Maintenance Manual

Site Master
Cable and Antenna Analyzer with Spectrum Analyzer

S331E, 2 MHz to 4 GHz
S332E, 2 MHz to 4 GHz, Spectrum Analyzer, 100 kHz to 4 GHz
S361E, 2 MHz to 6 GHz
S362E, 2 MHz to 6 GHz, Spectrum Analyzer, 100 kHz to 6 GHz

Anritsu Company
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Morgan Hill, CA 95037-2809
USA

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DECLARATION OF CONFORMITY

Manufacturer's Name: ANRITSU COMPANY

Manufacturer's Address: Microwave Measurements Division
490 Jarvis Drive
Morgan Hill, CA 95037-2809
USA

declares that the product specified below:

Product Name: Site Master

Model Number: S331E, S332E, S361E, S362E

conforms to the requirement of:

EMC Directive:	2004/108/EC
Low Voltage Directive:	2006/95/EC

Electromagnetic Compatibility: EN61326:2006

Emissions: EN55011: 2007 Group 1 Class A

Immunity:	EN 61000-4-2:1995 +A1:1998 +A2:2001	4kV CD, 8kV AD
	EN 61000-4-3:2006 +A1:2008	3V/m
	EN 61000-4-4:2004	0.5kV SL, 1kV PL
	EN 61000-4-5:2006	0 5kV L-L, 1kV L-E
	EN 61000-4-6: 2007	3V
	EN 61000-4-11: 2004	100% @ 20msec

Electrical Safety Requirement:

Product Safety: EN 61010-1:2001

Eric McLean, Corporate Quality Director

Morgan Hill, CA

21 July 2007
Date

European Contact: For Anritsu product EMC & LVD information, contact Anritsu LTD, Rutherford Close, Stevenage Herts, SG1 2EF UK, (FAX 44-1438-740202)

Safety Symbols

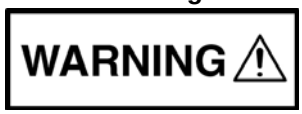
To prevent the risk of personal injury or loss related to equipment malfunction, Anritsu Company uses the following symbols to indicate safety-related information. For your own safety, please read the information carefully *before* operating the equipment.

Symbols Used in Manuals

Danger

This indicates a risk from a very dangerous condition or procedure that could result in serious injury or death and possible loss related to equipment malfunction. Follow all precautions and procedures to minimize this risk.

Warning



This indicates a risk from a hazardous condition or procedure that could result in light-to-severe injury or loss related to equipment malfunction. Follow all precautions and procedures to minimize this risk.

Caution

This indicates a risk from a hazardous procedure that could result in loss related to equipment malfunction. Follow all precautions and procedures to minimize this risk.

Safety Symbols Used on Equipment and in Manuals

The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions *before* operating the equipment. Some or all of the following five symbols may or may not be used on all Anritsu equipment. In addition, there may be other labels attached to products that are not shown in the diagrams in this manual.

This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.

This indicates a compulsory safety precaution. The required operation is indicated symbolically in or near the circle.

This indicates a warning or caution. The contents are indicated symbolically in or near the triangle.

This indicates a note. The contents are described in the box.

These indicate that the marked part should be recycled.

For Safety

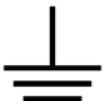
Warning

Always refer to the operation manual when working near locations at which the alert mark, shown on the left, is attached. If the operation, etc., is performed without heeding the advice in the operation manual, there is a risk of personal injury. In addition, the equipment performance may be reduced.

Moreover, this alert mark is sometimes used with other marks and descriptions indicating other dangers.

Warning

or



When supplying power to this equipment, connect the accessory 3-pin power cord to a 3-pin grounded power outlet. If a grounded 3-pin outlet is not available, use a conversion adapter and ground the green wire, or connect the frame ground on the rear panel of the equipment to ground. If power is supplied without grounding the equipment, there is a risk of receiving a severe or fatal electric shock.

Warning

This equipment can not be repaired by the operator. Do not attempt to remove the equipment covers or to disassemble internal components. Only qualified service technicians with a knowledge of electrical fire and shock hazards should service this equipment. There are high-voltage parts in this equipment presenting a risk of severe injury or fatal electric shock to untrained personnel. In addition, there is a risk of damage to precision components.

Warning

Use two or more people to lift and move this equipment, or use an equipment cart. There is a risk of back injury if this equipment is lifted by one person.

Caution

Electrostatic Discharge (ESD) can damage the highly sensitive circuits in the instrument. ESD is most likely to occur as test devices are being connected to, or disconnected from, the instrument's front and rear panel ports and connectors. You can protect the instrument and test devices by wearing a static-discharge wristband. Alternatively, you can ground yourself to discharge any static charge by touching the outer chassis of the grounded instrument before touching the instrument's front and rear panel ports and connectors. Avoid touching the test port center conductors unless you are properly grounded and have eliminated the possibility of static discharge.

Repair of damage that is found to be caused by electrostatic discharge is not covered under warranty.

Table of Contents

Chapter 7—Assembly Replacement

Chapter 8—Troubleshooting

Appendix A—Test Records

Chapter 1 — General Information

1-1 Introduction

This manual provides maintenance instructions for Anritsu Site Master Models S331E, S332E, S361E and S362E. The manual includes:

- General information in this chapter, including:
  - Lists of necessary test equipment to perform verification testing (Table 1-1, Table 1-2, Table 1-3, and Table 1-4)
  - Replaceable parts list (Table 1-5)
- Performance verification procedures:
  - Chapter 2, "Spectrum Analyzer Verification"
  - Chapter 3, "Cable and Antenna Analyzer Verification"
  - Chapter 4, "Power Meter Verification"
  - Chapter 5, "Option Verification"
- Battery pack information (Chapter 6, "Battery Information")
- Parts replacement procedures (Chapter 7, "Assembly Replacement")
- Blank test records are included in Appendix A.
  - Copy the blank test records from Appendix A and use them to record measured values. These test records form a record of the performance of your instrument. Anritsu recommends that you make a copy of the blank test records to document the measurements each time a Performance Verification is performed. Continuing to document this process each time it is performed provides a detailed history of instrument performance, which can allow you to observe trends.

Familiarity with the basic operation of the front panel keys (for example, how to change measurement mode, preset the unit, or the meaning of soft key or submenu) is assumed.

Caution	Before making any measurement, verify that all equipment has warmed up for at least 30 minutes.

1-2 Anritsu Customer Service Centers

For the latest service and sales information in your area, please visit the following URL:

http://www.anritsu.com/Contact.asp

Choose a country for regional contact information.

1-3 Recommended Test Equipment

The following test equipment is recommended for use in testing and maintaining Anritsu Site Master Model S3xxE. Table 1-1 is a list of test equipment that is required for verifying the Spectrum Analyzer functions. Table 1-2 is a list of test equipment that is required for verifying the Cable and Antenna Analyzer. Table 1-3 is a list of test equipment that is required for verifying the Power Meter. Table 1-4 is a list of test equipment that is required for verifying the functions of installed options.

Table 1-1. Test Equipment Required for Verifying Spectrum Analyzer Functions

Instrument	Critical Specification	Recommended Manufacturer/Model
Synthesized Signal Generator	Frequency: 0.1 Hz to 20 GHz, Power Output: +16 dBm, Step attenuator installed	Anritsu Model MG3692A/B/C with Options 2A, 3, 4, 22, 15x[a]
Power Meter	Power Range: –70 dBm to +20 dBm	Anritsu Model ML2438A
Power Sensor	Frequency: 100 kHz to 18 GHz Power Range: –30 dB to +20 dB	Anritsu Model MA2421D (Qty 2) or SC7816 (Qty 2)
Power Sensor	Frequency: 10 MHz to 18 GHz Power Range: –67 dB to +20 dB	Anritsu Model MA2442D (Qty 2)
Frequency Reference	Frequency: 10 MHz	Symmetricom RubiSource T&M
Vector Network Analyzer	10 MHz to 9 GHz	Anritsu Model MS4624A, B, or D
Calibration Kit for VNA	10 MHz to 9 GHz	Anritsu Model 3753A
Fixed Attenuator	10 dB Attenuation	Aeroflex/Weinschel Model 44-10 (Qty 2)
Power Splitter	Frequency: DC to 18 GHz	Aeroflex/Weinschel Model 1870A
Adapter	Frequency: DC to 20 GHz N(m) to N(m), 50 ohm	Anritsu Model 34NN50A
Adapter	Frequency: DC to 20 GHz N(m) to N(m), 50 ohm	Anritsu Model 34RKNF50
50 Ohm Termination	Frequency: DC to 18 GHz	Anritsu Model 28N50-2
RF Coaxial Cable	Frequency: DC to 18 GHz N(m) to N(m), 50 ohm	Anritsu Model 15NN50-0.6B
Coaxial Cable	BNC(m) to BNC(m), 50 ohm	Anritsu Model 2000-1627-R

a. MG3692A models require Option 15 to achieve power of +16 dBm at 3.5 GHz. MG3692B models do not require Option 15 to achieve power of +16 dBm at 3.5 GHz.

Table 1-2. Test Equipment Required for Cable and Antenna Analyzer Verification

Instrument	Critical Specification	Recommended Manufacturer/Model
Frequency Counter	Frequency: 2 GHz	Anritsu Model MF2412B
Open/Short	Frequency: DC to 18 GHz	Anritsu Model 22N50
Termination	Frequency: DC to 18 GHz Return Loss: 40 dB min.	Anritsu Model 28N50-2
Termination	Frequency: DC to 18 GHz Return Loss: 40 dB min.	Anritsu Model 28NF50-2
Adapter	Frequency: DC to 6 GHz N(f) to K(m)	Anritsu Model 34NFK50
Adapter	Frequency: DC to 20 GHz N(m) to N(m)	Anritsu Model 34NN50A
RF Coaxial Cable	Frequency: DC to 18 GHz N(m) to N(f), 50 ohm	Anritsu Model 15NNF50-0.6B
6 dB Offset Termination	Frequency: DC to 6.0 GHz	Anritsu Model SC7424
20 dB Offset Termination	Frequency: DC to 6.0 GHz	Anritsu Model SC7423

Table 1-3. Test Equipment Required for Power Meter Verification

Instrument	Critical Specification	Recommended Manufacturer/Model
Synthesized Signal Source	Frequency: 0.1 Hz to 20 GHz Power Output to +13 dBm	Anritsu Model MG3692A or B with options 2A, 4, 22, 15[a]
Power Meter	Power Range: −70 to +20 dBm	Anritsu Dual Channel Model ML2438A
Power Sensor	Frequency: 10 MHz to 18 GHz Power Range: −67 to +20 dB	Anritsu Model MA2442D (quantity 2)
Fixed Attenuator	10 dB Attenuation	Aeroflex/Weinschel Model 44-10
Power Splitter	Frequency: DC to 18 GHz	Aeroflex/Weinschel Model 1870A
Adapter	Frequency: DC to 20 GHz N(m) to N(m), 50 ohm	Anritsu Model 34NN50A
Adapter	Frequency: DC to 20 GHz K(m) to N(f), 50 ohm	Anritsu Model 34RKNF50
RF Coaxial Cable	Frequency: DC to 18 GHz N(m) to N(m), 50 ohm	Anritsu Model 15NN50-0.6B
Frequency Reference	Frequency: 10 MHz	Symmetricom Model RubiSource T&M

a. Option 15 is required for MG3692A models to achieve power of +13 dBm. MG3692B models do not require Option 15.

Table 1-4. Test Equipment Required for Verifying Options

Instrument	Critical Specification	Recommended Manufacturer/Model
Adapter	40 ohm Load	Anritsu Model T2904
Adapter	78 ohm Load	Anritsu Model T3536
Adapter	105 ohm Load	Anritsu Model T3377
Adapter	SMA to BNC(f)	Pomona 4290 or equivalent
Adapter	GPS Terminator	Amphenol B1004A1-ND3G-93R-0.05-1W or equivalent
GPS Antenna		Anritsu 2000-1528-R
Coaxial Cable	BNC(m) to BNC(m), 50 ohm	Any (Qty 2) Anritsu Model 2000-1627-R

1-4 Replaceable Parts

Table 1-5. List of Replaceable Parts

Part Number	Description
ND70931	S331E MB/VNA PCB Assembly (units without option 21)[a] s/n < 1128048 and 1128247, 1129004
ND73215	S331E MB/VNA PCB Assembly (units without option 21)[a] s/n > 1128047 except 1128247, 1129004
ND70932	S331E MB/VNA PCB Assembly (units with option 21)[a] s/n < 1123047 and 1123058
ND73217	S331E MB/VNA PCB Assembly (units with option 21)[a] s/n > 1123046 except 1123058
ND70929	S361E MB/VNA PCB Assembly (units without option 21)[a] s/n < 1128183 except 1127057 and 1125052
ND73216	S361E MB/VNA PCB Assembly (units without option 21)[a] s/n > 1128182 and 1127057, 1125052
ND70933	S361E MB/VNA PCB Assembly (units with option 21)[a] s/n < 1128183 except 1127057 and 1125052
ND73218	S361E MB/VNA PCB Assembly (units with option 21)[a] s/n > 1128182 and 1127057, 1125052
ND70934	S332E MB/VNA PCB Assembly[a] s/n < 1124046 and 1126145
ND73219	S332E MB/VNA PCB Assembly[a] s/n > 1124045 except 1126145
ND70936	S362E MB/VNA PCB Assembly[a] s/n < 1125034
ND73220	S362E MB/VNA PCB Assembly[a] s/n > 1125033
ND70937	S332E/S362E SPA Assembly s/n < 1124046 and 1126145 for S332E, s/n < 1125034 for S362E
ND73221	S332E/S362E SPA Assembly s/n > 1124045 except 1126145 for S332E, s/n > 1125033 for S362E
3-67304-9	Model S331E ID Label
3-67304-6	Model S332E ID Label
3-67304-5	Model S361E ID Label
3-67304-7	Model S362E ID Label
ND70320	GPS Module (Opt 31)
ND72101	Ethernet PCB Assy (Opt 411)
3-15-147	LCD Display
3-68567-3	Inverter PCB
2000-1654-R	Soft Carrying Case
ND73191	Front Case with Gasket (Excludes LCD, touch screen, encoder and keypad assemblies.)
ND73199	Back Case (Excludes Tilt Bail)
ND73201	Battery Door
633-44	Li-ion Battery Pack
3-513-100	Adapter Type N(f) to SMP(m) RF bulkhead connector
40-168-R	AC to DC Power Converter
3-410-103	Encoder (excluding knob)
3-61360-2	Knob (excluding encoder)
ND73200	Tilt Bail Assembly

Table 1-5. List of Replaceable Parts

Part Number	Description
3-72779	Fan Assembly
3-72811-3	Main Numeric Keypad PCB
3-72773	Rubber Keypad
3-72767	Keypad Washer
3-905-2744	Keypad Screw
ND73192	Speaker
ND73867	Touch Screen with Gasket[b]

a.When ordering the Main/VNA PCB Assembly, in order to ensure installation of correct options, all options that are installed on the instrument must be declared on the order. The options are listed and shown in the **System** (Shift-8) / Status display.

b.Firmware version 1.30 or later must be installed when using this part

Chapter 2 — Spectrum Analyzer Verification

2-1 Frequency Accuracy Verification

The following test is used to verify the CW frequency accuracy of the Spectrum Analyzer in the S332E and S362E Site Master.

Equipment Required

- Anritsu MG3692X Synthesized Signal Source
- 10 MHz Reference Standard
- Anritsu 34RKNF50 50 ohm Adapter
- Anritsu 15NN50-1.5C RF Coaxial Cable
- BNC male to BNC male Coaxial Cable

Procedure

1. Connect the 10 MHz Reference source to the Anritsu MG3692X Synthesized Signal Source.

Note	Do not connect the external 10 MHz Reference to the Site Master.

2. Turn on the 10 MHz Reference Standard and the Anritsu MG3692X Synthesized Signal Source.
3. Set the MG3692X output to 1 GHz CW, with an RF Output Level of –30 dBm.
4. Connect the output of the source to the RF In of the Site Master.
5. Turn on the Site Master.
6. Press the **Shift** key and then the **Mode** (9) key. Rotate the knob to highlight Spectrum Analyzer and then press the **Enter** key to switch to Spectrum Analyzer mode.
7. Press the **Shift** key, the **Preset** (1) key, and then the Preset soft key to reset the instrument to the default starting conditions.
8. Press the **Shift** key, the **Sweep** (3) key, then the Sweep Mode soft key, and select the Performance soft key.
9. Press the Amplitude soft key and then press the Reference Level soft key.
10. Use the keypad to enter –10 and select the dBm soft key.
11. Press the Span soft key, use the keypad to enter 10, and select the kHz soft key.
12. Press the BW soft key and select the RBW soft key.
13. Use the keypad to enter 100 and select the Hz soft key.
14. Press the VBW soft key, use the keypad to enter 30 and then select the Hz soft key.
15. Press the Freq soft key and select the Center Freq soft key.
16. Use the keypad to enter 1 and select the GHz soft key.
17. Press the Marker soft key, then the More soft key, set Counter Marker to On, select the Back soft key, and then press the Peak Search soft key.

Note	Without the Counter Marker On the frequency resolution will not allow looking at the kHz accuracy.

18. Verify that the marker frequency is 1 GHz ± 1.5 kHz (± 1.5 ppm) and record in Table A-1, "Spectrum Analyzer Frequency Accuracy".

19. Set the MG3692X frequency to 3.9 GHz and then 5.9 GHz (for S362E only).

20. Set the S332E or S362E center freq to 3.9 GHz and then 5.9 GHz (for S362E only).

21. Press the Marker soft key, then the More soft key, set Counter Marker to On, select the Back soft key, and then press the Peak Search soft key.

22. Verify that the marker frequency is 3.9 GHz ± 5.85 kHz (± 1.5 ppm) and then 5.9 GHz ± 8.85 kHz (± 1.5 ppm) for the S362E only and record in Table A-1.

Note	If the unit fails the Section 2-1 "Frequency Accuracy Verification" test contact your local Anritsu Service Center (http://www.anritsu.com/Contact.asp).

2-2 Single Side Band (SSB) Phase Noise Verification

This test is used to verify the single side band (SSB) phase noise of the spectrum analyzer in the S332E and S362E Site Master.

Equipment Required

- Anritsu MG3692X Synthesized Signal Source
- 10 MHz Reference Standard
- Anritsu 34RKNF50 50 Ohm Adapter
- Anritsu 15NN50-1.5C RF Coaxial Cable

Procedure

1. Connect the 10 MHz reference source to the Anritsu MG3692X Synthesized Signal Source.
2. Turn on the 10 MHz reference source and the Anritsu MG3692X Synthesized Signal Source.
3. Set the MG3692X output to 1.00 GHz CW, with an RF output level of +0 dBm.
4. Connect the output of the MG3692X Synthesized Signal Source to the RF In connector of the Site Master.
5. Turn on the Site Master.
6. Press the **Shift** key and then the **Mode** (9) key. Rotate the knob to highlight Spectrum Analyzer and then press the **Enter** key to switch to Spectrum Analyzer mode.
7. Press the **Shift** key, the **Preset** (1) key, and then the Preset soft key to reset to the default starting conditions.
8. Press the **Shift** key, the **Sweep** (3) key, then the Sweep Mode soft key, and select the Performance soft key.
9. Press the Amplitude soft key, then press the Reference Level soft key.
10. Use the keypad to enter 0 and select the dBm soft key.
11. Press the Atten Lvl soft key, use the keypad to enter 15 and press the dB soft key.
12. Press the Freq soft key and select the Center Freq soft key.
13. Use the keypad to enter 1.00 and press the GHz soft key.
14. Press the Span soft key, use the keypad to enter 110, and select the kHz soft key.
15. Press the BW soft key and select the RBW soft key.
16. Use the keypad to enter 1 and select the kHz soft key.
17. Press the VBW soft key and use the keypad to enter 3, then select the Hz soft key.
18. Press the **Shift** key and then press the **Trace** (5) key, then select the Trace A Operations soft key.
19. Press the # of Average soft key, use the keypad to enter 7, then press the **Enter** key.
20. Wait until the Trace Count displays "7/7".
21. Press the **Marker** key and select the Peak Search soft key.
22. Press the Delta On/Off soft key to turn Delta On.
23. Use the keypad to enter 10 and press the kHz soft key.
24. Enter the measured value into Table A-2, "Spectrum Analyzer SSB Phase Noise Verification".
25. Subtract 30 dB from the average value and verify that the result is less than –100 dBc/Hz (for 10 kHz offset) or –105 dBc/Hz (for 100 kHz offset) or –115 dBc/Hz (for 1 MHz offset) and record the Calculated Value results in the test records. Use Table A-2.

    For example: –70 dBc measured – 30 dB = –100 dBc/Hz

26. Repeat Step 16 through Step 25 for 100 kHz (set Span to 220 kHz) and 1 MHz offset (set Span to 2.04 MHz. Enter the test results and calculations in the appropriate rows of Table A-2.

2-3 Spurious Response (Second Harmonic Distortion) Verification

The following test is used to verify the input related spurious response of the spectrum analyzer in the S332E and S362E Site Master.

Equipment Required

- Anritsu MG3692X Synthesized Signal Source
- 10 MHz Reference Standard
- Anritsu 34RKNF50 50 Ohm Adapter or equivalent
- Anritsu 15NN50-1.5C RF Coaxial Cable
- Anritsu 1030-96 50 MHz Low Pass Filter
- BNC male to BNC male Coaxial Cable

Procedure

1. Connect the 10 MHz reference source to the Anritsu MG3692X Synthesized Signal Source.
2. Turn on the 10 MHz reference source and the Anritsu MG3692X Synthesized Signal Source.
3. Set the MG3692X output to 50.1 MHz CW, with an RF Output Level of –30 dBm.
4. Connect one end of the 50 MHz Low Pass Filter to the output of the source and the other end to the Site Master RF In with the coaxial cable.
5. Turn on the Site Master.
6. Press the **Shift** key and then the **Mode** (9) key. Rotate the knob to highlight Spectrum Analyzer and then press the **Enter** key to switch to Spectrum Analyzer mode.
7. Press the **Shift** key, the **Preset** (1) key, and then the Preset soft key to reset to the default starting conditions.
8. Press the **Shift** key, the **Sweep** (3) key, then the Sweep Mode soft key, and select the Performance soft key.
9. Press the Amplitude soft key and then press the Reference Level soft key.
10. Use the keypad to enter –27 and press the dBm soft key.
11. Press the Atten Lvl soft key and enter 0, then press the dB soft key.
12. Press the Freq soft key and select the Center Freq soft key.
13. Use the keypad to enter 50.1 and press the MHz soft key.
14. Press the Span soft key, use the keypad to enter 100, and select the kHz soft key.
15. Press the BW soft key and select the RBW soft key.
16. Use the keypad to enter 1 and select the kHz soft key.
17. Press the VBW soft key. Use the keypad to enter 10 and then select the Hz soft key.
18. Press the Amplitude soft key.
19. Press the Detection soft key, and then the Peak soft key.
20. Press the **Shift** key and then press the **Trace** (5) key, then select the Trace A Operations soft key.
21. Press the # of Average soft key, use the keypad to enter 5 and then press the **Enter** key.
22. Wait until the Trace Count displays “5/5”.
23. Press the **Marker** key and select the Peak Search soft key.
24. Record the amplitude for 50.1 MHz. Use Table A-3, “Spectrum Analyzer Spurious Response (Second Harmonic Distortion)”.

25. Press the Freq soft key and select the Center Freq soft key.

26. Use the keypad to enter 100.2 and press the MHz soft key.

27. Press the **Shift** key and then press the **Trace** (5) key, then select the Trace A Operations soft key.

28. Press the # of Average soft key, use the keypad to enter 5 and then press the **Enter** key.

29. Wait until the Trace Count displays "5/5".

30. Press the **Marker** key and select the Peak Search soft key.

31. Record the amplitude for 100.2 MHz in the test records. Use Table A-3.

32. Calculate the 2nd Harmonic level in dBc by subtracting the 50.1 MHz amplitude from the 100.2 MHz amplitude using this formula:

Second Harmonic Level Amplitude @ 100.2 MHz = 100.2 MHz amplitude – 50.1 MHz amplitude = _____ dBc

33. Verify that the calculated Second Harmonic Level is ≤ –56 dBc and record in the test records. Use Table A-3.

2-4 Resolution Bandwidth Accuracy Verification

The following test is used to verify the resolution bandwidth accuracy of the spectrum analyzer in the S332E and S362E Site Master.

Equipment Required

- Anritsu MG3692X Synthesized Signal Source
- 10 MHz Reference Standard
- Anritsu 34RKNF50 50 Ohm Adapter
- Anritsu 15NN50-1.5C RF Coaxial Cable
- BNC male to BNC male Coaxial Cable

Procedure

1. Connect the 10 MHz reference source to the Anritsu MG3692X Synthesized Signal Source and the S332E or S362E Site Master.
2. Turn on the MG3692X, set the frequency to 1 GHz CW and Level to –30 dBm.
3. Connect the output of the Anritsu MG3692X Synthesized Signal Source to the S332E or S362E Spectrum Analyzer RF In.
4. Turn on the S332E or S362E Site Master.
5. Press the **Shift** key and then the **Mode** (9) key. Rotate the knob to highlight Spectrum Analyzer and then press the **Enter** key to switch to Spectrum Analyzer mode.
6. Press the **Shift** key, the **Preset** (1) key, and then the Preset soft key to reset to the default starting conditions.
7. Press the **Shift** key, the **Sweep** (3) key, then the Sweep Mode soft key, and select the Performance soft key.
8. Press the Amplitude soft key and then press the Reference Level soft key.
9. Use the keypad to enter –10 and press the dBm soft key.
10. Press the Atten Lvl soft key and enter 0, then press the dB soft key.
11. Press the Scale soft key and enter 10, then press dB/div soft key.
12. Press the Freq soft key and select the Center Freq soft key.
13. Use the keypad to enter 1 and select the GHz soft key.

RBW Test

14. Press the Span soft key, use the keypad to enter the span listed in the test records. Refer to the **Span** column of Table A-4, “Spectrum Analyzer Resolution Bandwidth Accuracy”.
15. Press the BW soft key and select the RBW soft key.
16. Use the keypad to enter 3 and select the MHz soft key.
17. Set the VBW from the value listed in the test records. Refer to the **VBW** column of Table A-4.
18. Press the **Shift** key, press the **Measure** (4) key and then press the OCC BW soft key.
19. Press the dBc soft key and enter 3, then press the **Enter** key.
20. Press the OCC BW On/Off soft key to turn on occupied bandwidth.
21. Record the OCC BW reading in the test records. Use the **Measured Value** column of Table A-4.
22. Verify that the OCC BW reading frequency is within 10% of the RBW.
23. Repeat Step 14 through Step 22 for the other settings and record in Table A-4.

2-5 Spectrum Analyzer Absolute Amplitude Accuracy Verification

The tests in the following two sections verify the absolute amplitude accuracy of the Spectrum Analyzer in the S332E and S362E Site Master. The two parts of this test are "50 MHz Amplitude Accuracy Verification" immediately below and "Amplitude Accuracy Across Frequency Verification" on page 2-11.

50 MHz Amplitude Accuracy Verification

Equipment Required

- Anritsu MG3692X Synthesized Signal Source
- Anritsu ML2438A Dual Channel Power Meter
- Anritsu MA2442D High Accuracy Power Sensors (2)
- Anritsu 34NN50A 50 Ohm Adapter
- Anritsu 34RKNF50 50 Ohm Adapter
- Anritsu 15NN50-1.5C RF Coaxial Cable
- Aeroflex/Weinschel 1870A Power Splitter
- Aeroflex/Weinschel 44-10 10 dB Fixed Attenuator

Setup

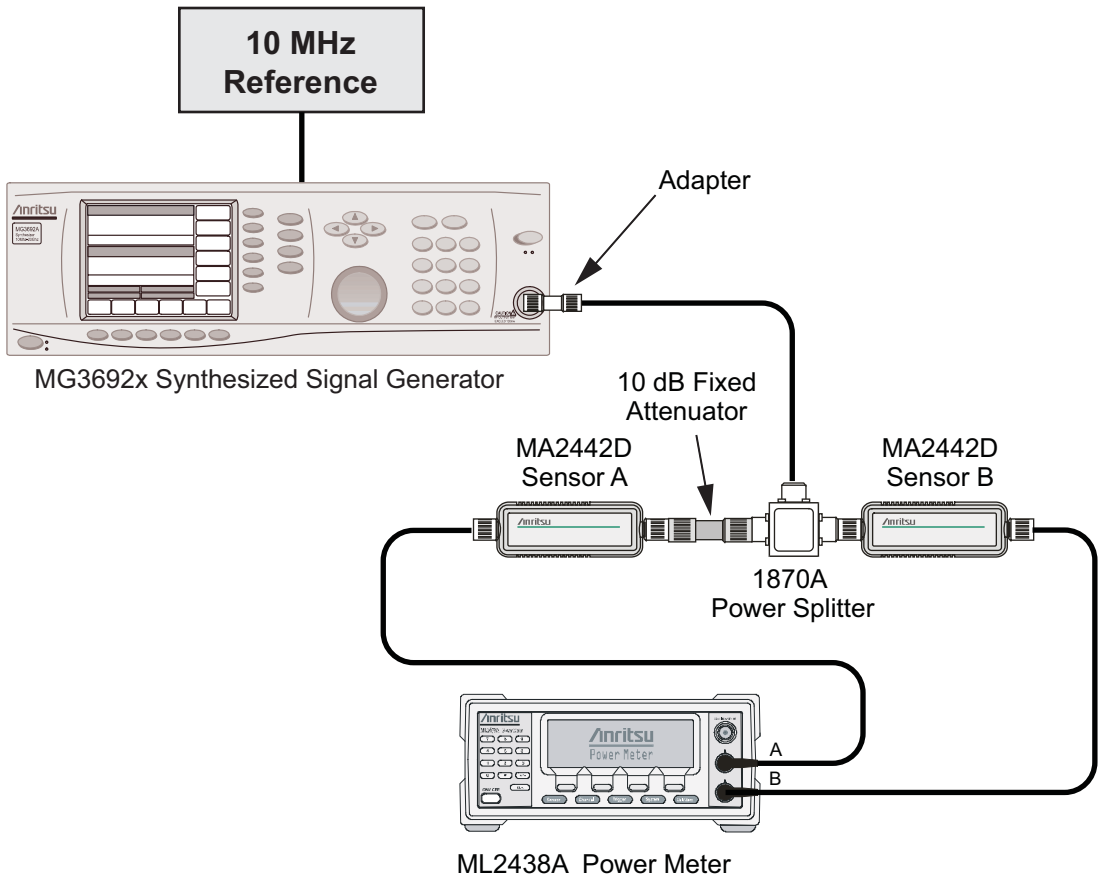


Figure 2-1. Absolute Amplitude Accuracy Verification Pretest Setup

Test Setup Components Characterization

1. Turn on the ML2438A Power Meter, the MG3692X Signal Source, and the S332E or S362E Site Master.
2. On the power meter, press the Channel soft key, the Setup soft key and then the Channel soft key to display Channel 2 Setup menu.
   a. Press the **Input** key twice to set the Input Configuration to B.
   b. Press the **Sensor** key to display both Sensor A and Sensor B readings.
   c. Connect the power sensors to the power meter and calibrate the sensors.
   d. Connect the Power Splitter to the MG3692X Output and Sensor B to one of the Power Splitter Outputs.
3. Install the 10 dB Fixed Attenuator to the other Power Splitter Output and then connect Sensor A to the end of the attenuator as shown in Figure 2-1, "Absolute Amplitude Accuracy Verification Pretest Setup".
4. Set the MG3692X to a frequency of 50 MHz.
5. On the Power Meter, press the **Sensor** key, the Cal Factor soft key, and then the Freq soft key.
   a. Use the keypad to enter 50 MHz as the input signal frequency, do this for both sensor A and sensor B, which sets the power meter to the proper power sensor cal factor.
   b. Press the **Sensor** key on the power meter to display the power reading.
6. Starting with 0 dBm, adjust the power level of the MG3692x to get a reading on Sensor A that matches the power level in the **Test Power Level @ 50 MHz** column of Table A-5, "Spectrum Analyzer 50 MHz Absolute Amplitude Accuracy Setup Table".
7. Record the Sensor B reading in the **Required Sensor B Reading** column of Table A-5.
8. Repeat Step 6 and Step 7 for the other input levels from –4 dBm to –50 dBm.

Note	Note Before continuing, allow a 30 minute warm up period for the internal circuitry to stabilize.

Measuring the Unit for 50 MHz Amplitude Accuracy

1. Remove Sensor A, add the adapter and connect it to the Spectrum Analyzer RF In connector of the S332E or S362E Site Master as shown in Figure 2-2.

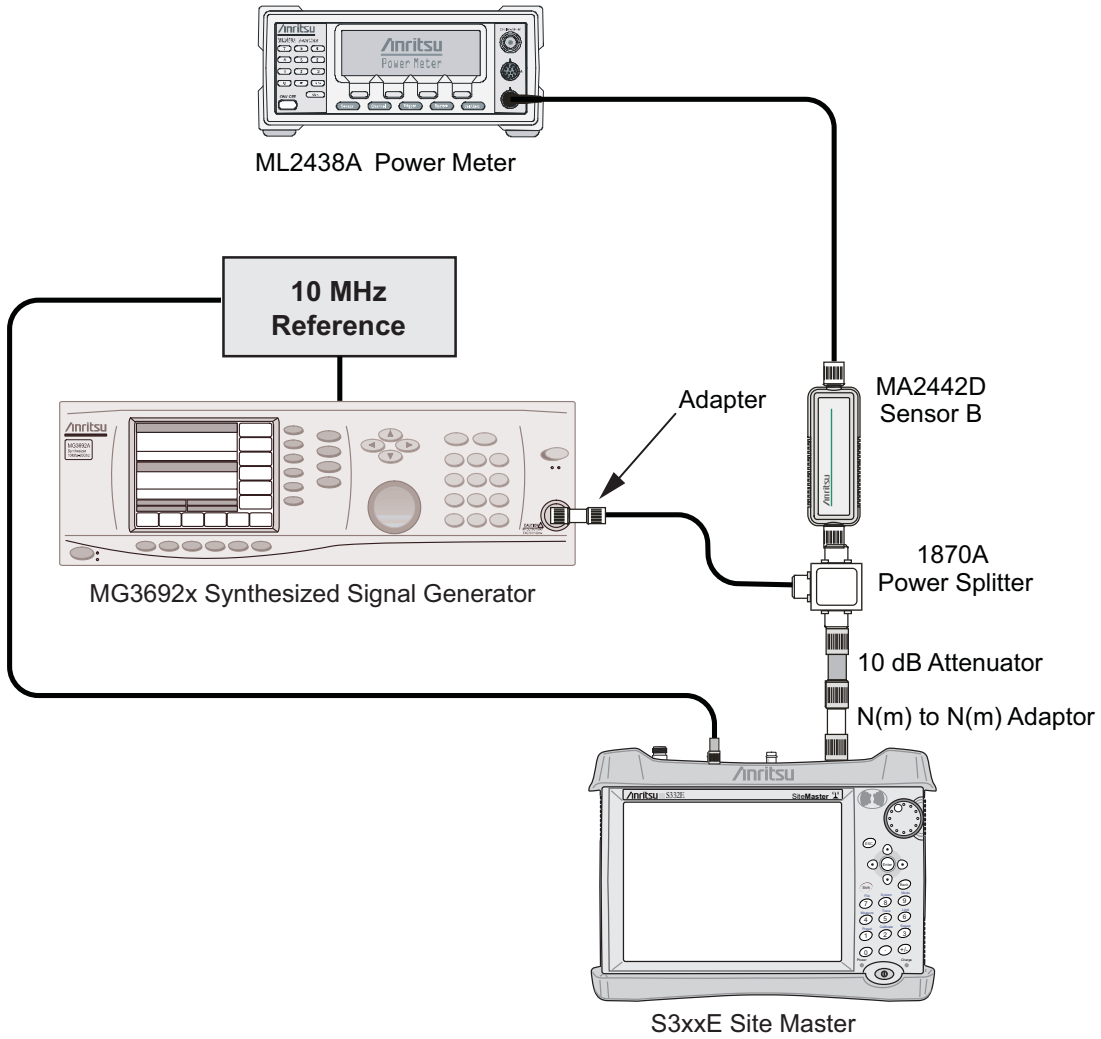


Figure 2-2. Absolute Amplitude Accuracy Verification Test Setup

2. On the S332E or S362E, press the **Shift** key and then the **Mode** (9) key. Rotate the knob to highlight Spectrum Analyzer and then press the **Enter** key to switch to Spectrum Analyzer mode.
3. Press the **Shift** key, the **Preset** (1) key, and then the Preset soft key to reset to the default starting conditions.
4. Press the **Shift** key, the **Sweep** (3) key, then the Sweep Mode soft key, and select the Performance soft key.
5. Press the Freq soft key and select the Center Freq soft key.
6. Use the keypad to enter 50 and select the MHz soft key.
7. Press the BW soft key and the RBW soft key.
8. Use the keypad to enter 1 and select the kHz soft key.
9. Press the VBW soft key and use the keypad to enter 10, then select the Hz soft key.
10. Press the Span soft key, use the keypad to enter 10, and select the kHz soft key.

11. Press the Amplitude soft key and then press the Reference Level soft key.
12. Use the keypad to enter 10 and press the dBm soft key.
13. Press the Atten Lvl soft key and enter 30, then press the dB soft key.
14. Adjust the source power so that the power meter displays the corresponding desired Sensor B reading as recorded for 0 dBm in the Required Sensor B Reading column of Table A-5.
15. Press the Marker soft key and select the Peak Search soft key.
16. Record the Marker 1 amplitude reading in the **0 dBm** row of Table A-6, "Spectrum Analyzer 50 MHz Absolute Amplitude Accuracy".
17. Verify that the Marker 1 amplitude reading is within the specification.
18. Repeat Step 14 through Step 17 for the other power level settings. Refer to Table A-5 for Required Sensor B Readings. Use Table A-6 to record test results.

Amplitude Accuracy Across Frequency Verification

This procedure is the second test used to verify the absolute amplitude accuracy of the Spectrum Analyzer in the S332E or S362E Site Master. The first procedure test was described above in "50 MHz Amplitude Accuracy Verification" on page 2-8.

Equipment Required

- Anritsu MG3692X Synthesized Signal Source
- Anritsu ML2438A Dual Channel Power Meter
- Anritsu MA2442D High Accuracy Power Sensors (2)
- Anritsu 34NN50A 50 Ohm Adapter
- Anritsu 34RKNF50 50 Ohm Adapter
- Anritsu 15NN50-1.5C RF Coaxial Cable
- Aeroflex/Weinschel 1870A Power Splitter
- Aeroflex/Weinschel 44-10 10 dB Fixed Attenuator

Test Setup Component Characterization

1. Connect both MA2442D power sensors to the power meter and calibrate the sensors.
2. Connect the equipment as shown in Figure 2-3.

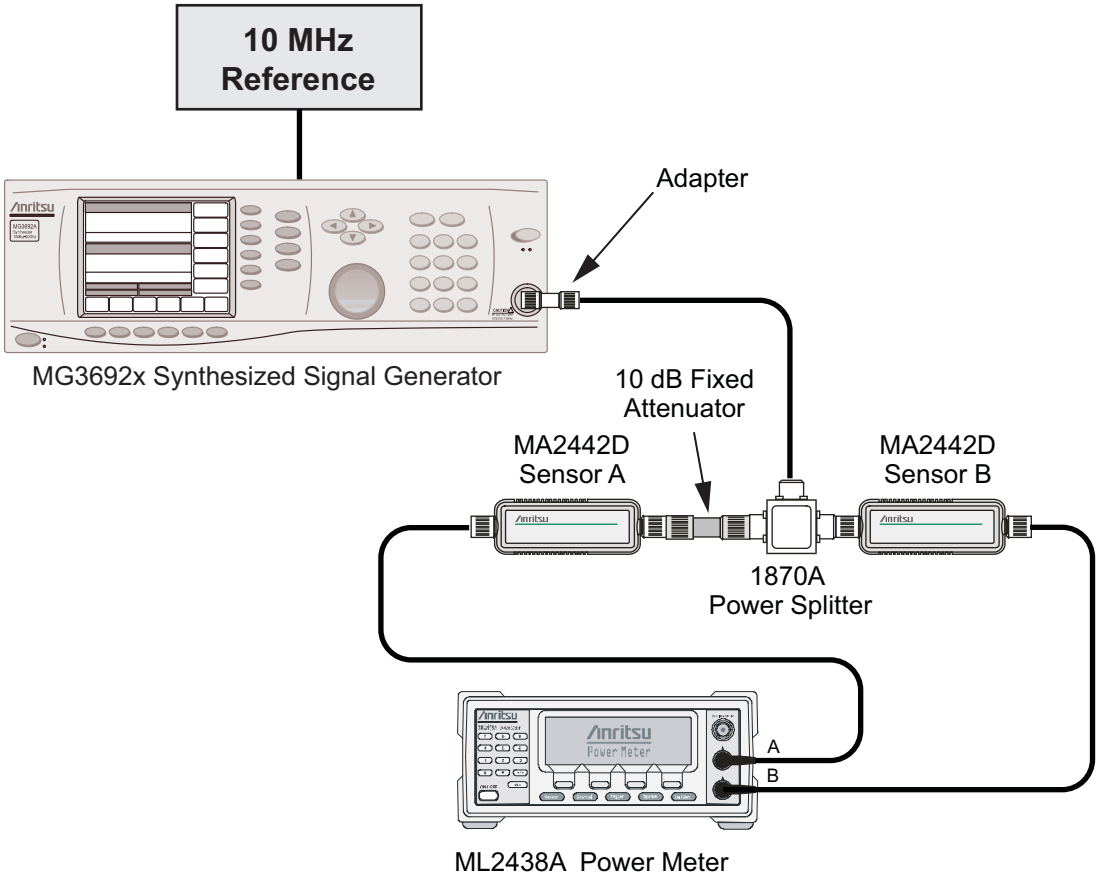


Figure 2-3. Fixed Level with Varying Frequency Setup

3. Set the MG3692x frequency to 10.1 MHz.
4. Set the power meter to display both Channel A and B. Press the **Sensor** key, the Cal Factor soft key, and then the Freq soft key. Use the keypad to enter the value matching the frequency of MG3692x as the input signal frequency, which sets the power meter to the proper power sensor cal factor. Repeat for Channel B. Press the **System** key to display the power reading.
5. Adjust the MG3692x output level so that Sensor A reading is –2 dBm ± 0.1 dB.
6. Record the Sensor B reading to the **–2 dBm** column of Table A-7, "Spectrum Analyzer Absolute Amplitude Accuracy Across Frequency Setup Table".
7. Adjust the MG3692x output level so that Sensor A reading is –30 dBm ± 0.1 dB.
8. Record the Sensor B reading to the **–30 dBm** column of Table A-7.
9. Repeat Steps 3 through 8 for all the frequencies listed in Table A-7.

Note	Before continuing, allow a 30 minute warm up for the internal circuitry to stabilize.

Setup

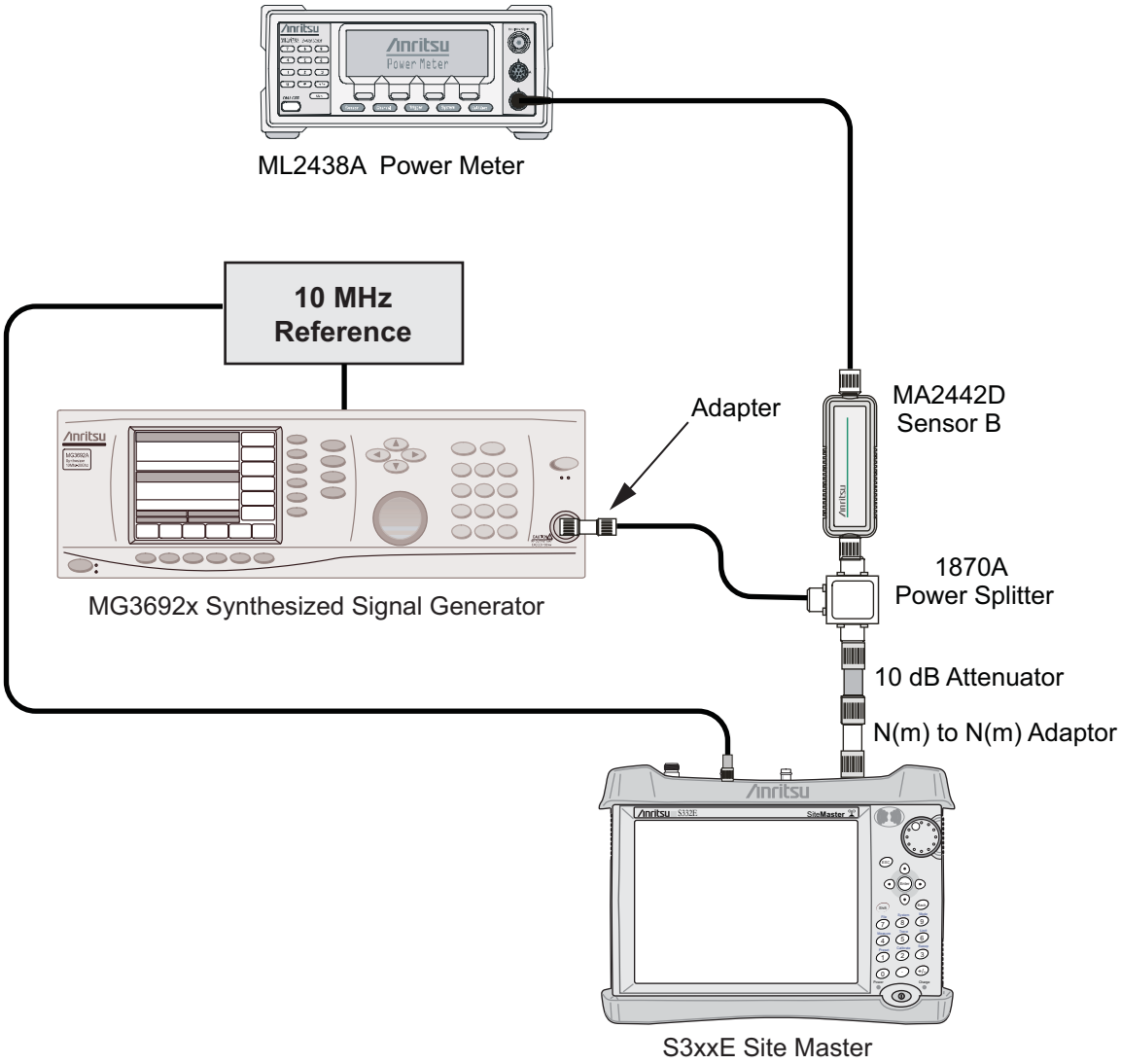


Figure 2-4. Absolute Amplitude Accuracy Across Frequency Verification Test Setup

Measuring Amplitude Accuracy Across Frequency

1. Connect the equipment as shown in Figure 2-4.

Note	To maintain test setup integrity, do not disconnect sensor B, the power splitter or the fixed attenuator.

2. Set the S332E or S362E to Spectrum Analyzer mode and then preset the unit.
3. Press the **Shift** key, the **Sweep** (3) key, then the Sweep Mode soft key, and select the Performance soft key.
4. Press the BW soft key. Then set the RBW to 1 kHz and the VBW to 10 Hz.
5. Press the Span soft key, set span to 10 kHz.
6. Set the MG3692x frequency to 10.1 MHz CW.
7. Set the MG3692x Output to –20 dBm.

8. Set the power meter to display Channel B. Press the **Sensor** key, the Cal Factor soft key, and then the Freq soft key. Use the keypad to enter the value matching the frequency of MG3692x as the input signal frequency, which sets the power meter to the proper power sensor cal factor. Press the **System** key to display the power reading.
9. Adjust the MG3692x output power so that the power meter displays a reading which matches the Sensor B reading for –30 dBm in Table A-7.
10. On the S332E or S362E, press the Amplitude soft key, then set the Reference Level to –20 dBm.
11. Press the Freq soft key and select the Center Freq soft key.
12. Enter 10.1 MHz (or the next frequency).
13. Press the Amplitude soft key, then set the Atten Lvl to 0 dB.
14. Press the **Marker** key and select the Peak Search soft key.
15. Record the Marker 1 amplitude reading in Table A-8, "Spectrum Analyzer Absolute Amplitude Accuracy Across Frequency".
16. Verify that the Marker 1 amplitude reading is within the specification.
17. Repeat Step 13 to Step 16 for Atten Lvl of 5 dB, 10 dB and 20 dB.
18. Adjust the MG3692x output power so that the power meter displays a reading which matches the Sensor B reading on the characterization chart for –2 dBm.
19. On the S332E or S362E, press the Amplitude soft key, then set the Reference Level to 10 dBm.
20. Repeat Steps 13 to Step 16 for Atten Lvl of 30 dB, 40 dB, 50 dB and 55 dB.
21. Repeat Steps 6 to Step 20 for all frequencies that are applicable for the unit under test. Record the results in Table A-8.

2-6 Residual Spurious Response Verification

The following two tests are used to verify the residual spurious response of the Spectrum Analyzer of the S332E and S362E Site Master and is performed using the positive peak detection mode. The two parts to this test are the "Residual Spurious Response Test with Preamp Off" immediately below and "Residual Spurious Response Test with Preamp On" on page 2-16.

Residual Spurious Response Test with Preamp Off

Equipment Required

- Anritsu 28N50-2 50 Ohm Termination

Procedure

1. Connect the 50 ohm Termination to the S332E or S362E Spectrum Analyzer RF In connector.
2. Press the **On/Off** key to turn on the S332E or S362E Site Master.
3. On the S332E or S362E:
   a. Press the **Shift** key and then the **Mode** (9) key.
   b. Rotate the knob to highlight Spectrum Analyzer and then press the **Enter** key to switch to Spectrum Analyzer mode.
4. Press the **Shift** key, the **Preset** (1) key, and then the Preset soft key to reset the instrument to the default starting conditions.
5. Press the **Shift** key, the **Sweep** (3) key, then the Sweep Mode soft key, and select the Performance soft key.
6. Press the Amplitude soft key, then press the Reference Level soft key.
7. Use the keypad to enter –40 and press the dBm soft key.
8. Press the Atten Lvl soft key and enter 0, then press the dB soft key.
9. Make sure that the Pre Amp On/Off soft key is in the Off position.
   - If the preamp is on, press the Pre Amp On/Off soft key to turn it off.
10. Press the Amplitude soft key, then select the Detection soft key and then the Peak soft key.
11. Press the Freq soft key and select the Start Freq soft key.
12. Use the keypad to enter 10 and select the MHz soft key.
13. Press the Stop Freq soft key, enter 50 and press the MHz soft key.
14. Press the BW soft key and select the RBW soft key.
15. Use the keypad to enter 1 and select the kHz soft key.
16. Press the VBW soft key, use the keypad to enter 300 and then select the Hz soft key.
17. Wait until one sweep is completed.
18. Press the Marker soft key and select the Peak Search soft key.
19. Verify that the Marker 1 amplitude reading is less than –90 dBm.

Note	If a spur larger than –90 dBm appears, wait another full sweep and observe whether the spur re-appears at the same point on the second sweep. If the spur does not appear at the same point on the second sweep, then the spur on the first sweep was not real.

20. Record the "Marker 1 amplitude" reading to Table A-9, "Spectrum Analyzer Residual Spurious with Preamp Off".

21. Repeat Step 11 through Step 20 for the other frequency band settings in Table A-9 as applicable to the unit under test.

Residual Spurious Response Test with Preamp On

Equipment Required

- Anritsu 28N50-2 50 Ohm Termination

Procedure

1. Connect the 50 Ohm Termination to the S332E or S362E Spectrum Analyzer RF In connector.
2. Press the **On/Off** key to turn on the S332E or S362E Site Master.
3. On the S332E or S362E, press the **Shift** key and then the **Mode** (9) key. Rotate the knob to highlight Spectrum Analyzer and then press the **Enter** key to switch to Spectrum Analyzer mode.
4. Press the **Shift** key, the **Preset** (1) key, and then the Preset soft key to reset the instrument to the default starting conditions.

Note	Before continuing, allow a 30 minute warm up period for the internal circuitry to stabilize.

5. Press the **Shift** key, the **Sweep** (3) key, then the Sweep Mode soft key, and select the Performance soft key.
6. Press the Amplitude soft key, then press the Reference Level soft key.
7. Use the keypad to enter –50 and press the dBm soft key.
8. Press the Atten Lvl soft key and enter 0, then press the dB soft key.
9. Make sure that the Pre Amp On/Off soft key is in the On position. If the preamp is off, press the Pre Amp On/Off soft key to turn it On.
10. Press the Amplitude soft key, then select the Detection soft key and then the Peak soft key.
11. Press the BW soft key and select the RBW soft key.
12. Use the keypad to enter 10 and select the kHz soft key.
13. Press the VBW soft key and use the keypad to enter 1, then select the kHz soft key.
14. Press the Freq soft key and select the Start Freq soft key.
15. Use the keypad to enter 10 and select the MHz soft key.
16. Press the Stop Freq soft key, enter 1 and press the GHz soft key.
17. Wait until one sweep is completed.
18. Press the Marker soft key and select the Peak Search soft key.
19. Record the "Marker 1 amplitude" reading in the test records and verify that it is less than –90 dBm. Use Table A-10, "Spectrum Analyzer Residual Spurious with Preamp On".
20. Repeat Step 14 through Step 19 for the other Start and Stop frequencies as applicable for the unit under test and record in Table A-10.

Note	If a spur larger than –90 dBm appears, wait another full sweep and observe whether the spur re-appears at the same point on the second sweep. If the spur does not appear at the same point on the second sweep, then the spur on the first sweep was not real.

2-7 Displayed Average Noise Level (DANL)

The following test is used to verify the Displayed Average Noise Level (DANL) of the spectrum analyzer systems in the S332E and S362E Site Master. This test is performed using the RMS detection mode.

Equipment Required

- Anritsu 28N50-2 50 Ohm Termination

Procedure

1. Connect the 50 Ohm Termination to the S332E or S362E Spectrum Analyzer RF In connector.
2. Press the **On/Off** key to turn on the S332E or S362E Site Master.
3. On the S332E or S362E, press the **Shift** key and then the **Mode** (9) key. Rotate the knob to highlight Spectrum Analyzer and then press the **Enter** key to switch to Spectrum Analyzer mode.
4. Press the **Shift** key, the **Preset** (1) key, and then the Preset soft key to reset the instrument to the default starting conditions.

Note	Before continuing, allow a 30 minute warm up period for the internal circuitry to stabilize.

5. Press the **Shift** key, the **Sweep** (3) key, then the Sweep Mode soft key, and select the Performance soft key.
6. Press the Amplitude soft key, then press the Reference Level soft key.
7. Use the keypad to enter –20 and press the dBm soft key.
8. Press the Atten Lvl soft key and enter 0, then press the dB soft key.
9. Make sure that the Preamp is Off.
10. Press the Amplitude soft key, then select the Detection soft key and then the RMS/AVG soft key.
11. Press the BW soft key and select the RBW soft key.
12. Use the keypad to enter 100 and select the kHz soft key.
13. Select the VBW soft key.
14. Use the keypad to enter 1 and select the kHz soft key.
15. Press the Freq soft key and select the Start Freq soft key.
16. Use the keypad to enter 10 and select the MHz soft key.
17. Press the Stop Freq soft key, enter 2.4 and press the GHz soft key.
18. Wait until one sweep is completed.
19. Press the Marker soft key and then select Peak Search soft key.
20. Record the Marker reading to the test records. Use the **Measured Value @ 100 kHz RBW** column of Table A-11, "Spectrum Analyzer DANL with Pre Amp Off".

Note	The noise floor consists of totally random signals where a spur is a fixed spike of varying amplitude that is always visible.

21. Repeat Step 15 through Step 20 for the other frequency settings in Table A-11 that are applicable for the unit under test. Change the VBW setting as indicated in the **VBW** column of Table A-11.
22. For each measured 100 kHz RBW value in the test record, convert it to 10 Hz RBW value by subtracting 40 dB.

    –100 dBm – 40 dB = –140 dBm

For example, if the marker shows a value of –100 dBm at 100 kHz RBW, the calculated value at 10 Hz RBW is –140 dBm.

23. Enter the calculated values in the test records. Use the **Calculated for 10 Hz RBW** column of Table A-11.

24. Verify that the calculated value is less than or equal to the value in the **Specification** column of Table A-11.

25. Press the Amplitude soft key, then press the Reference Level soft key.

26. Use the keypad to enter –50 and press the dBm soft key.

27. Press the Preamp On/Off soft key to turn the preamp On.

28. Repeat Step 11 through Step 24.

29. Record the Marker reading and calculated value in the test record using Table A-12, "Spectrum Analyzer DANL with Pre Amp On".

Chapter 3 — Cable and Antenna Analyzer Verification

3-1 Introduction

These tests verify that the Cable and Antenna Analyzer of the Model S3xxE Site Master is functional. The functional tests include:

3-2 Frequency Accuracy Verification

The following test is used to verify the CW frequency accuracy of the RF source in the S3xxE in Cable and Antenna Analyzer mode.

Equipment Required

- Frequency Counter Frequency: 2 GHz Anritsu Model MF2412B
- RF Coaxial Cable Freq: DC to 18 GHz, N(m) to N(f), 50 Ohm, Anritsu Model 15NNF50-0.6B

Procedure

1. Verify that the S3xxE is in Cable and Antenna Analyzer mode and preset the unit.
2. Verify that no external 10 MHz reference is connected to the S3xxE.
3. Press **Shift** then the **Sweep** key.
4. Verify that the RF Immunity is set to High.
5. Press the **Freq/Dist** key and set both the Start Freq and Stop Freq to 2 GHz.
6. Connect the RF cable from the S3xxE VNA Reflection RF Out to the Frequency Counter.
7. Turn on the Frequency Counter and press the **Preset** key.
8. Record the frequency data in Table A-13, "VNA Frequency Accuracy.

3-3 Return Loss Accuracy Verification

The following test can be used to verify the accuracy of return loss measurements. Measurement calibration of the S3xxE in Cable and Antenna Analyzer mode is required for this test.

Equipment Required

- Open/Short Frequency: DC to 18 GHz Anritsu Model 22N50
- Termination Frequency: DC to 18 GHz, Return Loss: 40 dB min. Anritsu Model 28N50-2
- 6 dB Offset Termination Frequency: DC to 6.0 GHz Anritsu Model SC7424
- 20 dB Offset Termination Frequency: DC to 6.0 GHz Anritsu Model SC7423

Procedure

1. Verify that the S3xxE is in Cable and Antenna Analyzer mode and preset the unit.
2. Press the **Measurement** key, then press the Return Loss soft key.
3. Press the **Shift** key, then press the **Calibrate** (2) key.
4. Press the Start Cal soft key. Follow the instructions on the screen to perform a calibration.
5. After the calibration is complete, install the 20 dB offset termination.
6. Press the **Amplitude** key, set Top to 17 dB, and Bottom to 23 dB.
7. Verify that the data display falls between 18.4 dB and 21.6 dB.
8. Press the **Marker** key and select the Marker to Peak soft key. Record the marker value, then select the Marker to Valley soft key and record the marker value. Record the worst case of the two values in Table A-14, “VNA Return Loss Accuracy Verification.
9. Remove the 20 dB offset and install the 6 dB offset.
10. Press the **Amplitude** key, set Top to 4.0 dB, and set Bottom to 8.0 dB.
11. Verify that the data display falls between 5 dB and 7 dB.
12. Press the **Marker** key and select the Marker to Peak soft key. Record the marker value, then select the Marker to Valley soft key and record the marker value. Record the worst case of the two values in Table A-14.

3-4 System Dynamic Range Verification

The following test can be used to verify the system dynamic range. Measurement calibration of the S3xxE in Cable and Antenna Analyzer mode is required.

Equipment Required

- Termination Frequency: DC to 18 GHz Return Loss: 40 dB min. Anritsu Model 28N50-2
- Termination Frequency: DC to 18 GHz Return Loss: 40 dB min. Anritsu Model 28NF50-2
- Adapter Frequency: DC to 20 GHz N(m) to N(m) Anritsu Model 34NN50A
- RF Coaxial Cable Freq: DC to 18 GHz N(m) to N(f), 50 Ohm Anritsu Model 15NNF50-0.6B

Procedure

1. Verify that the S3xxE is in Transmission Measurement mode and preset the unit.
2. Press the **Shift** key, then press the **Sweep** (3) key.
3. Verify that High Dynamic Range is set to On
4. Verify that the Output Power is set to High.
5. Press the Measure soft key.
6. Press the Start Cal soft key and follow the on screen instructions to perform calibration.
7. After the calibration is complete, disconnect one end of the cable and connect loads so that both the RF Out (Reflection In) and RF In ports are terminated.
8. Press the Sweep soft key, and select Averaging. Confirm that Averaging Off is selected indicated by the red dot in the top right hand corner.
9. Press the Amplitude soft key and set the Top to –50 dB and Scale to 10 dB/div.
10. Press **Shift**, Limit (6), and set the Limit to On.
11. Press the Multi-Segment Edit soft key and verify that the Point Frequency is set to 2 MHz.
12. Select Amplitude vertical soft key and set the limit to –80 dB.
13. Select Add Point, select Point Frequency, and enter 4.0 GHz.
14. Select Amplitude vertical soft key and enter –80 dB.

Perform steps 15 through 18 for S36xE units only,

15. Select Add Point, select Point Frequency, and enter 4.01 GHz.
16. Select Amplitude vertical soft key and enter –70 dB.
17. Select Add Point and select Point Frequency, and enter 6.00 GHz.
18. Select Amplitude vertical soft key and enter –70 dB.
19. Verify the display of the system dynamic range is below the limit lines (the data will be unstable, but should remain below the limit lines.)
20. Use a marker to find the maximum peak of each frequency band and enter the value in dB in Table A-15, "VNA System Dynamic Range Verification (for Units with Option 21 only).

Chapter 4 — Power Meter Verification

4-1 Power Meter Level Accuracy

The following test verifies the level accuracy of the S3xxE Power Meter function in the S3xxE.

Equipment Required

- Anritsu MG3692X Synthesized Signal Source
- Anritsu ML2438A Dual Channel Power Meter
- Anritsu MA2442D High Accuracy Power Sensors (2)
- Anritsu 34NN50A 50 Ohm Adapter
- Anritsu 34RKNF50 50 Ohm Adapter
- Anritsu 15NN50-1.5C RF Coaxial Cable
- Aeroflex/Weinschel 1870A Power Splitter
- Aeroflex/Weinschel 44-10 10 dB Fixed Attenuator

Setup

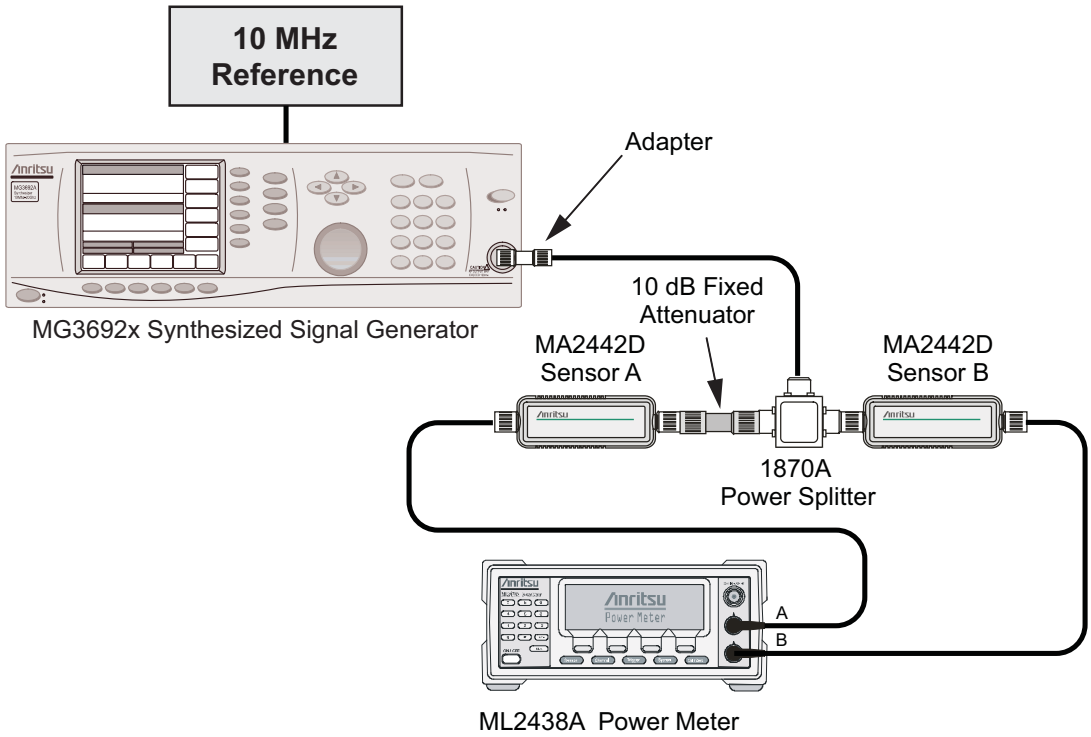


Figure 4-1. Power Meter Measurement Accuracy

Procedure Component Characterization:

1. Connect both MA2442D power sensors to the power meter and calibrate the sensors.
2. Connect the model 1870A power splitter to the MG3692A/B output and sensor B to one of the power splitter outputs as shown on the previous page. (Figure 4-1 on page 4-1).
3. Install the 10 dB Fixed Attenuator to the other power splitter output and then connect sensor A to the end of the Attenuator.
4. Set the power meter to display both Channels A and B. Press the **Sensor** key, the Cal Factor soft key, and then the Freq soft key. Use the keypad to enter the value matching the frequency of MG3692A/B as the input signal frequency, which sets the power meter to the proper power sensor cal factor. Repeat for Channel B. Press the **System** key to display the power reading.
5. Adjust the power level of the MG3692A/B to get a reading on sensor A that matches the power level (within ± 0.1 dB) in the first column of Table A-16, “Characterization Chart for Power Meter Verification” on page A-10.
6. Record the sensor B reading in the **Required Sensor B Reading** column of Table A-16.
7. Repeat Steps 5 and 6 for the other power level in the first column of Table A-16, recording the Sensor B reading in the second column.
8. Repeat the above steps for the next input frequency.

Power Meter Measurement Accuracy Procedure

1. Connect the equipment as shown in Figure 4-2.

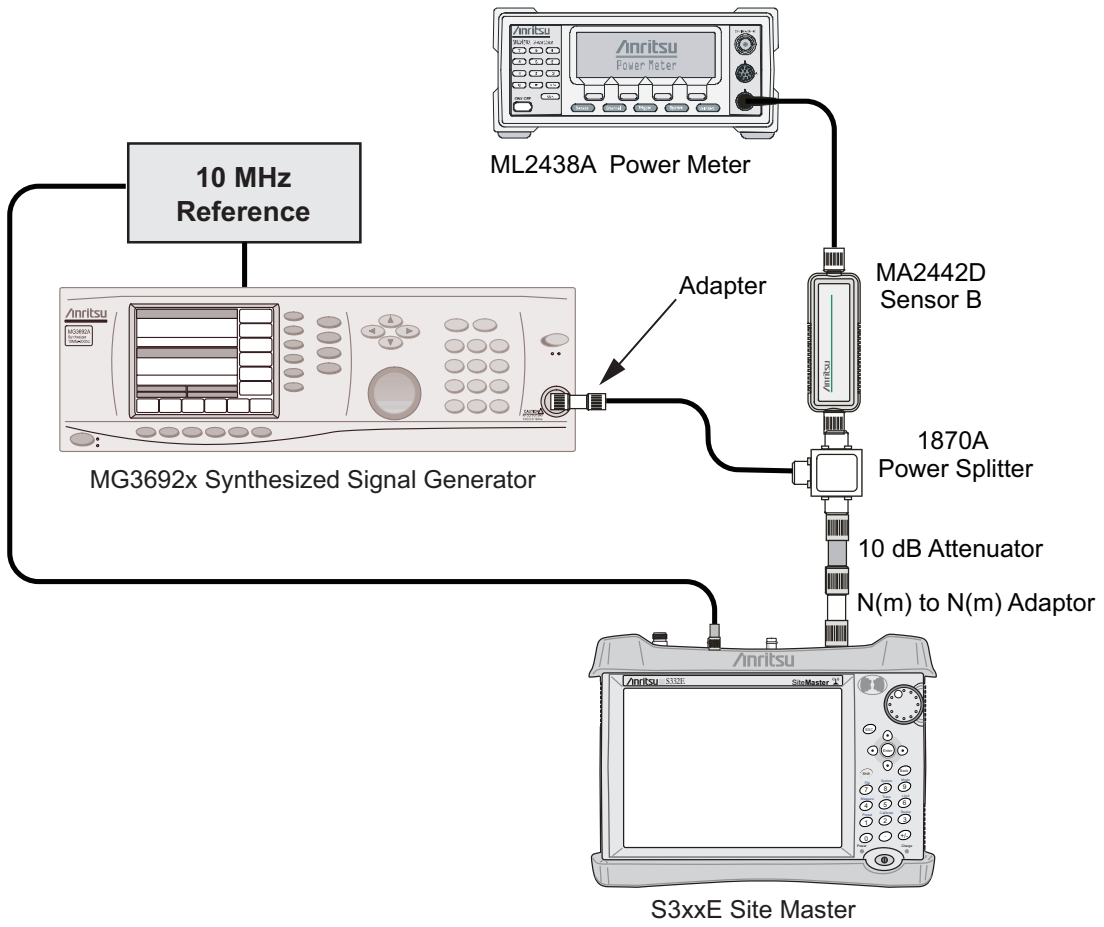


Figure 4-2. Power Meter Measurement Accuracy

2. Verify that the S3xxE is in the Power Meter mode and preset the unit.
3. Set the S3xxE span to 3 MHz.
4. Set the S3xxE center frequency to 50 MHz.
5. Adjust the MG3692A/B power so that the power meter sensor B matches the sensor B value shown in the Table A-16.
6. Record the reading on the S3xxE display in Table A-17, "Internal Power Meter Accuracy Verification" on page A-10.
7. Repeat steps 4 to 6 for the next test power level in Table A-16.
8. Repeat steps 4 to 6 for the next test frequency in Table A-16.

Chapter 5 — Option Verification

5-1 Introduction

This chapter describes the verification process for options available for the S3xxE Site Master.

5-2 Option 10, Bias Tee Verification

This test verifies that the optional Bias Tee in the Cable and Antenna Analyzer of the Model S3xxE Site Master is functional. These tests include:

Low Current Test Verification

The tests in this section verify the Bias-Tee Option 10 low current operation of the S3xxE in Cable and Antenna Analyzer mode.

Equipment Required

- Anritsu 40-168-R External Power Supply
- Anritsu T3377 105 Ohm Load

Procedure

1. Connect the external power supply (Anritsu PN 40-168-R) to the S3xxE Site Master.
2. Press the **On/Off** key to turn on the S3xxE.
3. Set the S3xxE to Cable and Antenna Analyzer mode and preset the unit.
4. Press the **Shift** key, and then the **System** (8) key, press the Applications Options soft key.

Low Current Test

1. Press the Bias Tee Voltage soft key and change voltage from 15 V to 12 V and confirm that the Current soft key is set to Low.
2. Connect the Anritsu T3377 105 Ohm load to the RF In test port.
3. Press the Bias Tee On/Off soft key to turn the Bias Tee On.
4. Record the Voltage and Current readings displayed on the left side of the screen in the **105 Ohm Load Low Current** section of Table A-18, "Option 10 Bias-Tee". Verify the voltage and current readings are within the specifications.
5. Press the Bias Tee On/Off soft key to turn the Bias Tee Off.
6. Repeat Steps 3 through Step 5, entering each of the voltage settings listed in the **105 Ohm Load Low Current** section of Table A-18.

High Current Test Verification

The tests in this section verify the Bias-Tee Option 10 high current operation of the S3xxE in Cable and Antenna Analyzer mode.

Equipment Required

- Anritsu 40-168-R External Power Supply
- Anritsu T2904 40 Ohm Load
- Anritsu T3536 78 Ohm Load

Procedure

1. Connect the external power supply (Anritsu PN 40-168-R) to the S3xxE Site Master.
2. Press the **On/Off** key to turn on the S3xxE.
3. Set the S3xxE to Cable and Antenna Analyzer mode and preset the unit.
4. Press the **Shift** key, and then the **System** (8) key, press the Applications Options soft key.

High Current Test

1. Press the Bias Tee Voltage soft key and confirm the voltage is set to 15 V. Confirm the soft key is set to High.
2. Connect the Anritsu T2904 40 Ohm load to the RF In test port.
3. Press the Bias Tee On/Off soft key to turn the Bias Tee On.
4. Record the Voltage and Current readings displayed on the left side of the screen in the **40 Ohm Load High Current** section of Table A-18. Verify the voltage and current readings are within the specifications.
5. Press the Bias Tee On/Off soft key to turn the Bias Tee Off. Disconnect the Anritsu T2904 40 Ohm load and connect the Anritsu T3536 78 Ohm load to the RF In port.
6. Select the Bias Tee Voltage soft key and enter 32 V.
7. Press the Bias Tee On/Off soft key to turn the Bias Tee On.
8. Record the Voltage and Current readings displayed on the left side of the screen in the **78 Ohm Load High Current** section of Table A-18. Verify the voltage and current readings are within the specifications.
9. Press the Bias Tee On/Off soft key to turn the Bias Tee Off.

Fault Verification

The tests in this section verify the Bias-Tee Option 10 fault condition of the S3xxE in Cable and Antenna Analyzer mode.

Equipment Required

- Anritsu 40-168-R External Power Supply
- Anritsu T2904 40 Ohm Load

Procedure

1. Connect the external power supply (Anritsu PN 40-168-R) to the S3xxE Site Master.
2. Press the **On/Off** key to turn on the S3xxE.
3. Set the S3xxE to Cable and Antenna Analyzer mode and preset the unit.
4. Press the **Shift** key, and then the **System** (8) key, press the Applications Options soft key.

Fault Test

5. Press the Bias Tee soft key and confirm that the Current soft key is set to Low.
6. Select the Bias Tee Voltage soft key and enter 32 V.
7. Connect the Anritsu T2904 40 Ohm load to the RF In port.
8. Press the Bias Tee On/Off soft key to turn the Bias Tee On.
9. Verify that the instrument makes a clicking sound and the Bias Tee current reading displayed on the left side of the screen is 0 mA.
10. Press the Bias Tee On/Off soft key to turn the Bias Tee Off.

5-3 Option 31, GPS Verification

This test verifies that the optional GPS option on the S3xxE Site Master is functional.

Frequency Accuracy Verification

The test in this section verifies the Spectrum Analyzer Frequency Accuracy with GPS Option 31 of the S3xxE in Spectrum Analyzer mode.

Equipment Required

- Anritsu MG3692X Synthesized Signal Source
- 10 MHz Reference Standard
- Anritsu 34RKNF50 50 Ohm Adapter
- Anritsu 15NN50-1.5C RF Coaxial Cable
- Anritsu 2000-1528-R GPS Antenna

Procedure

1. Connect the GPS antenna to the GPS Antenna connector on the S3xxE. On the S3xxE, change the mode to Spectrum Analyzer and preset the unit.

Note	If a fixed GPS antenna is not available, the Anritsu 2000-1528-R GPS antenna can be used for this test. Confirm that the Anritsu 2000-1528-R GPS antenna is in direct line-of-sight relationship to the satellites or place the antenna outside without any obstructions.

2. Press the **Shift** key and then the **System** key.
3. Press the GPS soft key, then press the GPS On/Off soft key to turn the GPS On.
4. When the GPS fix is acquired, the GPS indicator at the top of the LCD display will turn green.
5. The latitude and the longitude will also be displayed next to the GPS indicator.
6. Wait for about three minutes after the Reference Source indicator in the lower left hand corner of the LCD display has changed to GPS High Accuracy.

Note	If GPS fix is acquired using the Anritsu 2000-1528-R GPS antenna placed outside, bringing the instrument inside will lose satellite tracking. A red cross will appear on the green GPS indicator and the Reference Source indicator will change to “Int Hi Accy”. The following test will verify frequency accuracy to a lesser specification.

7. Connect the external 10 MHz Reference to the Anritsu MG3692x Synthesized Signal Generator.

Note	Do not connect the external 10 MHz Reference to the S3xxE Site Master.

8. Connect the output of the synthesized Signal Generator to the Spectrum Analyzer RF In of the S3xxE.
9. Set the MG3692x output to 4 GHz CW, with an RF output level of –30 dBm.
10. On the S3xxE, press the **Amplitude** key, and set the reference level to –10 dBm.
11. Press the Freq soft key and set the center frequency to 4.0 GHz.
12. Press the Span soft key and set the span to 10 kHz.
13. Press the BW soft key and set RBW to 100 Hz.

14. Press the VBW soft key and set to 30 Hz.
15. Press the **Marker** key, and select the Peak Search soft key.
16. Note the Reference Source value and use the appropriate row to record the data in the following steps.
17. Record the marker frequency in the **Measured Value** column of Table A-19, "Option 31 GPS Receiver".
18. Subtract the marker value from 4 GHz and record the result in the **Error column** of Table A-19. Verify that it is within specification.
19. If the value of Reference Source indicates GPS High Accuracy, then remove the GPS antenna and wait until the Reference Source indicates "Int Hi Accy" and repeat steps 16 through 18.

GPS Antenna Bias-Tee Verification

The tests in this section verify the GPS Antenna Bias-Tee Voltages of Option 31 in the S3xxE Site Master.

Equipment Required

- Adapter SMA to BNC(f), Pomona 4290 or equivalent
- Adapter GPS Terminator, Amphenol B1004A1-ND3G-93R-0.05-1W or equivalent

Procedure

1. Connect the external power supply (Anritsu PN 40-168-R) to the S3xxE Site Master.
2. Press the **On/Off** key to turn on the S3xxE.
3. Set the S3xxE to Spectrum Analyzer mode and preset the unit.
4. Press the **Shift** key, and then the **System** (3) key.

3.3 V Test

5. Connect the 4290 Adapter to the GPS Antenna SMA connector.
6. Connect the GPS Terminator to the 4290 Adapter.
7. Confirm the 3.3 V setting on the GPS Voltage soft key is selected (underlined)
8. Turn GPS On by toggling the GPS soft key so that the On text is underlined.
9. Select the GPS Info soft key. Record the GPS Antenna Current reading in the **Measured Value** column of Table A-20, "Option 31 GPS Receiver Bias-Tee Verification". Verify that it is within specification.

5 V Test

10. Press the **Escape** key to dismiss the GPS Info dialog.
11. Press the GPS Voltage soft key and select 5 V.
12. Select the GPS Info soft key. Record the GPS Antenna Current reading in the **Measured Value** column of Table A-20. Verify that it is within specification.

Chapter 6 — Battery Information

6-1 General Information

The following information relates to the care and handling of the Anritsu 633-44 battery pack and Lithium-Ion batteries.

- The battery supplied with the Site Master may need charging before use. Before using the Site Master, the internal battery may be charged either in the unit using the AC-DC Adapter (40-168-R) or the 12-Volt DC adapter (806-62), or separately in the optional Dual Battery Charger (2000-1374).
- Use only Anritsu approved battery packs.
- Recharge the battery only in the Site Master or in an Anritsu approved charger.
- When the Site Master or the charger is not in use, disconnect it from the power source.
- Do not charge batteries for longer than 24 hours; overcharging may shorten battery life.
- If left unused a fully charged battery will discharge itself over time.
- Temperature extremes affect the ability of the battery to charge: allow the battery to cool down or warm up as necessary before use or charging.
- Discharge the battery from time to time to improve battery performance and battery life.
- The battery can be charged and discharged hundreds of times, but it will eventually wear out.
- The battery may need to be replaced when the operating time between charging becomes noticeably shorter than normal.
- Never use a damaged or worn out charger or battery.
- Storing the battery in extreme hot or cold places will reduce the capacity and lifetime of the battery.
- Never short-circuit the battery terminals.
- Do not drop, mutilate or attempt to disassemble the battery.
- Do not dispose of batteries in a fire!
- Batteries must be recycled or disposed of properly. Do not place batteries in household garbage.
- Always use the battery for its intended purpose only.

6-2 Battery Pack Removal and Replacement

This section provides instructions for the removal and replacement of the Site Master battery pack.

Note	Many of the procedures in this section are generic, and apply to many similar instruments. Photos and illustrations used are representative and may show instruments other than the Site Master.

1. Locate the battery access door illustrated in Figure 6-1.

Figure 6-1. Battery Access Door Location and Finger Notch

2. Place a finger in the battery access door notch and push the door latch down towards the bottom of the instrument, as illustrated in Figure 6-2.

Figure 6-2. Opening the Battery Access Door

3. Remove the battery access door, the top will pop out a bit and then pull it up out of the access enclosure.

4. With the battery access door completely removed, grasp the battery lanyard and pull the battery straight out of the unit, as illustrated in Figure 6-3.

Figure 6-3. Removing the Battery

5. Replacement is the opposite of removal. Note the orientation of the battery contacts, and be sure to insert the battery with the contacts facing the front of the unit, refer to Figure 6-3 and Figure 6-4.

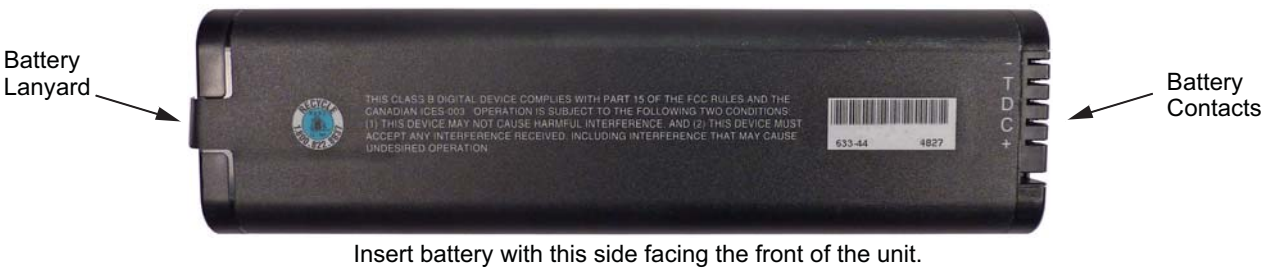


Figure 6-4. Battery Contacts and Orientation

Chapter 7 — Assembly Replacement

7-1 Replaceable Parts List

Refer to Table 1-5, “List of Replaceable Parts” on page 1-5 for the list of replaceable parts. Refer to the following sections for basic replacement instructions.

Note	Many of the procedures in this section are generic, and apply to many similar instruments. Photos and illustrations used are representative and may not match your instrument.

Caution	Only qualified personnel should open the case and replace internal assemblies. Assemblies shown in Table 1-5 are typically the only items that may be replaced. Because they are highly fragile, items that must be soldered may not be replaced without specialized training. Removing RF shields from PC boards or adjustment of screws on or near the shields may detune sensitive RF circuits and will result in degraded instrument performance. All work should be performed in a static-safe work area.

7-2 Opening the Site Master Case

Caution	Electrostatic Discharge (ESD) can damage the highly sensitive circuits in the instrument. Repair of damage that is found to be caused by electrostatic discharge is not covered under warranty. The Site Master contains components that can be easily damaged by electrostatic discharge (ESD). An ESD safe work area and proper ESD handling procedures that conform to ANSI/ESD S20.20-1999 or ANSI/ESD S20.20-2007 is mandatory to avoid ESD damage when handling subassemblies or components found in the instrument.

This procedure provides instructions for opening the Site Master case. With the case opened, the internal assemblies can be removed and replaced, as detailed in the following sections.

1. Remove the battery door and battery as shown in Section 6-2 “Battery Pack Removal and Replacement ” on page 6-2.
2. Remove the top and bottom bumpers (Figure 7-1) to expose the screw holes on the back of the unit..

Figure 7-1. Top Bumper and Option 31

3. Place the Site Master face down on a stable work surface that will not scratch the display.
4. Use a Phillips screwdriver to remove the six screws securing the two halves of the Site Master case together (Figure 7-2).

Figure 7-2. Remove the Four Screws

5. Carefully lift up on the side of the case indicated above and begin to separate the two halves.
6. Lay the Site Master flat and remove the battery connector cable between the two halves (Figure 7-3).

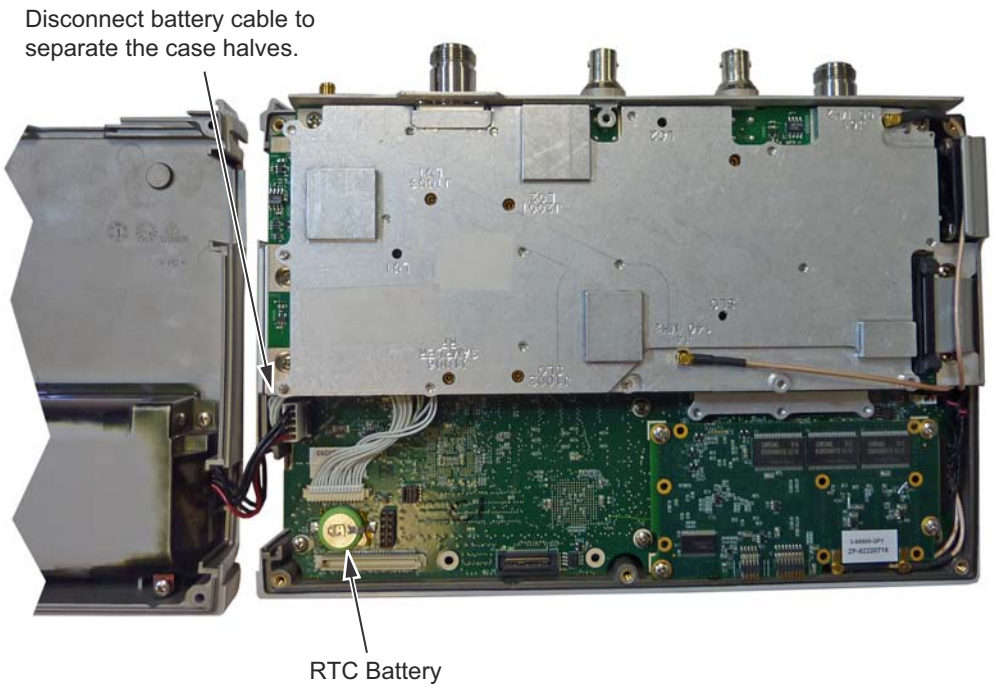


Figure 7-3. Site Master Opened 180 Degrees

7. Closing the case is the reverse of opening.

7-3 PCB Assembly Replacement

Note	Procedures in this section are generic, and apply to many similar instruments. Photos and illustrations used are representative and may not match your instrument.

This section describes the removal and replacement of the SPA and MB/VNA boards which are attached to each other and attached to the Site Master Case.

1. Open the case as described in Section 7-2 "Opening the Site Master Case".
2. Disconnect the Keypad PCB connector, the Fan Assembly connector, and the LCD connector.
3. Use a Phillips screwdriver to remove the 8 screws securing the Assemblies to the Case (Figure 7-4).

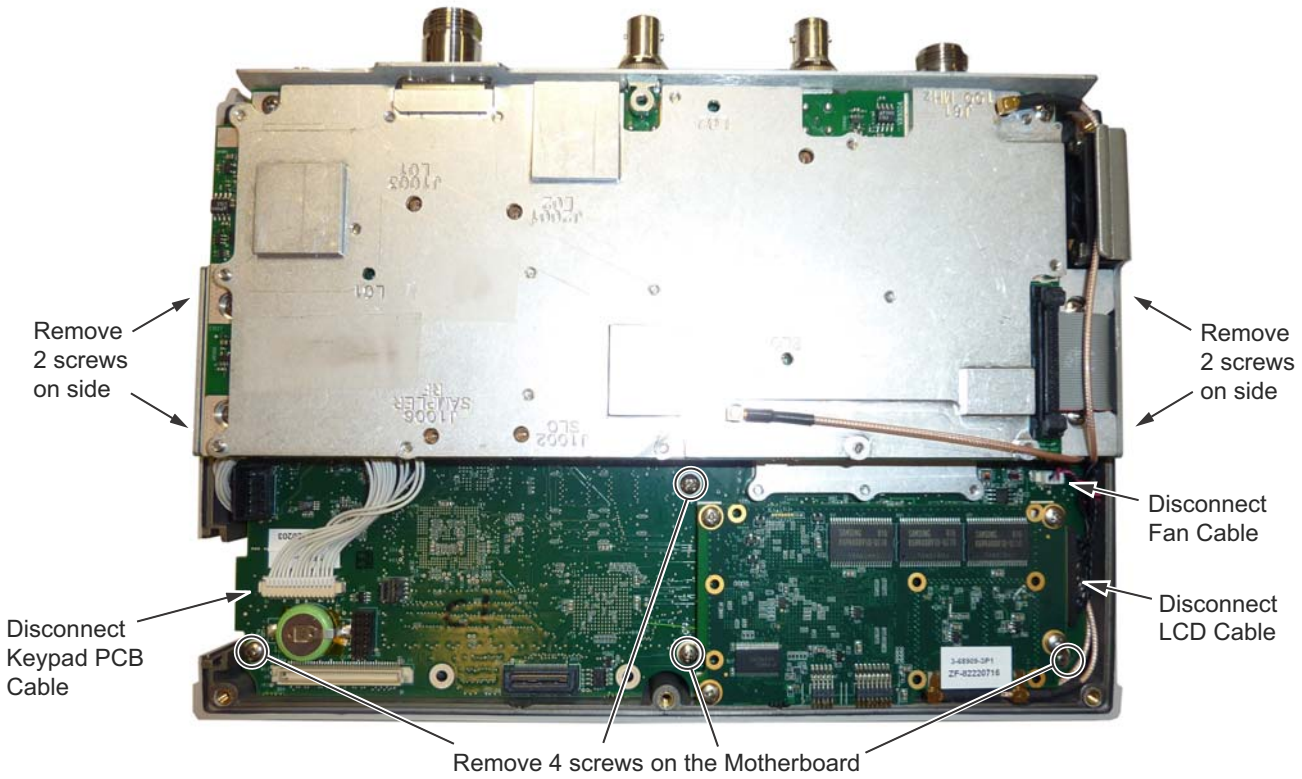


Figure 7-4. Removing the PCB Assemblies out of the Case

4. After the screws are removed the entire Assembly including the top connector panel will slide out of the case.
5. Installation is the reverse of removal. Take care to properly fit the connector panel into the grooves in the top of the case and confirm that none of the cables will be pinched when the back case is replaced.

7-4 SPA Assembly Replacement

This section describes the removal of the SPA Assembly board.

1. Open the case as described in Section 7-2 “Opening the Site Master Case”.
2. Remove the PCB Assembly from the front panel as described in Section 7-3 “PCB Assembly Replacement”.
3. Remove the castle nuts from the External Reference connector and the External Trigger connector (Figure 7-5).
4. Remove the motherboard ribbon connector.
5. Remove the 2 MCX connectors between the SPA board and the DSP board.
6. Remove the 6 screws retaining the SPA board.
7. Slide the SPA board out of the top panel.
8. Installation is the reverse of removal.

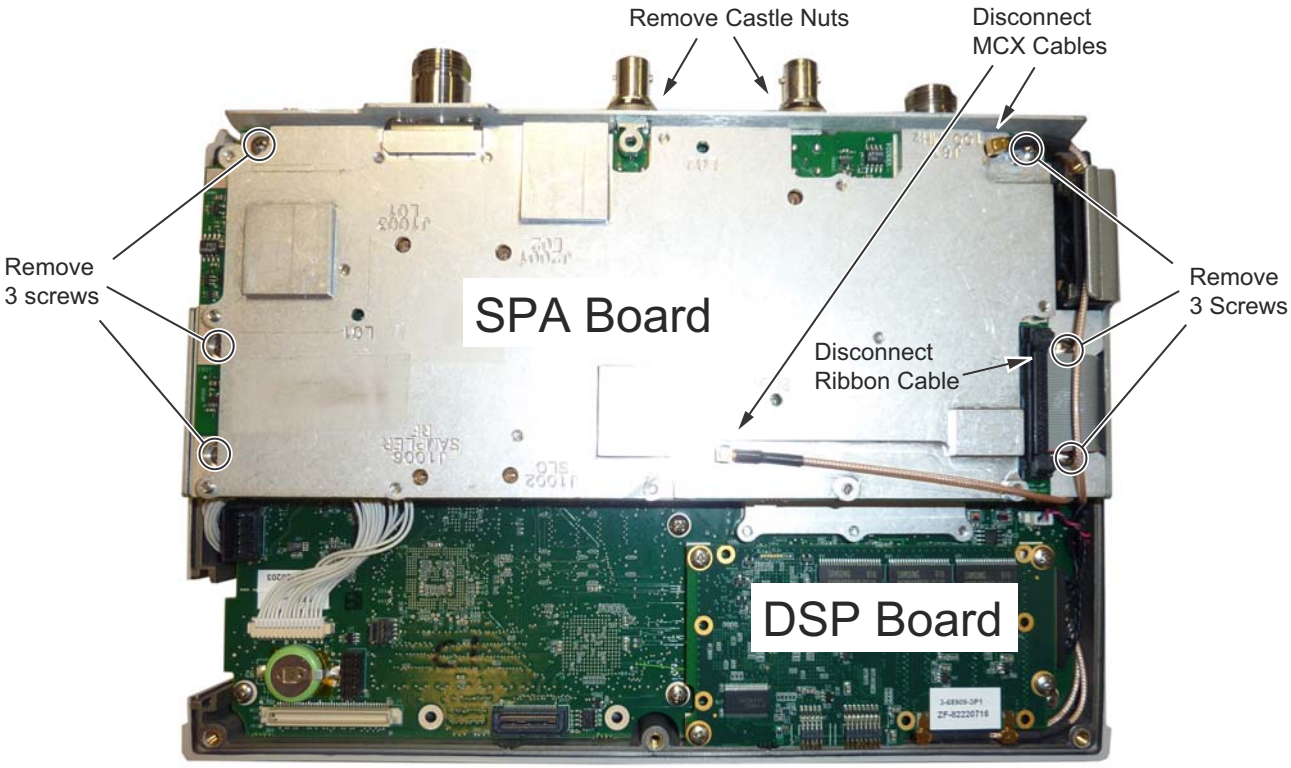


Figure 7-5. Removing the SPA Assemblies

7-5 SPA and MB/VNA N Connector Replacement

This procedure provides instructions for replacing the N connector attached to the SPA assembly or MB/VNA assembly.

1. Open the case as described in Section 7-2 “Opening the Site Master Case”.
2. Remove the PCB Assembly from the front panel as described in Section 7-3 “PCB Assembly Replacement”.
3. Remove the SPA assembly as described in Section 7-4 “SPA Assembly Replacement”.
4. If removing the MB/VNA N connector, remove the top plate from the MB/VNA.
5. Remove the four screws attaching the N connector to the shield (Figure 7-6).

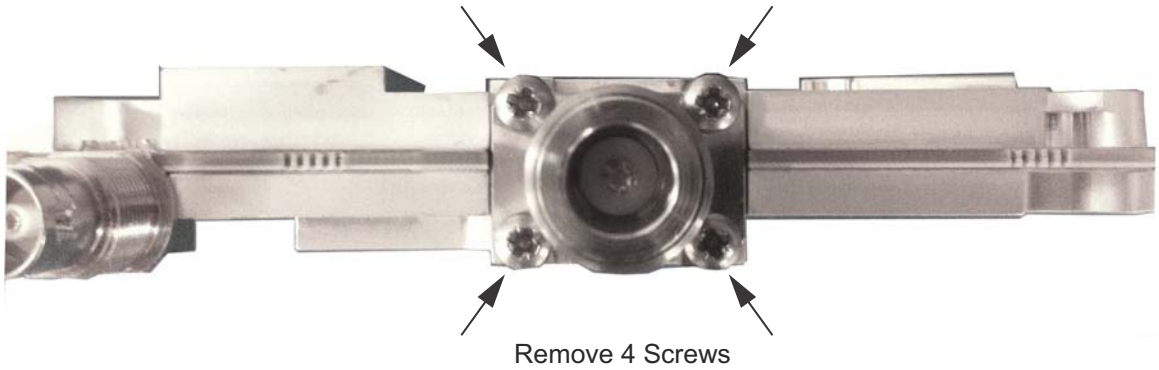


Figure 7-6. Remove 4 Screws

6. Disconnect the N connector from the SPA or MB/VNA by gently pulling the N connector away from the SPA or MB/VNA (Figure 7-7).

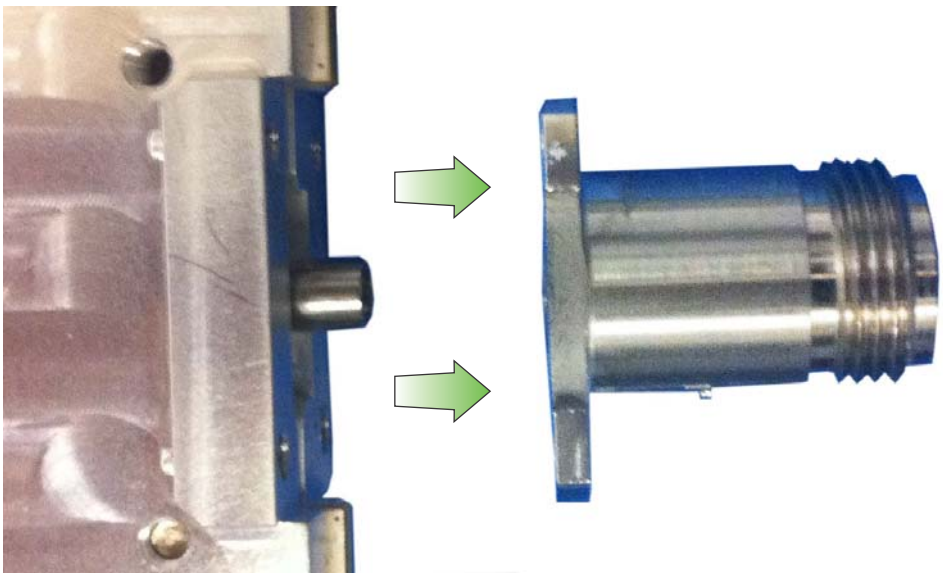


Figure 7-7. Remove N Connector from SPA or MB/VNA

7. Installation is the reverse of removal.

7-6 GPS (Option 31) Replacement

This procedures provides instructions for removing and replacing the GPS Module.

1. Open the case as described in Section 7-2 “Opening the Site Master Case”.
2. Remove the PCB Assembly from the front panel as described in Section 7-3 “PCB Assembly Replacement”.
3. Remove the SPA board as described in Section 7-4 “SPA Assembly Replacement”.

Note	The SPA board cables, connector and the DSP board do not need to be removed when replacing the GPS Module. Remove the screws and move the SPA board to the side.

4. Use a 5/16 inch wrench to remove the nut and waster from the GPS SMA connector. Push the connector through the top panel.
5. Remove the 2 screws retaining the GPS module to the Motherboard.
6. Carefully lift straight up on the GPS module to remove. The back of the GPS module board is directly connected to the Motherboard.
7. Installation is the reverse of removal.

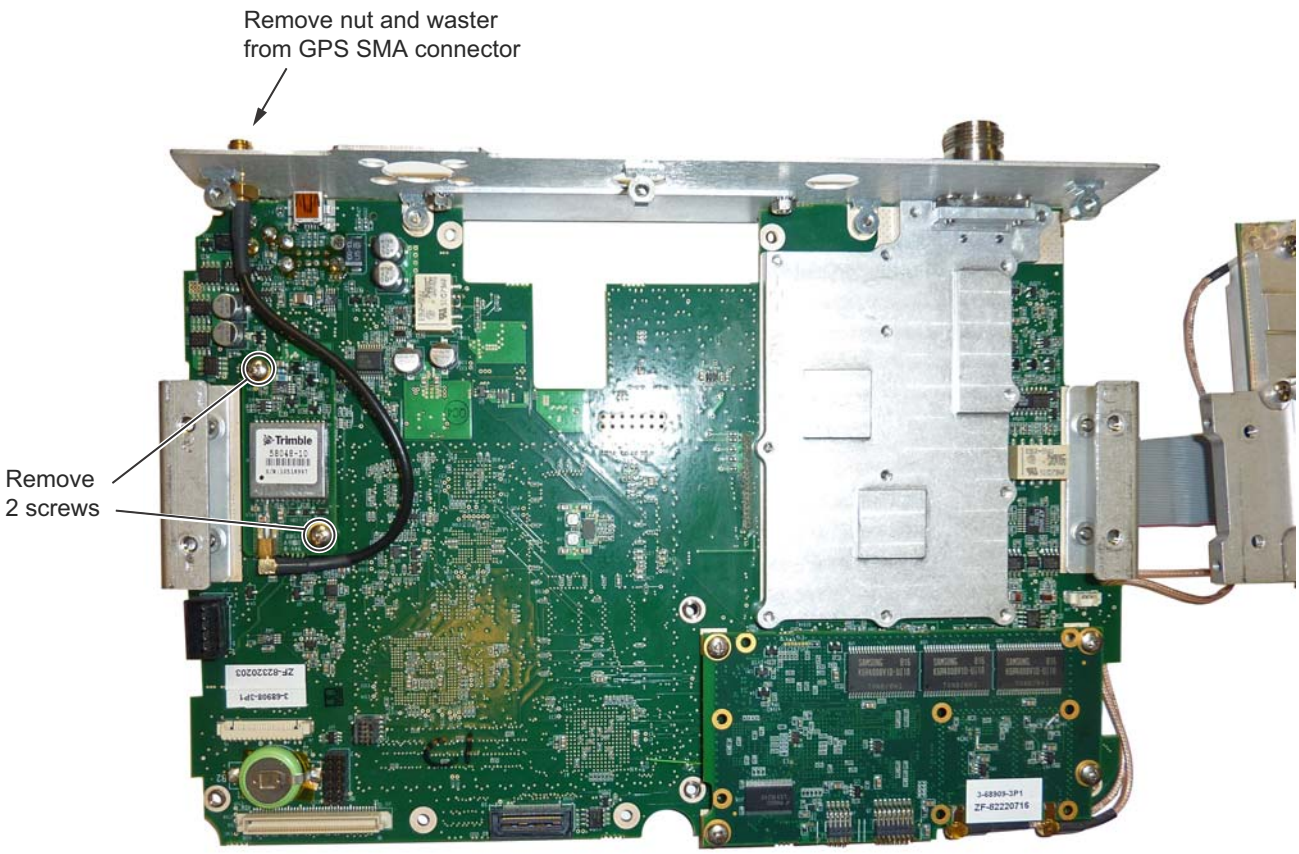


Figure 7-8. Removing the GPS Module from the Motherboard (SPA board set to the side)

7-7 Motherboard/VNA PCB Assembly Replacement

The procedures provides instructions for removing and replacing the GPS Module.

1. Open the case as described in Section 7-2 “Opening the Site Master Case”.
2. Remove the PCB Assembly from the front panel as described in Section 7-3 “PCB Assembly Replacement”.
3. Remove the SPA board as described in Section 7-4 “SPA Assembly Replacement”.
4. Remove the GPS board as described in Section 7-6 “GPS (Option 31) Replacement”.

Note	When ordering the Main/VNA PCB Assembly all options that are installed on the instrument must be stated on the order.

5. Installation is the reverse of removal.

7-8 Fan Assembly Replacement

This procedure provides instructions for removing and replacing the Fan Assembly.

1. Open the case as described in Section 7-2 “Opening the Site Master Case”.
2. Remove the Main VNA/PCB assembly from the front panel as described in Section 7-3 “PCB Assembly Replacement”.
3. Remove the 3 screws and nuts holding the Fan Assembly to the LCD Assembly housing. Refer to (Figure 7-9).

Note	The fan connector cable is routed through the LCD Assembly housing

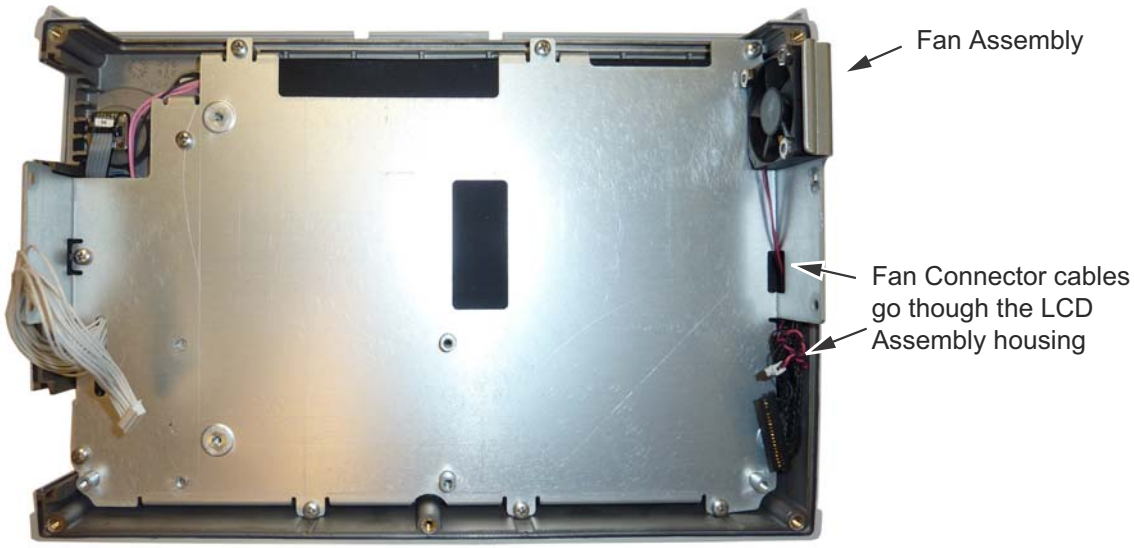


Figure 7-9. Front Panel Keypad Bezel

4. Reverse the above steps to install the replacement Fan Assembly.

7-9 LCD Assembly Replacement

This procedure provides instructions for removing and replacing the Liquid Crystal Display (LCD) once the Main PCB assembly has been separated from the BTS Master.

1. Open the case as described in Section 7-2 “Opening the Site Master Case”.
2. Remove the Main PCB assembly as described in Section 7-3 “PCB Assembly Replacement”.
3. Remove the 9 screws connecting the LCD Assembly to the front half of the case (Figure 7-10).

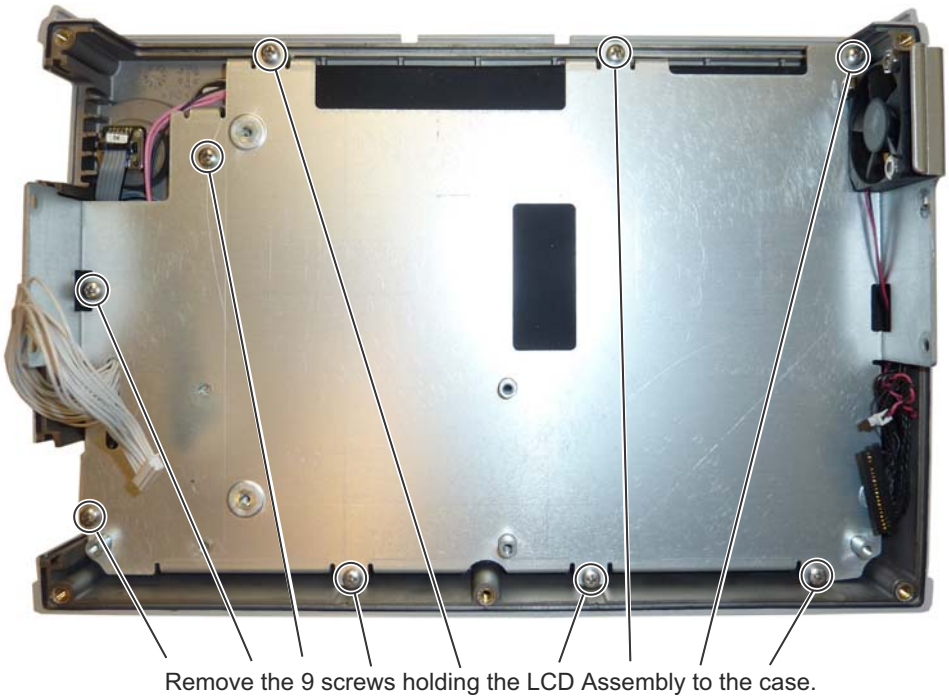


Figure 7-10. Removing the LCD Assembly

4. Turn the LCD assembly over and disconnect the front half of the case from the LCD Assembly (Figure 7-11).

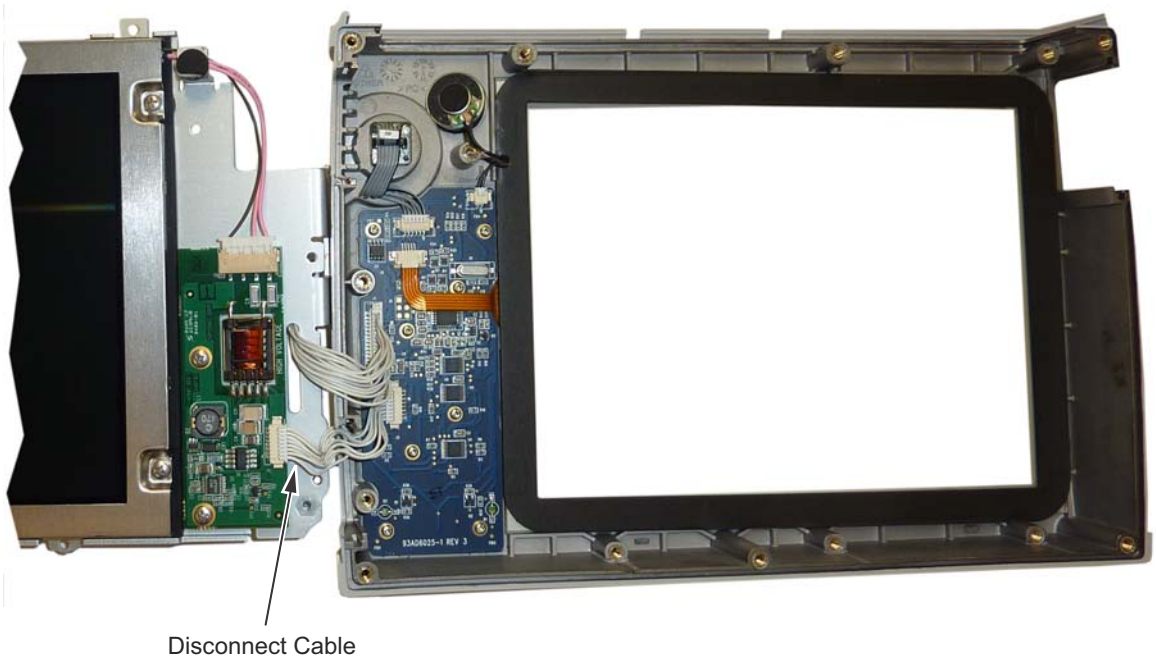


Figure 7-11. Replacing the LCD Assembly

5. Use a Phillips screw driver to remove the four screws securing the LCD to the housing (Figure 7-12).

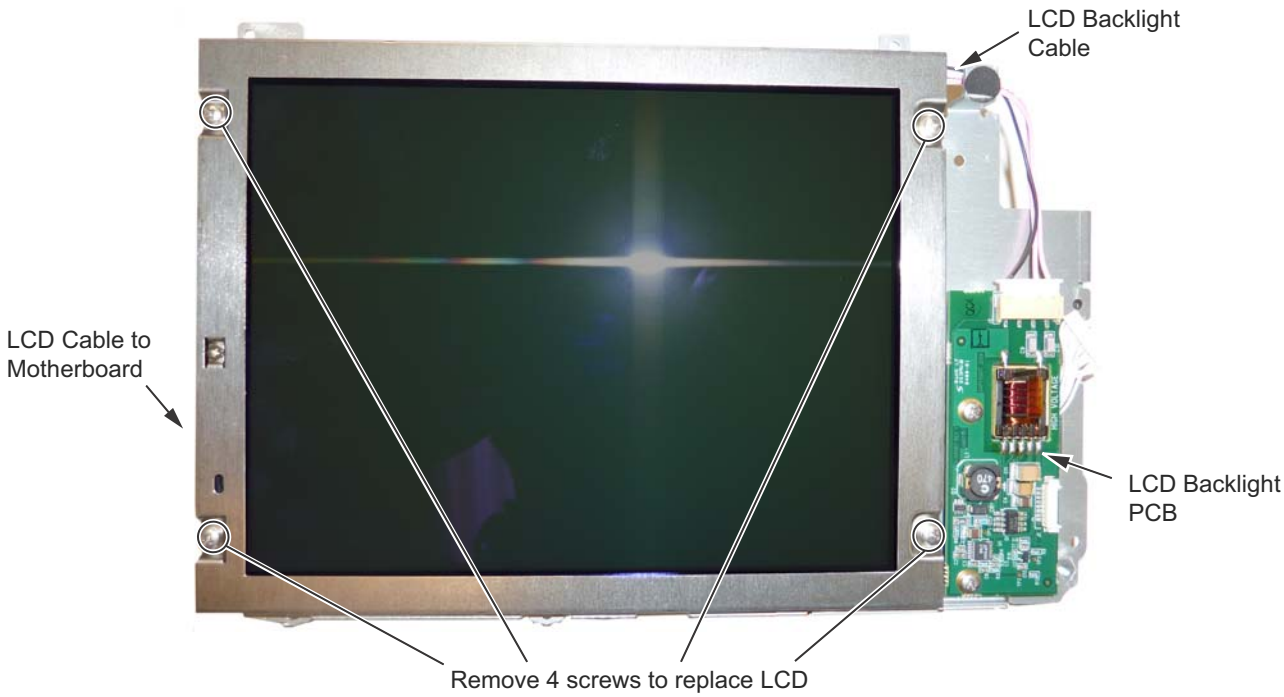


Figure 7-12. Replacing the LCD

6. Disconnect the LCD backlight cable from the LCD backlight PCB.
7. Disconnect the LCD cable from the side of the LCD.
8. Carefully remove the LCD.
9. Reverse the above steps to install the replacement LCD.

Note	Pay attention to the routing of the LCD Backlight Cable. The cable must be positioned so it is not pinched when the unit is reassembled.

7-10 LCD Backlight PCB Removal and Replacement

This procedure provides instructions for removing and replacing the BTS Master LCD backlight PCB.

1. Open the case as described in Section 7-2 “Opening the Site Master Case”.
2. Remove the Main PCB assembly from the front panel as described in Section 7-3 “PCB Assembly Replacement”.
3. Perform Step 1 through Step 4 of Section 7-9 “LCD Assembly Replacement”.
4. Disconnect the LCD backlight cable from the LCD backlight PCB.
5. Use a Phillips screw driver to remove the two screws securing the LCD backlight PCB to the Main PCB assembly (Figure 7-13).

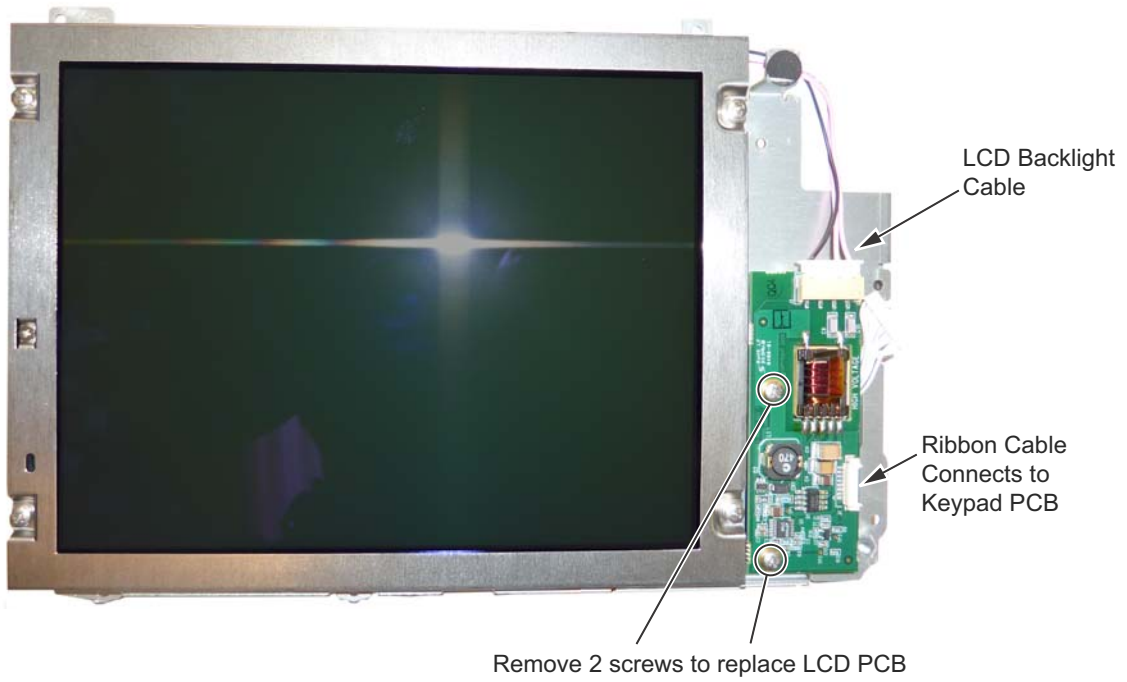


Figure 7-13. Replacing the LCD PCB

6. Carefully remove the LCD Backlight PCB.
7. Reverse the above steps to install the replacement LCD backlight PCB.

Note	Pay attention to the routing of the LCD Backlight Cable. The cable must be positioned so it is not pinched when the unit is reassembled.

7-11 Keypad and Keypad PCB Replacement

This procedure provides instructions for removing and replacing the keypad and the keypad PCB.

1. Open the case as described in Section 7-2 “Opening the Site Master Case”.
2. Remove the Main VNA/PCB assembly from the front panel as described in Section 7-3 “PCB Assembly Replacement”.
3. Remove the 8 screws and the cable connectors to remove the Keypad PCB (Figure 7-14). The Rubber Keypad is located under the Keypad PCB.

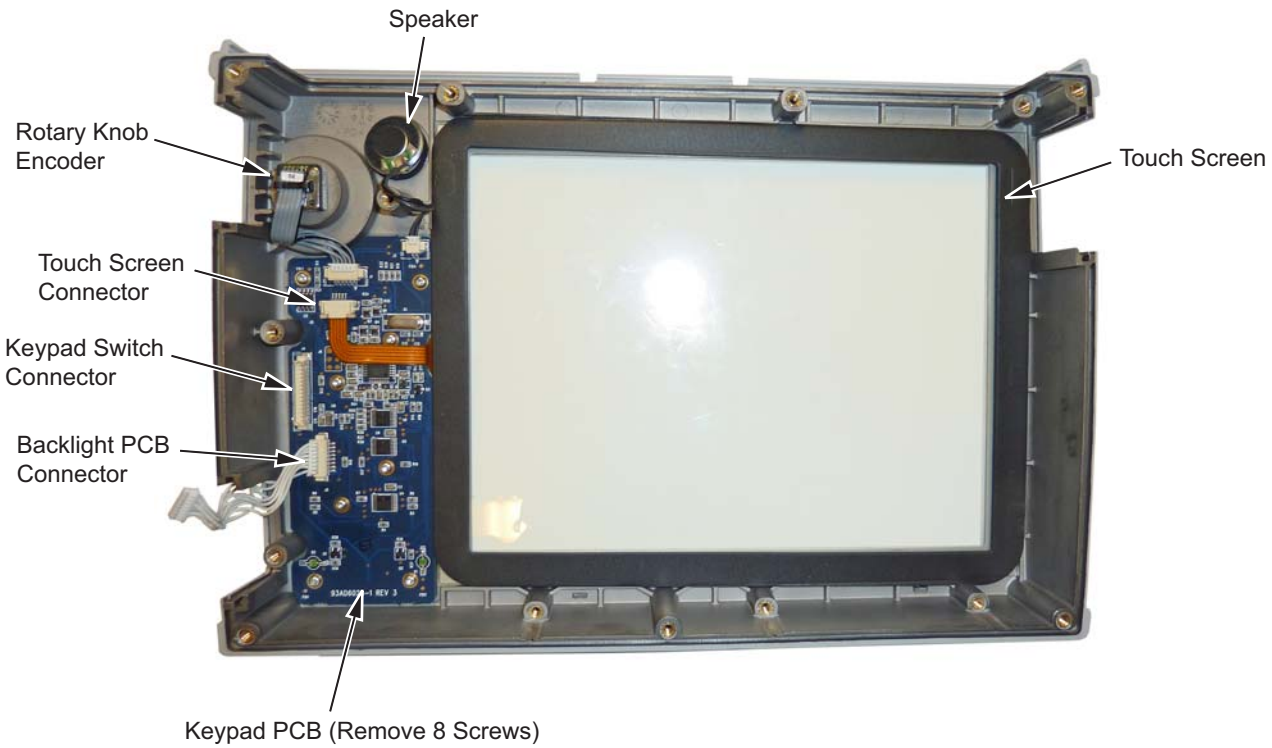


Figure 7-14. Front Panel Keypad Bezel

4. Reverse the above steps to install the replacement Keypad and/or Keypad PCB.
5. The Keypad PCB stores the touch screen calibration data. If the Keypad PCB is replaced, then a touch screen calibration must be performed. If no touch screen calibration data is stored in the new Keypad PCB when powering on a unit, it will stay at the boot up screen with the Anritsu logo shown and a message at the bottom of the screen stating:

   ```
   Failed to load touch screen calibration data. Please reboot the instrument.
   ```

   If this message is displayed, power off the unit and power the unit up in bootstrap mode by pressing and holding down the **Shift** - **4** - **0** keys while pressing the power on button. Now the unit will boot up in bootstrap mode and prompt you to perform a touch-screen calibration. After following the on-screen calibration directions, power the unit off and it will boot up correctly on the next power cycle.
6. If the Keypad PCB was replaced with a PCB that has touch screen calibration data, the unit will boot up properly, but the touch-screen calibration data will be invalid. Perform a touch-screen calibration by pressing the **Shift** key and then the **0** key, and follow the on-screen calibration directions.

7-12 Touch Screen Replacement

This procedure provides instructions for removing and replacing the touch screen.

1. Open the case as described in Section 7-2 “Opening the Site Master Case”.
2. Remove the Main VNA/PCB assembly from the front panel as described in Section 7-3 “PCB Assembly Replacement”.
3. Perform Step 1 through Step 4 of Section 7-9 “LCD Assembly Replacement”
4. Remove the touch screen flex circuit connector from the Keypad PCB by pulling the tabs on each side of the connector away from the connector and in the direction of the flex circuit. Refer to Figure 7-15.
5. Pull the Touch Screen cable out of the connector housing.
6. Remove the Touch Screen from the Bezel by pulling it straight up.

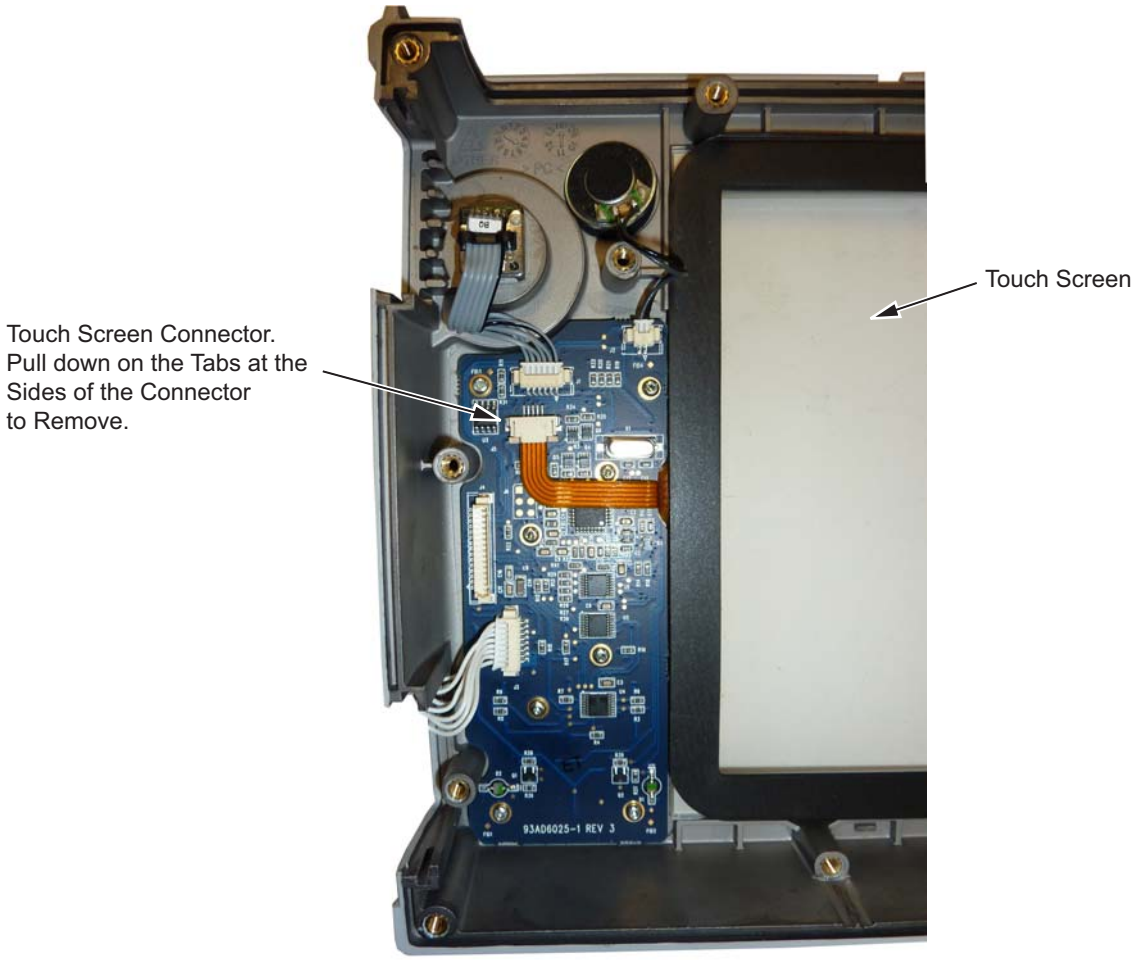


Figure 7-15. Replacing the Touch Screen

7. Reverse the above steps to install the replacement Touch Screen.

Note	Firmware version 1.30 and greater was modified to accept touch screen calibration data needed for touch screen part number ND73867. Ensure that firmware version 1.30 or greater is installed. If not, install the latest firmware.

8. Perform a touch screen calibration by pressing the **Shift** key and then the **0** key, and follow the on-screen calibration directions.

Chapter 8 — Troubleshooting

8-1 Introduction

This chapter describes the primary troubleshooting operations that can be performed by all Anritsu Service Centers. Perform the troubleshooting suggestions in the order they are listed. Operators of the MP1026B should refer to the User Guide for troubleshooting help.

Only qualified Anritsu personnel should replace internal assemblies. Major subassemblies shown in Table 1-5, "List of Replaceable Parts" on page 1-5 are typically the items that may be replaced. Because they are highly fragile, items that must be soldered may not be replaced without special training. Removal of RF shields from PC boards or adjustment of screws on or near the shields will detune sensitive RF circuits and will result in degraded instrument performance.

8-2 Turn-on Problems

Unit cannot boot-up, no activity occurs when the On/Off key is pressed:

1. Battery may be fully discharged. Confirm the battery is installed into the unit and connect the AC to DC converter (Anritsu part number 40-168-R) to the unit allowing the battery to charge.
2. Battery may be the wrong type. Use only Anritsu approved battery packs. Some non-approved battery packs will fit into the MP1026B, but are electrically incompatible and will not charge correctly.
3. External power supply may have failed or be the wrong type. Replace the external power supply.
4. The On/Off switch is damaged. Replace the keypad PCB or rubber keypad.
5. The Main PCB has failed. Replace the Main PCB/Spectrum Analyzer assembly.

Unit begins the boot process, but does not complete boot-up:

1. Using Master Software Tools, perform the Emergency Repair procedure, then update the system software (via the Tools menu).
2. During the boot-up process, the unit stops with the message:

   `Failed to load touch screen calibration data. Please reboot the instrument.`

   a. Power the unit off and boot up in boot strap mode (hold down the **Shift** - **4** - **0** keys while pressing the power on button).

   b. In boot strap mode, the unit prompts you to perform a touch screen calibration. Follow the on-screen directions until the touch screen calibration is complete, and then power cycle the unit.

   c. Once the unit boots up, ensure the firmware version is 1.30 or greater. If not, load the latest firmware and perform a touch screen calibration.
3. The Main PCB has failed. Replace the Main PCB/Spectrum Analyzer assembly.

Unit makes normal boot-up sounds, but the display has a problem:

1. If the display is dim, check the brightness setting under the System Menu / System Options.
2. Replace the Backlight Driver PCB.
3. Replace the LCD assembly.
4. The Main PCB has failed. Replace the Main PCB/Spectrum Analyzer assembly.

Boot-up Self Test fails:

1. Perform a Master Reset.

   If the message relates to the RTC battery, replace the RTC battery on the Main PCB.
2. The Main PCB has failed. Replace the Main PCB/Spectrum Analyzer assembly

8-3 Other Problems

Touch Screen Problems:

Unit boots correctly, but the touch screen is unresponsive.

1. The touch screen may have lost its calibration data. Press **Shift** then **0** to enter the touch screen calibration procedure. Follow the on-screen directions.
2. Check the firmware version installed on the unit and ensure it is version 1.30 or greater. If not, install the latest firmware version and redo the touch screen calibration as described in Step 1.
3. Replace the touch screen.

Battery Pack Charging Problems:

Refer to Chapter 6, "Battery Information".

Lock Error messages:

1. This message normally appears for 2 to 3 seconds when an external 10 MHz Reference is applied.
2. Spectrum Analyzer PCB has failed. Replace the Main/Spectrum Analyzer assembly.

Option 5, Power Monitor Problems:

1. Verify correct operation of RF detector (see User's Guide for a list of suitable detectors).
2. Replace the Option 5 PCB. No recalibration is required.

Spectrum Analyzer Problems:

1. Inspect the Spectrum Analyzer RF In connector for damage.
2. Refer to the User Guide.
3. Update system software using Master Software Tools (via Tools menu).
4. Spectrum Analyzer PCB has failed. Replace the Main/Spectrum Analyzer assembly.

Cable and Antenna Analyzer Problems:

1. Inspect the VNA RF In and VNA Reflection connectors for damage.
2. Inspect the Open, Short, Load and cable(s) for damage. Verify their operation on a suitable measurement instrument.
3. Refer to the User Guide.
4. Update system software using Master Software Tools (via Tools menu).
5. VNA module has failed. Replace the VNA module. No recalibration is required.

Option 50 Problems:

1. Replace the VNA Module with Option 50 assembly. This assembly has been calibrated at the factory.

Option 51, 52 or 53 Problems:

1. Replace the Option 51, 52, or 53 PCB (see Table 1-5, "List of Replaceable Parts" on page 1-5). No recalibration is required.

Other Issues:

1. Perform a Master Reset.
2. Refer to the User Guide.
3. Update system software using Master Software Tools (via Tools menu).
4. Replace the Main PCB/Spectrum Analyzer assembly.

Appendix A — Test Records

This appendix provides test records that can be used to record the performance of the S3xxE. Anritsu recommends that you make a copy of the following test record pages and document the measurements each time a Performance Verification is performed. Continuing to document this process each time it is performed provides a detailed history of instrument performance, which can allow you to observe trends.

S3____E Firmware Rev: _____ **Operator:** _____ **Date:** _____

Serial Number: _____ **Options:** _____

A-1 Test Records for Spectrum Analyzer Verification

Table A-1. Spectrum Analyzer Frequency Accuracy

Frequency	Measured Value	Deviation	Specification
1 GHz	GHz	kHz	± 1.5 kHz (± 1.5 ppm)
3.9 GHz	GHz	kHz	± 5.85 kHz (± 1.5 ppm)
5.9 GHz	GHz	kHz	± 8.85 kHz (± 1.5 ppm)

Table A-2. Spectrum Analyzer SSB Phase Noise Verification

Frequency	Measured Value	Calculated Value	Specification
10 kHz	dBc/Hz	dBc/Hz	≤ –100 dBc/Hz
100 kHz	dBc/Hz	dBc/Hz	≤ –105 dBc/Hz
1 MHz	dBc/Hz	dBc/Hz	≤ –115 dBc/Hz

Table A-3. Spectrum Analyzer Spurious Response (Second Harmonic Distortion)

Frequency	Measured Value	2nd Harmonic Distortion	Specification
50.1 MHz			
100.2 MHz		dBc	≤ –56 dBc

S3____E **Firmware Rev:** _____ **Operator:** _____ **Date:** _____

Serial Number: _____ **Options:** _____

Table A-4. Spectrum Analyzer Resolution Bandwidth Accuracy

BW Setting	Span	VBW	Lower Limit	Measured Values	Upper Limit
3 MHz	4.5 MHz	Auto	2.7 MHz	Hz	3.0 MHz
1 MHz	1.5 MHz	Auto	900 kHz	Hz	1.1 MHz
300 kHz	450 kHz	Auto	270 kHz	Hz	330 kHz
100 kHz	150 kHz	Auto	90 kHz	Hz	110 kHz
30 kHz	45 kHz	Auto	27 kHz	Hz	33 kHz
10 kHz	15 kHz	Auto	9 kHz	Hz	11 kHz
3 kHz	4.5 kHz	Auto	2.7 kHz	Hz	3.0 kHz
1 kHz	2 kHz	Auto	900 Hz	Hz	1.1 kHz
300 Hz	450 Hz	Auto	270 Hz	Hz	330 Hz
100 Hz	150 Hz	Auto	90 Hz	Hz	110 Hz
30 Hz	50 Hz	3 Hz	27 Hz	Hz	33 Hz
10 Hz	30 Hz	3 Hz	9 Hz	Hz	11 Hz

Table A-5. Spectrum Analyzer 50 MHz Absolute Amplitude Accuracy Setup Table

Test Power Level @ 50 MHz	Required Sensor B Reading
0 dBm	dBm
-4 dBm	dBm
-10 dBm	dBm
-14 dBm	dBm
-20 dBm	dBm
-24 dBm	dBm
-30 dBm	dBm
-34 dBm	dBm
-40 dBm	dBm
-44 dBm	dBm
-50 dBm	dBm

S3____E **Firmware Rev:** _____ **Operator:** _____ **Date:** _____

Serial Number: _____ **Options:** _____

Table A-6. Spectrum Analyzer 50 MHz Absolute Amplitude Accuracy

Input Power Level	Reference Level	Input Atten. Level	Measured Reading	Specification
0 dBm	10 dBm	30 dB	dBm	± 1.25 dB
-4 dBm	10 dBm	30 dB	dBm	± 1.25 dB
-10 dBm	0 dBm	20 dB	dBm	± 1.25 dB
-14 dBm	0 dBm	20 dB	dBm	± 1.25 dB
-20 dBm	-10 dBm	10 dB	dBm	± 1.25 dB
-24 dBm	-10 dBm	10 dB	dBm	± 1.25 dB
-30 dBm	-20 dBm	0 dB	dBm	± 1.25 dB
-34 dBm	-20 dBm	0 dB	dBm	± 1.25 dB
-40 dBm	-30 dBm	0 dB	dBm	± 1.25 dB
-44 dBm	-30 dBm	0 dB	dBm	± 1.25 dB
-50 dBm	-40 dBm	0 dB	dBm	± 1.25 dB

Table A-7. Spectrum Analyzer Absolute Amplitude Accuracy Across Frequency Setup Table

Frequency	Required Sensor B reading for –2 dBm @ Attenuator output	Required Sensor B reading for –30 dBm @ Attenuator output
10.1 MHz	dBm	dBm
50 MHz	dBm	dBm
100 MHz	dBm	dBm
500 MHz	dBm	dBm
1000 MHz	dBm	dBm
2000 MHz	dBm	dBm
3000 MHz	dBm	dBm
4000 MHz	dBm	dBm
5000 MHz	dBm	dBm
6000 MHz	dBm	dBm

S3____E **Firmware Rev:** _____ **Operator:** _____ **Date:** _____

Serial Number: _____ **Options:** _____

Table A-8. Spectrum Analyzer Absolute Amplitude Accuracy Across Frequency (1 of 2)

Freq (MHZ)	Input Power (dBm)	Atten. Level	Marker 1 Reading (dB)	Spec (dB)	Freq (MHZ)	Input Power (dBm)	Attn. Level	Marker 1 Reading (dB)	Spec (dB)
10.1	-30	0		±1.25	50	-30	0		±1.25
	-30	5		±1.25		-30	5		±1.25
	-30	10		±1.25		-30	10		±1.25
	-30	20		±1.25		-30	20		±1.25
	-2	30		±1.25		-2	30		±1.25
	-2	40		±1.25		-2	40		±1.25
	-2	50		±1.25		-2	50		±1.25
	-2	55		±1.25		-2	55		±1.25
100	-30	0		±1.25	500	-30	0		±1.25
	-30	5		±1.25		-30	5		±1.25
	-30	10		±1.25		-30	10		±1.25
	-30	20		±1.25		-30	20		±1.25
	-2	30		±1.25		-2	30		±1.25
	-2	40		±1.25		-2	40		±1.25
	-2	50		±1.25		-2	50		±1.25
	-2	55		±1.25		-2	55		±1.25
1000	-30	0		±1.25	2000	-30	0		±1.25
	-30	5		±1.25		-30	5		±1.25
	-30	10		±1.25		-30	10		±1.25
	-30	20		±1.25		-30	20		±1.25
	-2	30		±1.25		-2	30		±1.25
	-2	40		±1.25		-2	40		±1.25
	-2	50		±1.25		-2	50		±1.25
	-2	55		±1.25		-2	55		±1.25

S3____E **Firmware Rev: _____** **Operator: _____** **Date: _____**

Serial Number: _____ **Options: _____**

Table A-8. Spectrum Analyzer Absolute Amplitude Accuracy Across Frequency (2 of 2)

Freq (MHZ)	Input Power (dBm)	Atten. Level	Marker 1 Reading (dB)	Spec (dB)	Freq (MHZ)	Input Power (dBm)	Attn. Level	Marker 1 Reading (dB)	Spec (dB)
3000	-30	0		±1.25	4000	-30	0		±1.25
	-30	5		±1.25		-30	5		±1.25
	-30	10		±1.25		-30	10		±1.25
	-30	20		±1.25		-30	20		±1.25
	-2	30		±1.25		-2	30		±1.25
	-2	40		±1.25		-2	40		±1.25
	-2	50		±1.25		-2	50		±1.25
	-2	55		±1.25		-2	55		±1.25
5000	-30	0		±1.25	6000	-30	0		±1.25
	-30	5		±1.25		-30	5		±1.25
	-30	10		±1.25		-30	10		±1.25
	-30	20		±1.25		-30	20		±1.25
	-2	30		±1.25		-2	30		±1.25
	-2	40		±1.25		-2	40		±1.25
	-2	50		±1.25		-2	50		±1.25
	-2	55		±1.25		-2	55		±1.25

S3____E **Firmware Rev:** _____ **Operator:** _____ **Date:** _____

Serial Number: _____ **Options:** _____

Table A-9. Spectrum Analyzer Residual Spurious with Preamp Off

Start Freq.	Stop Freq.	RBW	VBW	Measured Values	Specification
10 MHz	50 MHz	1 kHz	300 Hz	dBm	≤ –90 dBm
50 MHz	2.0 GHz	3 kHz	10 kHz	dBm	≤ –90 dBm
2.0 GHz	4.0 GHz	1 kHz	1 kHz	dBm	≤ –90 dBm
4.0 GHz	5.0 GHz	1 kHz	3 kHz	dBm	≤ –90 dBm
5.0 GHz	5.2 GHz	1 kHz	1 kHz	dBm	≤ –90 dBm
5.2 GHz	5.7 GHz	300 Hz	3 kHz	dBm	≤ –90 dBm
5.7 GHz	5.9 GHz	300 Hz	3 kHz	dBm	≤ –90 dBm
5.9 GHz	6.0 GHz	1 kHz	100 Hz	dBm	≤ –90 dBm

Table A-10. Spectrum Analyzer Residual Spurious with Preamp On

Start Freq.	Stop Freq.	Measured Values	Specification
10 MHz	1.0 GHz	dBm	≤ –90 dBm
1.0 GHz	4.0 GHz	dBm	≤ –90 dBm
4.0 GHz	6.0 GHz	dBm	≤ –90dBm

S3____E **Firmware Rev:** _____ **Operator:** _____ **Date:** _____

Serial Number: _____ **Options:** _____

Table A-11. Spectrum Analyzer DANL with Pre Amp Off

Start Freq	Stop Freq	RBW	VBW	Measured Value at 100 kHz RBW	Calculated for 10 Hz RBW	Specification
10 MHz	2.4 GHz	100 kHz	1 kHz	dBm	dBm	≤ –131 dBm
2.4 GHz	4.0 GHz	100 kHz	1 kHz	dBm	dBm	≤ –127 dBm
4.0 GHz	5.0 GHz	100 kHz	1 kHz	dBm	dBm	≤ –124 dBm
5.0 GHz	6.0 GHz	100 kHz	1 kHz	dBm	dBm	≤ –116 dBm

Table A-12. Spectrum Analyzer DANL with Pre Amp On

Start Freq	Stop Freq	RBW	VBW	Measured Value at 100 kHz RBW	Calculated for 10 Hz RBW	Specification
10 MHz	2.4 GHz	100 kHz	1 kHz	dBm	dBm	≤ –147 dBm
2.4 GHz	4.0 GHz	100 kHz	1 kHz	dBm	dBm	≤ –144 dBm
4.0 GHz	5.0 GHz	100 kHz	1 kHz	dBm	dBm	≤ –140 dBm
5.0 GHz	6.0 GHz	100 kHz	1 kHz	dBm	dBm	≤ –133 dBm

S3____E **Firmware Rev:** _____ **Operator:** _____ **Date:** _____

Serial Number: _____ **Options:** _____

A-2 Test Records for Cable and Antenna Analyzer Verification

Table A-13. VNA Frequency Accuracy

Frequency	Measured Value	Specification
2 GHz (2000 MHz)	MHz	± 5.0 kHz (± 2.5 ppm)

Table A-14. VNA Return Loss Accuracy Verification

Return Loss	Measured Value	Specification
Start Frequency = 2 MHz, Stop Frequency = 4 GHz (S33xE) or 6 GHz (S36xE)		
6 dB	dB	5 dB ≤ x ≤ 7 dB
20 dB	dB	18.4 dB ≤ x ≤ 21.6 dB

Table A-15. VNA System Dynamic Range Verification (for Units with Option 21 only)

Frequency	Measured Value	Specification
400 MHz to 4 GHz	dB	≤ –80 dB
> 4 GHz to 6 GHz	dB	≤ –70 dB

S3____E **Firmware Rev:** _____ **Operator:** _____ **Date:** _____

Serial Number: _____ **Options:** _____

A-3 Test Records for Power Meter Verification

Table A-16. Characterization Chart for Power Meter Verification

Test Power Level @ 50 MHz	Required Sensor B Reading
0 dBm	dBm
–50 dBm	dBm
Test Power Level @ 6000 MHz	**Required Sensor B Reading**
0 dBm	dBm
–50 dBm	dBm

Table A-17. Internal Power Meter Accuracy Verification

Frequency	Input Power	Measured Values	Specification
50 MHz	0 dBm	dBm	± 1.25 dB
	–50 dBm	dBm	± 1.25 dB
4.0 GHz	0 dBm	dBm	± 1.25 dB
	–50 dBm	dBm	± 1.25 dB
6.0 GHz	0 dBm	dBm	± 1.50 dB
	–50 dBm	dBm	± 1.50 dB

S3____E **Firmware Rev:** _____ **Operator:** _____ **Date:** _____

Serial Number: _____ **Options:** _____

A-4 Test Records for Options Verification

Table A-18. Option 10 Bias-Tee

Voltage Setting	Measured Values		Voltage Specification	Current Specification
105 Ohm Load, Low Current				
12 V	V	mA	± 1.2 V	85 mA to 145 mA
18 V	V	mA	± 1.8 V	142 mA to 202 mA
24 V	V	mA	± 2.4 V	199 mA to 259 mA
40 Ohm Load, High Current				
15 V	V	mA	± 1.5 V	325 mA to 425 mA
78 Ohm Load, High Current				
32 V	V	mA	± 3.2 V	370 mA to 450 mA

S3____E **Firmware Rev:** _____ **Operator:** _____ **Date:** _____

Serial Number: _____ **Options:** _____

Table A-19. Option 31 GPS Receiver

Frequency	Measured Value	Error	Specification
Spectrum Analyzer Frequency Accuracy with GPS High Frequency Accuracy			
4.0 GHz	GHz	Hz	± 350 Hz (± 50 ppb)
Spectrum Analyzer Frequency Accuracy with Internal High Frequency Accuracy			
4.0 GHz	GHz	Hz	± 1.2 kHz (± 0.3 ppm)

Table A-20. Option 31 GPS Receiver Bias-Tee Verification

Voltage Setting	Measured Value	Specification
3.3 V	mA	32 mA ± 15 % (27.2 mA to 36.8 mA)
5.0 V	mA	55.6 mA ± 15 % (47.3 mA to 63.9 mA)

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