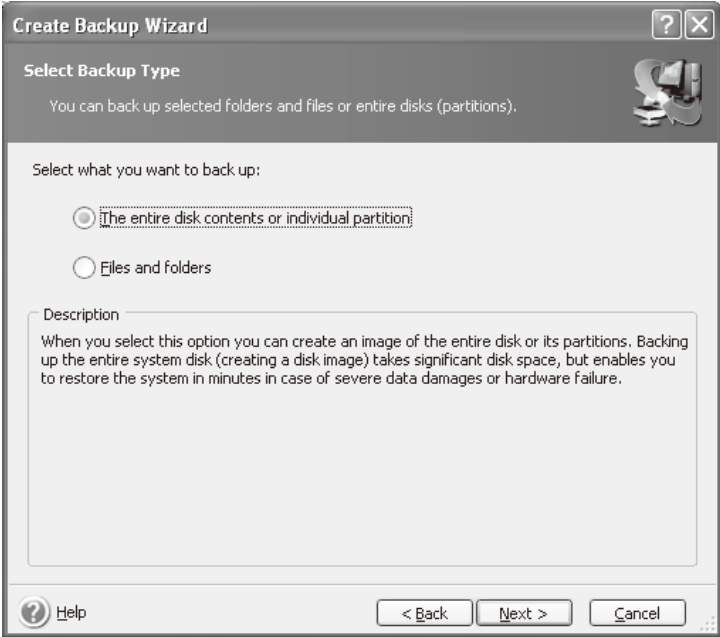
e5071cse1125

Step 6. Click **Next** button.



e5071cse1126

Step 7. Select “The entire disk contents or individual partition,” then click **Next** button.

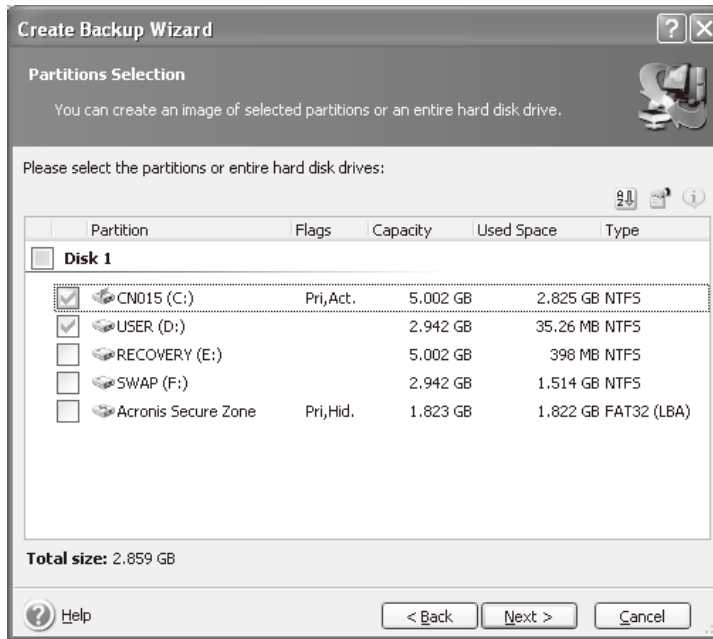


e5071cse1127

B. System Recovery

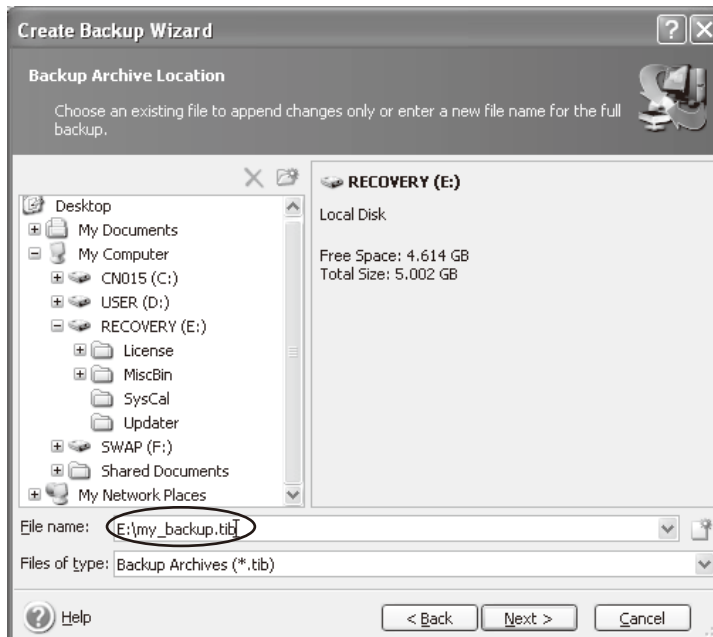
System Recovery System Recovery

Step 8. Select the C drive and D drive.



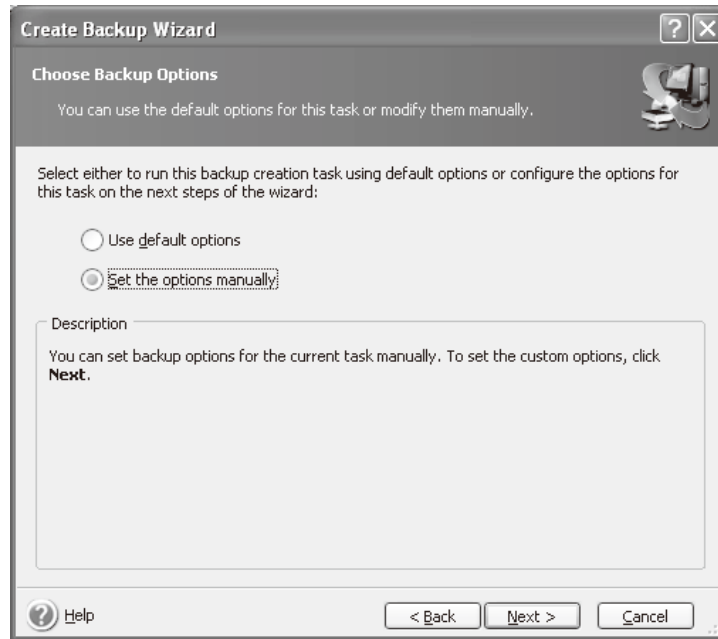
e5071cse1128

Step 9. Select the destination folder and input a file name, then click **Next** button. It is recommended to save the file to a directory which has enough space like the E drive. Also, never save the contents of the drive to the C, D or F drive.



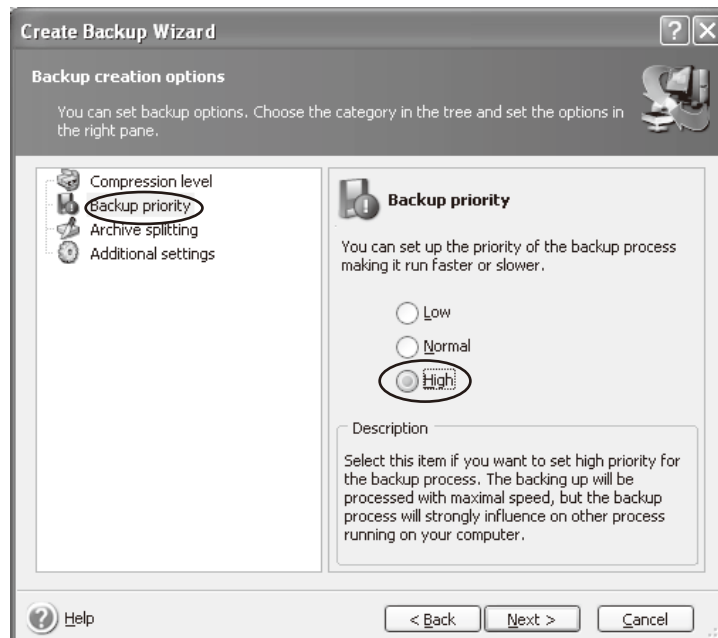
e5071cse1129

Step 10. Select “Set the options manually” and click **Next** button.



e5071cse1130

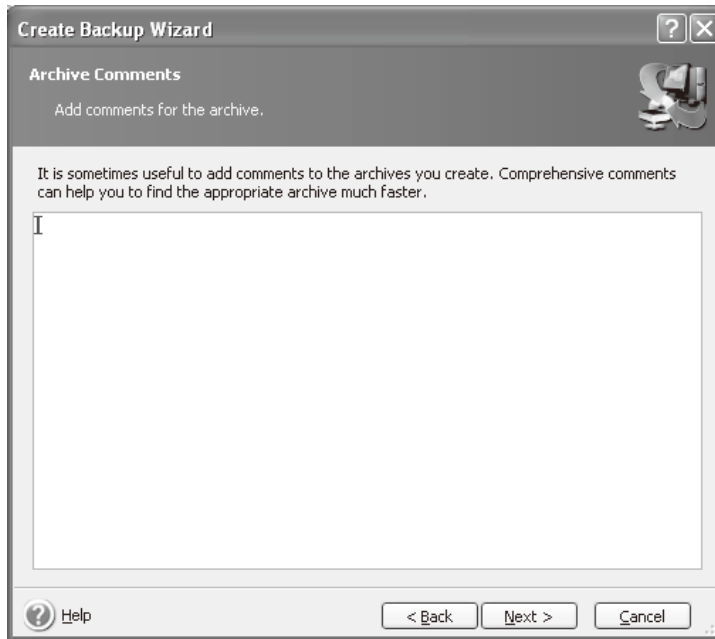
Step 11. Select “Backup priority” in the left field and “High” in the right field, then click **Next** button.



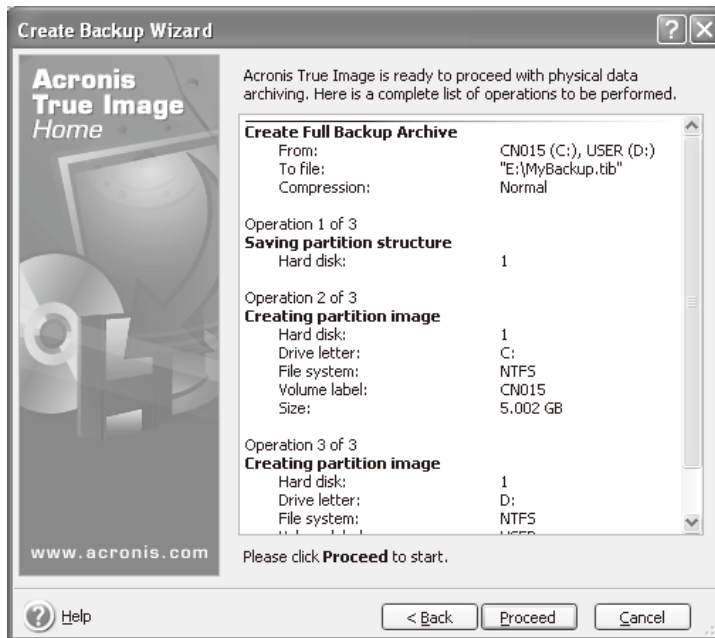
e5071cse1131

System Recovery System Recovery

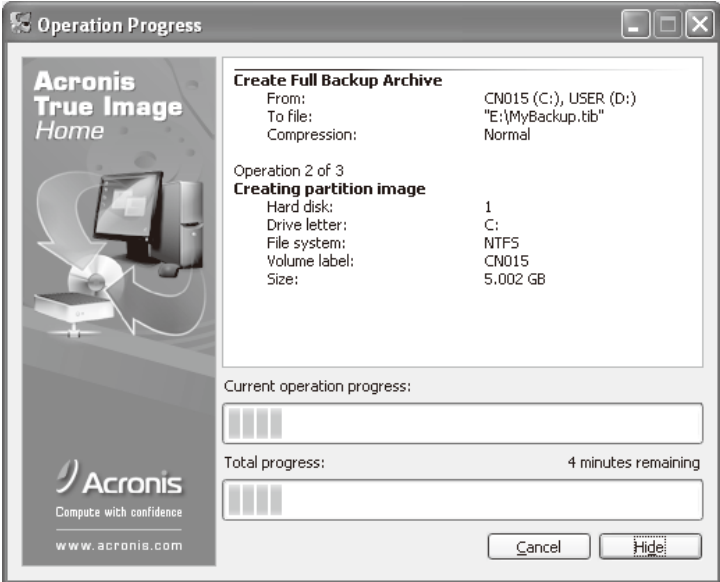
Step 12. If necessary, input comments and click **Next** button. The comments can be omitted.



Step 13. Click **Proceed** button.

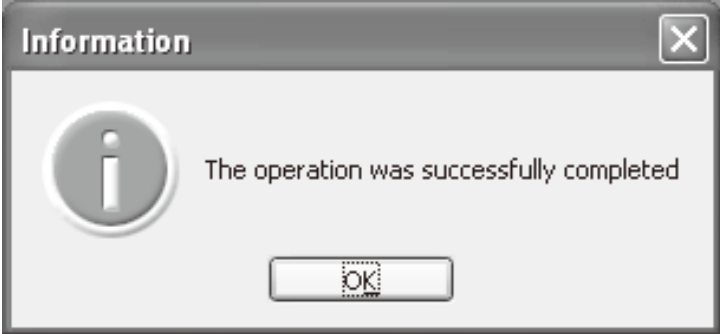


Step 14. The following screen appears during backup.



e5071cse1134

Step 15. The following screen appears when the user backup image was created. Click **OK**.



e5071cse1135

CAUTION

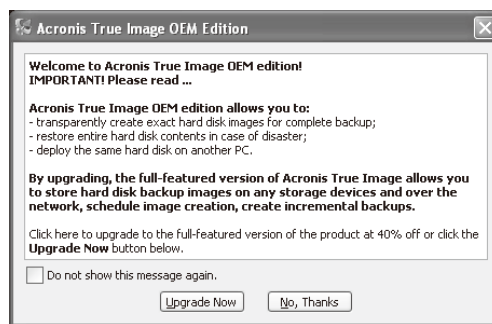
Never turn off the power during creating the user backup image because doing so may cause serious damage to the E5071C.

System Recovery System Recovery

Procedure to execute the user recovery function (HDD Revision: CN924 or below)

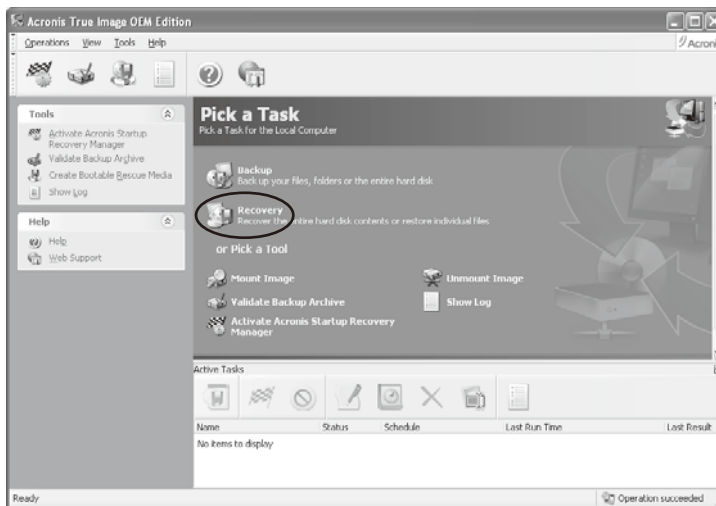
Returns the contents of the C and D drives to a user-specified state. To use this function, you must create the user backup image in advance. For more information, see the description “Procedure to create the user backup image (HDD Revision: CN924 or below)” on page 428.

- Step 1.** Close the E5071C application by pressing **System** > Service Menu > Exit.
- Step 2.** Close all other applications you currently open.
- Step 3.** From the Windows start menu, select All Programs > Acronis > Acronis True Image.
- Step 4.** Click “No, Thanks” button.



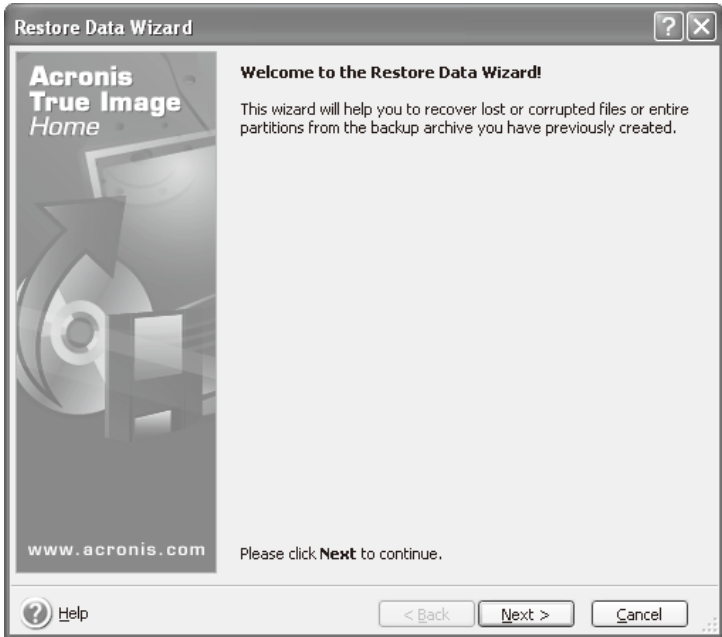
e5071cse1080

- Step 5.** Click **Recovery**.



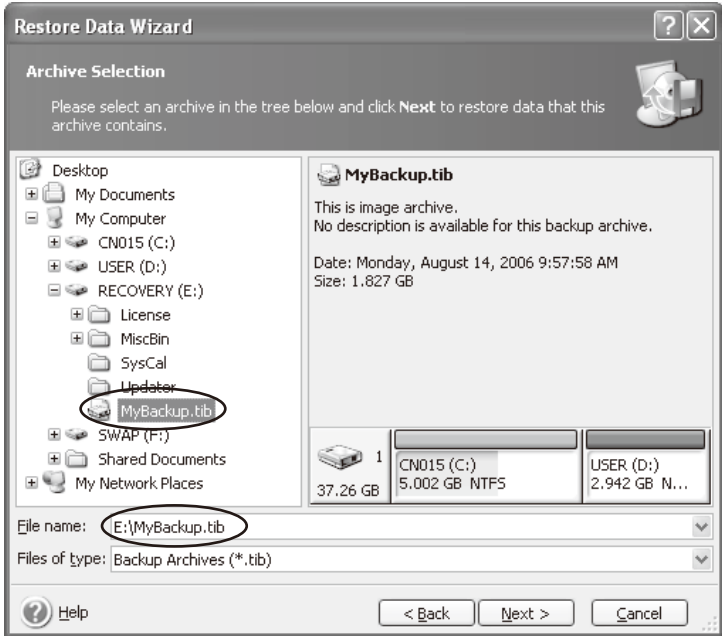
e5071cse1136

Step 6. Click **Next** button.



e5071cse1137

Step 7. Select the saved backup image file, then click **Next** button.

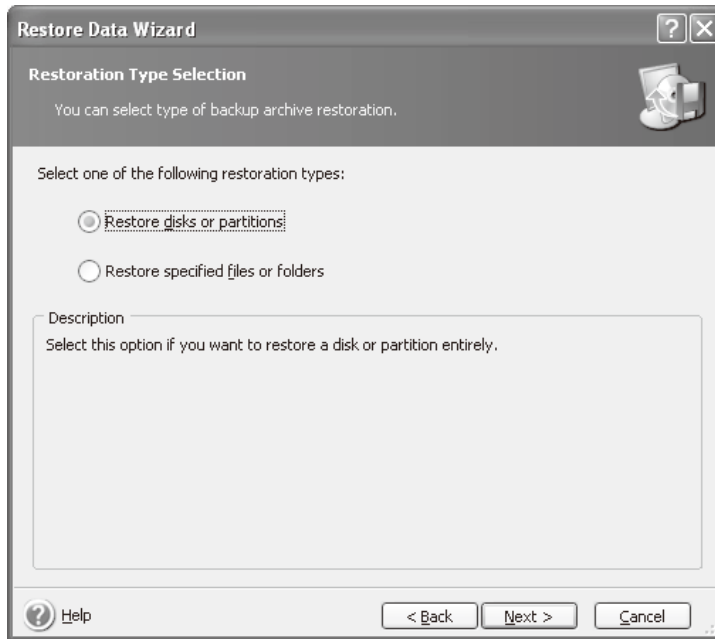


e5071cse1138

B. System Recovery

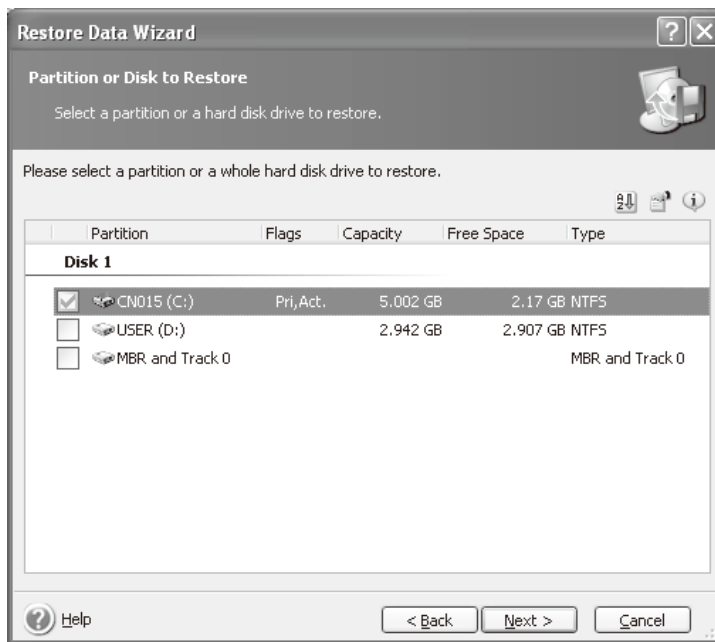
System Recovery System Recovery

Step 8. Select “Restore disks or partitions,” then click **Next** button.



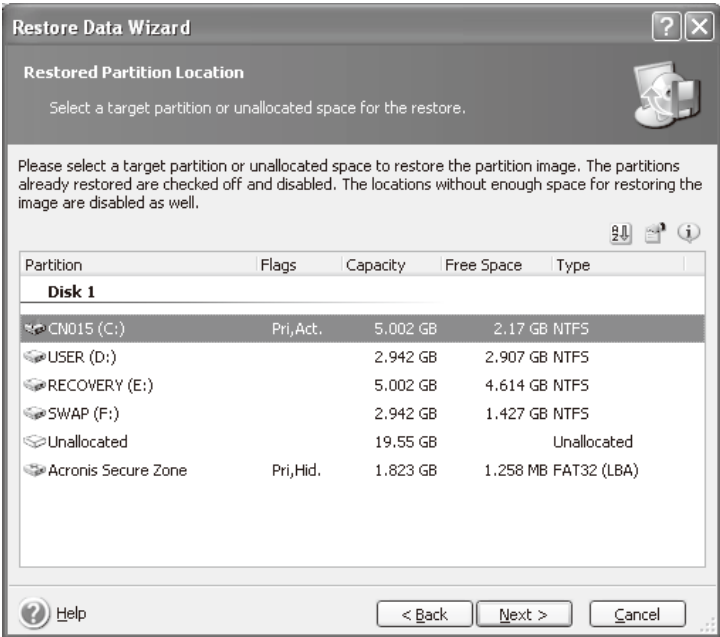
e5071cse1139

Step 9. Select the C drive, then click **Next** button.



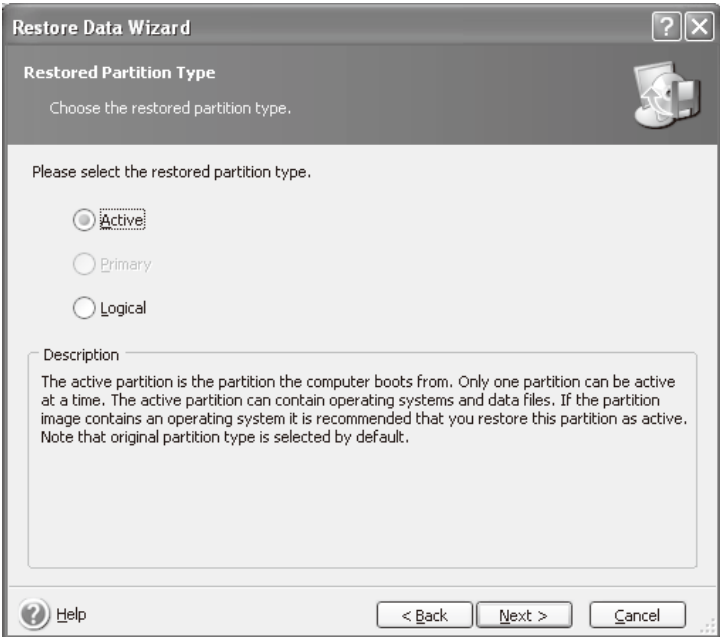
e5071cse1143

Step 10. Select the C drive to restore, then click **Next** button.



e5071cse1144

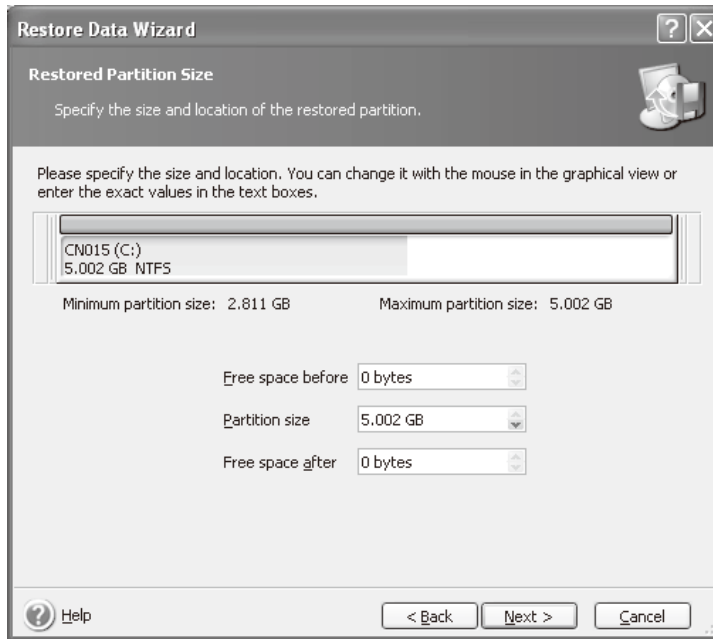
Step 11. Select “Active” and click **Next** button.



e5071cse1145

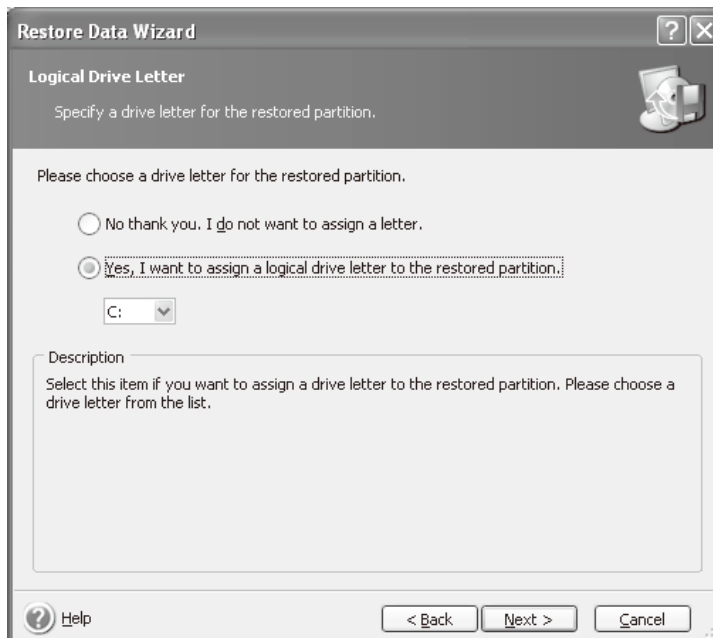
System Recovery System Recovery

Step 12. Click **Next** button.



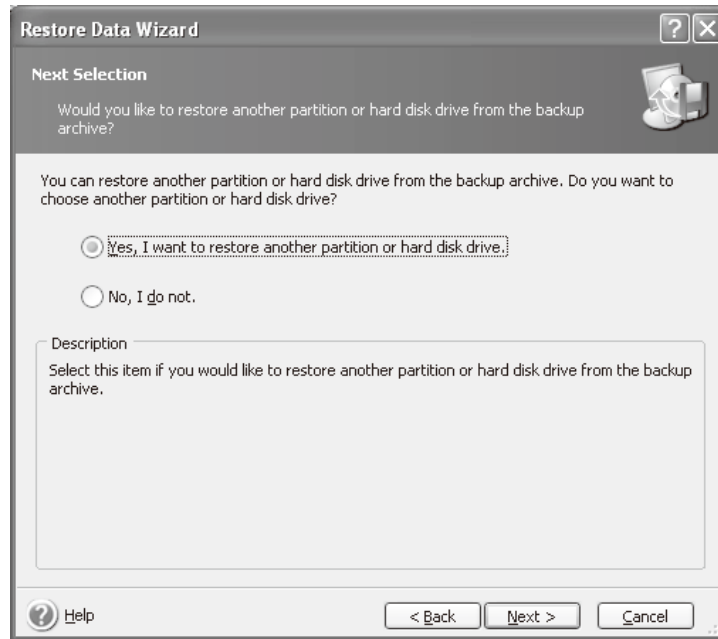
e5071cse1146

Step 13. Select “Yes, I want to assign a logical drive letter to the restored partition” and click **Next** button.



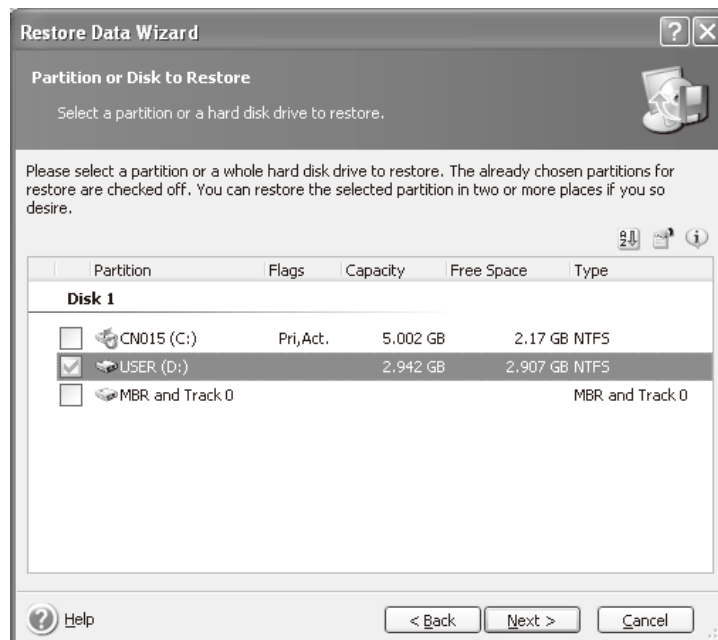
e5071cse1147

Step 14. Select “Yes, I want to restore another partition or hard disk drive,” then click **Next** button.



e5071cse1148

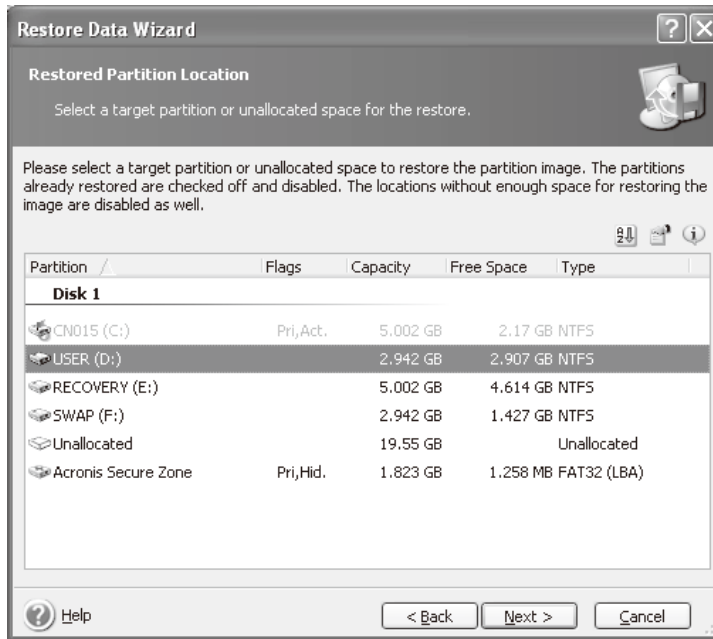
Step 15. Select the D drive to restore, then click **Next** button.



e5071cse1149

System Recovery System Recovery

Step 16. Select the D drive to restore, then click **Next** button.



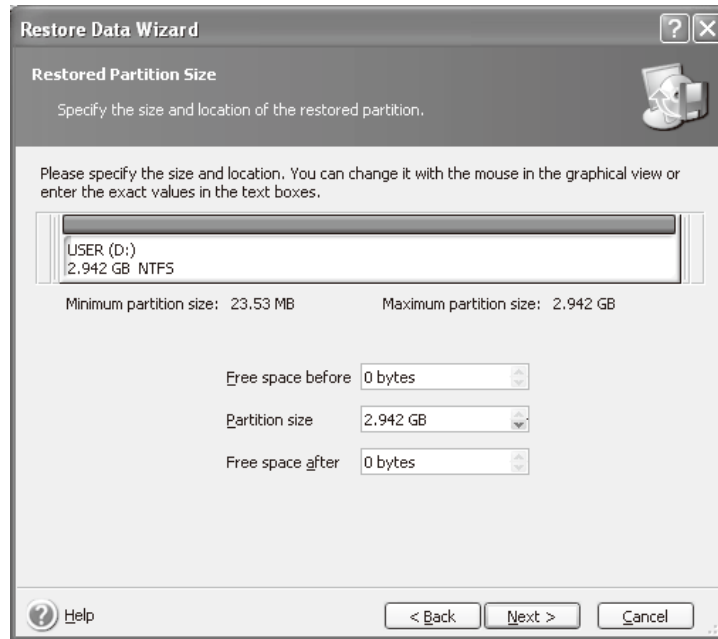
e5071cse1150

Step 17. Select "Logical" and click **Next** button.



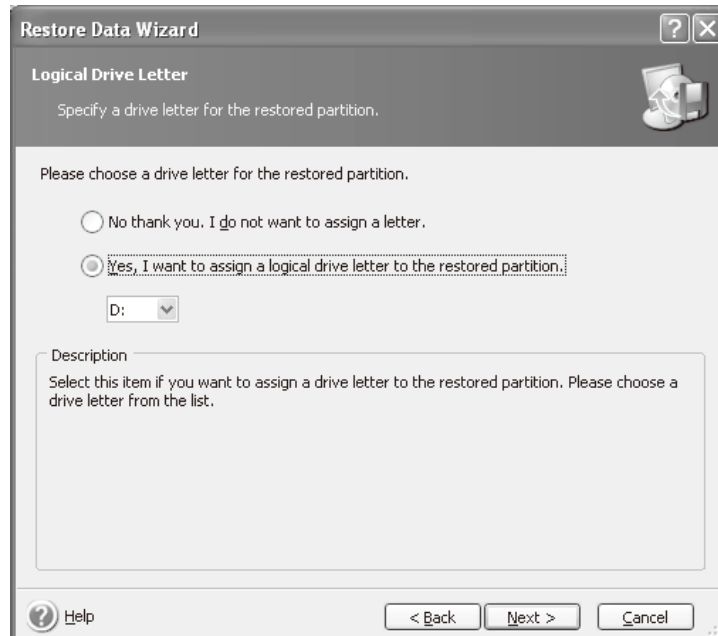
e5071cse1151

Step 18. Click **Next** button.



e5071cse1152

Step 19. Select “Yes, I want to assign a logical drive letter to the restored partition,” then click **Next** button.



e5071cse1153

System Recovery

System Recovery

Step 20. Select “No, I do not.” and click **Next** button.



e5071cse1154

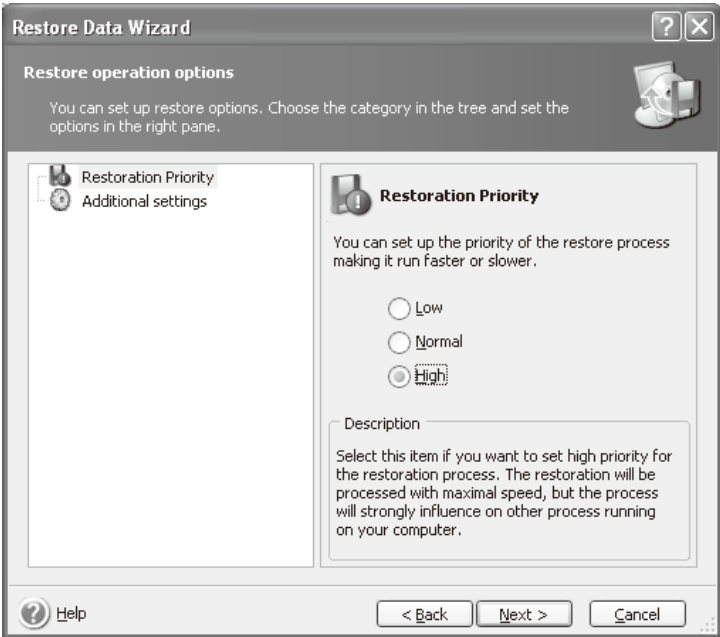
Step 21. Select “Set the options manually” and click **Next** button.



e5071cse1155

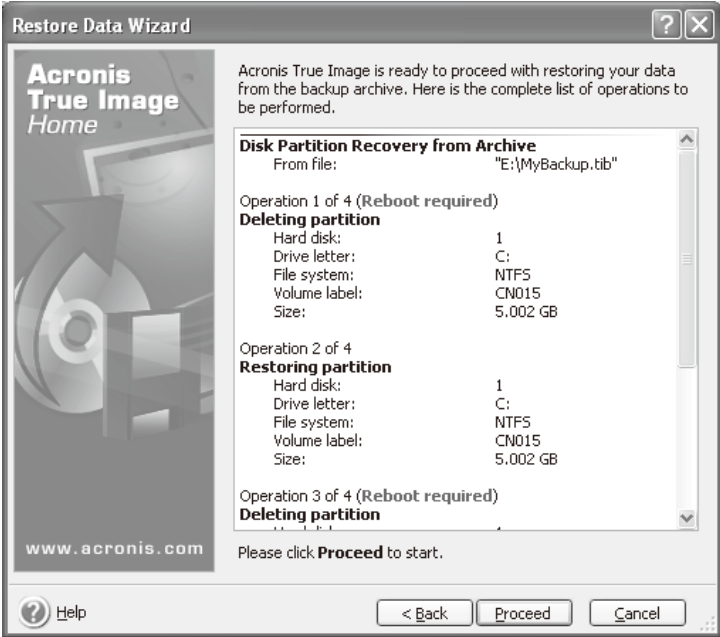
Step 22. Select “Restoration Priority” in the left field and “High” in the right field, then click **Next**

button.



e5071cse1156

Step 23. Click **Proceed** button.

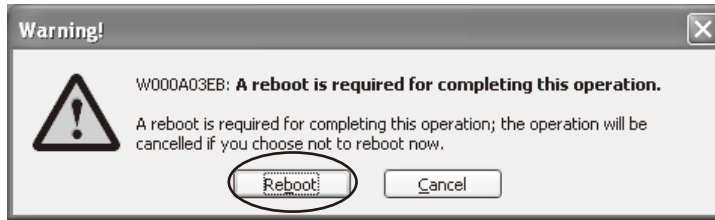


e5071cse1157

B. System Recovery

System Recovery System Recovery

Step 24. Click **Reboot** button.



e5071cse1158

CAUTION

Never turn off the power during the recovery of the user backup image because doing so may cause serious damage to the E5071C.

Step 25. After boot up, perform “Initial Registration of E5071C” on page 445 and “Calibration of the Touch Screen” on page 451.

Initial Registration of E5071C

When you start up the E5071C at the first time, you need to perform the initial registration of the Windows XP operating system of the E5071C. There are two procedures in accordance with the HDD revision.

NOTE It is not possible to check the HDD revision installed on your E5071C before Windows is booted. Therefore you should follow the procedure which you see on the E5071C.

NOTE You cannot use the front panel keys during the initial registration of the E5071C therefore connect the mouse and the keyboard before turning on the power.

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

Initial Registration Procedure (HDD Revision: CN925 or above)

- Step 1.** Turns on the E5071C.
- Step 2.** The Windows XP Professional Setup wizard appears. Click the **Next >** button (Figure B-5).

Figure B-5 Windows XP Professional Setup wizard



e5071cse1073

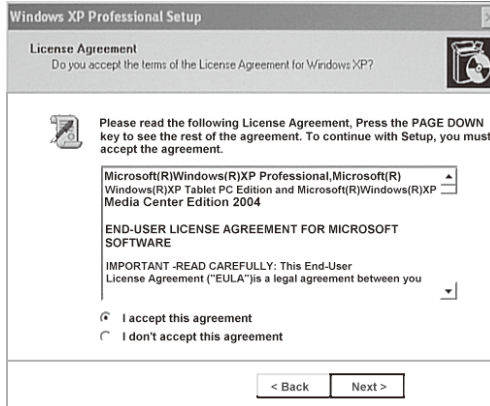
System Recovery

Initial Registration of E5071C

Step 3. In the Windows XP Professional Setup dialog box, read the license agreement, then select the **I accept this agreement** box and click the **Next >** button (Figure B-6).

Figure B-6

Windows XP Professional Setup dialog box (1/2)

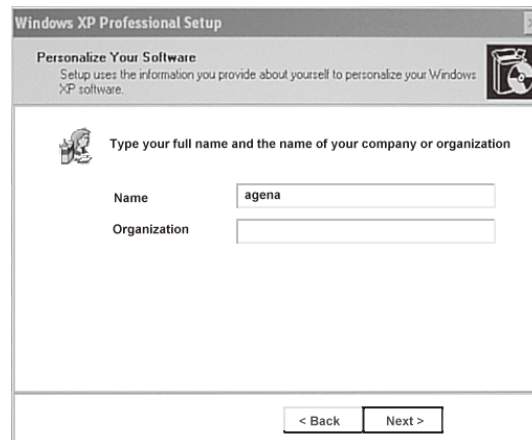


e5071cse1074

Step 4. In the next dialog box, input **agena** in the **Name** box. Then, click the **Next>** button (Figure B-7).

Figure B-7

Windows XP Professional Setup dialog box (2/2)



e5071cse1075

Step 5. The E5071C restart automatically.

Step 6. The Agilent Recovery Image Setup screen (Figure B-8) appears. Click OK to proceed.

Figure B-8 Agilent Recovery Image Setup Screen(1/1)



Step 7. A progress bar appears (Figure B-9) indicating the progress of the Recovery Image setup. The complete process takes less than 5 minutes to finish.

Figure B-9 Agilent Recovery Image Setup Screen(1/2)



Step 8. A message dialog box appears after the completion of the Recovery Image Setup procedure. The dialog box disappears automatically after a few seconds.

Step 9. E5071C firmware is executed, then the measurement display appears.

NOTE If the touch screen does not work after Initial Registration, refer to “Reconfiguring Touch Panel Settings” on page 447.

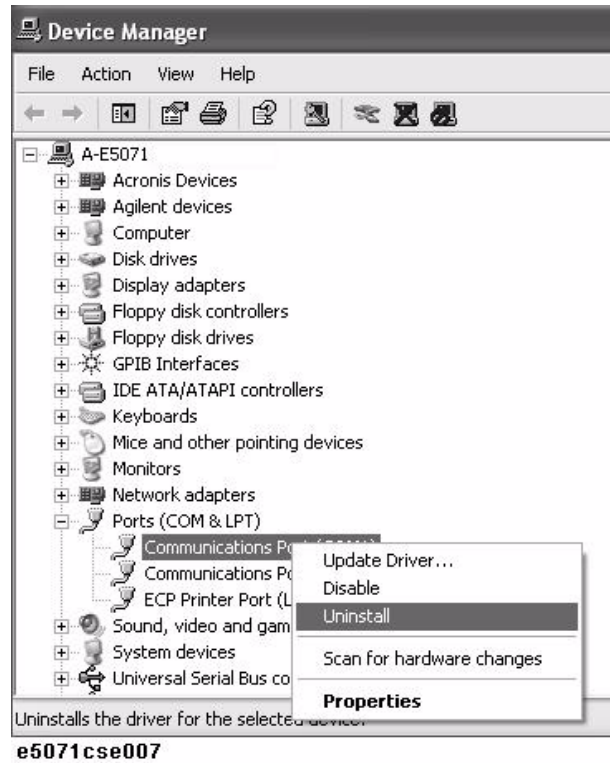
Reconfiguring Touch Panel Settings

- Step 1.** In E5071C, right click My Computer.
- Step 2.** Select Properties. The System Properties dialog box appears.
- Step 3.** Select Hardware tab.
- Step 4.** Click **Device Manager**. The Device Manager dialog box appears.
- Step 5.** Select Ports (COM & LPT).
- Step 6.** Check if two Communication Port (COM1) are displayed.

System Recovery

Initial Registration of E5071C

Step 7. Right click and select Uninstall for both the COM1 ports.



Step 8. The Confirm Device Removal message box appears. Click **OK**.

Step 9. Reboot the instrument.

Initial Registration Procedure (HDD Revision: CN924 or below)

- Step 1.** Turns on the E5071C.
- Step 2.** The Windows XP Professional Setup wizard appears. Click the **Next >** button (Figure B-10).

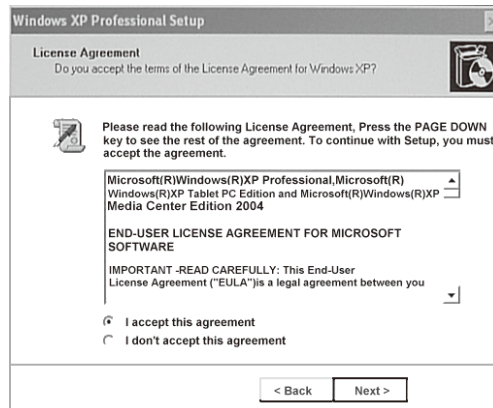
Figure B-10 Windows XP Professional Setup wizard



e5071cse1073

- Step 3.** In the Windows XP Professional Setup dialog box, select the **I accept this agreement** box and click the **Next >** button (Figure B-11).

Figure B-11 Windows XP Professional Setup dialog box (1/2)

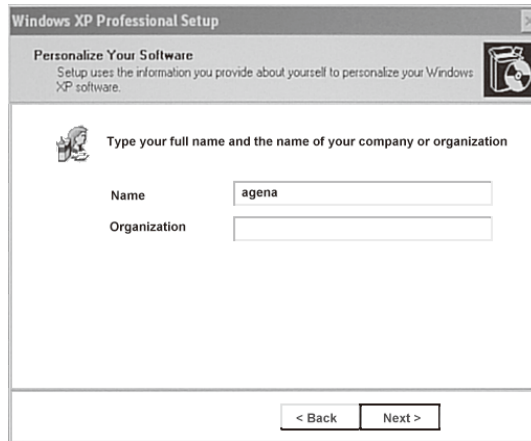


e5071cse1074

- Step 4.** In the next dialog box, input **agena** in the **Name** box. Then, click the **Next>** button (Figure B-12).

System Recovery
Initial Registration of E5071C

Figure B-12 Windows XP Professional Setup dialog box (2/2)



e5071cse1075

Step 5. After a while, the E5071C restart automatically.

Calibration of the Touch Screen

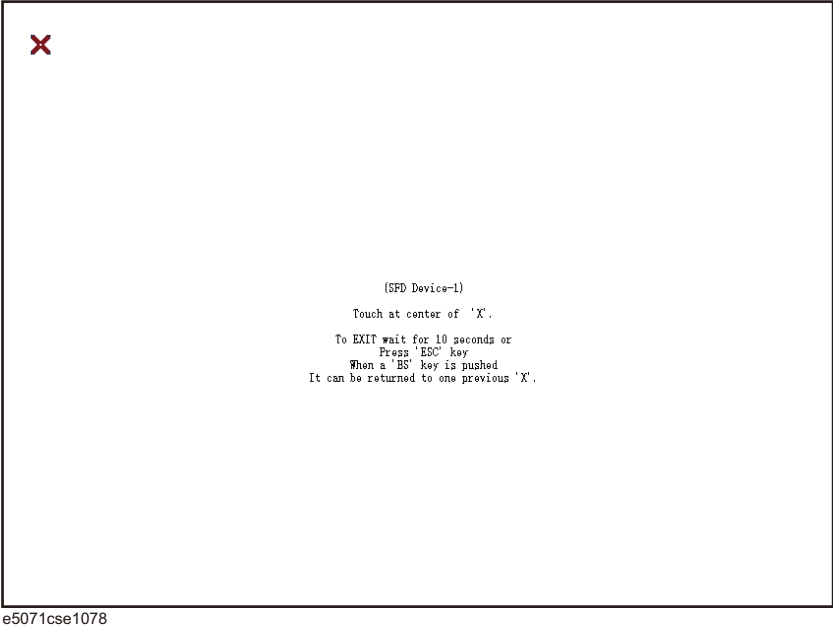
After E5071C measurement screen appears, you have to calibrate the touch screen. Follow the procedure described below to calibrate the touch screen.

- 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 B-13) appears.

Figure B-13

Touch Panel Calibration Screen



- Step 5.** Touch the x mark on the upper left with your finger. The mark x appears also on the upper right, lower left, and lower right. Touch the x marks in that order with your finger. Touching the four locations described above with your finger automatically concludes the touch screen calibration.

NOTE

With no operation on the touch screen calibration screen for a preset time, it automatically closes and the previous measurement screen reappears.

System Recovery
Calibration of the Touch Screen

C **Firmware Update**

This appendix describes how to update the E5071C firmware. When you want to update the E5071C firmware, refer to this appendix.

Firmware Update

Required Equipment

- E5071C (with keyboard and mouse).
- USB memory.

NOTE

The free space of 30 MB or more is necessary for the USB mass storage device.

Location of the latest E5071C Firmware

Step 1. The latest firmware can be downloaded from the following site.

- <http://www.agilent.com/find/ena/e5071c/>

How to update the E5071C firmware

It is possible to update the E5071C firmware, but not the following software by this procedure.

- OS (Operating System)
- VBA (Visual Basic for Application)
- Calibration Constant Data

The following is the procedure to update the E5071C firmware.

NOTE

User should log in as “agena”, and user should have administrator authority when performing firmware update.

Step 1. Download the latest firmware from the download site. It is prepared as execution file (E5071C_xx.xx.exe).

Step 2. Run the “E5071C_xx.xx.exe” to extract the E5071C.msi. Then, save this file to a USB mass storage device.

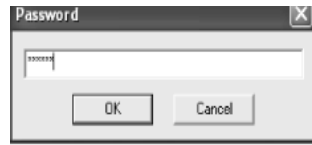
Step 3. Connect the mouse and the keyboard to the E5071C rear panel. Then turn the E5071C on.

Step 4. Connect the USB mass storage device into the front USB port of the E5071C.

Step 5. Update the E5071C firmware.

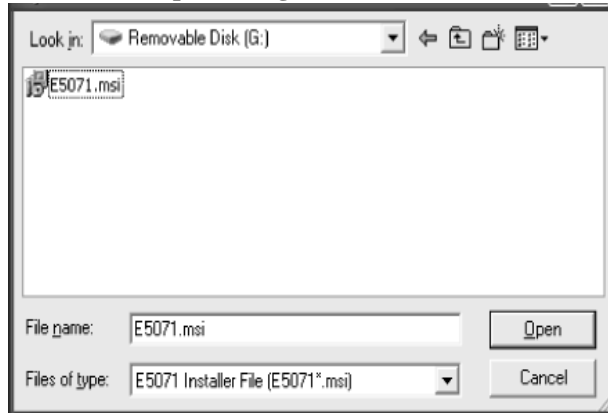
1. Press **System** key.
2. Press **Service Menu - Update Firmware** on the menu bar, and the Password dialog box will appear.
3. Enter the password **e507xa** into the Password box, then click **OK**.

Figure C-1 Password box



4. Open dialog box apperas. Confirm that **E5071.msi** is displayed at the File name column. Select it, then press the **Open** button, and the Windows instoller will appear.

Figure C-2 Firmware Open dialog box



- Step 6. After the installation is finished, the instrument will be restarted and the measurement view will appear.
- Step 7. Press **System** -**Firmware Revision**. Confirm the firmware revision you have just installed.

Firmware Update
Firmware Update

D Power Requirement

Preparation for Power Supply

Before turning on power to the equipment, be sure to verify the following:

Power Requirements

The E5071C requires the following power source:

	Requirements
Voltage	90 to 132 VAC or 198 to 264 VAC *1
Frequency	47 to 63 Hz
Maximum power consumption	350 VA

*1. Switched automatically by the E5071C in conformity to the voltage.

Verification and Connection of Power Cable

The three-wire power cable attached to the E5071C has one wire serving as a ground. Using this power cable allows the E5071C 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 on the rear panel of the E5071C 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 E5071C.

Power cord list, 16000-99101 shows the power cable options.

Blown Fuses

If the fuse appears to have blown during operation, this instrument may be subject to failure and must be repaired. For any assistance, contact Agilent Technologies Customer contact centre listed at the end of this guide.

This product uses the following fuse type:

Option 230/235/240/245/280/285/430/435/440/445/480/485: UL/CSA Type, Slow-Blo, 6.3 A-250 Vac.





Option 2K5/4K5: UL/CSA Type, Slow-Blo, 10A-250 Vac.

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




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 pressed down () position, press the switch to the popped up position ().
- Step 2.** Press the standby switch to the pressed down position ().
This operation turns ON the power, and the E5071C 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 OFF the E5071C.
- Press the standby switch () in the lower-left part of the front panel (now in the pressed down () position) to the popped up () position.
 - Send the shutdown command from an external controller.

These operations will start the E5071C 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 the external controller, to actuate the E5071C 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 or by disconnecting the power supply to the AC outlet, the shutdown process will not be carried out, and there is a risk of damage to the software or hardware of the E5071C.

Power Requirement
Turning the Power ON and OFF

E Messages

The E5071C can display error messages as well as messages that indicate the internal operating status of the equipment. This appendix explains what these messages mean by listing them in alphabetical order.

Messages showing the status of the E5071C are displayed in the lower-left area of the E5071C LCD screen. These messages include error messages that occur during the

Messages

execution of GPIB commands and others that indicate the internal status of the equipment.

Error messages are indicated following the character string “[Err]” and can be read out by a GPIB command. Other kinds of messages are indicated without the “[Err]” character string and cannot be read out by a GPIB command. This section explains the meaning of each message and how to resolve the problem it indicates.

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. Pushing a front panel key or executing :DISP:CCL command clears the error message. Errors caused by the operation of a front panel key simply appear on the display. They are not stored in the error queue with some exceptions.

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

20

Additional standard needed

The GPIB command that turns ON the calibration function has been sent before all of the data measurements needed to calculate the calibration factor have been completed. In 1-port calibration, for example, when measurements completed for OPEN and SHORT standards but not yet for LOAD standard,

You have tried to turn on the calibration function by calculating 1-port calibration coefficient using SENS:CORR:COLL:SAVE or SENS:CORR:OFFS:COLL:SAVE. Be sure to measure all necessary calibration data before sending commands. This error is not generated by front key operations.

B

-168

Block data not allowed

An block-data element has been received at a position where this instrument does not accept one.

C

240

Calibration data lost

This error occurs when a file containing the system calibration data is not found or in a damaged state at time of the startup of this instrument, indicating a failure of this instrument. Contact an Agilent Technology sales office or the company from which you bought the instrument.

22

Calibration method not selected

This error occurs when the command for validating the calibration data, SENS:CORR:COLL:SAVE or SENS:CORR:OFFS:COLL:SAVE is executed before the command for selecting a calibration type, SENS:CORR:COLL:METH:xxxx or SENS:CORR:OFFS:COLL:METH:xxxx, is executed. This error is not generated by front key operations.

-148

Character data not allowed

A character data element (not violating the standard) has been received at a position where this instrument does not accept one. Double quotes (") are omitted where it is necessary to place a parameter in double quotes ("), for example.

-100 **Command error**
A comprehensive syntax error has occurred showing that this instrument cannot detect a more detailed error. This code simply shows that a command error defined in 11.5.1.1.4, IEEE488.2 has occurred.

60 **Continuous switching may damage source attenuator**
This error occurs when different power ranges are selected in multiple channel measurement settings to avoid source attenuator damage.

NOTE This error occurs in the case of E5071C 2K5/4K5

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 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, for example.

This error occurs also when a numeric value other than a specified one is entered into a command in which the “port number” and “CalKit number” are specified as parameters and hence the parameters are not rounded. Such commands are, for example, CALC:FSIM:BAL:TOP:BBAL:PPOR, SENS:CORR:COLL:ACQ:OPEN, SENS:CORR:COLL:ECAL:SOLT3, SENS:CORR:COLL:CKIT:ORD:LOAD, etc.

-104 **Data type error**
The parser has recognized a data element that must not exist. Block data has been sent instead of numeric value data or character string data that had been expected, for example.

E

32 **ECal module not in appropriate RF path**
This error occurs when an ECal command, SENS:CORR:COLL:ECAL:SOLTn or SENS:CORR:OFFS:COLL:ECAL:xxxx, is executed with the port on the ECal module not connected correctly to the instrument. When the auto-detect function is turned OFF, (SENS:CORR:COLL:ECAL:ORI OFF), however, this error does not occur even when the port on the ECal module is not connected correctly to the instrument.

-200 **Execution error**
An error associated with execution has been generated for which this instrument cannot specify the error message. This code shows that an error associated with execution defined in 11.5.1.1.5, IEEE488.2 has occurred. This error occurs also when a calibration measurement is aborted.

-123 **Exponent too large**
The absolute value of the exponent exceeds 32,000 (see 7.7.2.4.1, IEEE488.2).

-178 **Expression data not allowed**
An expression-data element has been received at a position where this instrument does not

- accept one.
- 170 **Expression error**
When the expression data is put to syntactic analysis, an error not corresponding to one of Error Numbers -171 through -179 occurs.
- 502 **Equation run time error**
This error occurs under the following conditions:
- The trace number in data(tr)/mem(tr)/xAxis(tr) is out of range
of trace available depends on the maximum number of channel/traces
 - The port number in Advanced math function is out of range
of port available depends on the model option
- F**
- 31 **Failed to configure ECal module**
This error occurs when the control of the ECal module fails at time of executing an ECal command, SENS:CORR:COLL:ECAL:SOLTn or SENS:CORR:OFFS:COLL:ECAL:xxxx. The failure results from the failure to connect the ECal module to the USB port, failure of the ECal module, etc.
- 76 **Failed to control signal generator**
This error occurs when the external signal source fails to respond during measurement, though it is enabled (SENS:OFFS:LOC:STAT ON and SENS:OFFS:LOC:CONT ON).
Ensure the connection of the external signal source.
- 102 **Failed to copy file**
This error occurs when copying a file (MMEM:COPY command) fails.
- 104 **Failed to create directory**
This error occurs when creating a directory (MMEM:MDIR command) fails.
- 103 **Failed to delete file**
This error occurs when deleting a file (MMEM:DEL command) fails.
- 100 **Failed to read file**
This error occurs when a 2-port touchstone file (CALC:FSIM:SEND:PMC:PORT:USER:FILE command), the formatted data array (MMEM:LOAD:FDAT command) and limit table (MMEM:STOR:LIM command) for the active trace on the active channel, segment sweep table (MMEM:LOAD:SEGM command) for the active channel, a VBA project file (MMEM:LOAD:PROG command), etc. cannot be read normally.
- 101 **Failed to write file**
This error occurs when the formatted data array (MMEM:STOR:FDAT command) and limit table (MMEM:STOR:LIM command) for the active trace on the active channel, segment sweep table (MMEM:STOR:SEGM command) for the active channel, display image (MMEM:STOR:IMAG command) for the LCD screen, a VBA project file (MMEM:STOR:PROG command), etc. cannot be written normally.

- 257 **File name error**
A file name error. This message appears when an error exists in the file name and hence a command is not executed correctly. This error occurs when you try to copy to an unsuitable file name, for example.
- 256 **File name not found**
The file name specified is not found and hence the command is not executed correctly. This error occurs when you try to read a file that does not exist in a disk or a disk is not correctly inserted into the drive to read or write a file, for example.
- 107 **File transfer failed**
This error occurs when writing data into or reading data from a file (MMEM:TRAN command) fails.
- 56 **Fixture Simulator not allowed**
This error occurs when the fixture simulator is executed (CALC:FSIM:STAT ON) under the condition of the frequency offset is enabled (SENS:OFFS ON).
The fixture simulator is allowed to use when the frequency offset is not enabled.
- 24 **Frequency offset enabled**
This error occurs when the normal calibration (SENS:CORR:COLL:OPEN etc.) is performed under the condition of the frequency offset is enabled (SENS:OFFS ON).
- 25 **Frequency offset not enabled**
This error occurs when the scalar-mixer calibration (SENS:CORR:OFFS:COLL:OPEN etc.) is performed under the condition of the frequency offset is not enabled (SENS:OFFS OFF).
- 62 **Frequency out of range**
This error occurs when the setting of frequency exceeds output frequency range under the condition of the frequency offset is enabled (SENS:OFFS ON).
- G**
- 105 **GET not allowed**
A group execution trigger (GET) has been received in the program message (see 7.7, IEEE488.2).
- H**
- 114 **Header suffix out of range**
The unit of the header is outside the range. The header is invalid in the unit for numeric parameters following a SCPI command.
- I**
- 224 **Illegal parameter value**
The parameter value is not suitable. This error occurs when the CALC:PAR:DEF command is used to specify an S-parameter that does not exist in the model (S44 in the

case of a 2-port model), for example.

-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.

35

Insufficient ECal module memory

This error occurs when the embedded memory is insufficient to save the user property in ECal module during the user definition ECal processing.

-161

Invalid block data

Block data has been expected, but the block data that appears is invalid for some reason (see 7.7.6.2, IEEE488.2). The END message is received before the length of block data has been filled, for example.

28

Invalid calibration method

If the type of calibration is not specified or not correct when partial overwrite is executed with the GPIB command, this error occurs. This error does not occur for operation with front keys.

-101

Invalid character

An invalid character exists in the program message character string.

-141

Invalid character data

An invalid character is found in the character data element, or the parameter received is not valid.

-121

Invalid character in number

A character that is invalid for the data type subject to syntactic analysis has been received. For example, a letter is found in a decimal numeric value or a numeric character “9” in octal data.

500

Invalid equation expression

The equation expression used in Equation Editor is not valid.

501

Invalid equation label

The equation label used in Equation Editor is not valid.

-171

Invalid expression

The expression-data element is invalid (see 7.7.7.2, IEEE488.2). Parentheses are not paired, or illegal characters are used, for example.

-103

Invalid separator

The parser (a syntactic analysis program) had been expecting a delimiter, but a character that is not a delimiter has been sent.

-151

Invalid string data

Character string data has been expected, but the character string data that appears is invalid for some reason (see 7.7.5.2, IEEE488.2). The END message is received before the ending

Messages
Invalid suffix

quotation mark character appears, for example.

-131

Invalid suffix

The suffix does not comply with the syntax defined in 7.7.3.2, IEEE488.2. Or it does not suit E5071C.

L

53

Log sweep requires 2 octave minimum span

The span of sweep range is not satisfied the requirement for logarithmic sweep. The sweep type is automatically changed to linear sweep when this error occurs.

For example, this error occurs when, with the start and stop frequency are set 1 MHz and 2 MHz respectively, the sweep type is changed to logarithmic sweep.

Set the stop frequency to more than four times as many as the start frequency. And then select logarithmic sweep.

M

-109

Missing parameter

The number of parameters is less than that required for the command, or the parameter has not been entered. For example, the command SENS{1-6}:SWE:POIN requires one more parameter.

Therefore, when a message “SENS1:SWE:POIN” is sent to a correct program message “SENS1:SWE:POIN 201” this instrument receives the former message as an invalid one because all parameters have not been entered. Enter command parameters correctly.

N

70

No GPIB system controller

The GPIB system controller is not set properly.

This error occurs when USB/GPIB interface is not connected or the interface setting is improper, during the measurement for power calibration data or for that in scalar-mixer calibration.

It also occurs when USB/GPIB interface is not connected or the interface setting is improper, though the control of the external signal source is enabled.

Ensure the connection of USB/GPIB interface and its setting.

52

No valid memory trace

This error occurs when you have executed either DISP:WIND:TRAC:MEM ON command to display memory trace, or any other command to enable data calculation using memory trace (CALC:MATH:FUNC command with other than NORM is specified), though no valid data exists in memory trace. This error is not generated by front key operations.

-120

Numeric data error

An error resulting from the numeric value data (including numeric value data having no decimal point representation) has occurred. A numeric value error other than Errors -121 through -129 has occurred.

- 128 **Numeric data not allowed**
- An numeric-value-data element (not violating the standard) has been received at a position where this instrument does not accept one.
- O**
- 200 **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.
- It also occurs when you try to enable the time domain function in a model not having the time domain option. This holds true for the frequency offset option.
- This error is not generated by front key operations.
- 225 **Out of memory**
- Insufficient memory is available in this instrument to perform the required operation.
- 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.
- For instance, when a program message “:SENS1:SWE:TYPE LIN, SEGM” is sent instead of a correct program message with a command “:SENS1:SWE:TYPE LIN” which requires a parameter, the instrument receives the message as the number of parameters is invalid. See the command reference to confirm the required number of parameters.
- 41 **Peak not found**
- This error occurs when, after specifying a peak and executing the CALC:MARK:FUNC:EXEC and CALC:FUNC:EXEC commands, the specified peak is not found in the marker search analysis.
- 220 **Phase lock loop unlocked**
- This error occurs when the PLL circuit of this instrument becomes unlocked while the measurement is in progress. The measurement value is not correct. This error may occur when an external reference out of specification is connected to this instrument. Should an error occur with an external reference not connected, this instrument is faulty. Contact an Agilent Technology sales office or the company from which you bought the instrument.
- 221 **Port 1 receiver overload**
- The input to Test Port 1 exceeds the maximum input level. The measurement value is not correct. When a DUT is an amplifier or the like, this error may occur, damaging the receiver in the worst case. Should this error occur with a passive part used as the DUT or with nothing connected to the test port, this instrument is faulty. Contact an Agilent Technology sales office or the company from which you bought the instrument.
- If this error occurs, the stimulus signal output is automatically turned to off.

NOTE When FOM function or an external signal source is used over 8.5 GHz frequency measurements with E5071C-2K5/4K5, there is a possibility that overload detection and power trip occurs even if you measure the devices under the maximum input level. In that case, turn OFF the overload & power trip detect function after ensuring the value of input power level.

222 Port 2 receiver overload

The input to Test Port 2 exceeds the maximum input level. The measurement value is not correct. When a DUT is an amplifier or the like, this error may occur, damaging the receiver in the worst case. Should this error occur with a passive part used as the DUT or with nothing connected to the test port, this instrument is faulty. Contact an Agilent Technology sales office or the company from which you bought the instrument.

If this error occurs, the stimulus signal output is automatically turned to off.

NOTE When FOM function or an external signal source is used over 8.5 GHz frequency measurements with E5071C-2K5/4K5, there is a possibility that overload detection and power trip occurs even if you measure the devices under the maximum input level. In that case, turn OFF the overload & power trip detect function after ensuring the value of input power level.

223 Port 3 receiver overload (for Options 313, 314, 413, and 414 only)

The input to Test Port 3 exceeds the maximum input level. The measurement value is not correct. When a DUT is an amplifier or the like, this error may occur, damaging the receiver in the worst case. Should this error occur with a passive part used as the DUT or with nothing connected to the test port, this instrument is faulty. Contact an Agilent Technology sales office or the company from which you bought the instrument.

If this error occurs, the stimulus signal output is automatically turned to off.

NOTE When FOM function or an external signal source is used over 8.5 GHz frequency measurements with E5071C-2K5/4K5, there is a possibility that overload detection and power trip occurs even if you measure the devices under the maximum input level. In that case, turn OFF the overload & power trip detect function after ensuring the value of input power level.

224 Port 4 receiver overload (For Options 413 and 414 only)

The input to Test Port 4 exceeds the maximum input level. The measurement value is not correct. When a DUT is an amplifier or the like, this error may occur, damaging the receiver in the worst case. Should this error occur with a passive part used as the DUT or with nothing connected to the test port, this instrument is faulty. Contact an Agilent Technology sales office or the company from which you bought the instrument.

If this error occurs, the stimulus signal output is automatically turned to off.

NOTE When FOM function or an external signal source is used over 8.5 GHz frequency measurements with E5071C-2K5/4K5, there is a possibility that overload detection and power trip occurs even if you measure the devices under the maximum input level. In that case, turn OFF the overload & power trip detect function after ensuring the value of input power level.

- 73 **Power meter not settled**
- The measurement value of the power meter is unstable, or it goes outside the tolerance.
- This error occurs when the power meter’s measurement value does not become stable within about 10 seconds during measurement for power calibration data or that for scalar-mixer calibration data.
- This error also occurs when the power calibration value exceeds the set tolerance.
- In addition, it occurs when the power meter fails to respond for any reason, such as power-down for example, during measurement under the same conditions.
- Ensure a firm connection of the power sensor.
- 241 **Power on test failed**
- This error occurs when the power-on test fails, indicating a failure of this instrument. Contact an Agilent Technology sales office or the company from which you bought the instrument.
- 61 **Power unlevelled**
- The out power level exceeds available range.
- For example, if the level after correction exceeds the power level that can be outputted when correcting the power level with the power calibration and power slope feature, this error occurs.
- Check that the power level is set correctly, the power calibration has been performed correctly and the correction value of the power slope is set correctly.
- 120 **Printer error**
- This error occurs when the previous printing is still in progress or the printer fails (offline, short of paper, etc.) at time of outputting the display image on the LCD screen to the printer (HCOP:IMM command).
- 121 **Print failed**
- This error occurs when printing fails for reasons other than Error 120, Printer error.
- 284 **Program currently running**
- This error occurs when the PROG:SEL:STAT RUN command is executed with the VBA program in the Run state.
- 112 **Program mnemonic too long**
- The length of the header exceeds 12 characters (see 7.6.1.4.1, IEEE488.2).
- 286 **Program runtime error**
- An error occurring when VBA is executed.
- Q**
- 430 **Query DEADLOCKED**
- The state that generates a “DEADLOCKED” Query error (see 6.3.1.7, IEEE488.2). This error occurs when both input and output buffers have become full, preventing the instrument from continuing processing, for example.

- 400 **Query error**
A comprehensive query error has occurred showing that this instrument cannot detect a more detailed error. This code simply shows that a query error defined in 11.5.1.1.7 and 6.3, IEEE488.2 has occurred.
- 410 **Query INTERRUPTED**
The state that generates a “INTERRUPTED” Query error (see 6.3.2.3, IEEE488.1). This error occurs when data bytes (DAB) or GET are received before the transmission of the response after a query has not been completed, for example.
- 420 **Query UNTERMINATED**
The state that generates an “UNTERMINATED” Query error (see 6.3.2, IEEE488.2). This error occurs when this instrument is designated as the talker and an incomplete program message is received, for example.
- 440 **Query UNTERMINATED after indefinite response**
After a query asking for an indefinite response has been run, another query is received in the same program message (See 6.5.7.5.7, IEEE488.2).
- 350 **Queue overflow**
The queue contains a specific code in place of the code which caused this error. The code indicates that the error occurred because of no space available in the queue, but the error is not recorded.
- R**
- 105 **Recall failed**
This error occurs when reading an instrument status file (State01.sta, etc.) (MMEM:LOAD:STAT command) fails.
- S**
- 106 **Save failed**
This error occurs when writing an instrument status file (State01.sta, etc.) (MMEM:STOR:STAT command) fails.
- 33 **Selected parameter not valid for confidence check**
This error occurs when the mix mode S parameter has been selected for the S parameter you want to check, while using the confidence check function for calibration coefficient.
- 57 **SnP request not valid for selected measurement**
This error occurs when you try to save data to a Touchstone file but no measurement has been executed.
This error also occurs when you try to save a Touchstone file with power sweep measurement specified or with the frequency offset function set to ON.
- 50 **Specified channel hidden**
This error occurs when an attempt is made to activate a channel not on display using the DISP:WIND:ACT command. This error is not generated by front key operations.

- 23 **Specified error term does not exist**
The error occurs when the calibration coefficient type of the parameter specified in the read/write command of the calibration coefficient (SENS:CORR:COEF) is invalid for the calibration type selected by the calibration type selection command (SENS:CORR:COEF:METH:xxxx). This error is not generated by front key operations.
- 21 **Specified ports overlapped**
This error occurs when a port number is duplicated in a command requiring two or more port numbers as parameters. Such commands are, for example, CALC:FSIM:BAL:TOP:SSB:PPOR 1,2,3,3. Specify port setup correctly to avoid duplication of ports. This error is not generated by front key operations.
- 51 **Specified trace dose not exist**
This error occurs when CALC:PAR:SEL command is executed to activate more traces than specified by CALC:PAR:COUN command. This error is not generated by front key operations.
- 26 **Standard not selected**
This error occurs when you execute the measurement under the condition that the standard is not selected for the subclass (the standard number is set to 0).
- 150 **String data error**
When a character-string-data element is put to syntactic analysis, an error not corresponding to one of Error Numbers -151 through -159 occurs.
- 158 **String data not allowed**
A character-string-data element has been received at a position where this instrument does not accept one.
- 138 **Suffix not allowed**
A suffix is attached to a numeric value element to which a suffix is not allowed to be attached.
- 134 **Suffix too long**
The unit is too long.
The unit is expressed in 12 or more characters (see 7.7.3.4, IEEE488.2).
- 55 **Sweep mode changed to stepped sweep**
You cannot change the sweep mode to the swept mode.
This error occurs when you change the sweep mode to the swept mode/high speed swept mode under the conditions where the sweep type is set to power sweep, power slope function is enabled (ON, correction coefficient is other than zero), power calibration is ON, frequency offset is enabled, spurious avoidance of frequency offset is enabled, or external signal source control is enabled.
- 102 **Syntax error**
A command or data type that is not recognized exists.
- 310 **System error**
One of the errors designated as “system errors” in this instrument has occurred.

T

40 **Target value not found**

This error occurs when the target is not found during the marker search analysis after specifying the target and executing the CALC:MARK:FUNC:EXEC and CALC:FUNC:EXEC commands. This error occurs also when the bandwidth is not found after executing the bandwidth marker command, CALC:MARK:BWID:DATA?

-124 **Too many digits**

The number of digits of the argument of the decimal numeric-value-data element exceeds 255 with the preceding 0 removed (see 7.7.2.4.1, IEEE488.2).

-223 **Too much data**

The block-, expression-, or character-string-type program data that has been received conforms with the standard. But it exceeds the amount that can be processed under the condition 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.

54 **Transform, Gate not allowed**

This message appears when you turn on the gating/conversion function of the time domain feature, while frequency offset is enabled, measurement points are set to two, or sweep type is set to other than linear sweep

Turn off the frequency offset (SENS:OFFS OFF command), set the measurement points to three or more and the sweep type to linear sweep, and then turn on the gating/conversion function.

-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 condition (This 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

300 **Unable to estimate adapter length**

Adapter length can not be estimated at zero span. Change the frequency span other 0.

-113 **Undefined header**

A command not defined in this instrument, though not illegal in the syntactic structure, has been received. For example, when a message “:DISP:WIND1:TABL:MEM ON” is sent to a correct program message “:DISP:WIND1:TRAC1:MEM ON,” the message sent is received as an undefined command by this instrument. See the command reference and use correct commands.

This error occurs also when a port not existing on this model is specified in a command specifying a port number as an index. Such commands are CALC:FSIM:SEND:DEEM:PORTn:xxxx, CALC:FSIM:SEND:PMC:PORTn:xxxx, CALC:FSIM:SEND:ZCON:PORTn:Z0:R, and SENS:CORR:EXT:PORTn:TIME; they include PORTn as a part.

- 34 **User characterization not found in module**
- This error occurs when the selected user profile is not detected in the ECal memory, while reading it from the ECal module, written by the user definition ECal.
- V**
- 30 **Valid Ecal module not found**
- This error occurs when the number of ports of the ECal module connected is less than the necessary number of ports. This error occurs, for example, when a 4-port Cal executing command, SENS:CORR:COLL:ECAL:SOLT4, is executed with a 2-port ECal module connected. This error is not generated by front key operations.
- 71 **Valid power meter not found**
- Valid power meter is not connected.
- This error occurs when the E5071C and the power meter is not connected with USB/GPIB interface, the GPIB addresses do not match between the power meter and the E5071C's power meter, or the power meter is turned off, during the measurement for power calibration data or for that in scalar-mixer calibration.
- It also occurs when inoperable power meter is connected.
- Ensure the connection of the power meter, GPIB addresses and power supply.
- 72 **Valid power sensor not found. No valid sensor is connected to the power meter**
- This error occurs when no power sensor is connected to the specified channel of the power meter, during the measurement for power calibration data or for that in scalar-mixer calibration.
- Ensure the connection of the power sensor.
- 75 **Valid signal generator not found. No valid external signal source is connected**
- This error occurs when the specified type of external signal source is not connected to the specified GPIB address, though the control of the external signal source is enabled (SENS:OFFS:LOC:STAT ON and SENS:OFFS:LOC:CONT ON).
- It also occurs when USB/GPIB interface is set but not connected.
- Ensure the external signal source and the connection of USB/GPIB interface.

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. Pushing a front panel key or executing :DISP:CCL command clears the message.

This message simply appears on the display, being not known to a remote environment such as a GPIB. This message is not displayed when another error (against a red background) has already been displayed in the instrument message/Warning area.

The warning messages for this instrument are as follows:

Auto port extension not allowed

This message appears when you try to execute the auto port extension when the sweep type is the power sweep or the frequency offset function is ON.

If this message is displayed, the auto port extension is not available.

Calibration extrapolated

The frequency range that can be calibrated with the ECal module is exceeded. In this case, the calibration data for the minimum frequency or maximum frequency are used instead of the data exceeding the allowable frequency range for calibration.

Fixture simulator not allowed

This message appears when enabling the frequency offset, while the fixture simulator function is turned on.

If this message is displayed, the fixture simulator function is automatically turned off.

Log sweep requires 2 octave minimum span

If you change the sweep range that does not satisfy the necessary condition of the frequency span (the stop frequency is about 4 times or more of the start frequency) when the sweep type is set to the log sweep, this message is displayed.

If this message is displayed, the sweep type is automatically set to the linear sweep.

For example, if you attempt to change the log type to the log sweep when the start frequency is set to 1 MHz and the stop frequency to 2 MHz, this error occurs.

Set the stop frequency to a value of about 4 times or more the start frequency and then set the low sweep.

Peak not found

This warning message is displayed when, with the tracking turned on, the peak specified by the marker search has not been found by the time the sweep is finished (with the tracking executed).

Segment table changed

This warning message is displayed when the setting specified segment by segment in the segment table is automatically changed by a change in the other setting.

For example, this warning message is displayed when, with the power specified segment by segment in the segment table, the power setting for a segment is adjusted by a change in the power range setting.

Sweep mode changed to stepped sweep

This message appears when you set the sweep type to power sweep, power slope function to enabled (ON, correction coefficient is other than zero), power calibration to ON, frequency offset to enabled, spurious avoidance of frequency offset to enabled, or external signal source control to enabled, while the sweep mode is set to swept mode or high speed swept mode.

When this message is displayed, the sweep mode is automatically set to step mode (during swept mode) or high speed step mode (during high speed swept mode).

Target value not found

This warning message is displayed when, with the tracking turned on, the target specified by the marker search has not been found by the time the sweep is finished (with the tracking executed).

This warning message is displayed also when, with the bandwidth marker displayed, the setting for the bandwidth marker is changed at the end of the sweep, or when, with the active marker changed or moved, the bandwidth is not found.

Transform, Gate not allowed

This message appears when you have set the measurement points to two, sweep type to other than linear sweep, or frequency offset to enabled, while the gating/conversion function of the time domain feature is turned on.

If this message is displayed, the gating/conversion function is automatically turned off.

User Preset File not found

This warning message is displayed if no user preset file (D:\UserPreset.sta) exists when executing the SYST:UPR command.

If this message is displayed, a normal preset (SYST:PRES) will be performed.

Messages
User Preset File not found