

Model MS8911A
ISDBT Field Tester
MAINTENANCE MANUAL

Anritsu

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1. Introduction

This manual provides maintenance instructions for the ISDBT Field Tester Model MS8911A. It describes the product and provides performance verification procedures, parts replacement procedures, and a replaceable parts list.

2. Description

The MS8911A is a synthesizer-based handheld spectrum analyzer and ISDBT Field Tester.

3. Recommended Test Equipment

The following test equipment is recommended for use in testing and maintaining the ISDBT Field Tester.

NOTE: Verify that the test equipment is operating properly before it is used.

Table 1. Recommended Test Equipment

Equipment	Critical Specification	Recommended Manufacturer/Model
Synthesizer	Frequency: 2GHz to 20 GHz with options 2A, 3, 4, 15A and 22	Anritsu Model MG3692A
Power Meter	Power Range: -70 to +20 dBm	Anritsu Dual Channel Model ML2438A
Power Meter Cable	1.5 Meter	Anritsu Model ML2400A/20
Power Sensor	Frequency: 10 MHz to 18 GHz, -67 to +20 dB Quantity: 2 each	Anritsu Model MA2442D
Frequency Reference	Frequency: 10 MHz	Absolute Time Corp., Model 300
Low Pass Filter	Frequency: 50 MHz	Anritsu Model 1030-96
Fixed Attenuator	10 dB Attenuation	Weinschel Model 1-10
Power Splitter	Frequency: DC to 18 GHz	Weinschel Model 1870A
Adapter	Impedance: DC to 18 GHz N(m)-N(m), 50 Ohm	Anritsu Model 34NN50A
50 Ohm Adapter	Frequency: DC to 20 GHz K(m)-N(f), 50 Ohm	Anritsu Model 34RKNF50
50 Ohm Termination	Frequency: DC to 18 GHz	Anritsu Model 28N50-2
RF Coaxial Cable	Frequency: DC to 6.0 GHz N(m)-N(m), 50 Ohm	Anritsu Model 15NN50-1.5C
Coaxial Cable	BNC Male to Male 60 Inch, 50 Ohm	Pasternack Enterprises Model PE3067-60
Modulation Signal Generator	Frequency: 100 kHz to 3 GHz With options MU368040A, MU368010A MU368030A, MX368012A, MX368031A, MX368033A, MX368041A, MX368041A, B55-257	Anritsu Model MG3681A
Power Sensor	Frequency: 10 MHz to 18 GHz Power Range: -60 to +20 dBm Quantity: 2 each	Anritsu Model MA2482D
Programmable Attenuator	Frequency: DC to 2 GHz Attenuation: 100 dB (in 1 and 10 dB step)	Anritsu Model MN63A
Coupler	Frequency Range: 800 to 2400 MHz Nominal Coupling Factor: 30 dB	Anritsu part number 1091-307
Isolator	Frequency Range: 800 to 1000 MHz Isolation: 30 dB	Anritsu part number 1000-51 or Alcatel Model 9C34-41
High Power Load	DC to 18 GHz, 10W	Aeroflex/Weinschel Model 1418
Attenuator	Frequency Range: DC to 18 GHz Attenuation: 10 dB Quantity: 2 each	Aeroflex/Weinschel Model 44-10
RF Power Amplifier	Frequency: 100 to 1000 MHz, Gain: 19 dB min.	Mini Circuits Model TIA-1000-4
GPS Antenna	Magnet-mount with 15 foot cable	Anritsu Model 2000-1410
Digital Broadcast Signal Generator	250 kHz to 3 GHz With option MU894010A	Anritsu Signal Generator MG8940A with ISDB-T

4. Performance Verification

The sections that are listed below contain tests that can be used to verify the performance of the ISDBT Field Tester Model MS8911A.

A sample performance verification test record is provided on page 41.

Spectrum Analyzer Frequency Accuracy

The following test can be used to verify the CW frequency accuracy of the ISDBT Field Tester Spectrum Analyzer.

Equipment Required:

- Anritsu MG3692A Synthesized Signal Source with options 2A, 3, 4, 15A and 22 or equivalent
- 10 MHz Reference Standard
- Anritsu 34RKNF50 50 Ohm adapter or equivalent
- Anritsu ISDBT Field Tester External Power Supply (part number 40-168)
- 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 MG3692A Synthesized Signal Source and to the ISDBT Field Tester.
2. Connect the output of the source to the RF Input of the ISDBT Field Tester.
3. Connect the external power supply (Anritsu part number 40-168) to the ISDBT Field Tester.
4. Press and hold the **On/Off** key to turn on the ISDBT Field Tester.
5. Press the **Shift** key, the **Preset** key (1), and then the **Preset** soft key to reset the instrument to the default starting conditions.
6. Turn on the 10 MHz Reference Standard and the Anritsu MG3692A Synthesized Signal Source.

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

7. Set the MG3692A output to 1 GHz CW, with an RF output level of -30 dBm.
8. Press the **Amplitude** key, then press the **Reference Level** soft key.
9. Use the keypad to enter -10 and select the **dBm** soft key.
10. Press the **Freq** key and select the **Center Freq** soft key.
11. Use the keypad to enter 1 and select the **GHz** soft key.
12. Press the **Span** key, use the keypad to enter 10, and select the **kHz** soft key.
13. Press the **BW** key and select the **RBW** soft key.
14. Use the keypad to enter 100 and select the **Hz** soft key.
15. Press the **VBW** soft key and use the keypad to enter 30, then select the **Hz** soft key.
16. Press the **Marker** 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 on page 42, Spectrum Analyzer Frequency Accuracy.
18. Repeat Steps 7 through 16 for 7 GHz.
19. Verify that the marker frequency is 7 GHz ± 7 kHz and record in the test records on page 42, Spectrum Analyzer Frequency Accuracy.

NOTE: If the unit fails the Spectrum Analyzer Frequency Accuracy test, perform the Spectrum Analyzer Internal Reference Frequency Adjustment procedure page 4. If the unit still fails the Frequency Accuracy test after the Internal Reference Frequency adjustment has been completed, replace the PCB assembly.

Spectrum Analyzer Internal Reference Frequency Adjustment

Use this procedure to adjust the frequency if the unit fails the Spectrum Analyzer Frequency Accuracy verification test on page 3.

Equipment Required:

- Anritsu MG3692A Synthesized Signal Source with options 2A, 3, 4, 15A and 22 or equivalent
- 10 MHz Reference Standard
- Anritsu ISDBT Field Tester External Power Supply (part number 40-168)
- 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 MG3692A Synthesized Signal Source.
2. Connect the output of the source to the RF Input of the ISDBT Field Tester.
3. Connect the external power supply (Anritsu part number 40-168) to the ISDBT Field Tester.
4. Press the **On/Off** key to turn on the ISDBT Field Tester.
5. Press the **Shift** key, the **Preset** key (1), and then the **Preset** soft key to reset the instrument to the default starting conditions.
6. Turn on the 10 MHz reference source and the Anritsu MG3692A Synthesized Signal Source.
7. Set the MG3692A output to 7 GHz with an RF output level of -30 dBm.

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

8. Press the **Amplitude** 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** 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** key, use the keypad to enter 10, and select the **kHz** soft key.
14. Press the **BW** 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 and use the keypad to enter 30, then select the **Hz** soft key.

17. Press and hold the **Shift** key and press the **4**, **6**, and **8** (from top) soft keys together to enter into the ISDBT Field Tester Service Mode (Figure 1).

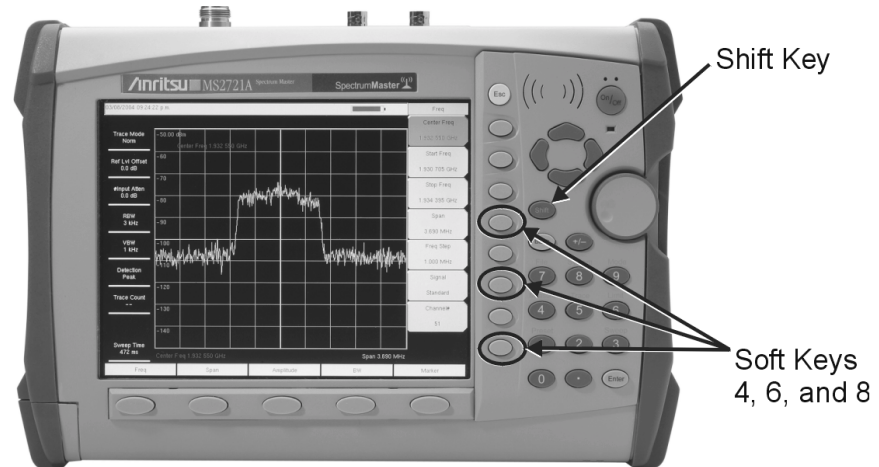


Figure 1. MS8911A ISDBT Field Tester Service Key Sequence

18. Press the Service Menu soft key, then the APP Service soft key.
19. Press the Calibration soft key, then the 10 MHz TXCO 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 ISDBT Field Tester off, and then back on to exit Service Mode.

Spectrum Analyzer SSB Phase Noise Verification

This test can be used to verify the single side band phase noise of the ISDBT Field Tester.

Equipment Required:

- Anritsu MG3692A Synthesized Signal Source with options 2A, 3, 4, 15A and 22 or equivalent
- Anritsu ISDBT Field Tester External Power Supply (part number 40-168)
- 10 MHz Reference Standard
- Anritsu 34RKNF50 50 Ohm adapter or equivalent
- Anritsu 15NN50-1.5C RF Coaxial Cable or equivalent

Procedure:

1. Connect the 10 MHz reference source to the Anritsu MG3692A Synthesized Signal Source.
2. Connect the output of the MG3692A Synthesized Signal Source to the RF In connector of the ISDBT Field Tester.
3. Connect the external power supply (Anritsu part number 40-168) to the ISDBT Field Tester.
4. Press the **On/Off** key to turn on the ISDBT Field Tester.
5. Press the **Shift** key, the **Preset** key (1), and then the **Preset** soft key to reset to the default starting conditions.
6. Turn on the 10 MHz reference source and the Anritsu MG3692A Synthesized Signal Source.
7. Set the MG3692A output to 7.09 GHz CW, with an RF output level of +13 dBm.

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

8. Press the **Amplitude** 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** 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** key, use the keypad to enter 110, and select the **kHz** soft key.
14. Press the **BW** 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** key and then press the **Trace** (5) 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. Subtract 30 dB from the average value and verify that the result is -100 dBc/Hz (For example: -45 dBc measured -30 dB \leq -100 dBc/Hz). Record in the test records on page 42, Spectrum Analyzer SSB Phase Noise Verification.

NOTE: The measured value is converted to dBc/Hz using the following formula:

$$\text{dBc | Hz} = - \left| \text{measured dBc} \right| - \left[10_{\log} (\text{RBW}/1\text{Hz}) \right]$$

$$\text{At 1 kHz RBW, } 10_{\log}(\text{RBW}/1\text{Hz}) = 30, \text{ so dBc | Hz} = - \left| \text{measured dBc} \right| - 30$$

24. Repeat Steps 15 through 23 for 20 kHz, 30 kHz and 100 kHz.

Spectrum Analyzer Spurious Response (Second Harmonic Distortion)

The following test can be used to verify the input related spurious response of the ISDBT Field Tester.

Equipment Required:

- Anritsu MG3692A Synthesized Signal Source with options 2A, 3, 4, 15A and 22 or equivalent
- Anritsu ISDBT Field Tester External Power Supply (part number 40-168)
- 10 MHz Reference Standard
- Anritsu 34RKNF50 50 Ohm adapter or equivalent
- Anritsu 15NN50-1.5C RF Coaxial Cable or equivalent
- 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 MG3692A Synthesized Signal Source.
2. Connect one end of the 50 MHz Low Pass Filter to the output of the source and the other end to the ISDBT Field Tester RF Input with the coaxial cable.
3. Connect the external power supply (Anritsu part number 40-168) to the ISDBT Field Tester.
4. Press the **On/Off** key to turn on the ISDBT Field Tester.
5. Press the **Shift** key, the **Preset** key (1), and then the **Preset** soft key to reset the instrument to the default starting conditions.
6. Turn on the 10 MHz reference source and the Anritsu MG3692A Synthesized Signal Source.
7. Set the MG3692A output to 50.1 MHz CW, with an RF output level of -30 dBm.

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

8. Press the **Amplitude** key, 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 **Span** key, use the keypad to enter 100, and select the **kHz** soft key.
12. Press the **Shift** key and then press the **Trace** (5) key.
13. Press the **Detection** soft key, and then the **Peak** soft key.
14. Press the **BW** 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 10, then select the **Hz** soft key.
17. Press the **Freq** key and select the **Center Freq** soft key.
18. Use the keypad to enter 50.0 and press the **MHz** soft key.
19. Press the **Shift** key and then press the **Trace** (5) key.
20. Press the **# of Average** soft key, use the keypad to enter 5, 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 in the test records on page 42, Spectrum Analyzer Spurious Response (Second Harmonic Distortion).
24. Press the **Freq** 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.
27. Press the **# of Average** soft key, use the keypad to enter 5, 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 on page 42, Spectrum Analyzer Spurious Response (Second Harmonic Distortion).
31. Convert this measured value to dB using the following formula:
Amplitude @50.1 MHz – amplitude @100.2 MHz = _____ dBc = Second Harmonic Level @ 100.2 MHz.
32. Verify that the converted Second Harmonic Level is –50 dBc or better and record in the test records on page 42, Spectrum Analyzer Spurious Response (Second Harmonic Distortion).

Spectrum Analyzer Residual Spurious Response

The following test can be used to verify the residual spurious response of the ISDBT Field Tester. This test is performed using the positive peak detection mode. There are two parts to this test:

- Residual Spurious Test with Preamp Off
- Residual Spurious Test with Preamp On

Residual Spurious Test with Preamp Off

Equipment Required:

- Anritsu 28N50-2 50 Ohm Termination or equivalent
- Anritsu ISDBT Field Tester External Power Supply (part number 40-168)

Procedure:

1. Connect the 50 Ohm termination to the ISDBT Field Tester RF Input.
2. Connect the external power supply (Anritsu part number 40-168) to the ISDBT Field Tester.
3. Press the **On/Off** key to turn on the ISDBT Field Tester.
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 for the internal circuitry to stabilize.

5. Press the **Amplitude** 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 **Trace** (5) key, then select the **Detection** and then the **Peak** soft keys.
10. Press the **Freq** 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** 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 and use the keypad to enter 300, then select the **Hz** soft key.
16. Wait until one sweep is completed.
17. Press the **Marker** key and select the **Peak Search** soft key.
18. Record the Marker 1 amplitude reading and verify that it is ≤ -90 dBm in the test records on page 43, Residual Spurious Test with Preamp Off.

NOTE: If a spur with an amplitude larger than –90 dBm occurs, wait another full sweep and observe whether the spur occurs at the same point on the second sweep. If the spur does not occur at the same point on the second sweep, then the spur on the first sweep was not real.

19. Repeat Steps 8 through 16 for the other settings.

Residual Spurious Test with Preamp On

Equipment Required:

- Anritsu 28N50-2 50 Ohm Termination or equivalent
- Anritsu ISDBT Field Tester External Power Supply (part number 40-168)

Procedure:

1. Connect the 50 Ohm termination to the ISDBT Field Tester RF Input.
2. Connect the external power supply (Anritsu part number 40-168) to the ISDBT Field Tester.
3. Press the **On/Off** key to turn on the ISDBT Field Tester.
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 for the internal circuitry to stabilize.

5. Press the **Amplitude** 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 **Trace** (5) key, then select the **Detection** and then the **Peak** soft keys.
10. Press the **BW** 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** 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** key and select the **Peak Search** soft key.
18. Record the Marker 1 amplitude reading and verify that it is ≤ -100 dBm in the test records on page 43, Residual Spurious Test with Preamp On.
19. Repeat Steps 11 through 18 for the other Start and Stop frequencies.

NOTE: If a spur with an amplitude larger than -100 dBm occurs, wait another full sweep and observe whether the spur occurs at the same point on the second sweep. If the spur does not occur at the same point on the second sweep, then the spur on the first sweep was not real.

Spectrum Analyzer Displayed Average Noise Level (DANL)

The following test can be used to verify the Displayed Average Noise Level of the ISDBT Field Tester. This test is performed using the RMS detection mode.

Equipment Required:

- Anritsu ISDBT Field Tester External Power Supply (part number 40-168)
- Anritsu 28N50-2 50 Ohm Termination or equivalent

Procedure:

1. Connect the 50 Ohm termination to the ISDBT Field Tester RF Input.
2. Connect the external power supply (Anritsu part number 40-168) to the ISDBT Field Tester.
3. Press the **On/Off** key to turn on the ISDBT Field Tester.
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 for the internal circuitry to stabilize.

5. Press the **Amplitude** key, then press the **Reference Level** soft key.
6. Use the keypad to enter -70 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** 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 **Trace** (5) key, then select the **Detection** and then the **RMS** soft keys.
10. Press the **Freq** key and select the **Start Freq** soft key.
11. Use the keypad to enter 10 and select the **MHz** soft key.
12. Press the **Stop Freq** soft key, enter 1 and press the **GHz** soft key.
13. Wait until one sweep is completed.
14. Press the **Marker** key and the **More** soft key.
15. Select the **Marker Noise** soft key to turn it on.
16. Use the rotary knob to move the marker to the noise floor and record the Marker reading in the test records on page 44, Spectrum Analyzer DANL.

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

17. Verify that the recorded value is ≤ -161 . The Max DANL (dBm/10 Hz) specification has been adjusted to (dBm/Hz).
18. Repeat Steps 10 through 17 for the other frequency settings.

Input Related Spurious (IRS) Signals

The following test can be used to verify the input related spurious signals of the ISDBT Field Tester at different frequencies.

Equipment Required:

- Anritsu MG3692A Synthesized Signal Source with options 2A, 3, 4, 15A and 22 or equivalent
- Anritsu ISDBT Field Tester External Power Supply (part number 40-168)
- 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 MG3692A Synthesized Signal Source.
2. Connect the output of the Anritsu MG3692A Synthesized Signal Source to the ISDBT Field Tester RF In.
3. Set the MG3692A output to 1674 MHz, with an RF output level of –30 dBm.
4. Connect the external power supply (Anritsu part number 40-168) to the ISDBT Field Tester.
5. 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 for the internal circuitry to stabilize.

Amplitude Reading at 1674 MHz:

6. Press the **Amplitude** key, then press the **Reference Level** soft key.
7. Use the keypad to enter –27 and press the **dBm** soft key.
8. Press the **Atten Lvl** soft key and enter 0, then press the **dB** soft key.
9. Press the **Shift** key and then press the **Trace** (5) key, then select the **Detection** and then the **Peak** soft key.
10. Press the **Freq** key and select the **Center Freq** soft key.
11. Use the keypad to enter 1674 and select the **MHz** soft key.
12. Press the **Span** key, use the keypad to enter 2, and select the **MHz** soft key.
13. Press the **BW** key and select the **RBW** soft key.
14. Use the keypad to enter 10 and select the **KHz** soft key.
15. Press the **VBW** soft key and use the keypad to enter 1, then select the **KHz** soft key.
16. Wait until one sweep is completed.
17. Press the **Marker** key and select the **Peak Search** soft key.
18. Record the Marker 1 amplitude reading for 1674 MHz in the test records on page 44, Amplitude Reading at 1674 MHz.
19. Press the **Freq** key and select the **Start Freq** soft key.
20. Use the keypad to enter 100 and select the **KHz** soft key.
21. Press **Stop Freq** soft key, enter 1673 and press the **MHz** soft key.
22. Press the **Marker** key and select the **Peak Search** soft key.
23. Record the Marker 1 amplitude reading in the test records on page 44, Amplitude Reading at 1674 MHz.
24. Calculate the input related spurious level and verify that it is –46 dBm:
(Input Related Spurious = Marker 1 reading – amplitude reading for 1674 MHz).
25. Repeat Steps 19 through 23, setting a start frequency of 1675 MHz and a stop frequency of 2800 MHz.

Amplitude Reading at 1701 MHz:

26. Set the MG3692A output to 1701 MHz, with an RF output level of –30 dBm.
27. On the ISDBT Field Tester, press the **Amplitude** key, then press the **Reference Level** soft key.
28. Use the keypad to enter –27 and press the **dBm** soft key.
29. Press the **Freq** 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** key, use the keypad to enter 2, and select the **MHz** soft key.
32. Press the **Span** key and then press the **Trace** (5) key.
33. Press the **# of Average** soft key, use the keypad to enter 5, then press the **Enter** key.
34. Wait until the Trace Count displays 5/5.
35. Press the **Marker** key and select the **Peak Search** soft key.
36. Record the amplitude at 1701 MHz in the test records on page 44, Amplitude Reading at 1701 MHz.
37. Press the **Freq** 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.
41. Press the **# of Average** soft key, use the keypad to enter 5, 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 in the test records on page 44, Amplitude Reading at 1701 MHz.
45. Calculate the input related spurious level and verify that it is –50 dBm:
(Input Related Spurious = Marker 1 reading – amplitude reading for 1701 MHz).

Amplitude Reading at 2145 MHz:

46. Set the MG3692A output to 1701 MHz, with an RF output level of –30 dBm.
47. On the ISDBT Field Tester, press the **Amplitude** key, then press the **Reference Level** soft key.
48. Use the keypad to enter –27 and press the **dBm** soft key.
49. Press the **Freq** key and select the **Center Freq** soft key.
50. Use the keypad to enter 2145 and select the **MHz** soft key.
51. Press the **Span** key, use the keypad to enter 2, and select the **MHz** soft key.
52. Press the **Shift** key and then press the **Trace** (5) key.
53. Press the **# of Average** soft key, use the keypad to enter 5, then press the **Enter** key.
54. Wait until the Trace Count displays 5/5.
55. Press the **Marker** key and select the **Peak Search** soft key.
56. Record the amplitude at 2145 MHz in the test records on page 44, Amplitude Reading at 2145 MHz.
57. Press the **Freq** key and select the **Start Freq** soft key.
58. Use the keypad to enter 470 and select the **MHz** soft key.
59. Press **Stop Freq** soft key, enter 472 and press the **MHz** soft key.
60. Press the **Shift** key and then press the **Trace** (5) key.
61. Press the **# of Average** soft key, use the keypad to enter 5, then press the **Enter** key.
62. Wait until the Trace Count displays 5/5.
63. Press the **Marker** key and select the **Peak Search** soft key.
64. Record the Marker 1 amplitude reading in the test records on page 44, Amplitude Reading at 2145 MHz.
65. Calculate the input related spurious level and verify that it is –60 dBm:
(Input Related Spurious = Marker 1 reading – amplitude reading for 2145 MHz).

Spectrum Analyzer Resolution Bandwidth Accuracy

The following test can be used to verify the resolution bandwidth accuracy of the ISDBT Field Tester at different frequencies.

Equipment Required:

- Anritsu MG3692A Synthesized Signal Source with options 2A, 3, 4, 15A and 22 or equivalent
- Anritsu ISDBT Field Tester External Power Supply (part number 40-168)
- 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 MG3692A Synthesized Signal Source.
2. Connect the output of the Anritsu MG3692A Synthesized Signal Source to the ISDBT Field Tester RF Input.
3. Connect the external power supply (Anritsu part number 40-168) to the ISDBT Field Tester.
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 for the internal circuitry to stabilize.

5. Set the MG3692A output to 1 GHz, with an RF output level of –30 dBm.
6. Press the **Amplitude** key, then press the **Reference Level** soft key.
7. Use the keypad to enter –10 and press the **dBm** soft key.
8. Press the **Atten Lvl** soft key and enter 0, then press the **dB** soft key.
9. Press the **Scale** soft key and enter 10, then press **dB/div** soft key.
10. Press the **Freq** key and select the **Center Freq** soft key.
11. Use the keypad to enter 1 and select the **GHZ** soft key.

RBW Test:

12. Press the **Span** key, use the keypad to enter the span in the test records on page 44, Spectrum Analyzer Resolution Bandwidth Accuracy.
13. Press the **BW** key and select the **RBW** soft key.
14. Use the keypad to enter 3 and select the **MHZ** soft key.
15. Set the VBW from the test records on page 44, Spectrum Analyzer Resolution Bandwidth Accuracy.
16. Press the **Shift** key then **Measure** (4) key, then press the **OCC BW** soft key.
17. Press the **dBc** soft key and enter 3, then press the **Enter** key.
18. Press the **OCC BW On/Off** soft key to turn on occupied bandwidth.
19. Record the OCC BW reading in the test records on page 44, Spectrum Analyzer Resolution Bandwidth Accuracy.
20. Verify that the OCC BW reading frequency is 10% of the RBW.
21. Repeat Steps 12 through 20 for the other settings.

Spectrum Analyzer Measurement Accuracy

The tests in this section verify the level accuracy of the ISDBT Field Tester Spectrum Analyzer. There are two parts to this test:

- Spectrum Analyzer Level Accuracy Across Frequency
- Level Accuracy vs. Input Power Level Test

Spectrum Analyzer Level Accuracy Across Frequency

Equipment Required:

- Anritsu MG3692A Synthesized Signal Source with options 2A, 3, 4, 15A and 22 or equivalent
- Anritsu ML2438A Dual Channel Power Meter or equivalent
- Anritsu MA2442D High Accuracy Power Sensors or equivalent (2)
- Anritsu ML2400A/20 Power Meter Cable (2)
- Weinschel 1870A Power Splitter or equivalent
- Anritsu 34NN50A 50 Ohm adapter or equivalent
- Anritsu 34RKNF50 50 Ohm adapter or equivalent
- Anritsu 15NN50-1.5C RF Coaxial Cable or equivalent
- Weinschel 1-10 10 dB Fixed Attenuator

Test Setup Component Characterization:

1. Turn on the power meter and signal source.
2. On the power meter, press the **Channel** 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 MG3692A 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 (Refer to Figure 2).

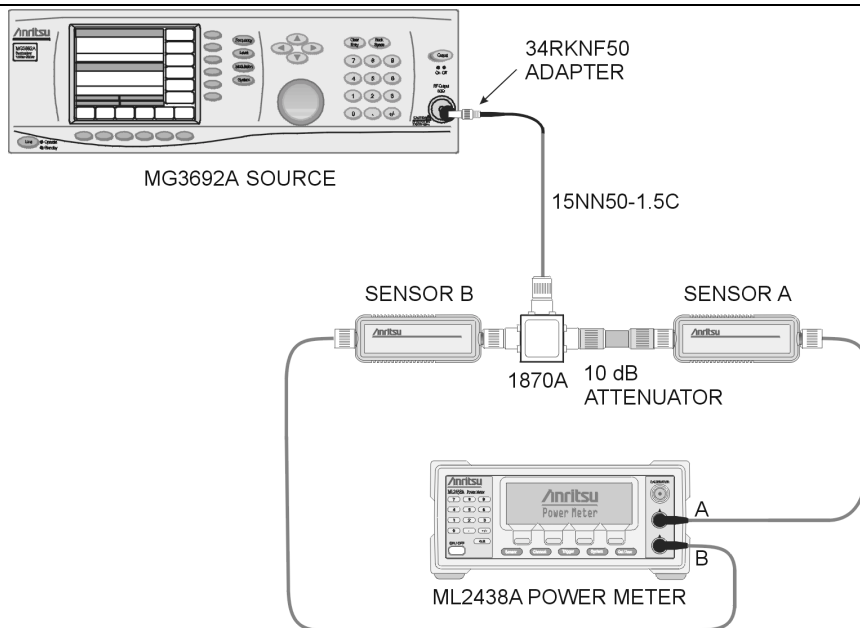


Figure 2. Level Accuracy Across Frequency Test Pre-test Setup

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

6. Set the MG3692A output to the frequency listed from the test records on page 45, Spectrum Analyzer Level Accuracy Across Frequency starting with 50 MHz CW.
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 MG3692A 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.
8. Adjust the power level reading on sensor A to -2 dBm by adjusting the power level on the MG3692A.
9. Record the sensor B reading in column 2 in the test records on page 45, Measuring the Unit for Frequency Level Accuracy.
10. Repeat Steps 6 through 9 for all the frequencies in column 1 in the test records on page 45, Measuring the Unit for Frequency Level Accuracy.
11. Repeat Steps 6 through 10 for a power level of -30 dBm.

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

Measuring the Unit for Frequency Level Accuracy:

1. Remove sensor A, install the 34NN50A adapter to the end of the Attenuator, and connect to the MS8911A as shown in Figure 3.

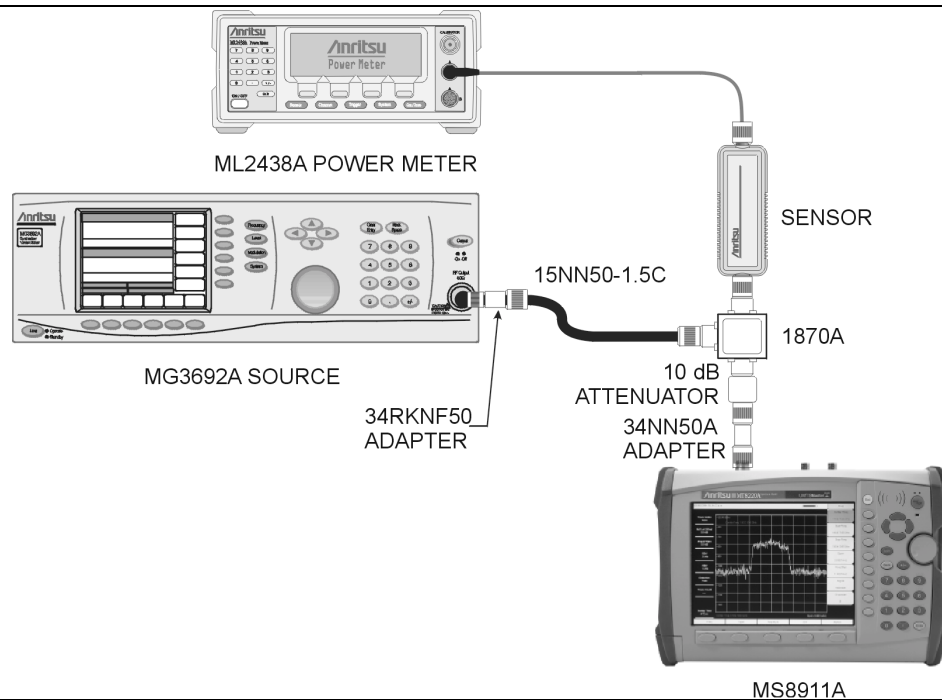


Figure 3. Level Accuracy Across Frequency Test Setup

2. Connect the external power supply (Anritsu part number 40-168) to the ISDBT Field Tester.
3. Press the **On/Off** key to turn on the ISDBT Field Tester.
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 for the internal circuitry to stabilize.

5. Press the **Amplitude** key, then press the **Reference Level** soft key.
6. Use the keypad to enter 10 and press the **dBm** soft key.
7. Press the **Atten Lvl** soft key and enter 60, then press the **dB** soft key.
8. Press the **BW** key and the **RBW** soft key.

9. Use the keypad to enter 1 and select the kHz soft key.
10. Press the VBW soft key and use the keypad to enter 10, then select the Hz soft key.
11. Press the **Span** key, use the keypad to enter 10, and select the kHz soft key.
12. Press the **Freq** key and select the **Center Freq** soft key.
13. Use the keypad to enter 50 and select the MHz soft key.
14. 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.
15. Set the MG3692A output to match the frequency in the preceding step.
16. Adjust the source power level so that the power meter displays the corresponding sensor B reading as recorded for -2 dBm in the test records on page 45, Spectrum Analyzer Level Accuracy Across Frequency for this same frequency.
17. Press the **Marker** key and select the **Peak Search** soft key.
18. Record the Marker 1 amplitude reading in the test records on page 45, Measuring the Unit for Frequency Level Accuracy.
19. Verify that the Marker 1 amplitude reading is within the specification shown in the test records on page 45, Measuring the Unit for Frequency Level Accuracy.
20. Repeat Steps 12 to 19 for the other frequencies in column 1.
21. Repeat Steps 12 to 20 for a power level of -30 dBm.

NOTE: Change the reference level to -20 dBm and the input level to 0 dB.

Level Accuracy vs. Input Power Level Test

Equipment Required:

- Anritsu MG3692A Synthesized Signal Source with options 2A, 3, 4, 15A and 22 or equivalent
- Anritsu ML2438A Dual Channel Power Meter or equivalent
- Anritsu MA2442D High Accuracy Power Sensors or equivalent (2)
- Anritsu ML2400A/20 Power Meter Cable (2)
- Weinschel 1870A Power Splitter or equivalent
- Anritsu 34NN50A 50 Ohm adapter or equivalent
- Anritsu 34RKNF50 50 Ohm adapter or equivalent
- Anritsu 15NN50-1.5C RF Coaxial Cable or equivalent
- Weinschel 1-10 10 dB Fixed Attenuator

Test Setup Components Characterization:

1. Turn on the power meter and signal source.

NOTE: Before continuing, allow a 30-minute warm up 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 MG3692A 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 (refer to Figure 2).

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. Adjust the power level of the MG3692A to get a reading on sensor A that matches the power level in column 1 of the test records in on page 45, Level Accuracy vs. Input Power Level Setting starting with 0 dBm.
8. Record the sensor B reading in column 2 of the test records on page 45, Level Accuracy vs. Input Power Level Setting.
9. Repeat Steps 7 and 8 for the other input levels in column 1, recording the results in column 2.

Measuring the Unit for Accuracy vs Input Power Level:

1. Remove sensor A add the adapter and connect it to the ISDBT Field Tester as shown in Figure 3.
2. 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.
3. Set the MG3692A output to 50 MHz CW.
4. Connect the external power supply (Anritsu part number 40-168) to the ISDBT Field Tester.
5. On the ISDBT Field Tester, 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 for the internal circuitry to stabilize.

6. Press the **Freq** key and select the **Center Freq** soft key.
7. Use the keypad to enter 50 and select the **MHZ** soft key.
8. Press the **BW** key and the **RBW** soft key.
9. Use the keypad to enter 1 and select the **KHZ** soft key.
10. Press the **VBW** soft key and use the keypad to enter 10, then select the **HZ** soft key.
11. Press the **Span** key, use the keypad to enter 10, and select the **KHZ** soft key.
12. Press the **Amplitude** key, then press the **Reference Level** soft key.
13. Use the keypad to enter 10 and press the **dBm** soft key.
14. Press the **Atten Lvl** soft key and enter 30, then press the **dB** soft key.
15. Adjust the source power so that the power meter displays the corresponding desired sensor B reading as recorded for 0 dBm in column 2 of the test records on page 45, Level Accuracy vs. Input Power Level Setting.
16. Press the **Marker** key and select the **Peak Search** soft key.
17. Record the Marker 1 amplitude reading in the test records on page 46, Measuring the Unit for Accuracy vs. Input Power Level.
18. Verify that the Marker 1 amplitude reading is within the specification in the test records on page 46, Measuring the Unit for Accuracy vs. Input Power Level.
19. Repeat Steps 12 through 18 for the other power level settings.

Level Accuracy Verification

The tests in this section verify the level accuracy of the MS8911A in ISDB-T mode.

Equipment Required:

- Anritsu MG8940A ISDB-T Signal Generator
- Mini-Circuits TIA-1000-4 RF Power Amplifier
- Anritsu MN63A Programmable Attenuator
- Weinschel Model 1870A Power Splitter, or equivalent
- Anritsu 15NN50-1.5C RF Coaxial Cable or equivalent (3)
- Anritsu ML2438A Power Meter
- Anritsu MA2482D Power Sensor
- Anritsu ML2400/20 Power Meter Cable
- Anritsu 34NN50A 50 Ohm adapter or equivalent

Procedure:

1. Connect the MG8940A, MS8911A, RF Amplifier, Programmable Attenuator, Divider, Power Meter and Power Sensors according to Figure 4.

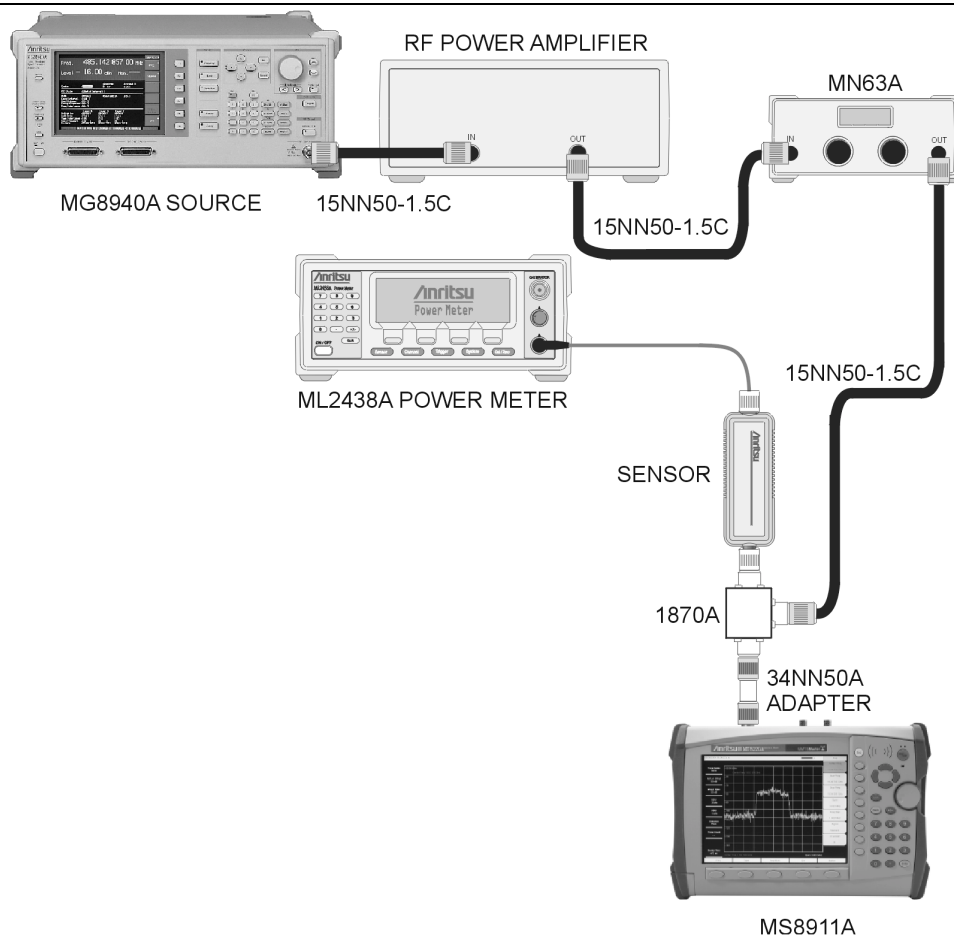


Figure 4. Level Accuracy Verification Setup

2. Turn on MG8940A, RF Amplifier, Programmable Attenuator, and Power Meter.

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

3. Connect the external power supply (Anritsu part number 40-168) to the MS8911A.

4. Press the **On/Off** key to turn on the MS8911A and wait until the measurement display appeared then press the **Shift** key then press the **Mode** (9) key to activate the mode selection menu.
5. Use up and down arrow keys and highlight ISDB-T Signal Analyzer and press the **Enter** key.
6. Press **Shift** key, **Preset** key (1), and then the **Preset** soft key.
7. Press the **Meas Selection** soft key, then select Field Strength.
8. Connect the power sensor to the power meter and calibrate the sensor.
9. On MG8940A press **Level** soft key, then enter -20 and press the **dBm** soft key.
10. Press the **Digital Mode** soft key and verify that the Digital key is on.
11. Use Up/Down arrow keys to highlight Mode, then press the **Set** soft key.
12. Select Mode 3 and press the **Set** soft key again.
13. Press the **Freq** key, enter 473.14285714 and press the **MHz** key to set source to the first frequency on page 46, Level Accuracy Test for 473.14285714 MHz With Pre-Amp Off.
14. Set the Programmable Attenuator 1X step knob and adjust so the sensor reads -10 dBm \pm 1 dB.
15. On MG8940A use the Resolution keys to set the output level to 0.01 dB step and adjust power level so the Power Meter reads as close as possible to -10 dBm (\pm 0.2 dB max) on the sensor.
16. On MS8911A press the **Frequency/Level** soft key, then press the **Channel** soft key, enter 13 then press the **Enter** key.
17. Press the **Reference Level** soft key, enter Reference Level on page 46, Level Accuracy Test for 473.14285714 MHz With Pre-Amp Off starting with -10 then press the **Enter** key.
18. Press the **Meas Setup** soft key and then the **Meas Mode** soft key.
19. Use Up/Down arrow keys and highlight Average and press the **Enter** key.
20. Press the **Average Count** soft key, then enter 50 and press the **Enter** key.
21. Wait until Average count displays (50/50).
22. Record Measured Value from MS8911A reading on page 46, Level Accuracy Test for 473.14285714 MHz With Pre-Amp Off.
23. Calculate the Deviation using the following formula and record on page 46, Level Accuracy Test for 473.14285714 MHz With Pre-Amp Off, then verify that it is within \pm 2.00 dB Deviation = (Measured Value) – (Test Level).
24. Add additional 5 dB to the Attenuation setting.
25. Set the Ref Level of MS8911A according on page 46, Level Accuracy Test for 473.14285714 MHz With Pre-Amp Off.
26. Press the **Meas Setup** soft key and then the **Meas Mode** soft key.
27. Use Up/Down arrow keys and highlight Average and press the **Enter** key.
28. Press the **Average Count** soft key, then enter 50 and press the **Enter** key.
29. Wait until Average count displays (50/50).
30. Record Measured Value from MS8911A reading on page 46, Level Accuracy Test for 473.14285714 MHz With Pre-Amp Off then calculate the Deviation and verify that it is within \pm 2.00 dB.
31. Repeat Steps 24 to 30 for Test Level up to -45 dBm on page 46, Level Accuracy Test for 473.14285714 MHz With Pre-Amp Off with Pre Amp off.
32. Set the RF output level of MG8940A to -60 dBm and Attenuator to 10 dB.
33. Use the Resolution keys to adjust power level so the Power Meter reads as close as possible to -50 dBm (\pm 0.2 dB max) on sensor A.
34. Record Measured Value from MS8911A reading on page 46, Level Accuracy Test for 473.14285714 MHz With Pre-Amp Off then calculate the Deviation and verify that it is within \pm 2.00 dB.
35. Repeat Steps 24 to 30 for Test Level -50 dBm to -60 dBm (-50 dBm to -85 dBm with Pre Amp on) on page 46, Level Accuracy Test for 473.14285714 MHz With Pre-Amp Off with Pre Amp off.

36. On MS8911A press the **Frequency/Level** soft key, then press **Pre Amp** soft key to turn Pre Amp on.
37. Set the Attenuator to 20 dB.
38. Set output level of MG8940A to -20 dBm, then use the Resolution keys to set the output level to 0.01 dB step and adjust power level so the Power Meter reads as close as possible to -20 dBm (± 0.2 dB max) on the sensor.
39. Repeat Steps 24 to 35 for the Test Level and Ref Level on page 46, Level Accuracy Test for 473.14285714 MHz With Pre-Amp On.
40. Repeat Steps 13 to 39 for Channel 38 (623.14285714 MHz) on page 47 for the off /on conditions and Channel 62 (767.14285714 MHz) on page 48 for the off/on conditions.

Noise Floor

The test in this section can be used to verify the noise floor of MS8911A in ISDB-T mode. This test is performed using the RMS detection mode.

Equipment Required:

- Anritsu 28N50-2, 50 Ohm Termination or equivalent

Procedure:

1. Connect the external power supply (Anritsu part number 40-168) to the MS8911A.
2. Press the **On/Off** key to turn on the MS8911A and wait until the measurement display appeared then press the **Shift** key then press the **Mode** (9) key to activate the mode selection menu.
3. Use Up/Down arrow keys and highlight ISDB-T Signal Analyzer and press the **Enter** key.
4. Press **Shift** key, **Preset** key (1), and then the **Preset** soft key.
5. Press the **Meas Selection** soft key, then select Field Strength.

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

6. Connect the 50 Ohm termination to MS8911A RF In.
7. Press the **Frequency/Level** soft key, then press the **Channel** soft key, enter Channels on page 48, Noise Floor Test starting with Channel 13 then press the **Enter** key.
8. Press the **Reference Level** soft key, enter -25 then press the **Enter** key.
9. Press the **Meas Setup** soft Key and then the **Meas Mode** soft key.
10. Use Up/Down arrow keys and highlight Average and press the **Enter** key.
11. Press the **Average Count** soft key, then enter 50 and press the **Enter** key.
12. Wait until Average count displays (50/50).
13. Record the Channel Power reading on page 47, Level Accuracy Test for 623.14285714 MHz With Pre-Amp Off and verify that it is ≤ -70 dBm.
14. Repeat Steps 7 to 13 for Channel 38 and 62.
15. On MS8911A Press **Frequency/Level** soft key, then press the **Pre Amp** soft key to turn on Pre Amp.
16. Press the **Reference Level** soft key, enter -50 then press the **Enter** key.
17. Repeat Steps 7 to 13 and record the Channel Power reading on page 47, Level Accuracy Test for 623.14285714 MHz With Pre-Amp Off and verify that it is ≤ -94 dBm.
18. Repeat Steps 7 to 17 for Channel 38 and 62 on page 47, Level Accuracy Test for 623.14285714 MHz With Pre-Amp Off.

Modulation Analysis Frequency Accuracy

The test in this section verify the frequency Accuracy of the MS8911A in ISDB-T Modulation Analysis mode.

Equipment Required:

- Anritsu MG8940A ISDB-T Signal Generator
- 10 MHz Reference Standard

Procedure:

1. Connect the 10 MHz frequency reference source to the Anritsu MG8940A and MS8911A according to Figure 5.

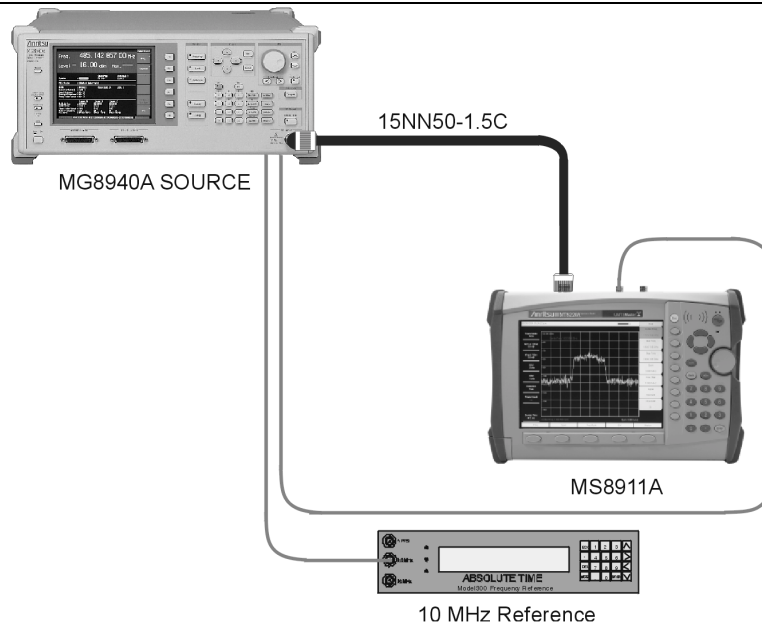


Figure 5. Residual Modulation Error Ratio (MER) Setup

2. Turn on MG8940A to warm up.
3. Connect the external power supply (Anritsu part number 40-168) to the MS8911A.
4. Press the **On/Off** key to turn on the MS8911A and wait until the measurement display appeared then press the **Shift** key then press the **Mode** (9) key to activate the mode selection menu.
5. Use Up/Down arrow keys and highlight ISDB-T Signal Analyzer and press **Enter** key.
6. Press **Shift** key, **Preset** key (1), and then the **Preset** soft key.
7. Press the **Meas Selection** soft key, then select Modulation.

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

8. Press the **Reference Level** soft key, enter -20 then press the **Enter** key.
9. On MG8940A, press **Level** soft key, then enter -20 and press the **dBm** soft key.
10. Press the **Digital Mode** soft key and verify that the Digital key is on.
11. Use Up/Down arrow keys to highlight Mode, then press the **Set** soft key.
12. Select Mode 3 and press the **Set** soft key again.
13. Press **Freq** key, enter 473.14285714 and press the **MHz** soft key.
14. On MS8911A press the **Frequency/Level** soft key, then press the **Channel** soft key, enter Channels on page 49, Frequency Accuracy Test in Modulation Analysis Mode starting with Channel 13 then press the **Enter** key.
15. Press the **Meas Setup** soft Key and then the **Meas Mode** soft key.
16. Use Up/Down arrow keys and highlight Average and press the **Enter** key.

17. Press the **Average Count** soft key, then enter 10 and press the **Enter** key.
18. Wait until Average count displays (10/10).
19. Record the Frequency Error reading on page 49, Frequency Accuracy Test in Modulation Analysis Mode and verify that it is within ± 0.3 Hz.
20. Repeat Steps 13 to 19 for all Channels and frequencies on page 49, Frequency Accuracy Test in Modulation Analysis Mode.
21. Press **Frequency/Level** soft key, then press the **Pre Amp** soft key to turn Pre Amp on.
22. Press the **Reference Level** soft key, enter -50 then press the **Enter** key.
23. Set the output level of MG8940A to -50 dBm.
24. Repeat Steps 13 to 19 and record the Frequency Error readings on page 49, Frequency Accuracy Test in Modulation Analysis Mode and verify that it is within ± 0.3 Hz.
25. Repeat Steps 13 to 24 for Channel 38 and Channel 62.

Frequency Lock Range

The test in this section can be used to verify the frequency lock range of the MS8911A in ISDB-T Modulation Analysis mode.

Equipment Required:

- Anritsu MG8940A ISDB-T Signal Generator
- 10 MHz Reference Standard

Procedure:

1. Connect the 10 MHz frequency reference source to the Anritsu MG8940A and MS8911A according to Figure 5.
2. Turn on MG8940A to warm up.
3. Connect the external power supply (Anritsu part number 40-168) to the MS8911A.
4. Press the **On/Off** key to turn on the MS8911A and wait until the measurement display appeared then press the **Shift** key then press the **Mode** (9) key to activate the mode selection menu.
5. Use Up/Down arrow keys and highlight ISDB-T Signal Analyzer and press the **Enter** key.
6. Press **Shift** key, **Preset** key (1), and then the **Preset** soft key.
7. Press the **Meas Selection** soft key, then select Modulation.

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

8. On MG8940A, press **Level** soft key, then enter -20 and press the **dBm** soft key.
9. Press **Freq** key, enter 473.23285714 and press the **MHz** soft key.
10. Press the **Digital Mode** key and verify that the **Digital** key is on.
11. Use Up/Down arrow keys to highlight **Mode**, then press the **Set** soft key.
12. Select **Mode 3** and press the **Spectrum Master** again.
13. On MS8911A press the **Frequency/Level** soft key, enter 13 then press the **Enter** key.
14. Press the **Reference Level** soft key, enter -20 then press the **Enter** key.
15. Use Up/Down arrow keys and highlight **Average** and press the **Enter** key.
16. Press the **Average Count** soft key, then enter 10 and press the **Enter** key.
17. Wait until Average count displays (10/10).
18. Record the Error reading on page 49, Frequency Lock Range and verify that it is within 90 kHz ± 0.2 Hz.
19. On MG8940A set frequency to 473.05285714 and repeat Steps 12 to 18.
20. Record the Error reading on page 49, Frequency Lock Range and verify that it is within 90 kHz ± 0.2 Hz.

1 dB Compression Level

The test in this section can be used to verify (1dB) compression level of the MS8911A.

Equipment Required:

- Anritsu MG8940A ISDB-T Signal Generator
- Mini-Circuits TIA-1000-4 RF Power Amplifier
- Anritsu MN63A Programmable Attenuator
- Weinschel Model 1870A Power Splitter
- Anritsu ML2438A Power Meter
- Anritsu MA2482DMA2482D Power Sensor
- Anritsu ML2400/20 Power Meter Cable

Procedure:

1. Connect the MG8940A, MS8911A, RF Amplifier, Programmable Attenuator, Divider, Power Meter and Power Sensors according to Figure 4.
2. Turn on MG8940A, RF Amplifier, Programmable Attenuator, and Power Meter.
3. Connect the external power supply (Anritsu part number 40-168) to the MS8911A.
4. Press the **On/Off** key to turn on the MS8911A and wait until the measurement display appears then press the **Shift** key then press the **Mode** (9) key to activate the mode selection menu.
5. Use Up/Down arrow keys and highlight ISDB-T Signal Analyzer and press the **Enter** key.
6. Press **Shift** key, **Preset** key (1), and then the **Preset** soft key.
7. Press the **Meas Selection** soft key, then select Field Strength.

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

8. Connect the power sensor A to the power meter and calibrate the sensor.
9. On MG8940A use the Resolution keys to set the output level to 0.01 dB step.
10. Press **Level** soft key, then enter -15 and press the **dBm** soft key.
11. Verify that Modulation is off.
12. Press the **Freq** key, enter 473.14285714 and press the **MHZ** soft key to set source to the first frequency on page 49, 1 dB Compression Level Test, with Pre-Amp Off.
13. Set the Programmable Attenuator 1X step knob and adjust so sensor A reads -25 dBm \pm 1 dB.
14. On MG8940A use the Resolution keys to set the output level to 0.01 dB step and adjust power level so the Power Meter reads -25 dBm \pm 0.05 dB -50 dBm for second power level) on sensor A.
15. On MS8911A press the **Frequency/Level** soft key, then press the **Channel** soft key, enter 13 then press the **Enter** key.
16. Press the **Reference Level** soft key, enter -25 dB (-50 for second power level) then press the **Enter** key
17. Press the **Execute Measure** soft key.
18. Record Measured Value from MS8911A reading on page 49, 1 dB Compression Level Test, with Pre-Amp Off.
19. Calculate delta (Δ) between measured value and Test Level using the following formula:
$$\Delta(\text{dB}) = \text{Test Level} - \text{Measured value.}$$
20. Verify that the delta is $\leq \pm 1.00$ dB. If the delta is $\geq \pm 1.00$ dB, that is the 1 dB compression level and stop test for the other Test Levels in that frequency.
21. Lower the Attenuation setting by 5 dB.
22. Repeat step 17 to 21.
23. Lower the Attenuation setting by 1 dB.
24. Repeat Steps 17 to 20.

25. Repeat Steps 23 to 24 for the Test Levels on page 49, 1 dB Compression Level Test, with Pre-Amp Off.
26. Repeat Steps 12 to 25 for Channel 38 and 62.
27. On MS8911A press the **Frequency/Level** soft key, then press **Pre Amp** soft key to turn Pre Amp on.
28. Press the **Reference Level** soft key, enter -50 then press the **Enter** key.
29. Set the Programmable Attenuator to 20 dB using 1X step knob.
30. On MG8940A use the Resolution keys to set the output level to 0.01 dB step and adjust power level so the Power Meter reads -50 dBm \pm 0.2 dB on sensor A.
31. Repeat Steps 12 to 25 for Channel 38 and Channel 62 on page 50, 1 dB Compression Level Test, with Pre-Amp On.

Phase Noise (2nd Step)

The tests in this section can be used to verify the phase noise of the MS8911A in ISDB-T mode.

Equipment Required:

- Anritsu MG8940A ISDB-T Signal Generator
- 10 MHz Reference Standard

Procedure:

1. Connect the 10 MHz frequency reference source to the Anritsu MG8940A and MS8911A according to Figure 5.
2. Turn on MG8940A to warm up.
3. Connect the external power supply (Anritsu part number 40-168) to the MS8911A.
4. Press the **On/Off** key to turn on the MS8911A and wait until the measurement display appeared then press the **Shift** key then press the **Mode** (9) key to activate the mode selection menu.
5. Use Up/Down arrow keys and highlight ISDB-T Signal Analyzer and press **Enter** key.
6. Press **Shift** key, **Preset** key (1), and then the **Preset** soft key.
7. Press the **Meas Selection** soft key, then select Phase Noise.

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

8. Press the **Reference Level** soft key, enter -10 then press the **Enter** key.
9. On MG8940A, press the **Level** soft key, then enter -10 and press the **dBm** soft key.
10. Verify that Modulation is off.
11. Press the **Freq** key, enter 473.14285714 then press the **MHz** soft key.
12. On MS8911A press the **Frequency/Level** soft key, enter 13 then press the **Enter** key.
13. Press the **Meas Setup** soft Key and then the **Meas Mode** soft key.
14. Use Up/Down arrow keys and highlight Average and press the **Enter** key.
15. Press the **Average Count** soft key, then enter 10 and press the **Enter** key.
16. Wait until Average count displays (10/10).
17. Record the Frequency Error and Phase Noise readings at 10 kHz and 100 kHz offsets on page 50, Phase Noise (2nd Step) and verify that they are within specifications.
18. Repeat step 11 to 17 for channels and frequencies listed on page 50, Phase Noise (2nd Step).

5. Battery Information

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

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

6. Battery Pack Removal and Replacement

This section provides instructions for the removal and replacing the ISDBT Field Tester 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 ISDBT Field Tester.

1. With the ISDBT Field Tester laying flat, face up, on a stable surface, locate the battery access door, as illustrated in Figure 6.



Figure 6. 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 illustrated in Figure 7.

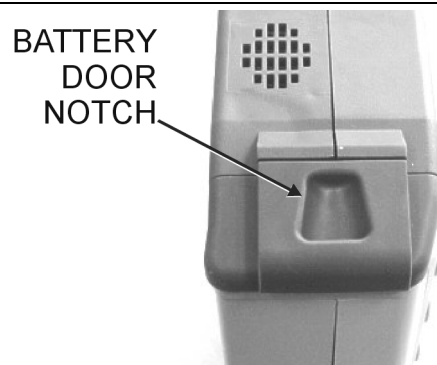


Figure 7. Battery Access Door Notch

3. Remove the battery access door, as illustrated in Figure 8.

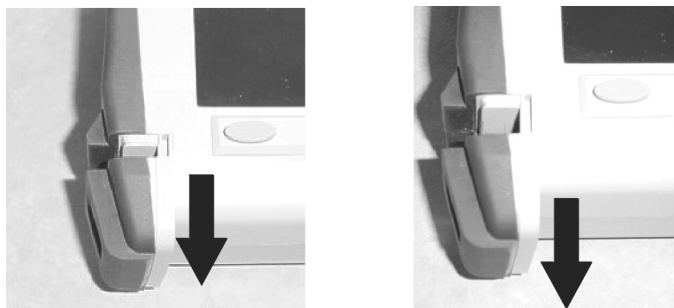


Figure 8. Removing the Battery Access Door

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 9.



Figure 9. 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 illustrated in Figure 10.

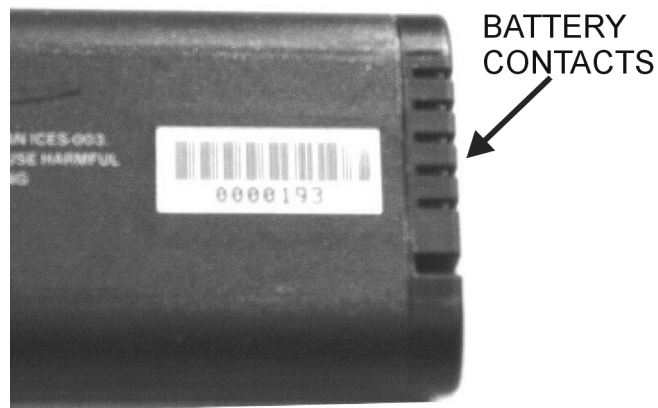


Figure 10. Battery Contacts

7. Opening the ISDBT Field Tester Case

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

1. Place the ISDBT Field Tester face down on a stable work surface.
2. Remove the battery door and battery as shown in on page 26, Battery Pack Removal and Replacement.
3. Use a Phillips screwdriver to remove the four screws securing the two halves of the ISDBT Field Tester case together (Figure 11).

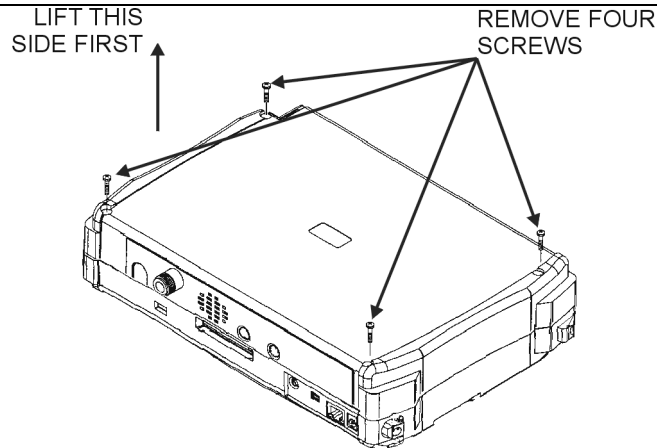


Figure 11. Removing the Cover Screws

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.

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 12 and Figure 13 and note the position and routing of the cables, they should be similarly routed when the unit is reassembled.

5. For GPS option 31 equipped units, 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 (Figure 12).

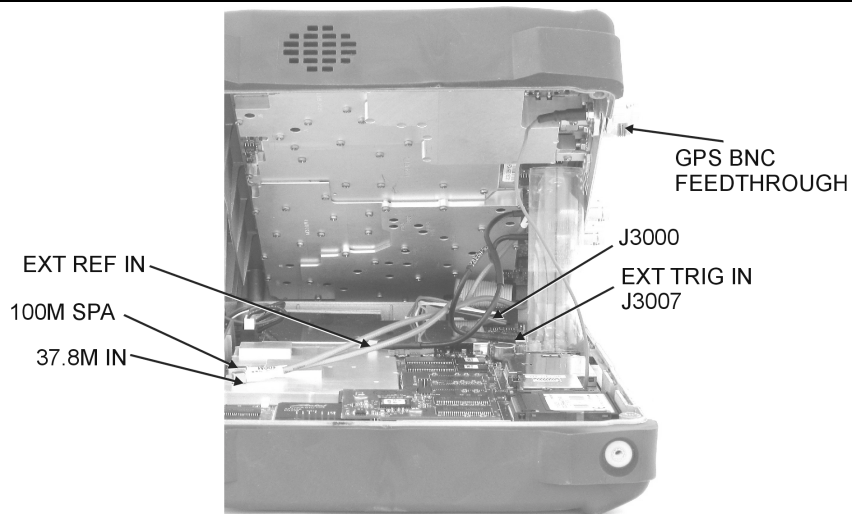


Figure 12. Front Panel Assembly Removal and Cable Connections

6. Carefully disconnect the External Reference In cable from the main PCB assembly connection marked EXT REF.
7. Carefully disconnect the External Trigger In cable from the main PCB connection marked J3007.

8. Carefully disconnect the cable that comes from J9007 of the Spectrum Analyzer module from the connector marked 100M SPA on the main PCB assembly.
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.
10. Carefully disconnect the ribbon cable that connects the Spectrum Analyzer module to the main PCB assembly at connector J3000.
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 the drawing below.

12. Reverse the above steps to reassemble the case (Figure 13).

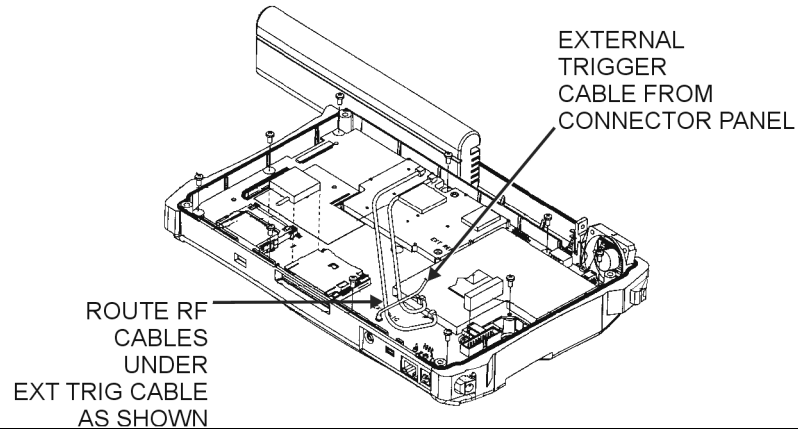


Figure 13. Cable Routing Diagram

8. Real Time Clock (RTC) Battery Removal and Replacement

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

1. Remove the cover as directed in on page 28, Opening the ISDBT Field Tester Case.
2. Carefully remove the RTV from the battery (Figure 14).

REAL TIME CLOCK BATTERY

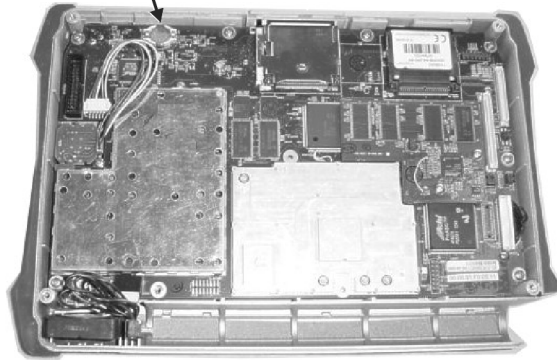


Figure 14. RTC Lithium Battery on the Main PCB

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.

9. Main PCB Assembly Replacement

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.

1. Remove the cover as directed in on page 28, Opening the ISDBT Field Tester 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 (Figure 15).

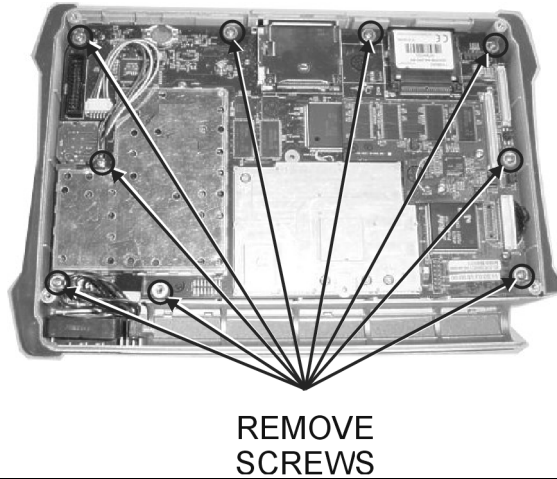


Figure 15. Main PCB Assembly Mounting Screws

5. Lift the bottom edge of the Main PCB assembly and disconnect the battery connector from J1001 on the main PCB (Figure 16).

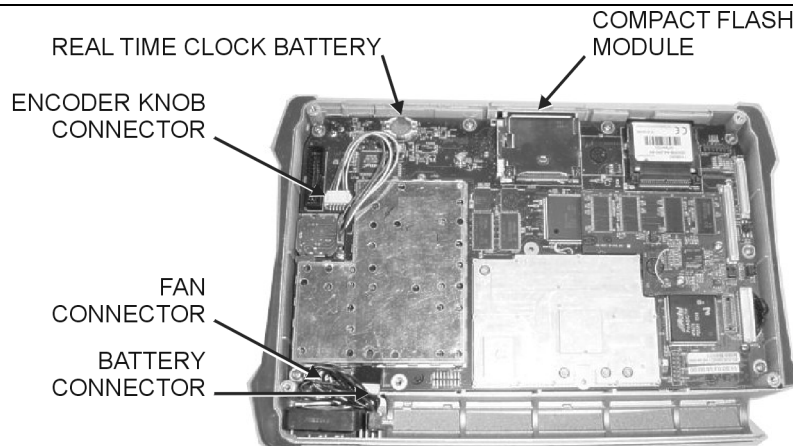


Figure 16. Main PCB Assembly Replacement

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.

10. Spectrum Analyzer Module Assembly Replacement

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.

1. Remove the cover as directed in on page 28, Opening the ISDBT Field Tester Case.
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 17).

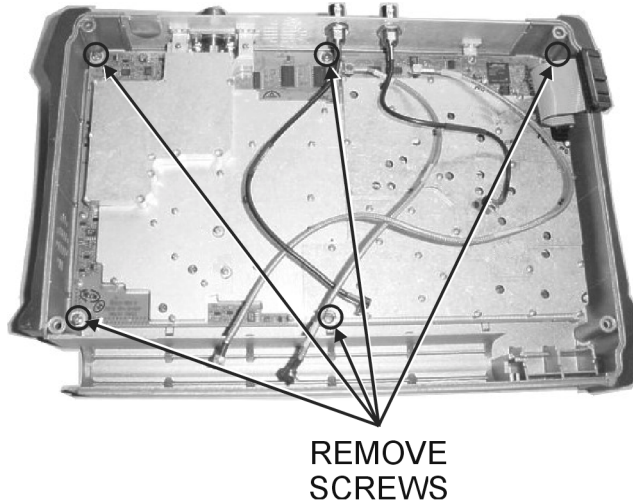


Figure 17. Spectrum Analyzer Module Removal

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.

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.

11. LCD Assembly Replacement

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

1. Remove the cover as directed in on page 28, Opening the ISDBT Field Tester Case.
2. Remove the Main PCB assembly from the front panel as directed in on page 31, Main PCB Assembly Replacement.
3. Use a Phillips screw driver to remove the four screws securing the LCD to the Main PCB assembly (Figure 18).

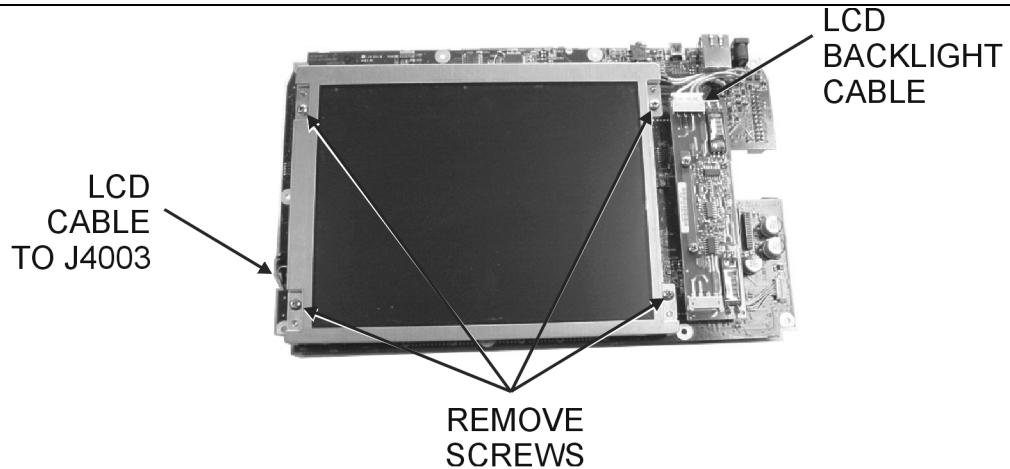


Figure 18. LCD Assembly Replacement

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.

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.

12. LCD Backlight PCB Removal and Replacement

This procedure provides instructions for removing and replacing the ISDBT Field Tester LCD backlight PCB.

1. Remove the cover as directed in on page 28, Opening the ISDBT Field Tester Case.
2. Remove the Main PCB assembly from the front panel as directed in on page 31, Main PCB Assembly Replacement.
3. Disconnect the LCD backlight cable from the LCD backlight PCB (Figure 19).

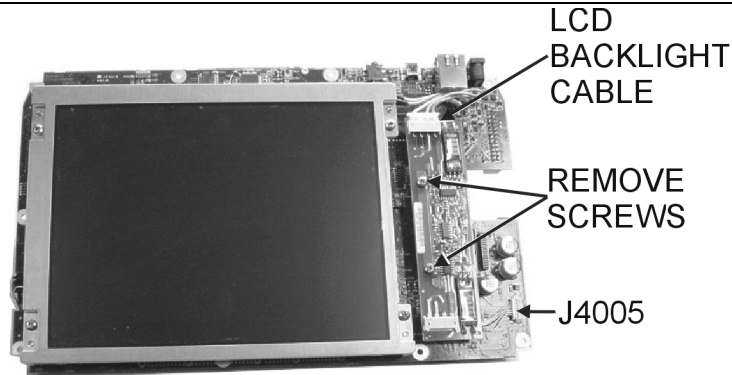


Figure 19. LCD Backlight PCB Removal and Replacement

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.

13. Keypad Membrane and PCB Replacement

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.

1. Place the instrument face up on a protected work surface.
2. There are eight locking tabs holding the keypad bezel to the case. 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 20).

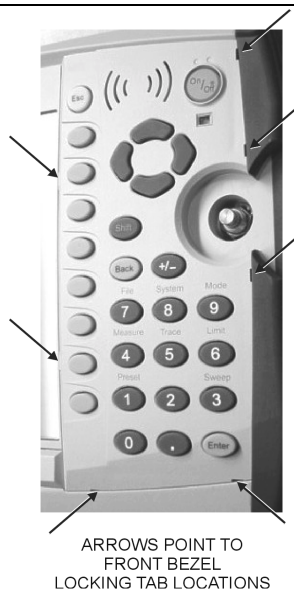


Figure 20. Front Panel Keypad Bezel

3. Remove the keypad membrane by carefully lifting the speaker and pulling the membrane off of the keypad PCB (Figure 21).

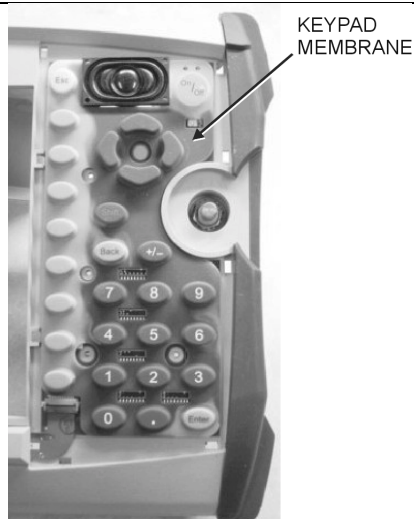


Figure 21. Keypad Membrane

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.

4. 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 22).
-



Figure 22. Keypad PCB

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

14. Function Key Membrane and Switchpad Replacement

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.

1. Place the instrument face up on a protected work surface.
2. Remove the keypad bezel and membrane as directed in on page 35, Keypad Membrane and PCB Replacement.
3. There are six 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. 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 (Figure 23).

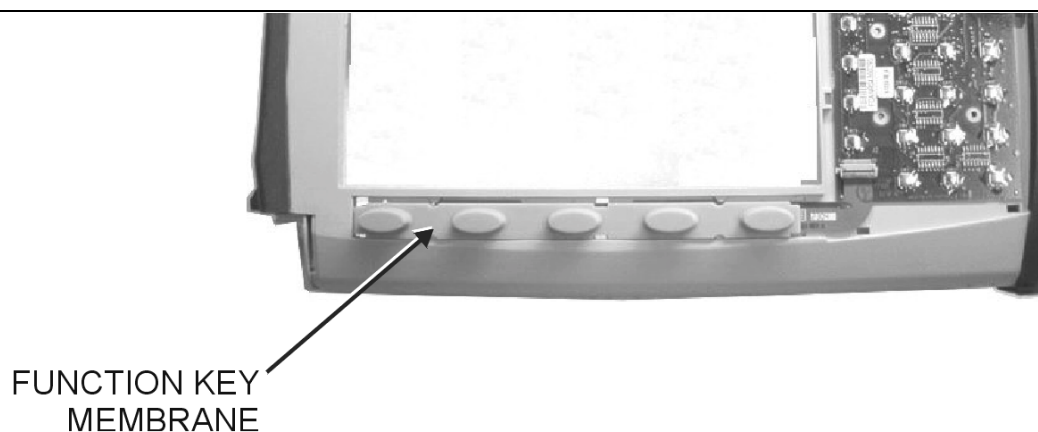


Figure 23. Function Key Membrane

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 (Figure 24).

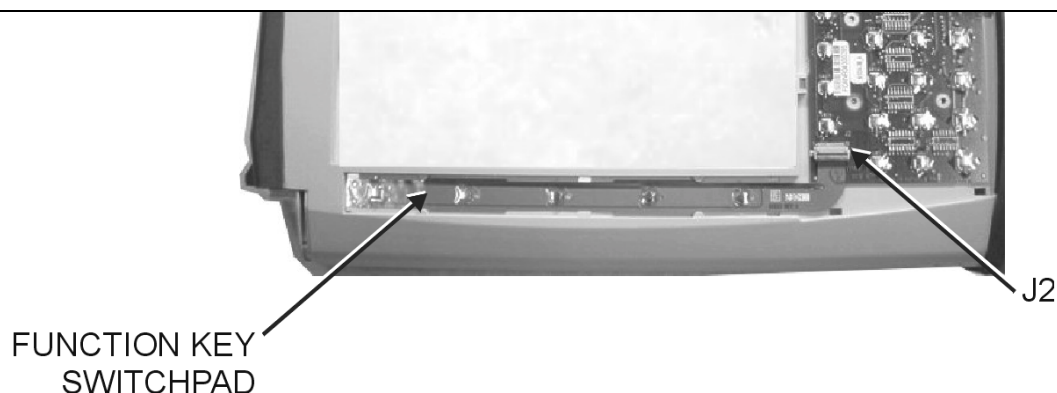


Figure 24. Function Key Switchpad

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.

15. Accessories and Replaceable Parts List

Accessories and replaceable parts for the ISDBT Field Tester MS8911A are listed below.

Table 2. Standard/Optional Parts List

Part Number	Description	Qty
10580-00125	User Guide, ISDBT Field Tester MS8911A	1
10580-00126	Programming Manual, ISDBT Field Tester MS8911A (disk only)	1
2300-347	Handheld Software Tools CD	1
40-168	AC Power Supply	1
806-141	Automotive Power Adapter	1
2000-1360	USB A-mini B Interface Cable	1
2000-1371	Ethernet Interface Cable	1
2000-1358	64 MB Compact Flash	1
1091-27	Type N male to SMA female adapter	1
1091-172	Type N male to BNC female adapter	1
61382	Soft Carrying Case	1
2000-1410	Magnet-Mount GPS Antenna	1

Table 3. Replacement Parts

Part Number	Description	Qty
633-44	Rechargeable Battery, Lithium-Ion	1
633-27	Lithium Coin Battery for Real Time Clock	1
ND64367	MS8911A Main/SPA PCB Assembly *	1
ND65208	MS8911A Main/SPA PCB Assembly with option 31 *	1
61333-3	Function Key Switchpad Assembly	1
61334-3	Main Keypad PCB Assembly	1
2000-1346	Liquid Crystal Display Backlight PCB	1
15-118	Liquid Crystal Display Assembly	1
61361	Function Key Membrane	1
61362	Keypad Membrane	1

* When ordering the Main/SPA PCB Assembly the options that are to be installed on the board must be defined. The options of the ISDBT Field Tester are listed on a tag at the top of the MS8911A.

Table 4. Hardware Parts

Part Number	Description	Qty
905-2639P	Screw, Pan, M3 x 6, Phillips, SS, PCH	27
905-2642P	Screw, Pan, M3 x 12, Phillips, SS, PCHL	4
905-2633P	Screw, Pan, M2 x 6, Phillips, SS, PCHL	28
905-2663	M3 x 0.5 KEP Nut	4
905-2684P	Screw, M2 x 14 MM, 18-8 SS	54
905-2685	Screw, 4 MM, Phillips, SS, Shoulder	2
410-101	Encoder	1
58211	Cable Assembly, BNC-MCX	1
61370-1	Cable Assembly, 3IN, INV BD	1
61465	Cable, Ribbon	1
61466-1	100 MHZ Coax Cable	1
61466-2	37.8 MHZ Coax Cable	1

Table 5. Case Parts

Part Number	Description	Qty
64126	Top Case, Plastic	1
64127	Bottom Case, Plastic	1
61379-1	Battery Door, Plastic Case	1
61363-1	Keypad Bezel, Numeric, Plastic Case	1
61378-1	Function Key Bezel, Plastic Case	1
61360-1	Encoder Knob, Plastic Case	1
61368	LCD Protective Cover	1
61381	Fan Bracket	1
ND64383	Fan Assembly	1
800-473	Battery Cable, Connector	1
64136	ID Label, Model MS8911A	1

16. ANRITSU Customer Service Centers

Table 6. Anritsu Customer Service Centers

UNITED STATES ANRITSU COMPANY 490 Jarvis Drive Morgan Hill, CA 95037-2809 Telephone: (408) 776-8300 1-800-ANRITSU (267-4878) FAX: (408) 776-1744	FRANCE ANRITSU S.A 9 Avenue du Quebec Zone de Courtaboeuf 91951 Les Ulis Cedex Telephone: 016-09-21-550 FAX: 016-44-61-065	KOREA ANRITSU CORPORATION LTD. Service Center: 8F Hyunjuk Building 832-41, Yeoksam Dong Kangnam-Ku Seoul, South Korea 135-080 Telephone: 82-2-553-6603 FAX: 82-2-553-6605
ANRITSU COMPANY 10 New Maple Ave., Unit 305 Pine Brook, NJ 07058 Telephone: (973) 227-8999 1-800-ANRITSU (267-4878) FAX: (973) 575-0092	GERMANY ANRITSU GmbH Grafenberger Allee 54-56 D-40237 Dusseldorf, Germany Telephone: 0211-968550 FAX: 0211-9685555	SINGAPORE ANRITSU (SINGAPORE) PTE LTD. 10, Hoe Chiang Road #07-01/02 Keppel Towers Singapore 089315 Telephone: 65-6282-2400 FAX: 65-6282-2533
ANRITSU COMPANY 1155 E. Collins Blvd Richardson, TX 7508.1 Telephone: 1-800-ANRITSU (267-4878) FAX: (972) 671-1877	INDIA MEERA AGENCIES PVT. LTD. 23 Community Centre Zamroodpur, Kailash Colony Extension, New Delhi, India 110 048 Phone: 011-2644-2700/2644-2800 FAX : 011-2644-2500	SOUTH AFRICA ETECSA 12 Surrey Square Office Park 330 Surrey Avenue Ferndale, Randburt, 2194 South Africa Telephone: 011-27-11-787-7200 FAX: 011-27-11-787-0446
AUSTRALIA ANRITSU PTY. LTD. Unit 3, 170 Foster Road Mt Waverley, VIC 3149 Australia Telephone: 03-9558-8177 FAX: 03-9558-8255	ISRAEL TECH-CENT. LTD. 4 Raul Valenberg St Tel-Aviv 69719 Telephone: 03-64-78-563 FAX: 03-64-78-334	SWEDEN ANRITSU AB Borgafjordsgatan 13 164 40 Kista, Sweden Telephone: 08-534-70700 FAX: 08-534-70730
BRAZIL ANRITSU ELECTRONICA LTDA. Praia de Botafogo, 440, Sala 2401 CEP22250-040, Rio de Janeiro, RJ, Brasil Telephone: 021-527-6922 FAX: 021-537-1456	ITALY ANRITSU Sp.A Roma Office Via E. Vittorini, 129 00144 Roma, EUR Telephone: 06-5099-711 FAX: 06-5022-425	TAIWAN ANRITSU CO., INC. 7F, No. 316, Section 1 NeiHu Road Taipei, Taiwan, R.O.C. Telephone: 886-2-8751-1816 FAX: 886-2-8751-2126
CANADA ANRITSU INSTRUMENTS LTD. 700 Silver Seven Road, Suite 120 Kanata, Ontario K2V 1C3 Telephone: (613) 591-2003 FAX: (613) 591-1006	JAPAN ANRITSU CUSTOMER SERVICES CO., LTD. 5-1-1 Onna Atsugi-shi Kanagawa-Prf. 243-0032 Japan Telephone: 046-296-6688 FAX: 046-225-8379	UNITED KINGDOM ANRITSU LTD. 200 Capability Green Luton, Bedfordshire LU1 3LU, England Telephone: 015-82-433200 FAX: 015-82-731303
CHINA ANRITSU ELECTRONICS (SHANGHAI) CO. LTD. 2F, Rm B, 52 Section Factory Building No. 516 Fu Te Rd (N) Shanghai 200131 P.R. China Telephone: 21-5868-0226, 5868-0227, 5868-0228 FAX: 21-5868-0588		

Appendix A Test Records

Introduction

This appendix provides test records that can be used to record the performance of the ISDBT Field Tester, on page 3, Performance Verification.

Test Records

We recommend 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.

ISDBT Field Tester MS8911A	Firmware Revision:	Operator:
Serial Number:	Options:	Date:

Spectrum Analyzer Frequency Accuracy

Frequency	Measured Value	Specification
1 GHz	_____ kHz	±1 kHz
7 GHz	_____ kHz	±7 kHz

Spectrum Analyzer SSB Phase Noise Verification

Frequency	Measured Value	Specification
10 kHz	_____ dBc/Hz	-100 dBc/Hz
20 kHz	_____ dBc/Hz	-100 dBc/Hz
30 kHz	_____ dBc/Hz	-100 dBc/Hz
100 kHz	_____ dBc/Hz	-100 dBc/Hz

Spectrum Analyzer Spurious Response (Second Harmonic Distortion)

Frequency	Measured Values	Converted Value	Specification
50.1 MHz	_____	_____ dBc	-45 dBc
100.2 MHz	_____	_____ dBc	-45 dBc

ISDBT Field Tester MS8911A	Firmware Revision:	Operator:
Serial Number:	Options:	Date:

Residual Spurious Test with Preamp Off

Start Freq.	Stop Freq.	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:

Input Frequency	Spur Level
1674 MHz	-46 dBc max (-56 dBc typical), 0 to 2800 MHz
1674 to 1774 MHz	-50 dBc max (-60 dBc typical) at (Finput - 1674 MHz)
1774 to 2900 MHz	-48 dBc max (-68 dBc typical) at (Finput - 1674 MHz)

Residual Spurious Test with 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

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Spectrum Analyzer DANL

Frequency	RBW	VBW	Measured for 100 kHz RBW	Calculated for 10 Hz RBW	Specification
10 MHz to 1.0 GHz	100 kHz	1 kHz	_____ dBm	_____ dBm	-151 dBm
1 GHz to 2.2 GHz	100 kHz	1 kHz	_____ dBm	_____ dBm	-149 dBm
2.2 GHz to 2.8 GHz	100 kHz	300 Hz	_____ dBm	_____ dBm	-143 dBm
2.8 GHz to 4.0 GHz	100 kHz	1 kHz	_____ dBm	_____ dBm	-149 dBm
4.0 GHz to 7.1 GHz	100 kHz	300 Hz	_____ dBm	_____ dBm	-144 dBm

Input Related Spurious (IRS) Signals

Amplitude Reading at 1674 MHz

Frequency	Measured Values	Calculated IRS	Specification
100 kHz - 1673 MHz	_____ dBm	_____ dBc	-46 dBc
1675 MHz - 2800 MHz	_____ dBm	_____ dBc	-46 dBc

Amplitude Reading at 1701 MHz

Frequency	Measured Values	Calculated IRS	Specification
26 MHz - 28MHz	_____ dBm	_____ dBc	-50 dBc

Amplitude Reading at 2145 MHz

Frequency	Measured Values	Calculated IRS	Specification
470 MHz - 472MHz	_____ dBm	_____ dBc	-60 dBc

Spectrum Analyzer Resolution Bandwidth Accuracy

BW Setting	Span	VBW	Lower Limit	Measured Values	Upper Limit
3 MHz	4.5 MHz	Auto	2.7 MHz	_____ Hz	3.3 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	9 kHz	_____ Hz	1.1 kHz
300 Hz	450 Hz	Auto	270 Hz	_____ Hz	330 Hz
100 Hz	150 Hz	Auto	90 Hz	_____ Hz	110 Hz
30 Hz	50 Hz	3 Hz	27 Hz	_____ Hz	33 Hz
10 Hz	30 Hz	3 Hz	9 Hz	_____ Hz	11 Hz

ISDBT Field Tester MS8911A	Firmware Revision:	Operator:
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Spectrum Analyzer Level Accuracy Across Frequency

Frequency	Required Sensor B reading for -2 dBm @ Attenuator output	Required Sensor B reading for -30 dBm @ Attenuator output
50 MHz	_____ dBm	_____ dBm
100 MHz	_____ dBm	_____ dBm
500 MHz	_____ dBm	_____ dBm
1000 MHz	_____ dBm	_____ dBm
2000 MHz	_____ dBm	_____ dBm
3000 MHz	_____ dBm	_____ dBm
4000 MHz	_____ dBm	_____ dBm
5000 MHz	_____ dBm	_____ dBm
6000 MHz	_____ dBm	_____ dBm
7000 MHz	_____ dBm	_____ dBm

Measuring the Unit for Frequency Level Accuracy

Frequency	Measured Values for -2 dBm	Specification	Measured Values for -30 dBm	Specification
50 MHz	_____ dBm	±1.75 dBm	_____ dBm	±1.25 dBm
100 MHz	_____ dBm	±1.75 dBm	_____ dBm	±1.25 dBm
500 MHz	_____ dBm	±1.75 dBm	_____ dBm	±1.25 dBm
1000 MHz	_____ dBm	±1.75 dBm	_____ dBm	±1.25 dBm
2000 MHz	_____ dBm	±1.75 dBm	_____ dBm	±1.25 dBm
3000 MHz	_____ dBm	±1.75 dBm	_____ dBm	±1.25 dBm
4000 MHz	_____ dBm	±1.75 dBm	_____ dBm	±1.75 dBm
5000 MHz	_____ dBm	±1.75 dBm	_____ dBm	±1.75 dBm
6000 MHz	_____ dBm	±1.75 dBm	_____ dBm	±1.75 dBm
7000 MHz	_____ dBm	±1.75 dBm	_____ dBm	±1.75 dBm

Level Accuracy vs. Input Power Level Setting

Test Power Level @ 50 MHz

- 0 dBm
- 4 dBm
- 10 dBm
- 14 dBm
- 20 dBm
- 24 dBm
- 30 dBm
- 34 dBm
- 40 dBm
- 44 dBm
- 50 dBm

Required Sensor B Reading

- _____ dBm
- _____ dBm
- _____ dBm
- _____ dBm
- _____ dBm
- _____ dBm
- _____ dBm
- _____ dBm
- _____ dBm
- _____ dBm
- _____ dBm

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Measuring the Unit for Accuracy vs. Input Power Level

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

Level Accuracy Test for 473.14285714 MHz With Pre-Amp Off

Test Level	Ref. Level	Measured Value	Deviation	Specification
-10 dBm	-10 dBm	_____ dBm	_____ dB	±2.0 dB
-15 dBm	-15 dBm	_____ dBm	_____ dB	±2.0 dB
-20 dBm	-20 dBm	_____ dBm	_____ dB	±2.0 dB
-25 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-30 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-35 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-40 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-45 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-50 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-55 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-60 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB

Level Accuracy Test for 473.14285714 MHz With Pre-Amp On

Test Level	Ref. Level	Measured Value	Deviation	Specification
-20 dBm	-20 dBm	_____ dBm	_____ dB	±2.0 dB
-25 dBm	-20 dBm	_____ dBm	_____ dB	±2.0 dB
-30 dBm	-30 dBm	_____ dBm	_____ dB	±2.0 dB
-35 dBm	-30 dBm	_____ dBm	_____ dB	±2.0 dB
-40 dBm	-40 dBm	_____ dBm	_____ dB	±2.0 dB
-45 dBm	-40 dBm	_____ dBm	_____ dB	±2.0 dB
-50 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-55 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-60 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-65 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-70 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-75 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-80 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-85 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB

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Level Accuracy Test for 623.14285714 MHz With Pre-Amp Off

Test Level	Ref. Level	Measured Value	Deviation	Specification
-10 dBm	-10 dBm	_____ dBm	_____ dB	±2.0 dB
-15 dBm	-15 dBm	_____ dBm	_____ dB	±2.0 dB
-20 dBm	-20 dBm	_____ dBm	_____ dB	±2.0 dB
-25 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-30 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-35 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-40 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-45 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-50 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-55 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-60 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB

Level Accuracy Test for 623.14285714 MHz With Pre-Amp On

Test Level	Ref. Level	Measured Value	Deviation	Specification
-20 dBm	-20 dBm	_____ dBm	_____ dB	±2.0 dB
-25 dBm	-20 dBm	_____ dBm	_____ dB	±2.0 dB
-30 dBm	-30 dBm	_____ dBm	_____ dB	±2.0 dB
-35 dBm	-30 dBm	_____ dBm	_____ dB	±2.0 dB
-40 dBm	-40 dBm	_____ dBm	_____ dB	±2.0 dB
-45 dBm	-40 dBm	_____ dBm	_____ dB	±2.0 dB
-50 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-55 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-60 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-65 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-70 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-75 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-80 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-85 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB

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Level Accuracy Test for 767.14285714 MHz With Pre-Amp Off

Test Level	Ref. Level	Measured Value	Deviation	Specification
-10 dBm	-10 dBm	_____ dBm	_____ dB	±2.0 dB
-15 dBm	-15 dBm	_____ dBm	_____ dB	±2.0 dB
-20 dBm	-20 dBm	_____ dBm	_____ dB	±2.0 dB
-25 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-30 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-35 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-40 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-45 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-50 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-55 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB
-60 dBm	-25 dBm	_____ dBm	_____ dB	±2.0 dB

Level Accuracy Test for 767.14285714 MHz With Pre-Amp On

Test Level	Ref. Level	Measured Value	Deviation	Specification
-20 dBm	-20 dBm	_____ dBm	_____ dB	±2.0 dB
-25 dBm	-20 dBm	_____ dBm	_____ dB	±2.0 dB
-30 dBm	-30 dBm	_____ dBm	_____ dB	±2.0 dB
-35 dBm	-30 dBm	_____ dBm	_____ dB	±2.0 dB
-40 dBm	-40 dBm	_____ dBm	_____ dB	±2.0 dB
-45 dBm	-40 dBm	_____ dBm	_____ dB	±2.0 dB
-50 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-55 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-60 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-65 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-70 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-75 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-80 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB
-85 dBm	-50 dBm	_____ dBm	_____ dB	±2.0 dB

Noise Floor Test

Channel	Frequency (MHz)	Ref. Level (dBm)	Pre-Amp Off		Pre-Amp On		
			Measured Value	Spec. (dBm)	Ref. Level (dBm)	Measured Value	Spec. (dBm)
13	473.14285714	-25	_____ dBm	≤-70	-50	_____ dBm	≤-94
38	623.14285714	-25	_____ dBm	≤-70	-50	_____ dBm	≤-94
62	767.14285714	-25	_____ dBm	≤-70	-50	_____ dBm	≤-94

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Frequency Accuracy Test in Modulation Analysis Mode

Channel	Frequency (MHz)	Ref. Level (dBm)	Pre-Amp Off		Pre-Amp On	
			Frequency Error	Spec. (Hz)	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

Frequency Lock Range

Channel	Frequency (MHz)	Measured Freq. Error (+)	Specification	Frequency (MHz)	Measured Freq. Error (+)	Specification
13	473.23285714	_____	90 kHz ±0.2 Hz	473.05285714	_____	90 kHz ±0.2 Hz

1 dB Compression Level Test, with Pre-Amp 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
-20	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-19	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-18	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-17	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-16	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-15	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-14	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-13	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-12	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-11	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-10	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-9	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-8	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-7	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-6	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-5	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-4	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-3	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-2	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-1	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
0	-25	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1

ISDBT Field Tester MS8911A	Firmware Revision:	Operator:
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1 dB Compression Level Test, with Pre-Amp 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
-45	-50	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-44	-50	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-43	-50	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-42	-50	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-41	-50	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-40	-50	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-39	-50	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-38	-50	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-37	-50	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-36	-50	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-35	-50	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-34	-50	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-33	-50	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-32	-50	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-31	-50	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1
-30	-50	_____	_____	Δ<1	_____	_____	Δ<1	_____	_____	Δ<1

Phase Noise (2nd Step)

MS8911A

Channel	Frequency (MHz)	@10 kHz Offset (dBc/Hz)	Phase (10k) (dBc/Hz)	@100 kHz Offset (dBc/Hz)	Phase (100k) (dBc/Hz)	Frequency (Hz)	Freq. Error (Hz)
13	473.14285714	≤-103	_____	≤-105	_____	Ch±19 Hz	_____
38	623.14285714	≤-103	_____	≤-105	_____	Ch±19 Hz	_____
62	767.14285714	≤-103	_____	≤-105	_____	Ch±19 Hz	_____

Anritsu

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