



UMTS Master™

Model MT8220A

High Performance Node B Analyzer

MAINTENANCE MANUAL

Anritsu

1. Introduction	1
2. Description	1
3. Recommended Test Equipment	1
4. Performance Verification	3
Spectrum Analyzer Frequency Accuracy	3
Spectrum Analyzer Internal Reference Frequency Adjustment	4
Spectrum Analyzer SSB Phase Noise Verification	5
Spectrum Analyzer Spurious Response (Second Harmonic Distortion)	6
Spectrum Analyzer Residual Spurious Response	7
Spectrum Analyzer Displayed Average Noise Level (DANL)	9
Input Related Spurious (IRS) Signals	10
Spectrum Analyzer Resolution Bandwidth Accuracy	13
Spectrum Analyzer Measurement Accuracy	14
GPS Option Verification (Option 31)	18
GSM/GPRS/EDGE Signal Analyzer Option Verification (Options 40 and/or 41)	19
GSM Burst Power, Frequency Error and Phase Error Tests	19
EDGE Burst Power, Frequency Error and Residual Error Tests	21
WCDMA/HSDPA RF Measurements (Option 44) Verification	22
Error Vector Magnitude (EVM) Verification (Options 45 or 65)	29
5. Battery Information	31
6. Battery Pack Removal and Replacement	32
7. Opening the UMTS Master Case	34
8. Real Time Clock (RTC) Battery Removal and Replacement	36
9. Main PCB Assembly Replacement	37
10. Spectrum Analyzer Module Assembly Replacement	38
11. LCD Assembly Replacement	39
12. LCD Backlight PCB Removal and Replacement	40
13. Keypad Membrane and PCB Replacement	41
14. Function Key Membrane and Switchpad Replacement	43
15. Accessories and Replaceable Parts List	44
16. ANRITSU Customer Service Centers	46
Appendix A Test Records	47
Introduction	47
Test Records	47

1. Introduction

This manual provides maintenance instructions for the UMTS Master Model MT8220A Spectrum Analyzer and W-CDMA Tester. It describes the product and provides performance verification procedures, parts replacement procedures, and a replaceable parts list.

2. Description

The MT8220A is a synthesizer-based handheld spectrum analyzer and W-CDMA tester.

3. Recommended Test Equipment

The following test equipment is recommended for use in testing and maintaining the UMTS Master.

Table 1. Recommended Test Equipment for Spectrum Analyzer Verification

Equipment	Critical Specification	Recommended Manufacturer/Model
Synthesizer	Frequency: 0.1 Hz to 20 GHz Power Output to +13 dBm	Anritsu Model MG3692A or B with options 2A, 4, 22, 15 *
Power Meter	Power Range: -70 to +20 dBm	Anritsu Dual Channel Model ML2438A
Power Sensor	Frequency: 10 MHz to 18 GHz, -67 to +20 dB	Anritsu Model MA2442D Quantity: 2
Frequency Reference	Frequency: 10 MHz	Symmetricom Model RubiSource T&M
Fixed Attenuator	10 dB Attenuation	Aeroflex/Weinschel Model 1-10 Quantity: 2
Power Splitter	Frequency: DC to 18 GHz	Aeroflex/Weinschel Model 1870A
50 MHz Lowpass Filter		Anritsu Model 1030-96
Adapter	Frequency: DC to 20 GHz N(m)-N(m), 50 Ohm	Anritsu Model 34NN50A
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 18 GHz N(m)-N(f), 50 Ohm	Anritsu Model 15NNF50-1.5B
Coaxial Cable	BNC Male to Male 50 Ohm	Any

* Note that MG3692A models require option 15 to achieve power of +13 dBm. MG3692B models do not require option 15 to achieve +13 dBm power.

Table 2. Recommended Test Equipment for Options Verification

Equipment	Critical Specification	Recommended Manufacturer/Model
Synthesizer	Frequency: 0.1 Hz to 20 GHz Power Output to +13 dBm	Anritsu Model MG3692A or B with options 2A, 4, 22, 15 *
Vector Signal Generator	Frequency: 100 kHz to 3 GHz	Anritsu Model MG3700A with Options MG3700A-002, MG3700A-021 **
Power Meter	Power Range: -70 to +20 dBm	Anritsu Dual Channel Model ML2438A
Power Sensor	Frequency: 10 MHz to 18 GHz, -60 to +20 dB	Anritsu Model MA2482D with Option 1, Quantity 2
Programmable Attenuator	Frequency: DC to 2 GHz Attenuation: 100 dB (in 1 and 10 dB step)	Anritsu Model MN63A
Fixed Attenuator	Frequency Range: DC to 18 GHz 10 dB Attenuation	Aeroflex/Weinschel Model 44-10. Quantity 2
Power Splitter	Frequency: DC to 18 GHz	Aeroflex/Weinschel Model 1870A
RF Power Amplifier	Frequency: 100 to 1000 MHz, Gain: 35 dB min.	Model TIA-1000-1R8 Two BNC(m) to N(f) adapters are required
Adapter	Frequency: DC to 20 GHz N(m)-N(m), 50 Ohm	Maury Microwave Model 8828B Quantity 2 (one if Anritsu Coupler and Circulator are used)
Adapter	Frequency: DC to 20 GHz K(m)-N(f), 50 Ohm	Anritsu Model 34RKNF50
Adapter	Frequency: 881.5 MHz BNC(m) to N(f), 50 Ohm	Midwest Microwave Model ADT-2615-NF-BNM-02, Quantity 2
Adapter	Frequency: 881.5 MHz SMA(m) to N(f), 50 Ohm	Midwest Microwave Model ADT-2582-NF-SMM-02, Quantity 4 (Required only if Anritsu Coupler and Circulator are used.)
Adapter	Frequency: 881.5 MHz SMA(m) to SMA(m), 50 Ohm	Midwest Microwave Model ADT-2594-MM-SMA-02, (Required only if Anritsu Coupler and Circulator are used.)
50 Ohm Termination	Frequency: DC to 18 GHz	Anritsu Model 28N50-2
High Power Load	DC to 18 GHz, 10W	Aeroflex/Weinschel Model M1418
Coupler	Frequency: 881.5 MHz Coupling Factor: 30 dB	Midwest Microwave Model CPW-5140-30-NNN-05 or CPW-5141-30-NNN-05 Alternative: Anritsu 1091-307 (Two SMA(m) to N(f) adapters required.)
Circulator	Frequency Range: 800 to 1000 MHz Isolation: 20 dB min	Meca Electronics, Inc. part number CN-0.900 Alternative: Anritsu part number 1000-50 (Two SMA(m) to N(f) adapter and one SMA(m) to SMA(m) adapter required.)
Coaxial Cable	BNC Male to Male 50 Ohm	Any
RF Coaxial Cable	Frequency: DC to 18 GHz N(m)-N(m), 50 Ohm	Anritsu Model 15NN50-1.5B Quantity 3
GPS Antenna	Magnet-mount with 15 foot cable	Anritsu Model 2000-1410

* Note that MG3692A models require option 15 to achieve power of +13 dBm. MG3692B models do not require option 15 to achieve +13 dBm power.

** Note that the MG3700A requires several factory custom test pattern files installed into its memory.

4. Performance Verification

The sections that are listed below contain tests that can be used to verify the performance of the UMTS Master Model MT8220A.

A sample performance verification test record is provided on page 47.

Spectrum Analyzer Frequency Accuracy

The following test can be used to verify the CW frequency accuracy of the UMTS Master Spectrum Analyzer.

Procedure:

1. Connect the 10 MHz reference source to the Anritsu MG3692A Synthesized Signal Source. Do not connect the 10 MHz external reference to the MT8220A.
2. Connect the output of the source to the RF Input of the UMTS Master.
3. Connect the external power supply (Anritsu part number 40-168) to the UMTS Master.
4. Press and hold the **On/Off** key to turn on the UMTS Master.
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 48, 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 48, 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.

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 UMTS Master.
3. Connect the external power supply (Anritsu part number 40-168) to the UMTS Master.
4. Press the **On/Off** key to turn on the UMTS Master.
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 UMTS Master Service Mode (Figure 1).

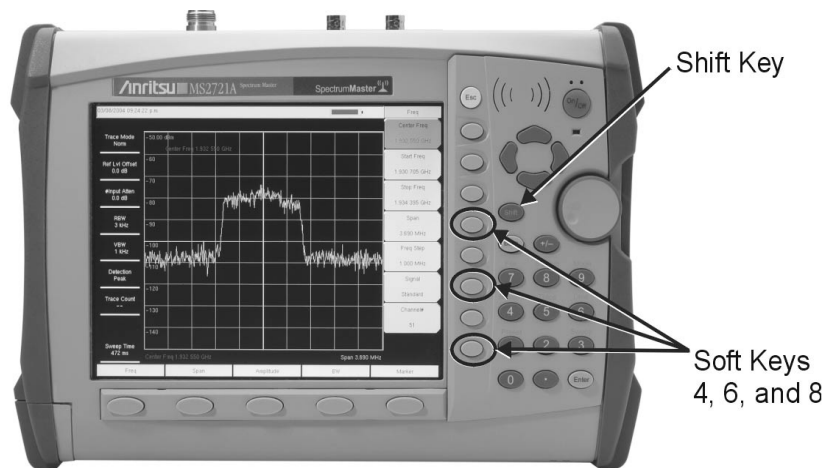


Figure 1. MT8220A UMTS Master Service Key Sequence

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 UMTS Master 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 UMTS Master.

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 UMTS Master.
3. Connect the external power supply (Anritsu part number 40-168) to the UMTS Master.
4. Press the **On/Off** key to turn on the UMTS Master.
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 indicator on the left side of the display shows 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 from the dB value shown on the marker readout to convert the value to dBc/Hz (for example, if the marker reads -80 dB, the value becomes -110 dBc/Hz). Record the dBc/Hz value in the test records in Appendix A, Spectrum Analyzer SSB Phase Noise Verification.
24. Repeat Steps 22 and 23 for 20 kHz marker delta, 30 kHz marker delta and 100 kHz marker delta.

Spectrum Analyzer Spurious Response (Second Harmonic Distortion)

The following test can be used to verify the input related spurious response of the UMTS Master.

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 UMTS Master RF Input with the coaxial cable.
3. Connect the external power supply (Anritsu part number 40-168) to the UMTS Master.
4. Press the **On/Off** key to turn on the UMTS Master.
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 48, 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 48, Spectrum Analyzer Spurious Response (Second Harmonic Distortion).
31. Calculate the Second Harmonic Level in dBc using the following formula:
Second Harmonic Level (dBc) = Amplitude @ 100.2 MHz - Amplitude @ 50.1 MHz
32. Record the calculated dBc value in the "2nd Harmonic Distortion" box in the test record and verify that it is -50 dBc or better.

Spectrum Analyzer Residual Spurious Response

The following test can be used to verify the residual spurious response of the UMTS Master. 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

Procedure:

1. Connect the 50 Ohm termination to the UMTS Master RF Input.
2. Connect the external power supply (Anritsu part number 40-168) to the UMTS Master.
3. Press the **On/Off** key to turn on the UMTS Master.
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 48, 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 start and stop frequencies. Change RBW and VBW settings as indicated in the test record.

Residual Spurious Test with Preamp On

Procedure:

1. Connect the 50 Ohm termination to the UMTS Master RF Input.
2. Connect the external power supply (Anritsu part number 40-168) to the UMTS Master.
3. Press the **On/Off** key to turn on the UMTS Master.
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 49, 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 UMTS Master. This test is performed using the RMS detection mode with Pre-Amp on and then with Pre-Amp off.

Procedure:

1. Connect the 50 Ohm termination to the UMTS Master RF Input.
2. Connect the external power supply (Anritsu part number 40-168) to the UMTS Master.
3. Press the **On/Off** key to turn on the UMTS Master.
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 and set the Reference Level to -50 dBm.
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. Press the **BW** soft key and set RBW to 100 kHz
14. Wait until one sweep has completed.
15. Press the **Marker** key.
16. Select the **Peak Search** soft key.
17. Record the Marker reading for the 10 MHz to 1.0 GHz band in the Measured column of the test record in Appendix A, Spectrum Analyzer DANL.
18. Repeat measurement Steps 15 through 17 for all frequency bands on the chart in the test records.
19. Convert each measured 100 kHz value in the chart, to 10 Hz RBW value by subtracting 40 dB. For example, if the marker shows a value of -100 dBm at 100 kHz RBW, the calculated value at 10 Hz RBW is -140 dBm. Enter the calculated values on the test record and verify that the calculated values meet the specifications.
20. Press the **Amplitude** soft key.
21. Set the Reference Level to -20 dBm and set the Pre Amp to Off.
22. Repeat steps 15 through 19 for the Pre Amp off measurements.
23. Enter the computed 10 Hz RBW values on the test record.

Input Related Spurious (IRS) Signals

The following test can be used to verify the input related spurious signals of the UMTS Master at different frequencies.

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 UMTS Master 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 UMTS Master.
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.

1674 MHz Input Related Spurious Check:

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 50, Amplitude Reading at 1674 MHz _____ dBc.
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 50, Amplitude Reading at 1674 MHz _____ dBc.
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.

1701 MHz Input Related Spurious Check:

26. Set the MG3692A output to 1701 MHz, with an RF output level of –30 dBm.
27. On the UMTS Master, 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 50, Amplitude Reading at 1701 MHz
_____ dBc.
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 50, Amplitude Reading at 1701 MHz
_____ dBc.
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).

2145 MHz Input Related Spurious Check:

46. Set the MG3692A output to 2145 MHz, with an RF output level of -30 dBm.
47. On the UMTS Master, 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 50, Amplitude Reading at 2145 MHz
_____ dBc.
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 50, Amplitude Reading at 2145 MHz
_____ dBc.
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 UMTS Master at different frequencies.

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 UMTS Master RF Input.
3. Connect the external power supply (Anritsu part number 40-168) to the UMTS Master.
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 50, 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 50, 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 50, 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 UMTS Master 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

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).

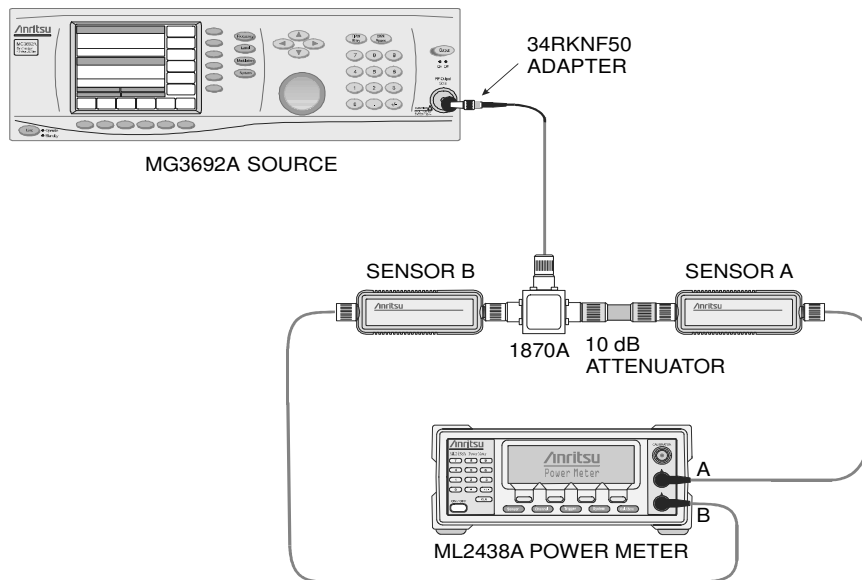


Figure 2. Level Accuracy Across Frequency Test Pre-test Setup

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 51, 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 51, 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 51, 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 MT8220A as shown in Figure 3.

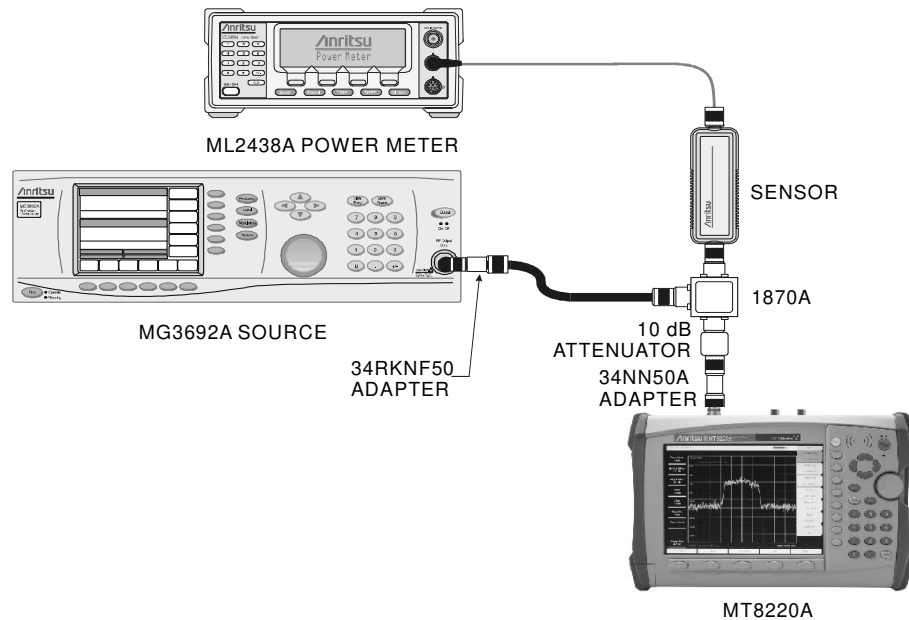


Figure 3. Level Accuracy Across Frequency Test Setup

2. Connect the external power supply (Anritsu part number 40-168) to the UMTS Master.
3. Press the **On/Off** key to turn on the UMTS Master.
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 51, 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 51, 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 51, 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

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 51, 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 51, 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 UMTS Master 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 UMTS Master.
5. On the UMTS Master, 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 51, 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 52, 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 52, Measuring the Unit for Accuracy vs. Input Power Level.
19. Repeat Steps 12 through 18 for the other power level settings.

GPS Option Verification (Option 31)

The following test verifies the GPS option in the MT8220A UMTS Master.

Procedure:

1. Connect the GPS antenna to the GPS Antenna connector on the MT8220A.

Note If no fixed GPS antenna is available, the Anritsu 2000-1410 GPS antenna can be used for this test. Ensure that the Anritsu 2000-1410 GPS antenna is in a direct line-of-sight relationship to the satellites or the antenna must be placed outside without any obstructions.

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

Note If GPS fix is acquired using the Anritsu 2000-1410 GPS antenna placing outside, bringing the instrument inside will lose satellite tracking. A red cross will appear on the green GPS indicator and the Reference Source indicator will change to Int Hi Accy. The following steps will verify frequency accuracy to a lesser specification.

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

Note Do not connect the external 10 MHz Reference to the MT8220A.

7. Connect the output of the synthesized Signal Generator to the Spectrum Analyzer RF In of the MT8220A.
8. On the MT8220A, change the Mode to **Spectrum Analyzer**. Preset the unit.
9. Set the MG3692x output to 7 GHz CW, with an RF output level of -30 dBm.
10. On the MT8220A, press the **Amplitude** soft key, and set the **Reference Level** to -10 dBm.
11. Press the **Freq** soft key and set the **Center Freq** to 7.0 GHz.
12. Press the **Span** soft key, set the **Span** to 10 kHz.
13. Press the **BW** soft key and set **RBW** to 100 Hz.
14. Press the **VBW** soft key and set to 30 Hz.
15. Press the **Marker** key, and select the **Peak Search** soft key.
16. Record the marker frequency in the "Measured Value" column of the chart on page 52 of Appendix A.
17. Subtract the marker value from 7 GHz and record the result to the "Error" column of the chart on page 52 of Appendix A and verify it is within specification.

GSM/GPRS/EDGE Signal Analyzer Option Verification (Options 40 and/or 41)

The tests in this section verify the optional GSM/GPRS/EDGE Signal Analyzer functions in the MT8220A.

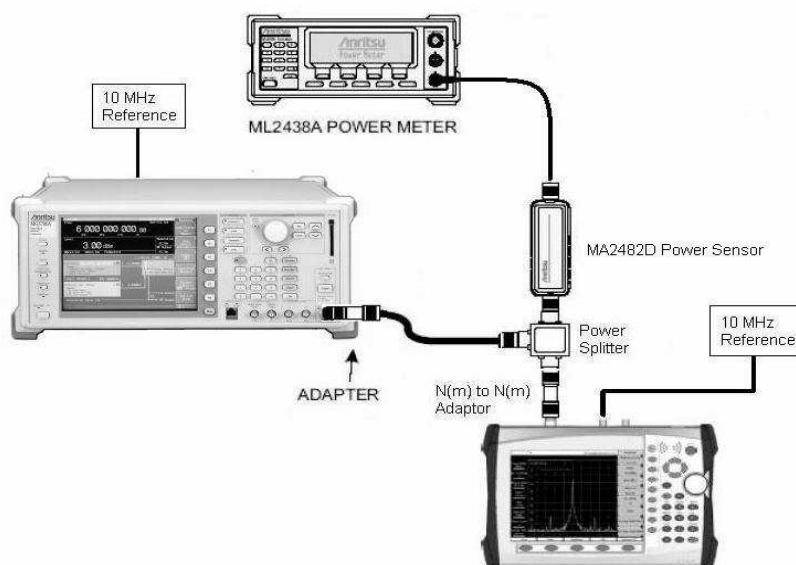


Figure 4. GSM/GPRS/EDGE Signal Analyzer Option Verification Setup

Set up Procedure:

1. Connect the equipment as shown in Figure 4.
2. Calibrate the power sensor prior to connecting it to the power splitter.
3. On the power meter, press the Sensor key, the Cal Factor soft key, and then the Freq soft key. Use the keypad to enter 850 MHz as the input signal frequency, which sets the power meter to the proper power sensor cal factor. Press the System key to display the power reading.
4. Set the MT8220A mode to GSM/GPRS/EDGE Signal Analyzer. Preset the unit.

GSM Burst Power, Frequency Error and Phase Error Tests

Test Procedure:

1. On the MG3700A, press the Preset key (yellow key on the upper left hand side).
2. Press the Down Arrow key or turn the knob to select Yes.
3. Press the Set key (There are two Set keys and they both do the same thing).
4. Press the (F1) soft key to select "Load File to Memory."
5. Press the (F1) soft key again to select "Select Package."
6. Using the Down Arrow key step through the selection list until the "GSM" option is highlighted.
7. Press the Set key.
8. Press the (F6) soft key "Return"
9. Press the Set key. The "Select Package" box will appear. Use the rotary knob to highlight "GSM" and press the Set key to select.
10. Another File List will appear. Use the rotary knob to select "GsmBurst_1slot" and press the Set key to select.
11. Press the MOD On/Off key to turn the Modulation LED on and verify the "Playing" indicator in the center of the LCD is flashing.
12. Press the Frequency key, enter 850 MHz.

13. Press the Level key, enter -10 and press the dBm soft key.
14. Adjust the MG3700A output so that the power meter reads $-10 \text{ dBm} \pm 0.2 \text{ dB}$.
15. On the MT8220A, press the Frequency soft key and enter 850 MHz as the Center Frequency.
16. Press the Measurements soft key and select GSM/EDGE Summary (a red dot will appear on the key label).
17. For an MT8220A with Option 40 (GSM/GPRS/EDGE RF Measurements), subtract the displayed Burst Power value from the power meter reading in step 14. Then record the calculated Burst Power error and the displayed value of Freq Error to the "At 850 MHz, -10 dBm Level, TCH Pattern" chart on the test record in Appendix A.
18. For an MT8220A with Option 41 (GSM/GPRS/EDGE Demodulator), record the displayed Phase Err RMS (deg) to the "At 850 MHz, -10 dBm Level, TCH Pattern" chart on the test record in Appendix A.
19. Verify that the measured values in step 17 or step 18 are within specifications.
20. On the MG3700A, change the selected signal pattern to "GsmBurst_8slot."
21. Adjust the Level of the MG3700A so that the power meter reads $-50 \text{ dBm} \pm 0.2 \text{ dB}$. Then wait 15 seconds to allow the MT8220A to update its measured results.
22. For an MT8220A with Option 40 (GSM/GPRS/EDGE RF Measurements), subtract the displayed Burst Power value from the power meter reading in step 21. Then record the calculated Burst Power error and the displayed value of Freq Error to the "At 850 MHz, -50 dBm Level, TCH ALL Pattern" chart on the test record in Appendix A.
23. For an MT8220A with Option 41 (GSM/GPRS/EDGE Demodulator), record the displayed Phase Err RMS (deg) to the "At 850 MHz, -50 dBm Level, TCH ALL Pattern" chart on the test record in Appendix A.
24. Verify that the measured values in step 22 or step 23 are within specifications.
25. Change the frequency of MG3700A to 1800 MHz.
26. On the power meter, press the Sensor key, the Cal Factor soft key, and then the Freq soft key. Use the keypad to enter 1800 MHz as the input signal frequency, which sets the power meter to the proper power sensor cal factor. Press the System key to display the power reading.
27. Adjust the level of the MG3700A so that the power meter reads $-10 \text{ dBm} \pm 0.2 \text{ dB}$.
28. On the MT8220A, set the Center Freq to 1800 MHz and wait 15 seconds to allow the MT8220A to update the measured results.
29. For an MT8220A with Option 40 (GSM/GPRS/EDGE RF Measurements), subtract the displayed Burst Power value from the power meter reading in step 27. Then record the calculated Burst Power error and the displayed value of Freq Error to the "At 1800 MHz, -10 dBm Level, TCH ALL Pattern" chart on the test record in Appendix A.
30. For an MT8220A with Option 41 (GSM/GPRS/EDGE Demodulator), record the displayed Phase Err RMS (deg) to "At 1800 MHz, -10 dBm Level, TCH ALL Pattern" chart on the test record in Appendix A.
31. Verify that the measured values in step 29 or step 30 are within specifications.
32. On the MG3700A, change the selected pattern to "GsmBurst_1slot."
33. Adjust the level of the MG3700A so that the power meter reads $-50 \text{ dBm} \pm 0.2 \text{ dB}$. Then wait 15 seconds to allow the MT8220A to update its measured results.
34. For an MT8220A with Option 40 (GSM/GPRS/EDGE RF Measurements), subtract the displayed Burst Power value from the power meter reading in step 33. Then record the calculated Burst Power error and the displayed value of Freq Error to the "At 1800 MHz, -50 dBm, TCH Pattern" chart on the test record in Appendix A.
35. For an MT8220A with Option 41 (GSM/GPRS/EDGE Demodulator), record the displayed Phase Err RMS (deg) to "At 1800 MHz, -50 dBm, TCH Pattern" chart on the test record in Appendix A.
36. Verify that the measured values in step 34 or step 35 are within specifications.

EDGE Burst Power, Frequency Error and Residual Error Tests

Test Procedure:

1. Ensure that the equipment settings are unchanged from the previous test.
2. On the MG3700A, change the selected pattern to "DL_MCS-9_1SLOT."
3. Adjust the level of the MG3700A so that the power meter reads $-50 \text{ dBm} \pm 0.2 \text{ dB}$. Then wait 15 seconds to allow the MT8220A to update its measured results.
4. For an MT8220A with Option 40 (GSM/GPRS/EDGE RF Measurements), subtract the displayed Burst Power value from the power meter reading in step 3. Then record the calculated Burst Power error and the displayed value of Freq Error to the "At 1800 MHz, -50 dBm Level, DL_MCS-9_1SLOT Pattern" chart on the test record in Appendix A.
5. For an MT8220A with Option 41 (GSM/GPRS/EDGE Demodulator), record the displayed EVM(rms) to the "At 1800 MHz, -50 dBm Level, DL_MCS-9_1SLOT Pattern" chart on the test record in Appendix A.
6. Verify that the measured values in step 4 or step 5 are within specifications.
7. On the MG3700A, change the selected pattern to "DL_MCS-9_4SLOT."
8. Adjust the level of the MG3700A so that the power meter reads $-10 \text{ dBm} \pm 0.2 \text{ dB}$. Then wait 15 seconds to allow the MT8220A to update its measured results.
9. For an MT8220A with Option 40 (GSM/GPRS/EDGE RF Measurements), subtract the displayed Burst Power value from the power meter reading in step 8. Then record the calculated Burst Power error and the displayed value of Freq Error to the "At 1800 MHz, -10 dBm Level, DL_MCS-9_4SLOT Pattern" chart on the test record in Appendix A.
10. For an MT8220A with Option 41 (GSM/GPRS/EDGE Demodulator), record the displayed EVM(rms) to the "At 1800 MHz, -10 dBm Level, DL_MCS-9_4SLOT Pattern" chart on the test record in Appendix A.
11. Verify that the measured values in step 9 or step 10 are within specifications.
12. Change the frequency of MG3700A to 850 MHz.
13. On the power meter, press the Sensor key, the Cal Factor soft key, and then the Freq soft key. Use the keypad to enter 850 MHz as the input signal frequency, which sets the power meter to the proper power sensor cal factor. Press the System key to display the power reading.
14. Adjust the level of the MG3700A so that the power meter reads $-50 \text{ dBm} \pm 0.2 \text{ dB}$.
15. On the MT8220A, set the Center Freq to 850 MHz. Then wait 15 seconds to allow the MT8220A to update its measured results.
16. For MT8220A with Option 40 (GSM/GPRS/EDGE RF Measurements), record the displayed values of Burst Power and Freq Error to -50 dBm Level Burst Power and Freq Error, 850 MHz DL_MCS-9_4SLOT Pattern on the test record in Appendix A.
17. For MT8220A with Option 41 (GSM/GPRS/EDGE Demodulator), record the displayed EVM(rms) to -50 dBm Level EVM(rms), 850 MHz DL_MCS-9_4SLOT Pattern on the test record in Appendix A.
18. Verify that the measured values in step 9 or step 10 are within specifications.
19. On the MG3700A, change the selected pattern to "DL_MCS-9_1SLOT."
20. Adjust the level of the MG3700A so that the power meter reads $-10 \text{ dBm} \pm 0.2 \text{ dB}$. Then wait 15 seconds to allow the MT8220A to update its measured results.
21. For MT8220A with Option 40 (GSM/GPRS/EDGE RF Measurements), record the displayed values of Burst Power and Freq Error to -10 dBm Level Burst Power and Freq Error, 850 MHz DL_MCS-9_1SLOT Pattern on the test record in Appendix A.
22. For MT8220A with Option 41 (GSM/GPRS/EDGE Demodulator), record the displayed EVM(rms) to -10 dBm Level EVM(rms), 850 MHz DL_MCS-9_1SLOT Pattern on the test record in Appendix A.
23. Verify that the measured values in step 21 or step 22 are within specifications.

WCDMA/HSDPA RF Measurements (Option 44) Verification

The tests in this section can be used to verify the functionality of the WCDMA/HSDPA RF Measurements Option.

- WCDMA Absolute Power Accuracy Verification
- WCDMA Occupied Bandwidth (OBW) Verification
- WCDMA RF Channel Power Accuracy and Adjacent Channel Leakage Ratio (ACLR) Verification
- HSDPA RF Channel Power Accuracy and Adjacent Channel Leakage Ratio (ACLR) Verification

WCDMA Absolute Power Accuracy Verification

This test verifies the absolute power accuracy in WCDMA Mode.

Procedure:

1. Connect the MG3700A, RF power amplifier, attenuator, power meter, and MA2482D sensors as shown in Figure 5.

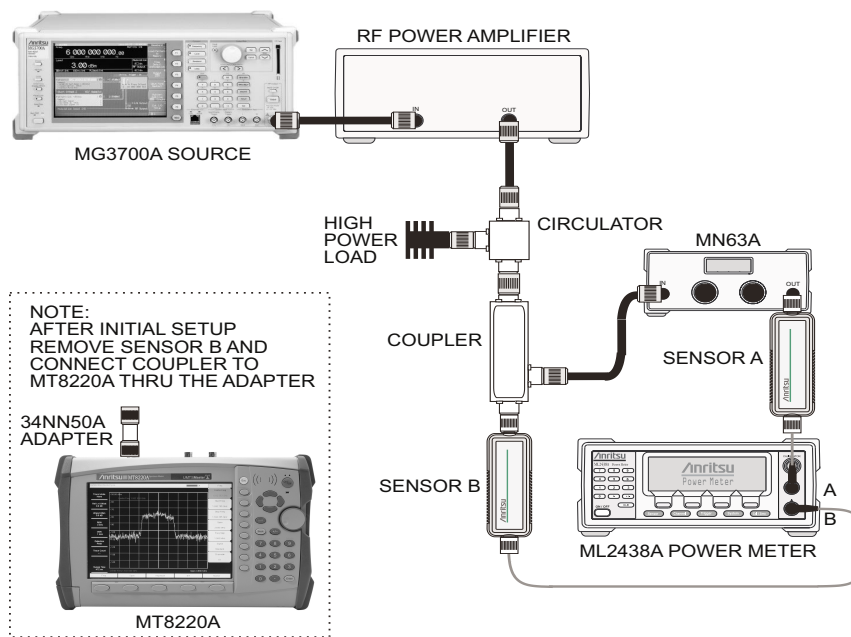


Figure 5. W-CDMA Absolute Power Accuracy Test Setup

2. Turn on the MG3700A, RF amplifier, attenuator and the power meter.
3. Connect the power sensors to the power meter and calibrate the sensors.
4. Set the mode of the MT8220A to WCDMA/HSDPA Signal Analyzer. Preset the unit.
5. On the MG3700A, press the Preset key (yellow key on the upper left hand side).
6. Press the Down Arrow key to select Yes.
7. Press the Set key (Note: There are two Set keys and they both do the same thing).
8. Press the (F1) soft key to select "Load File to Memory."
9. Press the (F1) soft key again to select "Select Package."
10. Using the Down Arrow key step through the selection list until the "W-CDMA(BS Tx test)" option is highlighted. Ensure that you have not highlighted "W-CDMA(BS Rx test)".
11. Press the Set key.
12. Press the (F6) soft key "Return."
13. Press the Set key. The "Select Package" box will appear. Again select the "W-CDMA(BS Tx test)" and Set.
14. Another File List will appear. Select "TestModel_1_16DPCH."

15. Press the Set key.
16. Press the MOD On/Off key and verify that the LED is on. Ensure that the "playing" indicator lights are moving.
17. Press the Frequency key and enter 881.5 MHz.
18. Press the Level key, enter -28 and press the dBm soft key. Turn the RF on.
19. Use the knob to adjust the power level so sensor B reads +10.00 dBm.
20. Set the MN63A attenuator to 0 dB.
21. Record the sensor A reading (PMA.10) in the chart at the end of this section. Refer to the "Example Values" chart for typical correct values.
22. Record the sensor B reading (PMB.10) in the chart at the end of this section.
23. Calculate $\Delta 1$ which is the error of the coupler output port deviation from ideal +10 dBm using the following formula: $\Delta 1 \text{ (dBm)} = (10 \text{ dBm} - \text{PMB}.10)$
24. Record the $\Delta 1$ value in the chart at the end of this section.
25. Calculate the accurate value of sensor A reading for coupler port output of +10 dBm (PMA.10C) using the following formula: $\text{PMA}.10\text{C} = \text{PMA}.10 + \Delta 1$
26. Record the calculated value of PMA.10C in the chart at the end of this section.
27. Set the MN63A attenuator to 18 dB and record sensor A reading (PMA.18) in the chart at the end of this section.
28. Calculate the accurate attenuation value using the following formula: $\text{ATT}.18 = (\text{PMA}.10 - \text{PMA}.18)$
29. Record the calculated value of ATT.18 in the chart at the end of this section.
30. Turn off the RF output of the MG3700A.
31. Disconnect sensor B from the coupler and connect the open end of the coupler to the MT8220A.
32. Set the MN63A attenuator to 0 dB.
33. On the MT8220A press the **Center Freq** soft key, enter 881.5 MHz.
34. Press the **Measurements** soft key, then the **RF Measurement** soft key, then the **Channel Spectrum** soft key.
35. On the MG3700A turn on the RF output and use the knob to adjust power level so that sensor A reads the value of PMA.10C.
36. Record the MG3700A power level setting (MG3700A.10) in the chart at the end of this section.
37. On the MT8220A press the **Amplitude** key and then press the **Adjust Range** soft key.
38. Record the measured Channel Power (dBm) reading in the +10 dBm row of "Measured Power" column of the Absolute Power Accuracy test record in Appendix A.
39. Use the following formula to calculate the error at +10 dBm: $\text{Error} = \text{Measured Power} - 10$
40. Record the calculated error value in the + 10 dBm row of the "Error" column of the Absolute Power Accuracy Test Table and verify that it is within specification.
41. Turn off the RF output of the MG3700A.
42. Set the MN63A attenuator to 18 dB.
43. Calculate the value of the MG3700A setting (MG3700A.28) for +28 dBm Test Level using the following formula: $\text{MG3700A}.28 = \text{MG3700A}.10 + \text{ATT}.18$
44. Record the calculated value of MG3700A.28 in the chart at the end of this section.
45. On the MG3700A turn on the RF output and use the knob to adjust power level to the recorded MG3700A.28 value.
46. On the MT8220A press the **Amplitude** key and then press the **Adjust Range** soft key.
47. Record the measured Channel Power (dBm) reading in the +28 dBm row of the "Measured Power" column of Absolute Power Accuracy Test in the test record in Appendix A.
48. Use the following formula to calculate the absolute power accuracy of the MT8220A at +28 dBm: $\text{Error} = \text{Measured Power} - 28$

49. Record the calculated error value in the +28 dBm row of the "Error" column of the Absolute Power Accuracy Test Table and verify that it is within specification.
50. Turn off the RF output of the MG3700A.
51. Set the MN63A attenuator to 0 dB.
52. Set power level of the MG3700A to -38 dBm and turn on the RF Output.
53. Calculate the value of sensor A reading (PMA-10) for -10 dBm Test Level using the following formula: $PMA-10 = PMA.10C - 20$
54. Record the calculated value of PMA-10 in the chart at the end of this section.
55. Turn on the RF output and use the knob to adjust power level to read the value of PMA-10 on sensor A.
56. On the MT8220A press the **Amplitude** key and then press the **Adjust Range** soft key.
57. Record the measured Channel Power (dBm) reading in the -10 dBm row of "Measured Power" column of the Absolute Power Accuracy Test in the test record.
58. Use the following formula to calculate the absolute power accuracy of the MT8220A at -10 dBm: $Error = Measured\ Power - (-10)$
59. Record the calculated error value in the -10 dBm row of the "Error" column of the Absolute Power Accuracy Test Table and verify that it is within specification.
60. Turn off the RF output of the MG3700A.
61. Set the MN63A attenuator to 0 dB.
62. Decrease power level of the MG3700A by 10 dB.
63. Calculate the value of sensor A reading (PMA-20) for -20 dBm Test Level using the following formula: $PMA-20 = PMA.10C - 30$
64. Record the calculated value of PMA-20 in the chart at the end of this section.
65. Turn on the RF output and use the knob to adjust power level to read the value of PMA-20 on sensor A.
66. On the MT8220A press the **Amplitude** key and then press the **Adjust Range** soft key.
67. Record the measured Channel Power (dBm) reading in the -20 dBm row of the "Measured Power" column of the Absolute Power Accuracy Test on the test record.
68. Turn off the RF output of the MG3700A.
69. Use the following formula to calculate the absolute power accuracy of MT8220A at -20 dBm: $Error = Measured\ Power - (-20)$
70. Record the calculated error value in the -20 dBm row of the "Error" column of the Absolute Power Accuracy Test in the test record and verify that it is within specification.

Example Values:

PMA.10	PMB.10	$\Delta 1$	PMA.10C	PMA.18	ATT.18
-22.6	10.0	0.0	-22.6	-40.5	17.9
MG3700A.10	MG3700A.28	PMA-10	PMA-20		
-30.9	-13.0	-42.6	-52.6		

Actual Values:

PMA.10	PMB.10	$\Delta 1$	PMA.10C	PMA.18	ATT.18
MG3700A.10	MG3700A.28	PMA-10	PMA-20		

WCDMA Occupied Bandwidth (OBW) Verification

The tests in this section can be used to verify the occupied bandwidth in the WCDMA Mode.

Procedure:

1. Connect the MA2482D power sensor to the power meter and calibrate the sensor.
2. Connect the MG3700A, splitter, attenuator, power meter, and sensor to the Spectrum Analyzer RF In as shown on Figure 6.

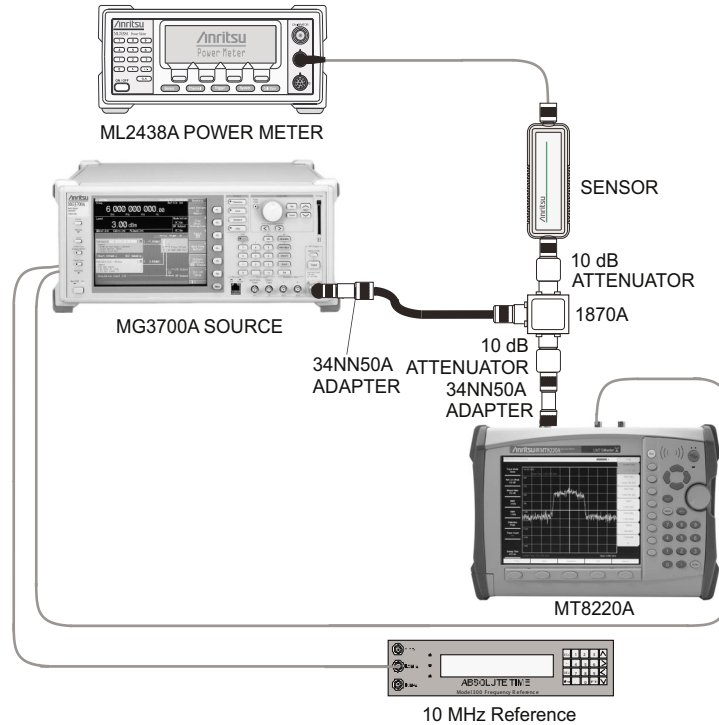


Figure 6. W-CDMA Occupied Bandwidth Test Setup

3. Ensure that the MT8220A is set to WCDMA/HSDPA Signal Analyzer mode. Preset the unit.
4. On the MG3700A, press the Preset key (yellow key on the upper left hand side).
5. Press the Down Arrow key to select Yes.
6. Press the Set key (Note: There are two Set keys and they both do the same thing).
7. Press the (F1) soft key to select "Load File to Memory"
8. Press the (F1) soft key again to select "Select Package"
9. Using the Down Arrow key step through the selection list until the "W-CDMA(BS Tx test)" option is highlighted. Ensure that you have not highlighted "W-CDMA(BS Rx test).
10. Press the Set key.
11. Press the (F6) soft key "Return."
12. Press the Set key. The "Select Package" list box will appear. Again select the W-CDMA(BS Tx test) and Set.
13. Another file list will appear. Select (highlight) "TestModel_1_16DPCH."
14. Press the Set key.
15. Press the MOD On/Off key and verify that the Modulation LED is on. Ensure that the "playing" indicator lights are moving.
16. Press the Frequency key, then enter 881.5 MHz.
17. Press the Level key, then enter -2 dBm. Turn the RF output on.

18. Use the knob to adjust the power level so the power meter reads -20 dBm, record the reading in the "Power Meter Reading" column of the test record in Appendix A.
19. On MT8220A press the **Center Frequency** soft key, enter 881.5 MHz.
20. Press the **Measurements** soft key, then the **RF Measurement** soft key and select **Channel Spectrum** soft key.
21. Press the **Amplitude** key, then press the **Adjust Range** soft key.
22. Record the Occ BW reading in the "OBW" column of the test record in Appendix A and verify that it is within specification.
23. Repeat Steps 16 to 22 for 1962.5 MHz, then repeat again for 2680.5 MHz.

WCDMA RF Channel Power Accuracy and Adjacent Channel Leakage Ratio (ACLR) Verification

The tests in this section verify the RF Channel Power Accuracy and ACLR Accuracy in the WCDMA Mode.

Procedure:

1. Connect the MA2482D power sensor to the power meter and calibrate the sensor.
2. Connect the MG3700A, splitter, attenuators, power meter, and sensor to the Spectrum Analyzer RF In as shown on Figure 6.
3. Ensure that the MT8220A is set to WCDMA/HSDPA Signal Analyzer mode. Preset the unit
4. On the MG3700A, press the Preset key (Yellow key on the upper left hand side).
5. Press the Down Arrow key to select Yes.
6. Press the Set key (Note: There are two Set keys and they both do the same thing).
7. Press the (F1) soft key to select "Load File to Memory."
8. Press the (F1) soft key again to select "Select Package."
9. Using the Down Arrow key step through the selection list until the "W-CDMA(BS Tx test)" option is highlighted. Ensure you have not highlighted "W-CDMA(BS Rx test)."
10. Press the Set key.
11. Press the (F6) soft key "Return."
12. Press the Set key. The "Select Package" list box will appear. Again select "W-CDMA(BS Tx test)" and Set.
13. Another file list box will appear. Select "TestModel_1_16DPCH."
14. Press the Set key.
15. Press the MOD On/Off key and verify that the Modulation LED is on. Ensure that the "playing" indicator lights are moving.
16. Press the Frequency key, then enter 881.5 MHz.
17. Press the Level key, then enter -2 dBm. Turn the RF on.
18. Use the knob to adjust the power meter to read -20 dBm and record the Power Meter reading in the "Power Meter Reading" column of the WCDMA RF Channel Power Accuracy Table.
19. On the MT8220A press the **Center Frequency** soft key, enter 881.5 MHz.
20. Press the **Measurements** soft key, then the **RF Measurement** soft key and select **ACLR**.
21. Press the **Amplitude** key, then press the **Adjust Range** soft key.
22. Record the measured CH 1 power (dBm value) in the Measured RF Channel Power column of the test record.
23. Calculate the RF Channel Power Accuracy using the following formula: RF Channel Power Accuracy (dB) = Measured RF Channel Power - 0.246 - Power Meter reading
24. Record the calculated value in the "RF CH Power Accuracy" column in the test record in Appendix A and verify that it is within specifications.
25. Record all four 881.5 MHz Measured Residual Adjacent Channel Leakage Ratios in dB at -10 MHz Offset, -5 MHz Offset, 5 MHz Offset and 10 MHz Offset in the test record in Appendix A.

26. Calculate the ACLR Accuracy at -10 and 10 MHz Offset using the following formula: ACLR Accuracy at -10 or 10 MHz Offset = $10 \text{ LOG}_{10}(10^{(-50/10)} + 10(\text{Measured_Residual_ACLR}/10)) - (-50) \text{ dB}$
27. Record the calculated results in the corresponding cells in the "Calculated ACLR Accuracy" column and verify that it is within specification.
28. Calculate the ACLR Accuracy at 5 MHz Offset using the following formula: ACLR Accuracy at -5 or 5 MHz Offset = $10 \text{ LOG}_{10}(10^{(-45/10)} + 10(\text{Measured_Residual_ACLR}/10)) - (-45) \text{ dB}$
29. Record the calculated results in the corresponding (881.5 MHz) cells in the "Calculated ACLR Accuracy" column and verify that it is within specification.
30. Repeat Steps 16 to 29 for 1962.5 MHz and 2680.5 MHz.

HSDPA RF Channel Power Accuracy and Adjacent Channel Leakage Ratio (ACLR) Verification

The tests in this section can be used to verify the RF Channel Power Accuracy and ACLR for the HSDPA signal in the WCDMA Mode.

Procedure:

1. Connect the MA2482D power sensor to the power meter and calibrate the sensor.
2. Connect the MG3700A, splitter, attenuators, power meter, and sensor to the Spectrum Analyzer RF In as shown on Figure 6.
3. Ensure that the MT8220A is set to WCDMA/HSDPA Signal Analyzer mode. Preset the unit.
4. On the MG3700A, press the Preset key (Yellow key on the upper left hand side).
5. Press the Down Arrow key to select Yes.
6. Press the Set key (Note: There are two Set keys and they both do the same thing).
7. Press the (F1) soft key to select "Load File to Memory."
8. Press the (F1) soft key again to select "Select Package."
9. Using the Down Arrow key step through the selection list until the "W-CDMA(BS Tx test)" option is highlighted. Ensure that "W-CDMA(BS Rx test)" is not highlighted.
10. Press the Set key.
11. Press the (F6) soft key "Return."
12. Press the Set key. The "Select Package" file list box will appear. Again select "W-CDMA(BS Tx test)" and Set.
13. Another file list box will appear. Select "TestModel_5_8HSPDSCH."
14. Press the Set key.
15. Press the MOD On/Off key and verify that the Modulation LED is on. Ensure that the "playing" indicator lights are moving.
16. Press the Frequency key, then enter 2680.5 MHz.
17. Press the Level key, then enter -2 dBm. Turn the RF on.
18. Use the knob to adjust the power meter to read -20 dBm and record the Power Meter reading in the "Power Meter Reading" column of the test record.
19. On the MT8220A press the **Center Frequency** soft key, enter 2680.5 MHz.
20. Press the **Measurements** soft key, then the **RF Measurement** soft key and select ACLR.
21. Press the **Amplitude** key, then press the **Adjust Range** soft key.
22. Record the measured CH 1 power (dBm value) in the Measured RF Channel Power column of the test record.
23. Calculate the RF Channel Power Accuracy using the following formula: $\text{RF Channel Power Accuracy (dB)} = \text{Measured RF Channel Power} - 0.246 - \text{Power Meter reading}$
24. Record the calculated value in the "RF CH Power Accuracy" column in the test record and verify that it is within specifications.
25. Record all four measured Residual Adjacent Channel Leakage Ratios in dB at -10 MHz Offset, -5 MHz Offset, 5 MHz Offset and 10 MHz Offset in the test record.
26. Calculate the ACLR Accuracy at -10 and 10 MHz Offset using the following formula: $\text{ACLR Accuracy at -10 or 10 MHz Offset} = 10 \text{ LOG}_{10}(10(-50/10) + 10(\text{Measured_Residual_ACLR}/10)) - (-50) \text{ dB}$
27. Record the calculated results in the corresponding cells in the "Calculated ACLR Accuracy" column and verify that it is within specification.
28. Calculate the ACLR Accuracy at 5 MHz Offset using the following formula: $\text{ACLR Accuracy at -5 or 5 MHz Offset} = 10 \text{ LOG}_{10}(10(-45/10) + 10(\text{Measured_Residual_ACLR}/10)) - (-45) \text{ dB}$
29. Record the calculated results in the corresponding cells in the "Calculated ACLR Accuracy" column and verify that it is within specification.

Error Vector Magnitude (EVM) Verification (Options 45 or 65)

The tests in this section can be used to verify the functionality of the WCDMA and/or HSDPA Demodulator Options.

WCDMA EVM Test (For MT8220A with Option 45 or Option 65)

Procedure:

1. Connect the MA2482D power sensor to the power meter and calibrate the sensor.
2. Connect the MG3700A, splitter, attenuators, power meter, and sensor to the Spectrum Analyzer RF In as shown in Figure 6.
3. Ensure that the MT8220A is set to WCDMA/HSDPA Signal Analyzer mode. Preset the unit.
4. On the MG3700A, press the Preset key (Yellow key on the upper left hand side).
5. Press the Down Arrow key to select Yes.
6. Press the Set key (Note: There are two Set keys and they both do the same thing).
7. Press the (F1) soft key to select "Load File to Memory"
8. Press the (F1) soft key again to select "Select Package"
9. Using the Down Arrow key step through the selection list until the "W-CDMA(BS Tx test)" option is highlighted. Ensure you have not highlighted "W-CDMA(BS Rx test)".
10. Press the Set key.
11. Press the (F6) soft key "Return"
12. Press the Set key. The "Select Package" file list box will appear. Again select the "W-CDMA(BS Tx test)" and Set.
13. Another file list box will appear. Select "TestModel_4_opt."
14. Press the Set key.
15. Press the MOD On/Off key and verify that the Modulation LED is on. Ensure that the "playing" indicator lights are moving.
16. Press the Frequency key, and enter 1962.5 MHz.
17. Press the Level key, then enter -2 dBm. Turn the RF on.
18. Use the knob to adjust the power meter to read -20 dBm.
19. On the MT8220A, press Center Frequency, enter 1962.5 MHz key.
20. Press the Measurements soft key, then press the Demodulator soft key and select the Modulation Summary soft key.
21. Press the Setup soft key, then ensure the Scrambling Code is set to Auto.
22. Ensure the Max Spreading Factor is set to 512.
23. Press the **Amplitude** key, then press the Adjust Range soft key.
24. Record the EVM reading in the test record and verify that it is within specification.

HSDPA EVM Test (For MT8220A with Option 65)

Note The WCDMA EVM Test should be completed prior to starting this test.

Procedure:

1. On the MG3700A, press the Preset key (Yellow key on the upper left hand side).
2. Press the Down Arrow key to select Yes.
3. Press the Set key (Note: There are two Set keys and they both do the same thing).
4. Press the (F1) soft key to select "Load File to Memory."
5. Press the (F1) soft key again to select "Select Package."
6. Using the Down Arrow key step through the selection list until the "W-CDMA(BS Tx test)" option is highlighted. Ensure you have not highlighted "W-CDMA(BS Rx test)."
7. Press the Set key.
8. Press the (F6) soft key "Return."
9. Press the Set key. The "Select Package" file list box will appear. Again select the "W-CDMA(BS Tx test)" and Set.
10. Another file list box will appear. Select "TestModel_5_8HSPDSCH."
11. Press the Set key.
12. Press the MOD On/Off key and verify that the Modulation indicator on the display is on.
13. Press the Frequency key, then enter 1962.5 MHz.
14. Press the Level key, then enter -2 dBm. Turn the RF on.
15. Use the knob to adjust the power meter to read -20 dBm.
16. On the MT8220A, press the Center Frequency soft key, enter 1962.5 MHz.
17. Press the Measurements soft key, then press the Demodulator soft key and select the Modulation Summary soft key.
18. Press the Setup soft key, and ensure Scrambling Code is set to Auto.
19. Ensure the Max Spreading Factor is set to 512.
20. Press the **Amplitude** key, then press the Adjust Range soft key.
21. Record the EVM reading in the test record. Ensure the measurement is within specification.

5. Battery Information

The following information relates to the care and handling of the UMTS Master battery, and Lithium-Ion batteries in general.

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

6. Battery Pack Removal and Replacement

This section provides instructions for the removal and replacing the UMTS Master battery pack.

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

1. With the UMTS Master laying flat, face up, on a stable surface, locate the battery access door, as illustrated in Figure 7.



Figure 7. 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 8.

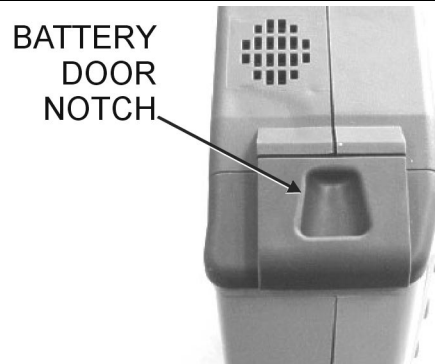


Figure 8. Battery Access Door Notch

3. Remove the battery access door, as illustrated in Figure 9.

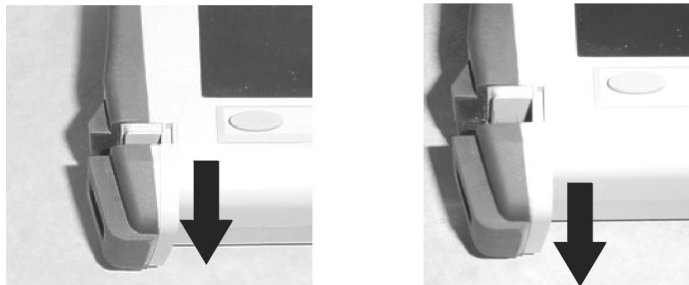


Figure 9. Removing the Battery Access Door

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 10.



Figure 10. 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 11.

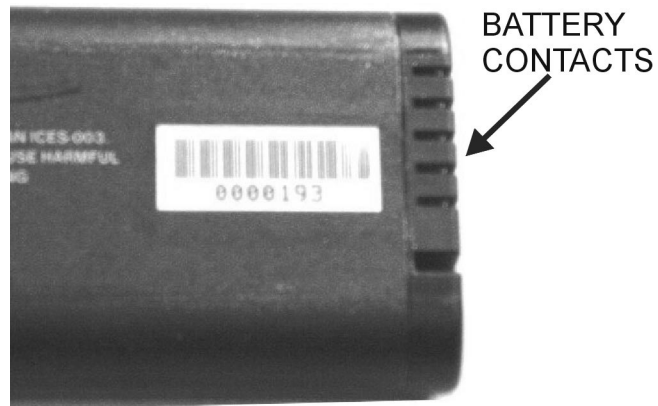


Figure 11. Battery Contacts

7. Opening the UMTS Master Case

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

1. Place the UMTS Master face down on a stable work surface.
2. Remove the battery door and battery as shown in on page 32, Battery Pack Removal and Replacement.
3. Use a Phillips screwdriver to remove the four screws securing the two halves of the UMTS Master case together (Figure 12).

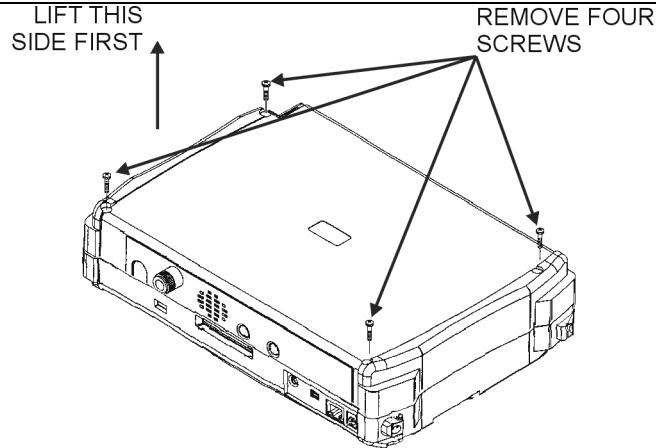


Figure 12. Removing the Cover Screws

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 13 and Figure 14 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 13).

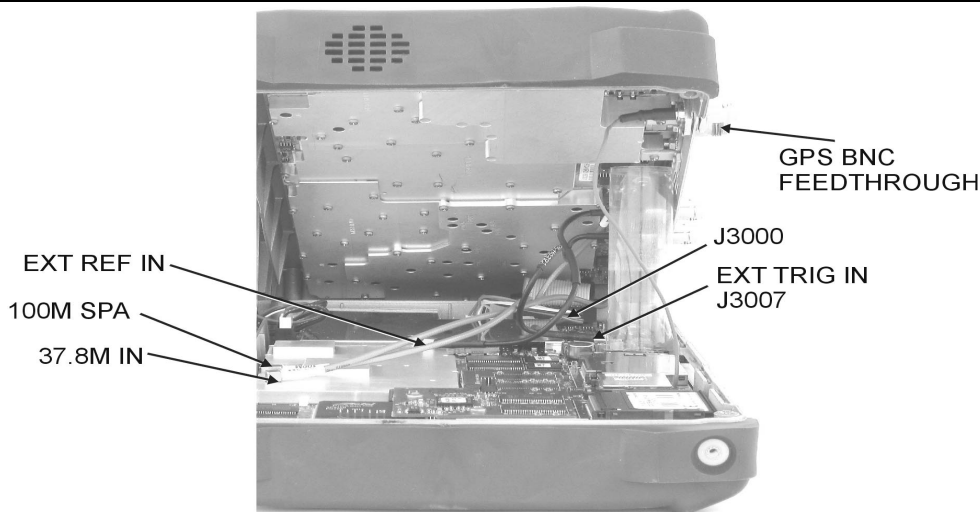


Figure 13. Front Panel Assembly Removal and Cable Connections

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 14).

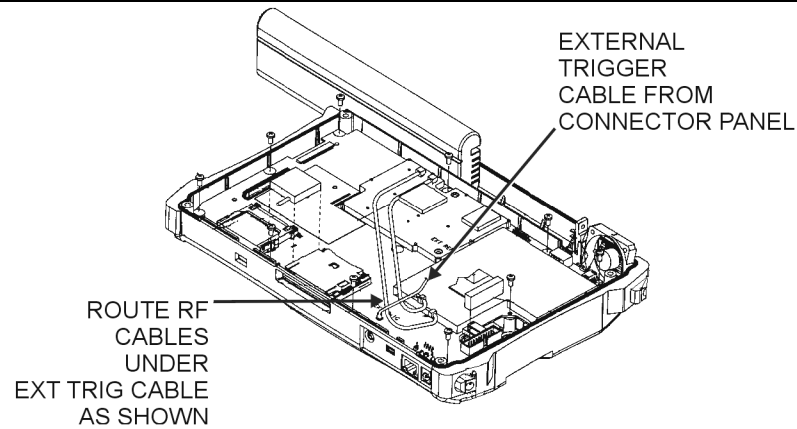


Figure 14. Cable Routing Diagram

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 34, Opening the UMTS Master Case.
2. Carefully remove the RTV from the battery (Figure 15).

REAL TIME CLOCK BATTERY

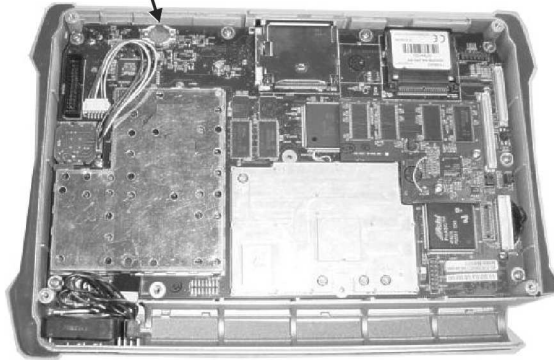


Figure 15. RTC Lithium Battery on the Main PCB

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 34, Opening the UMTS Master 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 16).

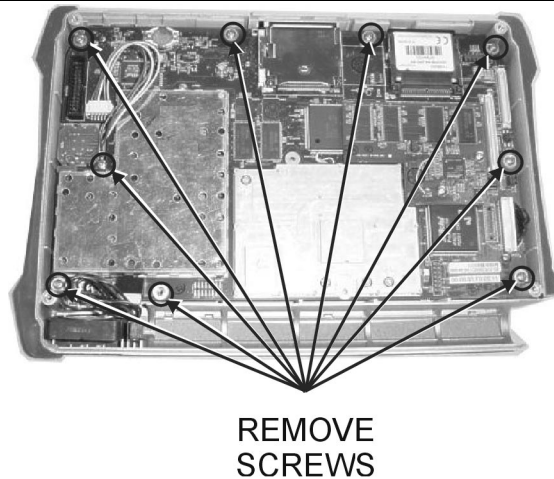


Figure 16. Main PCB Assembly Mounting Screws

5. Lift the bottom edge of the Main PCB assembly and disconnect the battery connector from J1001 on the main PCB (Figure 17).

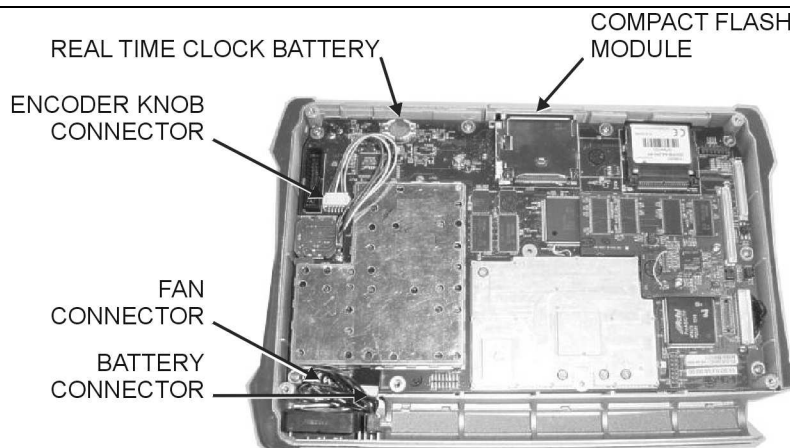


Figure 17. Main PCB Assembly Replacement

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 34, Opening the UMTS Master 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 18).

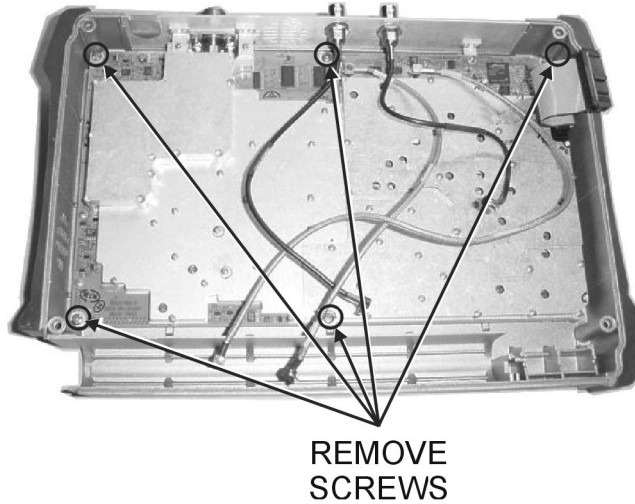


Figure 18. Spectrum Analyzer Module Removal

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 UMTS Master Case.

1. Remove the cover as directed in on page 34, Opening the UMTS Master Case.
2. Remove the Main PCB assembly from the front panel as directed in on page 37, Main PCB Assembly Replacement.
3. Use a Phillips screw driver to remove the four screws securing the LCD to the Main PCB assembly (Figure 19).

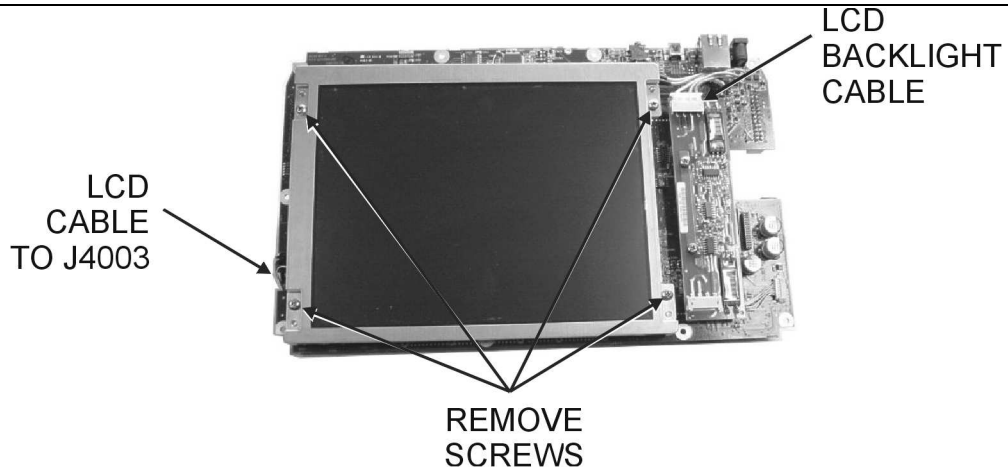


Figure 19. LCD Assembly Replacement

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 UMTS Master LCD backlight PCB.

1. Remove the cover as directed in on page 34, Opening the UMTS Master Case.
2. Remove the Main PCB assembly from the front panel as directed in on page 37, Main PCB Assembly Replacement.
3. Disconnect the LCD backlight cable from the LCD backlight PCB (Figure 20).

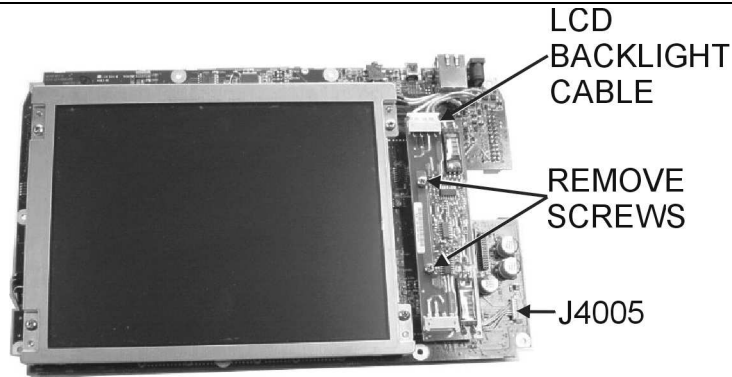


Figure 20. LCD Backlight PCB Removal and Replacement

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 UMTS Master 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 21).

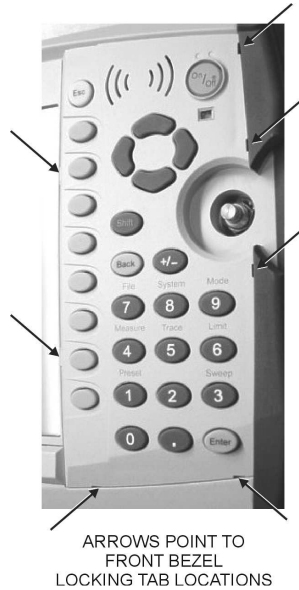


Figure 21. Front Panel Keypad Bezel

3. Remove the keypad membrane by carefully lifting the speaker and pulling the membrane off of the keypad PCB (Figure 22).

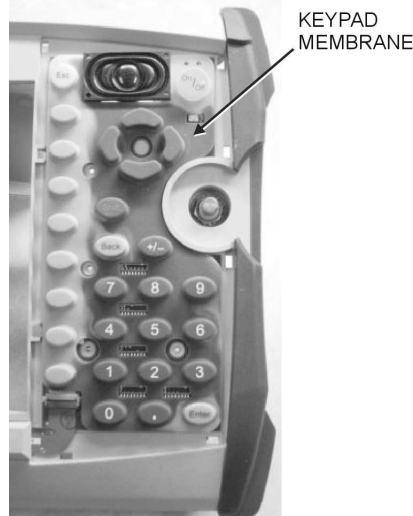


Figure 22. Keypad Membrane

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 23).



Figure 23. 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 UMTS Master case.

1. Place the instrument face up on a protected work surface.
2. Remove the keypad bezel and membrane as directed in on page 41, 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 24).

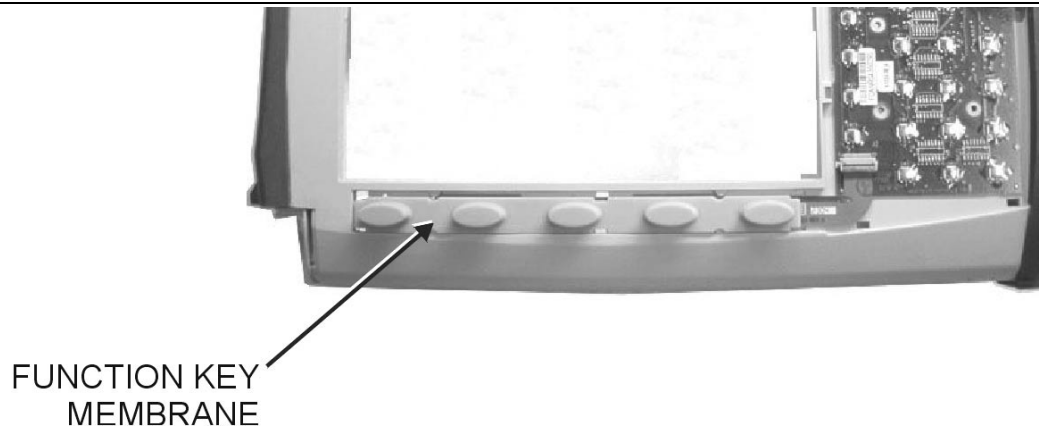


Figure 24. Function Key Membrane

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 25).

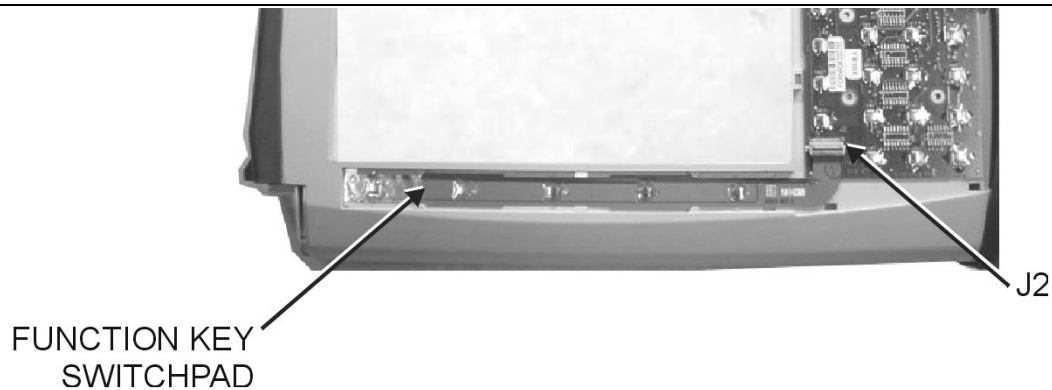


Figure 25. Function Key Switchpad

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 UMTS Master MT8220A are listed below.

Table 3. Standard/Optional Parts List

Part Number	Description	Qty
10580-00125	User Guide, UMTS Master MT8220A	1
10580-00126	Programming Manual, UMTS Master MT8220A (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 4. Replacement Parts

Part Number	Description	Qty
633-44	Rechargeable Battery, Lithium-Ion	1
633-27	Lithium Coin Battery for Real Time Clock	1
ND64367	MT8220A Main/SPA PCB Assembly *	1
ND65208	MT8220A Main/SPA PCB Assembly with option 31 *	1
61333-3	Function Key Switchpad Assembly	1
65027-3	Main Keypad PCB Assembly	1
2000-1346	Liquid Crystal Display Backlight PCB	1
3-15-118	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 UMTS Master are listed on a tag at the top of the MT8220A.

Table 5. 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
3-410-101	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 6. 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 MT8220A	1

16. ANRITSU Customer Service Centers

For an up to date list of worldwide Anritsu Service Centers, refer to the Contact page of the Anritsu Internet site:
<http://www.anritsu.com/Contact.asp>

Appendix A Test Records

Introduction

This appendix provides test records that can be used to record the performance of the UMTS Master, 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.

UMTS Master MT8220A	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	-102 dBc/Hz

Spectrum Analyzer Spurious Response (Second Harmonic Distortion)

Frequency	Measured Values	2nd Harmonic Distortion	Specification
50.1 MHz	_____		
100.2 MHz	_____	_____ dBc	-50 dBc

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)

UMTS Master MT8220A	Firmware Revision:	Operator:
Serial Number:	Options:	Date:

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

Spectrum Analyzer DANL (Pre Amp ON)

Frequency	RBW	VBW	Measured (100 kHz RBW)	Calculated (10 Hz RBW)	10 Hz Specification
10 MHz to 1.0 GHz	100 kHz	1 kHz	_____ dBm	_____ dBm	≥-151 dBm
>1.0 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	300 Hz	_____ dBm	_____ dBm	≥-149 dBm
>4.0 GHz to 7.1 GHz	100 kHz	300 Hz	_____ dBm	_____ dBm	≥-144 dBm

Spectrum Analyzer DANL (Pre Amp OFF)

Frequency	RBW	VBW	Measured (100 kHz RBW)	Calculated (10 Hz RBW)	10 Hz Specification
10 MHz to 1.0 GHz	100 kHz	1 kHz	_____ dBm	_____ dBm	≥-127 dBm
>1.0 GHz to 2.2 GHz	100 kHz	1 kHz	_____ dBm	_____ dBm	≥-123 dBm
>2.2 GHz to 2.8 GHz	100 kHz	300 Hz	_____ dBm	_____ dBm	≥-116 dBm
>2.8 GHz to 4.0 GHz	100 kHz	300 Hz	_____ dBm	_____ dBm	≥-126 dBm
>4.0 GHz to 7.1 GHz	100 kHz	300 Hz	_____ dBm	_____ dBm	≥-117 dBm

UMTS Master MT8220A	Firmware Revision:	Operator:
Serial Number:	Options:	Date:

Input Related Spurious (IRS) Signals

Amplitude Reading at 1674 MHz _____ dBc

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 _____ dBc

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

Amplitude Reading at 2145 MHz _____ dBc

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	900 Hz	_____ Hz	1.1 kHz
300 Hz	450 Hz	Auto	270 Hz	_____ Hz	330 Hz
100 Hz	150 Hz	Auto	90 Hz	_____ Hz	110 Hz
30 Hz	50 Hz	3 Hz	27 Hz	_____ Hz	33 Hz
10 Hz	30 Hz	3 Hz	9 Hz	_____ Hz	11 Hz

UMTS Master MT8220A	Firmware Revision:	Operator:
Serial Number:	Options:	Date:

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 dB	_____ dBm	±1.25 dB
100 MHz	_____ dBm	±1.75 dB	_____ dBm	±1.25 dB
500 MHz	_____ dBm	±1.75 dB	_____ dBm	±1.25 dB
1000 MHz	_____ dBm	±1.75 dB	_____ dBm	±1.25 dB
2000 MHz	_____ dBm	±1.75 dB	_____ dBm	±1.25 dB
3000 MHz	_____ dBm	±1.75 dB	_____ dBm	±1.25 dB
4000 MHz	_____ dBm	±1.75 dB	_____ dBm	±1.75 dB
5000 MHz	_____ dBm	±1.75 dB	_____ dBm	±1.75 dB
6000 MHz	_____ dBm	±1.75 dB	_____ dBm	±1.75 dB
7000 MHz	_____ dBm	±3.00 dB	_____ dBm	±1.75 dB

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

UMTS Master MT8220A	Firmware Revision:	Operator:
Serial Number:	Options:	Date:

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 dB
-4 dBm	10 dBm	30 dB	_____ dBm	±1.25 dB
-10 dBm	0 dBm	20 dB	_____ dBm	±1.25 dB
-14 dBm	0 dBm	20 dB	_____ dBm	±1.25 dB
-20 dBm	-10 dBm	10 dB	_____ dBm	±1.25 dB
-24 dBm	-10 dBm	10 dB	_____ dBm	±1.25 dB
-30 dBm	-20 dBm	0 dB	_____ dBm	±1.25 dB
-34 dBm	-20 dBm	0 dB	_____ dBm	±1.25 dB
-40 dBm	-30 dBm	0 dB	_____ dBm	±1.25 dB
-44 dBm	-30 dBm	0 dB	_____ dBm	±1.25 dB
-50 dBm	-40 dBm	0 dB	_____ dBm	±1.25 dB

Option 31 GPS Receiver

Frequency	Measured Value	Error	Specification
7 GHz	_____ GHz	_____ Hz	±4.75 Hz (w/GPS Hi Accy) or ±9.5 Hz (w/Int Hi Accy)

UMTS Master MT8220A	Firmware Revision:	Operator:
Serial Number:	Options:	Date:

Option 40 GSM/GPRS/EDGE RF Measurement

At 850 MHz, -10 dBm Level, TCH Pattern	Measured Value	Specification
Burst Power Error	dB	$\leq \pm 1.5$ dB
Frequency Error	Hz	$\leq \pm 10$ Hz
At 850 MHz, -50 dBm Level, TCH ALL Pattern	Measured Value	Specification
Burst Power Error	dB	$\leq \pm 1.5$ dB
Frequency Error	Hz	$\leq \pm 10$ Hz
At 1800 MHz, -50 dBm Level, TCH Pattern	Measured Value	Specification
Burst Power Error	dB	$\leq \pm 1.5$ dB
Frequency Error	Hz	$\leq \pm 10$ Hz
At 1800 MHz, -10 dBm Level, TCH ALL Pattern	Measured Value	Specification
Burst Power Error	dB	$\leq \pm 1.5$ dB
Frequency Error	Hz	$\leq \pm 10$ Hz
At 850 MHz, -10 dBm Level, DL_MCS-9_1SLOT Pattern	Measured Value	Specification
Burst Power Error	dB	$\leq \pm 1.5$ dB
Frequency Error	Hz	$\leq \pm 10$ Hz
At 850 MHz, -50 dBm Level, DL_MCS-9_4SLOT Pattern	Measured Value	Specification
Burst Power Error	dB	$\leq \pm 1.5$ dB
Frequency Error	Hz	$\leq \pm 10$ Hz
At 1800 MHz, -10 dBm Level, DL_MCS-9_4SLOT Pattern	Measured Value	Specification
Burst Power Error	dB	$\leq \pm 1.5$ dB
Frequency Error	Hz	$\leq \pm 10$ Hz
At 1800 MHz, -50 dBm Level, DL_MCS-9_1SLOT Pattern	Measured Value	Specification
Burst Power Error	dB	$\leq \pm 1.5$ dB
Frequency Error	Hz	$\leq \pm 10$ Hz

UMTS Master MT8220A	Firmware Revision:	Operator:
Serial Number:	Options:	Date:

Option 41 GSM/GPRS/EDGE Demodulator

At 850 MHz, -10 dBm Level, TCH Pattern

	Measured Value	Specification
Phase Err RMS (Deg)	Deg	≤ 1 Deg

At 850 MHz, -50 dBm Level, TCH ALL Pattern

	Measured Value	Specification
Phase Err RMS (Deg)	Deg	≤ 1 Deg

At 1800 MHz, -50 dBm Level, TCH Pattern

	Measured Value	Specification
Phase Err RMS (Deg)	Deg	≤ 1 Deg

At 1800 MHz, -10 dBm Level, TCH ALL Pattern

	Measured Value	Specification
Phase Err RMS (Deg)	Deg	≤ 1 Deg

At 850 MHz, -10 dBm Level, DL_MCS-9_1SLOT Pattern

	Measured Value	Specification
EVM(rms)	%	≤ 2.5%

At 850 MHz, -50 dBm Level, DL_MCS-9_4SLOT Pattern

	Measured Value	Specification
EVM(rms)	%	≤ 2.5%

At 1800 MHz, -10 dBm Level, DL_MCS-9_4SLOT Pattern

	Measured Value	Specification
EVM(rms)	%	≤ 2.5%

At 1800 MHz, -50 dBm Level, DL_MCS-9_1SLOT Pattern

	Measured Value	Specification
EVM(rms)	%	≤ 2.5%

UMTS Master MT8220A	Firmware Revision:	Operator:
Serial Number:	Options:	Date:

Option 44 WCDMA and HSDPA RF Measurements

WCDMA Absolute Power Accuracy Verification

Test Level	Measured Power	Error	Specification
+10 dBm	dBm	dB	±1.25 dBm
+28 dBm	dBm	dB	±1.25 dBm
-10 dBm	dBm	dB	±1.25 dBm
-20 dBm	dBm	dB	±1.25 dBm

WCDMA Occupied Bandwidth (OBW)

Frequency	Power Meter Reading	OBW	Specification
881.5 MHz	_____ dBm	_____	4.2 MHz ±100 kHz
1962.5 MHz	_____ dBm	_____	4.2 MHz ±100 kHz
2680.5 MHz	_____ dBm	_____	4.2 MHz ±100 kHz

WCDMA RF Channel Accuracy

Frequency	Power Meter Reading	Measured RF Channel Power	RF CH Power Accuracy	Specification
881.5 MHz				±1.25 dB max
1962.5 MHz				±1.25 dB max
2680.5 MHz				±1.25 dB max

UMTS Master MT8220A	Firmware Revision:	Operator:
Serial Number:	Options:	Date:

WCDMA ACLR Accuracy

Frequency / Offset (MHz)	Measured Residual ACLR	Calculated ACLR Accuracy	Specification
881.5 / -10			±0.8 dB
881.5 / -5			±0.8 dB
881.5 / 5			±0.8 dB
881.5 / 10			±0.8 dB
1962.5 / -10			±0.8 dB
1962.5 / -5			±0.8 dB
1962.5 / 5			±0.8 dB
1962.5 / 10			±0.8 dB
2680.5 / -10			±1.0 dB
2680.5 / -5			±1.0 dB
2680.5 / 5			±1.0 dB
2680.5 / 10			±1.0 dB

HSDPA RF Channel Power Accuracy

Frequency	Power Meter Reading	Measured RF Channel Power	RF CH Power Accuracy	Specification
2680.5 MHz				±1.25 dB max.

HSDPA ACLR Accuracy

Frequency / Offset (MHz)	Measured Residual ACLR	Calculated ACLR Accuracy	Specification
2680.5 / -10			±1.0 dB
2680.5 / -5			±1.0 dB
2680.5 / 5			±1.0 dB
2680.5 / 10			±1.0 dB

UMTS Master MT8220A	Firmware Revision:	Operator:
Serial Number:	Options:	Date:

Option 45 WCDMA Demodulator and Option 65 WCDMA/HSDPA Demodulator

WCDMA Error Vector Magnitude (Test Model 4; Option 45 or 65)

Frequency	EVM	Specification
1962.5 MHz		% ≤±2.5%

HSDPA Error Vector Magnitude (Test Model 5; Option 65)

Frequency	EVM	Specification
1962.5 MHz		% ≤±2.5%

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Equipment marked with the Crossed-out Wheelie Bin symbol complies with the European Parliament and Council Directive 2002/96/EC (the "WEEE Directive") in the European Union.



For Products placed on the EU market after August 13, 2005, please contact your local Anritsu representative at the end of the product's useful life to arrange disposal in accordance with your initial contract and the local law.