Certification Application Report
FCC Part 15.247 & Industry Canada RSS-210

Test Lab:	Applicant:
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FCC ID/ IC:	MQOH1AVA-10001/ 2570A-H1AVA101	**Test Report Date:**	September 25, 2007
Platform:	N/A	**RTL Work Order Number:**	2007241
Model Name / Number:	H1 / AVA-100-01	**RTL Quote Number:**	QRTL07-265
American National Standard Institute:	ANSI C63.4-2003: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz		
FCC Classification:	DTS – Part 15 Digital Transmission System		
FCC Rule Part(s):	FCC Rules Part 15.247 (10-01-05): Operation within the bands 920-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Direct Sequence System		
Industry Canada:	RSS-210, Issue 7 Low-power License-exempt Radiocommunication Devices		
Digital Interface Information:	Digital Interface was found to be compliant		

Frequency Range (MHz)	Output Power (W)*	Frequency Tolerance	Emission Designator
2412-2462	0.059	N/A	14M6G7D
2412-2462	0.191	N/A	17M9G7D

**power reported is maximum peak conducted power*

I, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report. No modifications were made to the equipment during testing in order to achieve compliance with these standards. Furthermore, there was no deviation from, additions to, or exclusions from, the applicable parts of FCC Part 2, FCC Part 15, ANSI C63.4, and Industry Canada RSS-210.

Signature: _____ Date: September 25, 2007

Typed/Printed Name: Desmond A. Fraser Position: President

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1 General Information

1.1 Scope

Applicable Standards:

- FCC Rules Part 15.247 (10-01-06): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz.

- Industry Canada RSS-210 (Issue 7 September 2005): Low-power License-exempt Radiocommunication Devices

1.2 Description of EUT

Equipment Under Test	Body Worn Terminal
Model Name / Number	H1 / AVA-100-01
Power Supply	Battery operated
Modulation Type	DSSS
Transfer Rate	1, 2, 5.5, 11 Mbps (b rates) 6, 9, 12, 18, 24, 36, 48, 54 Mbps (g rates)
Frequency Range	2412 – 2462 MHz
Antenna Connector Type	Internal
Antenna Types	Internal

1.3 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4 2003).

1.4 Related Submittal(s)/Grant(s)

This is an original application for FCC certification for Vocollect, Inc. Model #: AVA-100-01, FCC ID: MQOH1AVA-10001, and IC: 2570A-H1AVA101.

1.5 Modifications

Modifications were required for passing results at the 2nd harmonic in the 802.11b mode:

1. Removed the Bergquist thermal pad and replaced with Wurth Elektronik PN: 30405 A6 flexible absorber ferrite material in approximately ¼ of the bottom portion of the radio.
2. Cut the center of the top Poron® material away from the edges of the radio to minimize compression.

2 Test Information

2.1 Description of Test Modes

In accordance with FCC 15.31(m), and because the EUT utilizes an operating band greater than 10 MHz, the following frequencies were tested:

Table 2-1: Channels Tested

Channel	Frequency
1	2412
6	2437
11	2462

2.2 Exercising the EUT

The EUT was tested in all three orthogonal planes in order to determine worst-case emissions. The EUT was provided with software to continuously transmit during testing. The carrier was also checked to verify that information was being transmitted. There were no deviations from the test standard(s) and/or methods. The test results reported relate only to the item tested.

2.3 Test Results Summary

Table 2-2: Test Results Summary – FCC Part 15, Subpart C (Section 15.247)

Standard	Test	Pass/Fail or N/A
FCC 15.207	AC Power Conducted Emissions	Pass
FCC 15.209	Radiated Emissions	Pass
FCC 15.247(a)(2)	6 dB Bandwidth	Pass
FCC 15.247(b)	Maximum Peak Power Output	Pass
FCC 15.247(d)	Antenna Conducted Spurious Emissions	Pass
FCC 15.247(e)	Power Spectral Density	Pass
FCC 15.247(d)	Band Edge Measurement	Pass
RSS-Gen	20 dB Bandwidth	N/A

2.4 Test System Details

The test samples were received on August 23, 2007. The FCC identifiers for all applicable equipment, plus descriptions of all cables used in the tested system, are identified in the following tables.

Table 2-3: Equipment Under Test

Part	Manufacturer	Model #	Serial Number	FCC ID	Cable Description	RTL Bar Code
WLAN Terminal	Vocollect, Inc.	AVA-100-01	0017230072EF	MQOH1AVA-10001	N/A	18094
WLAN Terminal	Vocollect, Inc.	AVA-100-01	0017230151C9	MQOH1AVA-10001	N/A	18095
WLAN Terminal	Vocollect, Inc.	AVA-100-01	001723015479	MQOH1AVA-10001	N/A	18096
Battery	Vocollect, Inc.	1000956	N/A	N/A	N/A	18088
Headset	Vocollect, Inc	N/A	237330032	N/A	1.4 m shielded I/O	18097
Headset	Vocollect, Inc	N/A	237330032	N/A	1.4 m shielded I/O	18098

2.5 Configuration of Tested System

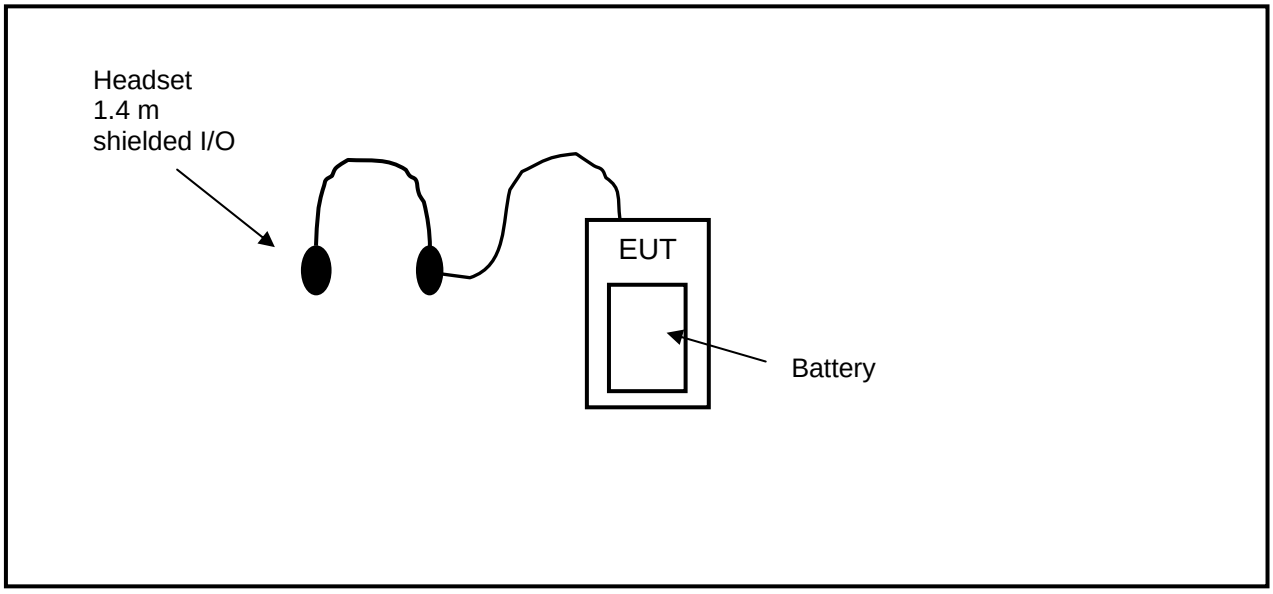


Figure 2-1: Configuration of System Under Test

3 Peak Output Power - §15.247(b)(3); RSS-210 §A8.4(4)

3.1 Power Output Test Procedure

A conducted power measurement of the EUT was taken using an Agilent 4416A EPM-P Series Power Meter with an E9323A Peak and Average Power Sensor.

Table 3-1: Power Output Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901184	Agilent Technologies	E4416A	EPM-P Power Meter, single channel	GB41050573	10/3/07
901356	Agilent Technologies	E9323A	Power Sensor	31764-264	10/3/07

3.2 Power Output Test Data

Table 3-2: Power Output Test Data

Mode	Channel	Frequency (MHz)	Peak Power Conducted Output (dBm)	Average Power Conducted Output (dBm)
802.11b	1	2412	17.7	14.1
802.11b	6	2437	17.7	14.5
802.11b	11	2462	17.7	14.1
802.11g	1	2412	22.5	13.9
802.11g	6	2437	22.6	14.0
802.11g	11	2462	22.8	14.0

Notes:

- Maximum peak power is being used to show compliance for EMC. Maximum average power is presented per "FCC OET SAR Measurement Procedures for 802.11a/b/g Transmitters (Oct '06 Rev. 1.1)" for comparison to the SAR report.
- Vocollect firmware power setting of 75.

Test Personnel:

Daniel Baltzell		September 17, 2007
Test Engineer	Signature	Date Of Test

4 Compliance with the Band Edge – FCC §15.247(d); RSS-210 §2.2

4.1 Band Edge Test Procedure

The transmitter output was connected to its appropriate antenna. Peak (1 MHz RBW/VBW) and average (1 MHz RBW/10 Hz VBW) radiated measurements were taken with a suitable span to encompass the peak of the fundamental. A delta measurement was performed from the highest peak in the restricted band to the peak of the fundamental, and subtracted from the field strength; the result was compared to the limit in the restricted band (54 dBuV/m).

Table 4-1: Band Edge Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer (3 Hz – 50 GHz)	US440203416	6/13/08
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
901425	Insulated Wire, Inc.	KPS-1503-2400-KPS	RF cable, 20'	NA	12/5/07
901242	Rhein Tech Labs	WRT-000-0003	Wood rotating table	N/A	Not Required
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	6/15/10
900913	Hewlett Packard	85462A	EMI Receiver RF Section (9 KHz – 6.5 GHz)	3325A00159	3/21/08

4.2 Restricted Band Edge Test Results

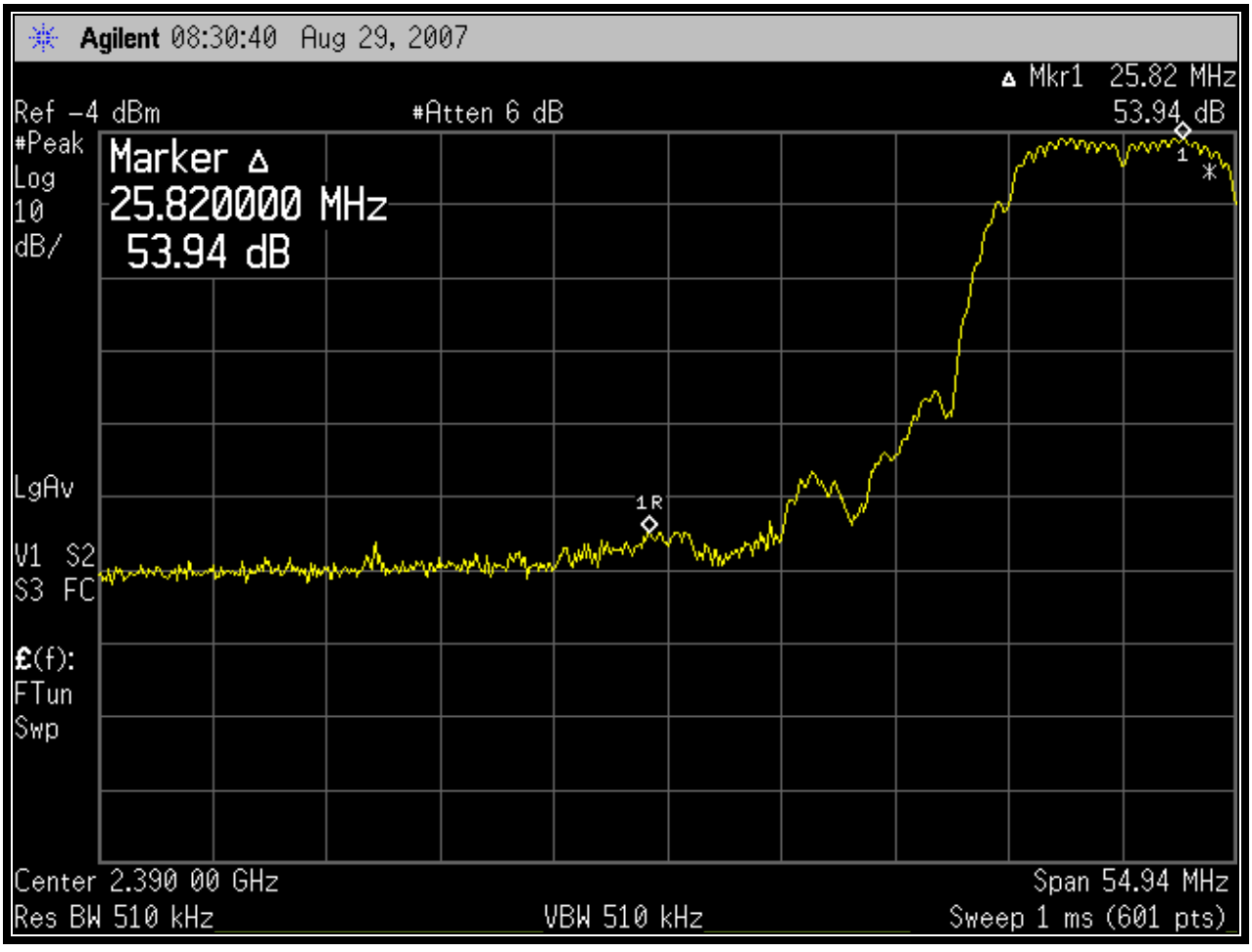
4.2.1 Calculation of Lower Band Edge 802.11b

106.2 dBuV/m is the field strength measurement, from which the delta measurement of 53.9 dB is subtracted (reference plots), resulting in a level of 52.3 dB. This level has a margin of 1.7 dB below the limit of 54 dBuV/m.

Calculation: 106.2 dBuV/m – 53.9 dB – 54 dBuV/m = -1.7 dB

Peak Field Strength of Lower Band Edge (1 MHz RBW/1 MHz VBW) = 109.2 dBuV/m
Average Field Strength of Lower Band Edge (1 MHz RBW/10 Hz VBW) = 106.2 dBuV/m
Delta measurement = 53.9 dB

Plot 4-1: Lower Band Edge: Average Measurement Channel 1 (TX Frequency: 2412 MHz); 802.11b



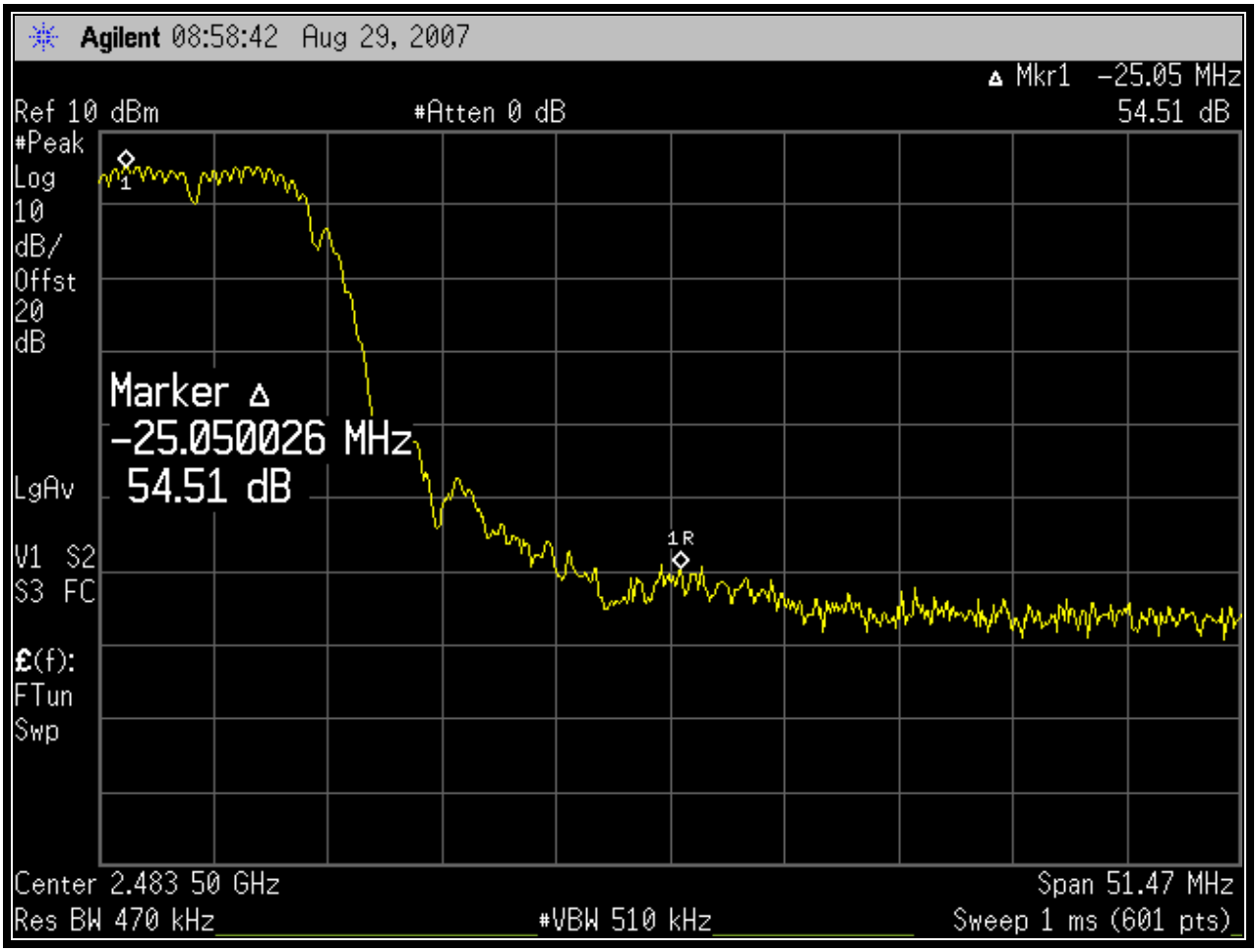
4.2.2 Calculation of Upper Band Edge 802.11b

107.6 dBuV/m is the field strength measurement, from which the delta measurement of 54.5 dB is subtracted (reference plots), resulting in a level of 53.1 dB. This level has a margin of 0.9 dB below the limit of 54 dBuV/m.

Calculation: 107.6 dBuV/m – 54.5 dB – 54 dBuV/m = -0.9 dB

Peak Field Strength of Upper Band Edge (1 MHz RBW/1 MHz VBW) = 111.2 dBuV/m
Average Field Strength of Upper Band Edge (1 MHz RBW/10 Hz VBW) = 107.6 dBuV/m
Delta measurement = 54.5 dB

Plot 4-2: Upper Band Edge: Average Measurement Channel 11 (TX Frequency: 2462 MHz); 802.11b



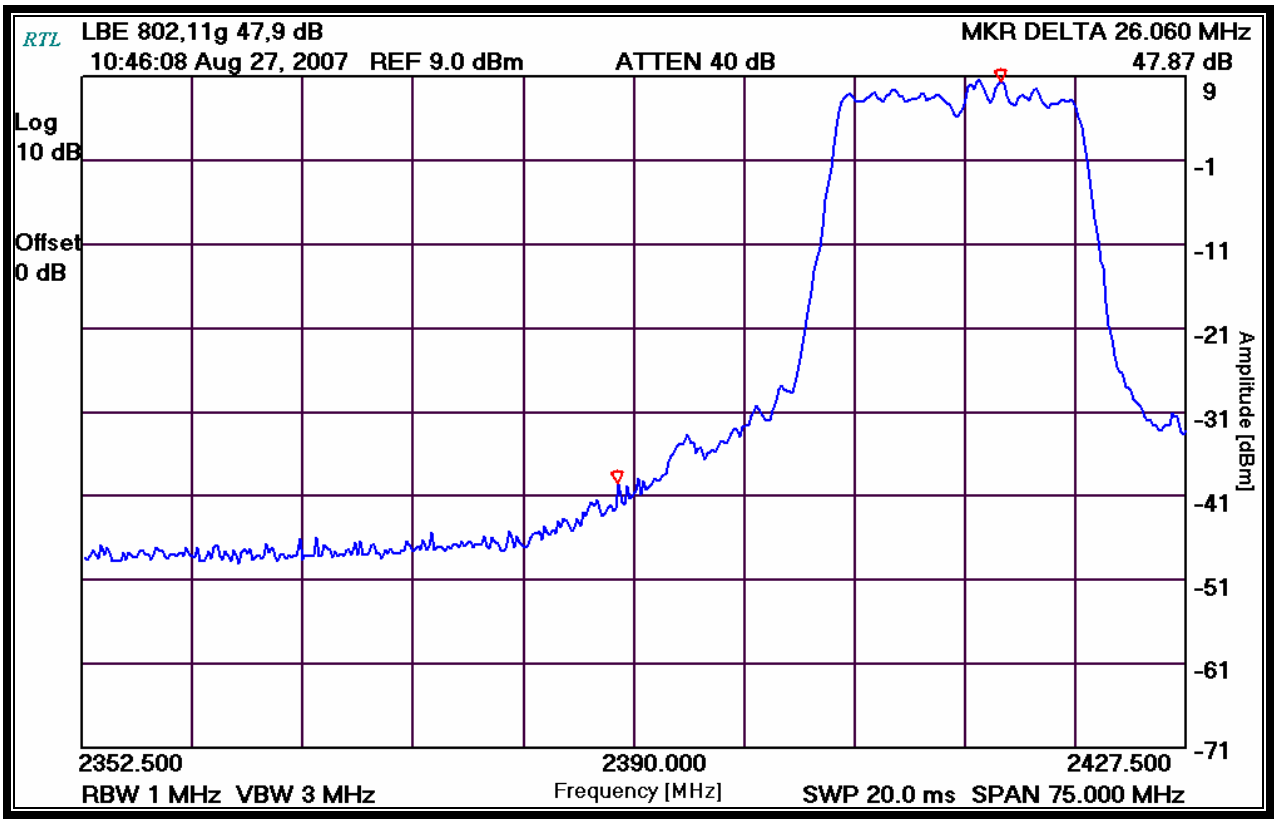
4.2.3 Calculation of Lower Band Edge 802.11g

100.9 dBuV/m is the field strength measurement, from which the delta measurement of 47.9 dB is subtracted (reference plots), resulting in a level of 53 dB. This level has a margin of 1 dB below the limit of 54 dBuV/m.

Calculation: 100.9 dBuV/m – 47.9 dB – 54 dBuV/m = -1 dB

Peak Field Strength of Lower Band Edge (1 MHz RBW/1 MHz VBW) = 114.1 dBuV/m
Average Field Strength of Lower Band Edge (1 MHz RBW/10 Hz VBW) = 100.9 dBuV/m
Delta measurement = 47.9 dB

Plot 4-3: Lower Band Edge: Average Measurement Channel 1 (TX Frequency: 2412 MHz); 802.11g



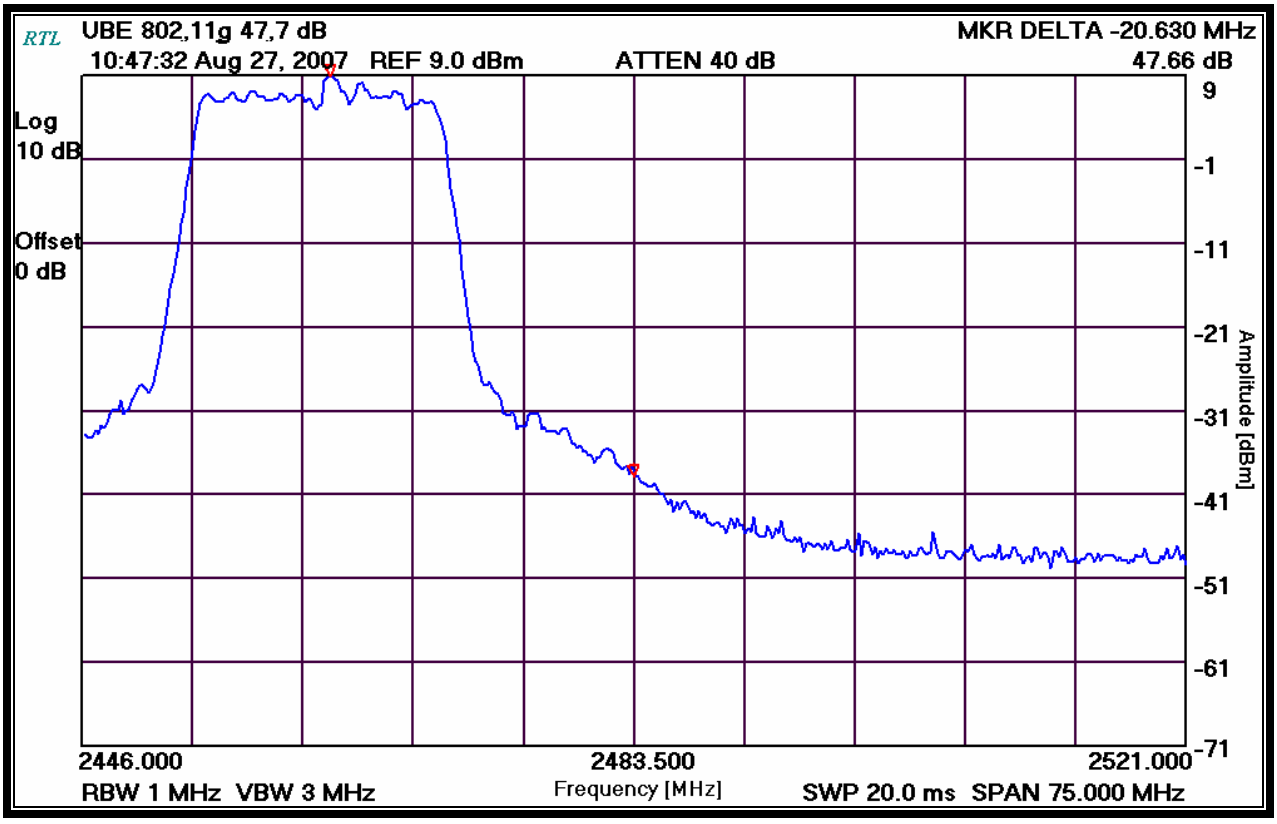
4.2.4 Calculation of Upper Band Edge 802.11g

101.3 dBuV/m is the field strength measurement, from which the delta measurement of 47.7 dB is subtracted (reference plots), resulting in a level of 53.6 dB. This level has a margin of 0.4 dB below the limit of 54 dBuV/m.

Calculation: 101.3 dBuV/m – 47.7 dB – 54 dBuV/m = -0.4 dB

Peak Field Strength of Upper Band Edge (1 MHz RBW/1 MHz VBW) = 114.4 dBuV/m
Average Field Strength of Upper Band Edge (1 MHz RBW/10 Hz VBW) = 101.3 dBuV/m
Delta measurement = 47.7 dB

Plot 4-4: Upper Band Edge: Average Measurement Channel 11 (TX Frequency: 2462 MHz); 802.11g



Test Personnel:

Daniel Baltzell	Daniel W. Baltzell	August 27, 29, & September 18, 2007
Test Engineer	Signature	Dates Of Test

5 Antenna Conducted Spurious Emissions - §15.247(d); RSS-210 RSS-Gen

5.1 Antenna Conducted Spurious Emissions Test Procedures

Antenna spurious emissions per FCC 15.247(c) were measured from the EUT antenna port using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 100 kHz. The modulated carrier was identified at the following frequencies: 2412 MHz, 2437 MHz and 2462 MHz.

5.2 Antenna Conducted Spurious Emissions Test Results

No harmonics or spurs were found within 20 dB (note that we are reporting power as peak) of the limit from the carrier to the 10th harmonic of the carrier frequency. Per FCC 15.31(o), no data is being reported.

Table 5-1: Antenna Conducted Spurious Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer (3 Hz – 50 GHz)	US440203416	6/13/08

Test Personnel:

Daniel Baltzell		September 17, 2007
Test Engineer	Signature	Date Of Test

6 6 dB Bandwidth - §15.247(a)(2); RSS-210 §A8.2(a)

6.1 6 dB Bandwidth Test Procedure – Minimum 6 dB Bandwidth

The minimum 6 dB bandwidths per FCC 15.247(a)(2) were measured using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 300 Hz. The device was modulated. The minimum 6 dB bandwidths are presented below.

Table 6-1: 6 dB Bandwidth Test Equipment

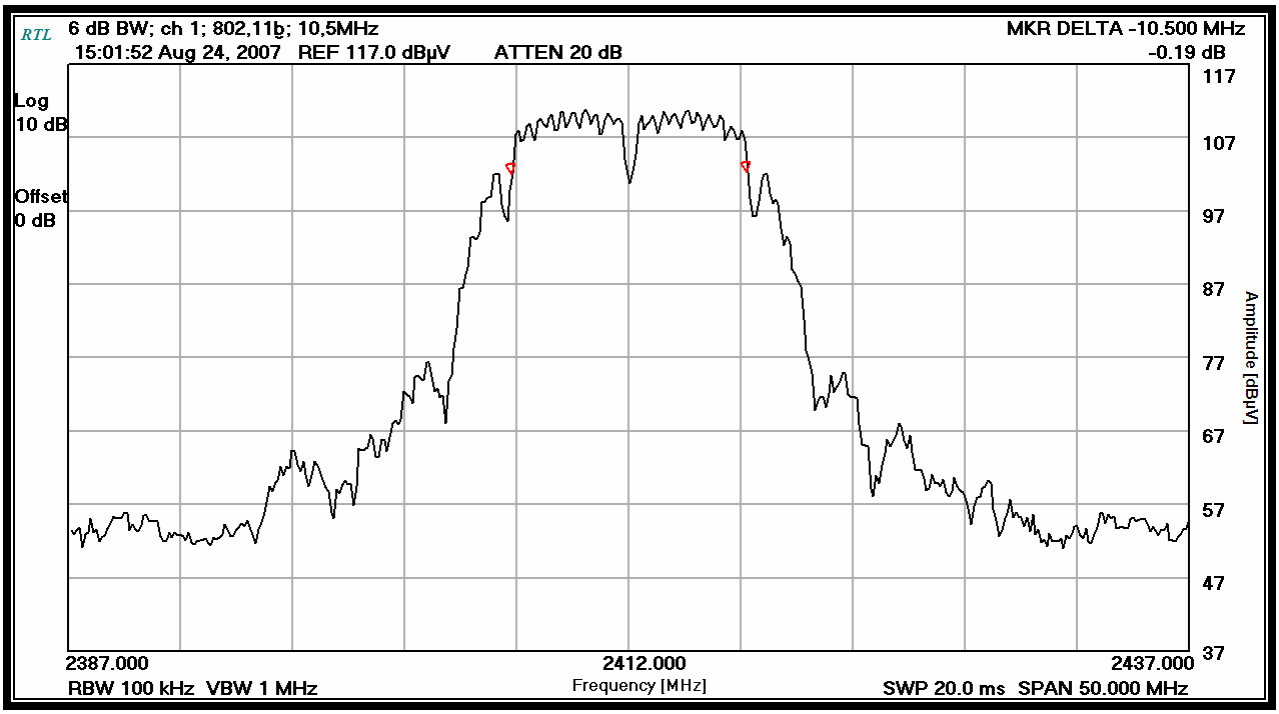
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer (3 Hz – 50 GHz)	US440203416	6/13/08

6.2 6 dB Bandwidth Test Results

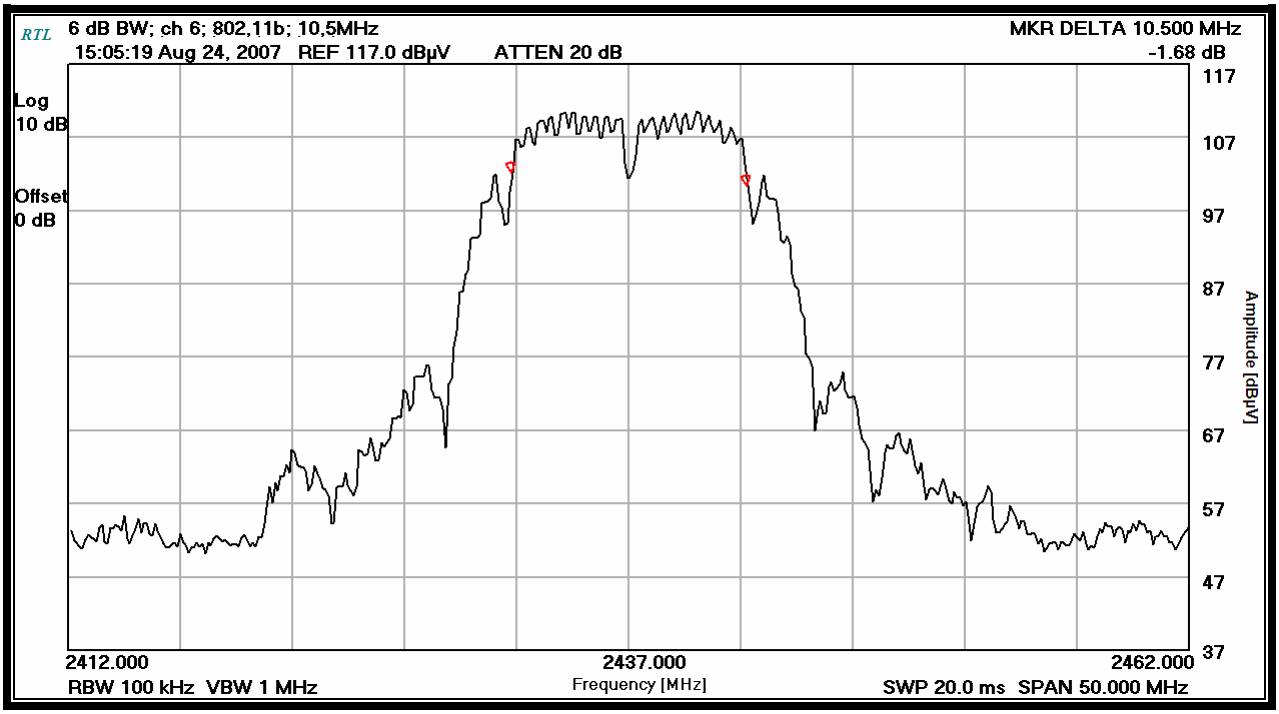
Table 6-2: 6 dB Bandwidth Test Data

Mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/Fail
802.11b	1	2412	10.5	0.5	Pass
802.11b	6	2437	10.5	0.5	Pass
802.11b	11	2462	10.5	0.5	Pass
802.11g	1	2412	16.75	0.5	Pass
802.11g	6	2437	16.75	0.5	Pass
802.11g	11	2462	16.75	0.5	Pass

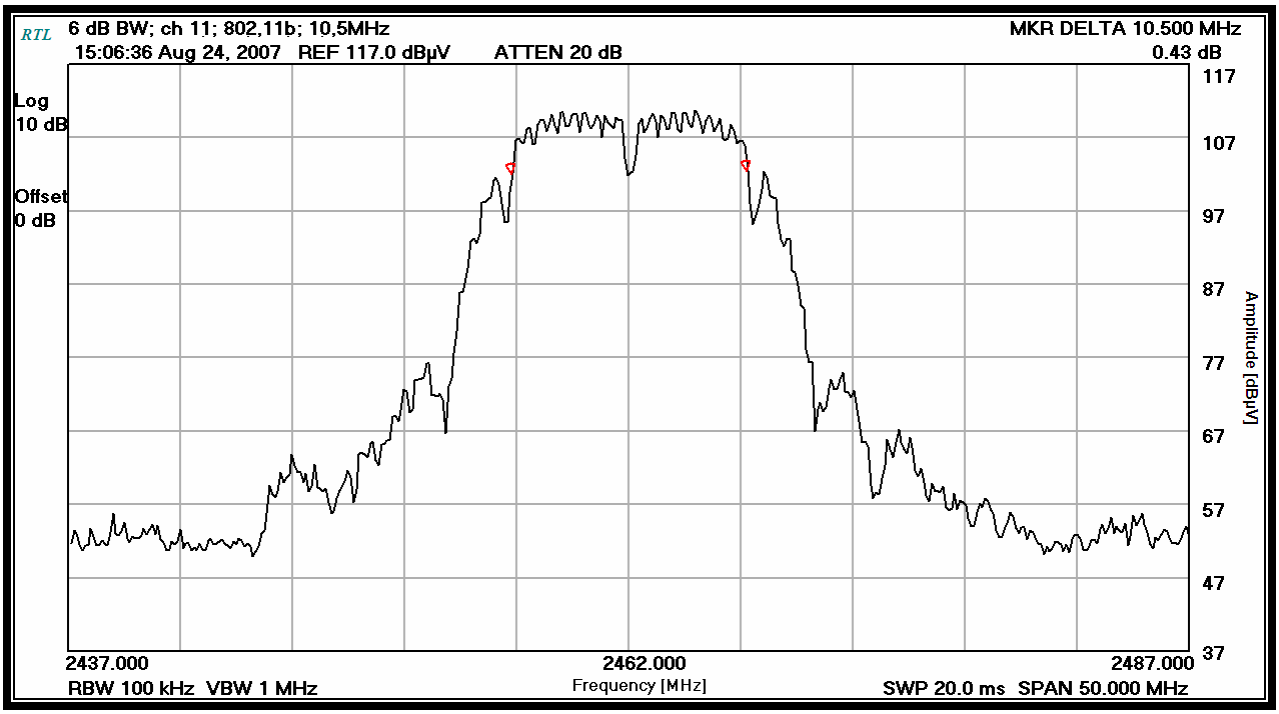
Plot 6-1: 6 dB Bandwidth Channel 1 (TX Frequency: 2412 MHz) – 802.11b



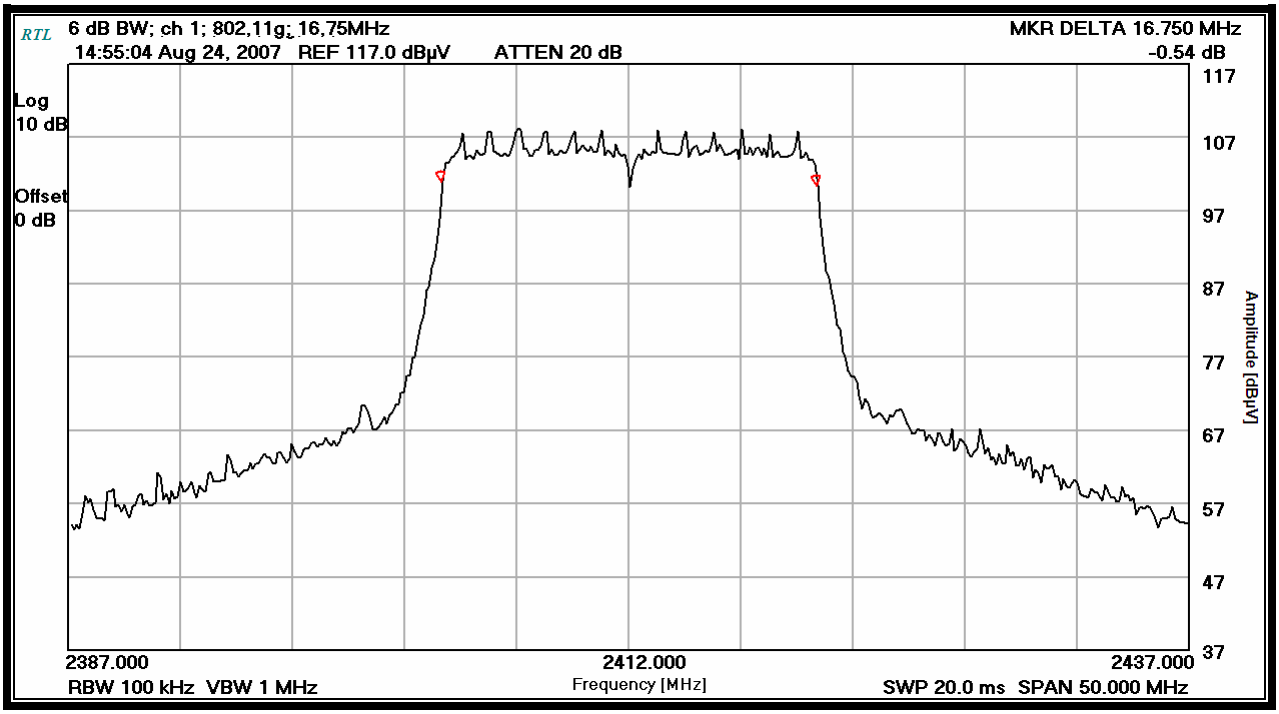
Plot 6-2: 6 dB Bandwidth Channel 6 (TX Frequency: 2437 MHz) – 802.11b



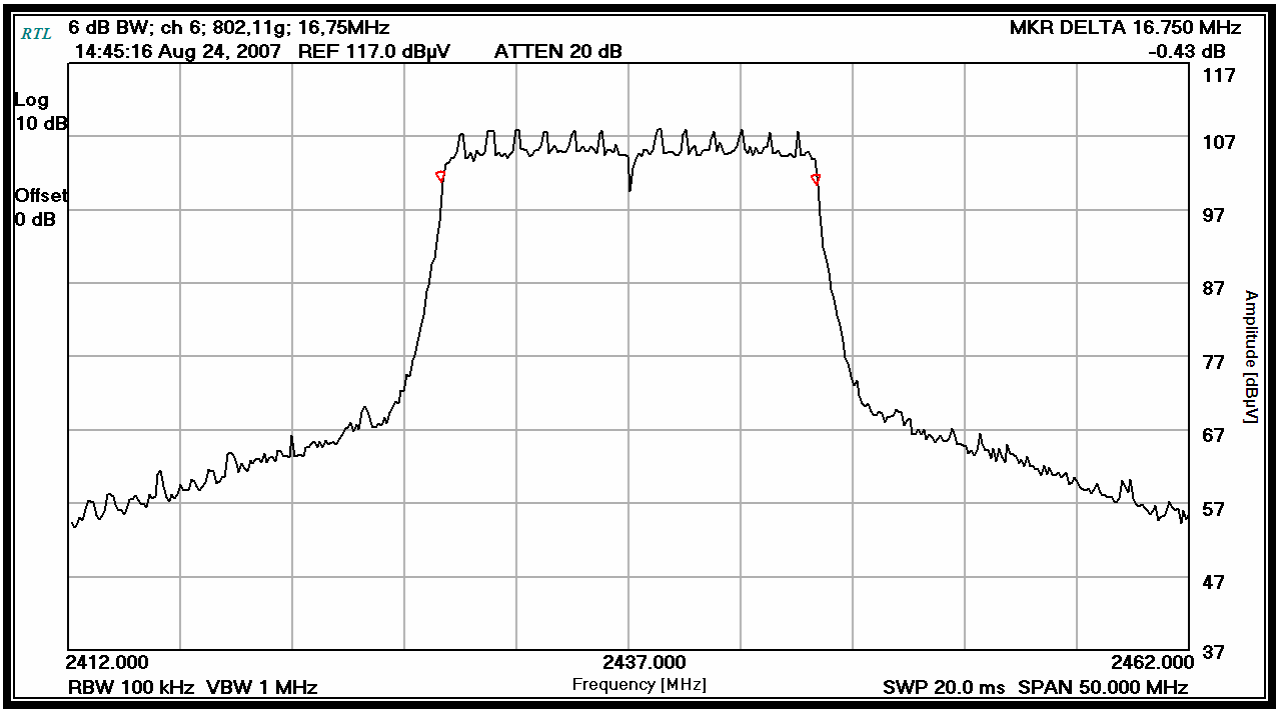
Plot 6-3: 6 dB Bandwidth Channel 11 (TX Frequency: 2462 MHz) – 802.11b



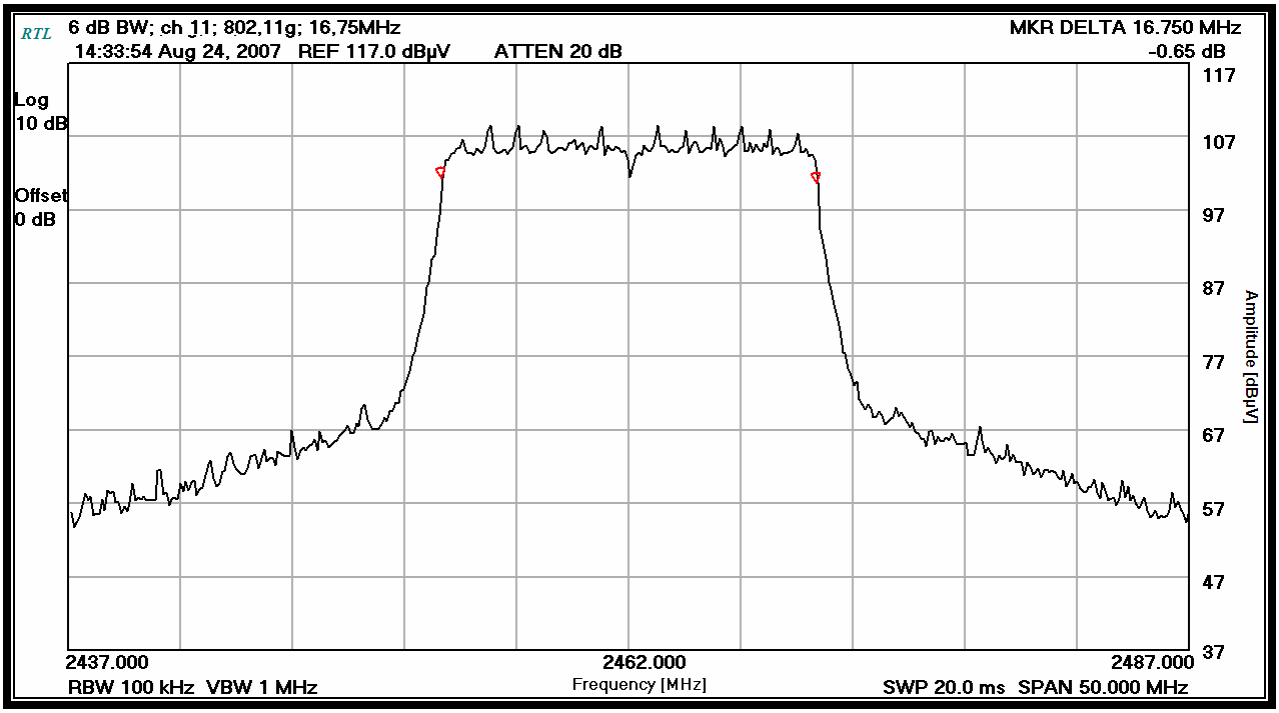
Plot 6-4: 6 dB Bandwidth Channel 1 (TX Frequency: 2412 MHz) – 802.11g



Plot 6-5: 6 dB Bandwidth Channel 6 (TX Frequency: 2437 MHz) – 802.11g



Plot 6-6: 6 dB Bandwidth Channel 11 (TX Frequency: 2462 MHz) – 802.11g



Test Personnel:

Daniel Baltzell		August 24, 2007
Test Engineer	Signature	Date Of Tests

7 Power Spectral Density - §15.247(e); RSS-210 §A8.2(b)

7.1 Power Spectral Density Test Procedure

The power spectral density per FCC 15.247(d) was measured using a 50 ohm spectrum analyzer with the resolution bandwidth set at 3 kHz, the video bandwidth set at 30 kHz, and the sweep time set at 500 seconds. The spectral lines were resolved for the modulated carriers at 2.412 GHz, 2.437 GHz, and 2.462 GHz respectively. These levels are below the +8 dBm limit. See the power spectral density table and plots.

Table 7-1: Power Spectral Density Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901215	Hewlett Packard	8596EM	Spectrum Analyzer (9 kHz - 12.8 GHz)	3826A00144	10/16/07

7.2 Power Spectral Density Test Data

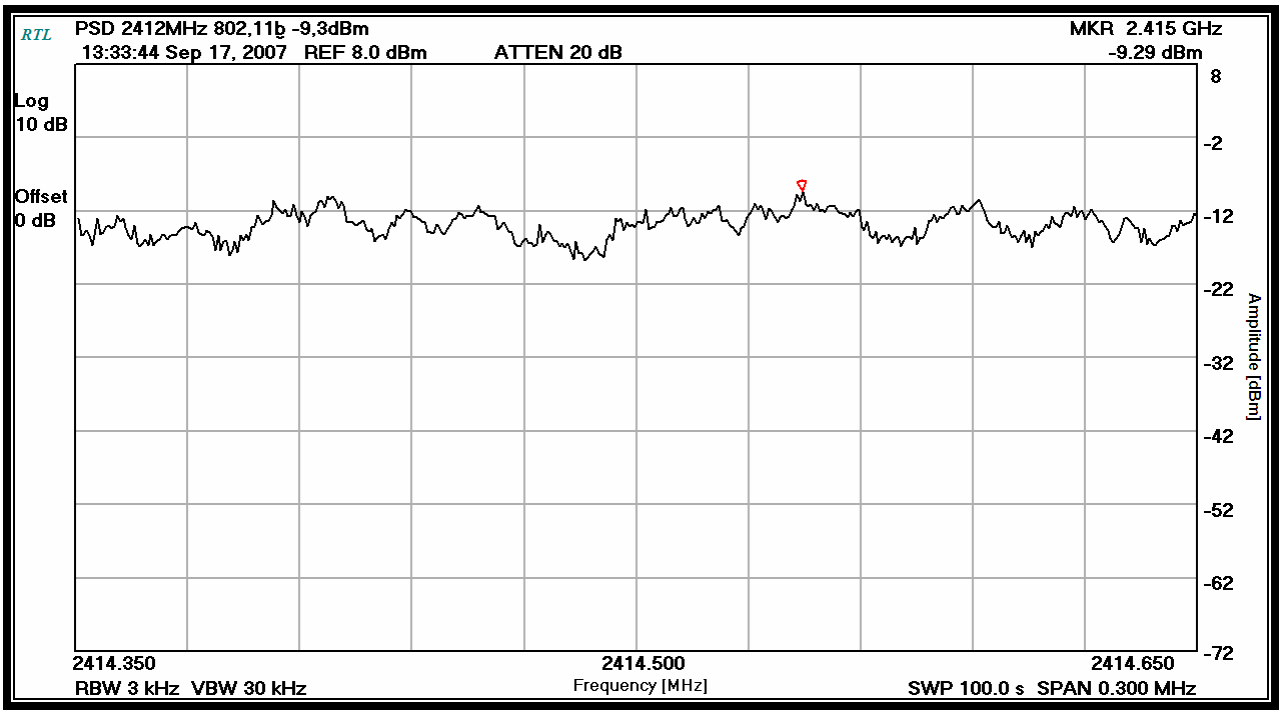
Table 7-2: Power Spectral Density Test Data 802.11b

Channel	Frequency (MHz)	RF Power Level (dBm)	Maximum Limit +8dBm	Pass/Fail
1	2412	-9.3	8	Pass
6	2437	-3.0	8	Pass
11	2462	-3.1	8	Pass

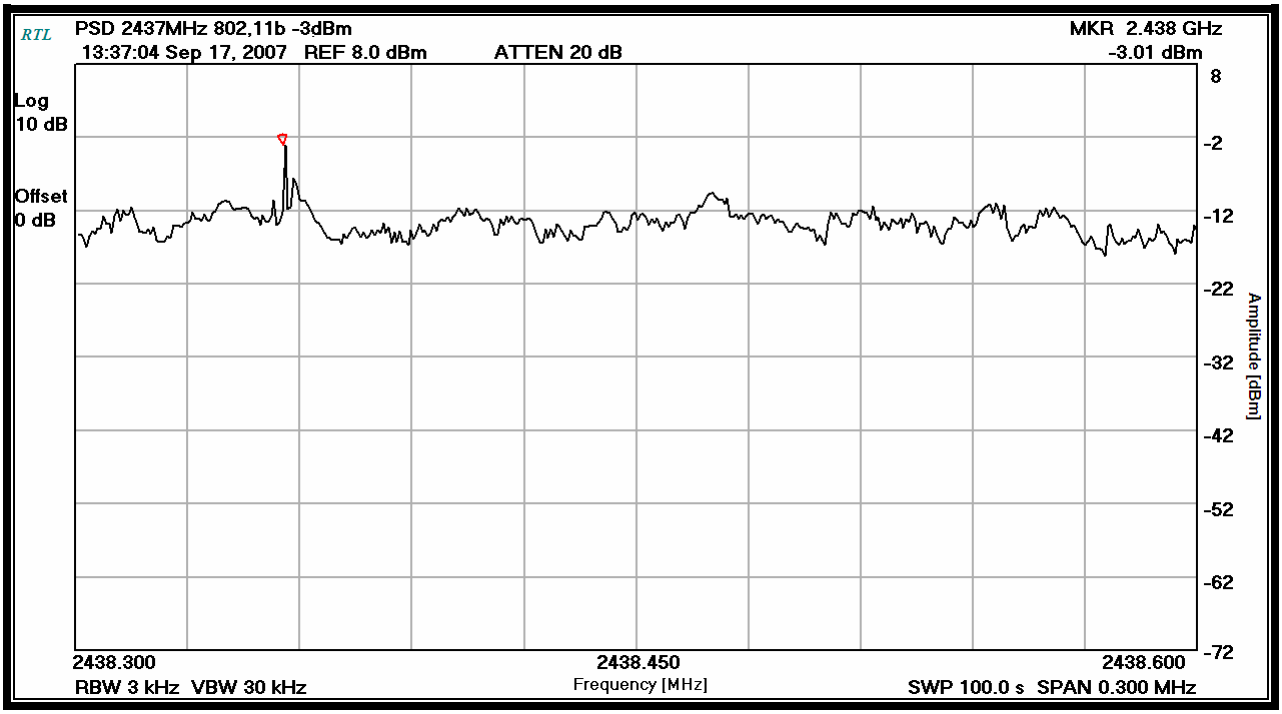
Table 7-3: Power Spectral Density Test Data 802.11g

Channel	Frequency (MHz)	RF Power Level (dBm)	Maximum Limit +8dBm	Pass/Fail
1	2412	-13.5	8	Pass
6	2437	-10.7	8	Pass
11	2462	-9.4	8	Pass

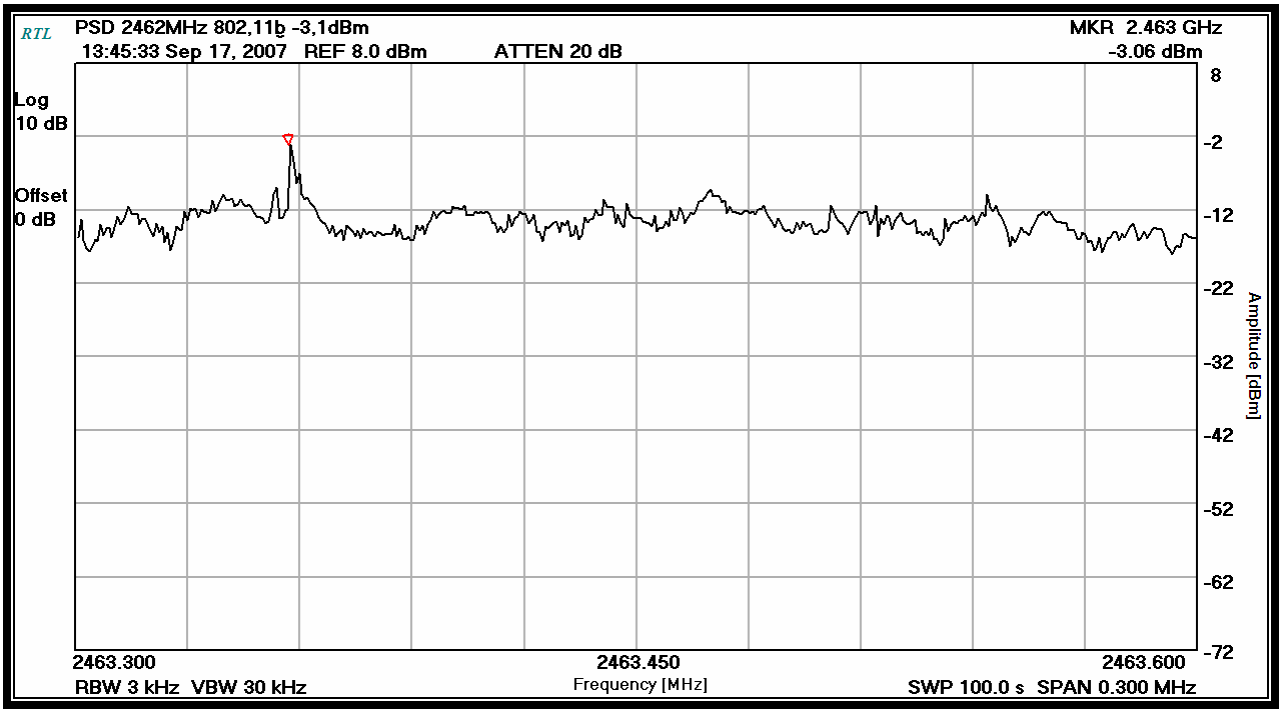
Plot 7-1: Power Spectral Density: Channel 1 (2412 MHz); 802.11b



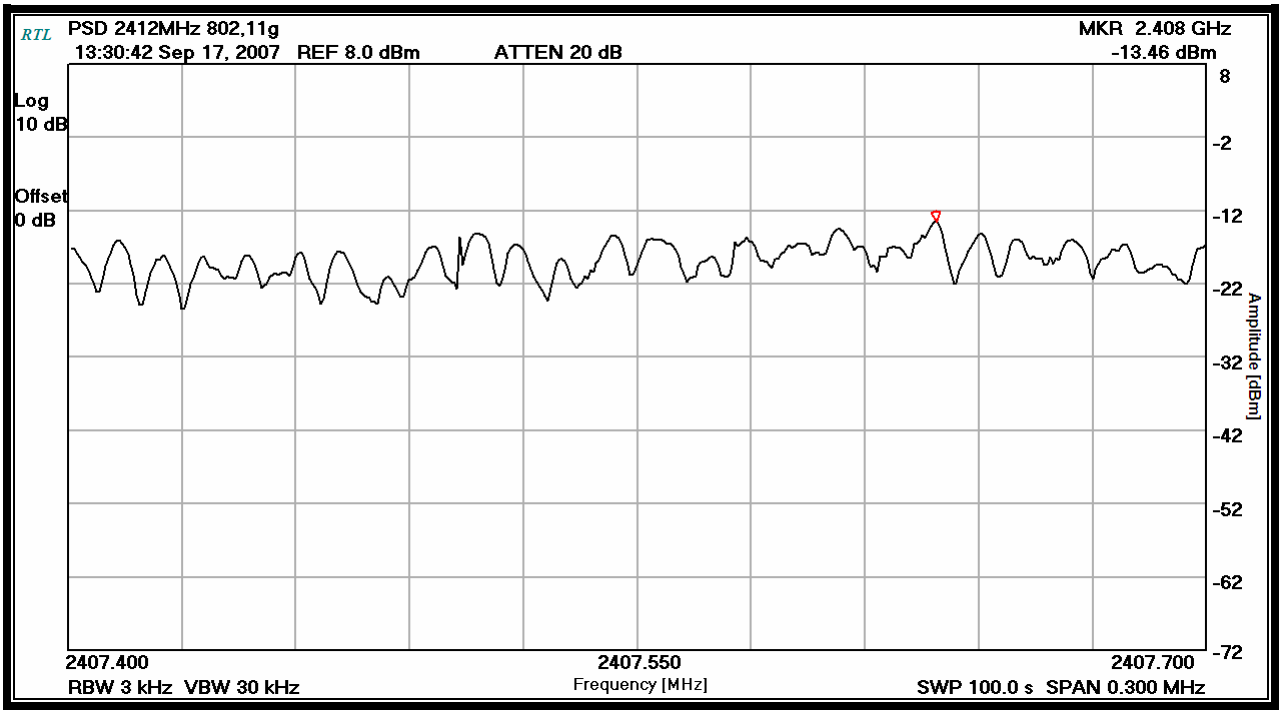
Plot 7-2: Power Spectral Density: Channel 6 (2437 MHz); 802.11b



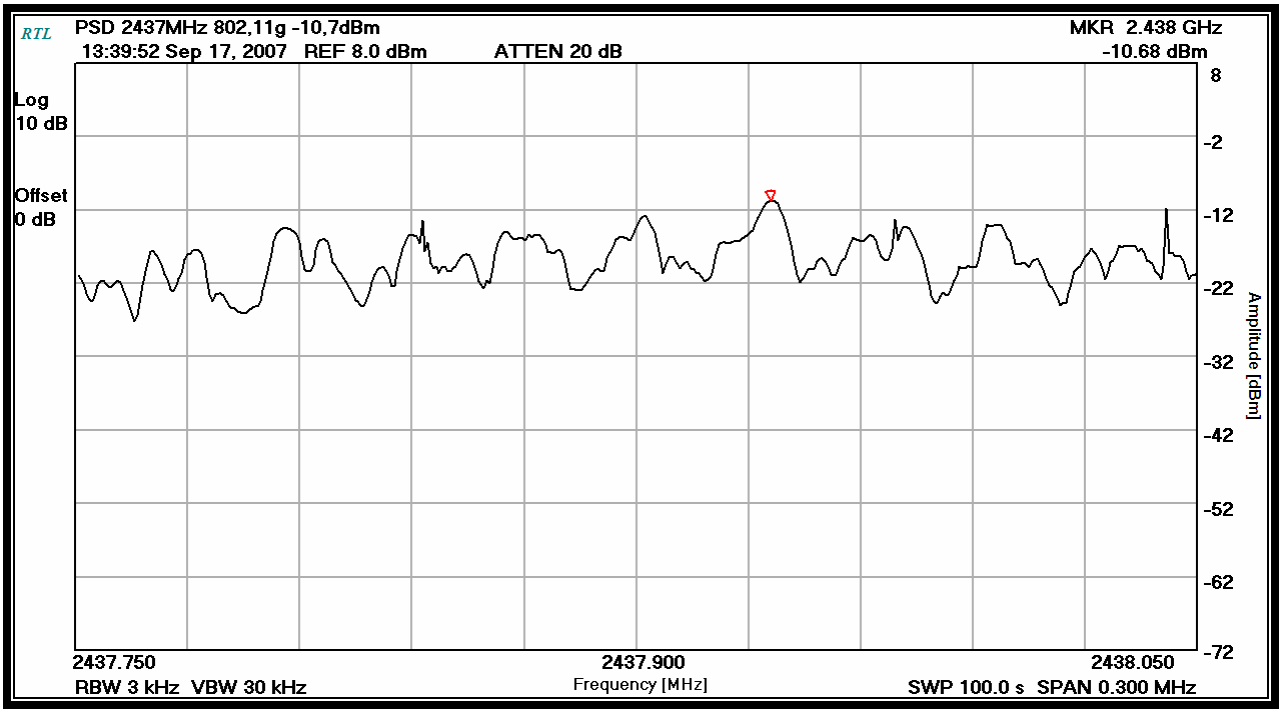
Plot 7-3: Power Spectral Density: Channel 11 (2462 MHz); 802.11b



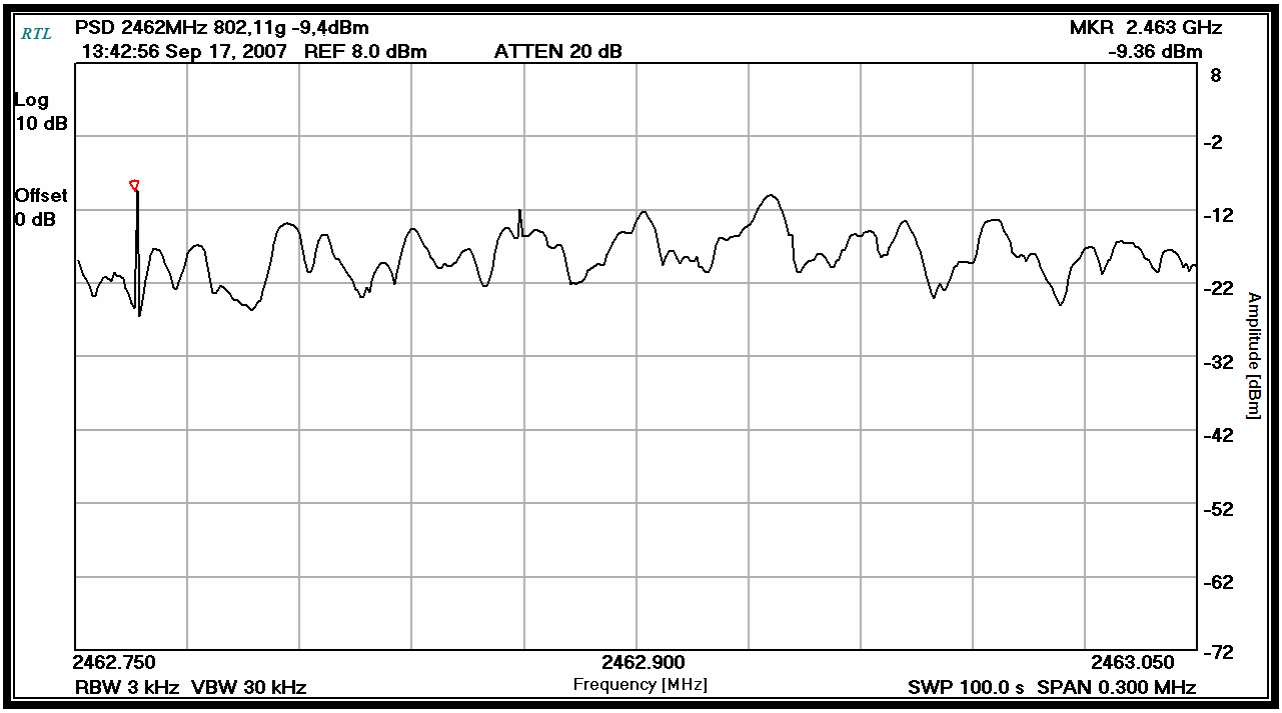
Plot 7-4: Power Spectral Density: Channel 1 (2412 MHz); 802.11g



Plot 7-5: Power Spectral Density: Channel 6 (2437 MHz); 802.11g



Plot 7-6: Power Spectral Density: Channel 11 (2462 MHz); 802.11g



Test Personnel:

Daniel Baltzell		September 17, 2007
Test Engineer	Signature	Date Of Tests

8 Conducted Emissions Measurement Limits – FCC §15.207; RSS-Gen

8.1 Limits of Conducted Emissions Measurement

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

8.2 Site and Test Description

The power line conducted emissions measurements were performed in a Series 81 type shielded enclosure manufactured by Rayproof. The EUT was assembled on a wooden table 80 centimeters high. Power was fed to the EUT through a 50 ohm/50 microhenry Line Impedance Stabilization Network (LISN). The EUT LISN was fed power through an A.C. filter box on the outside of the shielded enclosure. The filter box and EUT LISN housing are bonded to the ground plane of the shielded enclosure. A second LISN, the peripheral LISN, provides isolation for the EUT test peripherals. This peripheral LISN was also fed A.C. power. A metal power outlet box, which is bonded to the ground plane and electrically connected to the peripheral LISN, powers the EUT host peripherals.

The spectrum analyzer was connected to the A.C. line through an isolation transformer. The 50 ohm output of the EUT LISN was connected to the spectrum analyzer input through a Solar 100 kHz high-pass filter. The filter is used to prevent overload of the spectrum analyzer from noise below 100 kHz. Conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable).

The analyzer's 6 dB bandwidth was set to 9 kHz. Video filter less than 10 times the resolution bandwidth is not used. Average measurements are performed in linear mode using a 10 kHz resolution bandwidth, a 1 Hz video bandwidth, and by increasing the sweep time in order to obtain a calibrated measurement. The emission spectrum was scanned from 150 kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limits were measured and have been recorded.

Table 8-1: Conducted Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
901215	Hewlett Packard	8596EM	Spectrum Analyzer (9 kHz - 12.8 GHz)	3826A00144	10/16/07
901084	AFJ International	LS16	16A LISN	16010020082	3/28/08

8.3 Conducted Emissions Test Data

Table 8-2: Conducted Emissions Test Data – Neutral - RX Mode

Temperature: 74°F Humidity: 40%									
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC 15.207 QP Limit (dBuV)	FCC 15.207 QP Margin (dBuV)	FCC 15.207 AV Limit (dBuV)	FCC 15.207 AV Margin (dBuV)	Pass/ Fail
0.152	Pk	41.9	0.2	42.1	65.9	-23.8	55.9	-13.8	Pass
0.328	Pk	29.0	0.2	29.2	59.5	-30.3	49.5	-20.3	Pass
0.364	Pk	31.2	0.2	31.4	58.6	-27.2	48.6	-17.2	Pass
0.870	Pk	28.1	0.3	28.4	56.0	-27.6	46.0	-17.6	Pass
14.810	Pk	24.3	2.1	26.4	60.0	-33.6	50.0	-23.6	Pass
19.450	Pk	20.4	2.4	22.8	60.0	-37.2	50.0	-27.2	Pass

Table 8-3: Conducted Emissions Test Data – Hot – RX Mode

Temperature: 74°F Humidity: 40%									
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC 15.207 QP Limit (dBuV)	FCC 15.207 QP Margin (dBuV)	FCC 15.207 AV Limit (dBuV)	FCC 15.207 AV Margin (dBuV)	Pass/ Fail
0.169	Pk	39.7	0.2	39.9	65.0	-25.1	55.0	-15.1	Pass
0.258	Pk	30.7	0.1	30.8	61.5	-30.7	51.5	-20.7	Pass
0.329	Pk	29.0	0.2	29.2	59.5	-30.3	49.5	-20.3	Pass
0.650	Pk	27.2	0.2	27.4	56.0	-28.6	46.0	-18.6	Pass
14.880	Pk	23.5	2.1	25.6	60.0	-34.4	50.0	-24.4	Pass
16.500	Pk	23.3	2.2	25.5	60.0	-34.5	50.0	-24.5	Pass

Table 8-4: Conducted Emissions Test Data – Neutral - TX Mode 802.11b

Temperature: 74°F Humidity: 40%									
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC 15.207 QP Limit (dBuV)	FCC 15.207 QP Margin (dBuV)	FCC 15.207 AV Limit (dBuV)	FCC 15.207 AV Margin (dBuV)	Pass/ Fail
0.152	Pk	41.9	0.2	42.1	65.9	-23.8	55.9	-13.8	Pass
0.254	Pk	31.5	0.1	31.6	61.6	-30.0	51.6	-20.0	Pass
0.350	Pk	29.8	0.2	30.0	59.0	-29.0	49.0	-19.0	Pass
0.870	Pk	27.3	0.3	27.6	56.0	-28.4	46.0	-18.4	Pass
12.820	Pk	22.5	2.0	24.5	60.0	-35.5	50.0	-25.5	Pass
16.430	Pk	23.4	2.2	25.6	60.0	-34.4	50.0	-24.4	Pass

Table 8-5: Conducted Emissions Test Data – Hot – TX Mode 802.11b

Temperature: 74°F Humidity: 40%									
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC 15.207 QP Limit (dBuV)	FCC 15.207 QP Margin (dBuV)	FCC 15.207 AV Limit (dBuV)	FCC 15.207 AV Margin (dBuV)	Pass/ Fail
0.152	Pk	41.5	0.2	41.7	65.9	-24.2	55.9	-14.2	Pass
0.309	Pk	30.9	0.3	31.2	60.0	-28.8	50.0	-18.8	Pass
0.469	Pk	29.8	0.2	30.0	56.5	-26.5	46.5	-16.5	Pass
0.870	Pk	28.4	0.3	28.7	56.0	-27.3	46.0	-17.3	Pass
15.840	Pk	23.6	2.2	25.8	60.0	-34.2	50.0	-24.2	Pass
19.380	Pk	22.5	2.4	24.9	60.0	-35.1	50.0	-25.1	Pass

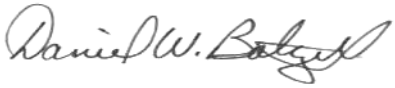
Table 8-6: Conducted Emissions Test Data – Neutral - TX Mode 802.11g

Temperature: 74°F Humidity: 40%									
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC 15.207 QP Limit (dBuV)	FCC 15.207 QP Margin (dBuV)	FCC 15.207 AV Limit (dBuV)	FCC 15.207 AV Margin (dBuV)	Pass/ Fail
0.175	Pk	38.3	0.2	38.5	64.7	-26.2	54.7	-16.2	Pass
0.266	Pk	30.7	0.2	30.9	61.2	-30.3	51.2	-20.3	Pass
0.307	Pk	29.9	0.3	30.2	60.1	-29.9	50.1	-19.9	Pass
0.800	Pk	28.1	0.3	28.4	56.0	-27.6	46.0	-17.6	Pass
13.630	Pk	23.5	2.0	25.5	60.0	-34.5	50.0	-24.5	Pass
18.050	Pk	21.1	2.4	23.5	60.0	-36.5	50.0	-26.5	Pass

Table 8-7: Conducted Emissions Test Data – Hot – TX Mode 802.11g

Temperature: 74°F Humidity: 40%									
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC 15.207 QP Limit (dBuV)	FCC 15.207 QP Margin (dBuV)	FCC 15.207 AV Limit (dBuV)	FCC 15.207 AV Margin (dBuV)	Pass/ Fail
0.178	Pk	38.0	0.2	38.2	64.6	-26.4	54.6	-16.4	Pass
0.239	Pk	33.3	0.1	33.4	62.1	-28.7	52.1	-18.7	Pass
0.297	Pk	31.3	0.3	31.6	60.3	-28.7	50.3	-18.7	Pass
0.500	Pk	28.7	0.2	28.9	56.0	-27.1	46.0	-17.1	Pass
13.700	Pk	24.0	2.0	26.0	60.0	-34.0	50.0	-24.0	Pass
16.650	Pk	23.5	2.2	25.7	60.0	-34.3	50.0	-24.3	Pass

Test Personnel:



Daniel W. Baltzell		August 27, 2007
Test Engineer	Signature	Date Of Tests

9 Radiated Emissions - §15.209; RSS-210 §A8.5 and RSS-Gen

9.1 Limits of Radiated Emissions Measurement

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009-0.490	2400/f (kHz)	300
0.490-1.705	2400/f (kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

As shown in 15.35(b), for frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any circumstances of modulation.

9.2 Radiated Emissions Measurement Test Procedure

Before final measurements of radiated emissions were made on the open-field three/ten meter range, the EUT was scanned indoors at one and three meter distances. This was done in order to determine its emissions spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements on the open-field range, at each frequency, in order to ensure that maximum emission amplitudes were attained.

Final radiated emissions measurements were made on the three/ten-meter, open-field test site. The EUT was placed on a nonconductive turntable 0.8 meters above the ground plane. The spectrum was examined from 9 kHz to the 10^{th} harmonic of the highest fundamental transmitter frequency (24.8 GHz).

At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations. For frequencies between 30 and 1000 MHz, the spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. For emissions above 1000 MHz, emissions are measured using the average detector function with a minimum resolution bandwidth of 1 MHz. No video filter less than 10 times the resolution bandwidth was used. The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

Table 9-1: Radiated Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900151	Rohde and Schwarz	HFH2-Z2	Loop Antenna (9 kHz - 30 MHz)	827525/019	9/15/09
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	10/28/07
900905	Rhein Tech Labs	PR-1040	OATS 1 Preamplifier 40 dB (30 MHz – 2 GHz)	1006	5/16/08
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
901231	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	5/16/08
901232	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	5/16/08
901235	IW Microwave Products	KPS-1503-360-KPS	High frequency RF cables	36"	5/16/08
901242	Rhein Tech Labs	WRT-000-0003	Wood rotating table	N/A	Not Required
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	6/14/10
900321	EMCO	3161-03	Horn Antennas (4 - 8,2 GHz)	9508-1020	6/14/10
900323	EMCO	3160-7	Horn Antennas (8,2 - 12,4 GHz)	9605-1054	6/14/10
900356	EMCO	3160-08	Horn Antenna (12.4 - 18 GHz)	9607-1044	6/14/10
900325	EMCO	3160-9	Horn Antennas (18 - 26.5 GHz)	9605-1051	6/14/10
900392	Hewlett Packard	1197OK	Harmonic Mixer (18 – 26.5 GHz)	3525A00159	11/27/07
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	5/22/08
900930	Hewlett Packard	85662A	Spectrum Analyzer Display Section	3144A20839	5/22/08
900889	Hewlett Packard	85685A	RF Preselector (20 Hz - 2 GHz)	3146A01309	5/22/08
900913	Hewlett Packard	85462A	EMI Receiver RF Section (9 kHz – 6.5 GHz)	3325A00159	3/21/08

9.3 Radiated Emissions Test Results

9.3.1 Radiated Emissions – Digital Test Data

Table 9-2: Digital Radiated Emissions

Temperature: 73°F Humidity: 64%										
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pass/ Fail
221.158	Qp	V	260	1.0	50.1	-17.7	32.4	46.0	-13.6	Pass
233.441	Qp	H	180	1.0	42.7	-16.5	26.2	46.0	-19.8	Pass
245.730	Qp	H	225	1.0	41.7	-15.3	26.4	46.0	-19.6	Pass
294.874	Qp	H	240	1.0	45.5	-13.6	31.9	46.0	-14.1	Pass
331.738	Qp	V	120	1.3	41.4	-12.4	29.0	46.0	-17.0	Pass
344.034	Qp	V	250	1.0	40.5	-12.0	28.5	46.0	-17.5	Pass
393.165	Qp	H	170	1.0	40.5	-10.3	30.2	46.0	-15.8	Pass
430.035	Qp	V	250	1.0	41.3	-9.2	32.1	46.0	-13.9	Pass

9.3.2 Radiated Emissions Harmonics/Spurious Test Data

Table 9-3: Radiated Emissions Harmonics/Spurious Channel 1 (TX Frequency: 2412 MHz); 802.11b

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/ 10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4824.0	57.6	49.4	3.5	52.9	54.0	-1.1
7236.0	39.3	26.7	7.8	34.5	86.2	-51.7
9648.0	36.6	25.6	14.0	39.6	86.2	-46.6
12060.0	36.2	26.4	15.2	41.6	54.0	-12.4

Table 9-4: Radiated Emissions Harmonics/Spurious Channel 6 (TX Frequency: 2437 MHz); 802.11b

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/ 10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4874.0	57.1	50.2	3.5	53.7	54.0	-0.3
7311.0	40.2	27.4	7.2	34.6	54.0	-19.4
9748.0	36.4	25.9	13.6	39.5	84.9	-45.4
12185.0	36.8	26.3	14.6	40.9	54.0	-13.1

Table 9-5: Radiated Emissions Harmonics/Spurious Channel 11 (TX Frequency: 2462 MHz); 802.11b

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/ 10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4924.0	56.3	49.9	3.5	53.4	54.0	-0.6
7386.0	40.6	27.8	6.6	34.4	54.0	-19.6
9848.0	37.7	26.4	15.2	41.6	87.6	-46.0
12310.0	37.7	26.2	15.0	41.2	54.0	-12.8

Table 9-6: Radiated Emissions Harmonics/Spurious Channel 1 (TX Frequency: 2412 MHz); 802.11g

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/ 10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4824.0	41.4	28.2	5.8	34.0	54.0	-20.0
7236.0	36.8	25.8	7.8	33.6	80.9	-47.3
9648.0	36.1	25.6	14.0	39.6	80.9	-41.3
12060.0	37.4	26.4	15.2	41.6	54.0	-12.4

Table 9-7: Radiated Emissions Harmonics/Spurious Channel 6 (TX Frequency: 2437 MHz); 802.11g

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/ 10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4874.0	41.8	27.8	5.2	33.0	54.0	-21.0
7311.0	39.3	26.0	7.2	33.2	54.0	-20.8
9748.0	36.7	25.9	13.6	39.5	81.6	-42.1
12185.0	36.9	26.3	14.6	40.9	54.0	-13.1

Table 9-8: Radiated Emissions Harmonics/Spurious Channel 11 (TX Frequency: 2462 MHz); 802.11g

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/ 10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4924.0	42.6	28.9	5.1	34.0	54.0	-20.0
7386.0	38.9	26.3	6.6	32.9	54.0	-21.1
9848.0	37.3	26.4	15.2	41.6	81.3	-39.7
12310.0	37.6	26.2	15.0	41.2	54.0	-12.8

Test Personnel:

Daniel Baltzell		September 18, 2007
Test Engineer	Signature	Date Of Test

10 99% Bandwidth - RSS-Gen §4.6.1

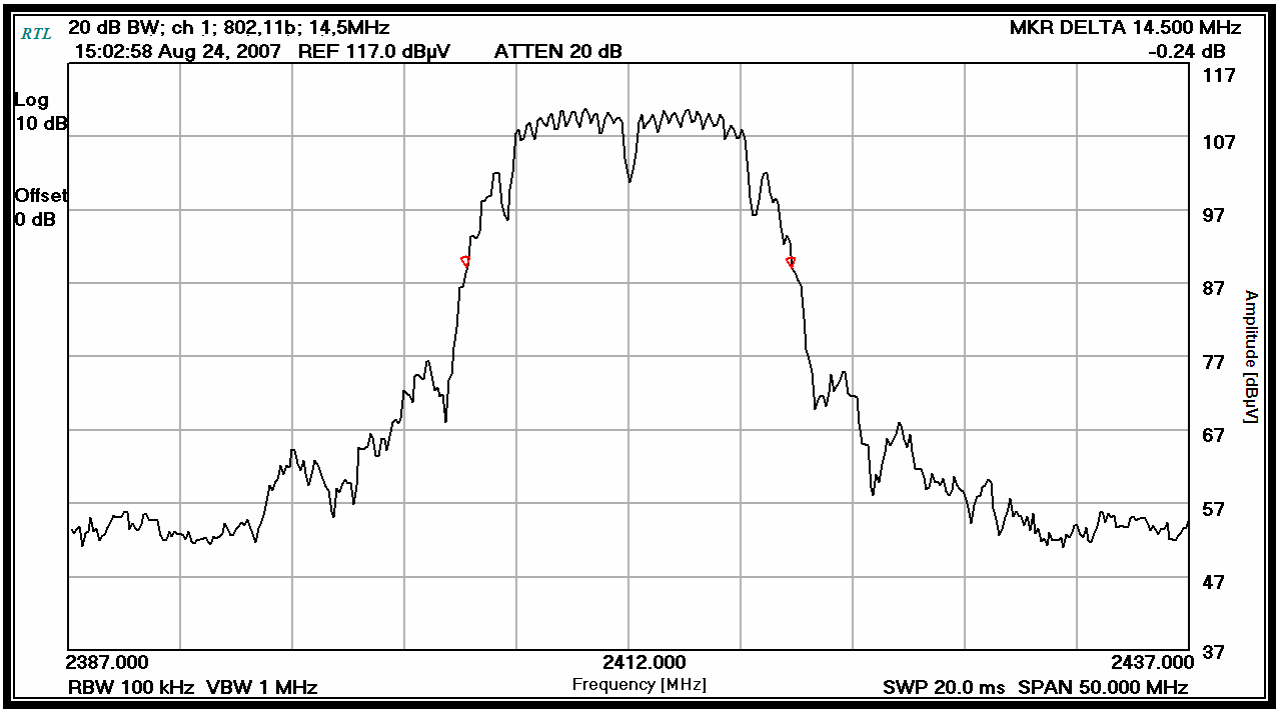
Table 10-1: 99% Bandwidth Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer (3 Hz – 50 GHz)	US440203416	6/13/08

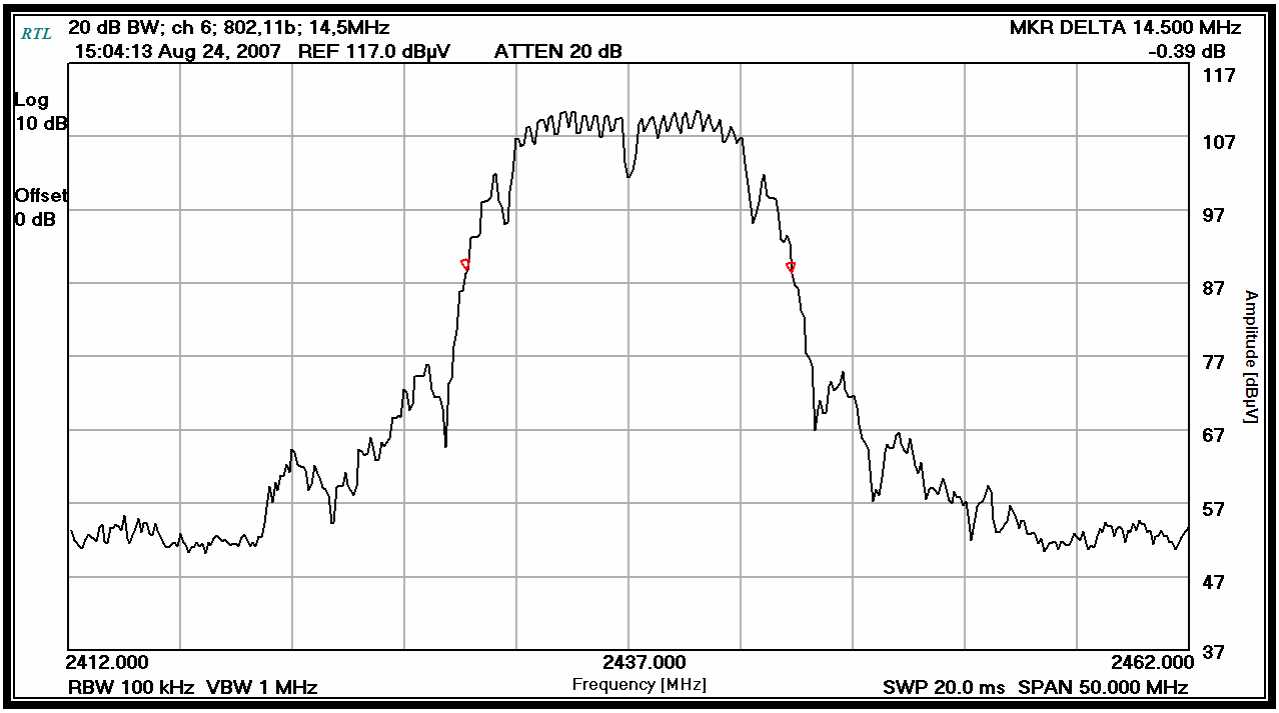
Table 10-2: 99% Bandwidth Test Data

Mode	Channel	Frequency (MHz)	99% Bandwidth (MHz)
802.11b	1	2412	14.5
802.11b	6	2437	14.5
802.11b	11	2462	14.6
802.11g	1	2412	17.6
802.11g	6	2437	17.8
802.11g	11	2462	17.9

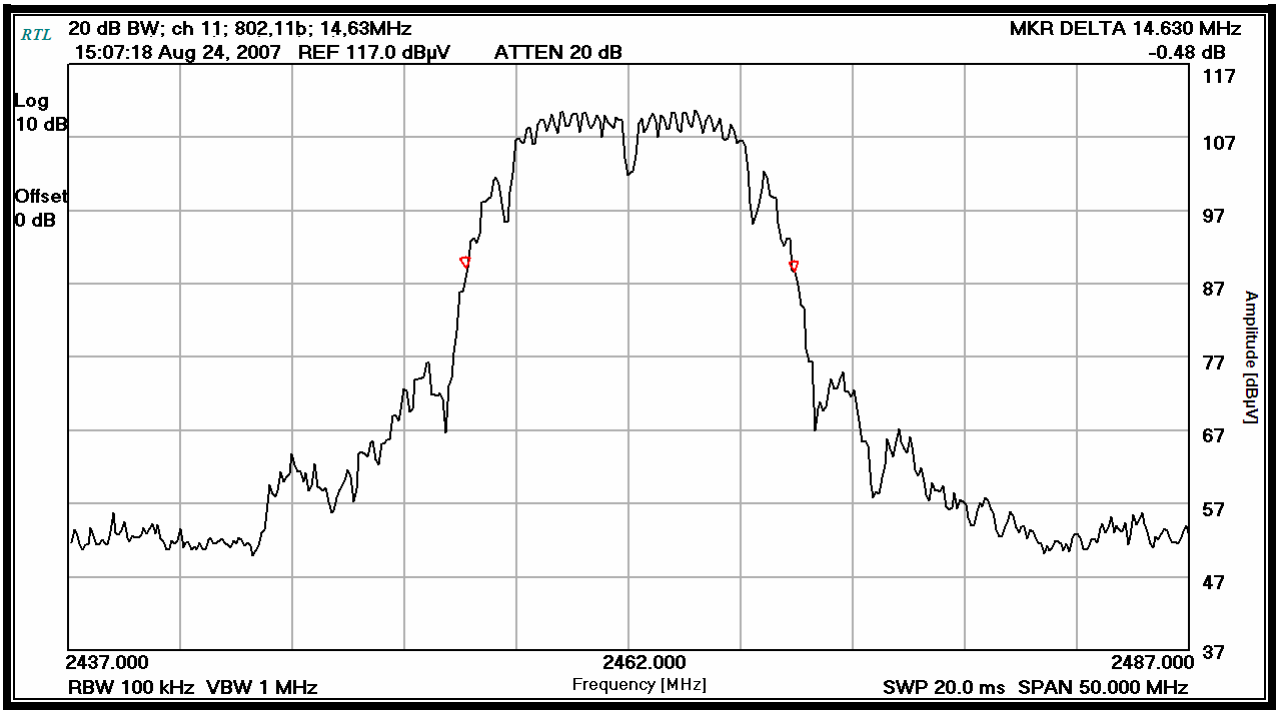
Plot 10-1: 99% Bandwidth Channel 1 (TX Frequency: 2412 MHz) – 802.11b



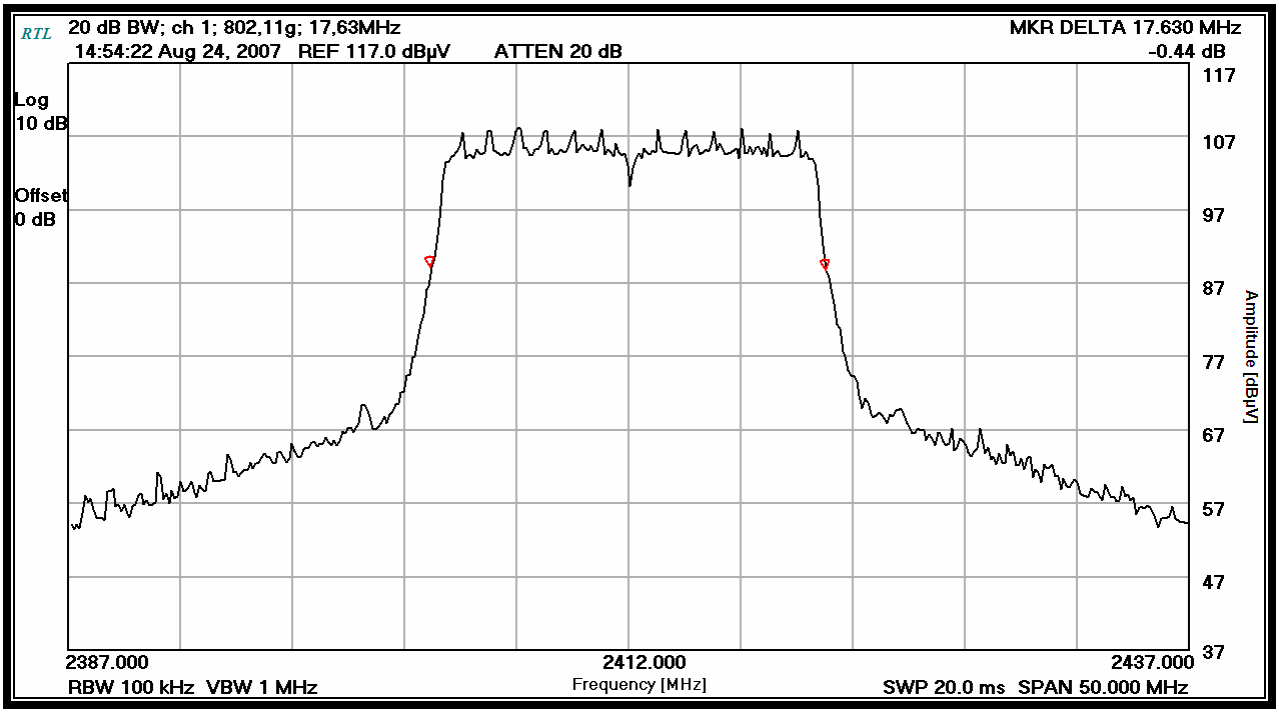
Plot 10-2: 99% Bandwidth Channel 6 (TX Frequency: 2437 MHz) – 802.11b



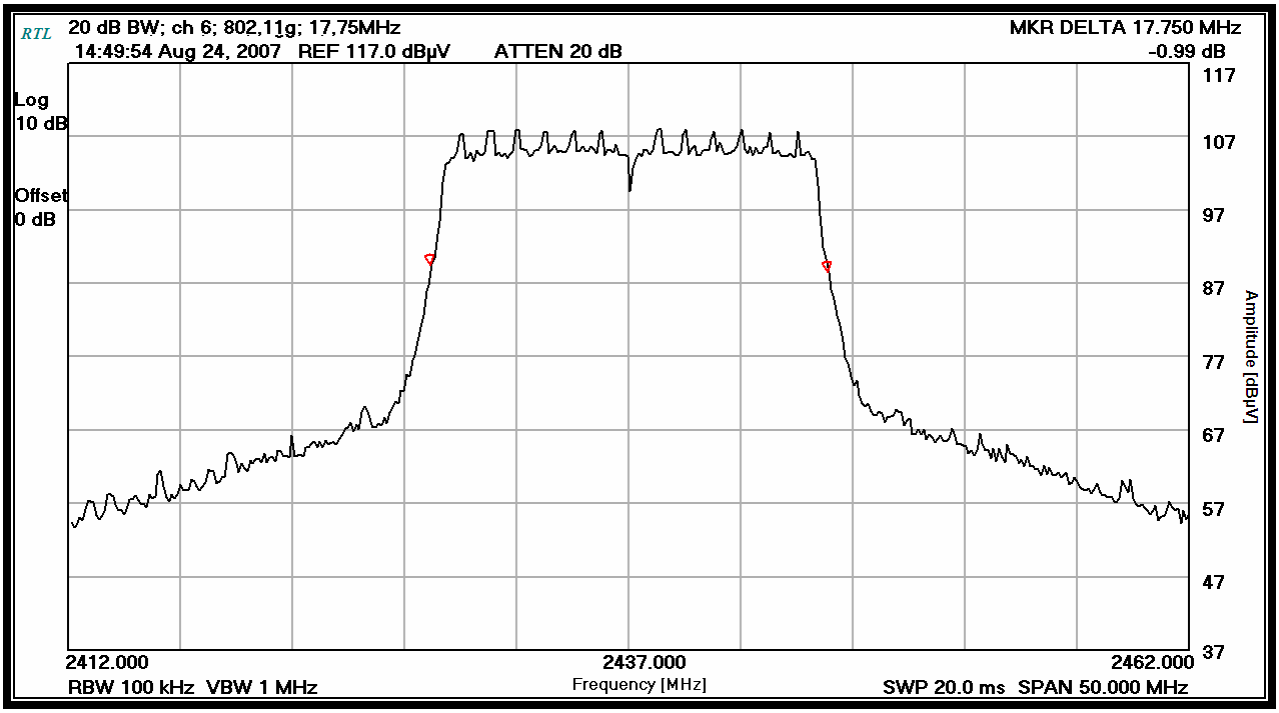
Plot 10-3: 99% Bandwidth Channel 11 (TX Frequency: 2462 MHz) – 802.11b



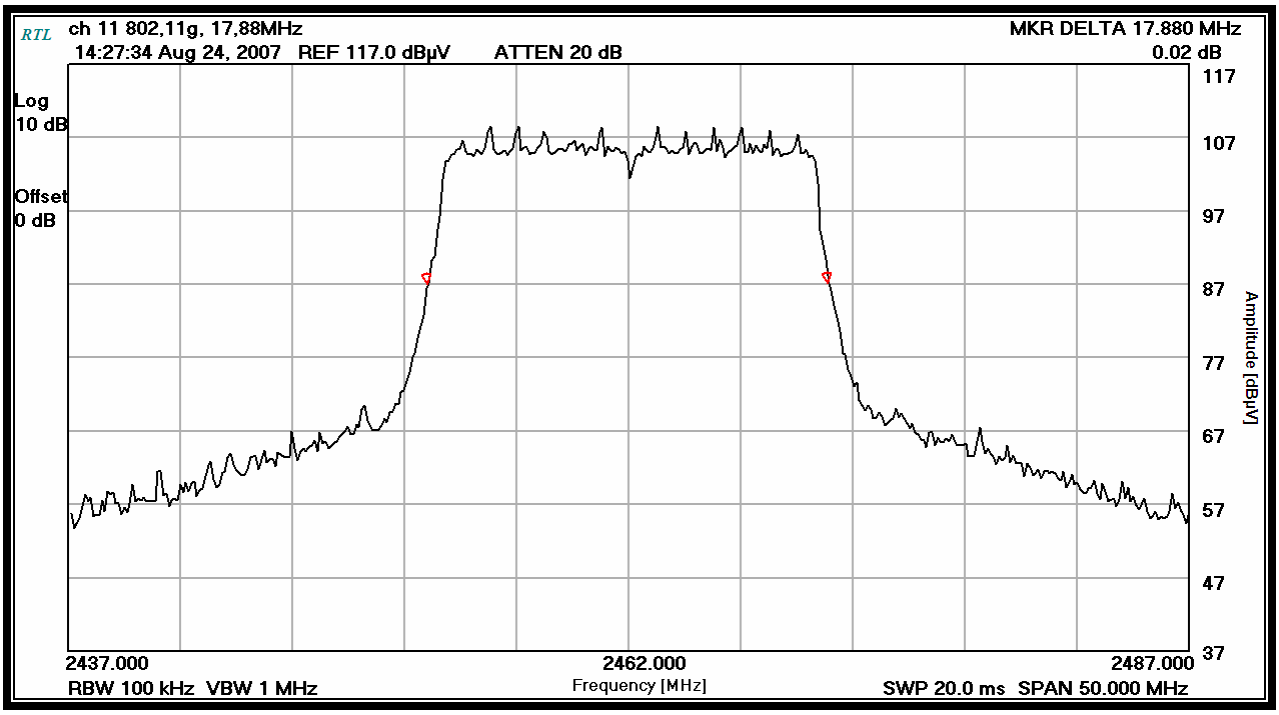
Plot 10-4: 99% Bandwidth Channel 1 (TX Frequency: 2412 MHz) – 802.11g



Plot 10-5: 99% Bandwidth Channel 6 (TX Frequency: 2437 MHz) – 802.11g



Plot 10-6: 99% Bandwidth Channel 11 (TX Frequency: 2462 MHz) – 802.11g



Test Personnel:

Daniel Baltzell	Daniel W. Baltzell	August 24, 2007
Test Engineer	Signature	Date Of Tests

11 Conclusion

The data in this measurement report shows that the EUT as tested, Vocollect, Inc. Model # AVA-100-01, FCC ID: MQOH1AVA-10001, IC: 2570A-H1AVA101, complies with all the applicable requirements of Parts 2 and 15 of the FCC Rules and Regulations, and Industry Canada RSS-210 and RSS Gen.