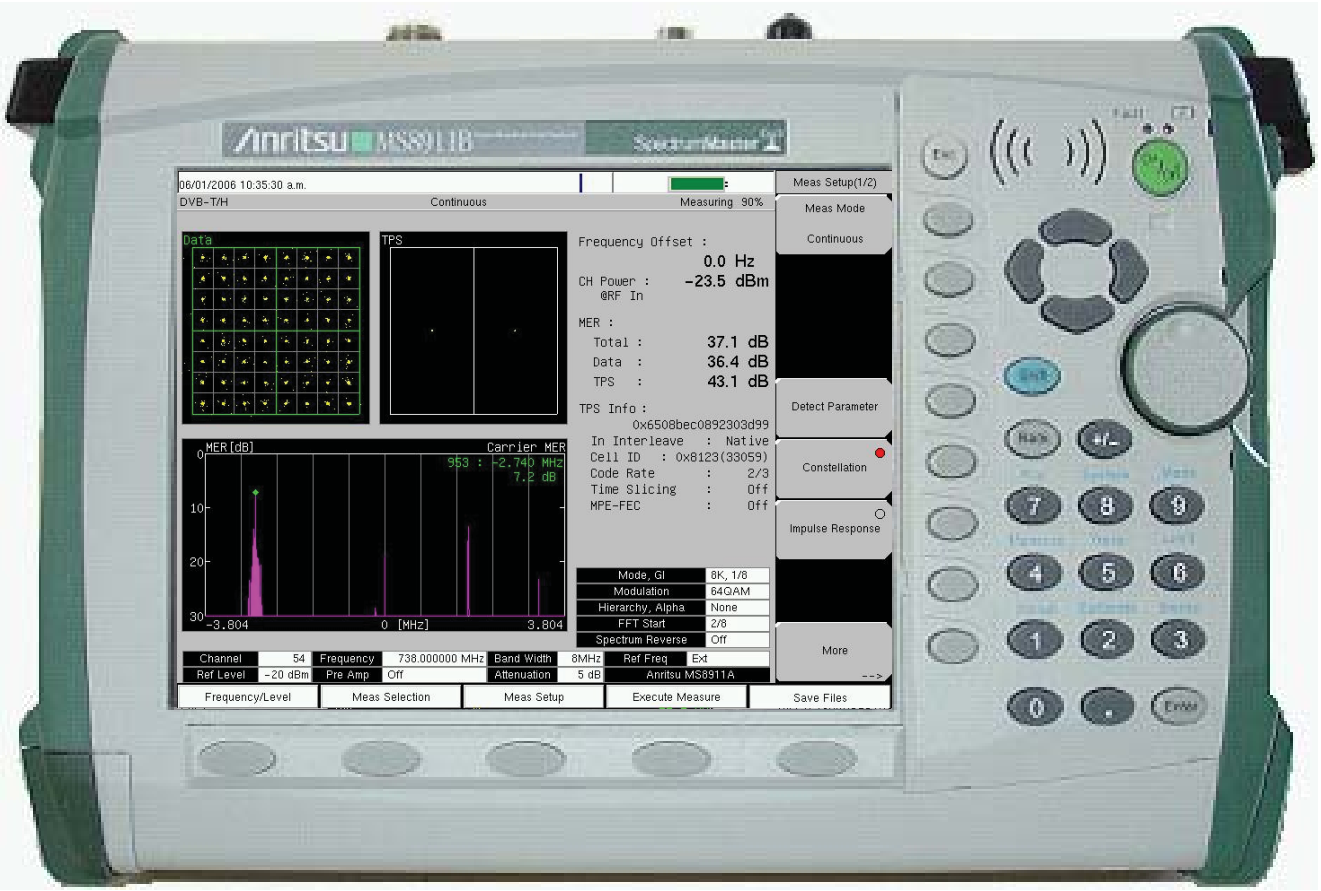
Maintenance Manual

MS8911B ISDBT Field Tester

MS8911B ISDBT Digital Broadcast Field Analyzer/Tester

100 kHz to 7.1 GHz



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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 very dangerous procedure that could result in serious injury or death, and possible loss related to equipment malfunction, if not performed properly.

Warning

This indicates a hazardous procedure that could result in light-to-severe injury or loss related to equipment malfunction, if proper precautions are not taken.

Caution

This indicates a hazardous procedure that could result in loss related to equipment malfunction if proper precautions are not taken.

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

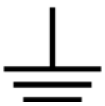
Warning

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.

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Chapter 1 — Maintenance Manual Overview

1-1 Introduction

This manual provides maintenance instructions for the Digital Broadcast Field Analyzer Model MS8911B. It describes the product and provides performance verification procedures, parts replacement procedures, and a replaceable parts list.

1-2 Description

The MS8911B Digital Broadcast Field Analyzer features high performance spectrum analysis function in a compact battery operated unit. It is designed for area survey and field maintenance of digital broadcasting equipment.

The MS8911B has five main software options:

Option MS8911B-030: Integrated Services Digital Broadcasting-Terrestrial (ISDB-T) Analysis Software (ISDB-T Signal Analyzer)

Option MS8911B-032: ISDB-T Single Frequency Network (SFN) Field Measurement Software (ISDB-T SFN Analyzer)

Option MS8911B-050: Digital Video Broadcasting-Terrestrial/Handheld (DVB-T/H) Analysis Software (DVB-T/H Signal Analyzer)

Option MS8911B-052: DVB-T/H SFN Field Measurement Software (DVB-T/H SFN Signal Analyzer)

Option MS8911B-057: DVB-T/H Bit Error Ratio (BER) Measurements

1-3 Recommended Test Equipment

The following test equipment is recommended for use in testing and maintaining the MS8911B Digital Broadcast Field Analyzer.

Table 1-1. Recommended Test Instruments (1 of 2)

Instrument	Critical Specification	Recommended Manufacturer and Model
Synthesized Signal Generator	Frequency: 0.1 Hz to 20 GHz Power Output: +16 dBm Step attenuator installed	Anritsu Model MG3692A or MG3692B, with Options 2A, 4, 22, 15x • The MG3692A requires Option 15 to achieve power of +16 dBm at 3.5 GHz. • The MG3692B does not require option 15 to achieve power of +16 dBm at 3.5 GHz.
Vector Signal Generator	Frequency: 100 kHz to 3 GHz	Anritsu Model MG3700A, with MG3700A-002 and MG3700A-021 hardware options. In addition, the MG3700A requires several factory custom test pattern files installed into its memory.
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	Two (2) each Anritsu Model MA2442D

Table 1-1. Recommended Test Instruments (2 of 2)

Instrument	Critical Specification	Recommended Manufacturer and Model
Power Sensor	Frequency: 10 MHz to 18 GHz Power Range: -60 to +20 dBm	Two (2) each Anritsu Model MA2482D with Option 1
Programmable Attenuator	Frequency: DC to 2 GHz Attenuation:100 dB in 1 and 10 dB steps	Anritsu Model MN63A
Vector Network Analyzer (VNA)	Frequency: 10 MHz to 9 GHz	Anritsu Model MS4624A, MS4624B or MS4624D
Type N Calibration Kit for VNA	Frequency: 10 MHz to 9 GHz	Anritsu Model 3753R
Phase Stable Coaxial Cable	Frequency: DC to 18 GHz Connectors: N (m) to N (m), 50 Ohm	Anritsu Model 15NN50-0.6B
RF Coaxial Cable	Frequency: DC to 6 GHz Connectors: N (m) to N (m), 50 Ohm	Anritsu Model 15NN50-1.5C (Quantity 2)
Coaxial Cable	Connectors: BNC (m) to BNC (m), 75 Ohm	Anritsu PN 3-806-169
50 Ohm Termination	Frequency: DC to 18 GHz	Anritsu Model 28N50-2
Adapter	Frequency: DC to 20 GHz Connectors: N (m) to N (m), 50 Ohm	Anritsu Model 34NN50A
Adapter	Frequency: DC to 20 GHz Connectors: K (m) to N (f), 50 Ohm	Anritsu Model 34RKNF50
Lowpass Filter	Cutoff Frequency: 50 MHz Connectors: N (m) to N(f)	Anritsu PN 1030-96
RF Limiter	Frequency: 10 MHz to 18 GHz Connectors: N (m) In and N (f) Out, 50 Ohm	Anritsu Model 1N50C
Bit Error Rate (BER) Tester	DVB ASI Input	Anritsu Model MP8931A
Frequency Reference	Frequency: 10 MHz	Symmetricom Model RubiSource T&M
Fixed Attenuator	10 dB Attenuation	Two (2) each Aeroflex/Weinschel Model 44-10 Fixed Attenuators
Power Splitter	Frequency: DC to 18 GHz	Aeroflex/Weinschel Model 1870A
RF Cable	Frequency: DC to 70 GHz Connectors: V (m) to V (f)	Anritsu Model 3670V50A-2
Step Attenuator	With traceable Characterization Data	Anritsu Model SC5567
Step Attenuator Controller		Anritsu Model SC3796
Coaxial Cable	Connectors: BNC (m) to BNC (m) Impedance: 50 Ohm Length: 0.6 meter	Any

1-4 Performance Verification

The sections that are listed below contain tests that can be used to verify the performance of the Digital Broadcast Field Analyzer Model MS8911B.

A blank performance verification test record is provided in Appendix A — Test Records.

1-5 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.

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 MS8911B Digital Broadcast Field Analyzer.

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**.
    - Do not connect the external **10 MHz Reference** to the **Digital Broadcast Field Analyzer**.
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 Input** of the **Digital Broadcast Field Analyzer**.
5. Turn on the **Digital Broadcast Field Analyzer**.
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.

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

8. Press the Amplitude soft key and then press the Reference Level soft key.
9. Use the **keypad** to enter **–10** and select the dBm soft key.
10. Press the Span soft key, use the **keypad** to enter **10**, and select the kHz soft key.
11. Press the BW soft key and select the RBW soft key.
12. Use the **keypad** to enter **100** and select the **Hz** soft key.
13. Press the VBW soft key, use the **keypad** to enter **30** and then select the Hz soft key.
14. Press the Freq soft key and select the Center Freq soft key.
15. Use the **keypad** to enter **1** and select the GHz soft key.
16. Press the Marker soft key, and select the Peak Search soft key.
17. Verify that the marker frequency is 1 GHz ±1 kHz and record in the test records.
    - Use Table A-1, “Spectrum Analyzer (SA) - Frequency Accuracy,” on page A-3 in Appendix A — Test Records.
18. Set the **MG3692X** Frequency to **7 GHz**.
19. Set the **MS8911B** Center Freq to **7 GHz.**

20. Press the Marker soft key, and select the Peak Search soft key.

21. Verify that the marker frequency is **7 GHz ±7 kHz** and record the results in the test records.

- Use Table A-1, "Spectrum Analyzer (SA) - Frequency Accuracy," on page A-3,

Note	If the unit fails the Spectrum Analyzer Frequency Accuracy test, perform the Spectrum Analyzer Internal Reference Frequency Adjustment procedure below in Section 2-2 "Internal Reference Frequency Adjustment " on page 2-3. If the unit still fails the Frequency Accuracy test after the Internal Reference Frequency adjustment has been completed, replace the PCB assembly. See Chapter 9 — PCB and Module Replacement, Section 9-3 "Spectrum Analyzer Module Assembly Replacement " on page 9-4.

2-2 Internal Reference Frequency Adjustment

Use this procedure to adjust the frequency if the unit fails the verification test in Section 2-1 "Frequency Accuracy Verification" on page 2-1.

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**.
2. Turn on the **10 MHz reference source** and the **Anritsu MG3692X Synthesized Signal Source**.
3. Set the **MG3692X** output to **7 GHz** with an RF Output Level of **–30 dBm**.
4. Connect the output of the source to the **RF Input** of the **Digital Broadcast Field Analyzer**.
5. Turn on the **Digital Broadcast Field Analyzer**.
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 Amplitude soft key, then press the Reference Level soft key.
9. Use the **keypad** to enter **–10** and select the dBm soft key.
10. Press the Atten Lvl soft key, use the **keypad** to enter **0** and press the dB soft key.
11. Press the Freq soft key and select the Center Freq soft key.
12. Use the **keypad** to enter **7** and select the GHz soft key.
13. Press the Span soft key, use the **keypad** to enter **10** and select the kHz soft key.
14. Press the BW soft key and select the RBW soft key.
15. Use the **keypad** to enter **100** and select the Hz soft key.
16. Press the VBW soft key, use the **keypad** to enter **30** and then select the Hz soft key.

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

17. Press and hold the **Shift** key and then press the **4**, **6**, and **8** (from top) soft keys together to enter into the Service Mode as shown below in Figure 2-1, "MS8911B Digital Broadcast Field Analyzer Service Mode Key Sequence".

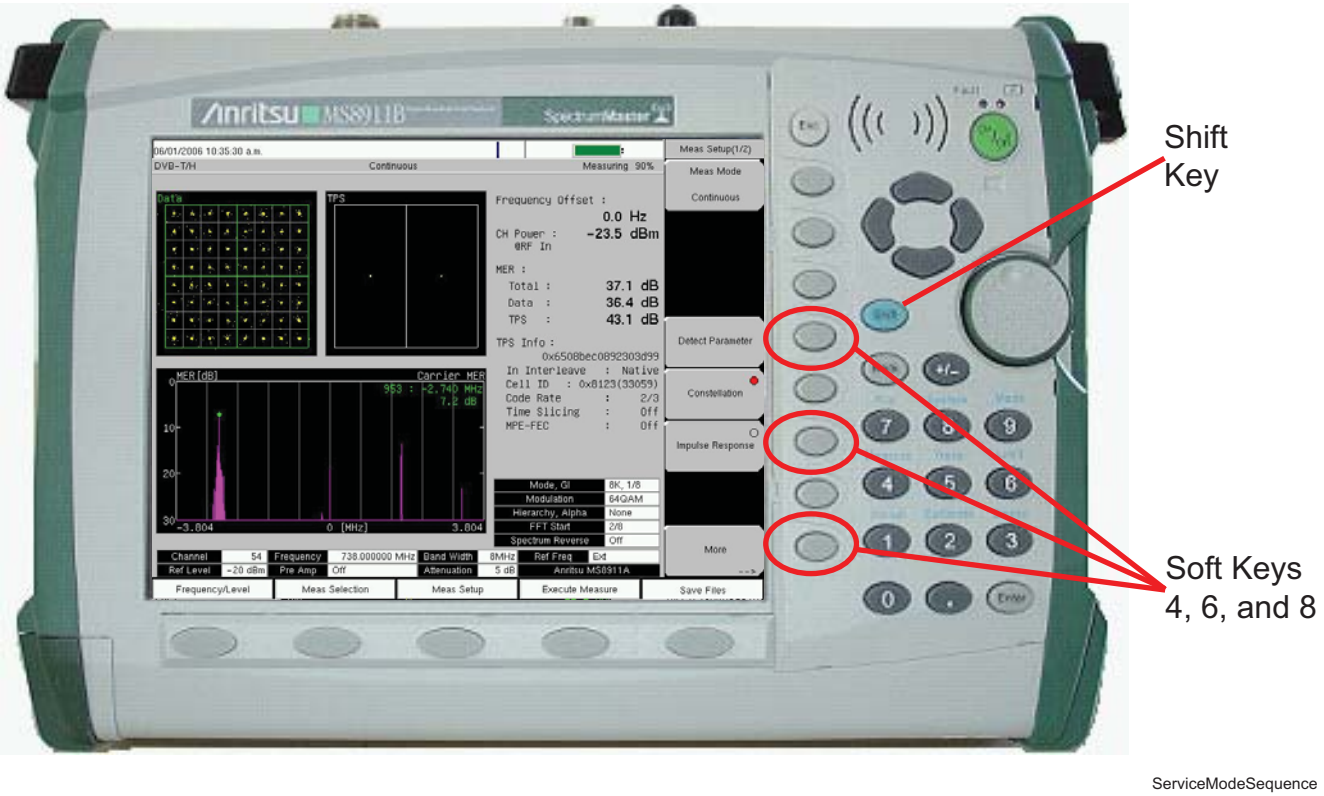

Figure 2-1. MS8911B Digital Broadcast Field Analyzer Service Mode Key Sequence

18. Press the Service Menu soft key, then the APP Service soft key.

19. Press the Calibration soft key, then the 10 MHz Ref soft key.

20. Use the **Up/Down** arrow keys or the **rotary knob** to slowly adjust the displayed signal to the center of the display. Allow the signal to stabilize between adjustments, and repeat as necessary.

21. Turn the **MS8911B** off, and then back on to exit Service Mode.

2-3 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 MS8911B Digital Broadcast Field Analyzer.

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 **7.09 GHz CW**, with an RF output level of **+13 dBm**.
4. Connect the output of the **MG3692X Synthesized Signal Source** to the **RF In** connector of the **Digital Broadcast Field Analyzer**.
5. Turn on the **Digital Broadcast Field Analyzer**.
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.

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

8. Press the Amplitude soft key, then press the Reference Level soft key.
9. Use the **keypad** to enter **0** and select the dBm soft key.
10. Press the Atten Lvl soft key, use the **keypad** to enter **15** and press the dB soft key.
11. Press the Freq soft key and select the Center Freq soft key.
12. Use the **keypad** to enter **7.090050** and press the GHz soft key.
13. Press the Span soft key, use the keypad to enter **110**, and select the kHz 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 and use the **keypad** to enter **3**, then select the Hz soft key.
17. Press the Shift soft key and then press the **Trace (5)** key, then select the Trace A Operations soft key.
18. Press the # of Average soft key, use the **keypad** to enter **7**, then press the Enter key.
19. Wait until the Trace Count displays 7/7.
20. Press the **Marker** key and select the Peak Search soft key.
21. Press the Delta On/Off soft key to turn Delta on.
22. Use the **keypad** to enter **10** and press the kHz soft key.

23. Enter the measured value into Table A-2, "SA - SSB Phase Noise," on page A-3.

24. Subtract 30 dB from the average value and verify that the result is −100 dBc/Hz and record the results in the test records.

- For example: –70 dBc measured – 30 dB = −100 dBc/Hz
- Use Table A-2.

Note	The measured value is converted to dBc/Hz using the following formula: dBc | Hz = – |measured dBc| – [10 log (RBW/1Hz)] At 1 kHz RBW, 10 log (RBW/1Hz) = 30, so dBc | Hz = – |measured dBc| – 30

25. Repeat Step #15 through Step #23 for 20 kHz, 30 kHz and 100 kHz.

- Enter the test results and calculations in the appropriate rows of Table A-2.

2-4 Spurious Response (Second Harmonic Distortion) Verification

The following test is used to verify the input related spurious response of the spectrum analyzer in the MS8911B Digital Broadcast Field Analyzer.

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
- 50 MHz Low Pass Filter (Anritsu part number 1030-96)
- 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 **Digital Broadcast Field Analyzer RF Input** with the coaxial cable.
5. Turn on the **Digital Broadcast Field Analyzer**.
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.

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

8. Press the Amplitude soft key and then press the Reference Level soft key.
9. Use the **keypad** to enter **–27** 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 Freq soft key and select the Center Freq soft key.
12. Use the **keypad** to enter **50.1** and press the MHz soft key.
13. Press the Span soft key, use the **keypad** to enter **100**, and select the kHz 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 **10** and then select the Hz soft key.
17. Press the **Shift** key and then press the **Sweep (3)** key.
18. Press the Detection soft key, and then the Peak soft key.
19. Press the **Shift** key and then press the **Trace (5)** key, then select the Trace A Operations soft key.
20. Press the # of Average soft key, use the **keypad** to enter **5** and then press the **Enter** key.
21. Wait until the Trace Count displays 5/5.
22. Press the **Marker** key and select the Peak Search soft key.
23. Record the amplitude for 50.1 MHz.

- Use Table A-3, "SA - Spurious Response (Second Harmonic Distortion) ," on page A-3 in Appendix A — Test Records.

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

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

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

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

28. Wait until the Trace Count displays 5/5.

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

30. Record the amplitude for 100.2 MHz in the test records.

- Use Table A-3.

31. 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

32. Verify that the calculated Second Harmonic Level is –50 dBc and record in the test records.

- Use Table A-3.

2-5 Input Related Spurious (IRS) Signals Verification

The following test is used to verify the input related spurious signals of the spectrum analyzer in the MS8911B Digital Broadcast Field Analyzer at different frequencies.

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 or equivalent
- BNC male to BNC male coaxial cable

Procedure

1. Connect **the 10 MHz reference source** to the **Anritsu MG3692X Synthesized Signal Source**.
2. Connect the output of the **Anritsu MG3692X Synthesized Signal Source** to the Digital Broadcast Field Analyzer **RF In**.
3. Set the **MG3692X** RF Output Level to **–30 dBm**.
4. Turn on the **Digital Broadcast Field Analyzer**.
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.

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

1674 MHz Input Related Spurious Check

7. Set the **MG3692X** Frequency to **1701 MHz CW**.
8. On the **MS8911B**, press the **Amplitude** key and then press the Reference Level soft key.
9. Use the **keypad** to enter **–27** 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 **Shift** key and then press the **Sweep (3)** key, then select the Detection and then the Peak soft key.
12. Press the Freq soft key and select the Center Freq soft key.
13. Use the **keypad** to enter **1674** and select the MHz soft key.
14. Press the Span soft key, use the **keypad** to enter **2**, and select the MHz soft key.
15. Press the BW soft key and select the RBW soft key.
16. Use the **keypad** to enter **10** and select the kHz soft key.
17. Press the VBW soft key. Use the **keypad** to enter **1** and then select the kHz soft key.
18. Wait until one sweep is completed.
19. Press the Marker soft key and select the Peak Search soft key.
20. Record the Marker 1 amplitude reading for 1674 MHz.

- Use the 1674 MHz row in Table A-4, "SA - Spurious Input Related Spurious (IRS) Signals," on page A-3.

21. Press the Freq soft key and select the Start Freq soft key.

22. Use the **keypad** to enter **100** and select the kHz soft key.

23. Press Stop Freq soft key, enter **1673** and press the MHz soft key.

24. Press the Marker soft key and select the Peak Search soft key.

25. Record the Marker 1 amplitude reading to the test record.

- Use the 1674 MHz - 100 kHz to 1673 MHz row in Table A-4 on page A-3.

26. Calculate the input related spurious level and verify that it is –46 dBc using the following formula and record it in the test records.

- Input Related Spurious = Marker 1 Reading – Amplitude Reading for 1674 MHz
- Use the 1674 MHz row in Table A-4 on page A-3.

27. Repeat Step #21through Step #26 setting a start frequency of 1675 MHz and a stop frequency of 2800 MHz and record the results in the test records.

- Use the 1674 MHz - 1675 MHz to 2800 MHz Measured Value row in Table A-4 on page A-3.

1701 MHz Input Related Spurious Check

28. Set the **MG3692X** Frequency to **1701 MHz CW**.

29. On the **MS8911B**, press the Freq soft key and select the Center Freq soft key.

30. Use the **keypad** to enter **1701** and select the MHz soft key.

31. Press the Span soft key, use the **keypad** to enter **2**, and select the MHz soft key.

32. Press the **Trace (5)** key, then select the Trace A Operations soft key.

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

34. Wait until the Trace Count displays 5/5.

35. Press the Marker soft key and select the Peak Search soft key.

36. Record the amplitude at 1701 MHz to the test records.

- Use the 1701 MHz row in Table A-4 on page A-3.

37. Press the Freq soft key and select the Start Freq soft key.

38. Use the **keypad** to enter **26** and select the MHz soft key.

39. Press Stop Freq soft key, enter **28** and press the MHz soft key.

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

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

42. Wait until the Trace Count displays 5/5.

43. Press the Marker key and select the Peak Search soft key.

44. Record the Marker 1 amplitude reading to the test records.

- Use the 1701 MHz row in Table A-4 on page A-3.

45. Calculate the input related spurious level using the formula below, verify that it is –50 dBc, and record it in the test records.

- Input Related Spurious = Marker 1 reading – Amplitude reading for 1701 MHz
- Use the 1701 MHz row in Table A-4 on page A-3.

2145 MHz Input Related Spurious Check

46. Set the **MG3692X** Frequency to **2145 MHz CW**.

47. On the **MS8911B**, press the Freq soft key and select the Center Freq soft key.

48. Use the keypad to enter **2145** and select the MHz soft key.

49. Press the Span soft key, use the **keypad** to enter **2**, and select the MHz soft key.

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

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

52. Wait until the Trace Count displays 5/5.

53. Press the Marker soft key and select the Peak Search soft key.

54. Record the amplitude at 2145 MHz in the test records.

- Use the 2145 MHz row in Table A-4, "SA - Spurious Input Related Spurious (IRS) Signals," on page A-3.

55. Press the Freq soft key and select the Start Freq soft key.

56. Use the **keypad** to enter **470** and select the MHz soft key.

57. Press Stop Freq soft key, enter **472** and press the MHz soft key.

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

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

60. Wait until the Trace Count displays 5/5.

61. Press the Marker soft key and select the Peak Search soft key.

62. Record the Marker 1 amplitude reading in the test records.

- Use the 2145 MHz row in Table A-4 on page A-3.

63. Calculate the input related spurious level using the formula below, record the results in the test records, and verify that it is –60 dBc.

- Input Related Spurious = Marker 1 Reading – Amplitude Reading for 2145 MHz
- Use the 2145 MHz row in Table A-4 on page A-3.

2-6 Resolution Bandwidth Accuracy Verification

The following test is used to verify the resolution bandwidth accuracy of the spectrum analyzer in the MS8911B Digital Broadcast Field Analyzer.

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 **MS8911B Digital Broadcast Field Analyzer**.
2. Turn on the **MG3692X**, set Frequency to **1 GHz CW** and Level to **–30 dBm**.
3. Connect the output of the **Anritsu MG3692X Synthesized Signal Source** to the **MS8911B Spectrum Analyzer RF Input**.
4. Turn on the **MS8911B Digital Broadcast Field Analyzer**.
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.

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

7. Press the Amplitude soft key and then press the Reference Level soft key.
8. Use the **keypad** to enter **–10** and press the dBm soft key.
9. Press the Atten Lvl soft key and enter **0**, then press the dB soft key.
10. Press the Scale soft key and enter **10**, then press dB/div soft key.
11. Press the Freq soft key and select the Center Freq soft key.
12. Use the **keypad** to enter **1** and select the GHz soft key.

RBW Test

13. Press the Span soft key, use the **keypad** to enter the span listed in the test records.
    - Refer to the Span column in Table A-5, "SA - Resolution Bandwidth Accuracy," on page A-4 in Appendix A — Test Records.
14. Press the BW soft key and select the RBW soft key.
15. Use the **keypad** to enter **3** and select the MHz soft key.
16. Set the VBW from the value listed in the test records.
    - Refer to the VBW column in Table A-5 on page A-4.
17. Press the **Shift** key, press the **Measure (4)** key and then press the OCC BW soft key.
18. Press the dBc soft key and enter **3**, then press the **Enter** key.
19. Press the OCC BW On/Off soft key to turn on occupied bandwidth.

20. Record the OCC BW reading in the the test records.

- Use the Measured Value column in Table A-5 on page A-4.

21. Verify that the OCC BW reading frequency is 10% of the RBW.

22. Repeat Step #13 through Step #20 for the other settings.

- Use Table A-5 on page A-4.

2-7 Spectrum Analyzer Absolute Amplitude Accuracy Verification

The tests in the following two sections verify the absolute amplitude accuracy of the Spectrum Analyzer in the MS8911B Digital Broadcast Field Analyzer. The two parts of this test are "50 MHz Amplitude Accuracy Verification" immediately below and "Amplitude Accuracy Across Frequency Verification" on page 2-18.

2-8 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

Test Setup Components Characterization

1. Turn on the **ML2438A Power Meter**, the **MG3692X Signal Source,** and the **MS8911B Digital Broadcast Field Analyzer**.

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

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.
   - Press the **Input** key twice to set the Input Configuration to B.
   - Press the **Sensor** key to display both Sensor A and Sensor B readings.
3. Connect the **power sensors** to the **power meter** and calibrate the **sensors**.
4. Connect the **Power Splitter** to the **MG3692X Output** and **Sensor B** to one of the **Power Splitter Outputs**.
5. 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 2-2, "Absolute Amplitude Accuracy Verification Pretest Setup" below.

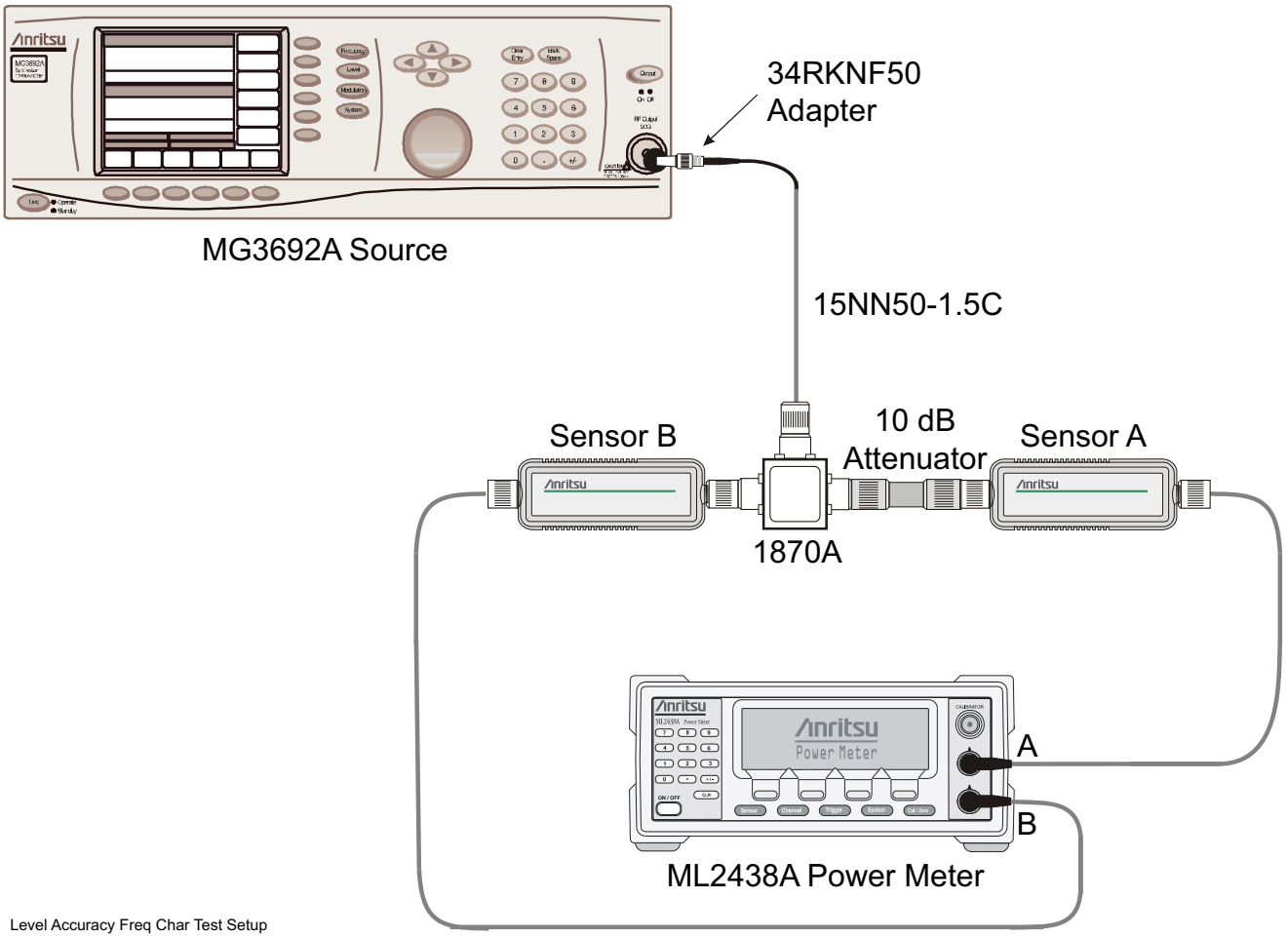

Figure 2-2. Absolute Amplitude Accuracy Verification Pretest Setup

6. On the **Power Meter**, press the **Sensor** key, the Cal Factor soft key, and then the Freq soft key.

- Use the **keypad** to enter **50 MHz** as the input signal frequency, which sets the power meter to the proper power sensor cal factor.
- Press the **Sensor** key on the power meter to display the power reading.

7. 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-6.

- Refer to Table A-6, "SA - 50 MHz Absolute Amplitude Accuracy Setup Table," on page A-4.

8. Record the Sensor B reading in the "Required Sensor B Reading" column to the test records.

- Use Table A-6 on page A-4.

9. Repeat Step #7 and Step #8 for the other input levels from –4 dBm to –50 dBm.

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 **MS8911B Digital Broadcast Field Analyzer** as shown in Figure 2-3 below.

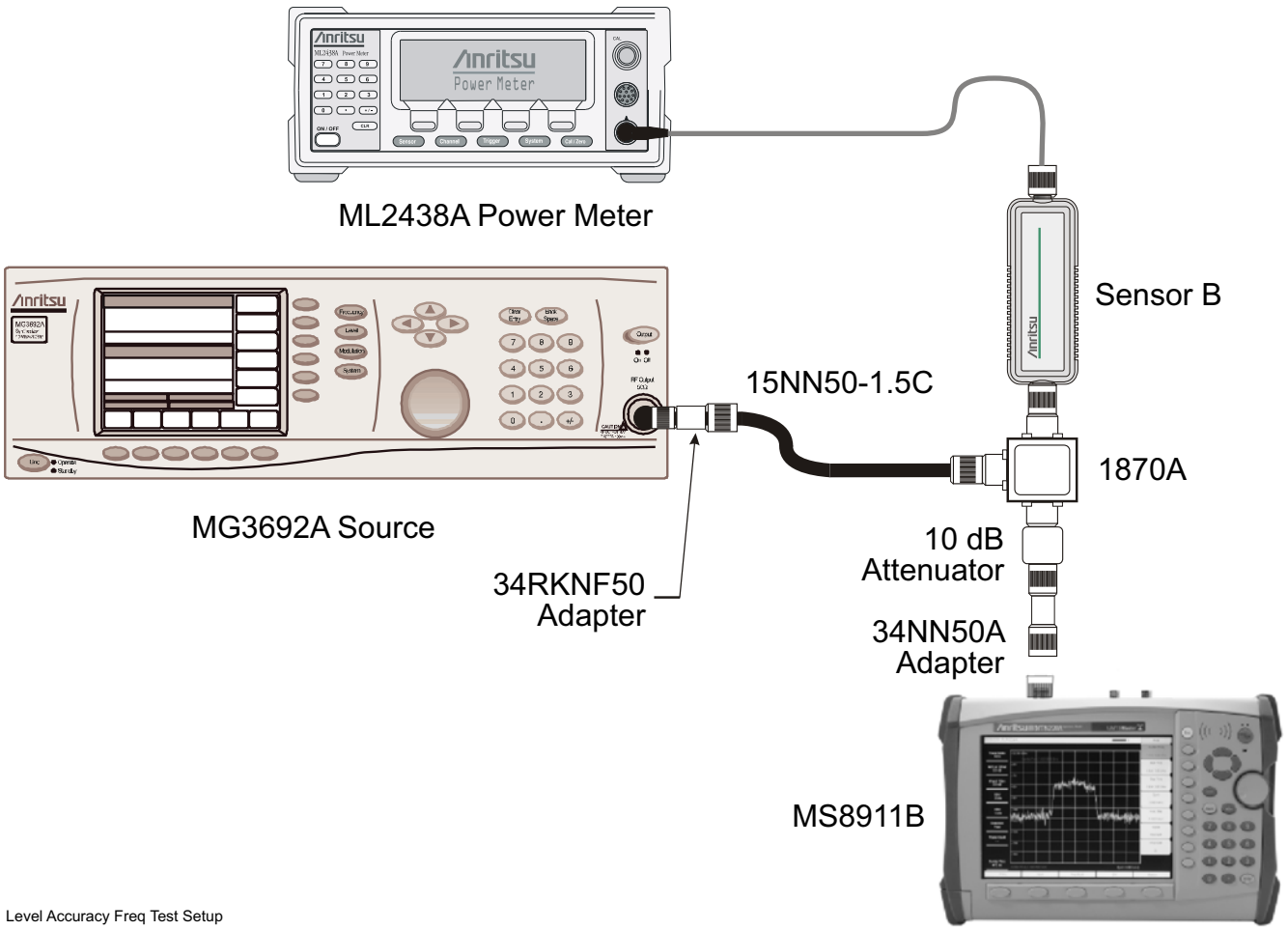

Figure 2-3. Absolute Amplitude Accuracy Verification Test Setup

2. On the **MS8911B**, 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 Freq soft key and select the Center Freq soft key.
5. Use the **keypad** to enter **50** and select the MHz soft key.
6. Press the BW soft key and the RBW soft key.
7. Use the **keypad** to enter **1** and select the kHz soft key.
8. Press the VBW soft key and use the **keypad** to enter 10, then select the Hz soft key.
9. Press the Span soft key, use the **keypad** to enter **10**, and select the kHz soft key.
10. Press the Amplitude soft key and then press the Reference Level soft key.
11. Use the **keypad** to enter **10** and press the dBm soft key.

12. Press the Atten Lvl soft key and enter **30**, then press the dB soft key.

13. 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 in Table A-6.

14. Press the Marker soft key and select the Peak Search soft key.

15. Record the Marker 1 amplitude reading in the test records.

- Use the 0 dBm row of Table A-7, "SA - 50 MHz Absolute Amplitude Accuracy," on page A-5.

16. Verify that the Marker 1 amplitude reading is within the specification.

17. Repeat Step #13 through Step #16 for the other power level settings.

- Refer to Table A-6 for Required Sensor B Readings.
- Use Table A-7 to record test results.

2-9 Amplitude Accuracy Across Frequency Verification

This procedure is the second test used to verify the absolute amplitude accuracy of the Spectrum Analyzer in the MS8911B Digital Broadcast Field Analyzer. The first procedure test is described above in Section 2-8 "50 MHz Amplitude Accuracy Verification" on page 2-14.

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

Procedure - Test Setup Component Characterization

1. Turn on the **ML2438A Power Meter**, the **MG3692X Signal Source**, and the **MS8911B Digital Broadcast Field Analyzer**.
2. On the **power meter**, press the **Channel** key, the Setup soft key and then the Channel soft key to display the Channel 2 Setup menu.
   - Press the **Input** key twice to set the Input Configuration to B.
   - Press the **Sensor** key to display both Sensor A and Sensor B readings.
3. Connect the **power sensors** to the **power meter** and calibrate the **sensors**.
4. Connect the **Power Splitter** to the **MG3692X output** and **Sensor B** to one of the **power splitter outputs**.
5. 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 , "" on page 2-15 above.

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

6. Starting with **50 MHz CW**, set the **MG3692X output** to the frequency listed in Table A-8.
   - Refer to Table A-8, "SA - Absolute Amplitude Accuracy Across Frequency Setup Table," on page A-5.
7. On the power meter, 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. This sets the **power meter** to the proper **power sensor** cal factor. Press the **Sensor** key on the power meter to display the power reading.
8. Adjust the power level reading on **Sensor A** to **–2 dBm** by adjusting the power level on the **MG3692X**.
9. Record the **Sensor B** reading in the test records.
   - Use the "Required Sensor B Reading for –2 dBm @ Attenuator Output" column of Table A-8 on page A-5.
10. Repeat Step #6 through Step #9 for all the frequencies in the "Frequency" column of Table A-8 on page A-5.

11. Repeat Step #6 through Step #10 for a power level of **–30 dBm**.
    - Refer to the Frequency column of Table A-8.
    - Record test tesults in the "Required Sensor B Reading for –30 dBm @ Attenuator Output" column of Table A-8.

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

Procedure - Measuring Amplitude Accuracy Across Frequency

1. Remove **Sensor A**, install the **34NN50A Adapter** to the end of the **Attenuator**, and connect to the MS8911B as shown in Figure 2-3, "Absolute Amplitude Accuracy Verification Test Setup" on page 2-16 above.
2. On the **MS8911B**, 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 the instrument to the default starting conditions.
4. Press the BW soft key and the RBW soft key.
5. Use the **keypad** to enter **1** and select the kHz soft key.
6. Press the VBW soft key, use the **keypad** to enter **10** and then select the Hz soft key.
7. Press the Span soft key, use the **keypad** to enter **10**, and select the kHz soft key.
8. Press the Amplitude soft key, then press the Reference Level soft key.
9. Use the **keypad** to enter **–20** 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 **Freq** key and select the Center Freq soft key.
12. Use the **keypad** to enter **50** and select the MHz soft key.
13. On the **Power Meter,** press the **Sensor** key and then the CalFactor soft key. Select the Freq soft key and enter **50 MHz** for the Input Signal Frequency. This sets the power meter to the proper power sensor cal factor. Press the **Sensor** key to display the power reading.
14. Set the **MG3692X output** to match the frequency in the preceding step.
15. Adjust the source power level so that the **Power Meter** displays the corresponding Sensor B reading as recorded for –30 dBm for this same frequency in the left columns of Table A-8, "SA - Absolute Amplitude Accuracy Across Frequency Setup Table," on page A-5.
16. Press the **Marker** key and select the Peak Search soft key.
17. Record the "Marker 1 amplitude" reading in the test records.
    - Use the "–30 dBm / 0 dB Input" column in Table A-9, "SA - Absolute Amplitude Accuracy Across Frequency for –30 dBm @ 0 dB and –30 dBm @ 5 dB," on page A-6.
18. Verify that the Marker 1 amplitude reading is within the specification.
19. Repeat Step #11 through Step #18 for the other frequencies in Table A-8 on page A-5.
20. Repeat Step #10 through Step #19 for Attenuation Levels of of **5 dB**, **10 dB**, and **20 dB** and record the results in the test records.
    - For –30 dBm / 5 dB, use the right side column in Table A-9 on page A-6.
    - For –30 dBm / 10 dB, use the left side column in Table A-10, "SA - Absolute Amplitude Accuracy Across Frequency for –30 dBm @ 10 dB and –30 dBm @ 20 dB," on page A-6.
    - For –30 dBm / 20 dB, use the right side column in Table A-10 on page A-6.

21. Set the **MG3692X** Frequency to **50 MHz** and then adjust the output power so that the **power meter** displays the corresponding **Sensor B** reading as recorded for –2 dBm in the left side column in Table A-8.
    - Refer to Table A-8, "SA - Absolute Amplitude Accuracy Across Frequency Setup Table," on page A-5.
22. On the **MS8911B**, set the Reference Level to **10 dBm** and Atten Lvl to **30 dB**.
23. Repeat Step #11 through Step #19.

2-10 Residual Spurious Response Verification

The following two tests are used to verify the residual spurious response of the Spectrum Analyzer of the **MS8911B Digital Broadcast Field Analyzer** 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 the "Residual Spurious Response Test with Preamp On" on page 2-23.

2-11 Residual Spurious Response Test with Preamp Off

Equipment Required

- Anritsu 28N50-2 50 Ohm Termination

Procedure

1. Connect the **50 Ohm Termination** to the **MS8911B Spectrum Analyzer RF Input**.
2. Press the **On/Off** key to turn on the **MS8911B Digital Broadcast Field Analyzer**.
3. On the MS8911B:
   - 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 Amplitude soft key, then press the Reference Level soft key.
6. Use the **keypad** to enter **–40** and press the dBm soft key.
7. Press the Atten Lvl soft key and enter **0**, then press the dB soft key.
8. 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.
9. Press the **Shift** key and then press the **Sweep (3)** key, then select the Detection and then the Peak soft keys.
10. Press the Freq soft key and select the Start Freq soft key.
11. Use the **keypad** to enter **100** and select the kHz soft key.
12. Press the Stop Freq soft key, enter **10** and press the MHz soft key.
13. Press the BW soft key and select the RBW soft key.
14. Use the **keypad** to enter **3** and select the kHz soft key.
15. Press the VBW soft key, use the **keypad** to enter **300** and then select the Hz soft key.
16. Wait until one sweep is completed.
17. Press the Marker soft key and select the Peak Search soft key.

18. Verify that the Marker 1 amplitude reading is –90 dBm.

Note	If a spur of amplitude 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.

19. Record the "Marker 1 amplitude" reading to the test records.

- Use Table A-12, "SA - Residual Spurious - Preamp Off," on page A-8 in Appendix A — Test Records."

20. Repeat Step #10 through Step #19 for the other frequency band settings.

2-12 Residual Spurious Response Test with Preamp On

Equipment Required

- Anritsu 28N50-2 50 Ohm Termination

Procedure

1. Connect the **50 Ohm Termination** to the **MS8911B Spectrum Analyzer RF Input**.
2. Press the **On/Off** key to turn on the **MS8911B Digital Broadcast Field Analyzer**.
3. On the **MS8911B**, 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 Amplitude soft key, then press the Reference Level soft key.
6. Use the **keypad** to enter **–40** and press the dBm soft key.
7. Press the Atten Lvl soft key and enter **0**, then press the dB soft key.
8. 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.
9. Press the **Shift** key and then press the **Sweep (3**) key, then select the Detection and then the Peak soft keys.
10. Press the BW soft key and select the RBW soft key.
11. Use the **keypad** to enter **10** and select the kHz soft key.
12. Press the VBW soft key and use the **keypad** to enter **1**, then select the kHz soft key.
13. Press the Freq soft key and select the Start Freq soft key.
14. Use the **keypad** to enter **100** and select the kHz soft key.
15. Press the Stop Freq soft key, enter **10** and press the MHz soft key.
16. Wait until one sweep is completed.
17. Press the Marker soft key and select the Peak Search soft key.
18. Record the "Marker 1 amplitude" reading in the test records and verify that it is –100 dBm.
    - Use Table A-13, "SA - Residual Spurious - Preamp On," on page A-9.
19. Repeat Step #10 through for the other frequency band settings.
20. Repeat Step #11 through Step #18 for the other Start and Stop frequencies.

Note	If a spur of amplitude larger than –100 dBm occurs, 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.

2-13 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 MS8911B Digital Broadcast Field Analyzer. 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 **MS8911B Spectrum Analyzer RF Input.**
2. Press the **On/Off** key to turn on the **MS8911B Digital Broadcast Field Analyzer**.
3. On the **MS8911B**, 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 Amplitude soft key, then press the Reference Level soft key.
6. Use the **keypad** to enter **–50** and press the dBm soft key.
7. Press the Atten Lvl soft key and enter **0**, then press the dB soft key.
8. Make sure that the Preamp is Off.
9. Press the **Shift** key and then press the **Sweep (3)** key, then select the Detection and then the RMS soft keys.
10. Press the BW soft key and select the RBW soft key.
11. Use the **keypad** to enter **100** and select the kHz soft key.
12. Select the VBW soft key.
13. Use the **keypad** to enter **1** and 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 then select Peak Search soft key.
19. Record the Marker reading to the test records.
    - Use the Measured Value @ 100 kHz RBW column in Table A-14, “SA - DANL - Preamp Off,” on page A-9.

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

20. Repeat Step #14 through Step #19 for the other frequency settings.
    - Change the VBW setting as indicated in the VBW column of Table A-14 on page A-9.
21. 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.

22. Enter the calculated values in the test records.

- Use the Calculated for 10 Hz RBW column in Table A-14 on page A-9.

23. Verify that the calculated value is less than or equal to the value in the Specification column in Table A-14 on page A-9.

24. Press the Amplitude soft key, press the Preamp On/Off soft key to turn the preamp on.

25. Repeat Step #10 through Step #23.

26. Record the Marker reading and calculated value in the test records.

- Use Table A-15, "SA - DANL - Preamp On," on page A-9.

2-14 RF Input VSWR Verification

The test in this section is used to verify the VSWR of the Spectrum Analyzer RF Input of the MS8911B.

Equipment Required:

- Anritsu MS4624x Vector Network Measurement System (VNMS)
- Anritsu 3753R N connector Calibration Kit
- Anritsu 15NN50-0.6B RF Cable

Procedure:

1. Install a **Type N Cable** on **Port 1** of the MS4624x VNMS so that the test port (open end of cable) is the **male connector**.
2. On the **MS4624x**, press the **Default** key and select Continue. Allow the unit to default.
3. Under the **Freq** key, set the Start Frequency to **10 MHz** and Stop Frequency to **7.1 GHz**.
4. Press the **CH1** key.
5. Under the **Display** key, select Display Mode and select Single Channel.
6. Under the **Meas** key, ensure S11 is selected.
7. Under the **Display** key, select Graph Type and select SWR.
8. Under the **Display** key, select Scale and Set the Resolution to **.5 (x1).** Set the Reference Value to **2.0 (x1)**
9. Under the **Display** key, select Limits. Turn the Upper Limit on and set it to **2.0 (x1)**.
10. Press the **Marker** key, set Display Markers to ON
11. Press **Marker Readout**
12. Set Marker 1 to ON
13. Press the **Cal** key and make the following selections on the menus and soft keys:
    - Perform Cal | Manual Cal | 2 Port | Next Cal Step | Reflection Only | Port 1 Only | Normal (1601 pts max) | Next Cal Step | Port 1 Connector = Type N (M) | Start Cal.
14. Perform the calibration at the end of the cable as prompted by the **VNMS**, using the female components from the cal kit (no adapters).
    - After the calibration is complete, make sure the **LED** on the **Cal** key is on.
15. On the **MS8911B**, set mode to Spectrum Analyzer and then preset the unit.
16. Under the Amplitude soft key, set the Atten Lvl to 10 dB.
17. Under the Sweep menu, set the Sweep to Single.
18. Connect the **MS8911B Spectrum Analyzer RF In** connector to the end of the cable where the calibration was performed.
19. Ensure that the red measurement data falls completely under the Limit Line. Under the **VNMS Marker** key, press **Marker to Peak**, then **Marker to Max**, and read the value.
20. Record the maximum value to the test record.
    - Use the “10 dB Attenuation” row in Table A-16, “SA - RF Input VSWR,” on page A-10.
21. Change the **MS8911B** Atten Lvl to **20 dB** and ensure the measurement falls completely under the Limit Line.
22. Record the maximum value as read from the marker in the test record.
    - Use the “20 dB Attenuation” row in Table A-16 on page A-10.

23. Change the MS8911B Atten Lvl to **60 dB** and ensure the measurement falls completely under the Limit Line.

24. Record the maximum value as read from the marker in the test record.

- Use the 60 dB Attenuation row in Table A-16 on page A-10.

Chapter 3 — ISDB-T Signal Analyzer Option 30 Verification

3-1 Introduction

The tests in this section verify the performance of the optional ISDB-T Signal Analyzer option of the **MS8911B**. The six (6) tests are:

- Frequency Accuracy and Residual Modulation Error Ratio (MER) Verification
- Frequency Lock Range Verification
- Level Accuracy Verification
- 1 dB Compression Level Verification
- Noise Floor Verification
- Phase Noise Verification

3-2 Frequency Accuracy and Residual MER Verification

The test in this section is used to verify the frequency accuracy of the **MS8911B** in ISDB-T Signal Analyzer mode.

Equipment Required

- Anritsu MG3700A Vector Signal Generator
- Anritsu 15NN50-1.5C RF Cable
- 10 MHz Reference Standard

Procedure

1. Connect the **10 MHz Frequency Reference** source to the Anritsu **MG3700A** and **MS8911B** as shown in Figure 3-1, "ISDB-T Option 30 - Signal Analyzer Test Setup" below.

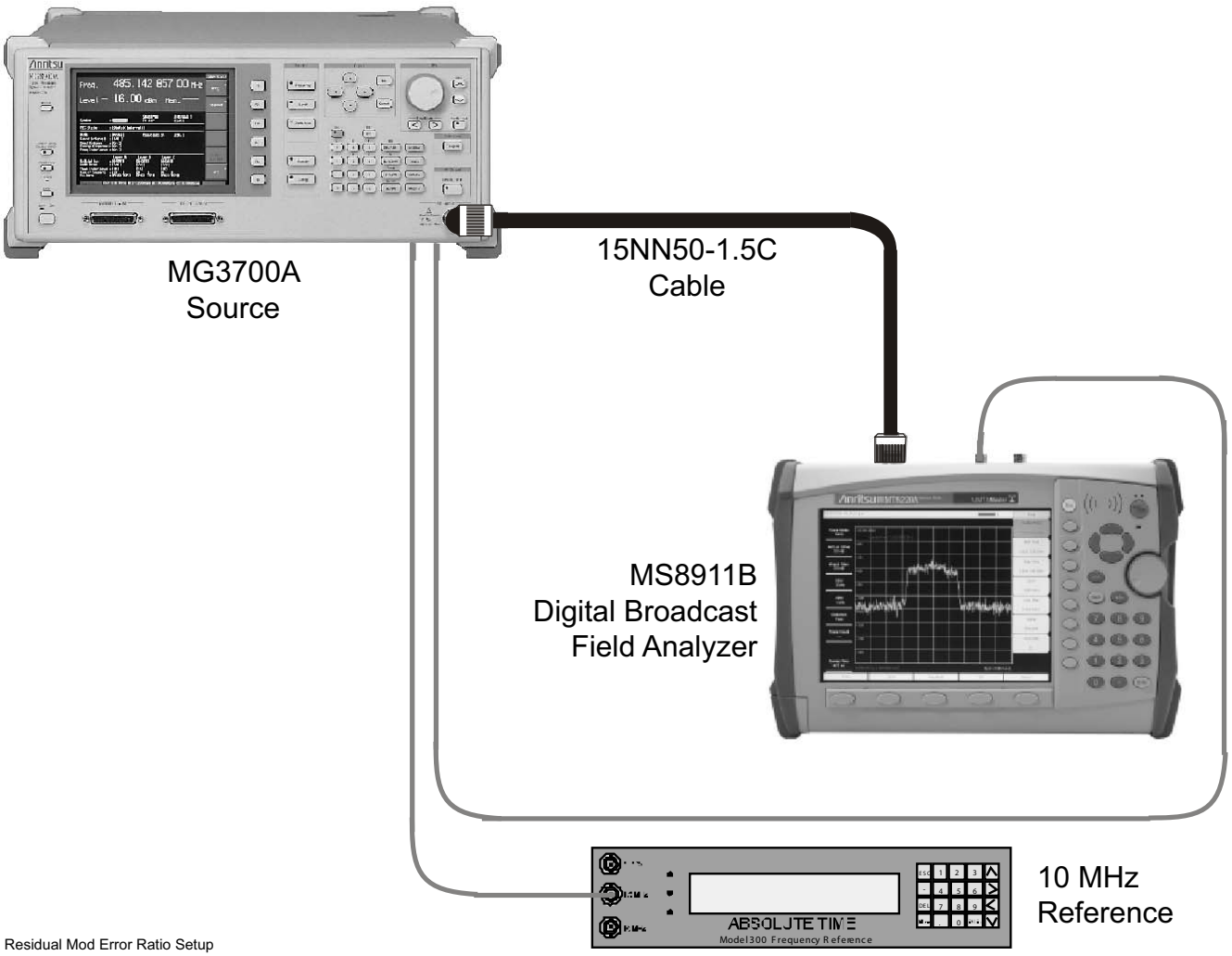

Figure 3-1. ISDB-T Option 30 - Signal Analyzer Test Setup

2. On **MG3700A** press the yellow **Preset** key located on the upper left side of the instrument.
3. Press the **Down Arrow** key to select Yes.
4. Press the **Set** key
   - Note that there are two **Set** keys and they both provide the same functions.
5. Press the F1 soft key to select Load File to Memory.
6. Press the F1 soft key again to select Select Package.
7. Using the **Down Arrow** key, step through the selection list until the Digital_Broadcast option is highlighted.
8. Press the **Set** key.
9. Press the F6 soft key labeled Return.
10. Press the **Set** key.
11. Using the **Down Arrow** key, step through the selection list until the Digital_Broadcast option is highlighted.
12. Press the **Set** key.
13. Using the **Down Arrow** key, step through the selection list until the ISDB-T_1layer_1ch option is highlighted.
14. Press the **Set** key.
15. Set the **Frequency** to **473.14285714 MHz**.
16. Set the **Level** to **–20 dBm**.
17. Ensure that the **Modulation On/Off** key and the **Output** key both have LEDs on.
18. Set the mode of the MS8911B to ISDB-T Signal Analyzer.
    - Press the **Shift** key, the **Preset (1)** key and then select the Preset soft key to reset the unit.
19. Ensure that **Channel** is set to **13**.
20. Press the Meas Selection soft key, then select Modulation Analysis.
21. Input the **MG3700A** signal into the **Spectrum Analyzer RF In** connector of the **MS8911B**.
22. On **MS8911B**, press the Frequency/Level soft key, set the Reference Level to **–20 dBm**.
23. Press the Meas Setup soft key and then the Meas Mode soft key.
24. Use the rotary **knob** to highlight Average and then press the **Enter** key.
25. Set the Average Count to **10**.
26. Wait until the Average (10/10) appears at the top of the display.
27. Record the Frequency Error as shown on the **MS8911B** display to the test records.
    - Use the "Preamp Off Frequency Error" column and the "Channel 13" row in Table A-17, "ISDB-T Signal Analyzer Option 30 - Frequency Accuracy," on page A-11 in Appendix A — Test Records.
28. Record the "Total MER (Modulation Error Ratio)" as shown on the **MS8911B** display to the test records.
    - Use the "Total MER Preamp Off" column and the "Channel 13" row in Table A-18, "ISDB-T Signal Analyzer Option 30 - Residual MER," on page A-11.
29. Under the Frequency/Level soft key, set the **MS8911B** to Channel **38**.
30. Set the frequency of the **MG3700A** to **623.14285714 MHz**.
31. Press the Execute Measure soft key.
32. Wait until the Average (10/10) appears at the top of the display.
33. Record the Frequency Error as shown on the **MS8911B** display to the test records.

- Use the "Preamp Off Frequency Error" column and the "Channel 38" row in Table A-17 on page A-11.

34. Record the Total MER as shown on the **MS8911B** display to the test records.

- Use the "Total MER Preamp Off" column and the Channel 38 row in Table A-18 on page A-11.

35. Set the MS8911B to **Channel 62**.

36. Set the frequency of the **MG3700A** to **767.14285714 MHz**.

37. Press the Execute Measure soft key.

38. Wait until the Average (10/10) appears at the top of the display.

39. Record the Frequency Error as shown on the **MS8911B** display to the test records.

- Use the "Preamp Off Frequency Error" column and the "Channel 62" row in Table A-17 on page A-11.

40. Record the Total MER as shown on the **MS8911B** display to the test records.

- Use the "Total MER Preamp Off" column and the "Channel 62" row in Table A-18 on page A-11.

41. On the **MG3700A**, set the **Frequency** to **473.14285714 MHz** and the output level to **–50 dBm**.

42. On the **MS8911B**, press the Frequency/Level soft key, then press the Preamp soft key to turn the Preamp on.

43. Set the Reference Level to **–50 dBm**.

44. Press the Execute Measure soft key.

45. Repeat the steps above from Step #26 through Step #40.

- Record the Frequency Error to the "Preamp On Frequency Error" column in Table A-17 on page A-11.
- Record the Total MER to the "Total MER Preamp On" column in Table A-18 on page A-11.

3-3 Frequency Lock Range Verification

The test in this section can be used to verify the frequency lock range of the **MS8911B** in ISDB-T Signal Analyzer mode.

Equipment Required

- Anritsu MG3700A Vector Signal Generator
- Anritsu 15NN50-1.5C RF Cable
- 10 MHz Reference Standard

Procedure

1. Connect the **10 MHz Frequency Reference** source to the Anritsu **MG3700A** and **MS8911B** as shown above in Figure 3-1, "ISDB-T Option 30 - Signal Analyzer Test Setup" on page 3-2.
2. On the **MG3700A**, press the yellow **Preset** key located on the upper left side of the instrument.
3. Press the **Down Arrow** key to select Yes.
4. Press the **Set** key
    - Note that there are two **Set** keys and they both provide the same functions.
5. Press the F1 soft key to select Load File to Memory.
6. Press the F1 soft key again to select Select Package.
7. Use the **Down Arrow** key to step through the selection list until the Digital_Broadcast option is highlighted.
8. Press the **Set** key.
9. Press the F6 soft key labeled Return.
10. Press the **Set** key.
11. Use the **Down Arrow** key to step through the selection list until the Digital_Broadcast option is highlighted.
12. Press the **Set** key.
13. Use the **Down Arrow** key to step through the selection list until the ISDB-T_1layer_1ch option is highlighted.
14. Press the **Set** key.
15. Set the **Frequency** to **473.23285714 MHz**.
16. Set the **Level** to **–20 dBm**.
17. Ensure the **Modulation On/Off** key and the **Output** key both have LEDs on.
18. Set the mode of the **MS8911B** to ISDB-T Signal Analyzer. Press the **Shift** key, the **Preset (1)** key, and then select the Preset soft key to reset the unit.
19. Input the **MG3700A** signal into the **Spectrum Analyzer RF In** connector of the **MS8911B**.
20. On **MS8911B**, press the Frequency/Level soft key and ensure Channel is set to **13**.
21. Set the **Reference Level** to **–20 dBm**.
22. Press the Meas Selection soft key and select Modulation Analysis.
23. Press the Meas Setup soft Key and then the Meas Mode soft key.
24. Use the rotary **knob** to highlight Average and press the **Enter** key.
25. Press the Average Count soft key, then enter **10** and press the **Enter** key.
26. Wait until Average (10/10) appears at the top of the display.

27. Record the Frequency Error in the test records.

- Use Table A-19, "ISDB-T Signal Analyzer Option 30 - Frequency Lock Range," on page A-11.

28. On the **MG3700A** set the frequency to **473.05285714 MHz.**

29. Press Execute Measure to read the new frequency.

30. Wait until Average (10/10) appears at the top of the display.

31. Record the Frequency Error in the the test records.

- Use Table A-19 on page A-11.

3-4 Level Accuracy Verification

The tests in this section verify the level accuracy of the MS8911B in ISDB-T Signal Analyzer mode.

Equipment Required

- Anritsu MG3700A Vector Signal Generator
- Anritsu MN63A Programmable Attenuator
- Anritsu ML2438A Power Meter
- Anritsu MA2482D Power Sensors (2)
- Anritsu 1N50C RF Limter
- Anritsu 34NN50A Adapter
- Anritsu 15NNF50-1.5C RF Coaxial Cables (3)
- Aeroflex/Weinschel 1870A Power Splitter
- Aeroflex/Weinschel 44-10 10 dB Fixed Attenuator
- Mini-Circuits TIA-1000-1R8 RF Power Amplifier
- Midwest Microwave ADT-2615-NF-BNM-02 Adapters (2)

Procedure

1. Ensure that the **Power Amplifier** is off.
2. Connect the **MG3700A Signal Generator**, **Power Amplifier** with **N(f)-BNC(m) adapters**, **RF Limiter**, **MN63A Programmable Attenuator**, **Power Divider**, **Power Meter**, and **Power Sensors** as shown in Figure 3-2, "ISDB-T Option 30 - Level Accuracy and 1 dB Compression Level Pretest Setup - Two Sensors" below.

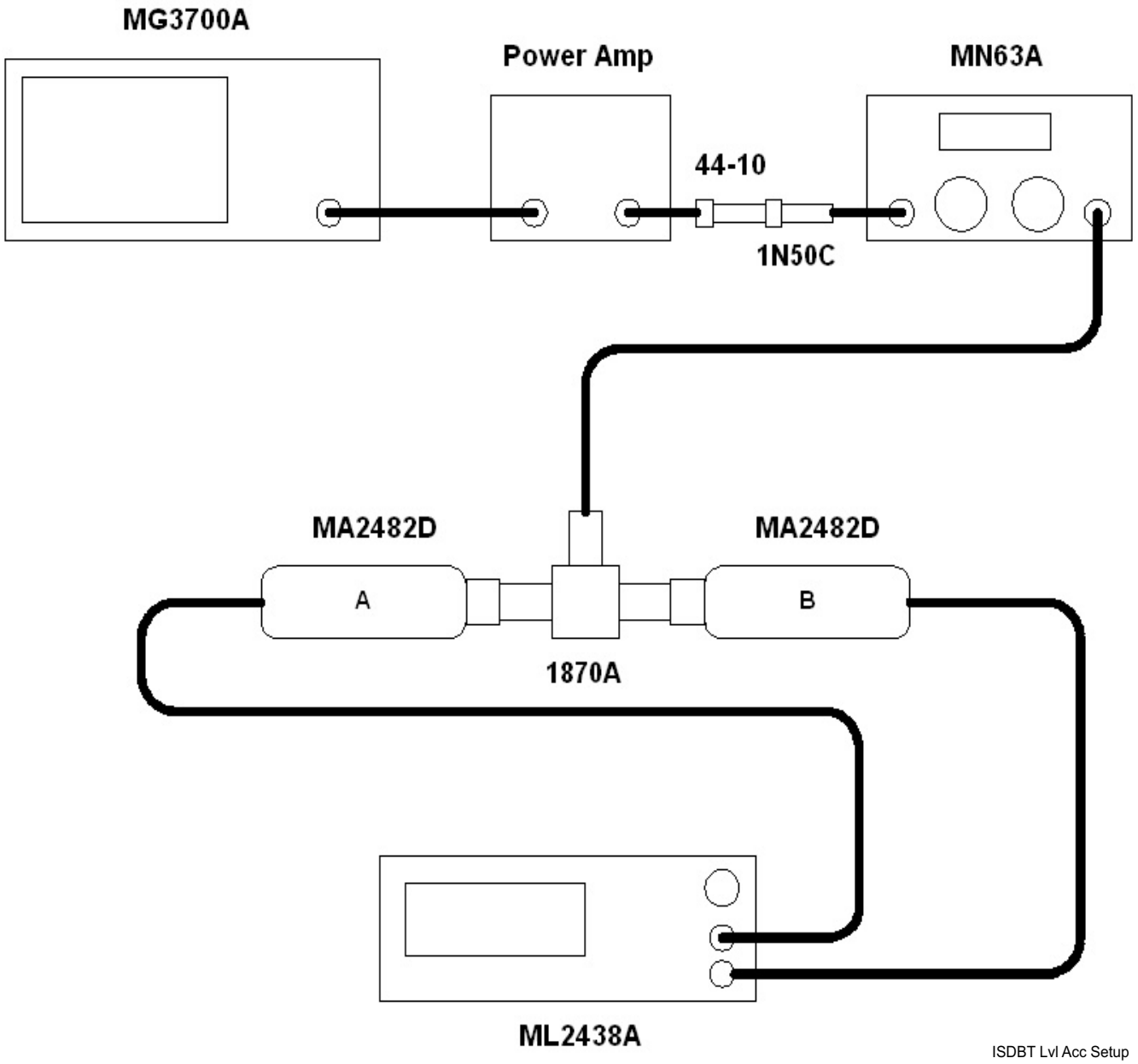

Figure 3-2. ISDB-T Option 30 - Level Accuracy and 1 dB Compression Level Pretest Setup - Two Sensors

3. On MG3700A, press the yellow **Preset** key located on the upper left side of the instrument.

4. Press the **Down Arrow** key to select Yes.

5. Press the **Set** key

- Note that there are two **Set** keys and they both do the same thing.

6. Press the F1 soft key to select Load File to Memory.

7. Press the F1 soft key again to select Select Package.

8. Using the **Down Arrow** key, step through the selection list until the Digital_Broadcast option is highlighted.
9. Press the **Set** key.
10. Press the F6 soft key labled Return.
11. Press the **Set** key.
12. Using the **Down Arrow** key, step through the selection list until the Digital_Broadcast option is highlighted.
13. Press the **Set** key.
14. Using the **Down Arrow** key, step through the selection list until the ISDB-T_1layer_1ch option is highlighted.
15. Press the **Set** key.
16. Perform Zero/Cal on **Sensor A** and **Sensor B** of the power meter.
    - Set the cal factor of both sensors to **473 MHz**.
17. Set the **MG3700A Frequency** to **473.14285714 MHz**.
18. Set the **Level** to **–25 dBm**.
19. Ensure the **Modulation On/Off** key and the **Output** key both have LEDs ON.
20. Turn on power amplifier and allow it to warm up for at least 5 minutes.
21. Adjust the MN63A attenuator so that Sensor A Reading is **–10 dBm ± 1 dB**. Record the attenuation reading.
    - Use the "MN63A Attenuation Reading AT(–10)" column in Table 3-1, "Readings for Sensor A, Sensor B, DAB(–10), and MN63A Attenuation AT(–10)" below.
22. On the MG3700A, adjust the power level so that **Power Meter Sensor A** reading is **–10.0 dBm ± 0.2 dB**.
23. Record the following values to the appropriate columns in Table 3-1, "Readings for Sensor A, Sensor B, DAB(–10), and MN63A Attenuation AT(–10)":
    - Power Meter Sensor A reading to the "Sensor A Reading" column
    - Power Meter Sensor B reading to the "Sensor B Reading" column
24. Subtract Sensor A Reading from Sensor B reading and record the result to the "DAB(–10)" column.
    - DAB(–10) = Sensor B Reading – Sensor A Reading
    - Use the "DAB(–10)" column of Table 3-1, "Readings for Sensor A, Sensor B, DAB(–10), and MN63A Attenuation AT(–10)" below.

Table 3-1. Readings for Sensor A, Sensor B, DAB(–10), and MN63A Attenuation AT(–10)

Frequency (Channel)	Sensor A Reading	Sensor B Reading	DAB(–10)	MN63A Attenuation Reading, AT(–10)
473.14285714 MHz (Ch 13)				
623.14285714 MHz (Ch 38)				
767.14285714 MHz (Ch 62)				

25. Calculate the AT(set) values for Test Levels **–10 dBm** through **–45 dBm** and record the values.

- Use the "AT(set)" column in Table A-20, "ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-12.

26. Remove **Sensor A** from the **Power Splitter** and then connect the **Power Splitter** to the **MS8911B Spectrum Analyzer RF In** with an **N-Male to N-Male** adapter as shown below in Figure 3-3, "ISDB-T Option 30 - Level Accuracy and 1 dB Compression Level Pretest Setup - Sensor B Only".

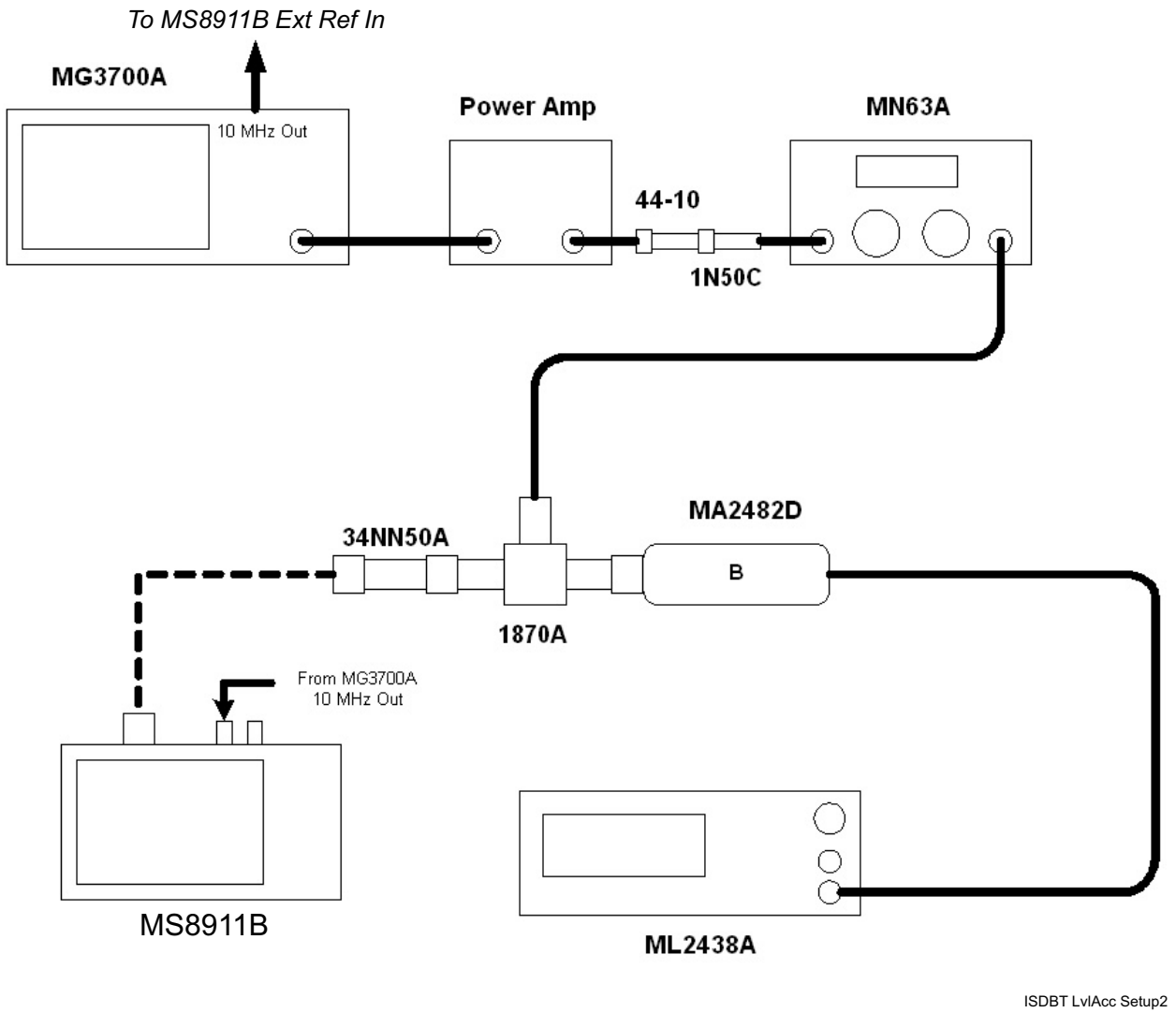

Figure 3-3. ISDB-T Option 30 - Level Accuracy and 1 dB Compression Level Pretest Setup - Sensor B Only

27. Record the new Power Meter Sensor B reading to the SB(–10) box in the test record.

- Use the "SB(–10) or SB(–50) (dBm)" column and the "SB(–10)" box in Table A-20, "ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-12.

28. On the MS8911B, set the mode to ISDB-T Signal Analyzer and preset the unit.

29. Press the Meas Selection soft key, ensure Field Strength is selected.

30. Press the Frequency/Level soft key, ensure **Channel** is **13** and Preamp is Off.

31. Change the Reference Level to **–10 dBm**.

32. Press the Meas Setup soft key and then the Meas Mode soft key.

33. Use **Up/Down** arrow keys and highlight Average and press the **Enter** key.

34. Change the Average Count to **50** if required.

35. After Average (50/50) appears at the top of the display, record the Channel Power from the MS8911B to the "M(Level)" column under "Preamp Off" on the test record.

- Use the "Preamp Off - M(Level) (dBm)" column in Table A-20, "ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-12.

36. Calculate the Deviation using the following formula:

- Deviation = M(Level) – SB(–10) – DAB(–10) – AT(–10) + AT(set)

Note	Since AT(–10) is the same as AT(set), [–AT(–10) + AT(set)] = 0

37. Record the result to the Dev column under "Pre Amp Off" on the test record and verify that it is within specification.

- Use the "Preamp Off - Dev (dB)" column in Table A-20, "ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-12.

38. Set the MN63A attenuation to the next AT(set) value in the test record.

39. Press the Frequency/Level soft key and set the Reference Level of MS8911B to **–15 dBm**.

40. After Average (50/50) appears, record the **–15 dBm Channel Power** from the MS8911B.

- Use the "Preamp Off - M(Level) (dB)" column in Table A-20, "ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-12.

41. Calculate the Deviation using the following formula:

- Deviation = M(Level) – SB(–10) – DAB(–10) – AT(–10) + AT(set)

42. Record the result to the Dev column under "Pre Amp Off" on the test record and verify that it is within specification.

- Use the "Preamp Off - Dev (dB)" column in Table A-20, "ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-12.

43. Set the MN63A attenuation to the next AT(set) value in the test record.

44. Set the Reference Level of MS8911B to **–20 dBm**.

45. After Average (50/50) appears, record the **–20 dBm Channel Power** from the MS8911B to the test record.

- Use the "Preamp Off - M(Level) (dB)" column in Table A-20, "ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-12.

46. Calculate the Deviation using the following formula:

- Deviation = M(Level) – SB(–10) – DAB(–10) – AT(–10) + AT(set)

47. Record the result to the Dev column under "Pre Amp Off" on the test record and verify that it is within specification.

- Use the "Preamp Off - Dev (dB)" column in Table A-20, "ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-12.

48. Press the Frequency/Level soft key and set Preamp to On. Change Reference Level if required.

49. After Average (50/50) appears, record the **–20 dBm Channel Power** from the MS8911B.

- Use the "Preamp On - M(Level)" column in Table A-20, "ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-12.

50. Calculate the Deviation using the following formula:

- Deviation = M(Level) – SB(–10) – DAB(–10) – AT(–10) + AT(set)

51. Record the result to the Dev column under "Pre Amp On" on the test record and verify that it is within specification.

- Use the "Preamp On -Dev (dB)" column in Table A-20, "ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-12.

52. Repeat Step #43 through Step #51 for Test levels **–25 dBm** to **–45 dBm**. Change Reference Level and switch Preamp per the "Ref Level Preamp On/Off" column in test record.

- See the "Ref Level Preamp Off/On" column in Table A-20, "ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-12 for required values.

53. Turn off the **Power Amplifier**, disconnect the **Power Splitter** from the MS8911B, re-connect Sensor A to the power splitter as shown in Figure 3-2, "ISDB-T Option 30 - Level Accuracy and 1 dB Compression Level Pretest Setup - Two Sensors" on page 3-8.

54. Set the **MN63A Attenuation** to **10 dB**.

55. Set the **MG3700A Level** to **–60 dBm.**

56. Turn on the **Power Amplifier** and allow it to warm up for at least 5 minutes.

57. Adjust the **MN63A Attenuator** so that the Sensor A Reading is **–50 dBm ± 1 dB**. Record the attenuation reading.

- Use the "MN63A Attenuation Reading AT–50)" column in Table 3-2, "Readings for Sensor A, Sensor B, DAB(–50), and MN63A Attenuator AT(–50)," on page 3-12 below.

58. On MG3700A adjust power level so that Power Meter Sensor A Reading is **–50.0 dBm ± 0.2 dBm**.

59. Record the following values to the appropriate columns in Table 3-2, "Readings for Sensor A, Sensor B, DAB(–50), and MN63A Attenuator AT(–50)":

- Power Meter Sensor A reading to the "Sensor A Reading" column
- Power Meter Sensor B reading to the "Sensor B Reading" column

60. Subtract Sensor A Reading from Sensor B reading and record the result.

- DAB(–50) = Sensor B Reading – Sensor A Reading
- Record the calculations in the "DAB(–50)" column of Table 3-2, "Readings for Sensor A, Sensor B, DAB(–50), and MN63A Attenuator AT(–50)".

Table 3-2. Readings for Sensor A, Sensor B, DAB(–50), and MN63A Attenuator AT(–50)

Frequency (Channel)	Sensor A Reading	Sensor B Reading	DAB(–50)	MN63A Attenuation Reading, AT(–50)
473.14285714 MHz (Ch 13)				
623.14285714 MHz (Ch 38)				
767.14285714 MHz (Ch 62)				

61. Calculate the AT(set) values for Test Levels –55 dBm through –84 dBm and record the values to the "AT(set)" column on the test record.

- Use the "AT (set) (dB)" column in Table A-20, "ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-12.

62. Remove **Sensor A** from the **Power Splitter** and then connect the **Power Splitter** to the **MS8911B Spectrum Analyzer RF In** with an **N-Male to N-Male Adapter** as shown in Figure 3-3, "ISDB-T Option 30 - Level Accuracy and 1 dB Compression Level Pretest Setup - Sensor B Only" on page 3-10.

63. Record the new **Power Meter** Sensor B reading to the "SB(–50)" box in the test record.

- Use the "SB(–10) Or SB(–50) (dBm)" column and the "SB(–50)" box in Table A-20, "ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-12.

64. Repeat Step #43 through Step #51 for Test levels **–50 dBm** to **–84 dBm**.

- Change Reference Level and switch the Preamp on or off per the "Ref Level Pre Amp On/Off" column in Table A-20 on page A-12.

65. Use the following formula to calculate Deviation (Dev):

- Deviation = M(Level) – SB(–50) – DAB(–50) – AT(–50) + AT(set)

66. Repeat Step #16 through Step #64 for a frequency of 623.14285714 MHz (Ch 38). Set the cal factor of both Power Sensors to **623 MHz** and record results in the test records.

- Use Table A-21, "ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 38ch @ 623.14285714 MHz," on page A-13 to record results.

67. Repeat Step #16 through Step #64 for a frequency of 767.14285714 MHz (Ch 62). Set the cal factor of both Power Sensors to **767 MHz** and record results in the Test Records.

- Use Table A-22, "ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 62ch @ 767.14285714 MHz," on page A-14 to record results.

3-5 1 dB Compression Level Verification

The tests in this section verify the accuracy of the MS8911B is not degraded by compression when operating in the ISDB-T Signal Analyzer mode.

Equipment Required

- Anritsu MG3700A Vector Signal Generator
- Anritsu MN63A Programmable Attenuator
- Anritsu ML2438A Power Meter
- Anritsu MA2482D Power Sensors (2)
- Anritsu 1N50C RF Limter
- Anritsu 34NN50A Adapter
- Anritsu 15NNF50-1.5C RF Coaxial Cables (3)
- Aeroflex/Weinschel 1870A Power Splitter
- Aeroflex/Weinschel 44-10 10 dB Fixed Attenuator
- Mini-Circuits TIA-1000-1R8 RF Power Amplifier
- Midwest Microwave ADT-2615-NF-BNM-02 Adapters (2)

Procedure

1. Ensure that the **Power Amplifier** is off.
2. On the **Power Meter:**
   - Set Low Level Averaging to **Low**
   - Set Averaging to **Moving** with 50 averages.
   - Set the Power Meter to read **True RMS**.
3. Perform a Zero/Cal on both sensors of the power meter.
4. Connect the **MG3700A Signal Generator**, **Power Amplifier** with **N(f)-BNC(m) Adapters**, **RF Limiter**, **MN63A Programmable Attenuator**, **Power Divider**, **Power Meter**, and **Power Sensors** as shown in Figure 3-2, “ISDB-T Option 30 - Level Accuracy and 1 dB Compression Level Pretest Setup - Two Sensors” on page 3-8.
5. On the MG3700A, press the **MOD On/Off** button to turn Modulation off.
   - The **MOD On/Off LED** is off.
6. Set the Level output of the MG3700A to **–25 dBm**.
7. Set the MN63A attenuation to **20 dB**.
8. Turn on the **power amplifier** and allow it to warm up at least five minutes.

473.14285714 MHz Tests

9. Set the cal factor of both sensors to **473 MHz**.
10. Set the MG3700A Frequency to **473.14285714 MHz**.
11. Adjust the MN63A attenuation so that the **Power Meter Sensor A** reading is **–25 dBm ± 1 dB**. Record the MN63A Attenuation reading.
    - Use the “AT(–25)” column of Table 3-3, “Readings for Sensor A and MN63A Attenuation at AT(–25), AT(–15), AT(–50), and AT(–43)” below.

12. Adjust the Level of the MG3700A so that **Power Meter Sensor A** reads **–25.0 dBm ± 0.05 dB**. Record the Sensor A reading.
    - Use the "Sensor A Reading M(Sa)" column of Table 3-3, "Readings for Sensor A and MN63A Attenuation at AT(–25), AT(–15), AT(–50), and AT(–43)" below.

Table 3-3. Readings for Sensor A and MN63A Attenuation at AT(–25), AT(–15), AT(–50), and AT(–43)

Frequency (Channel)	Sensor A Reading M(Sa)	MN63A Attenuation Reading, AT(–25)	MN63A Attenuation Reading, AT(–15)	MN63A Attenuation Reading, AT(–50)	MN63A Attenuation Reading, AT(–43)
473.14285714 MHz (Ch 13)					
623.14285714 MHz (Ch 38)					
767.14285714 MHz (Ch 62)					

13. Remove **Sensor A** from the splitter and connect the **MS8911B RF In** to the open end of the splitter using an adapter as shown in Figure 3-3, "ISDB-T Option 30 - Level Accuracy and 1 dB Compression Level Pretest Setup - Sensor B Only" on page 3-10.
14. Set the MS8911B to ISDB-T Signal Analyzer mode and **preset** the unit.
15. Press the Meas Selection soft key, ensure Field Strength is activated.
16. Ensure the MS8911B Channel is set to **13** and Pre Amp is Off.
17. Set the Reference Level to **–25 dBm**.
18. Record the MS8911B Channel Power reading of MeasCP(–25) to the test record.
    - Use the "Channel 13 - Meas Value (dBM)" column in the "–25 dBm Test Level" row in Table A-23, "ISDB-T Signal Analyzer Option 30 - 1 dB Compression Level - Preamp Off".
19. Calculate the difference, Delta(–25), using the following formula:
    - Delta(–25) = M(Sa) – MeasCP(–25)
20. Record the result to the Delta column on the test record. Verify that the result is less than 1 dB.
    - Use the "Channel 13 - Delta (dB)" column in the "–25 dBm Test Level" row in Table A-23 on page A-14.
21. Calculate AT(–15) using the following formula:
    - AT(–15) = AT(–25) –10
22. Set the **MN63A** attenuation to **AT(–15)**.

Note	Note that the **Over Range** message on the MS8911B is normal.

23. Record the **MS8911B** Channel Power reading MeasCP(–15) to the "–15 dBm Test Level" row of the "Meas. Value" column on the test record.
    - Use the "Meas Value (dBm)" column on the "–15 Test Level (dBm)" row in Table A-23, "ISDB-T Signal Analyzer Option 30 - 1 dB Compression Level - Preamp Off".
24. Calculate the Delta at –15 dBm Input using the following formula:
    - Delta(–15) = M(Sa) + 10 – MeasCP(–15) + Delta(–25)

25. Record the result to the "Delta" column on the test record. Verify that it is less than 1 dB.

- Use the "Channel 13 - Delta (dB)" column in the "–15 dBm Test Level" row in Table A-23, "ISDB-T Signal Analyzer Option 30 - 1 dB Compression Level - Preamp Off".

26. Calculate the value of AT(–50) using the following formula:

- AT(–50) = ATT(–25) + 25

27. Adjust the **MN63A** attenuation to **AT(–50)**.

28. Set the Reference Level on the MS8911B to **–50 dBm** and turn the Preamp on.

29. Record the MS8911B Channel Power reading, MeasCP(–50), to the "–50 dBm Test Level" row of in the "Meas. Value" column on the test record.

- Use the "Channel 13 - Meas Value (dBm)" column in the "–50 dBm Test Level" row in Table A-24, "ISDB-T Signal Analyzer Option 30 - 1 dB Compression Level - Preamp On," on page A-15.

30. Calculate the Delta at –50 dBm Input, Delta(–50), using the following formula:

- Delta(–50) = M(Sa) – 25 – MeasCP(–50) + Delta(–25)

31. Record the result to the "Delta" column on the test record. Verify that it is less than 1 dB.

- Use the "Channel 13 - Delta (dB)" column in the "–50 dBm Test Level" row in Table A-24 on page A-15.

32. Calculate the AT(–43) using the following formula:

- AT(–43) = AT(–25) + 18

33. Set the MN63A attenuation to AT(–43).

Note	Note that the Over Range on the MS8911B is normal.

34. Record the MS8911B Channel Power reading, MeasCP(–43), in the "–43 dBm Test Level" row of the "Meas. Value" column on the test record.

- Use the "Channel 13 - Meas Value (dBm)" column in the "–50 dBm Test Level" row in Table A-24 on page A-15.

35. Calculate the Delta at –43 dBm Input, Delta(–43), using the following formula:

- Delta(–43) = M(Sa) – 18 – MeasCP(–43) + Dev(–50)

36. Record the result to the "Delta" column on the test record. Verify that it is less than 1 dB.

- Use the "Channel 13 - Delta (dB)" column in the "–43 dBm Test Level" row in Table A-24 on page A-15.

623.14285714 MHz Tests

37. Remove the **MS8911B** from the test setup and re-install **Sensor A** to the open **splitter** output as shown in Figure 3-2, "ISDB-T Option 30 - Level Accuracy and 1 dB Compression Level Pretest Setup - Two Sensors" on page 3-8.

38. Set the **MG3700A** Frequency to **623.14285714 MHz**. Ensure the **Mod On/Off LED** is off.

39. Set the cal factor of both **sensors** to **623 MHz**.

40. Adjust the MN63A attenuation so that the **Power Meter Sensor A** reads **–25 dBm ± 1 dB**. Record the MN63A attenuation readout.

- Use the "AT(–25)" column in Table 3-3, "Readings for Sensor A and MN63A Attenuation at AT(–25), AT(–15), AT(–50), and AT(–43)," on page 3-15 above.

41. Adjust the Level of the **MG3700A** so that the **Power Meter Sensor A** reads **–25.0 dBm ± 0.05 dB**. Record the Sensor A reading to the "M(Sa)" column in Table 3-3 on page 3-15 above.

- Use the "Sensor A Reading M(Sa)" column in Table 3-3 on page 3-15 above.

42. Remove **Sensor A** from the **splitter** and connect the **MS8911B RF In** to the open end of the splitter using an adapter as shown in Figure 3-3, "ISDB-T Option 30 - Level Accuracy and 1 dB Compression Level Pretest Setup - Sensor B Only" on page 3-10.
43. Set the **MS8911B** Channel to **38**.
44. Set Preamp to Off and Reference Level to **–25 dBm**.
45. Repeat Step #18 through Step #36 for Channel 38.

767.14285714 MHz Tests

46. Remove the **MS8911B** from the test setup and re-install **Sensor A** to the open **splitter** output as shown in Figure 3-2, "ISDB-T Option 30 - Level Accuracy and 1 dB Compression Level Pretest Setup - Two Sensors" on page 3-8.
47. Set the **MG3700A** Frequency to **767.14285714 MHz.** Ensure the **Mod On/Off LED** is off.
48. Set the cal factor of both **sensors** to **767 MHz**.
49. Adjust the **MN63A** attenuation so that the **Power Meter Sensor A** reads **–25 dBm ± 1 dB**. Record the **MN63A** attenuation readout.
    - Use the "AT(–25)" column in Table 3-3, "Readings for Sensor A and MN63A Attenuation at AT(–25), AT(–15), AT(–50), and AT(–43)," on page 3-15 above.
50. Adjust the Level of the MG3700A so that the **Power Meter Sensor A** reads **–25.0 dBm ± 0.05 dB**. Record the Sensor A reading.
    - Use the "Sensor A M(Sa)" column in Table 3-3 on page 3-15.
51. Remove **Sensor A** from the **splitter** and connect the **MS8911B RF In** to the open end of the splitter using an adapter as shown in Figure 3-3, "ISDB-T Option 30 - Level Accuracy and 1 dB Compression Level Pretest Setup - Sensor B Only" on page 3-10 above.
52. Set the **MS8911B** Channel to **62**.
53. Set Preamp to Off and Reference Level to **–25 dBm**.
54. Repeat Step #18 through Step #36 for Channel 62.

3-6 Noise Floor Verification

The tests in this section verify the noise floor of the MS8911B in ISDB-T Signal Analyzer mode.

Equipment Required

- Anritsu 28N50-2 50 Ohm Termination

Procedure

1. Set the mode of the **MS8911B** to ISDB-T Signal Analyzer and **preset** the unit.
2. Install a **50 ohm termination** to the **Spectrum Analyzer RF In** connector.
3. Press the Meas Selection soft key, then select Field Strength.
4. Ensure the **Channel** is set to **13** and Preamp is OFF.
5. Set the Reference Level to **–25 dBm**.
6. Press the Meas Setup soft key. Change Meas Mode to Average and leave Average Count set to **50**.
7. After Average (50/50) appears, record the Channel Power onto the "Pre Amp OFF" line of the test record.
   - Use the "Preamp Off - Measured Value" column in Table A-25, "ISDB-T Signal Analyzer Option 30 - Noise Floor," on page A-15.
8. Set the Reference Level to **–50 dBm** and the Preamp to ON.
9. After Average (50/50) appears, record the Channel Power onto the "Pre Amp ON" line of the test record.
   - Use the "Preamp On - Measured Value" column in Table A-25 on page A-15.
10. Change the channel to 38. Set the Preamp to OFF.
11. Repeat Step #5 through Step #9 for Channel 38.
12. Change the channel to 62. Set the Preamp to OFF.
13. Repeat Step #5 through Step #9 for Channel 62.

3-7 Phase Noise Verification

This test verifies the phase noise of the MS8911B in the ISDB-T Signal Analyzer mode.

Equipment Required

- Anritsu MG3700A Vector Signal Generator
- 10 MHz Reference Standard

Procedure

1. Connect the **10 MHz Frequency Reference** signal to the **MG3700A** and the **MS8911B**.
2. Set the **MG3700A** Frequency to **473.14285714 MHz**. Set the Level to **–10 dBm**.
3. Press the **Mod On/Off** key so that the LED is OFF.
4. Input the RF signal from **MG3700A** into the **MS8911B Spectrum Analyzer RF In**.
5. Set the mode of the **MS8911B** to ISDB-T Signal Analyzer and **preset** the unit.
6. Press the Frequency/Level soft key and ensure the unit is set to **Channel 13**. Change the Reference Level to **–10 dBm** and ensure that the Preamp is OFF.
7. Press the Meas Selection soft key and select Phase Noise. A **red dot** appears on soft key label.
8. Press the Meas Setup soft key and then the Meas Mode soft key. Use the **Down arrow** key to select Average and press the **Enter** key.
9. Wait until the Average counter displays (10/10).
10. Record the 10 kHz and the 100 kHz Phase Noise readouts onto the test record.
    - Use the "Phase (10 kHz) (dBc/Hz)" and the "Phase (100 kHz (dBc/Hz)" columns in the "Channel 13" row in Table A-26, "ISDB-T Signal Analyzer Option 30 - Phase Noise," on page A-15.
11. Record the Frequency Error onto the test record.
    - Use the "Freq Error (Hz)" column in the "Channel 13" row in Table A-26 on page A-15.
12. Set the Frequency of the **MG3700A** to **623.14285714 MHz** and change the **MS8911B** Channel to **38**.
13. Wait until the Average counter displays (10/10).
14. Record the 10 kHz and the 100 kHz Phase Noise readouts onto the test record.
    - Use the "Phase (10 kHz) (dBc/Hz)" and the "Phase (100 kHz (dBc/Hz)" columns in the "Channel 38" row in Table A-26 on page A-15.
15. Record the Frequency Error onto the test record.
    - Use the "Freq Error (Hz)" column in the "Channel 38" row in Table A-26 on page A-15.
16. Set the Frequency of the **MG3700A** to **767.14285714 MHz** and change the **MS8911B** Channel to **62**.
17. Wait until Average counter displays (10/10).
18. Record the 10 kHz and the 100 kHz Phase Noise readouts onto the test record.
    - Use the "Phase (10 kHz) (dBc/Hz)" and the "Phase (100 kHz (dBc/Hz)" columns in the "Channel 62" row in Table A-26 on page A-15.
19. Record the Frequency Error onto the test record.
    - Use the "Freq Error (Hz)" column in the "Channel 62" row in Table A-26 on page A-15.

Chapter 4 — ISDB-T SFN Analyzer Option 32 Verification

4-1 Introduction

The tests in this section verify the performance of the optional ISDB-T SFN Analyzer option of the MS8911B. These tests include:

- Level Accuracy Verification
- 1 dB Compression Level Verification
- Noise Floor Verification

4-2 Level Accuracy Verification

The tests in this section verify the level accuracy of the MS8911B in ISDB-T SFN Analyzer mode.

Equipment Required

- Anritsu MG3700A Vector Signal Generator
- Anritsu MN63A Programmable Attenuator
- Anritsu ML2438A Power Meter
- Anritsu MA2482D Power Sensors (2)
- Anritsu 1N50C RF Limter
- Anritsu 34NN50A Adapter
- Anritsu 15NNF50-1.5C RF Coaxial Cables (3)
- Aeroflex/Weinschel 1870A Power Splitter
- Aeroflex/Weinschel 44-10 10 dB Fixed Attenuator
- Mini-Circuits TIA-1000-1R8 RF Power Amplifier
- Midwest Microwave ADT-2615-NF-BNM-02 Adapters (2)

Procedure

1. Ensure that the **Power Amplifier** is OFF.
2. Connect the **MG3700A Signal Generator**, **Power Amplifier** with **N (f) to BNC (m)** adapters, **RF Limiter**, **MN63A Programmable Attenuator**, **Power Divider**, **Power Meter,** and **Power Sensors** as shown in Figure 4-1, “ISDB-T SFN Option 32 - Level Accuracy Verification Setup - Two Sensors” on page 4-2 below.

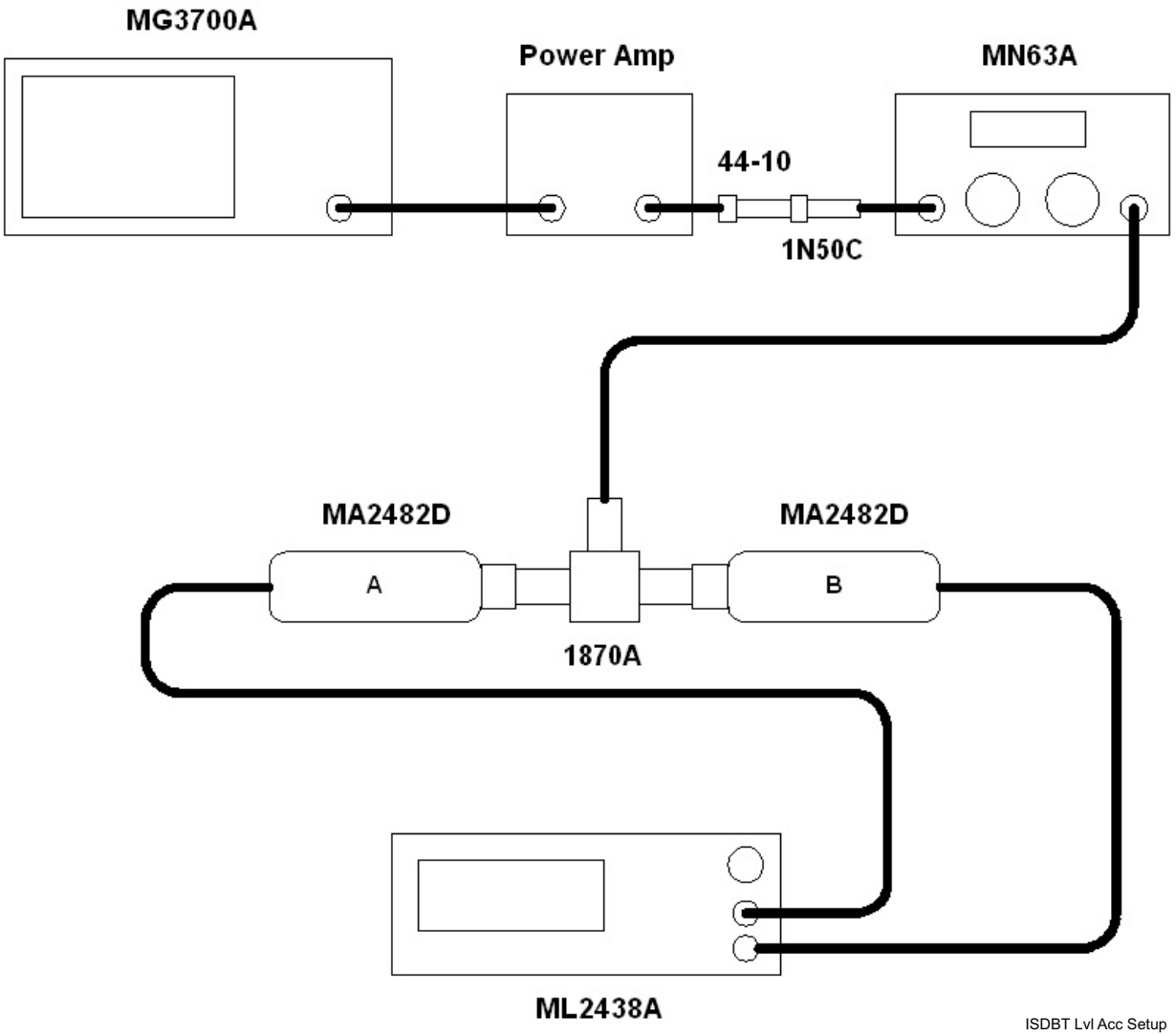

Figure 4-1. ISDB-T SFN Option 32 - Level Accuracy Verification Setup - Two Sensors

3. On the **MG3700A,** press the yellow **Preset** key located on the upper left side of the instrument.

4. Press the **Down Arrow** key to select Yes.

5. Press the **Set** key.

Note	There are two **Set** keys and they both do the same thing).

6. Press the F1 soft key to select Load File to Memory.

7. Press the F1 soft key again to select Select Package.

8. Use the **Down Arrow** key to step through the selection list until the Digital_Broadcast option is highlighted.

9. Press the **Set** key.

10. Press the F6 soft key labeled Return.
11. Press the **Set** key.
12. Use the **Down Arrow key** to step through the selection list until the Digital_Broadcast option is highlighted.
13. Press the **Set** key.
14. Use the **Down Arrow** key to step through the selection list until the ISDB-T_1layer_1ch option is highlighted.
15. Press the **Set** key.
16. Perform Zero/Cal on **Sensor A** and **Sensor B** of the **power meter** and set the cal factor of both sensors to **473 MHz**.
17. Set the **MG3700A** frequency to **473.14285714 MHz**.
18. Set the Level to **–25 dBm**.
19. Ensure the **Modulation On/Off** key and the **Output** key both have **LEDs** ON.
20. Turn on the **power amplifier** and allow it to warm up for at least 5 minutes.
21. Adjust the **MN63A Attenuator** so that the **Sensor A** reading is **–10 dBm ± 1 dB** and record the reading in the test record.
    - Use the "DAB(-10)" column in Table 4-1, "Readings for Sensor A, Sensor B, DAB(–10), and MN63A Attenuation AT(–10)" below.
22. On the **MG3700A,** adjust the power level so that the **Power Meter Sensor A** reading is **–10.0 dBm ± 0.2 dB**.
23. Record the following values to the appropriate columns in Table 4-1 below:
    - **Power Meter Sensor A** reading to the "Sensor A Reading" column
    - **Power Meter Sensor B** reading to the "Sensor B Reading" column
24. Subtract **Sensor A Reading** from **Sensor B Reading** and record the result below:
    - DAB(–10) = Sensor B Reading – Sensor A Reading
    - Use the "DAB(–10)" column of Table 4-1 below.

Table 4-1. Readings for Sensor A, Sensor B, DAB(–10), and MN63A Attenuation AT(–10)

Frequency (Channel)	Sensor A Reading	Sensor B Reading	DAB(–10)	MN63A Attenuation Reading, AT(–10)
473.14285714 MHz (Ch 13)				
623.14285714 MHz (Ch 38)				
767.14285714 MHz (Ch 62)				

25. Calculate the AT(set) values for Test Levels –10 dBm through –45 dBm and record the values to the "AT(set)" column on the test record in Table A-27, "ISDB-T SFN Analyzer Option 32 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-16.
26. Remove **Sensor A** from the **Power Splitter** and then connect the **Power Splitter** to the **MS8911B Spectrum Analyzer RF In** with an **N (m) to N (m) Adapter** as shown in Figure 4-2, "ISDB-T SFN Option 32 - Level Accuracy Verification Setup - Sensor B Only" on page 4-4 below.

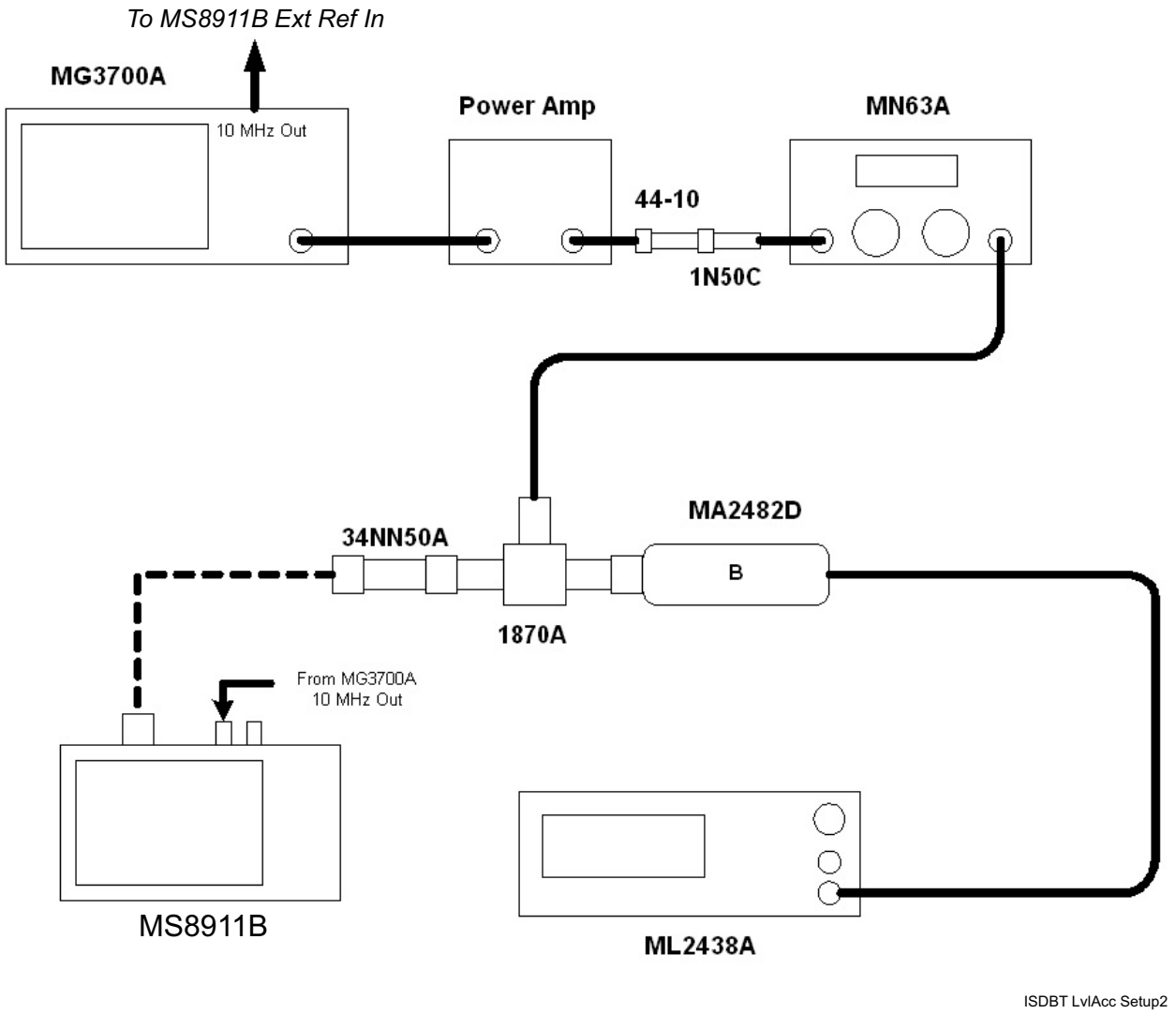

Figure 4-2. ISDB-T SFN Option 32 - Level Accuracy Verification Setup - Sensor B Only

27. Record the new **Power Meter Sensor B** reading to the SB(–10) box in the test record.

- Use the "SB(–10)" box in the "SB(–10) of SB(–50) (dBm)" column of Table A-27, "ISDB-T SFN Analyzer Option 32 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-16 in Appendix A — Test Records.

28. On the **MS8911B**, set the mode to ISDB-T SFN Analyzer and **preset** the unit.

29. Press the Meas Setup soft key and set Meas Mode to Single.

30. Press the Frequency/Level soft key and ensure Channel is **13** and Preamp is OFF.

31. Change the Reference Level to **–10 dBm**.

32. After the data appears on the left of the display, record the –25 dBm Channel Power from the **MS8911B** to the "M(Level)" column under "Preamp Off" on the test record.

- Use the "Preamp Off - M (Level) (dBm)" column and the "–10" row of Table A-27, "ISDB-T SFN Analyzer Option 32 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-16.

33. Calculate the Deviation using the following formula:

- Deviation = M(Level) – SB(–10) – DAB(–10) – AT(–10) + AT(set)

Note	Note: Since AT(–10) is the same as AT(set), [– AT(–10) + AT(set)] = 0

34. Record the result to the "Dev" column under "Preamp Off" on the test record and verify that it is within specification.

- Use the "Preamp Off - Dev (dB)" column and the "–10" row of Table A-27, "ISDB-T SFN Analyzer Option 32 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-16.

35. Set the **MN63A Attenuation** to the next AT(set) value listed in Table A-27 in the test record.

36. Press the Frequency/Level soft key and set the **MS8911B** Reference Level to **–15 dBm**.

37. After the data appears on the left of the display, record the –15 dBm Channel Power from the MS8911B to the "M(Level)" column under "Preamp Off" on the test record.

- Use the "Preamp Off - M (Level) (dBm)" column and the "–15" row of Table A-27, "ISDB-T SFN Analyzer Option 32 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-16.

38. Calculate the Deviation using the following formula:

- Deviation = M(Level) – SB(–10) – DAB(–10) – AT(–10) + AT(set)

39. Record the result to the "Dev" column under "Preamp Off" on the test record and verify that it is within specification.

- Use the "Preamp Off - Dev (dB)" column and the "–15" row of Table A-27, "ISDB-T SFN Analyzer Option 32 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-16.

40. Set the **MN63A Attenuation** to the next AT(set) value in the test record.

41. Set the Reference Level of the **MS8911B** to **–20 dBm**.

42. After the data appears on the left of the display, record the –20 dBm Channel Power from the **MS8911B** the "M(Level)" column under "Pre Amp Off" on the test record.

- Use the "Preamp Off - M (Level) (dBm)" column and the "–20" row of Table A-27, "ISDB-T SFN Analyzer Option 32 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-16.

43. Calculate the Deviation using the following formula:

- Deviation = M(Level) – SB(-10) – DAB(-10) – AT(-10) + AT(set)

44. Record the result to the "Dev" column under "Pre Amp Off" on the test record and verify that it is within specification.

- Use the "Preamp Off - Dev (dB)" column and the "–20" row of Table A-27, "ISDB-T SFN Analyzer Option 32 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-16.

45. Press the Frequency/Level soft key and set Preamp to ON. Change the Reference Level if required.

46. After the data appears on the left of the display, record the –20 dBm Channel Power from the **MS8911B** to the "M(Level)" column under "Preamp On" on the test record.

- Use the "Preamp On - M (Level) (dBm)" column and the "–20" row of Table A-27, "ISDB-T SFN Analyzer Option 32 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-16.

47. Calculate the Deviation using the following formula:
    - Deviation = M(Level) – SB(–10) – DAB(–10) – AT(–10) + AT(set)
48. Record the result to the "Dev" column under "Preamp On" on the test record and verify that it is within specification.
    - Use the "Preamp On - Dev (dB)" column and the "–20" row of Table A-27, "ISDB-T SFN Analyzer Option 32 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-16.
49. Repeat Step #40 through Step #48 immediately above for Test levels –25 dBm to –45 dBm. Change the Reference Level and switch the Pre Amp per the "Ref Level Pre Amp On/Off" column in test record.
    - Use test levels in Table A-27 on page A-16
50. Turn off the **Power Amplifier**, disconnect the **Power Splitter** from the **MS8911B**, and re-connect **Sensor A** to the **Power Splitter** as shown in Figure 4-1, "ISDB-T SFN Option 32 - Level Accuracy Verification Setup - Two Sensors" on page 4-2 above.
51. Set the **MN63A** Attenuation to **10 dB**.
52. Set the **MG3700A** Level to **–60 dBm**.
53. Turn on the Power Amplifier and allow it to warm up for at least 5 minutes.
54. Adjust the **MN63A Attenuator** so that the **Sensor A** reading is **–50 dBm ± 1 dB**. Record the attenuation reading to Table 4-2, "Readings for Sensor A, Sensor B, DAB(–50), and MN63A Attenuation AT(–50)," on page 4-6 below in the "AT(–50)"column.
55. On the **MG3700A,** adjust the power level so that **Power Meter Sensor A** reading is **–50.0 dBm ± 0.2 dB**.
56. Record the following values to the appropriate columns in Table 4-2, "Readings for Sensor A, Sensor B, DAB(–50), and MN63A Attenuation AT(–50)" below.
    - **Power Meter Sensor A** reading to the "Sensor A Reading" column
    - **Power Meter Sensor B** reading to the "Sensor B Reading" column
57. Subtract Sensor A reading from Sensor B reading and record the result.
    - DAB(–50) = Sensor B Reading – Sensor A Reading
    - Record the calculation in the "DAB(–50)" column of Table 4-2 below.

Table 4-2. Readings for Sensor A, Sensor B, DAB(–50), and MN63A Attenuation AT(–50)

Frequency (Channel)	Sensor A Reading	Sensor B Reading	DAB(–50)	MN63A Attenuation Reading, AT(–50)
473.14285714 MHz (Ch 13)				
623.14285714 MHz (Ch 38)				
767.14285714 MHz (Ch 62)				

58. Calculate the AT(set) values for Test Levels –55 dBm through –84 dBm and record the values to the "AT(set)" column on the test record.
    - Use the "AT(set) (dB)" column in Table A-27, "ISDB-T SFN Analyzer Option 32 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-16.
59. Remove **Sensor A** from the **Power Splitter** and then connect the **Power Splitter** to the **MS8911B Spectrum Analyzer RF In** with an **N (m) to N (m) Adapter**.

60. Record the new **Power Meter Sensor B** reading to the "SB(–50)" box in the test record.

- Use the "SB(–50) (dBm)" box in the the "–50" row in Table A-27, "ISDB-T SFN Analyzer Option 32 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz," on page A-16.

61. Repeat Step #43 through Step #51 for Test Levels –50 dBm to –84 dBm. Change the Reference Level and switch the Preamp ON or OFF per the "Ref Level Pre Amp On/Off" column in test record. Use the following formula to calculate Deviation:

- Deviation = M(Level) – SB(–50) – DAB(–50) – AT(–50) + AT(set)

62. Repeat Step #16 through Step #61 for frequencies **623.14285714 MHz (Ch 38)** and **767.14285714 MHz (Ch 62)**. Set the cal factor of both power sensors to **623 MHz** or **767 MHz** as required.

4-3 1dB Compression Level Verification

The tests in this section verify the accuracy of the MS8911B is not degraded by compression when operating in the ISDB-T SFN Analyzer mode.

Equipment Required

- Anritsu MG3700A Vector Signal Generator
- Anritsu MN63A Programmable Attenuator
- Anritsu ML2438A Power Meter
- Anritsu MA2482D Power Sensors (2)
- Anritsu 1N50C RF Limter
- Anritsu 34NN50A Adapter
- Anritsu 15NNF50-1.5C RF Coaxial Cables (3)
- Aeroflex/Weinschel 1870A Power Splitter
- Aeroflex/Weinschel 44-10 10 dB Fixed Attenuator
- Mini-Circuits TIA-1000-1R8 RF Power Amplifier
- Midwest Microwave ADT-2615-NF-BNM-02 Adapters (2)

Procedure

1. Ensure that the **Power Amplifier** is OFF.
2. On the **Power Meter**, set Low Level Averaging to Low and Averaging to Moving with 50 averages. Set the **power meter** to read True RMS.
3. Perform a Zero/Cal on both **sensors** of the power meter.
4. Connect the **MG3700A Signal Generator**, **Power Amplifier** with **N (f) to BNC (m) Adapters**, **RF Limiter**, **MN63A Programmable Attenuator**, **Power Divider**, **Power Meter,** and **Power Sensors** as shown in Figure 4-3, “ISDB-T SFN Option 32 - 1 dB Compression Level Test Setup - Two Sensors” on page 4-9 below.

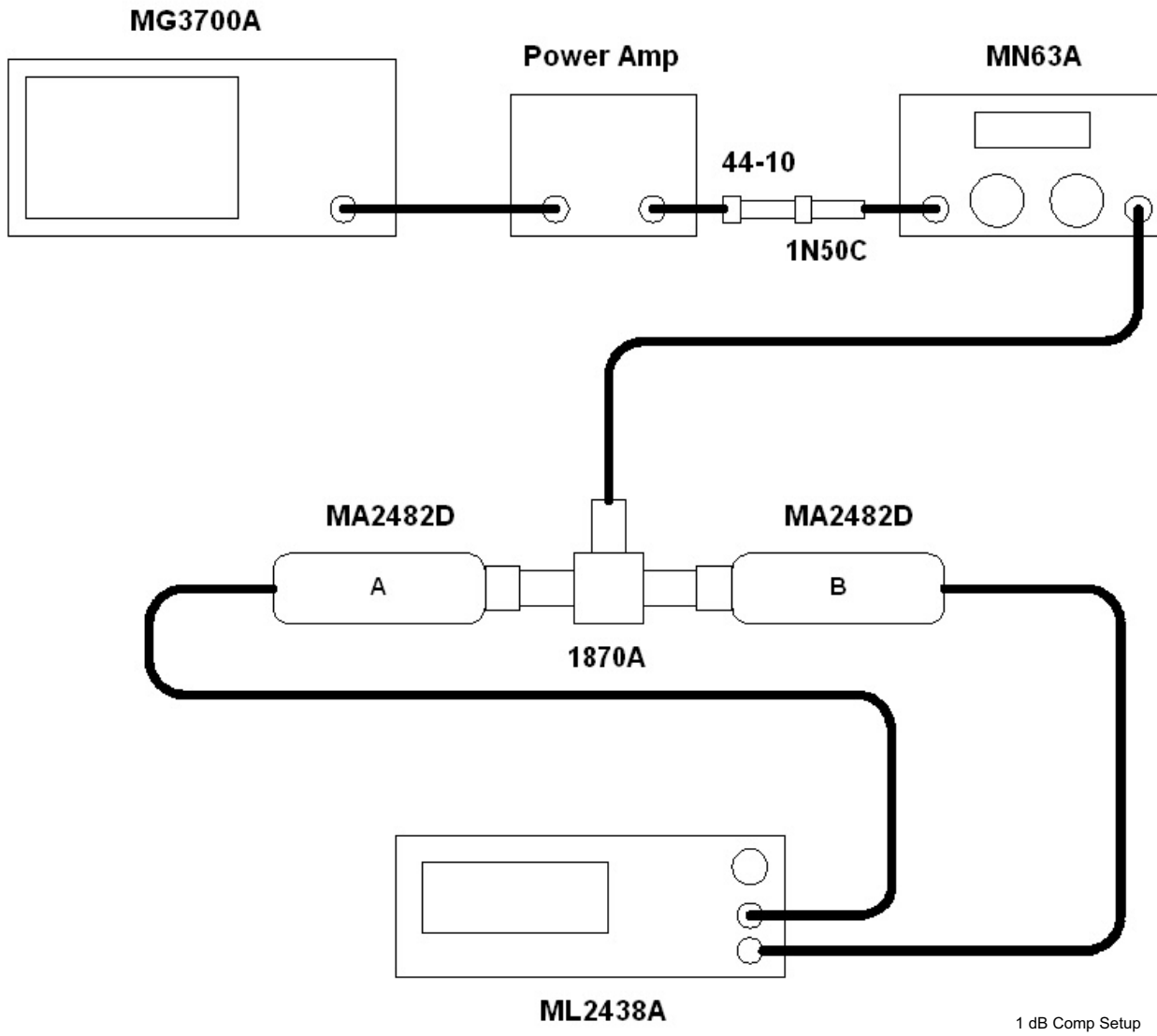

Figure 4-3. ISDB-T SFN Option 32 - 1 dB Compression Level Test Setup - Two Sensors

5. On the **MG3700A**, press the **MOD On/Off** button to turn Modulation OFF so that the **MOD On/Off LED** is OFF.
6. Set the Level output of the **MG3700A** to **–25 dBm**.
7. Set the **MN63A** attenuation to **20 dB**.
8. Turn on the **power amplifier** and allow it to warm up at least five minutes.

473.14285714 MHz Tests

9. Set the cal factor of both **sensors** to **473 MHz**.
10. Set the **MG3700A** Frequency to **473.14285714 MHz.**

11. Adjust the **MN63A** attenuation so that the **Power Meter Sensor A** reading is **–25 dBm ± 1 dB** and record the results.
    - Use the "473.14285714 MHz - Ch 13" row and the "AT(–25)" column of Table 4-3, "Readings for Sensor A M(Sa) and MN63A Attenuation at AT(–25), AT(–15), AT(–50), and AT(–43)" below.
12. Adjust the Level of the **MG3700A** so that **Power Meter Sensor A** reads **–25.0 dBm ± 0.05 dB** and record the results.
    - Use the "473.14285714 MHz - Ch 13" row and the "M(Sa)" column of Table 4-3 below.

Table 4-3. Readings for Sensor A M(Sa) and MN63A Attenuation at AT(–25), AT(–15), AT(–50), and AT(–43)

Frequency (Channel)	Sensor A Reading M(Sa)	MN63A Attenuation Reading, AT(–25)	MN63A Attenuation Reading, AT(–15)	MN63A Attenuation Reading, AT(–50)	MN63A Attenuation Reading, AT(–43)
473.14285714 MHz (Ch 13)					
623.14285714 MHz (Ch 38)					
767.14285714 MHz (Ch 62)					

13. Remove **Sensor A** from the **splitter** and connect the **MS8911B RF In** to the open end of the **splitter** using an **adapter** as shown in Figure 4-4, "ISDB-T SFN Option 32 - 1 dB Compression Level Test Setup - Sensor B Only" on page 4-11 below.

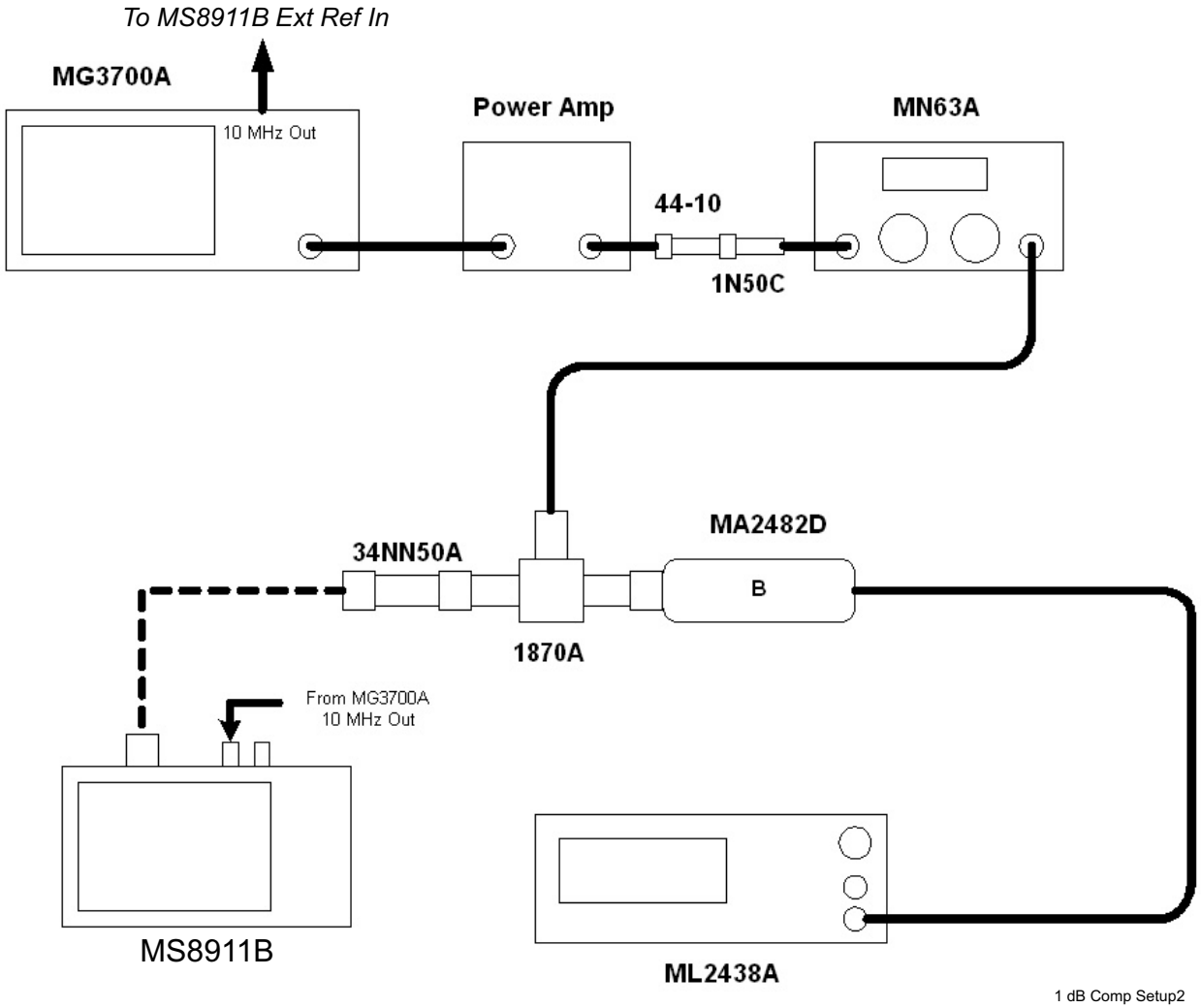

Figure 4-4. ISDB-T SFN Option 32 - 1 dB Compression Level Test Setup - Sensor B Only

14. Set the **MS8911B** to ISDB-T SFN Analyzer mode and **preset** the unit.

15. Press the Meas Setup soft key and set Meas Mode to Single.

16. Press the Frequency/Level soft key and ensure the **MS8911B** Channel is set to **13** and Preamp is OFF.

17. Set the Reference Level to **–25 dBm**.

18. Record the **MS8911B** Channel Power reading, MeasCP(–25), to the "–25 dBm Test Level" row of the "Meas. Value" column on the test record.

- Use Table A-30, "ISDB-T SFN Analyzer Option 32 - 1 dB Compression - Preamp Off," on page A-18.

19. Calculate the difference, Delta(–25), using the following formula:

- Delta(–25) = M(Sa) – MeasCP(–25)

20. Record the result to the "Delta" column on the test record. Verify that the result is less than 1 dB.

- Use Table A-30 on page A-18.

21. Calculate AT(–15) using the following formula:

- AT(–15) = AT(–25) – 10

22. Set the MN63A attenuation to AT(–15).

Note	Note that the Over Range message on the MS8911B is normal.

23. Record the MS8911B Channel Power reading, MeasCP(–15), to the "–15 dBm Test Level" row of the "Meas. Value" column on the test record.

- Use Table A-30, "ISDB-T SFN Analyzer Option 32 - 1 dB Compression - Preamp Off," on page A-18

24. Calculate the Delta at –15 dBm Input using the following formula:

- Delta(–15) = M(Sa) + 10 – MeasCP(–15) + Delta(–25)

25. Record the result to the "Delta" column on the test record. Verify that it is less than 1 dB.

- Use Table A-30 on page A-18.

26. Calculate the value of AT(–50) using the following formula:

- AT(–50) = AT(–25) + 25

27. Adjust the **MN63A** attenuation to **AT(–50)**.

28. Set the Reference Level on the **MS8911B** to **–50 dBm** and turn Preamp ON.

29. Record the **MS8911B** Channel Power reading, MeasCP(-50), to the "–50 dBm Test Level" row of in the "Meas. Value" column on the test record.

- Use Table A-31, "ISDB-T SFN Analyzer Option 32 - 1 dB Compression - Preamp On," on page A-19.

30. Calculate the Delta at –50 dBm Input, Delta(–50), using the following formula:

- Delta(–50) = M(Sa) – 25 – MeasCP(–50) + Delta(–25)

31. Record the result to the "Delta" column on the test record. Verify that it is less than 1 dB.

- Use Table A-31 on page A-19.

32. Calculate the AT(–43) using the following formula:

- AT(–43) = AT(–25) + 18

33. Set the **MN63A** attenuation to AT(-43).

- Note that the **Over Range** message on the MS8911B is normal.

34. Record the MS8911B Channel Power reading, MeasCP(–43), in the "–43 dBm Test Level" row of the "Meas. Value" column on the test record.

35. Calculate the Delta at –43 dBm Input, Delta(–43), using the following formula:

- Delta(–43) = M(Sa) – 18 – MeasCP(–43) + Delta(–50)

36. Record the result to the "Delta" column on the test record. Verify that it is less than 1 dB.

- Use Table A-31 on page A-19.

623.14285714 MHz Tests

37. Remove the **MS8911B** from the test setup and re-install **Sensor A** to the open **splitter** output as shown in Figure 4-3, "ISDB-T SFN Option 32 - 1 dB Compression Level Test Setup - Two Sensors" on page 4-9

38. Set the **MG3700A** Frequency to **623.14285714 MHz and** ensure the **Mod On/Off LED** is Off and the **Output LED** is On.

39. Set the cal factor of both **sensors** to **623 MHz.**

40. Adjust the **MN63A** attenuation so that the **Power Meter Sensor A** reads **–25 dBm ± 1 dB**. Record the MN63A attenuation readout to the "AT(–25)" column in Table 4-3, "Readings for Sensor A M(Sa) and MN63A Attenuation at AT(–25), AT(–15), AT(–50), and AT(–43)," on page 4-10 above.
    - Use "623.14285714 MHz - Ch 38" row and the "AT(–25)" column of Table 4-3 on page 4-10 above.
41. Adjust the Level of the **MG3700A** so that the **Power Meter Sensor A** reads **–25.0 dBm ± 0.05 dB**. Record the **Sensor A** reading.
    - Use the "623.14285714 MHz - Ch 38" row and the "M(Sa)" column of Table 4-3 on page 4-10 above.
42. Remove **Sensor A** from the **splitter** and connect the **MS8911B RF In** to the open end of the **splitter** using an **adapter** as shown in Figure 4-4, "ISDB-T SFN Option 32 - 1 dB Compression Level Test Setup - Sensor B Only" on page 4-11 above.
43. Set the **MS8911B** Channel to **38**.
44. Set Preamp to OFF and Reference Level to **–25 dBm**.
45. Repeat Step #18 through Step #36.

767.14285714 MHz Tests

46. Remove the **MS8911B** from the test setup and re-install **Sensor A** to the open **splitter** output as shown in Figure 4-3, "ISDB-T SFN Option 32 - 1 dB Compression Level Test Setup - Two Sensors" on page 4-9 above.
47. Set the **MG3700A** Frequency to **767.14285714 MHz** and ensure the **Mod On/Off LED** is Off and the **Output LED** is On.
48. Set the cal factor of both **sensors** to **767 MHz**.
49. Adjust the **MN63A** attenuation so that the **Power Meter Sensor A** reads **–25 dBm ± 1 dB**. Record the **MN63A** attenuation readout to the "AT(–25)" column in Table 4-3 on page 4-10 above.
50. Adjust the Level of the MG3700A so that the power meter (Sensor A) reads **–25.0 dBm ± 0.05 dB**. Record the **Sensor A** reading to the "M(Sa)" column in Table 4-3 on page 4-10 above.
    - Use "767.14285714 MHz - Ch 62" row and the "M(Sa)" column of Table 4-3 on page 4-10 above.
51. Remove **Sensor A** from the **splitter** and connect the **MS8911B RF In** to the open end of the **splitter** using an **adapter** as shown in Figure 4-4, "ISDB-T SFN Option 32 - 1 dB Compression Level Test Setup - Sensor B Only" on page 4-11 above.
52. Set the **MS8911B** Channel to **62**.
53. Set Preamp to OFF and Reference Level to **–25 dBm**.
54. Repeat Step #18 through Step #36.

4-4 Noise Floor Verification

The tests in this section verify the noise floor of the MS8911B in ISDB-T SFN Analyzer mode.

Equipment Required

- Anritsu 28N50-2 50 Ohm Termination

Procedure

1. Set the mode of the **MS8911B** to ISDB-T SFN Analyzer and **preset** the unit.
2. Install a **50 ohm termination** to the **Spectrum Analyzer RF In** connector.
3. Ensure the Channel is set to **13** and Preamp is **Off**.
4. Set the Reference Level to **–25 dBm**.
5. Record the Channel Power [dBm] as shown in the lower left corner of the display onto the "Preamp Off" line of the test record.
   - Use Table A-32, "ISDB-T SFN Analyzer Option 32 - Noise Floor," on page A-19.
6. Set Preamp to **On** and change Reference Level to **–50 dBm**.
7. Record the Power [dBm] as shown in the lower left corner of the display onto the "Preamp On" line of the test record.
   - Use Table A-32 on page A-19.
8. Change the channel to **Channel 38**, set Preamp to **Off**.
9. Repeat Step #4 through Step #7 for **Channel 38**.
10. Change the channel to **Channel 62**, set Preamp to **Off**.
11. Repeat Step #4 through Step #7 for **Channel 62**.

Chapter 5 — DVB-T/H Signal Analyzer Option 50-57 Verification

5-1 Introduction

The tests in this section verify the performance of the optional DVB-T/H Signal Analyzer option of the MS8911B. These tests include:

- Frequency Accuracy and Residual Modulation Error Ratio (MER) Verification
- Frequency Lock Range Verification
- Level Accuracy Verification
- 1 dB Compression Level Verification
- Noise Floor Verification
- BER Measurement Functional Check (Option 57 Only)

5-2 Frequency Accuracy and Residual MER Verification

The tests in this section verify the frequency accuracy and residual modulation error ratio (MER) of the MS8911B in DVB-T/H Signal Analyzer mode.

Equipment Required

- Anritsu MG3700A Vector Signal Generator
- Anritsu 15NN50-1.5C RF Cable
- 10 MHz Reference Standard

Procedure

1. Connect the **10MHz External Reference** signal into the **MG3700A** and the **MS8911B** as shown below in Figure 5-1.

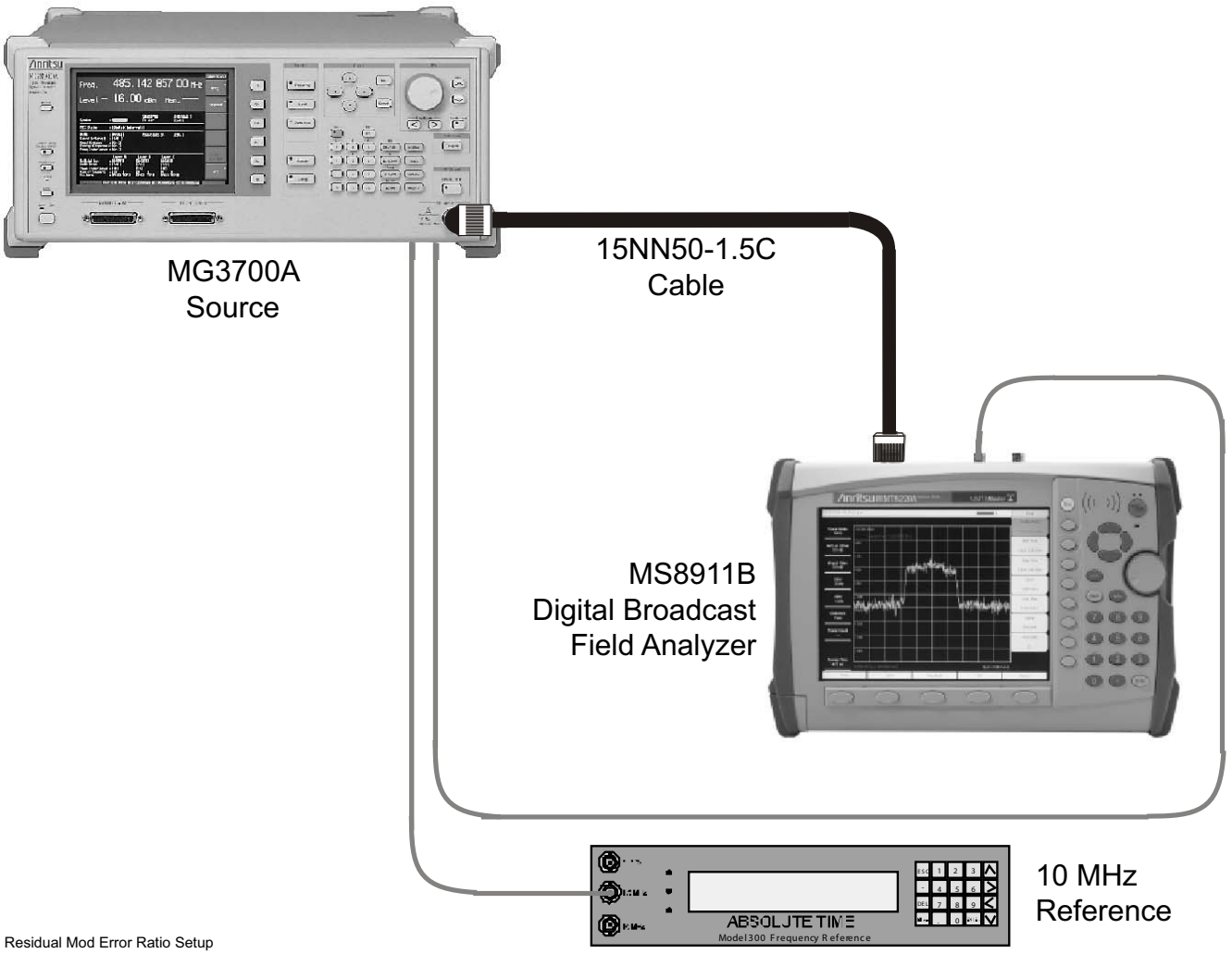

Figure 5-1. DVB-T/H Signal Analyzer Option 50-57 - Frequency Accuracy and Residual MER Verification Test Setup

2. On **MG3700A**, press the yellow **Preset** key on the upper left side of the instrument.
3. Press the **Down Arrow** key to select Yes.
4. Press the Set key
   - Note that there are two **Set** keys and they both provide the same function.
5. Press the F1 soft key to select Load File to Memory.
6. Press the F1 soft key again to select Select Package.
7. Use the **Down Arrow** key to step through the selection list until the Digital_Broadcast option is highlighted.
8. Press the **Set** key.

9. Press the F6 soft key labled Return.
10. Press the **Set** key.
11. Use the **Down Arrow** key to step through the selection list until the Digital_Broadcast option is highlighted.
12. Press the **Set** key.
13. Use the **Down Arrow** key to step through the selection list until the DVB-T_H_00 option is highlighted.
14. Press the **Set** key.
15. Set the Level to **–20 dBm**.
16. Set the Frequency to **470 MHz**.
17. Press the **Baseband** key and then the **More** key.
18. Press the F5 soft key labeled Pattern Combination [Defined].
19. Press the **Set** key.
20. Use the **Down Arrow** key to step through the selection list until the Digital_Broadcast option is highlighted.
21. Press the **Set** key.
22. Use the **Down Arrow** key to step through the selection list until the DVB-T_H_00 option is highlighted.
23. Press the **Set** key.
24. Rotate the **knob** to highlight Freq Offset and use the **numeric keypad** to enter **4 MHz**.
25. Ensure the **Modulation On/Off** key and the **Output** key both have **LEDs** ON.
26. Connect the **MG3700A Output** to **MS8911B Spectrum Analyzer RF In** connector.
27. Set the mode of the **MS8911B** to DVB-T/H Signal Analyzer and **preset** the unit.
28. Press the Meas Selection soft key, then select Modulation Analysis.
29. Press the Frequency/Level soft key, and set the Reference Level to **–20 dBm**.
30. Ensure that Channel is set to **21**.
31. Press the Meas Setup soft Key and then the Meas Mode soft key.
32. Use the **Up/Down** arrow keys to highlight Average and press the **Enter** key.
33. Press the Average Count soft key, then enter **10** and press the **Enter** key.
34. Wait until Average (10/10) appears at the top of the display.
35. Record the Frequency Offset reading on the MS8911B to the "Pre Amp Off" section of the test record.
    - Use the "Channel 21" row and the "Ref Level –20 dBm - Frequency Error" box in Table A-33, "DVB-T/H Signal Analyzer Option 50 and 57 - Frequency Accuracy," on page A-20 in the test records.
36. Record the MER Total reading on the MS8911B to the "Pre Amp Off" section of the test record.
    - Use the "Channel 21" row and the "Preamp Off - Total MER Preamp Off" column in Table A-34, "DVB-T/H Signal Analyzer Option 50 and 57 - Residual MER," on page A-20.
37. Set the **MG3700A** Level to **–50 dBm**.
38. Set the **MS8911B** Reference Level to **–50 dBm**.
39. Wait until Average (10/10) appears at the top of the display.
40. Record the Frequency Offset reading on the MS8911B to the "Preamp On" section of the test record.
    - Use the "Channel 21" row and the "Ref Level –500 dBm - Frequency Error" box in Table A-33 on page A-20.

41. Record the MER Total reading on the MS8911B to the "Preamp On" section of the test record.

- Use the "Channel 21" row and the "Preamp On - Total MER Preamp On" column in Table A-34, "DVB-T/H Signal Analyzer Option 50 and 57 - Residual MER," on page A-20.

42. Set **MS8911B** Preamp to OFF.

43. Set the **MG3700A** Frequency to **662 MHz** and Level to **–20 dBm**.

44. Change the **MS8911B** to Channel **45** and set Reference Level to **–20 dBm**.

45. Repeat Step #34 through Step #41.

46. Set **MS8911B** Preamp to OFF.

47. Set the **MG3700A** Frequency to **854 MHz** and Level to **–20 dBm**.

48. Change the **MS8911B** to Channel **69** and set Reference Level to **–20 dBm**.

49. Repeat Step #34 through Step #41.

Frequency Lock Range Verification

The test in this section can be used to verify the frequency lock range of the MS8911B in DVB-T/H Signal Analyzer mode.

Equipment Required

- Anritsu MG3700A Vector Signal Generator
- Anritsu 15NN50-1.5C RF Cable
- 10 MHz Reference Standard

Procedure

1. Connect the **External 10 MHz Frequency Reference** source to the **MG3700A** and **MS8911B**.
2. On **MG3700A,** press the yellow **Preset** key located in the upper left side of the instrument.
3. Press the **Down Arrow** key to select Yes.
4. Press the **Set** key.
    - Note that there are two **Set** keys and they both provide the same functions.
5. Press the F1 soft key to select Load File to Memory.
6. Press the F1 soft key again to select Select Package.
7. Use the **Down Arrow** key to step through the selection list until the Digital_Broadcast option is highlighted.
8. Press the **Set** key.
9. Press the F6 soft key labled Return.
10. Press the Set key.
11. Use the **Down Arrow** key to step through the selection list until the Digital_Broadcast option is highlighted.
12. Press the **Set** key.
13. Use the **Down Arrow** key to step through the selection list until the DVB-T_H_00 option is highlighted.
14. Press the **Set** key.
15. Set the Frequency to **474.09 MHz**.
16. Set the Level to **–20 dBm**.
17. Ensure the **Modulation On/Off** key and the **Output** key both have **LEDs** ON.
18. Set the mode of the **MS8911B** to DVB-T/H Signal Analyzer and **preset** the unit.
19. Connect the **MG3700A Output** to the **MS8911B Spectrum Analyzer RF In** connector.
20. Press the Meas Selection soft key, then select Modulation Analysis.
21. Press the Frequency/Level soft key and ensure Channel is set to **21**.
22. Set the Reference Level to **–20 dBm**.
23. Press the Meas Setup soft Key and then the Meas Mode soft key.
24. Use the **Up/Down** arrow keys to highlight Average and press the **Enter** key.
25. Press the Average Count soft key, then enter **10** and press the **Enter** key.
26. Wait until Average (10/10) appears at the top of the display.

27. Record the Frequency Offset reading on the test record.

- Use the "Channel 21 - 474.09 MHz" row in Table A-35, "DVB-T/H Signal Analyzer Option 50 and 57 - Frequency Lock Range," on page A-20.

28. On the **MG3700A,** set the frequency to **473.91 MHz**.

29. Press Execute Measure. After Average (10/10) appears, record the Frequency Offset.

- Use the "Channel 21 - 473.91 MHz" row in Table A-35 on page A-20.

5-3 Level Accuracy Verification

The tests in this section verify the level accuracy of the MS8911B in DVB-T/H Signal Analyzer mode.

Equipment Required

- Anritsu MG3700A Vector Signal Generator
- Anritsu MN63A Programmable Attenuator
- Anritsu ML2438A Power Meter
- Anritsu MA2482D Power Sensors (2)
- Anritsu 1N50C RF Limter
- Anritsu 34NN50A Adapter
- Anritsu 15NNF50-1.5C RF Coaxial Cables (3)
- Aeroflex/Weinschel 1870A Power Splitter
- Aeroflex/Weinschel 44-10 10 dB Fixed Attenuator
- Mini-Circuits TIA-1000-1R8 RF Power Amplifier
- Midwest Microwave ADT-2615-NF-BNM-02 Adapters (2)

Procedure

1. Ensure that the **Power Amplifier** is off.
2. Connect the **MG3700A Signal Generator**, **Power Amplifier** with **N (f) to BNC (m)** adapters, **RF Limiter**, **MN63A Programmable Attenuator**, **Power Divider**, **Power Meter**, and **Power Sensors** as shown in Figure 5-2, “DVB-T/H Option 50 and 57 - Level Accuracy Verification - Two Sensors” on page 5-8.

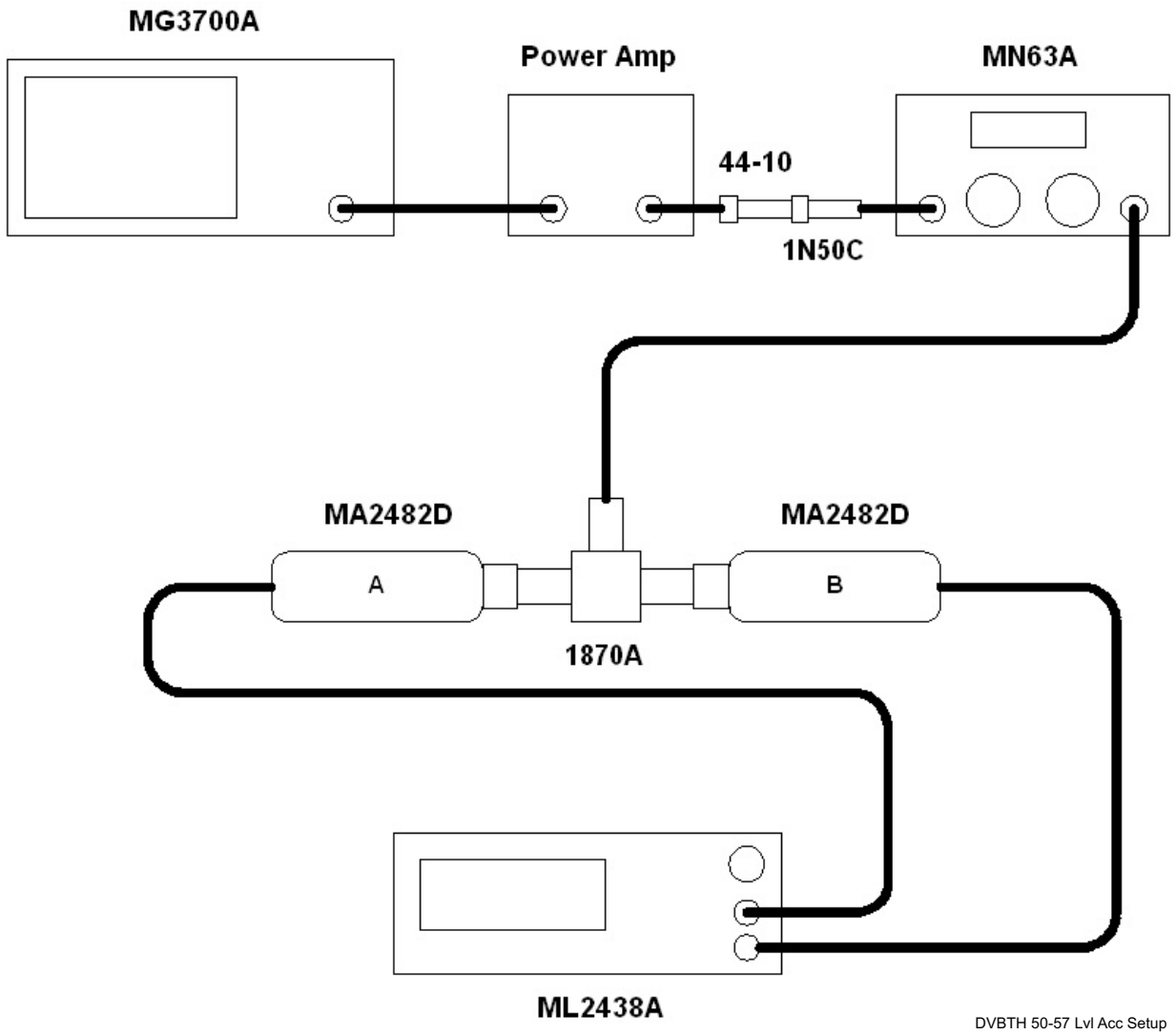

Figure 5-2. DVB-T/H Option 50 and 57 - Level Accuracy Verification - Two Sensors

3. On the **MG3700A**, press the yellow **Preset** key located on the upper left side of the instrument.
4. Press the **Down Arrow** key to select Yes.
5. Press the **Set** key.
   - Note that there are two **Set** keys and they perform the same functions.
6. Press the F1 soft key to select Load File to Memory.
7. Press the F1 soft key again to select Select Package.
8. Use the **Down Arrow** key to step through the selection list until the Digital_Broadcast option is highlighted.
9. Press the **Set** key.
10. Press the F6 soft key labeled Return.

11. Press the **Set** key.
12. Use the **Down Arrow** key to step through the selection list until the Digital_Broadcast option is highlighted.
13. Press the **Set** key.
14. Use the **Down Arrow** key to step through the selection list until the DVB-T_H_00 option is highlighted.
15. Press the **Set** key.
16. Perform a Zero/Cal on **Sensor A** and **Sensor B** of the **power meter**. Set the cal factor of both sensors to **474 MHz**.
17. Set the **MG3700A** Frequency to **474 MHz**.
18. Set the Level to **–25 dBm**.
19. Ensure the **Modulation On/Off** key and the **Output** key both have **LEDs** ON.
20. Turn on the **power amplifier** and allow it to warm up for at least 5 minutes.
21. Adjust the **MN63A Attenuator** so that **Sensor A** reading is **–10 dBm ± 1 dB**. Record the attenuation reading.
    - Use the "MS63A Attenuation Reading AT(–10)" column and the "474 MHz" row in Table 5-1, "Readings for Sensor A, Sensor B, DAB(–10), and MN63 Attenuation AT(–10)" below.
22. On the **MG3700A,** adjust the power level so that **Power Meter Sensor A** reading is **–10.0 dBm ± 0.2 dB**.
23. Record the following values to the appropriate table cells in Table 5-1 below.
    - **Power Meter Sensor A** reading to "Sensor A Reading"
    - **Power Meter Sensor B** reading to "Sensor B Reading"
24. Subtract the **Sensor A** reading from the **Sensor B** reading and record the result.
    - Use the "DAB(–10)" column of Table 5-1 below.

Table 5-1. Readings for Sensor A, Sensor B, DAB(–10), and MN63 Attenuation AT(–10)

Frequency (Channel)	Sensor A Reading	Sensor B Reading	DAB(–10)	MN63A Attenuation Reading, AT(–10)
474 MHz (Ch 21)				
666 MHz (Ch 45)				
858 MHz (Ch 69)				

25. Calculate the AT(set) values for Test Levels –10 dBm through –45 dBm and record the values to the test record.
    - Use the "AT(set)" column and the appropriate "dBm" row in Table A-36, "DVB-T/H Signal Analyzer Option 50 and 57 - Level Accuracy - Measurement Channel = 21ch @ 474 MHz," on page A-21 in Appendix A — Test Records.
26. Remove **Sensor A** from the **Power Splitter** and then connect the **Power Splitter** to the **MS8911B Spectrum Analyzer RF In** with an **N (m) to N (m) Adapter** as shown in Figure 5-3, "DVB-T/H Option 50 and 57 - Level Accuracy Verification - Sensor B Only" on page 5-10 below.

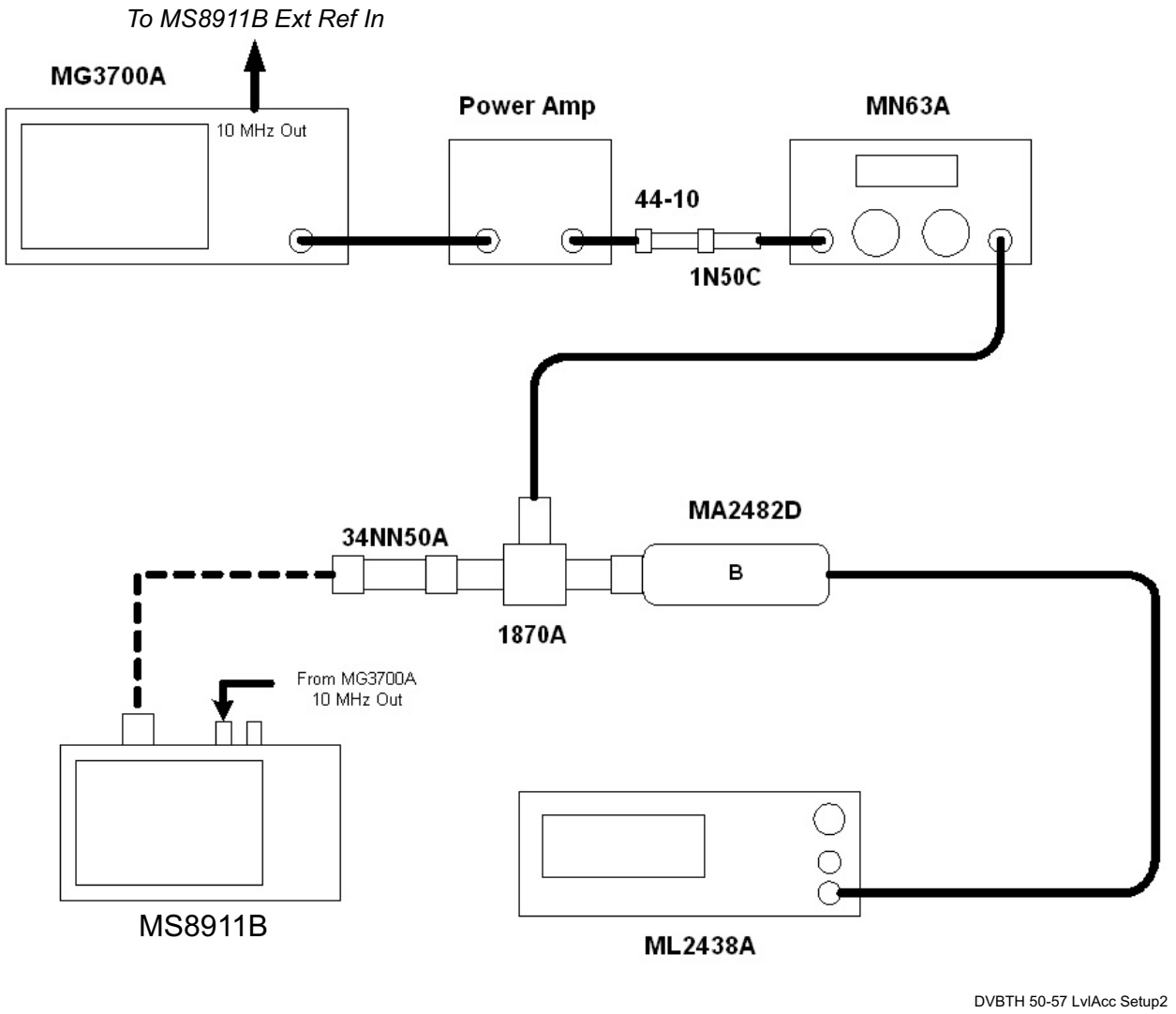

Figure 5-3. DVB-T/H Option 50 and 57 - Level Accuracy Verification - Sensor B Only

27. Record the new **Power Meter Sensor B** reading to the in the test record.

- Use the "SB(–10)" box in Table A-36, "DVB-T/H Signal Analyzer Option 50 and 57 - Level Accuracy - Measurement Channel = 21ch @ 474 MHz," on page A-21.

28. On the **MS8911B**, set the mode to DVB-T/H Signal Analyzer and **preset** the unit.

29. Press the Frequency/Level soft key, ensure **Channel 21** is selected and the Preamp is OFF.

30. Change the Reference Level to **–10 dBm**.

31. Press the Meas Setup soft key and then the Meas Mode soft key.

32. Use the **Up/Down** arrow keys to highlight Average and press the **Enter** key.

33. Change the Average Count to **50** if required.

34. After Average (50/50) appears at the top of the display, record the Channel Power from the **MS8911B** to the "M(Level)" column under "Pre Amp Off" on the test record.

- Use the "M(Level)" column under "Pre Amp Off" in Table A-36, "DVB-T/H Signal Analyzer Option 50 and 57 - Level Accuracy - Measurement Channel = 21ch @ 474 MHz," on page A-21.

35. Calculate the Deviation using the following formula:

- Deviation = M(Level) – SB(–10) – DAB(–10) – AT(–10) + AT(set)

Note	Since AT(–10) is the same as AT(set), [– AT(-10) + AT(set)] = 0

36. Record the result to the "Dev" column under "Preamp Off" on the test record and verify that it is within specification.

- Use the "Dev" column under "Preamp Off" in Table A-36 on page A-21.

37. Set the **MN63A** attenuation to the next AT(set) value in the test record.

38. Press the Frequency/Level soft key and set the Reference Level of **MS8911B** to **–15 dBm**.

39. After Average (50/50) appears, record the –15 dBm Channel Power from the **MS8911B** to the "M(Level)" column under "Preamp Off" on the test record.

- Use the "M(Level)" column under "Preamp Off" in Table A-36 on page A-21.

40. Calculate the Deviation using the following formula:

- Deviation = M(Level) – SB(–10) – DAB(–10) – AT(–10) + AT(set)

41. Record the result to the "Dev" column under "Preamp Off" on the test record and verify that it is within specification.

- Use the "Dev" column under "Preamp Off" in Table A-36 on page A-21.

42. Set the **MN63A** attenuation to the next AT(set) value in the test record.

43. Set the Reference Level of **MS8911B** to **–20 dBm**.

44. After Average (50/50) appears, record the –20 dBm Channel Power from the **MS8911B** the "M(Level)" column under "Preamp Off" on the test record.

- Use the "M(Level)" column under "Preamp Off" in Table A-36 on page A-21.

45. Calculate the Deviation using the following formula:

- Deviation = M(Level) – SB(–10) – DAB(–10) – AT(–10) + AT(set)

46. Record the result to the "Dev" column under "Preamp Off" on the test record and verify that it is within specification.

- Use the "Dev" column under "Preamp Off" in Table A-36 on page A-21.

47. Press the Frequency/Level soft key and set Preamp to ON. Change the Reference Level if required.

48. After Average (50/50) appears, record the –20 dBm Channel Power from the **MS8911B** in the "M(Level)" column under "Preamp On" on the test record.

- Use the "M(Level)" column under "Preamp On" in Table A-36 on page A-21.

49. Calculate the Deviation using the following formula:

- Deviation = M(Level) – SB(–10) – DAB(–10) – AT(–10) + AT(set)

50. Record the result to the "Dev" column under "Preamp On" on the test record and verify that it is within specification.

- Use the "Dev" column under "Preamp On" in Table A-36 on page A-21.

51. Repeat Step #43 through Step #51 for Test levels **–25 dBm** to **–45 dBm**. Change Reference Level and switch Preamp per the "Ref Level Pre Amp On/Off" column in test record.

52. Turn off the **power amplifier**, disconnect the **power splitter** from the **MS8911B**, and reconnect **Sensor A** to the **power splitter** as shown in Figure 5-2, "DVB-T/H Option 50 and 57 - Level Accuracy Verification - Two Sensors" on page 5-8.

53. Set the **MN63A** Attenuation to **10 dB**.
54. Set the **MG3700A** Level to –60 dBm.
55. Turn on the **power amplifier** and allow it to warm up for at least 5 minutes.
56. Adjust the **MN63A Attenuator** so that the **Sensor A** reading is **–50 dBm ± 1 dB**. Record the attenuation reading to Table 5-2 below in the "AT(–50)" column.
    - Use the "MN63A Attenuation Reading AT(–50)" column of Table 5-2, "Readings for Sensor A, Sensor B, DAB(–50), and MMN63A Attenuation AT(–50)" below.
57. On the **MG3700A** adjust the power level so that **Power Meter Sensor A** reading is **–50.0 dBm ± 0.2 dB**.
58. Record the following value to the appropriate columns in Table 5-2.
    - **Power Meter Sensor A** reading to the "Sensor A Reading" column
    - **Power Meter Sensor B** reading to the "Sensor B Reading" column
59. Subtract the Sensor A reading from Sensor B reading and record the result to the "DAB(–50)" column of Table 5-2 below.

Table 5-2. Readings for Sensor A, Sensor B, DAB(–50), and MMN63A Attenuation AT(–50)

Frequency (Channel)	Sensor A Reading	Sensor B Reading	DAB(–50)	MN63A Attenuation Reading, AT(–50)
474 MHz (Ch 21)				
666 MHz (Ch 45)				
858 MHz (Ch 69)				

60. Calculate the AT(set) values for Test Levels **–55 dBm** through **–84 dBm** and record the values to the "AT(set)" column on the test record.
    - Use the AT(set) column in Table A-36, "DVB-T/H Signal Analyzer Option 50 and 57 - Level Accuracy - Measurement Channel = 21ch @ 474 MHz," on page A-21.
61. Remove **Sensor A** from the **Power Splitter** and then connect the **Power Splitter** to the **MS8911B Spectrum Analyzer RF In** with an **N (m) to N (m) Adapter**.
62. Record the new Power Meter Sensor B reading to the "SB(–50)" box in the test record.
    - Use the "SB(–50)" box in Table A-36 on page A-21.
63. Repeat Step #43 through Step #51 for Test Levels **–50 dBm** to **–84 dBm**. Change the Reference Level and switch the Preamp On or Preamp Off per the "Ref Level Pre Amp On/Off" column in test record. Use the following formula to calculate Deviation:
    - Deviation = M(Level) – SB(–50) – DAB(–50) – AT(–50) + AT(set)
64. Repeat Step #16 through Step #63 for frequencies **666 MHz (Ch 45)** and **858 MHz (Ch 69)**. Set the cal factor of both power sensors to **666 MHz** or **858 MHz** as required.
    - For **666 MHz - Channel 45**, use Table A-37, "DVB-T/H Signal Analyzer Option 50 and 57 - Level Accuracy - Measurement Channel = 45ch @ 666 MHz," on page A-22.
    - For **858 MHz - Channel 69**, use Table A-38, "DVB-T/H Signal Analyzer Option 50 and 57 - Level Accuracy - Measurement Channel = 62ch @ 767.14285714 MHz," on page A-23.

5-4 1 dB Compression Level Verification

The tests in this section verify the accuracy of the MS8911B is not degraded by compression when operating in the DVB-T/H Signal Analyzer mode.

Equipment Required

- Anritsu MG3700A Vector Signal Generator
- Anritsu MN63A Programmable Attenuator
- Anritsu ML2438A Power Meter
- Anritsu MA2482D Power Sensors (2)
- Anritsu 1N50C RF Limter
- Anritsu 34NN50A Adapter
- Anritsu 15NNF50-1.5C RF Coaxial Cables (3)
- Aeroflex/Weinschel 1870A Power Splitter
- Aeroflex/Weinschel 44-10 10 dB Fixed Attenuator
- Mini-Circuits TIA-1000-1R8 RF Power Amplifier
- Midwest Microwave ADT-2615-NF-BNM-02 Adapters (2)

Procedure

1. Ensure that the **Power Amplifier** is OFF.
2. On the **power meter**, set Low Level Averaging to Low and Averaging to Moving with **50 averages**. Also set the **power meter** to read True RMS.
3. Perform a Zero/Cal on both **sensors** of the **power meter**.
4. Connect the **MG3700A Signal Generator**, **Power Amplifier** with **N (f) to BNC (m) Adapters**, **RF Limiter**, **MN63A Programmable Attenuator**, **Power Divider**, **Power Meter,** and **Power Sensors** as shown in Figure 5-2, "DVB-T/H Option 50 and 57 - Level Accuracy Verification - Two Sensors" on page 5-8 above.
5. On the **MG3700A**, press the **MOD On/Off** button to turn Modulation OFF so that the **MOD On/Off LED** is off.
6. Set the Level output of the **MG3700A** to **–25 dBm**.
7. Set the **MN63A** attenuation to **20 dB.**
8. Turn on the **power amplifier** and allow it to warm up at least five minutes.

474 MHz Tests

9. Set the cal factor of both sensors to **474 MHz**.
10. Set the **MG3700A** Frequency to **474 MHz**.
11. Adjust the **MN63A** attenuation so that the **Power Meter Sensor A** reading is **–25 dBm ± 1 dB**. Record the MN63A attenuation readout to the "AT(–25)" column.
    - Use the "474 MHz" row and the "AT(–25)" column in Table 5-3, "Readings for Sensor A M(Sa) and MN63A Attenuation at AT(–25), AT(–15), AT(–50), and AT(–43)," on page 5-14 below.

12. Adjust the Level of the **MG3700A** so that the **Power Meter Sensor A** reads **–25.0 dBm ± 0.05 dB**. Record the Sensor A reading to the "M(Sa)" column in Table 5-3 below.

Table 5-3. Readings for Sensor A M(Sa) and MN63A Attenuation at AT(–25), AT(–15), AT(–50), and AT(–43)

Frequency (Channel)	Sensor A Reading M(Sa)	MN63A Attenuation Reading, AT(–25)	MN63A Attenuation Reading, AT(–15)	MN63A Attenuation Reading, AT(–50)	MN63A Attenuation Reading, AT(–43)
474 MHz (Ch 21)					
666 MHz (Ch 45)					
858 MHz (Ch 69)					

13. Remove **Sensor A** from the **splitter** and connect the **MS8911B RF In** to the open end of the **splitter** using an **adapter** as shown in Figure 5-3, "DVB-T/H Option 50 and 57 - Level Accuracy Verification - Sensor B Only" on page 5-10 above.
14. Set the **MS8911B** to DVB-T/H Signal Analyzer mode and **preset** the unit.
15. Press the Meas Selection soft key and ensure Signal Power is activated.
16. Press the Frequency/Level soft key and ensure the **MS8911B** is set to Channel 21 and the Preamp is OFF.
17. Set the Reference Level to **–25 dBm**.
18. Record the **MS8911B Channel Power** reading, MeasCP(–25), to the test record.
    - Use "–25 dBm Test Level" row of the "Meas. Value" column in Table A-39, "DVB-T/H Signal Analyzer Option 50 and 57 - 1 dB Compression - Preamp Off," on page A-24.
19. Calculate the difference, Delta(–25), using the following formula:
    - Delta(–25) = M(Sa) – MeasCP(–25)
20. Record the result to the "Delta" column on the test record. Verify that the result is less than 1 dB.
    - Use the "Delta" column in Table A-39 on page A-24.
21. Calculate AT(–15) using the following formula:
    - AT(–15) = AT(–25) – 10
22. Set the **MN63A** attenuation to AT(–15).
    - Note that the Over Range message on the **MS8911B** is normal.
23. Record the **MS8911B** Channel Power reading, MeasCP(–15), to the test record.
    - Use the "–15 dBm Test Level" row of the "Meas. Value" column in Table A-39 on page A-24.
24. Calculate the Delta at –15 dBm Input using the following formula:
    - Delta(–15) = M(Sa) + 10 – MeasCP(–15) + Delta(–25)
25. Record the result to the "Delta" column to the test record. Verify that it is less than 1 dB.
    - Use the "Delta" column in Table A-39 on page A-24.
26. Calculate the value of AT(–50) using the following formula:
    - AT(–50) = AT(–25) + 25
27. Adjust the **MN63A** attenuation to AT(–50).
28. Set the Reference Level on the **MS8911B** to –50 dBm and turn the Preamp on.

29. Record the **MS8911B** Channel Power reading, MeasCP(–50), to the "–50 dBm Test Level" row of in the "Meas. Value" column on the test record.
    - Use the "–50 dBm Test Leve"l row in the "Meas. Value" column in Table A-40, "DVB-T/H Signal Analyzer Option 50 and 57 - 1 dB Compression - Preamp On," on page A-24.
30. Calculate the Delta at –50 dBm Input, Delta(–50), using the following formula:
    - Delta(–50) = M(Sa) – 25 – MeasCP(–50) + Delta(–25)
31. Record the result to the "Delta" column on the test record. Verify that it is less than 1 dB.
    - Use the "Delta" column in Table A-40 on page A-24.
32. Calculate the AT(–43) using the following formula:
    - AT(–43) = AT(–25) + 18
33. Set the **MN63A** attenuation to AT(–43).
    - Note that the Over Range message on the **MS8911B** is normal.
34. Record the **MS8911B** Channel Power reading, MeasCP(–43), in the "–43 dBm Test Level" row of the "Meas. Value" column on the test record.
    - Use the "–43 dBm Test Level" row of the "Meas. Value" column in Table A-40 on page A-24.
35. Calculate the Delta at –43 dBm Input, Delta(–43), using the following formula:
    - Delta(–43) = M(Sa) – 18 – MeasCP(–43) + Dev(–50)
36. Record the result to the "Delta" column on the test record. Verify that it is less than 1 dB.
    - Use the "Delta" column in Table A-40 on page A-24.

666 MHz Tests

37. Remove the **MS8911B** from the test setup and reinstall **Sensor A** to the open splitter output as shown in Figure 5-2, "DVB-T/H Option 50 and 57 - Level Accuracy Verification - Two Sensors" on page 5-8 above.
38. Set the **MG3700A** Frequency to **666 MHz** and ensure the **Mod On/Off LED** is off.
39. Set the cal factor of both sensors to **666 MHz**.
40. Adjust the **MN63A** attenuation so that the **Power Meter Sensor A** reads **–25 dBm ± 1 dB**. Record the **MN63A** attenuation readout to the "AT(–25)" column in Table 5-3 above.
    - Use the "666 MHz" row and the "AT(–25)" column in Table 5-3, "Readings for Sensor A M(Sa) and MN63A Attenuation at AT(–25), AT(–15), AT(–50), and AT(–43)," on page 5-14 above.
41. Adjust the Level of the **MG3700A** so that the **Power Meter Sensor A** reads **–25.0 dBm ± 0.05 dB**. Record the Sensor A reading to the M(Sa) column in Table 5-3 on page 5-14 above.
42. Remove **Sensor A** from the **splitter** and connect the **MS8911B RF In** to the open end of the **splitter** using an **adapter** as shown in Figure 5-2, "DVB-T/H Option 50 and 57 - Level Accuracy Verification - Two Sensors" on page 5-8 above.
43. Set the **MS8911B** to **Channel 45**.
44. Set the Preamp to Off and the Reference Level to **–25 dBm**.
45. Repeat Step #18 through Step #36.

858 MHz Tests

46. Remove the **MS8911B** from the test setup and reinstall **Sensor A** to the open **splitter** output as shown in Figure 5-3, "DVB-T/H Option 50 and 57 - Level Accuracy Verification - Sensor B Only" on page 5-10 above.
47. Set the **MG3700A** Frequency to **858 MHz** and ensure the **Mod On/Off LED** is off.
48. Set the cal factor of both sensors to **858 MHz**.

49. Adjust the **MN63A** attenuation so that **Power Meter Sensor A** reads **–25 dBm ± 1 dB**. Record the MN63A attenuation readout to the "AT(–25)" column in Table 5-3.

- Use the "858 MHz" row and the "AT(–25)" column in Table 5-3, "Readings for Sensor A M(Sa) and MN63A Attenuation at AT(–25), AT(–15), AT(–50), and AT(–43)," on page 5-14 above.

50. Adjust the Level of the **MG3700A** so that **Power Meter Sensor A** reads **–25.0 dBm ± 0.05 dB**. Record the Sensor A reading to the M(Sa) column in Table 5-3.

51. Remove **Sensor A** from the **splitter** and connect the **MS8911B RF In** to the open end of the **splitter** using an adapter as shown in Figure 5-3, "DVB-T/H Option 50 and 57 - Level Accuracy Verification - Sensor B Only" on page 5-10 above.

52. Set the **MS8911B** to Channel 69.

53. Set the Preamp to OFF and Reference Level to **–25 dBm**.

54. Repeat Step #18 through Step #36.

5-5 Noise Floor Verification

The tests in this section verify the noise floor of the MS8911B in DVB-T/H Signal Analyzer mode.

Equipment Required:

- Anritsu 28N50-2 50 Ohm Termination

Procedure:

1. Set the mode of the MS8911B to DVB-T/H Analyzer and **preset** the unit.
2. Install a **50 Ohm Termination** to the **Spectrum Analyzer RF In** connector.
3. Ensure the Channel is set to **21** and Pre Amp is Off.
4. Press the Meas Setup soft key. Change Meas Mode to Average, leave Average Count set to **50**.
5. Press the Frequency/Level soft key and set the Reference Level to **–25 dBm**.
6. After Averages (50/50) appears at the top of the display, record the Channel Power onto the "Preamp Off" line of the test record.
   - Use the "Channel 21" row and the "Preamp Off - Measured Value" column in Table A-41, "DVB-T/H Signal Analyzer Option 50 and 57 - Noise Floor," on page A-24.
7. Set the Preamp to On.
8. Set the Reference Level to **–50 dBm**.
9. After Averages (50/50) appears at the top of the display, record the Channel Power onto the Pre Amp ON line of the test record.
   - Use the "Channel 21" row and the "Preamp On - Measured Value" column in Table A-41 on page A-24.
10. Change the channel to **Channel 45**. Set Pre Amp to Off.
11. Repeat Step #5 through Step #9 for Channel 45.
    - Use the "Channel 45" row in Table A-41 on page A-24.
12. Change the channel to **Channel 69**. Set Pre Amp to Off.
13. Repeat Step #5 through Step #9 for Channel 69.
    - Use the "Channel 69" row in Table A-41 on page A-24.

5-6 BER Measurement Functional Check Option 57 Only

This section provides the procedures to check the functionality of the BER measurement hardware that is included with Option 57 in the MS8911B Digital Broadcast Field Analyzer.

Equipment Required

- Anritsu MG3700A Vector Signal Generator
- Anritsu MP8931A Bit Error Rate Tester
- Anritsu ML2438A Power Meter
- Anritsu MA2482D Power Sensor
- Anritsu 34NN50A Adapter
- Anritsu 15NNF50-1.5C RF Coaxial Cable
- Anritsu 3-806-169 75 Ohm BNC(m) to BNC(m) RF Coaxial Cable
- Aeroflex/Weinschel 1870A Power Splitter

Procedure

1. Turn on the **MG3700A**, **MP8931A**, **ML2438A**, and the **MS8911B**.
2. Perform Zero/Cal on **Sensor A** of the **power meter**. Set the cal factor of the **sensor** to **474 MHz**.
3. Connect the **MG3700A Signal Generator**, **Power Splitter**, **Power Sensor**, **34NN50A Adapter**, **MS8911B,** and the **MP8931A** as shown in Figure 5-4, "DVB-T/H Option 50 and 57 - BER Functional Check Setup" on page 5-19 below.

Note	Use a **75 Ohm BNC** cable to connect between the **DVB-ASI Input** connector of the **MP8931A** and the **DVB-ASI Out** connector of the **MS8911B**.

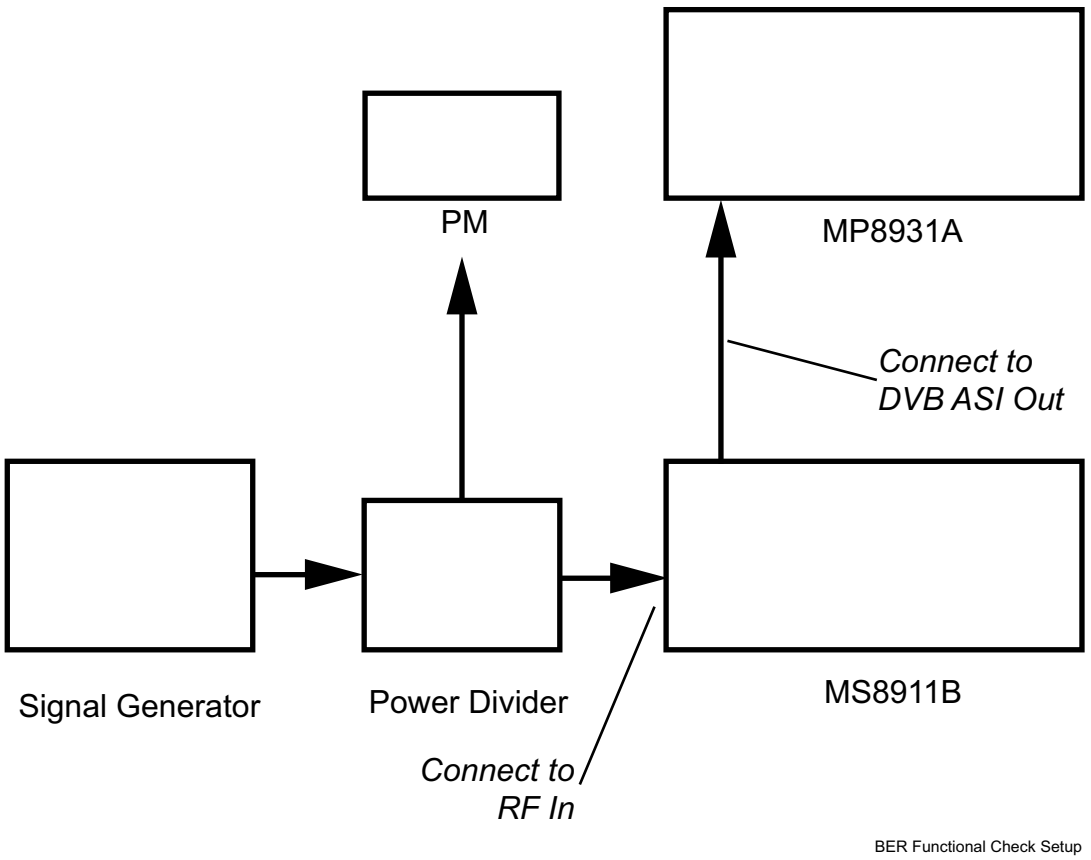

Figure 5-4. DVB-T/H Option 50 and 57 - BER Functional Check Setup

4. On the **MP8931A**, press the **Menu** key.
5. Press the **Down Arrow** key until the triangle pointer is at System* on the display.
6. Press the **Right Arrow** key so that Initialize appears on the display.
7. Press the **Enter** key twice.
8. Press the **Menu** key and then the **Up Arrow** or **Down Arrow** keys until the triangle pointer is at Pattern.
9. Press the **Enter** key to select.
10. Press the **Up Arrow** or **Down Arrow** keys until the triangle pointer is at ALL0 and then press the **Enter** key.
11. Press the **Down Arrow** key. The pointer should be at Interface. Then press **Enter** to select.
12. Press the **Right Arrow** key and then press the **Down Arrow** key until the pointer is at DVB-ASI. Press the **Enter** key to select.
13. Press the **Menu** key and then the **Up Arrow** or **Down Arrow** keys until the triangle pointer is at DVB-ASI*. Press the **Right Arrow** key and confirm that the PKT is set to (1)+187+(16).
14. On **MG3700A**, press the yellow **Preset** key located on the upper left side of the instrument.
15. Press the **Down Arrow** key to select Yes.
16. Press the **Set** key.

- Note that there are two **Set** keys and they both provide the same functions.

17. Set the **MG3700A** Frequency to **474 MHz**.

18. Press the **Baseband** key.

19. Press the **More** key located at the bottom of the row.

20. Press the F5 Pattern Combination soft key as required until Edit appears.

21. Press the **More** key

22. Press the F3 soft key so that Output B appears.

23. Press the **Baseband** key and then the F1 soft key.

24. Press the F2 soft key so that Memory A is highlighted.

25. Press the F1 key and use the **Down Arrow** key to highlight MS8911B-057_Inspection.

26. Press the **Set** key.

27. Use the **Arrow** key to highlight 8M_AWGNand press the **Set** key.

- If an Overwrite question appears, answer Yes.

28. Press the F2 soft key so that Memory B is highlighted

29. Highlight 8M_8k_64QAM_2_3_ALL0 and press the **Set** key.

- If an Overwrite question appears, answer Yes.

30. Press the F6 Return soft key.

31. Use the **Arrow** keys to highlight the blank line between Pattern:[and the small green A memory symbol.

32. Press the Set key.

33. Ensure that MS8911B-057_Inspection is highlighted and press the **Set** key.

34. Ensure that 8M_AWGN is highlighted and press the **Set** key.

35. Use the **Arrow** keys to highlight the blank line between Pattern:[and the small violet B memory symbol.

36. Press the **Set** key.

37. Ensure that MS8911B-057_Inspection is highlighted and press the **Set** key.

38. Ensure 8M_8k_64QAM_2_3_ALL0 is highlighted and press the **Set** key.

39. Press the **MOD On/Off** and **Output** keys so that both **LEDs** are on.

40. Adjust the Level so that the **power meter** reads **–25.0 dBm ± 0.2 dB**.

41. Set the **MS8911B** to DVB-T/H Signal Analyzer mode and **preset** the unit.

42. Press the Frequency/Level soft key.

43. Ensure that the Channel Map is set to UHF (Europe), and Channel is set to **21**, Reference Level is set to **–25 dBm** and Preamp is set to Off.

44. Press the Execute Measure soft key and verify that the Moving Avg value of the MER(quick) [dB] is **>27 dB**.

45. On the **MP8931A**, press the **Start/Stop** key and verify that 0e–9 is displayed. This verifies the DVB ASI Out is functioning properly.

Chapter 6 — DVB-T/H SFN Analyzer Option 52 Verification

6-1 Introduction

The tests in this section verify the performance of the optional DVB-T/H SFN Analyzer option of the MS8911B. These tests include:

- Level Accuracy Verification
- 1 dB Compression Level Verification
- Noise Floor Verification

6-2 Level Accuracy Verification

The tests in this section verify the level accuracy of the MS8911B in DVB-T/H SFN Analyzer mode.

Equipment Required

- Anritsu MG3700A Vector Signal Generator
- Anritsu MN63A Programmable Attenuator
- Anritsu ML2438A Power Meter
- Anritsu MA2482D Power Sensors (2)
- Anritsu 1N50C RF Limter
- Anritsu 34NN50A Adapter
- Anritsu 15NNF50-1.5C RF Coaxial Cables (3)
- Aeroflex/Weinschel 1870A Power Splitter
- Aeroflex/Weinschel 44-10 10 dB Fixed Attenuator
- Mini-Circuits TIA-1000-1R8 RF Power Amplifier
- Midwest Microwave ADT-2615-NF-BNM-02 Adapters (2)

Procedure

1. Ensure that the **Power Amplifier** is off.
2. Connect the **MG3700A Signal Generator**, **Power Amplifier** with **N (f) to BNC (m) Adapters**, **RF Limiter**, **MN63A Programmable Attenuator**, **Power Divider**, **Power Meter**, and **Power Sensors** as shown in Figure 6-1, “DVB-T/H SFN Analyzer Option 52 - Level Accuracy Verification - Two Sensors” on page 6-2 below.

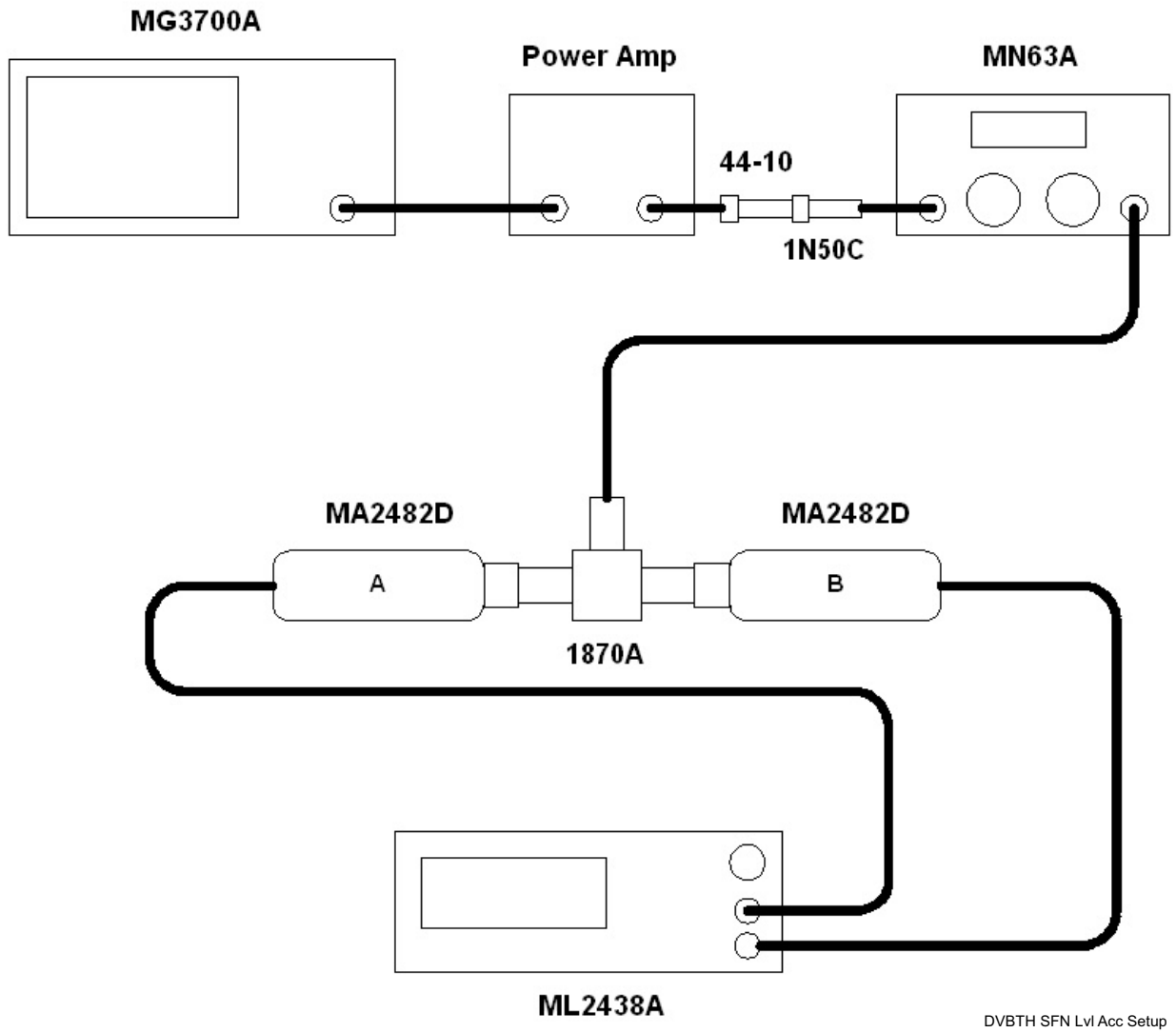

Figure 6-1. DVB-T/H SFN Analyzer Option 52 - Level Accuracy Verification - Two Sensors

3. On **MG3700A,** press the yellow **Preset** key located in the upper left side of the instrument.
4. Press the **Down Arrow** key to select Yes.
5. Press the **Set** key.
   - Note that there are two **Set** keys and they both provide the same functions.
6. Press the F1 soft key to select Load File to Memory.
7. Press the F1 soft key again to select Select Package.
8. Use the **Down Arrow** key to step through the selection list until the Digital_Broadcast option is highlighted.
9. Press the **Set** key.
10. Press the **F6** soft key Return.

11. Press the **Set** key.
12. Use the **Down Arrow** key to step through the selection list until the Digital_Broadcast option is highlighted.
13. Press the **Set** key.
14. Use the **Down Arrow** key to step through the selection list until the DVB-T_H_00 option is highlighted.
15. Press the **Set** key.
16. Perform Zero/Cal on **Sensor A** and **Sensor B** of the **power meter**. Set the cal factor of both sensors to **474 MHz**.
17. Set the **MG3700A** Frequency to **474 MHz**.
18. Set the Level to **–25 dBm**.
19. Ensure the **Modulation On/Off** key and the **Output** key both have **LEDs ON**.
20. Turn on the **power amplifier** and allow it to warm up for at least 5 minutes.
21. Adjust the **MN63A Attenuator** so that **Sensor A** reading is **–10 dBm ± 1 dB**. Record the attenuation reading.
    - Use the "474 MHz" row and the "AT(–10)" column of Table 6-1, "Readings for Sensor A, Sensor B, DAB–10, MN63A Attenuation AT(–10)" below.
22. On the **MG3700A**, adjust the power level so that **Power Meter Sensor A** reading is **–10.0 dBm ± 0.2 dB**.
23. Record the following values to the appropriate columns of Table 6-1 below:
    - Power Meter Sensor A reading to "Sensor A Reading"
    - Power Meter Sensor B reading to "Sensor B Reading"
24. Subtract Sensor A reading from Sensor B reading and record the result to the "DAB(–10)" column of Table 6-1 below.
    - DAB(–10) = Sensor Reading B – Sensor A Reading

Table 6-1. Readings for Sensor A, Sensor B, DAB–10, MN63A Attenuation AT(–10)

Frequency (Channel)	Sensor A Reading	Sensor B Reading	DAB(–10)	MN63A Attenuation Reading, AT(–10)
474 MHz (Ch 21)				
666 MHz (Ch 45)				
858 MHz (Ch 69)				

25. Calculate the AT(set) values for Test Levels **–10 dBm** through **–45 dBm** and record the values to the test record.
    - Use the "AT(set)" column in Table A-42, "DVB-T/H SFN Analyzer Option 52 - Level Accuracy - Measurement Channel = 21ch @ 474 MHz," on page A-25.
26. Remove **Sensor A** from the **Power Splitter** and then connect the **Power Splitter** to the **MS8911B Spectrum Analyzer RF In** with an **N (m) to N (m) Adapter** as shown in Figure 6-2, "DVB-T/H SFN Analyzer Option 52 - Level Accuracy Verification - Sensor B Only" on page 6-4 below.

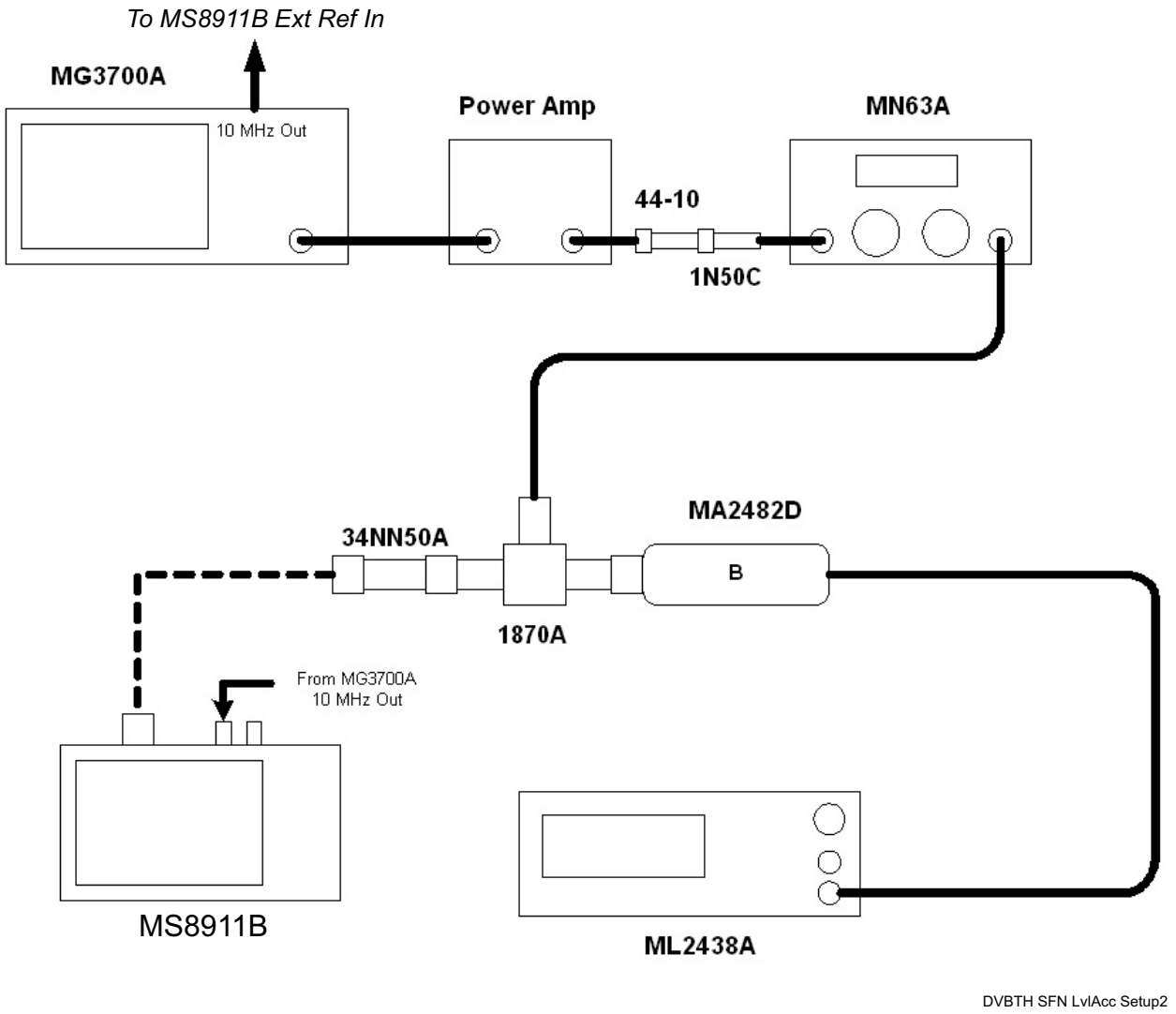

Figure 6-2. DVB-T/H SFN Analyzer Option 52 - Level Accuracy Verification - Sensor B Only

27. Record the new **Power Meter Sensor B** reading to the "SB(–10)" box in the test record.

- Use Table A-42, "DVB-T/H SFN Analyzer Option 52 - Level Accuracy - Measurement Channel = 21ch @ 474 MHz," on page A-25.

28. On **MS8911B**, set the mode to DVB-T/H SFN Analyzer and **preset** the unit.

29. Press the Meas Setup soft key and set Meas Mode to Single.

30. Press the Frequency/Level soft key and ensure Channel is **21** and Preamp is Off.

31. Change the Reference Level to **–10 dBm**.

32. After the data appears on the left of the display, record the –25 dBm Channel Power from the **MS8911B** to the "M(Level)" column under "Pre Amp Off" on the test record.

- Use Table A-42 on page A-25.

33. Calculate the Deviation using the following formula:

- Deviation = M(Level) – SB(–10) – DAB(–10) – AT(–10) + AT(set)

Note	Since AT(–10) is the same as AT(set), [– AT(–10) + AT(set)] = 0

34. Record the result to the "Dev" column under "Pre Amp Off" on the test record and verify that it is within specification.

- Use Table A-42 on page A-25.

35. Set the **MN63A** attenuation to the next AT(set) value in the test record.

36. Press the Frequency/Level soft key and set the Reference Level of **MS8911B** to **–15 dBm**.

37. After the data appears on the left of the display, record the –15 dBm Channel Power from the **MS8911B** to the "M(Level)" column under "Preamp Off" on the test record.

- Use Table A-42 on page A-25.

38. Calculate the Deviation using the following formula:

- Deviation = M(Level) – SB(–10) – DAB(–10) – AT(–10) + AT(set)

39. Record the result to the "Dev" column under "Preamp Off" on the test record and verify that it is within specification.

- Use Table A-42 on page A-25.

40. Set the **MN63A** attenuation to the next "AT(set)" value in the test record.

41. Set the Reference Level of **MS8911B** to **–20 dBm**.

42. After the data appears on the left of the display, record the –20 dBm Channel Power from the **MS8911B** the "M(Level)" column under "Preamp Off" on the test record.

- Use Table A-42 on page A-25.

43. Calculate the Deviation using the following formula:

- Deviation = M(Level) – SB(–10) – DAB(–10) – AT(–10) + AT(set)

44. Record the result to the "Dev" column under "Pre Amp Off" on the test record and verify that it is within specification.

- Use Table A-42 on page A-25.

45. Press the Frequency/Level soft key and set Preamp to **On**. Change Reference Level if required.

46. After the data appears on the left of the display, record the –20 dBm Channel Power from the **MS8911B** the M(Level) column under "Preamp On" on the test record.

- Use Table A-42 on page A-25.

47. Calculate the Deviation using the following formula:

- Deviation = M(Level) – SB(–10) – DAB(–10) – AT(–10) + AT(set)

48. Record the result to the "Dev" column under "Pre Amp On" on the test record and verify that it is within specification.

- Use Table A-42 on page A-25.

49. Repeat Step #43 through Step #51 for Test Levels –25 dBm to –45 dBm. Change Reference Level and switch Preamp per the "Ref Level Pre Amp On/Off" column in test record.

50. Turn off the **power amplifier**, disconnect the **power splitter** from the **MS8911B**, reconnect **Sensor A** to the **power splitter** as shown in Figure 6-1, "DVB-T/H SFN Analyzer Option 52 - Level Accuracy Verification - Two Sensors" on page 6-2 above.

51. Set the **MN63A** attenuation to **10 dB**.

52. Set the **MG3700A** Level to **–60 dBm**.

53. Turn on **power amplifier** and allow it to warm up for at least 5 minutes.

54. Adjust the **MN63A Attenuator** so that **Sensor A** reading is **–50 dBm ± 1 dB**. Record the attenuation reading to the table below "AT(–50)".

- Use Table 6-2, "Readings for Sensor A, Sensor B, DAB–50, and MN63A AT(–50)," on page 6-6.

55. On MG3700A adjust power level so that Power Meter Sensor A reading is **–50.0 dBm ± 0.2 dB**.

56. Record the "Power Meter Sensor A" reading, "Power Meter Sensor B" reading, and "MN63A Attenuation Reading."

- Use Table 6-2 below.

57. Subtract **Sensor A** reading from **Sensor B** reading and record the result to the "AB(–50)" column.

- Use Table 6-2 below.
- DAB(–50) = Sensor B Reading – Sensor A Reading

Table 6-2. Readings for Sensor A, Sensor B, DAB–50, and MN63A AT(–50)

Frequency (Channel)	Sensor A Reading	Sensor B Reading	DAB(–50)	MN63A Attenuation Reading, AT(–50)
474 MHz (Ch 21)				
666 MHz (Ch 45)				
858 MHz (Ch 69)				

58. Calculate the AT(set) values for Test Levels –55 dBm through –84 dBm and record the values to the AT(set) column on the test record.

- Use Table A-42, "DVB-T/H SFN Analyzer Option 52 - Level Accuracy - Measurement Channel = 21ch @ 474 MHz," on page A-25.

59. Remove Sensor A from the Power Splitter and then connect the Power Splitter to the MS8911B Spectrum Analyzer RF In with an N male to N male adapter as shown in Figure 6-2, "DVB-T/H SFN Analyzer Option 52 - Level Accuracy Verification - Sensor B Only" on page 6-4.

60. Record the new Power Meter Sensor B reading to the SB(–50) box in the test record.

- Use Table A-42 on page A-25.

61. Repeat Step #43 through Step #54 for Test levels –50 dBm to –84 dBm. Change the Reference Level and switch the Pre Amp on or off per the "Ref Level Pre Amp On/Off" column in test record. Use the following formula to calculate Deviation:

- Deviation = M(Level) – SB(–50) – DAB(–50) – AT(–50) + AT(set)

62. Repeat Step #16 through Step #61 for frequencies **666 MHz (Ch 45)** and **858 MHz (Ch 69)**. Set the calibration factor of both power sensors to **666 MHz** or **858 MHz** as required.

- For "666 MHz - Channel 45", use Table A-43, "DVB-T/H SFN Analyzer Option 52 - Level Accuracy - Measurement Channel = 45ch @ 666 MHz," on page A-26.
- For "858 MHz - Channel 69", use Table A-44, "DVB-T/H SFN Analyzer Option 52 - Level Accuracy - Measurement Channel = 69ch @ 858 MHz," on page A-27.

6-3 1 dB Compression Level Verification

The tests in this section verify the accuracy of the MS8911B is not degraded by compression when operating in the DVB-T/H SFN Analyzer mode.

Equipment Required

- Anritsu MG3700A Vector Signal Generator
- Anritsu MN63A Programmable Attenuator
- Anritsu ML2438A Power Meter
- Anritsu MA2482D Power Sensors (2)
- Anritsu 1N50C RF Limter
- Anritsu 34NN50A Adapter
- Anritsu 15NNF50-1.5C RF Coaxial Cables (3)
- Aeroflex/Weinschel 1870A Power Splitter
- Aeroflex/Weinschel 44-10 10 dB Fixed Attenuator
- Mini-Circuits TIA-1000-1R8 RF Power Amplifier
- Midwest Microwave ADT-2615-NF-BNM-02 Adapters (2)

Procedure

1. Ensure that the **Power Amplifier** is off.
2. On the **power meter**, set Low Level Averaging to Low" and Averaging to "Moving" with 50 averages. Also set the **power meter** to read True RMS.
3. Perform a Zero/Cal on both **sensors** of the **power meter**.
4. Connect the **MG3700A Signal Generator**, **Power Amplifier with N (f) to BNC (m) adapters**, **RF Limiter**, **MN63A Programmable Attenuator**, **Power Divider**, **Power Meter**, and **Power Sensors** as shown in Figure 6-3, "DVB-T/H SFN Analyzer Option 52 - 1 dB Compression Level Verification - Two Sensors" on page 6-8 below.

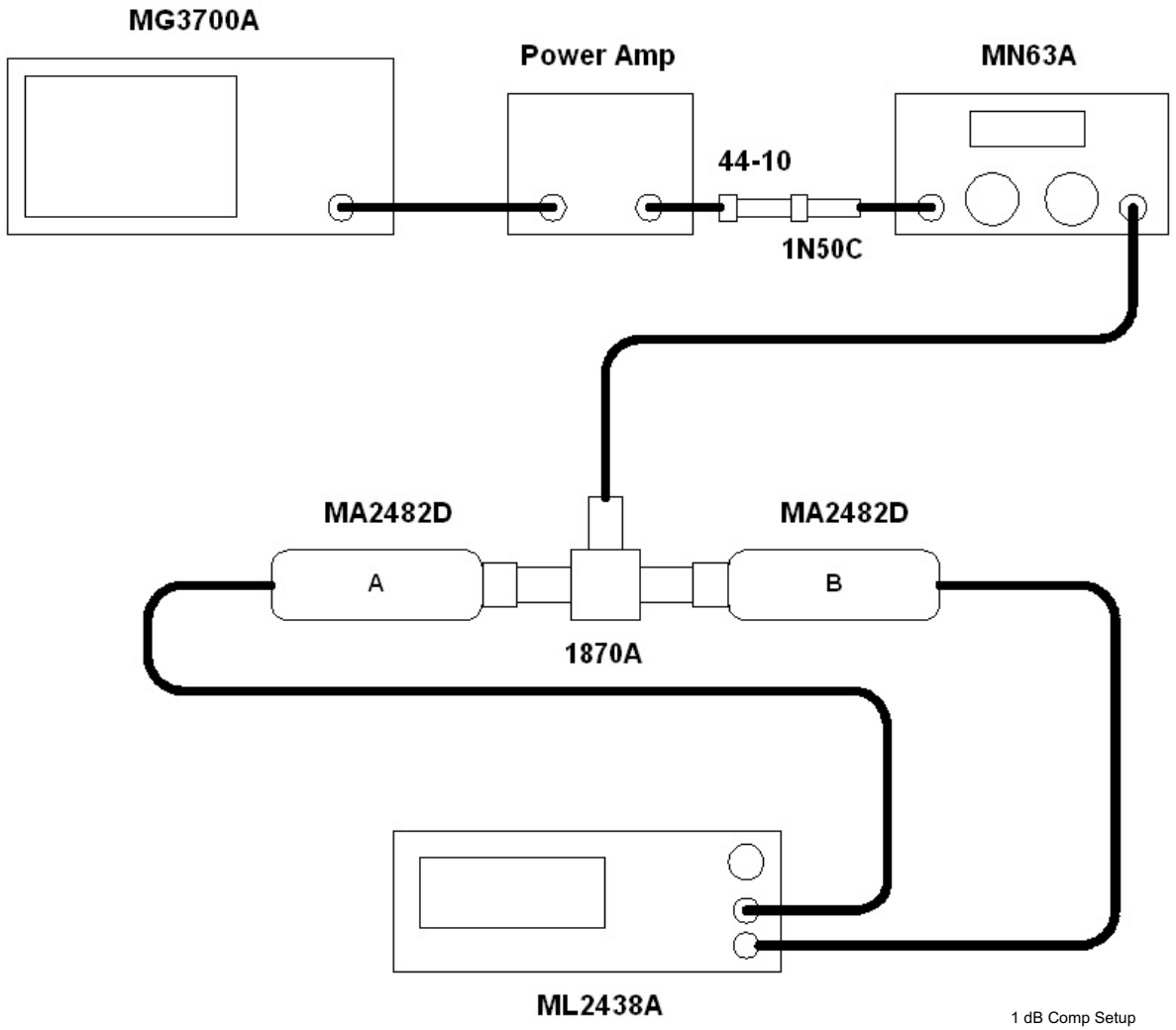

Figure 6-3. DVB-T/H SFN Analyzer Option 52 - 1 dB Compression Level Verification - Two Sensors

5. On the **MG3700A**, press the **MOD On/Off** button to turn Modulation off so that the **MOD On/Off LED** is off.
6. Set the Level output of the **MG3700A** to **–25 dBm**.
7. Set the **MN63A** attenuation to **20 dB**.
8. Turn on the **power amplifier** and allow it to warm up at least five minutes.

474 MHz Tests

9. Set the cal factor of both **sensors** to **474 MHz**.
10. Set the **MG3700A** Frequency to **474 MHz**.
11. Adjust the **MN63A** attenuation so that the **Power Meter Sensor A** reading is **–25 dBm ± 1 dB**.
    - Record the **MN63A** attenuation readout to the AT(–25) column of Table 6-3, "Readings for Sensor A M(Sa) and MN63A Attenuation for AT(–25), AT(–15), AT(–50), and A(–43)" below.
12. Adjust the Level of the **MG3700A** so that the **Power Meter Sensor A** reads **–25.0 dBm ± 0.05 dB**.
    - Record the **Sensor A** reading to the M(Sa) column in Table 6-3 below.

Table 6-3. Readings for Sensor A M(Sa) and MN63A Attenuation for AT(–25), AT(–15), AT(–50), and A(–43)

Frequency (Channel)	Sensor A Reading M(Sa)	MN63A Attenuation Reading, AT(–25)	MN63A Attenuation Reading, AT(–15)	MN63A Attenuation Reading, AT(–50)	MN63A Attenuation Reading, AT(–43)
474 MHz (Ch 21)					
666 MHz (Ch 45)					
858 MHz (Ch 69)					

13. Remove **Sensor A** from the **splitter** and connect the **MS8911B RF In** to the open end of the **splitter** using an **adapter** as shown below in Figure 6-4, "DVB-T/H SFN Analyzer Option 52 - 1 dB Compression Level Verification - Sensor B Only" on page 6-10.

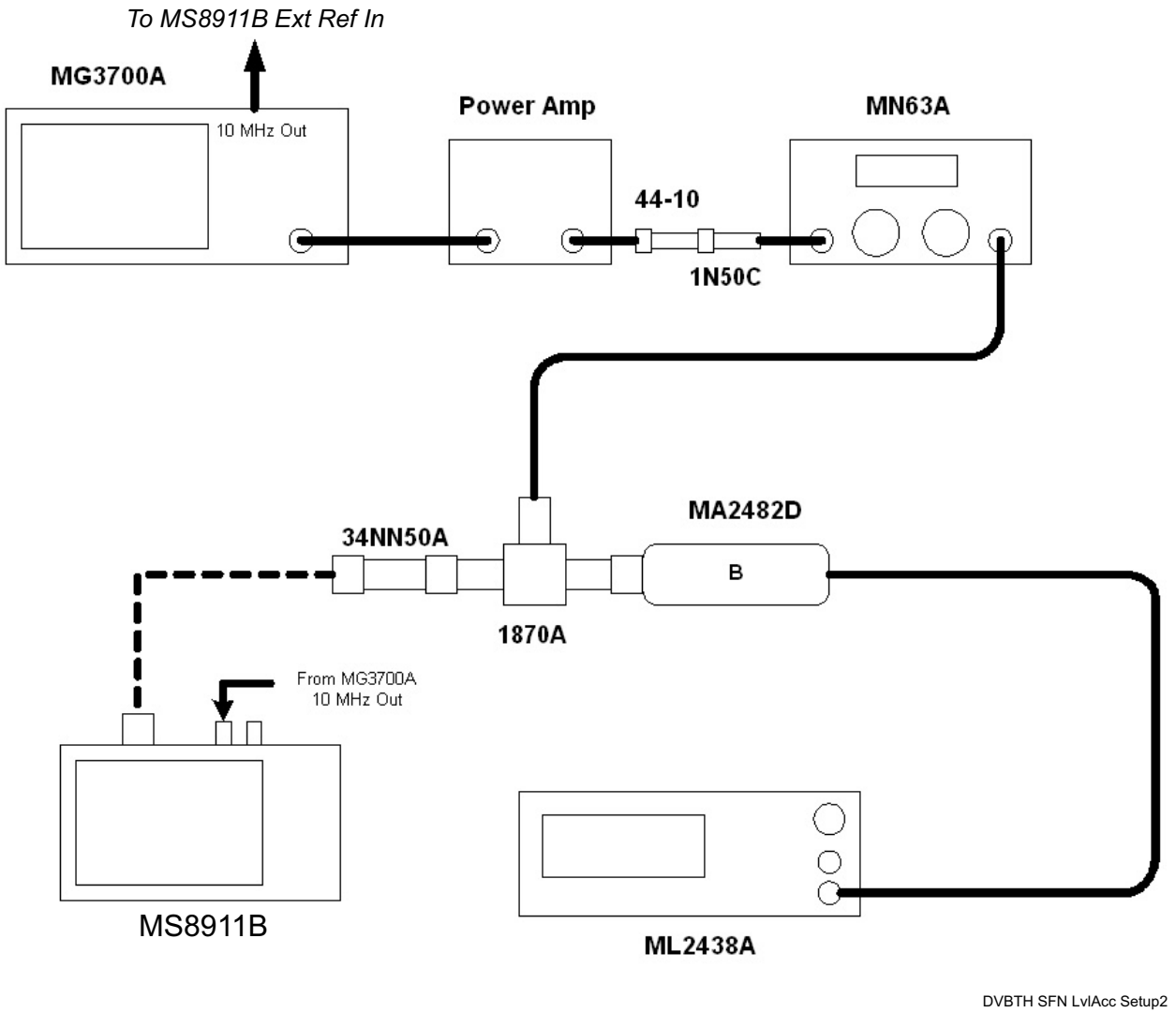

Figure 6-4. DVB-T/H SFN Analyzer Option 52 - 1 dB Compression Level Verification - Sensor B Only

14. Set the **MS8911B** to DVB-T/H SFN Analyzer mode and **preset** the unit.
15. Press the Meas Setup soft key and set Meas Mode to Single.
16. Press the Frequency/Level soft key and ensure the **MS8911B** Channel is set to **21** and Preamp is **Off**.
17. Set the Reference Level to **–25 dBm**.
18. Record the **MS8911B** Channel Power reading, MeasCP(–25), to the "–25 dBm Test Level" row of the "Meas Value" column on the test record.
    - Use Table A-45, "DVB-T/H SFN Analyzer Option 52 - 1 dB Compression - Preamp Off," on page A-28 in Appendix A — Test Records.
19. Calculate the difference, Delta(–25), using the following formula:
    - Delta(–25) = M(Sa) – MeasCP(–25)

20. Record the result to the "Delta" column on the test record. Verify that the result is less than **1 dB**.

- Use Table A-45, "DVB-T/H SFN Analyzer Option 52 - 1 dB Compression - Preamp Off," on page A-28.

21. Calculate AT(–15) using the following formula:

- AT(–15) = AT(–25) – 10

22. Set the **MN63A** attenuation to **AT(–15)**.

- Note that the Over Range message on the **MS8911B** is normal.

23. Record the **MS8911B** Channel Power reading, MeasCP(–15), to the test record.

- Use the "–15 dBm Test Level" row of the "Meas Value" column in Table A-45 on page A-28.

24. Calculate the Delta at –15 dBm Input using the following formula:

- Delta(–15) = M(Sa) + 10 – MeasCP(–15) + Delta(–25)

25. Record the result to the "Delta" column on the test record. Verify that it is less than 1 dB.

- Use Table A-45 on page A-28.

26. Calculate the value of AT(–50) using the following formula:

- AT(–50) = AT(–25) + 25

27. Adjust the **MN63A** attenuation to **AT(–50)**.

28. Set the Reference Level on the **MS8911B** to **–50 dBm** and turn the Preamp **On**.

29. Record the **MS8911B** Channel Power reading, MeasCP(–50), to the "–50 dBm Test Level" row of in the "Meas. Value" column on the test record.

- Use the "–50 dBm Test Level" row of the "Meas. Value" column in Table A-46, "DVB-T/H SFN Analyzer Option 52 - 1 dB Compression - Preamp On," on page A-28.

30. Calculate the Delta at –50 dBm Input, Delta(–50), using the following formula:

- Delta(–50) = M(Sa) – 25 – MeasCP(–50) + Delta(–25)

31. Record the result to the "Delta" column on the test record. Verify that it is less than **1 dB**.

- Use Table A-46 on page A-28.

32. Calculate the AT(–43) using the following formula:

- AT(–43) = AT(–25) + 18

33. Set the **MN63A** attenuation to **AT(–43).**

- Note that the Over Range message on the **MS8911B** is normal.

34. Record the **MS8911B** Channel Power reading, MeasCP(–43), in the "–43 dBm Test Level" row of the "Meas Value" column on the test record.

- Use the "–43 dBm Test Level" row of the "Meas Value" column on the test record.e Table A-46.

35. Calculate the Delta at –43 dBm Input, Delta(–43), using the following formula:

- Delta(–43) = M(Sa) – 18 – MeasCP(–43) + Dev(–50)

36. Record the result to the "Delta" column on the test record. Verify that it is less than **1 dB**.

- Use Table A-46 on page A-28.

666 MHz Tests

37. Remove the **MS8911B** from the test setup and reinstall **Sensor A** to the open splitter output as shown above in Figure 6-3, "DVB-T/H SFN Analyzer Option 52 - 1 dB Compression Level Verification - Two Sensors" on page 6-8.

38. Set the **MG3700A** Frequency to **666 MHz** and ensure the **Mod On/Off LED** is off.

39. Set the cal factor of both **sensors** to **666 MHz**.

40. Adjust the **MN63A** attenuation so that the **Power Meter Sensor A** reads **–25 dBm ± 1 dB**. Record the MN63A attenuation readout to the test records.
    - Use the "AT(–25)" column in Table 6-3, "Readings for Sensor A M(Sa) and MN63A Attenuation for AT(–25), AT(–15), AT(–50), and A(–43)," on page 6-9 above.
41. Adjust the Level of the **MG3700A** so that the **Power Meter Sensor A** reads **–25.0 dBm ± 0.05 dB**. Record the **Sensor A** reading to the test records.
    - Use the "M(Sa)" column in Table 6-3 on page 6-9 above.
42. Remove **Sensor A** from the **splitter** and connect the **MS8911B RF In** to the open end of the **splitter** using an adapter as shown above in Figure 6-4, "DVB-T/H SFN Analyzer Option 52 - 1 dB Compression Level Verification - Sensor B Only" on page 6-10 above.
43. Set the **MS8911B** Channel to **45**.
44. Set Preamp to **Off** and Reference Level to **–25 dBm**.
45. Repeat Step #17 through Step #36 and record the test results.
    - Use Table A-46, "DVB-T/H SFN Analyzer Option 52 - 1 dB Compression - Preamp On," on page A-28.

858 MHz Tests

46. Remove the **MS8911B** from the test setup and reinstall **Sensor A** to the open **splitter** output as shown above in Figure 6-3, "DVB-T/H SFN Analyzer Option 52 - 1 dB Compression Level Verification - Two Sensors" on page 6-8 above.
47. Set the **MG3700A** Frequency to **858 MHz** and ensure the **Mod On/Off LED** is off.
48. Set the cal factor of both **sensors** to **858 MHz**.
49. Adjust the **MN63A** attenuation so that the **Power Meter Sensor A** reads **–25 dBm ± 1 dB**. Record the **MN63A** attenuation readout to the AT(–25) column in Table 6-3, "Readings for Sensor A M(Sa) and MN63A Attenuation for AT(–25), AT(–15), AT(–50), and A(–43)," on page 6-9 above.
50. Adjust the Level of the **MG3700A** so that the **Power Meter Sensor A** reading is **–25.0 dBm ± 0.05 dB**.
    - Record the **Sensor A** reading to the "M(Sa)" column in Table 6-3 on page 6-9.
51. Remove **Sensor A** from the **splitter** and connect the **MS8911B RF In** to the open end of the **splitter** using an **adapter** as shown in above in Figure 6-4, "DVB-T/H SFN Analyzer Option 52 - 1 dB Compression Level Verification - Sensor B Only" on page 6-10 above.
52. Set the **MS8911B** Channel to **69**.
53. Set Preamp to **Off** and Reference Level to **–25 dBm**.
54. Repeat Step #17 through Step #36.

6-4 Noise Floor Verification

The tests in this section verify the noise floor of the MS8911B in DVB-T/H SFN Analyzer mode.

Equipment Required

- Anritsu 28N50-2 50 Ohm Termination

Procedure

1. Set the mode of the **MS8911B** to ISDB-T SFN Analyzer and **preset** the unit.
2. Install a **50 ohm termination** to the **Spectrum Analyzer RF In** connector.
3. Ensure the Channel is set to **21** and the Preamp is **Off**.
4. Set the Reference Level to **–25 dBm**.
5. Record the Channel Power [dBm] as shown in the lower left corner of the display onto the "Preamp Off - Measured Value" in the test record.
   - Use the "Channel 21" row in Table A-47, "DVB-T/H SFN Analyzer Option 52 - Noise Floor," on page A-28.
6. Set the Preamp to **On** and change the Reference Level to **–50 dBm**.
7. Record the Power [dBm] as shown in the lower left corner of the display onto the "Preamp On - Measured Value" in the test record.
   - Use the "Preamp On - Measured Value" column in Table A-47 on page A-28.
8. Change the channel to **Channel 45**, and set the Preamp to **Off**.
9. Repeat Step #4 through Step #7 for **Channel 45**.
   - Use the "Channel 45" row in Table A-47 on page A-28.
10. Change the channel to **Channel 69**, set Preamp to **Off**.
11. Repeat Step #4 through Step #7 for **Channel 69**.
    - Use the "Channel 69" row in Table A-47 on page A-28.

Chapter 7 — Battery Information and Replacement

7-1 Battery Information

The following information relates to the care and handling of the Digital Broadcast Field Analyzer battery, and Lithium-Ion batteries in general.

Approved Batteries Only

- Always use the battery for its intended purpose only.
- Use only Anritsu approved battery packs.
- 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.

Recharging

- The battery supplied with the Digital Broadcast Field Analyzer may need charging before use.
- Before using the Digital Broadcast Field Analyzer, the internal battery may be charged in the Digital Broadcast Field Analyzer, using either the AC-DC Adapter (40-168-R) or the 12-Volt DC adapter (806-62).
- The battery can also be charged separately in the optional Dual Battery Charger (2000-1374).
- Recharge the battery only in the Digital Broadcast Field Analyzer or in an Anritsu approved charger.
- Do not charge batteries for longer than 24 hours; overcharging may shorten battery life.

Analyzer Not In Use

- When the Digital Broadcast Field Analyzer or the charger is not in use, disconnect it from the power source.
- 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.
- Storing the battery in extreme hot or cold places will reduce the capacity and lifetime of the battery.

Physical Handling of Batteries

- Never short-circuit the battery terminals.
- Do not drop, mutilate or attempt to disassemble the battery.

Battery Disposal

- Do not dispose of batteries in a fire!
- Batteries must be recycled or disposed of properly. Do not place batteries in household garbage.

7-2 Battery Pack Removal and Replacement

This section provides instructions for the removal and replacing the Digital Broadcast Field Analyzer 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 Digital Broadcast Field Analyzer.

1. With the Digital Broadcast Field Analyzer laying flat, face up, on a stable surface, locate the **Battery Access Door**, as shown in Figure 7-1, "Battery Access Door Location".

Figure 7-1. Battery Access Door Location

2. Place a finger in the battery access door **notch** and push the door down towards the bottom of the instrument, as shown in Figure 7-2, "Battery Access Door Notch".

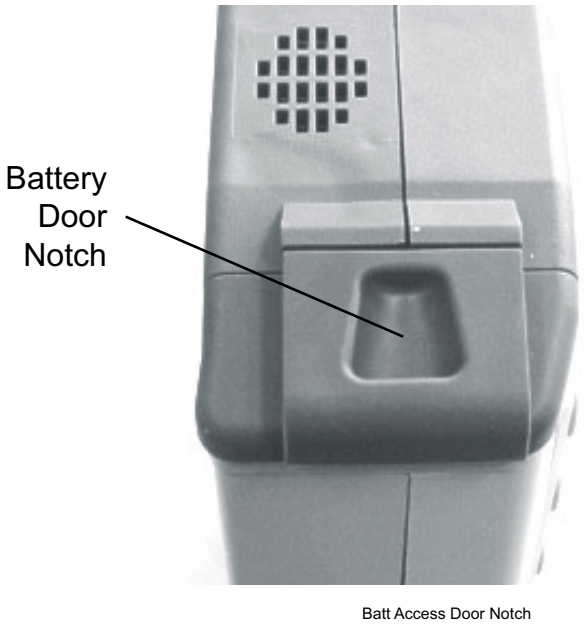

Figure 7-2. Battery Access Door Notch

3. Remove the **Battery Access Door**, as shown in Figure 7-3, "Removing the Battery Access Door".

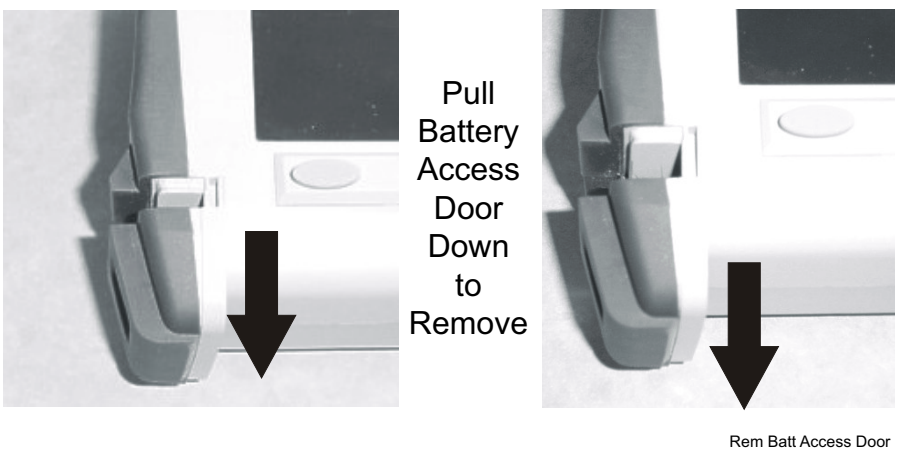

Figure 7-3. Removing the Battery Access Door

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 7-4, "Removing the Battery".

Figure 7-4. Removing the Battery

5. Replacement is the opposite of removal. Note the orientation of the battery contacts, and be sure to insert the new battery with the contacts facing the bottom of the unit, as shown in Figure 7-5, "Orientation of Battery Contacts" below.

Figure 7-5. Orientation of Battery Contacts

Chapter 8 — Opening the Instrument Case

8-1 Introduction

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

8-2 Opening the Digital Broadcast Field Analyzer Case

Procedure

1. Place the Digital Broadcast Field Analyzer face down on a stable work surface.
2. Remove the battery door and battery as shown above in Section 7-2 “Battery Pack Removal and Replacement ” on page 7-2.
3. Use a Phillips screwdriver to remove the four screws securing the two halves of the Digital Broadcast Field Analyzer case together as shown in Figure 8-1, “Opening the Case - Remove Four (4) Screws and Lift Up Case”.
4. Carefully lift up on the side of the case shown and begin to separate the two halves.
    - For units with the GPS Option 31, lift on the bottom side.

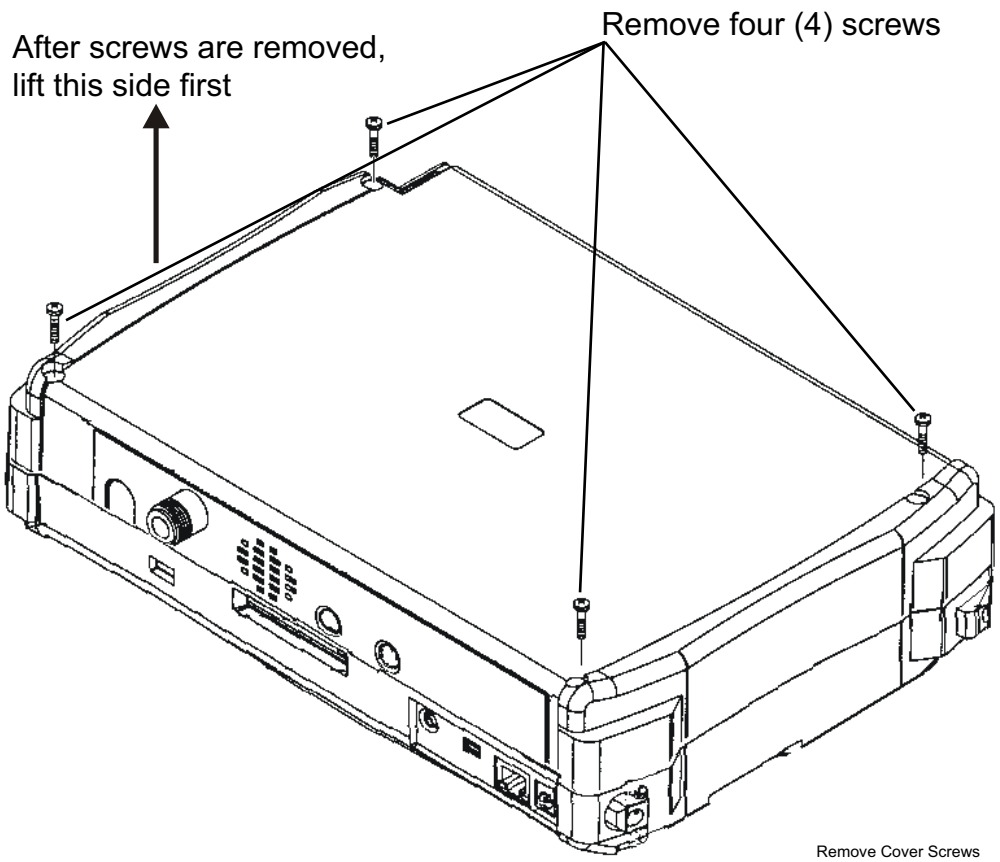

Figure 8-1. Opening the Case - Remove Four (4) Screws and Lift Up Case

Caution	Do not force or pull the two halves of the case apart completely, there are delicate cables attached between the two halves that must be disconnected first. Refer to Figure 8-2 on page 8-2 and Figure 8-3 on page 8-3 and note the position and routing of the cables. The cables should be similarly routed when the unit is reassembled.

5. For instruments equipped with **GPS Option 31**, carefully loosen and remove the lock nut and washer from the **GPS BNC** connector at the housing feed through. Then remove the **GPS BNC** connector from the case as shown in Figure 8-2, "Opening the Case - GPS BNC (if equipped), External Trigger In, and J9007/100M Cable Removal" on page 8-2.
6. Carefully disconnect the **External Reference In** cable from the Main PCB Assembly connection marked **EXT REF** as shown in Figure 8-2.
7. Carefully disconnect the **External Trigger In** cable from the main PCB connection marked **J3007** as shown in Figure 8-2.
8. Carefully disconnect the cable between the **J9007** connector on the **Spectrum Analyzer** module and the from the **100M SPA** connector on the **Main PCB** assembly. as shown in Figure 8-2.

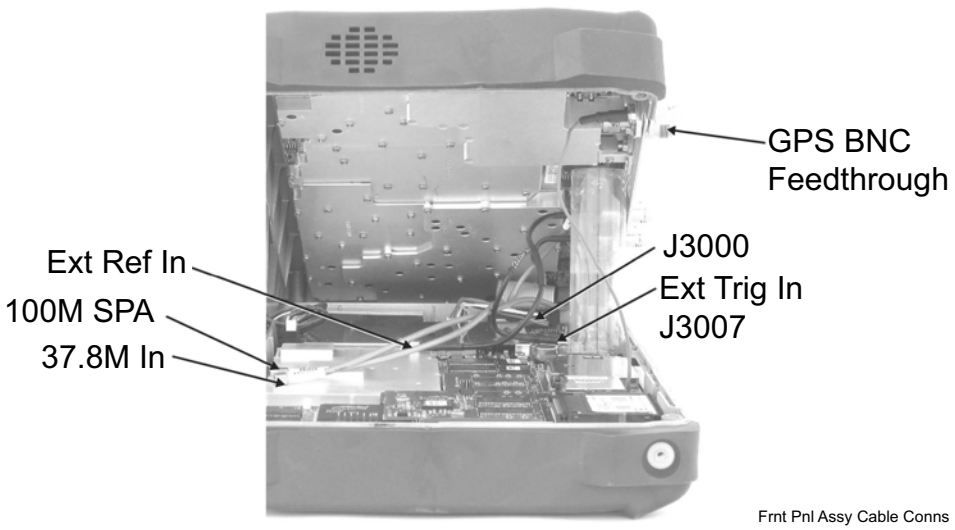

Figure 8-2. Opening the Case - GPS BNC (if equipped), External Trigger In, and J9007/100M Cable Removal

9. Carefully disconnect the cable that comes from **J3008** of the Spectrum Analyzer module from the connector marked **37.8M IN** on the main PCB assembly as shown in Figure 8-2 above.
10. Carefully disconnect the ribbon cable that connects the Spectrum Analyzer module to the main PCB assembly at connector **J3000** as shown in Figure 8-2 above.
11. The two halves of the instrument can now be safely separated. Refer to the following sections to remove and replace specific components of the instrument.

Note	Proper routing of the cables is important for instrument performance. Note the cable routing as illustrated in Figure 8-3 on page 8-3 below.

12. Reverse the above steps to reassemble the case. Use Figure 8-3, "Case Reassembly - Cable Routing for RF and External Trigger Cables" on page 8-3 above to make sure the cabled are rerouted correctly.

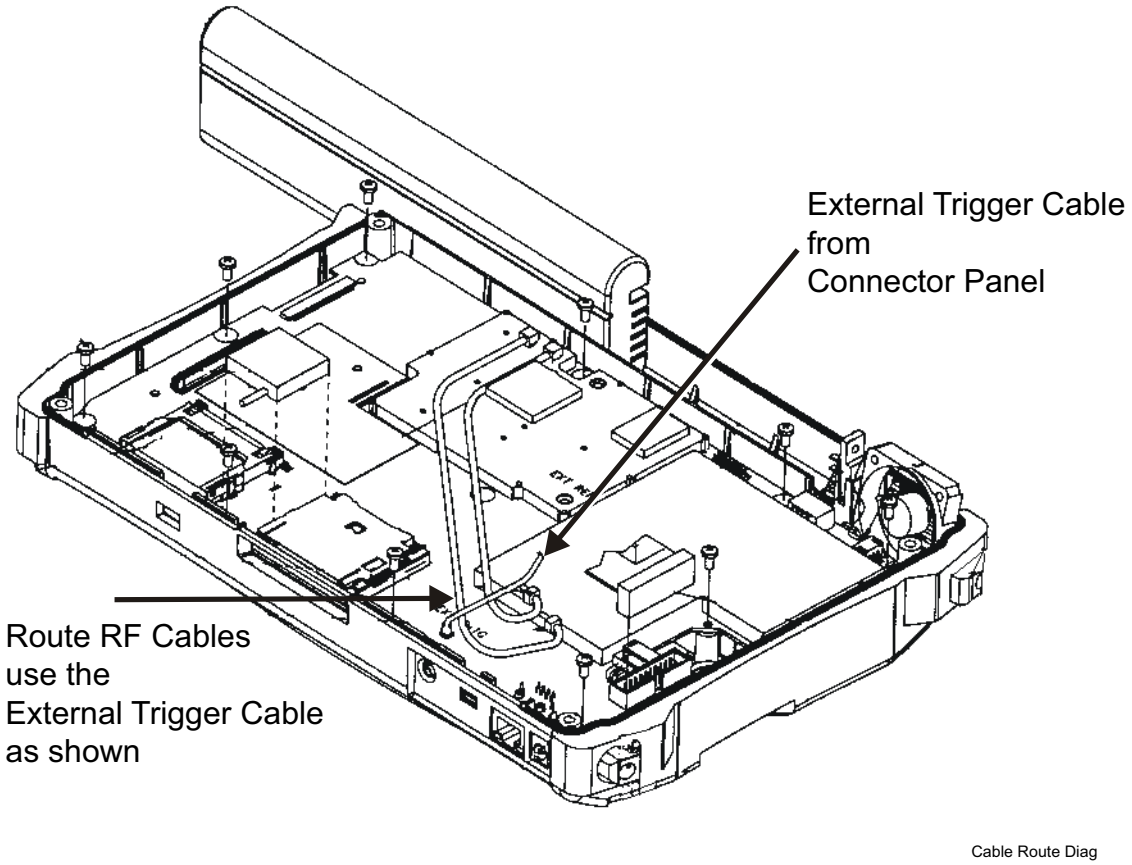

Figure 8-3. Case Reassembly - Cable Routing for RF and External Trigger Cables

8-3 Real Time Clock (RTC) Battery Removal and Replacement

Introduction

This procedure provides instructions for removal and replacement of the RTC lithium coin battery.

Procedure:

1. Remove the cover as directed above in Section 8-2 “Opening the Digital Broadcast Field Analyzer Case” on page 8-1.
2. Carefully remove the RTV (room temperature vulcanizing) silicon sealant from the battery as shown in Figure 8-4, “Real Time Clock (RTC) Battery Location”.
3. Remove the battery.
4. Place the new battery into the holder with the positive side facing up.
5. Apply RTV to the battery and the holder to secure the battery.

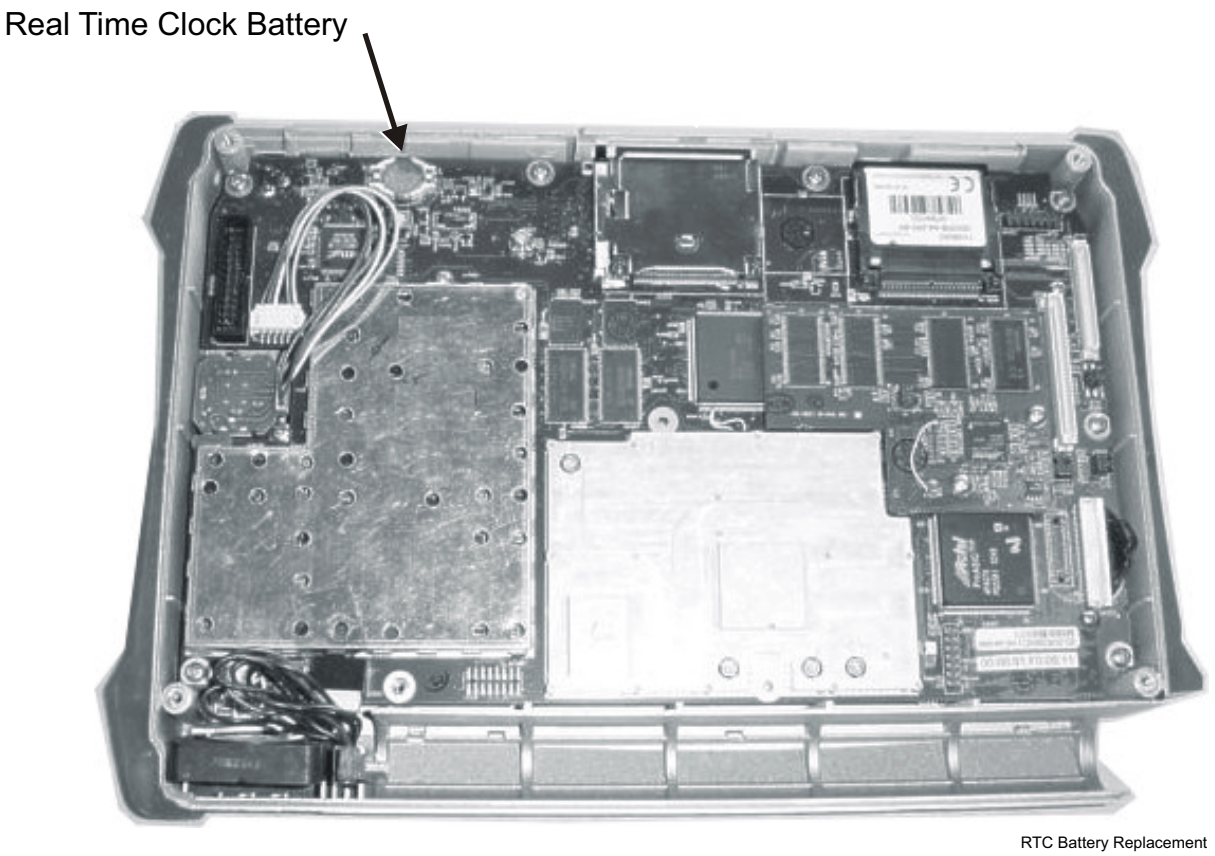

Figure 8-4. Real Time Clock (RTC) Battery Location

Chapter 9 — PCB and Module Replacement

9-1 Introduction

These procedures detail the following PCB and assembly removal and replacement:

- Main PCB Assembly
- Spectrum Analyzer Module Assembly
- LDC Assembly
- LCD Backlight PCB
- Keypad Membrane and PCB
- Function Key Membrane and Switchpad

9-2 Main PCB Assembly Replacement

Overview

This procedure provides instructions for replacing the **Main PCB** assembly. The **Main PCB** assembly is located in the front panel half of the instrument.

Note	The **Main PCB** assembly and the **Spectrum Analyzer** module are always replaced as a set.

Procedure

1. Remove the cover as described in Chapter 8 — Opening the Instrument Case.
2. Disconnect the Fan connector at J1002 on the Main PCB assembly.
3. Disconnect the Encoder Knob connector at J501 on the Main PCB assembly.
4. Use a Phillips screwdriver to remove the nine screws securing the main PCB assembly to the Front Panel section as shown in Figure 9-1, “Main PCB - Removing the Nine (9) Screw” on page 9-2.
5. Lift the bottom edge of the Main PCB assembly and disconnect the battery connector from J1001 on the main PCB shown in Figure 9-2, “Removing the Battery Connector Cable on Main PCB” on page 9-3
6. Pull the Main PCB assembly down and out of the Front Panel section, taking care to slide the Compact Flash module clear of the case.

7. Replacement is the reverse of removal. Take care to insure that the connector on the Main PCB aligns with the connector on the Keypad PCB coming through the front panel.

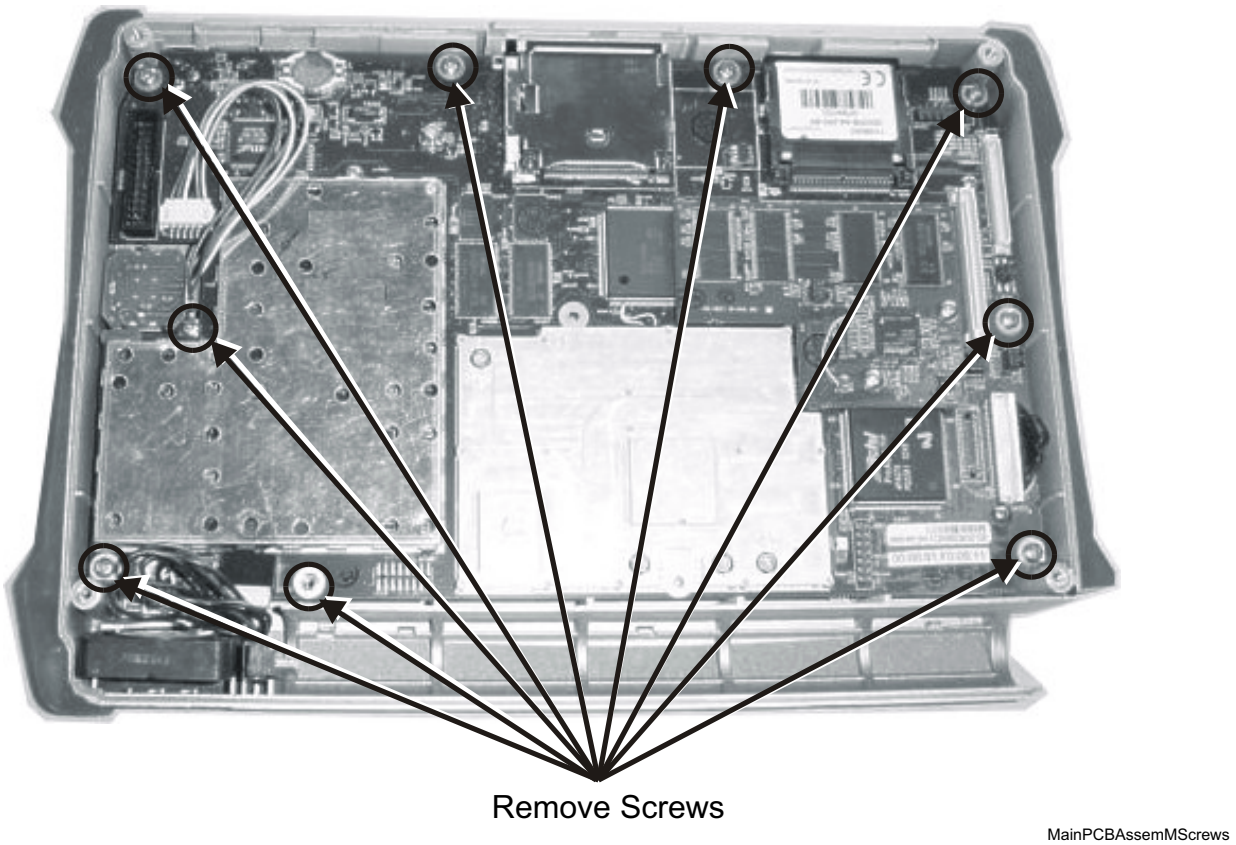

Figure 9-1. Main PCB - Removing the Nine (9) Screw

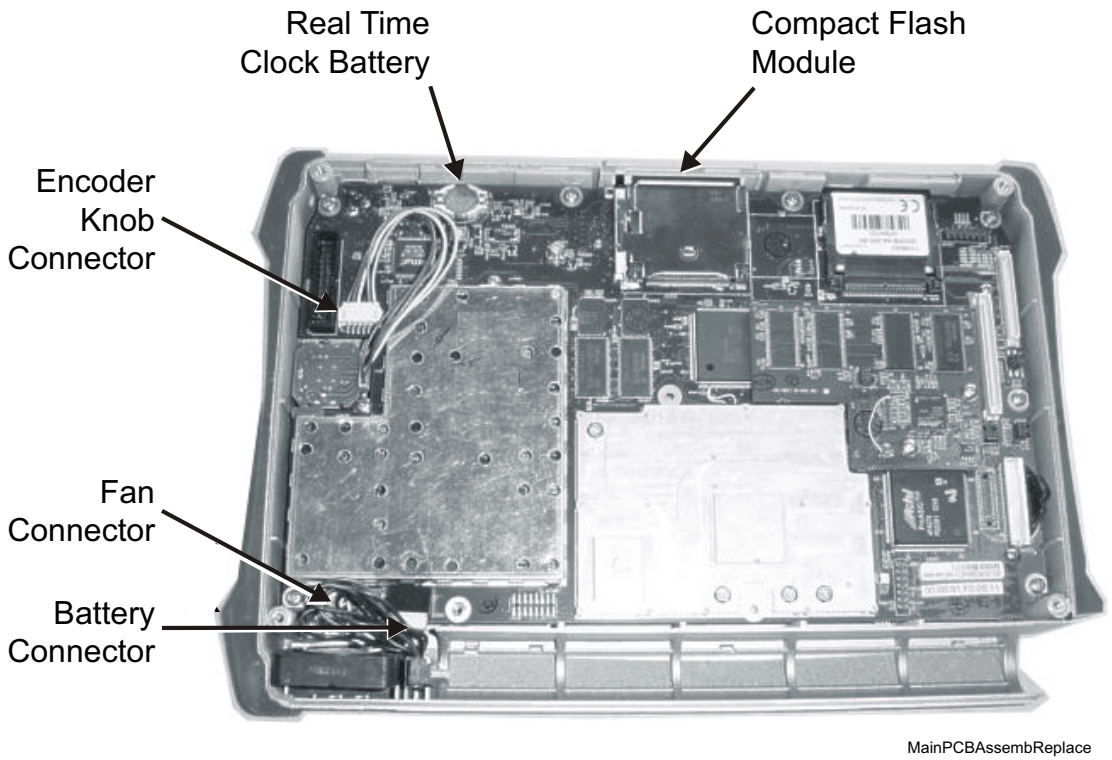

Figure 9-2. Removing the Battery Connector Cable on Main PCB

9-3 Spectrum Analyzer Module Assembly Replacement

Overview

This procedure provides instructions for removing and replacing the Spectrum Analyzer Module. The Spectrum Analyzer Module Assembly is located in the back half of the case and includes the connector panel.

Note	The Main PCB assembly and the Spectrum Analyzer module are always replaced as a set.

Procedure

1. Remove the **cover** of the Field Analyzer Case as directed above.
   - Section 8-2 “Opening the Digital Broadcast Field Analyzer Case” on page 8-1.
2. Use a Phillips screwdriver to remove the six screws securing the Spectrum Analyzer Module Assembly to the back half of the instrument case.
   - Figure 9-3, “Spectrum Analyzer Module Mounting Screws”.
3. Carefully lift the **Spectrum Analyzer Module Assembly** and connector panel out of the case.

4. Installation is the reverse of removal. Take care to properly fit the connector panel into the grooves in the top of the case.

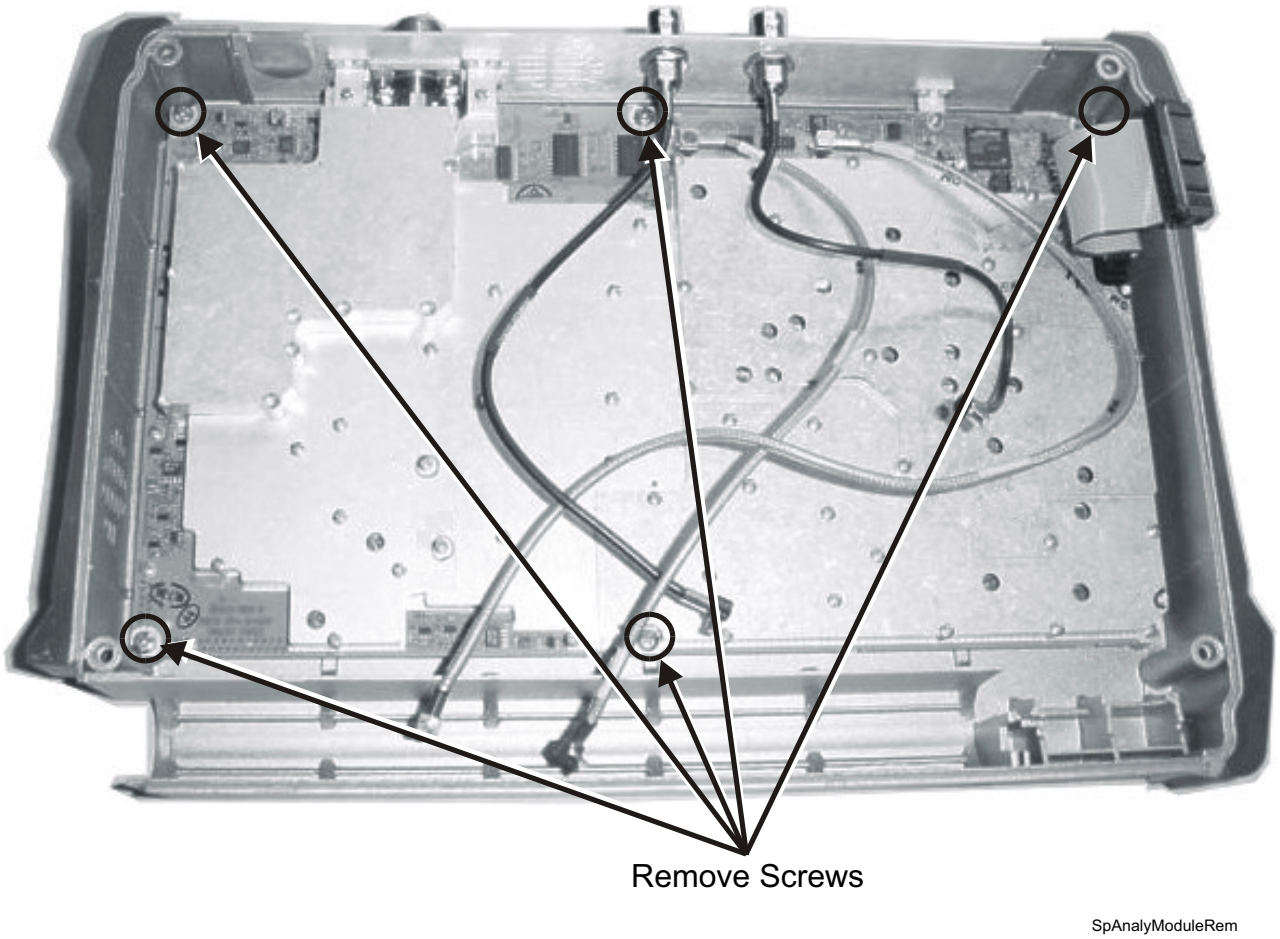

Figure 9-3. Spectrum Analyzer Module Mounting Screws

Note	There is an RF gasket material between the two halves of the case, and in the connector panel grooves. Take care not to remove or damage this material when removing or replacing the **Spectrum Analyzer Module** and connector panel assembly.

9-4 LCD Assembly Replacement

Overview

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

Procedure

1. Remove the **cover** of the Digital Broadcase Field Analyzer Case as directed above in Section 8-2 “Opening the Digital Broadcast Field Analyzer Case” on page 8-1
2. Remove the **Main PCB** assembly from the front panel as directed above in Section 9-2 “Main PCB Assembly Replacement ” on page 9-1
3. Use a Phillips screw driver to remove the four screws securing the LCD to the Main PCB assembly as shown below in Figure 9-4, “LCD Cable, Mounting Screws, and Backlight Cable”
4. Disconnect the LCD backlight cable from the LCD backlight PCB.
5. Disconnect the LCD cable from J4003 on the back side of the Main PCB.
6. Carefully remove the LCD.
7. Reverse the above steps to install the replacement LCD.

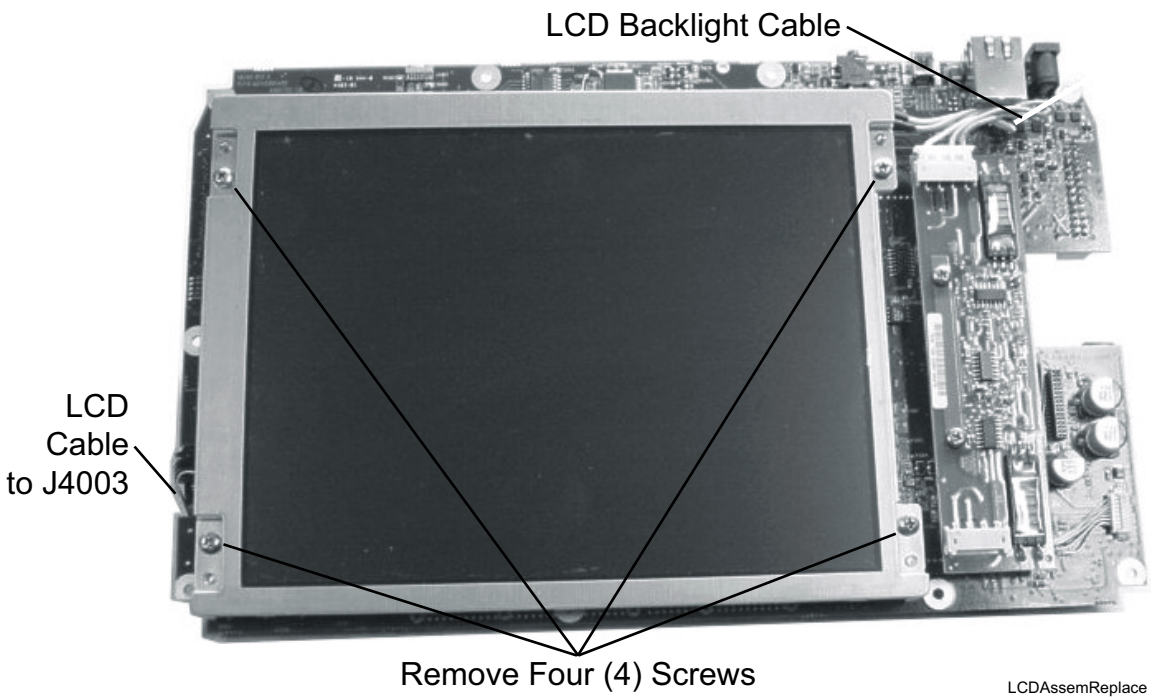

Figure 9-4. LCD Cable, Mounting Screws, and Backlight Cable

Note	Pay attention to the routing of the LCD Backlight Cable. The cable must be positioned so as not to be pinched when the assembly is reattached to the front panel.

9-5 LCD Backlight PCB Removal and Replacement

Overview

This procedure provides instructions for removing and replacing the Digital Broadcast Field Analyzer LCD backlight PCB.

Procedure

1. Remove the **cover** of the Digital Broadcase Field Analyzer Case as directed above.
   - Section 8-2 “Opening the Digital Broadcast Field Analyzer Case” on page 8-1
2. Remove the **Main PCB** assembly from the front panel as directed above.
   - Section 9-2 “Main PCB Assembly Replacement ” on page 9-1
3. Disconnect the **LCD backlight cable** from the LCD backlight PCB.
   - Figure 9-5, “LCD Backlight Cable and Mounting Screws”

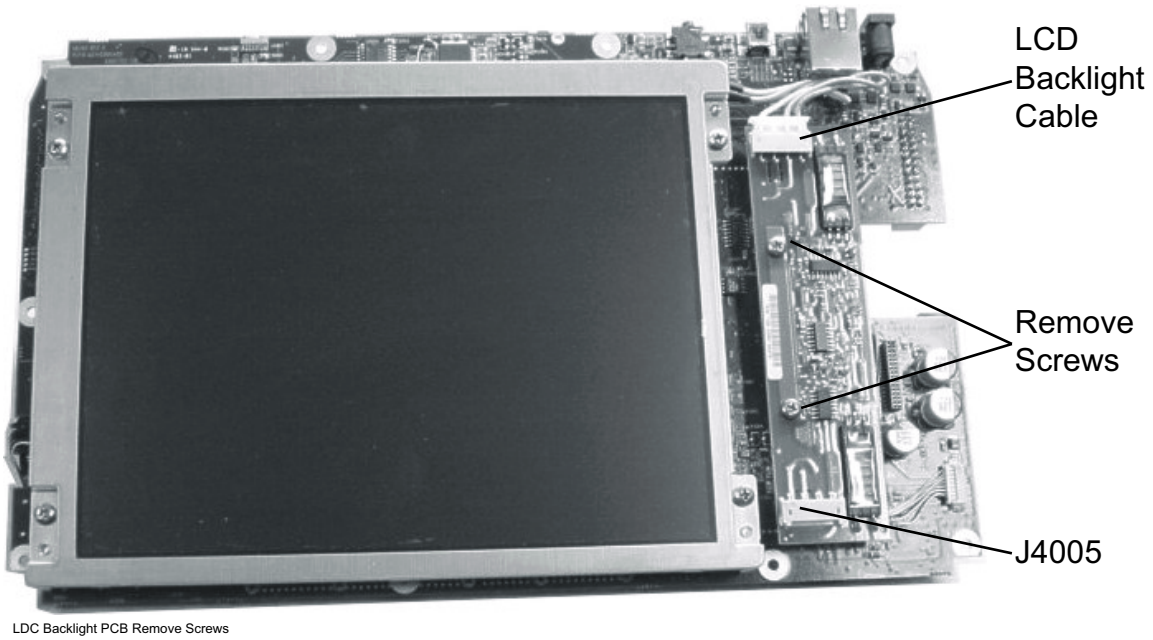

Figure 9-5. LCD Backlight Cable and Mounting Screws

4. Use a Phillips screw driver to remove the two screws securing the **Backlight PCB** to the Main PCB assembly.
5. Lift the **LCD Backlight PCB** and disconnect the backlight control cable from **J4005** on the Main 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 as not to be pinched when the assembly is reattached to the front panel.

9-6 Keypad Membrane and PCB Replacement

Overview

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

Note	The keypad PCBs and membranes can be replaced without opening the ISDBT Field Tester case.

Procedure

1. Place the instrument face up on a protected work surface.
2. There are eight locking tabs holding the keypad bezel to the case.
   - See Figure 9-6, "Front Panel Keypad Bezel and Locking Tab Locations"

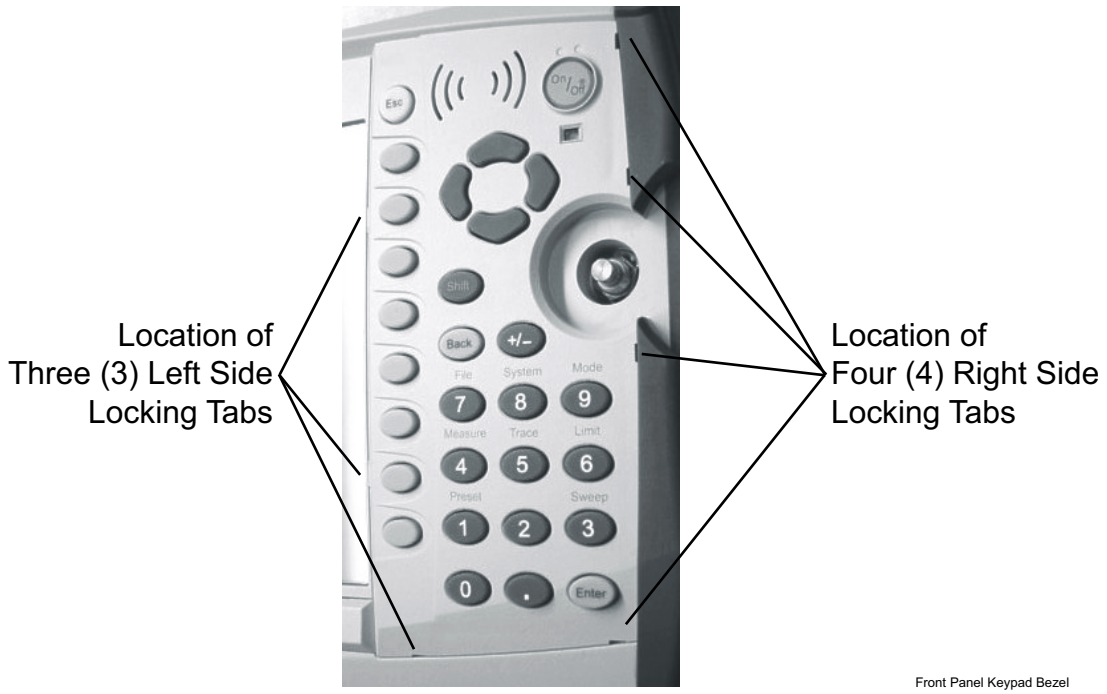

Figure 9-6. Front Panel Keypad Bezel and Locking Tab Locations

3. Using a small flat-blade screwdriver, carefully pry the front bezel locking tabs free of the main body of the case.

- This will expose the keypad membrane (Figure 9-7, “Keypad Membrane” on page 9-9).

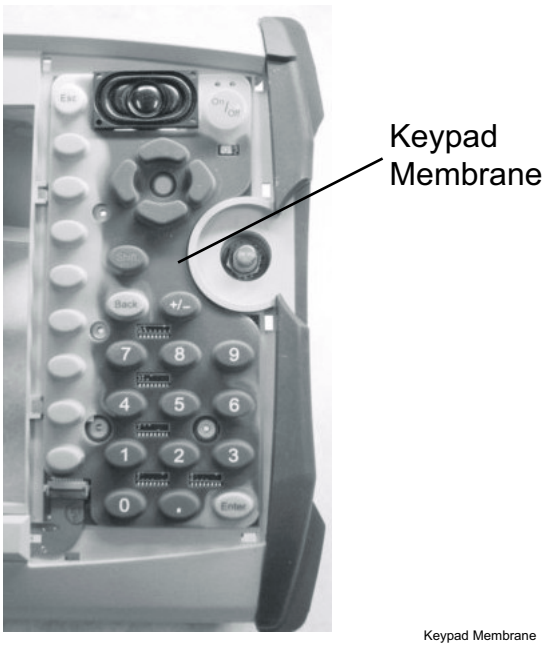

Figure 9-7. Keypad Membrane

4. Remove the Keypad Membrane by carefully lifting the speaker and pulling the membrane off of the keypad PC.

Note	The speaker is held in place by four locating pins on the inside of the keypad bezel. When the keypad bezel is removed, the speaker is held only by the fragile connecting wires. Use care not to damage the speaker wires when removing or replacing the keypad membrane or PCB.

5. Disconnect the function key flexible switchpad from J2 of the keypad PCB by carefully lifting the locking tab on connector J2 to release the flexible switchpad (Figure 9-8, "Keypad PCB and J2 Connector").

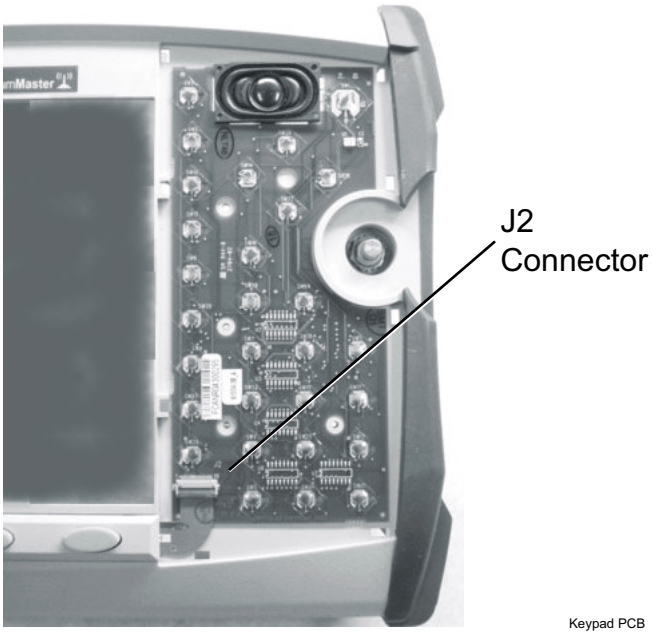

Figure 9-8. Keypad PCB and J2 Connector

6. Remove the Keypad PCB, taking care not to damage the speaker wires.

7. Reverse the above steps to install the replacement assembly, with the following cautions:

- Carefully close the locking tab on connector J2 to secure the flexible switchpad connection. The tab should "snap" into position when fully closed.
- Insert the membrane over the keypad PCB, and under the speaker. Take care to properly orient the membrane so that the rubber pins are aligned with the keypad switches on the PCB.
- The speaker is held in place by four locating pins on the inside of the keypad bezel. Verify that the four locating pins are properly seated into the four corner holes of the speaker when reinstalling the bezel.
- Verify that all locking tabs are fully seated into the main body of the case when reinstalling the bezel.

9-7 Function Key Membrane and Switchpad Replacement

Overview

This procedure provides instructions for replacing the function key membrane and switchpad.

Note	The function key PCB and membrane can be replaced without opening the ISDBT Field Tester case.

Procedure

1. Place the instrument face up on a protected work surface.
2. Remove the keypad bezel and membrane as directed in Section 9-6 “Keypad Membrane and PCB Replacement ” on page 9-8.
3. There are six (6) locking tabs holding the function key bezel to the case. Using a small flat blade screwdriver, carefully pry the function key bezel locking tabs free of the main body of the case as shown in Figure 9-6, “Front Panel Keypad Bezel and Locking Tab Locations”. This will expose the function key membrane.
4. Remove the function key membrane by gently pulling the membrane up and away from the front panel as shown in Figure 9-7, “Keypad Membrane”

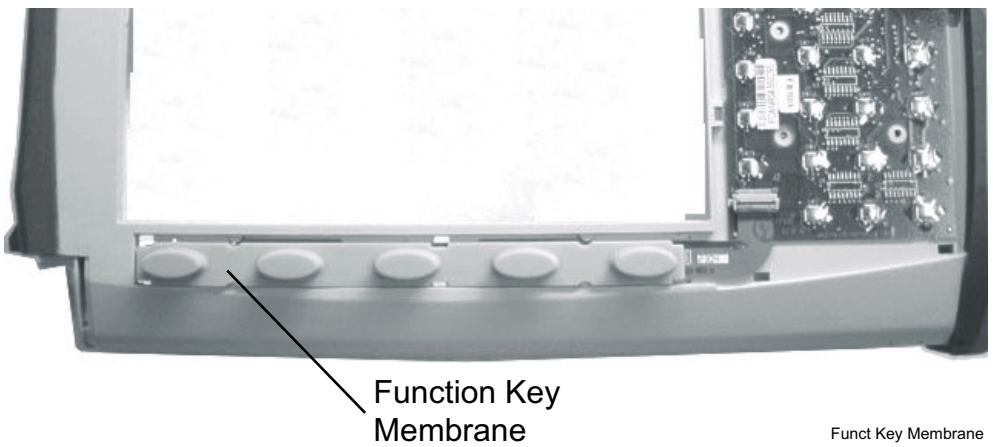

Figure 9-9. Function Key Membrane

5. Disconnect the function key flexible switchpad from J2 of the keypad PCB by carefully lifting the locking tab on connector J2 to release the flexible switchpad as shown below in Figure 9-10

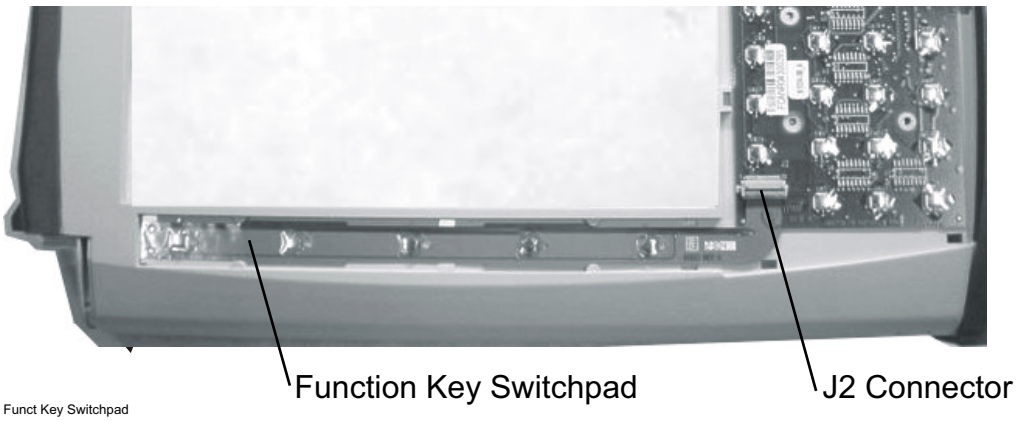

Figure 9-10. Function Key Switchpad

6. Reverse the above steps to install the replacement switchpad or membrane.

Note	Carefully close the locking tab on connector J2 to secure the flexible switchpad connection. The tab should “snap“ into position when fully closed.

Chapter 10 — Replacement Parts List

10-1 Introduction

Replaceable parts for the Digital Broadcast Field Analyzer MS8911B are listed below.

10-2 Replacement Parts Listing

Table 10-1. Replacement Parts List (1 of 2)

Part Number	Description
40-168-R	AC Power Supply
806-141	Automotive Power Adapter
3-2000-1498	USB A-mini B Interface Cable
2000-1371	Ethernet Interface Cable
3-806-152	CAT 5e Crossover Patch Cable
3-2000-1567	512 MB Compact Flash
1091-27	Type N male to SMA female adapter
1091-172	Type N male to BNC female adapter
65729	Soft Carrying Case
633-44	Rechargeable Battery, Lithium-Ion
3-633-26	Lithium Coin Battery for Real Time Clock
ND66811	MS8911B Main/SPA PCB Assembly When ordering the Main/Spectrum Analyzer PCB Assembly, to ensure installation of correct options on the replacement units, all options that are installed on the instrument **must** be declared on the order. The options are listed on a label on the instrument and are also shown in the **System | Status** display.
ND68035	MS8911B Main/SPA/BER PCB Assembly (for units with Option 57) When ordering the Main/Spectrum Analyzer PCB Assembly, to ensure installation of correct options on the replacement units, all options that are installed on the instrument **must** be declared on the order. The options are listed on a label on the instrument and are also shown in the **System | Status** display.
61333-3	Function Key Switchpad Assembly
65027-3	Main Keypad PCB Assembly
3-66549-3	Liquid Crystal Display Backlight PCB
3-15-118	Liquid Crystal Display Assembly
61361	Function Key Membrane
61362	Keypad Membrane
3-410-101	Rotary Switch Encoder

Table 10-1. Replacement Parts List (2 of 2)

Part Number	Description
58211-2	Cable Assembly, BNC-MCX
61370-1	Cable Assembly, 3IN, INV BD
61465	Cable, Ribbon
61466-4	100 MHz Coax Cable
61466-5	37.8 MHz Coax Cable
ND69114	Top Case, Plastic
ND69107	Bottom Case, Plastic
61379-1	Battery Door, Plastic Case
61363-1	Keypad Bezel, Numeric, Plastic Case
61378-1	Function Key Bezel, Plastic Case
61360-2	Encoder Knob, Plastic Case
61368	LCD Protective Cover
61381	Fan Bracket
ND64383	Fan Assembly
3-806-195	Battery Cable, Connector
65733	ID Label, Model MS8911B

Appendix A — Test Records

A-1 Introduction

This appendix provides test records that can be used to record the performance of the MS8911B Digital Broadcast Field Analyzer.

Anritsu Company 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 the instrument‘s performance.

The following forms are available in this appendix:

MS8911B - Spectrum Analyzer

MS8911B - ISDB-T Signal Analyzer - With Option 30

MS8911B - ISDB-T SFN Analyzer - With Option 32

MS8911B - DVB-T/H Signal Analyzer - With Option 50 and 57

MS8911B - DVB-T/H SFN Analyzer - With Option 52

A-2 MS8911B - Spectrum Analyzer Tests

Serial Number:	Firmware Revision:	Operator:
Options:		Date:

Frequency Accuracy

Table A-1. Spectrum Analyzer (SA) - Frequency Accuracy

Frequency	Measured Value	Specifications
1 GHz	kHz	±1 kHz
7 GHz	kHz	±7 kHz

SSB Phase Noise

Table A-2. SA - SSB Phase Noise

Frequency	Measured Value	Calculated Value = Measured Value – 30 dB	Specifications
0 kHz	dBc/Hz	dBc/Hz	–100 dBc/Hz
20 kHz	dBc/Hz	dBc/Hz	–100 dBc/Hz
30 kHz	dBc/Hz	dBc/Hz	–100 dBc/Hz
100 kHz	dBc/Hz	dBc/Hz	–102 dBc/Hz

Spurious Response (Second Harmonic Distortion)

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

Frequency	Measured Value	2nd Harmonic Distortion	Specifications
50.1 MHz			
100.2 MHz		dBc	≤ –50 dBc

Input Related Supurious (IRS) Signals

Table A-4. SA - Spurious Input Related Spurious (IRS) Signals

Amplitude Reading Frequency	Amplitude Reading (dBM)	Frequency	Measured Value	Calculated IRS	Specifications
1674 MHz	dBm	100 kHz to 1673 MHz	dBm	dBc	–46 dBc
		1675 MHz to 2800 MHz	dBm	dBc	–46 dBc
1701 MHz	dBm	26 MHz to 28 MHz	dBm	dBc	–50 dBc
2145 MHz	dBm	470 MHz to 472 MHz	dBm	dBc	–60 dBc

Resolution Bandwidth Accuracy

Table A-5. SA - Resolution Bandwidth Accuracy

BW Setting	Span	VBW	Lower Limit	Measured Value	Upper Limit
3 MHz	4.5 MHz	Auto	2.7 MHz	Hz	3.3 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	3.3 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

50 MHz Absolute Amplitude Accuracy Setup

Table A-6. SA - 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

50 MHz Absolute Amplitude Accuracy

Table A-7. SA - 50 MHz Absolute Amplitude Accuracy

Input Power Level	Reference Level	Input Attenuation Level	Measured Reading	Specifications
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

Absolute Amplitude Accuracy Across Frequency - Setup

Table A-8. SA - 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
100 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
7000 MHz	dBm	dBm

Absolute Amplitude Accuracy Across Frequency –30 dBm @ 0 dB & –30 dB @ 5 dB

Table A-9. SA - Absolute Amplitude Accuracy Across Frequency for –30 dBm @ 0 dB and –30 dBm @ 5 dB

	–30 dBm Input Level and 0 dB Input Attenuation		–30 dBm Input Level and 5 dB Input Attenuation	
Frequency	**Measured Values**	**Specification**	**Measured Values**	**Specification**
50 MHz	dBm	±1.25 dB	dBm	±1.25 dB
100 MHz	dBm	±1.25 dB	dBm	±1.25 dB
500 MHz	dBm	±1.25 dB	dBm	±1.25 dB
1000 MHz	dBm	±1.25 dB	dBm	±1.25 dB
2000 MHz	dBm	±1.25 dB	dBm	±1.25 dB
3000 MHz	dBm	±1.25 dB	dBm	±1.25 dB
4000 MHz	dBm	±1.25 dB	dBm	±1.25 dB
5000 MHz	dBm	±1.75 dB	dBm	±1.75 dB
6000 MHz	dBm	±1.75 dB	dBm	±1.75 dB
7000 MHz	dBm	±1.75 dB	dBm	±1.75 dB

Absolute Amplitude Accuracy Across Frequency –30 dBm @ 10 dB & –30 dB @ 20 dB

Table A-10. SA - Absolute Amplitude Accuracy Across Frequency for –30 dBm @ 10 dB and –30 dBm @ 20 dB

	–30 dBm Input Level and 10 dB Input Attenuation		–30 dBm Input Level and 20 dB Input Attenuation	
Frequency	**Measured Values**	**Specification**	**Measured Values**	**Specification**
50 MHz	dBm	±1.25 dB	dBm	±1.25 dB
100 MHz	dBm	±1.25 dB	dBm	±1.25 dB
500 MHz	dBm	±1.25 dB	dBm	±1.25 dB
1000 MHz	dBm	±1.25 dB	dBm	±1.25 dB
2000 MHz	dBm	±1.25 dB	dBm	±1.25 dB
3000 MHz	dBm	±1.25 dB	dBm	±1.25 dB
4000 MHz	dBm	±1.25 dB	dBm	±1.25 dB
5000 MHz	dBm	±1.75 dB	dBm	±1.75 dB
6000 MHz	dBm	±1.75 dB	dBm	±1.75 dB
7000 MHz	dBm	±1.75 dB	dBm	±1.75 dB

Absolute Amplitude Accuracy Across Frequency –2 dBm @ 30 dB

Table A-11. SA - Absolute Amplitude Accuracy Across Frequency for –2 dBm @ 30 dB

	–2 dBm Input Level and 30 dB Input Attenuation			
Frequency	**Measured Values**	**Specification**		
50 MHz	dBm	±1.25 dB		
100 MHz	dBm	±1.25 dB		
500 MHz	dBm	±1.25 dB		
1000 MHz	dBm	±1.25 dB		
2000 MHz	dBm	±1.25 dB		
3000 MHz	dBm	±1.25 dB		
4000 MHz	dBm	±1.25 dB		
5000 MHz	dBm	±1.75 dB		
6000 MHz	dBm	±1.75 dB		
7000 MHz	dBm	±1.75 dB		

Residual Spurious - Preamp Off

Table A-12. SA - Residual Spurious - Preamp Off

Start Frequency	Stop Frequency	RBW	VBW	Measured Values	Specification
100 kHz	10 MHz	3 kHz	300 Hz	dBm	≤ –90 dBm
10 MHz	1.0 GHz	30 kHz	1 kHz	dBm	≤ –90 dBm
1 GHz	2.2 GHz	10 kHz	300 Hz	dBm	≤ –90 dBm
2.2 GHz	2.7 GHz	1 kHz	300 Hz	dBm	≤ –90 dBm
2.7 GHz	2.8 GHz	1 kHz	100 Hz	dBm	≤ –90 dBm
2.8 GHz	3.199 GHz	10 kHz	300 Hz	dBm	≤ –90 dBm
3.2 GHz	4.009 GHz	30 kHz	1 kHz	dBm	≤ –84 dBm
4.009 GHz	5.083 GHz	10 kHz	300 Hz	dBm	≤ –84 dBm
5.083 GHz	5.895 GHz	10 kHz	100 Hz	dBm	≤ –84 dBm
5.895 GHz	7.1 GHz	10 kHz	100 Hz	dBm	≤ –84 dBm
Exceptions @ Frequency @ Spur Level					
Frequency	**Spur Level**				
250 MHz	–85 dBm max				
300 MHz	–85 dBm max				
350 MHz	–85 dBm max				
~ 4010 MHz	–80 dBm max				
~ 5084 MHz	–70 dBm max				
~ 5894 MHz	–75 dBm max				
~ 7028 MHz	–80 dBm max				

Residual Spurious - Preamp On

Table A-13. SA - Residual Spurious - Preamp On

Start Frequency	Stop Frequency	Measured Values	Specification
100 kHz	10 MHz	dBm	≤ –100 dBm
10 MHz	1.0 GHz	dBm	≤ –100 dBm
1.0 GHz	2.0 GHz	dBm	≤ –100 dBm
2.0 GHz	3.0 GHz	dBm	≤ –100 dBm
3.0 GHz	4.0 GHz	dBm	≤ –100 dBm
4.0 GHz	5.0 GHz	dBm	≤ –100 dBm
5.0 GHz	6.0 GHz	dBm	≤ –100 dBm
6.0 GHz	7.1 GHz	dBm	≤ –100 dBm

DANL - Preamp Off

Table A-14. SA - DANL - Preamp Off

Start Frequency	Stop Frequency	RBW	VBW	Measured Value @ 100 kHz RBW	Calculated for 10 Hz RBW	Specification
10 MHz	1.0 GHz	100 kHz	1 kHz	dBm	dBm	–127 dBm
1 GHz	2.2 GHz	100 kHz	1 kHz	dBm	dBm	–123 dBm
2.2 GHz	2.8 GHz	100 kHz	300 kHz	dBm	dBm	–116 dBm
2.8 GHz	4.0 GHz	100 kHz	1 kHz	dBm	dBm	–126 dBm
4.0 GHz	7.1 GHz	100 kHz	300 kHz	dBm	dBm	–117 dBm

DANL - Preamp On

Table A-15. SA - DANL - Preamp On

Start Frequency	Stop Frequency	RBW	VBW	Measured Value @ 100 kHz RBW	Calculated for 10 Hz RBW	Specification
10 MHz	1.0 GHz	100 kHz	1 kHz	dBm	dBm	–151 dBm
1 GHz	2.2 GHz	100 kHz	1 kHz	dBm	dBm	–149 dBm
2.2 GHz	2.8 GHz	100 kHz	300 kHz	dBm	dBm	–143 dBm
2.8 GHz	4.0 GHz	100 kHz	1 kHz	dBm	dBm	–149 dBm
4.0 GHz	7.1 GHz	100 kHz	300 kHz	dBm	dBm	–146 dBm

RF Input VSWR

Table A-16. SA - RF Input VSWR

Attenuation	VSWR	Specification
10 dB Attenuation		≤ 2.00
20 dB Attenuation		≤ 2.00
60 dB Attenuation		≤ 2.00

A-3 MS8911B - ISDB-T Signal Analyzer - With Option 30

Serial Number:	Firmware Revision:	Operator:
Options: **ONLY FOR UNITS WITH OPTION 30**		Date:

Frequency Accuracy

Table A-17. ISDB-T Signal Analyzer Option 30 - Frequency Accuracy

		Preamp Off			Preamp On		
Channel	Frequency (MHz)	Ref Level (dBm)	Preamp Off Frequency Error	Spec (Hz)	Ref Level (dBm)	Preamp On Frequency Error	Spec (Hz)
13	473.14285714	–20	Hz	±0.3	–50	Hz	±0.3
38	623.14285714	–20	Hz	±0.3	–50	Hz	±0.3
62	767.14285714	–20	Hz	±0.3	–50	Hz	±0.3

Residual MER

Table A-18. ISDB-T Signal Analyzer Option 30 - Residual MER

		Preamp Off		Preamp On	
Channel	Frequency	Total MER Preamp Off	Specification	Total MER Preamp On	Specification
13	473.14285714 MHz	dB	≥ 42 dB	dB	≥ 37 dB
38	623.14285714 MHz	dB	≥ 42 dB	dB	≥ 37 dB
62	767.14285714 MHz	dB	≥ 42 dB	dB	≥ 37 dB

Frequency Lock Range

Table A-19. ISDB-T Signal Analyzer Option 30 - Frequency Lock Range

Channel	Frequency	Measured Frequency Error	Specification
13	473.23285714 MHz	Hz	±0.3 Hz
13	473.05285714 MHz	Hz	±0.3 Hz

Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz

Table A-20. ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz

Test Level (dBm)	AT(set) (dB)	SB(–10) Or SB(–50) (dBm)	Input Level (dBm)	Ref Level Preamp Off / On	Preamp Off		Preamp On		Spec (dB)
					M (Level) (dBm)	Dev (dB)	M (Level) (dBm)	Dev (dB)	
–10	=AT(–10)			–10 / NA			-NA-	-NA-	±2.0
–15	=AT(–10) + 5=	-NA-		–15 / NA			-NA-	-NA-	±2.0
–20	=AT(–10) + 10=	-NA-		–20 / –20					±2.0
–25	=AT(–10) + 15=	-NA-		–25 / –20					±2.0
–30	=AT(–10) + 20=	-NA-		–25 / –30					±2.0
–35	=AT(–10) + 25=	-NA-		–25 / –30					±2.0
–40	=AT(–10) + 30=	-NA-		–25 / –40					±2.0
–45	=AT(–10) + 35=	-NA-		–25 / –40					±2.0
–50	=AT(–50)			–25 / –50					±2.0
–55	=AT(–50) + 5=	-NA-		–25 / –50					±2.0
–60	=AT(–50) + 10=	-NA-		–25 / –50					±2.0
–65	=AT(–50) + 15=	-NA-		NA / –50	-NA-	-NA-			±2.0
–70	=AT(–50) + 20=	-NA-		NA / –50	-NA-	-NA-			±2.0
–75	=AT(–50) + 25=	-NA-		NA / –50	-NA-	-NA-			±2.0
–80	=AT(–50) + 30=	-NA-		NA / –50	-NA-	-NA-			±2.0
–84	=AT(–50) + 34=	-NA-		NA / –50	-NA-	-NA-			±2.0

Level Accuracy - Measurement Channel = 38ch @ 623.14285714 MHz

Table A-21. ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 38ch @ 623.14285714 MHz

Test Level (dBm)	AT(set) (dB)	SB(–10) Or SB(–50) (dBm)	Input Level (dBm)	Ref Level Preamp Off / On	Preamp Off		Preamp On		Spec (dB)
					M (Level) (dBm)	Dev (dB)	M (Level) (dBm)	Dev (dB)	
–10	=AT(–10)			–10 / NA			-NA-	-NA-	±2.0
–15	=AT(–10) + 5=	-NA-		–15 / NA			-NA-	-NA-	±2.0
–20	=AT(–10) + 10=	-NA-		–20 / –20					±2.0
–25	=AT(–10) + 15=	-NA-		–25 / –20					±2.0
–30	=AT(–10) + 20=	-NA-		–25 / –30					±2.0
–35	=AT(–10) + 25=	-NA-		–25 / –30					±2.0
–40	=AT(–10) + 30=	-NA-		–25 / –40					±2.0
–45	=AT(–10) + 35=	-NA-		–25 / –40					±2.0
–50	=AT(–50)			–25 / –50					±2.0
–55	=AT(–50) + 5=	-NA-		–25 / –50					±2.0
–60	=AT(–50) + 10=	-NA-		–25 / –50					±2.0
–65	=AT(–50) + 15=	-NA-		NA / –50	-NA-	-NA-			±2.0
–70	=AT(–50) + 20=	-NA-		NA / –50	-NA-	-NA-			±2.0
–75	=AT(–50) + 25=	-NA-		NA / –50	-NA-	-NA-			±2.0
–80	=AT(–50) + 30=	-NA-		NA / –50	-NA-	-NA-			±2.0
–84	=AT(–50) + 34=	-NA-		NA / –50	-NA-	-NA-			±2.0

Level Accuracy - Measurement Channel = 62ch @ 767.14285714 MHz

Table A-22. ISDB-T Signal Analyzer Option 30 - Level Accuracy - Measurement Channel = 62ch @ 767.14285714 MHz

Test Level (dBm)	AT(set) (dB)	SB(–10) Or SB(–50) (dBm)	Input Level (dBm)	Ref Level Preamp Off / On	Preamp Off		Preamp On		Spec (dB)
					M (Level) (dBm)	Dev (dB)	M (Level) (dBm)	Dev (dB)	
–10	=AT(–10)			–10 / NA			-NA-	-NA-	±2.0
–15	=AT(–10) + 5=	-NA-		–15 / NA			-NA-	-NA-	±2.0
–20	=AT(–10) + 10=	-NA-		–20 / –20					±2.0
–25	=AT(–10) + 15=	-NA-		–25 / –20					±2.0
–30	=AT(–10) + 20=	-NA-		–25 / –30					±2.0
–35	=AT(–10) + 25=	-NA-		–25 / –30					±2.0
–40	=AT(–10) + 30=	-NA-		–25 / –40					±2.0
–45	=AT(–10) + 35=	-NA-		–25 / –40					±2.0
–50	=AT(–50)			–25 / –50					±2.0
–55	=AT(–50) + 5=	-NA-		–25 / –50					±2.0
–60	=AT(–50) + 10=	-NA-		–25 / –50					±2.0
–65	=AT(–50) + 15=	-NA-		NA / –50	-NA-	-NA-			±2.0
–70	=AT(–50) + 20=	-NA-		NA / –50	-NA-	-NA-			±2.0
–75	=AT(–50) + 25=	-NA-		NA / –50	-NA-	-NA-			±2.0
–80	=AT(–50) + 30=	-NA-		NA / –50	-NA-	-NA-			±2.0
–84	=AT(–50) + 34=	-NA-		NA / –50	-NA-	-NA-			±2.0

1 dB Compression Level - Preamp Off

Table A-23. ISDB-T Signal Analyzer Option 30 - 1 dB Compression Level - Preamp Off

Test Level (dBm)	Ref Level (dBm)	Channel 13			Channel 38			Channel 62		
		Meas. Value (dBm)	Delta (dB)	Spec (dB)	Meas. Value (dBm)	Delta (dB)	Spec (dB)	Meas. Value (dBm)	Delta (dB)	Spec (dB)
–25	–25			Δ < 1			Δ < 1			Δ < 1
–15	–25			Δ < 1			Δ < 1			Δ < 1

1 dB Compression Level - Preamp On

Table A-24. ISDB-T Signal Analyzer Option 30 - 1 dB Compression Level - Preamp On

Test Level (dBm)	Ref Level (dBm)	Channel 13			Channel 38			Channel 62		
		Meas. Value (dBm)	Delta (dB)	Spec (dB)	Meas. Value (dBm)	Delta (dB)	Spec (dB)	Meas. Value (dBm)	Delta (dB)	Spec (dB)
–50	–50			Δ < 1			Δ < 1			Δ < 1
–43	–50			Δ < 1			Δ < 1			Δ < 1

Noise Floor

Table A-25. ISDB-T Signal Analyzer Option 30 - Noise Floor

Channel	Frequency	Preamp Off			Preamp On		
		Ref Level (dBm)	Preamp Off Measured Value	Spec (dBm)	Ref Level (dBm)	Preamp On Measured Value	Spec (dBm)
13	473.14285714 MHz	–25	dBm	≤ –70	–50	dBm	≤ –94
38	623.14285714 MHz	–25	dBm	≤ –70	–50	dBm	≤ –94
62	767.14285714 MHz	–25	dBm	≤ –70	–50	dBm	≤ –94

Phase Noise

Table A-26. ISDB-T Signal Analyzer Option 30 - Phase Noise

Channel	Frequency	10 kHz Phase Noise		100 kHz Phase Noise		Frequency Error	
		@10 kHz Offset (dBc/Hz)	Phase (10 kHz) (dBc/Hz)	@100 kHz Offset (dBc/Hz)	Phase (100 kHz) (dBc/Hz)	Freq. Error Spec	Freq. Error (Hz)
13	473.14285714 MHz	≤ –103		≤ –105		±0.2 Hz	
38	623.14285714 MHz	≤ –103		≤ –105		±0.2 Hz	
62	767.14285714 MHz	≤ –103		≤ –105		±0.2 Hz	

A-4 MS8911B - ISDB-T SFN Analyzer - With Option 32

Serial Number:	Firmware Revision:	Operator:
Options: **ONLY FOR UNITS WITH OPTION 32**		Date:

Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz

Table A-27. ISDB-T SFN Analyzer Option 32 - Level Accuracy - Measurement Channel = 13ch @ 473.14285714 MHz

Test Level (dBm)	AT(set) (dB)	SB(–10) Or SB(–50) (dBm)	Input Level (dBm)	Ref Level Preamp Off / On	Preamp Off		Preamp On		Spec (dB)
					M (Level) (dBm)	Dev (dB)	M (Level) (dBm)	Dev (dB)	
–10	=AT(–10)			–10 / NA			-NA-	-NA-	±2.0
–15	=AT(–10) + 5=	-NA-		–15 / NA			-NA-	-NA-	±2.0
–20	=AT(–10) + 10=	-NA-		–20 / –20					±2.0
–25	=AT(–10) + 15=	-NA-		–25 / –20					±2.0
–30	=AT(–10) + 20=	-NA-		–25 / –30					±2.0
–35	=AT(–10) + 25=	-NA-		–25 / –30					±2.0
–40	=AT(–10) + 30=	-NA-		–25 / –40					±2.0
–45	=AT(–10) + 35=	-NA-		–25 / –40					±2.0
–50	=AT(–50)			–25 / –50					±2.0
–55	=AT(–50) + 5=	-NA-		–25 / –50					±2.0
–60	=AT(–50) + 10=	-NA-		–25 / –50					±2.0
–65	=AT(–50) + 15=	-NA-		NA / –50	-NA-	-NA-			±2.0
–70	=AT(–50) + 20=	-NA-		NA / –50	-NA-	-NA-			±2.0
–75	=AT(–50) + 25=	-NA-		NA / –50	-NA-	-NA-			±2.0
–80	=AT(–50) + 30=	-NA-		NA / –50	-NA-	-NA-			±2.0
–84	=AT(–50) + 34=	-NA-		NA / –50	-NA-	-NA-			±2.0

Level Accuracy - Measurement Channel = 38ch @ 623.14285714 MHz

Table A-28. ISDB-T SFN Analyzer Option 32 - Level Accuracy - Measurement Channel = 38ch @ 623.14285714 MHz

Test Level (dBm)	AT(set) (dB)	SB(–10) Or SB(–50) (dBm)	Input Level (dBm)	Ref Level Preamp Off / On	Preamp Off		Preamp On		Spec (dB)
					M (Level) (dBm)	Dev (dB)	M (Level) (dBm)	Dev (dB)	
–10	=AT(–10)			–10 / NA			-NA-	-NA-	±2.0
–15	=AT(–10) + 5=	-NA-		–15 / NA			-NA-	-NA-	±2.0
–20	=AT(–10) + 10=	-NA-		–20 / –20					±2.0
–25	=AT(–10) + 15=	-NA-		–25 / –20					±2.0
–30	=AT(–10) + 20=	-NA-		–25 / –30					±2.0
–35	=AT(–10) + 25=	-NA-		–25 / –30					±2.0
–40	=AT(–10) + 30=	-NA-		–25 / –40					±2.0
–45	=AT(–10) + 35=	-NA-		–25 / –40					±2.0
–50	=AT(–50)			–25 / –50					±2.0
–55	=AT(–50) + 5=	-NA-		–25 / –50					±2.0
–60	=AT(–50) + 10=	-NA-		–25 / –50					±2.0
–65	=AT(–50) + 15=	-NA-		NA / –50	-NA-	-NA-			±2.0
–70	=AT(–50) + 20=	-NA-		NA / –50	-NA-	-NA-			±2.0
–75	=AT(–50) + 25=	-NA-		NA / –50	-NA-	-NA-			±2.0
–80	=AT(–50) + 30=	-NA-		NA / –50	-NA-	-NA-			±2.0
–84	=AT(–50) + 34=	-NA-		NA / –50	-NA-	-NA-			±2.0

Level Accuracy - Measurement Channel = 62ch @ 767.14285714 MHz

Table A-29. ISDB-T SFN Analyzer Option 32 - Level Accuracy - Measurement Channel = 62ch @ 767.14285714 MHz

Test Level (dBm)	AT(set) (dB)	SB(–10) Or SB(–50) (dBm)	Input Level (dBm)	Ref Level Preamp Off / On	Preamp Off		Preamp On		Spec (dB)
					M (Level) (dBm)	Dev (dB)	M (Level) (dBm)	Dev (dB)	
–10	=AT(–10)			–10 / NA			-NA-	-NA-	±2.0
–15	=AT(–10) + 5=	-NA-		–15 / NA			-NA-	-NA-	±2.0
–20	=AT(–10) + 10=	-NA-		–20 / –20					±2.0
–25	=AT(–10) + 15=	-NA-		–25 / –20					±2.0
–30	=AT(–10) + 20=	-NA-		–25 / –30					±2.0
–35	=AT(–10) + 25=	-NA-		–25 / –30					±2.0
–40	=AT(–10) + 30=	-NA-		–25 / –40					±2.0
–45	=AT(–10) + 35=	-NA-		–25 / –40					±2.0
–50	=AT(–50)			–25 / –50					±2.0
–55	=AT(–50) + 5=	-NA-		–25 / –50					±2.0
–60	=AT(–50) + 10=	-NA-		–25 / –50					±2.0
–65	=AT(–50) + 15=	-NA-		NA / –50	-NA-	-NA-			±2.0
–70	=AT(–50) + 20=	-NA-		NA / –50	-NA-	-NA-			±2.0
–75	=AT(–50) + 25=	-NA-		NA / –50	-NA-	-NA-			±2.0
–80	=AT(–50) + 30=	-NA-		NA / –50	-NA-	-NA-			±2.0
–84	=AT(–50) + 34=	-NA-		NA / –50	-NA-	-NA-			±2.0

1 dB Compression - Preamp Off

Table A-30. ISDB-T SFN Analyzer Option 32 - 1 dB Compression - Preamp Off

Test Level (dBm)	Ref Level (dBm)	Channel 13			Channel 38			Channel 62		
		Meas Value (dBm)	Delta (dB)	Spec	Meas Value (dBm)	Delta (dB)	Spec	Meas Value (dBm)	Delta (dB)	Spec
–25	–25			Δ < 1			Δ < 1			Δ < 1
–15	–25			Δ < 1			Δ < 1			Δ < 1

1 dB Compression - Preamp On

Table A-31. ISDB-T SFN Analyzer Option 32 - 1 dB Compression - Preamp On

Test Level (dBm)	Ref Level (dBm)	Channel 13			Channel 38			Channel 62		
		Meas Value (dBm)	Delta (dB)	Spec	Meas Value (dBm)	Delta (dB)	Spec	Meas Value (dBm)	Delta (dB)	Spec
–50	–50			Δ < 1			Δ < 1			Δ < 1
–43	–50			Δ < 1			Δ < 1			Δ < 1

Noise Floor

Table A-32. ISDB-T SFN Analyzer Option 32 - Noise Floor

Channel	Frequency	Preamp Off			Preamp On		
		Ref Level	Preamp Off	Spec	Ref Level	Preamp On	Spec
13	473 MHz	–25 dBm	dBm	< –70 dBm	–50 dBm	dBm	< –94 dBm
38	623 MHz	–25 dBm	dBm	< –70 dBm	–50 dBm	dBm	< –94 dBm
62	767 MHz	–25 dBm	dBm	< –70 dBm	–50 dBm	dBm	< –94 dBm

A-5 MS8911B - DVB-T/H Signal Analyzer - With Option 50 and 57

Serial Number:	Firmware Revision:	Operator:
Options: **ONLY FOR UNITS WITH OPTION 50 and OPTION 57**		Date:

Frequency Accuracy

Table A-33. DVB-T/H Signal Analyzer Option 50 and 57 - Frequency Accuracy

Channel	Ref Level (dBm)	Frequency Error	Specification	Ref Level (dBm)	Frequency Error	Specification
21	–20	Hz	±0.3 Hz	–50	Hz	±0.3 Hz
45	–20	Hz	±0.3 Hz	–50	Hz	±0.3 Hz
69	–20	Hz	±0.3 Hz	–50	Hz	±0.3 Hz

Residual MER

Table A-34. DVB-T/H Signal Analyzer Option 50 and 57 - Residual MER

Channel	Preamp Off		Preamp On	
	Total MER Preamp Off	Specification	Total MER Preamp On	Specification
21	dB	≥ 42 dB	dB	≥ 37 dB
45	dB	≥ 42 dB	dB	≥ 37 dB
69	dB	≥ 42 dB	dB	≥ 37 dB

Frequency Lock Range

Table A-35. DVB-T/H Signal Analyzer Option 50 and 57 - Frequency Lock Range

Channel	Frequency	Measured Frequency Error	Specification
21	474.09 MHz		±0.3 Hz
21	473.91 MHz		±0.3 Hz

Level Accuracy - Measurement Channel = 21ch @ 474 MHz

Table A-36. DVB-T/H Signal Analyzer Option 50 and 57 - Level Accuracy - Measurement Channel = 21ch @ 474 MHz

Test Level (dBm)	AT(set) (dB)	SB(–10) Or SB(–50) (dBm)	Input Level (dBm)	Ref Level Preamp Off / On	Preamp Off		Preamp On		Spec (dB)
					M (Level) (dBm)	Dev (dB)	M (Level) (dBm)	Dev (dB)	
–10	=AT(–10)			–10 / NA			-NA-	-NA-	±2.0
–15	=AT(–10) + 5=	-NA-		–15 / NA			-NA-	-NA-	±2.0
–20	=AT(–10) + 10=	-NA-		–20 / –20					±2.0
–25	=AT(–10) + 15=	-NA-		–25 / –20					±2.0
–30	=AT(–10) + 20=	-NA-		–25 / –30					±2.0
–35	=AT(–10) + 25=	-NA-		–25 / –30					±2.0
–40	=AT(–10) + 30=	-NA-		–25 / –40					±2.0
–45	=AT(–10) + 35=	-NA-		–25 / –40					±2.0
–50	=AT(–50)			–25 / –50					±2.0
–55	=AT(–50) + 5=	-NA-		–25 / –50					±2.0
–60	=AT(–50) + 10=	-NA-		–25 / –50					±2.0
–65	=AT(–50) + 15=	-NA-		NA / –50	-NA-	-NA-			±2.0
–70	=AT(–50) + 20=	-NA-		NA / –50	-NA-	-NA-			±2.0
–75	=AT(–50) + 25=	-NA-		NA / –50	-NA-	-NA-			±2.0
–80	=AT(–50) + 30=	-NA-		NA / –50	-NA-	-NA-			±2.0
–84	=AT(–50) + 34=	-NA-		NA / –50	-NA-	-NA-			±2.0

Level Accuracy - Measurement Channel = 45ch @ 666 MHz

Table A-37. DVB-T/H Signal Analyzer Option 50 and 57 - Level Accuracy - Measurement Channel = 45ch @ 666 MHz

Test Level (dBm)	AT(set) (dB)	SB(–10) Or SB(–50) (dBm)	Input Level (dBm)	Ref Level Preamp Off / On	Preamp Off		Preamp On		Spec (dB)
					M (Level) (dBm)	Dev (dB)	M (Level) (dBm)	Dev (dB)	
–10	=AT(–10)			–10 / NA			-NA-	-NA-	±2.0
–15	=AT(–10) + 5=	-NA-		–15 / NA			-NA-	-NA-	±2.0
–20	=AT(–10) + 10=	-NA-		–20 / –20					±2.0
–25	=AT(–10) + 15=	-NA-		–25 / –20					±2.0
–30	=AT(–10) + 20=	-NA-		–25 / –30					±2.0
–35	=AT(–10) + 25=	-NA-		–25 / –30					±2.0
–40	=AT(–10) + 30=	-NA-		–25 / –40					±2.0
–45	=AT(–10) + 35=	-NA-		–25 / –40					±2.0
–50	=AT(–50)			–25 / –50					±2.0
–55	=AT(–50) + 5=	-NA-		–25 / –50					±2.0
–60	=AT(–50) + 10=	-NA-		–25 / –50					±2.0
–65	=AT(–50) + 15=	-NA-		NA / –50	-NA-	-NA-			±2.0
–70	=AT(–50) + 20=	-NA-		NA / –50	-NA-	-NA-			±2.0
–75	=AT(–50) + 25=	-NA-		NA / –50	-NA-	-NA-			±2.0
–80	=AT(–50) + 30=	-NA-		NA / –50	-NA-	-NA-			±2.0
–84	=AT(–50) + 34=	-NA-		NA / –50	-NA-	-NA-			±2.0

Level Accuracy - Measurement Channel = 62ch @ 767.14285714 MHz

Table A-38. DVB-T/H Signal Analyzer Option 50 and 57 - Level Accuracy - Measurement Channel = 62ch @ 767.14285714 MHz

Test Level (dBm)	AT(set) (dB)	SB(–10) Or SB(–50) (dBm)	Input Level (dBm)	Ref Level Preamp Off / On	Preamp Off		Preamp On		Spec (dB)
					M (Level) (dBm)	Dev (dB)	M (Level) (dBm)	Dev (dB)	
–10	=AT(–10)			–10 / NA			-NA-	-NA-	±2.0
–15	=AT(–10) + 5=	-NA-		–15 / NA			-NA-	-NA-	±2.0
–20	=AT(–10) + 10=	-NA-		–20 / –20					±2.0
–25	=AT(–10) + 15=	-NA-		–25 / –20					±2.0
–30	=AT(–10) + 20=	-NA-		–25 / –30					±2.0
–35	=AT(–10) + 25=	-NA-		–25 / –30					±2.0
–40	=AT(–10) + 30=	-NA-		–25 / –40					±2.0
–45	=AT(–10) + 35=	-NA-		–25 / –40					±2.0
–50	=AT(–50)			–25 / –50					±2.0
–55	=AT(–50) + 5=	-NA-		–25 / –50					±2.0
–60	=AT(–50) + 10=	-NA-		–25 / –50					±2.0
–65	=AT(–50) + 15=	-NA-		NA / –50	-NA-	-NA-			±2.0
–70	=AT(–50) + 20=	-NA-		NA / –50	-NA-	-NA-			±2.0
–75	=AT(–50) + 25=	-NA-		NA / –50	-NA-	-NA-			±2.0
–80	=AT(–50) + 30=	-NA-		NA / –50	-NA-	-NA-			±2.0
–84	=AT(–50) + 34=	-NA-		NA / –50	-NA-	-NA-			±2.0

1 dB Compression - Preamp Off

Table A-39. DVB-T/H Signal Analyzer Option 50 and 57 - 1 dB Compression - Preamp Off

Test Level (dBm)	Ref Level (dBm)	Channel 21			Channel 45			Channel 69		
		Meas Value (dBm)	Delta (dB)	Spec	Meas Value (dBm)	Delta (dB)	Spec	Meas Value (dBm)	Delta (dB)	Spec
–25	–25			Δ < 1			Δ < 1			Δ < 1
–15	–25			Δ < 1			Δ < 1			Δ < 1

1 dB Compression - Preamp On

Table A-40. DVB-T/H Signal Analyzer Option 50 and 57 - 1 dB Compression - Preamp On

Test Level (dBm)	Ref Level (dBm)	Channel 21			Channel 45			Channel 69		
		Meas Value (dBm)	Delta (dB)	Spec	Meas Value (dBm)	Delta (dB)	Spec	Meas Value (dBm)	Delta (dB)	Spec
–50	–50			Δ < 1			Δ < 1			Δ < 1
–43	–50			Δ < 1			Δ < 1			Δ < 1

Noise Floor

Table A-41. DVB-T/H Signal Analyzer Option 50 and 57 - Noise Floor

Channel	Frequency	Preamp Off			Preamp On		
		Ref Level (dBm)	Measured Value	Spec Preamp Off	Ref Level (dBm)	Measured Value	Spec Preamp On
21	474 MHz	–25	dBm	≤ –69 dBm	–50	dBm	≤ –93 dBm
45	666 MHz	–25	dBm	≤ –69 dBm	–50	dBm	≤ –93 dBm
69	858 MHz	–25	dBm	≤ –69 dBm	–50	dBm	≤ –93 dBm

A-6 MS8911B - DVB-T/H SFN Analyzer - With Option 52

Serial Number:	Firmware Revision:	Operator:
Options: **ONLY FOR UNITS WITH OPTION 52**		Date:

Level Accuracy - Measurement Channel = 21ch @ 474 MHz

Table A-42. DVB-T/H SFN Analyzer Option 52 - Level Accuracy - Measurement Channel = 21ch @ 474 MHz

Test Level (dBm)	AT(set) (dB)	SB(–10) Or SB(–50) (dBm)	Input Level (dBm)	Ref Level Preamp Off / On	Preamp Off		Preamp On		Spec (dB)
					M (Level) (dBm)	Dev (dB)	M (Level) (dBm)	Dev (dB)	
–10	=AT(–10)			–10 / NA			-NA-	-NA-	±2.0
–15	=AT(–10) + 5=	-NA-		–15 / NA			-NA-	-NA-	±2.0
–20	=AT(–10) + 10=	-NA-		–20 / –20					±2.0
–25	=AT(–10) + 15=	-NA-		–25 / –20					±2.0
–30	=AT(–10) + 20=	-NA-		–25 / –30					±2.0
–35	=AT(–10) + 25=	-NA-		–25 / –30					±2.0
–40	=AT(–10) + 30=	-NA-		–25 / –40					±2.0
–45	=AT(–10) + 35=	-NA-		–25 / –40					±2.0
–50	=AT(–50)			–25 / –50					±2.0
–55	=AT(–50) + 5=	-NA-		–25 / –50					±2.0
–60	=AT(–50) + 10=	-NA-		–25 / –50					±2.0
–65	=AT(–50) + 15=	-NA-		NA / –50	-NA-	-NA-			±2.0
–70	=AT(–50) + 20=	-NA-		NA / –50	-NA-	-NA-			±2.0
–75	=AT(–50) + 25=	-NA-		NA / –50	-NA-	-NA-			±2.0
–80	=AT(–50) + 30=	-NA-		NA / –50	-NA-	-NA-			±2.0
–84	=AT(–50) + 34=	-NA-		NA / –50	-NA-	-NA-			±2.0

Level Accuracy - Measurement Channel = 45ch @ 666 MHz

Table A-43. DVB-T/H SFN Analyzer Option 52 - Level Accuracy - Measurement Channel = 45ch @ 666 MHz

Test Level (dBm)	AT(set) (dB)	SB(–10) Or SB(–50) (dBm)	Input Level (dBm)	Ref Level Preamp Off / On	Preamp Off		Preamp On		Spec (dB)
					M (Level) (dBm)	Dev (dB)	M (Level) (dBm)	Dev (dB)	
–10	=AT(–10)			–10 / NA			-NA-	-NA-	±2.0
–15	=AT(–10) + 5=	-NA-		–15 / NA			-NA-	-NA-	±2.0
–20	=AT(–10) + 10=	-NA-		–20 / –20					±2.0
–25	=AT(–10) + 15=	-NA-		–25 / –20					±2.0
–30	=AT(–10) + 20=	-NA-		–25 / –30					±2.0
–35	=AT(–10) + 25=	-NA-		–25 / –30					±2.0
–40	=AT(–10) + 30=	-NA-		–25 / –40					±2.0
–45	=AT(–10) + 35=	-NA-		–25 / –40					±2.0
–50	=AT(–50)			–25 / –50					±2.0
–55	=AT(–50) + 5=	-NA-		–25 / –50					±2.0
–60	=AT(–50) + 10=	-NA-		–25 / –50					±2.0
–65	=AT(–50) + 15=	-NA-		NA / –50	-NA-	-NA-			±2.0
–70	=AT(–50) + 20=	-NA-		NA / –50	-NA-	-NA-			±2.0
–75	=AT(–50) + 25=	-NA-		NA / –50	-NA-	-NA-			±2.0
–80	=AT(–50) + 30=	-NA-		NA / –50	-NA-	-NA-			±2.0
–84	=AT(–50) + 34=	-NA-		NA / –50	-NA-	-NA-			±2.0

Level Accuracy - Measurement Channel = 69ch @ 858 MHz

Table A-44. DVB-T/H SFN Analyzer Option 52 - Level Accuracy - Measurement Channel = 69ch @ 858 MHz

Test Level (dBm)	AT(set) (dB)	SB(–10) Or SB(–50) (dBm)	Input Level (dBm)	Ref Level Preamp Off / On	Preamp Off		Preamp On		Spec (dB)
					M (Level) (dBm)	Dev (dB)	M (Level) (dBm)	Dev (dB)	
–10	=AT(–10)			–10 / NA			-NA-	-NA-	±2.0
–15	=AT(–10) + 5=	-NA-		–15 / NA			-NA-	-NA-	±2.0
–20	=AT(–10) + 10=	-NA-		–20 / –20					±2.0
–25	=AT(–10) + 15=	-NA-		–25 / –20					±2.0
–30	=AT(–10) + 20=	-NA-		–25 / –30					±2.0
–35	=AT(–10) + 25=	-NA-		–25 / –30					±2.0
–40	=AT(–10) + 30=	-NA-		–25 / –40					±2.0
–45	=AT(–10) + 35=	-NA-		–25 / –40					±2.0
–50	=AT(–50)			–25 / –50					±2.0
–55	=AT(–50) + 5=	-NA-		–25 / –50					±2.0
–60	=AT(–50) + 10=	-NA-		–25 / –50					±2.0
–65	=AT(–50) + 15=	-NA-		NA / –50	-NA-	-NA-			±2.0
–70	=AT(–50) + 20=	-NA-		NA / –50	-NA-	-NA-			±2.0
–75	=AT(–50) + 25=	-NA-		NA / –50	-NA-	-NA-			±2.0
–80	=AT(–50) + 30=	-NA-		NA / –50	-NA-	-NA-			±2.0
–84	=AT(–50) + 34=	-NA-		NA / –50	-NA-	-NA-			±2.0

1 dB Compression - Preamp Off

Table A-45. DVB-T/H SFN Analyzer Option 52 - 1 dB Compression - Preamp Off

Test Level (dBm)	Ref Level (dBm)	Channel 21			Channel 45			Channel 69		
		Meas Value (dBm)	Delta (dB)	Spec	Meas Value (dBm)	Delta (dB)	Spec	Meas Value (dBm)	Delta (dB)	Spec
–25	–25			Δ < 1			Δ < 1			Δ < 1
–15	–25			Δ < 1			Δ < 1			Δ < 1

1 dB Compression - Preamp On

Table A-46. DVB-T/H SFN Analyzer Option 52 - 1 dB Compression - Preamp On

Test Level (dBm)	Ref Level (dBm)	Channel 21			Channel 45			Channel 69		
		Meas Value (dBm)	Delta (dB)	Spec	Meas Value (dBm)	Delta (dB)	Spec	Meas Value (dBm)	Delta (dB)	Spec
–50	–50			Δ < 1			Δ < 1			Δ < 1
–43	–50			Δ < 1			Δ < 1			Δ < 1

Noise Floor

Table A-47. DVB-T/H SFN Analyzer Option 52 - Noise Floor

Channel	Frequency	Preamp Off			Preamp On		
		Ref Level (dBm)	Measured Value	Spec Preamp Off	Ref Level (dBm)	Measured Value	Spec Preamp On
21	474 MHz	–25	dBm	≤ –70 dBm	–50	dBm	≤ –94 dBm
45	666 MHz	–25	dBm	≤ –70 dBm	–50	dBm	≤ –94 dBm
69	858 MHz	–25	dBm	≤ –70 dBm	–50	dBm	≤ –94 dBm

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