Engineering and Testing for EMC and Safety Compliance

CERTIFICATION APPLICATION REPORT
FCC Part 15.247 & INDUSTRY CANADA RSS-210

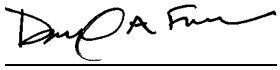
Test Lab:	Applicant:
Rhein Tech Laboratories, Inc. Phone: 703-689-0368 360 Herndon Parkway Fax: 703-689-2056 Suite 1400 Web: www.rheintech.com Herndon, VA 20170 E-Mail: ATCBINFO@rheintech.com	Vocollect, Inc. Phone: 412-349-2580 Contact: Joe Lesik Fax: 412-829-1063 703 Rodi Road Pittsburgh, PA 15235 E-Mail: jlesik@vocollect.com

FCC ID/ IC ID:	MQOTT700-10000/ 2570A-TT700100	**Test Report Date:**	October 28, 2005
Platform:	N/A	**RTL Work Order Number:**	2005147
Model Name/ Model Number:	Talkman T5/TT-700	**RTL Quote Number:**	QRTL05-240

American National Standard Institute:	ANSI C63.4: 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 (WLAN portion) DSS – Part 15 Spread Spectrum Transmitter (Bluetooth portion)
FCC Rule Part(s):	FCC Rules Part 15.247: Operation within the bands 920-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Direct Sequence System
Industry Canada:	RSS-210: Low Power License-Exempt Communications Devices
Digital Interface Information	Digital Interface was found to be compliant

Frequency Range (MHz)	Output Power (W)	Frequency Tolerance	Emission Designator
2412-2462	0.035	N/A	N/A
2402-2480	0.002	N/A	N/A

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, FCC 97-114, ANSI C63.4, and Industry Canada RSS-210.

Signature: 

Date: October 28, 2005

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: 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: Low Power License-Exempt Communications Devices

1.2 Description of EUT

Equipment Under Test	Body Worn Terminal	
Model	TT-700	
Power Supply	Battery operated	
Modulation Type	DSSS – WLAN	FHSS - Bluetooth
Transfer Rate	11, 5.5, 2, and 1 Mbps	
Frequency Range	2412 – 2462 MHz	2402 – 2480 MHz
Antenna Connector Type	Internal	Internal
Antenna Types	Internal	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 certification for Vocollect, Inc. Model: TT-700, FCC ID: MQOTT700-10000.

1.5 Modifications

No modifications were required for compliance.

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 for DSSS – 1 Mbps

Channel	Frequency
1	2412
6	2437
11	2462

Table 2-2: Channels Tested for FHSS – 1 Mbps

Channel	Frequency
0	2402
38	2440
78	2480

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 Result Summary

Table 2-3: Test Result Summary – FCC Part 15, Subpart C (Section 15.247) – DSSS WLAN

Standard	Test	Pass/Fail or N/A
FCC 15.207	AC Power Conducted Emissions	N/A
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

Table 2-4: Test Result Summary – FCC Part 15, Subpart C (Section 15.247) – FHSS Bluetooth

Standard	Test	Pass/Fail or N/A
FCC 15.207	AC Power Conducted Emissions	N/A
FCC 15.209	Radiated Emissions	Pass
FCC 15.247(b)	Maximum Peak Power Output	Pass
FCC 15.247(d)	Antenna Conducted Spurious Emissions	Pass
FCC 15.247(d)	Band Edge Measurement	Pass
FCC 15.247 (a)(1)	Carrier Frequency Separation	Pass
FCC 15.247 (a)(1)(ii)	20 dB Bandwidth	Pass
FCC 15.247 (a)(1)(iii)	Hopping Characteristics	Pass
FCC 15.247 (a)(1)(iii)	Average Time of Occupancy	Pass

2.4 Test System Details

The test sample was received on September 28, 2005. The FCC identifiers for all applicable equipment, plus descriptions of all cables used in the tested system, are identified in the following tables.

Table 2-5: Equipment Under Test

Part	Manufacturer	Model	Serial Number	FCC ID	Cable Description	RTL Bar Code
WLAN/Bluetooth terminal	Vocollect, Inc.	TT-700	REV C 30	MQOTT700-10000	N/A	16888

2.5 Configuration of Tested System

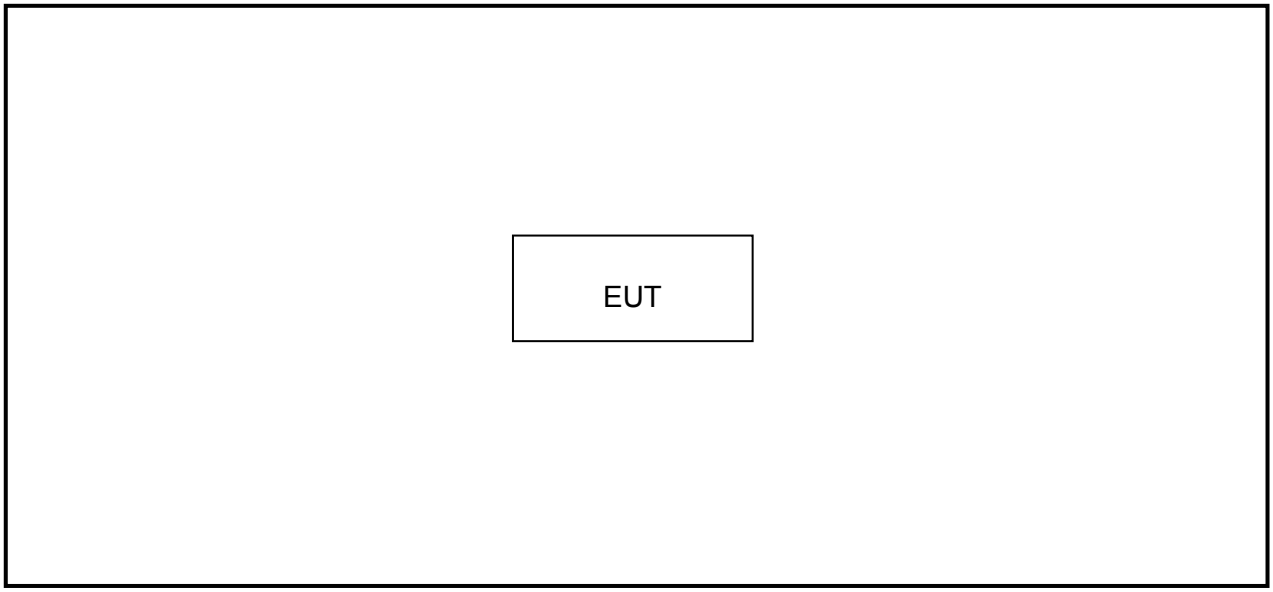


Figure 2-1: Configuration of System Under Test

3 Peak Output Power - §15.247(b)(1); RSS-210 §6.6.2(o)

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	9/10/06
901356	Agilent Technologies	E9323A	Power Sensor	31764-264	9/10/06

3.2 Power Output Test Data

Table 3-2: Power Output Test Data – DSSS WLAN

Channel	Frequency (MHz)	Peak Power conducted output (dBm)
1	2412	14.7
6	2437	15.5
11	2462	15.0

Table 3-3: Power Output Test Data – FHSS Bluetooth

Channel	Frequency (MHz)	Peak Power conducted output (dBm)
0	2402	2.0
38	2440	2.3
78	2480	2.1

Test Personnel:

Richard B. McMurray	Richard B. McMurray	September 29, 2005
EMC Test Engineer	Signature	Date Of Test

4 Compliance with the Band Edge – FCC §15.247(d); RSS-210 §6.6.2(o)

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
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	9/14/06
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"	9/1/06
901232	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	9/1/06
901235	IW Microwave Products	KPS-1503-360-KPS	High frequency RF cables	36"	9/1/06
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	5/20/07

4.2 Restricted Band Edge Test Results

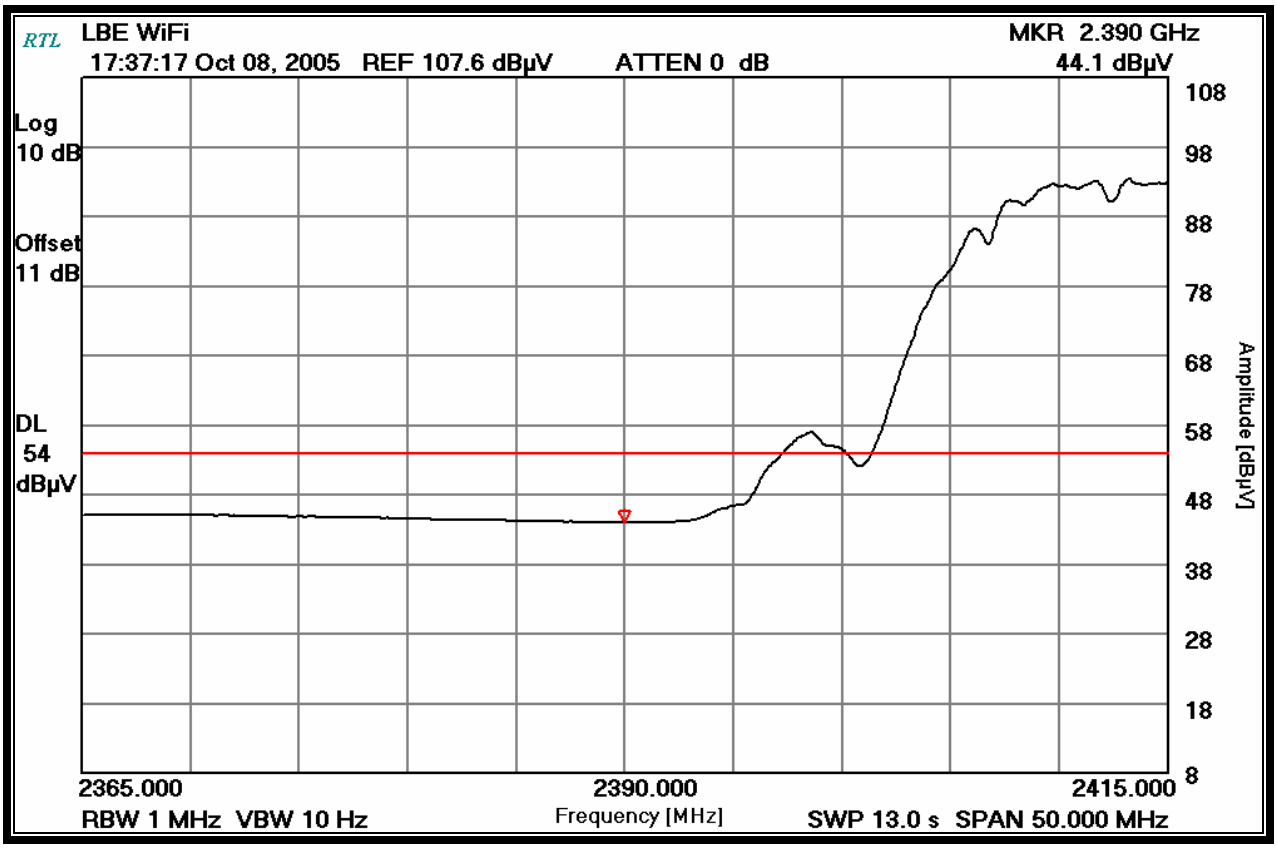
4.2.1 Calculation of Lower Band Edge – DSSS WLAN

97.4 dBuV/m is the field strength measurement, from which the delta measurement of 49.2 dB is subtracted (reference plots), resulting in a level of 48.2 dB. This level has a margin of 5.8 dB below the limit of 54 dBuV/m.

Calculation: 100.7 dBuV/m – 49.2 dB – 54 dBuV/m = -5.8 dB

Peak Field Strength of Lower Band Edge (1 MHz RBW/1 MHz VBW) = 100.7 dBuV/m
Average Field Strength of Lower Band Edge (1 MHz RBW/10 Hz VBW) = 97.4 dBuV/m
Delta measurement = 49.2 dB

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



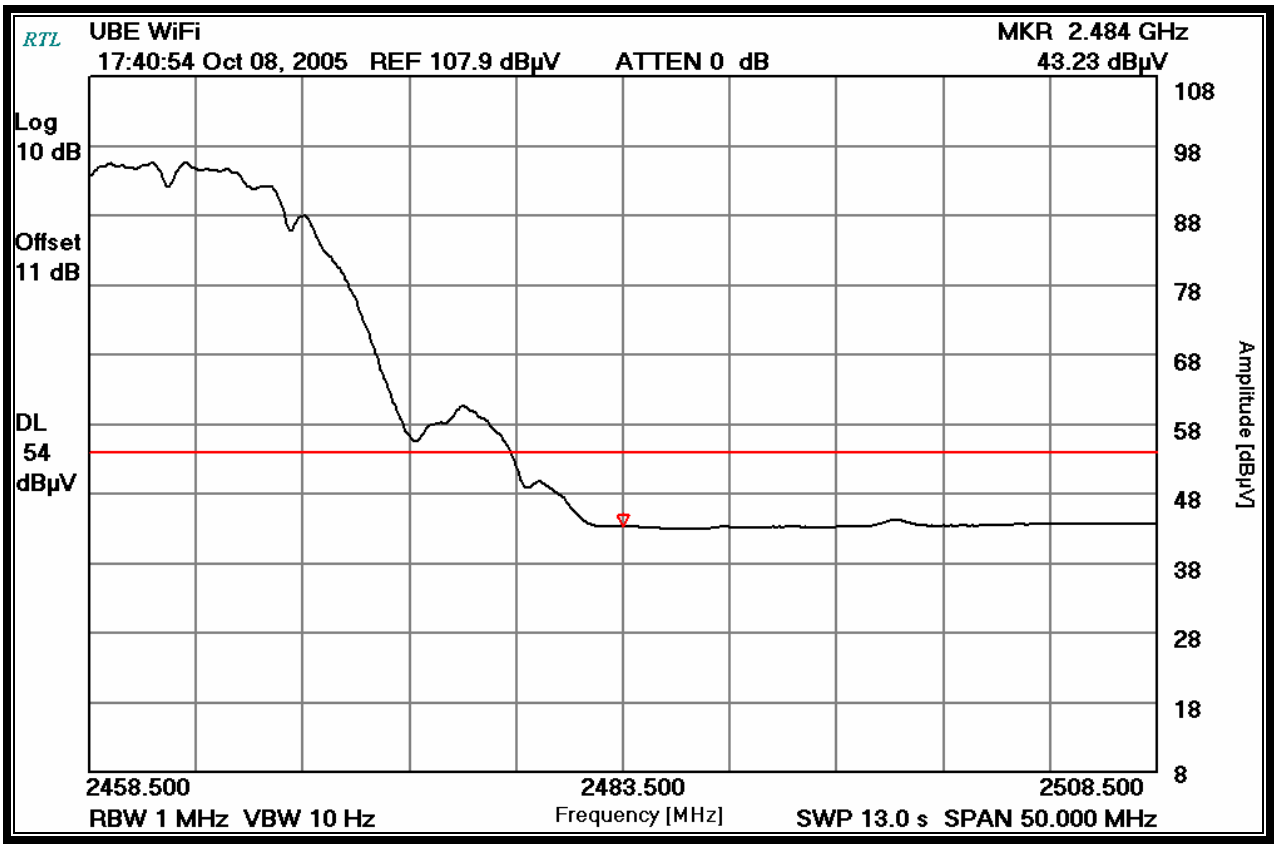
4.2.2 Calculation of Upper Band Edge – DSSS WLAN

98.2 dBuV/m is the field strength measurement, from which the delta measurement of 52.7 dB is subtracted (reference plots), resulting in a level of 45.5 dB. This level has a margin of 8.5 dB below the limit of 54 dBuV/m.

Calculation: 98.2 dBuV/m – 52.7 dB – 54 dBuV/m = -8.5 dB

Peak Field Strength of Lower Band Edge (1 MHz RBW/1 MHz VBW) = 102.1 dBuV/m
Average Field Strength of Lower Band Edge (1 MHz RBW/10 Hz VBW) = 98.2 dBuV/m
Delta measurement = 52.7 dB

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



Test Personnel:

Daniel W. Baltzell	Daniel W. Baltzell	October 8, 2005
Test Engineer	Signature	Dates Of Test

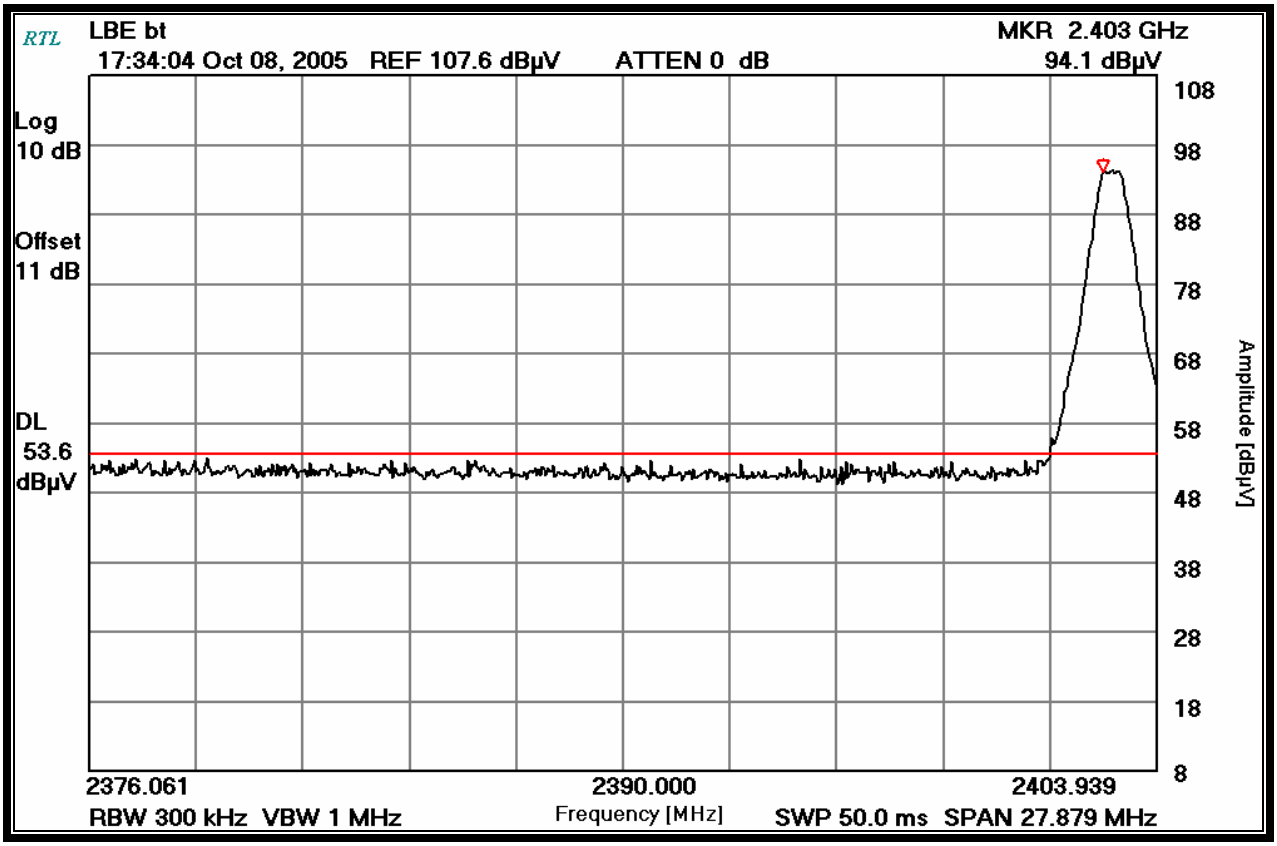
4.2.3 Calculation of Lower Band Edge – Bluetooth

95.4 dBuV/m is the field strength measurement, from which the delta measurement of 44.5 dB is subtracted (reference plots), resulting in a level of 50.9 dB. This level has a margin of 3.1 dB below the limit of 54 dBuV/m.

Calculation: 95.4 dBuV/m – 44.5 dB – 54 dBuV/m = -3.1 dB

Peak Field Strength of Lower Band Edge (1 MHz RBW/1 MHz VBW) = 95.6 dBuV/m
Average Field Strength of Lower Band Edge (1 MHz RBW/10 Hz VBW) = 95.4 dBuV/m
Delta measurement = 44.5 dB

Plot 4-3: Lower Band Edge: Average Measurement Channel 0 (TX Frequency: 2402 MHz)



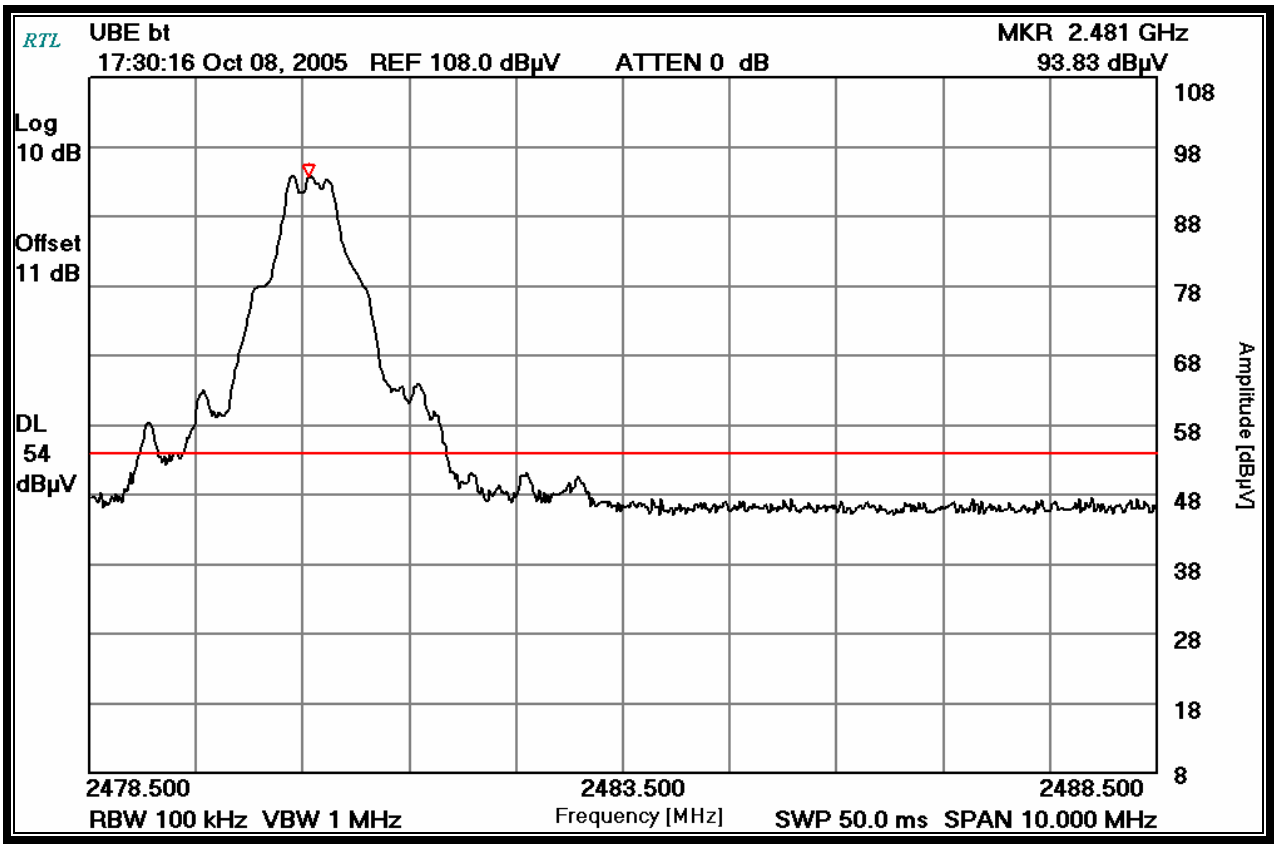
4.2.4 Calculation of Upper Band Edge – Bluetooth

94.8 dBuV/m is the field strength measurement, from which the delta measurement of 47.5 dB is subtracted (reference plots), resulting in a level of 47.3 dB. This level has a margin of 6.7 dB below the limit of 54 dBuV/m.

Calculation: 94.8 dBuV/m – 47.5 dB – 54 dBuV/m = -6.7 dB

Peak Field Strength of Lower Band Edge (1 MHz RBW/1 MHz VBW) = 95.0 dBuV/m
Average Field Strength of Lower Band Edge (1 MHz RBW/10 Hz VBW) = 94.8 dBuV/m
Delta measurement = 47.5 dB

Plot 4-4: Upper Band Edge: Average Measurement Channel 78 (TX Frequency: 2480 MHz)



Test Personnel:

Daniel W. Baltzell	Daniel W. Baltzell	October 8, 2005
Test Engineer	Signature	Dates Of Test

5 Antenna Conducted Spurious Emissions - §15.247(d); RSS-210 §6.6.2(o)

5.1 Antenna Conducted Spurious Emissions Test Procedures

Antenna spurious emissions per FCC 15.247(c) was 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, and 2402 MHz, 2440 MHz and 2480 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 carrier level 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
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz – 22 GHz)	3138A07771	8/03/06

Test Personnel:

Richard B. McMurray	Richard B. McMurray	October 5 – 6, 2005
EMC Test Engineer	Signature	Date Of Test

6 6 dB Bandwidth - §15.247(a)(2); RSS-210 §6.6.2(o)

6.1 6 db Bandwidth Test Procedure – Minimum 6 db Bandwidth – DSSS WLAN

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

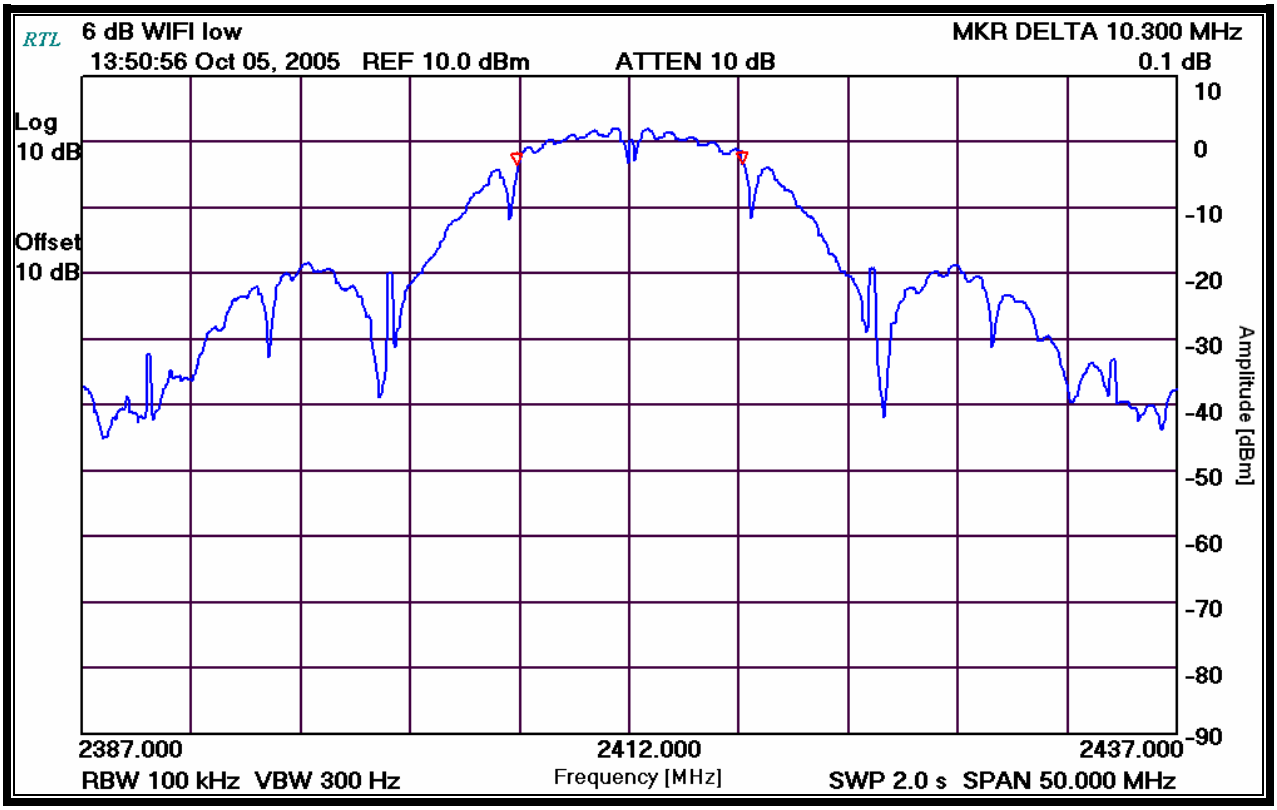
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900930/900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz – 22 GHz)	3138A07771	8/26/2006

6.2 6 db Bandwidth Test Results

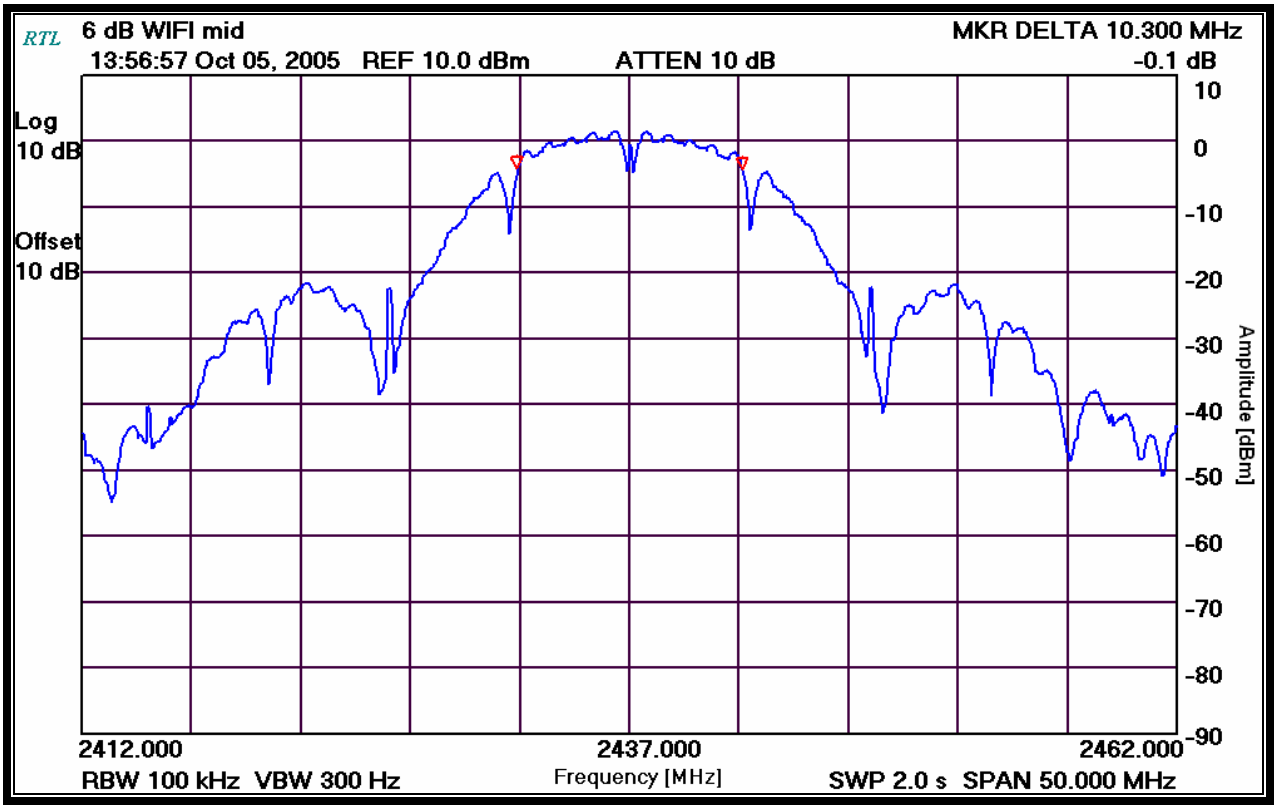
Table 6-2: 6 db Bandwidth Test Data - WLAN

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/Fail
1	2412	10.3	0.5	Pass
6	2437	10.3	0.5	Pass
11	2462	10.3	0.5	Pass

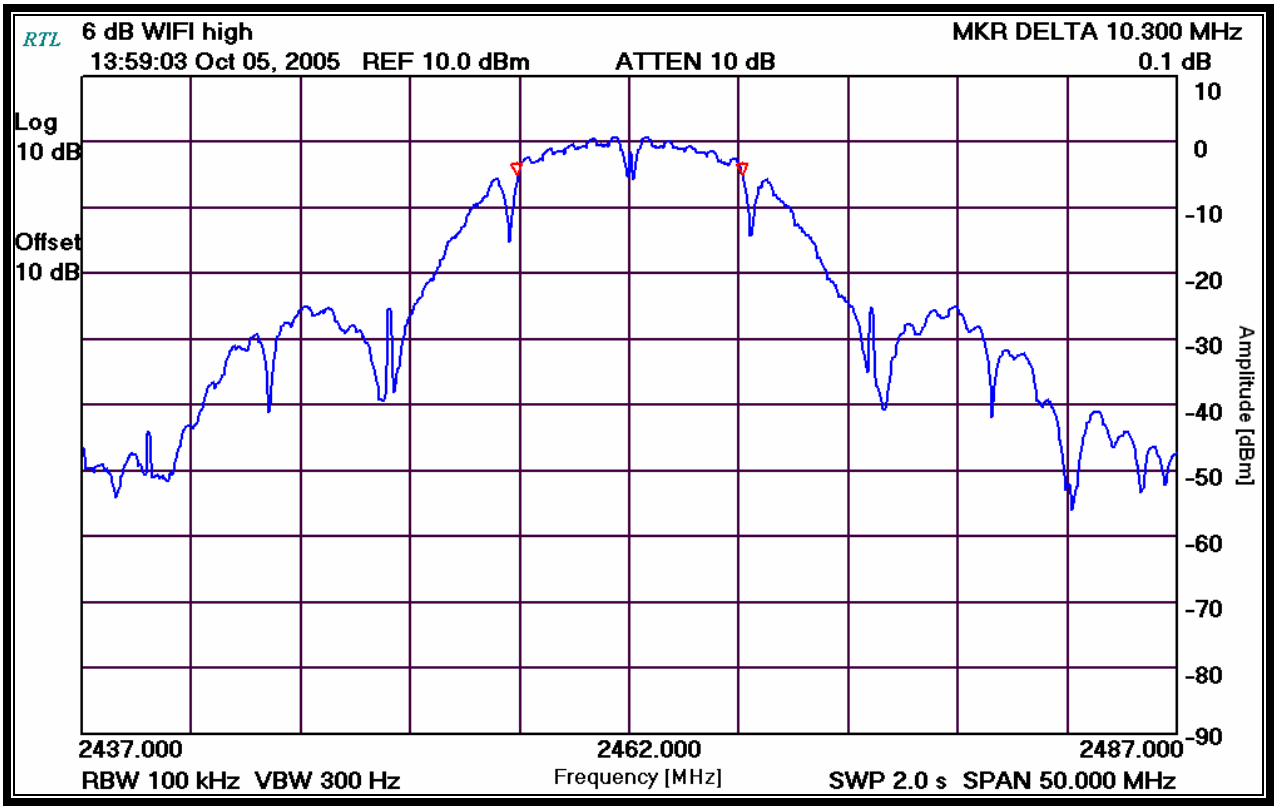
Plot 6-1: 6 dB Bandwidth Channel 1 (TX Frequency: 2412 MHz)



Plot 6-2: 6 dB Bandwidth Channel 6; (TX Frequency: 2437 MHz)



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



Test Personnel:

Richard B. McMurray	Richard B. McMurray	October 5, 2005
EMC Test Engineer	Signature	Date Of Test

7 Power Spectral Density - §15.247(e); RSS-210 §6.6.2(o)

7.1 Power Spectral Density Test Procedure – DSSS WLAN

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.

Note: This test is not applicable for the Bluetooth transmitter.

Table 7-1: Power Spectral Density Test Equipment

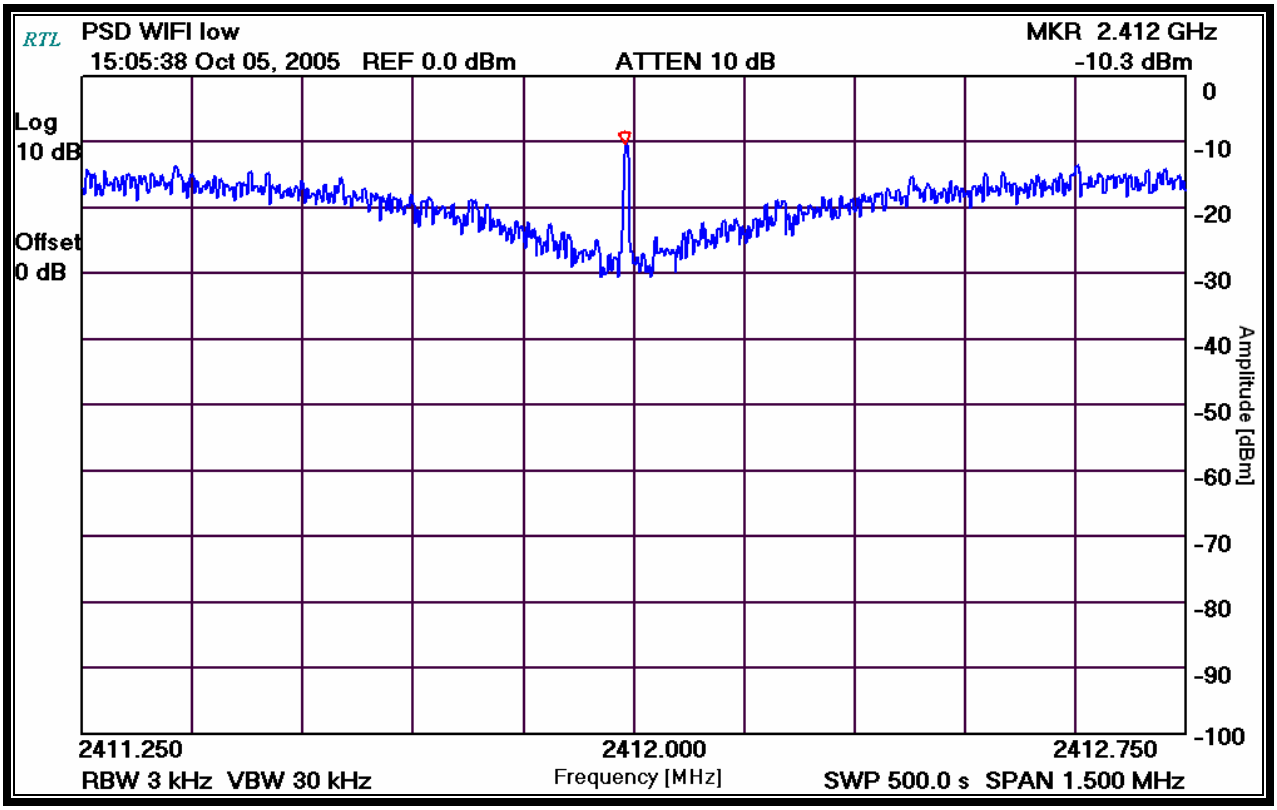
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz – 22 GHz)	3138A07771	8/3/06

7.2 Power Spectral Density Test Data

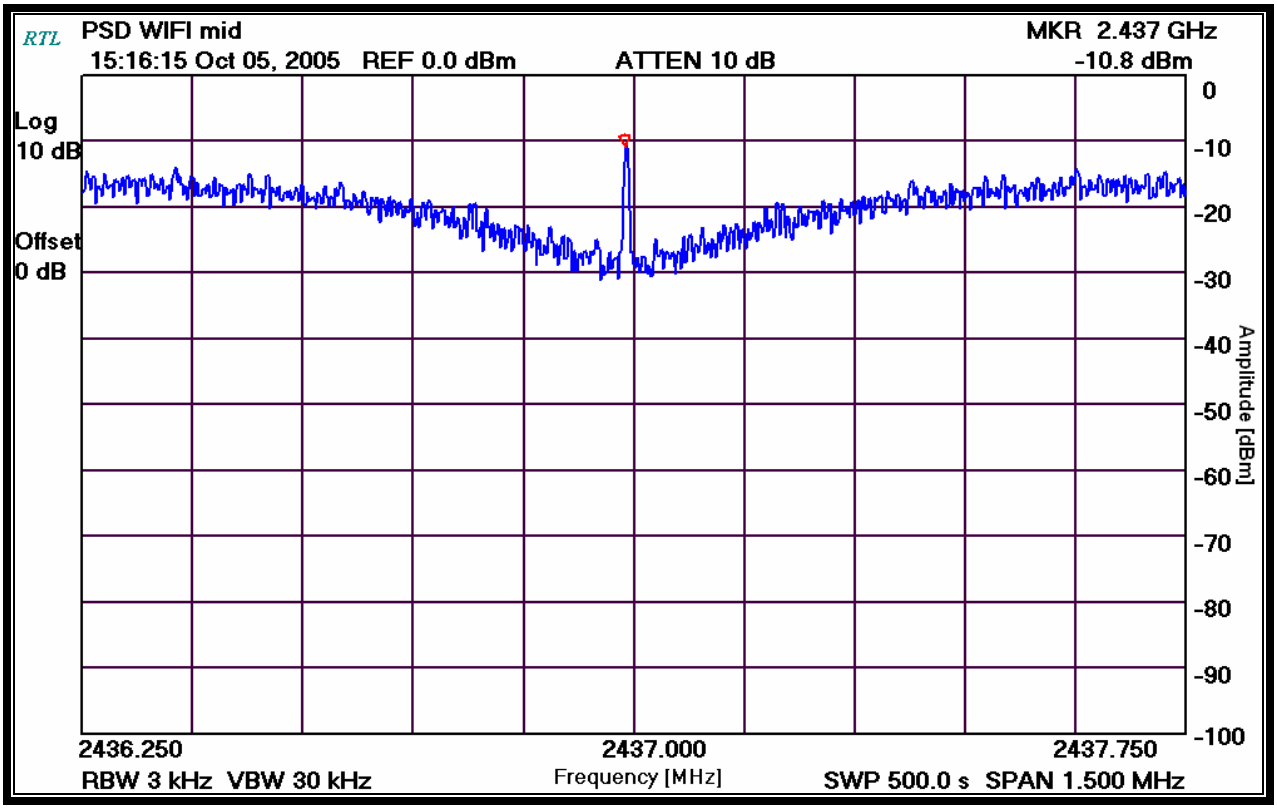
Table 7-2: Power Spectral Density Test Data

Channel	Frequency (MHz)	RF Power Level (dBm)	Maximum Limit +8dBm	Pass/Fail
1	2412	-10.3	8	Pass
6	2437	-10.8	8	Pass
11	2462	-11.7	8	Pass

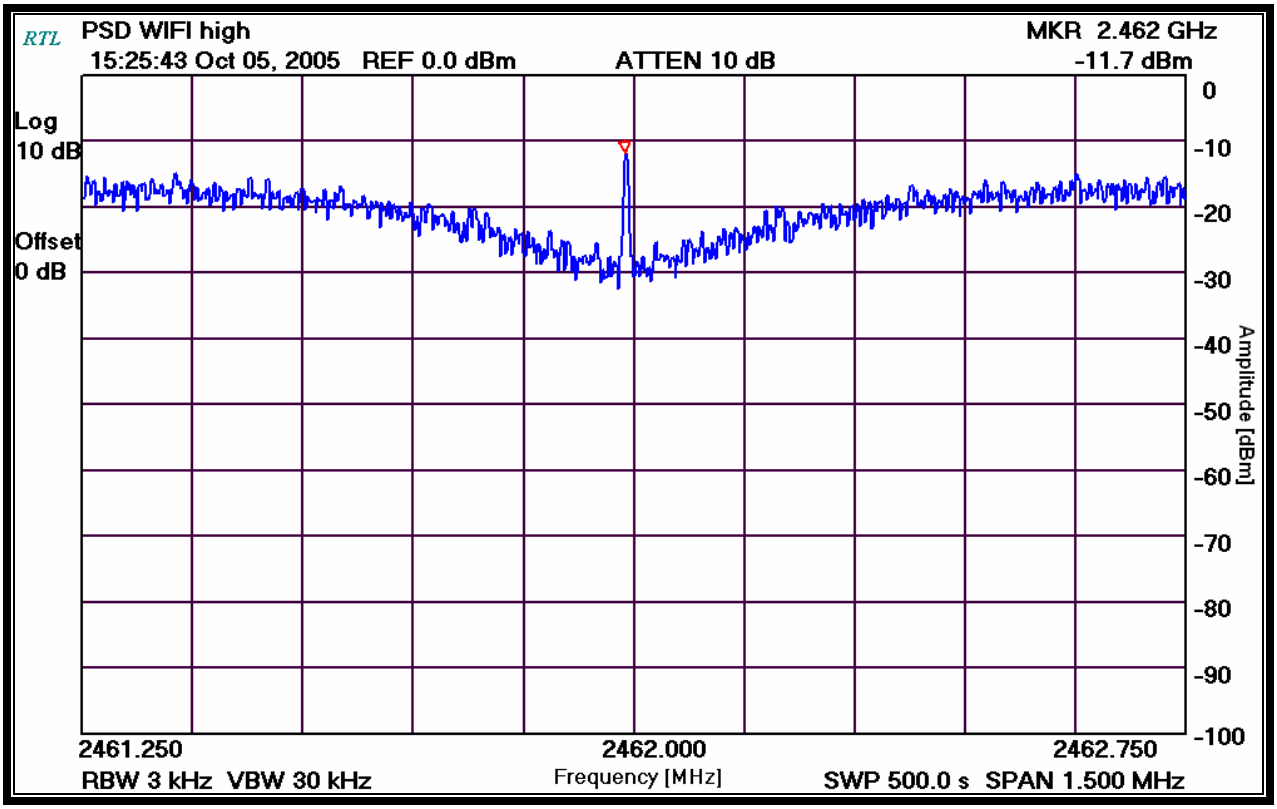
Plot 7-1: Power Spectral Density: Channel 1 (2412 MHz)



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



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



Test Personnel:

Richard B. McMurray	Richard B. McMurray	October 5 – 6, 2005
EMC Test Engineer	Signature	Date Of Test

8 20 dB Bandwidth – FCC §15.247 (a)(1)(ii); IC RSS-210 §5.9.1

8.1 20 dB Bandwidth Test Procedure

The minimum 20 dB bandwidths per RSS-210 were measured using a 50-ohm spectrum analyzer. The carrier was adjusted on the analyzer so that it was displayed entirely on the Spectrum Analyzer. The sweep time was set to 10 seconds and allowed through several sweeps with the max hold function used in peak detector mode. The resolution bandwidth was set to 100 kHz, and the video bandwidth set at 300 kHz. The minimum 20 dB bandwidths were measured using the spectrum analyzer delta marker set 20 dB down from the peak of the carrier and modulated with a 2 Mbps data rate. The table below contains the bandwidth measurement results.

Note: This test is not applicable for the DSSS WLAN transmitter.

Table 8-1 20 dB Bandwidth Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz – 22 GHz)	3138A07771	8/03/2006

8.2 20 dB Modulated Bandwidth Test Data

Table 8-2 20 dB Modulated Bandwidth Test Data - Bluetooth

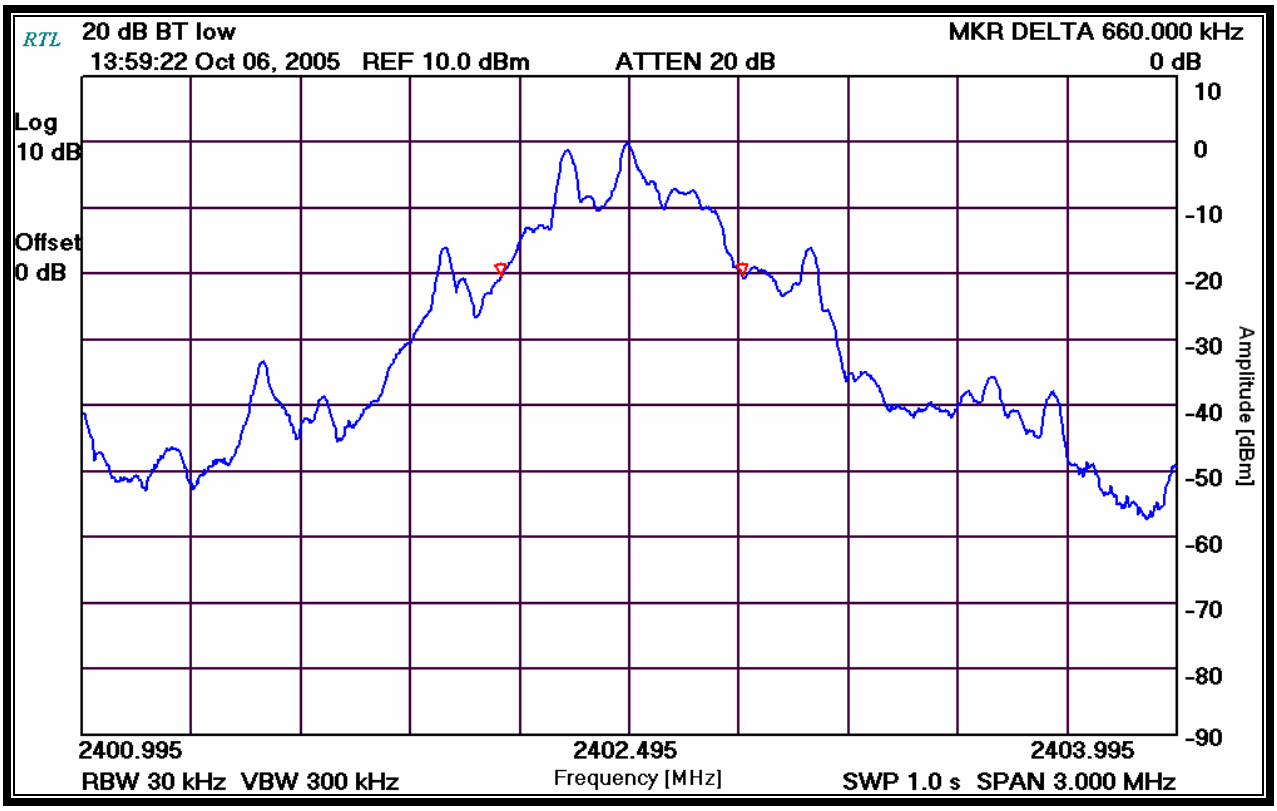
Minimum 20 dB bandwidths

Channel	20 dB Bandwidth (kHz)
0	660
38	798
78	654

8.3 20 dB Bandwidth Plots

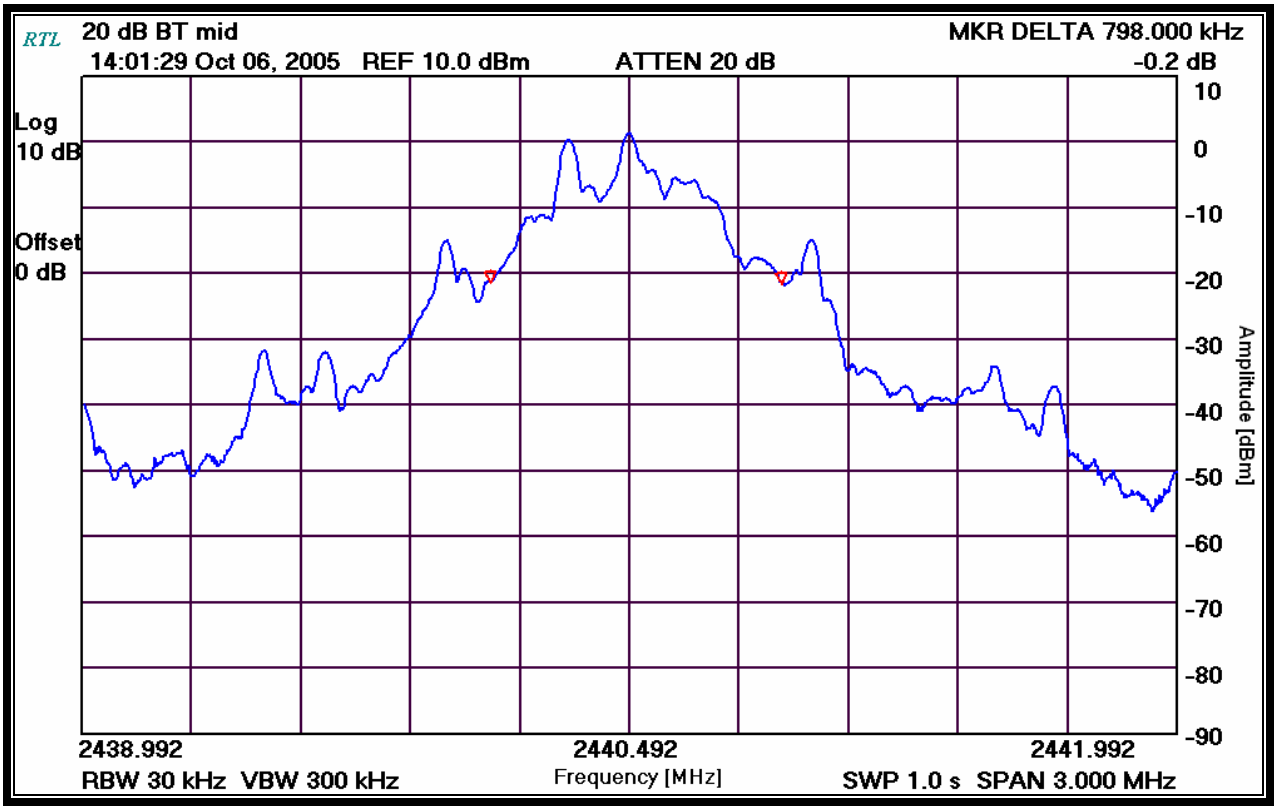
Channel:	0
Channel Frequency (MHz):	2402
Resolution Bandwidth (kHz):	30
Video Bandwidth (kHz):	300
Span (MHz):	3

Plot 8-1: 20 dB Bandwidth Channel 0



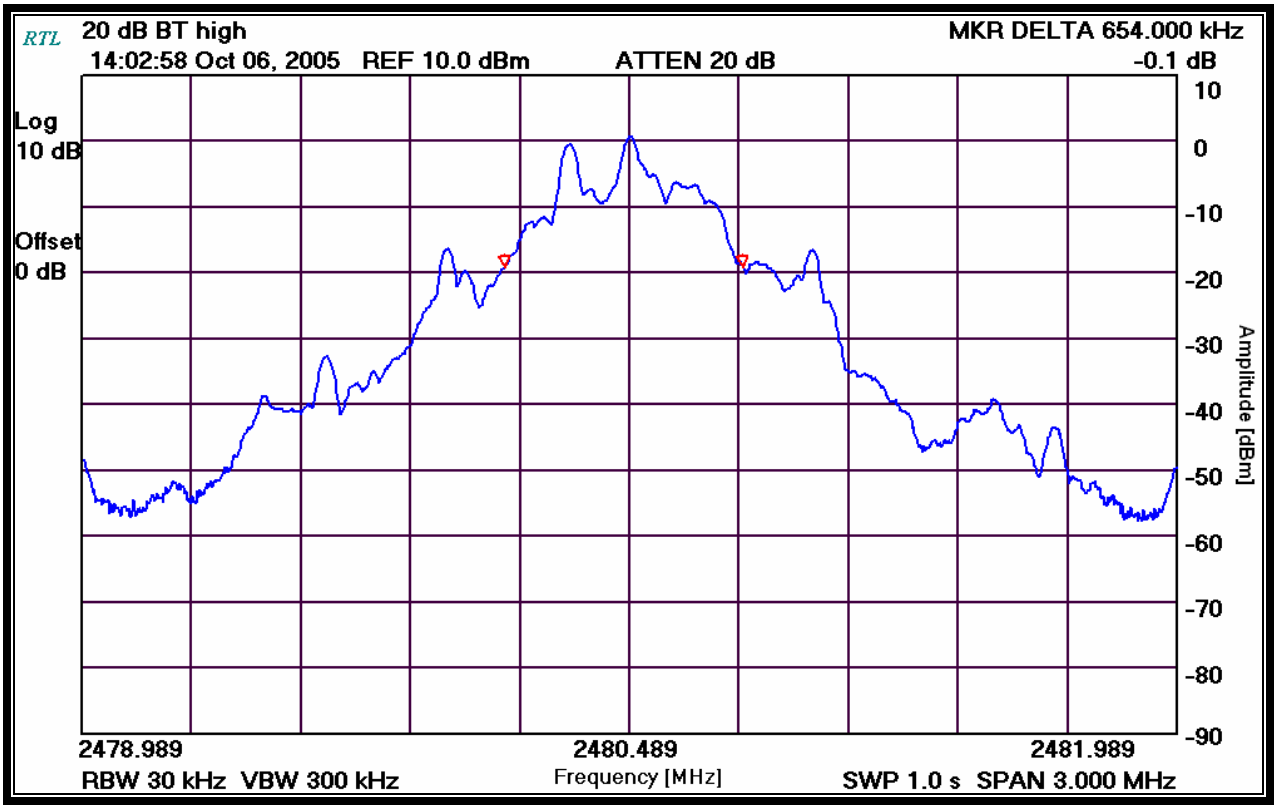
Channel:	38
Channel Frequency (MHz):	2440
Resolution Bandwidth (kHz):	30
Video Bandwidth (kHz):	300
Span (MHz):	3

Plot 8-2: 20 dB Bandwidth Channel 38



Channel:	78
Channel Frequency (MHz):	2480
Resolution Bandwidth (kHz):	30
Video Bandwidth (kHz):	300
Span (MHz):	3

Plot 8-3: 20 dB Bandwidth Channel 78



Test Personnel:

Richard B. McMurray	Richard B. McMurray	October 6, 2005
EMC Test Engineer	Signature	Date Of Test

9 Carrier Frequency Separation - §15.247(a)(1)

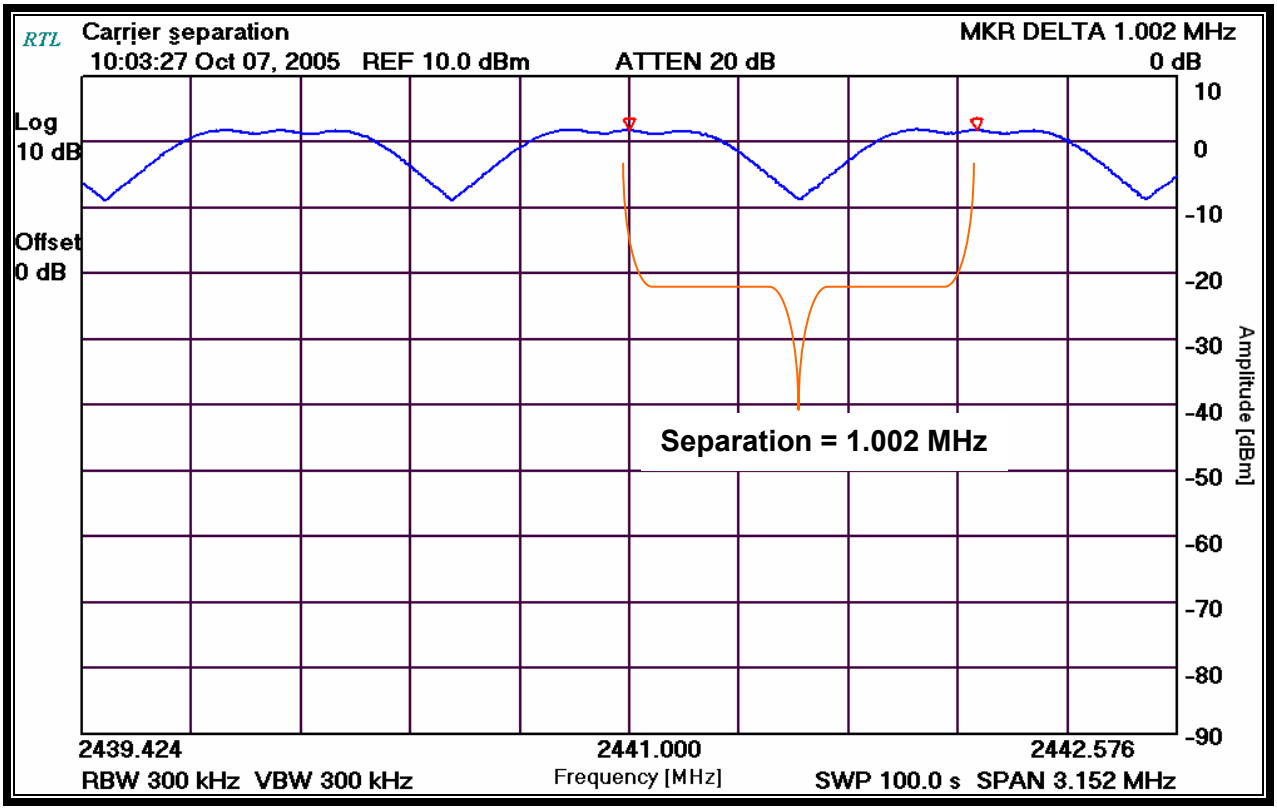
9.1 Carrier Frequency Separation Test Procedure

Frequency Hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Measured frequency separation = 1.002 MHz

9.2 Carrier Frequency Separation Test Data

Plot 9-1: Carrier Frequency Separation - Bluetooth



Test Personnel:

Richard B. McMurray	Richard B. McMurray	October 7, 2005
EMC Test Engineer	Signature	Date Of Test

10 Hopping Characteristics – FCC §15.247 (a)(1)(iii); IC RSS-210 §6.2.2(o)

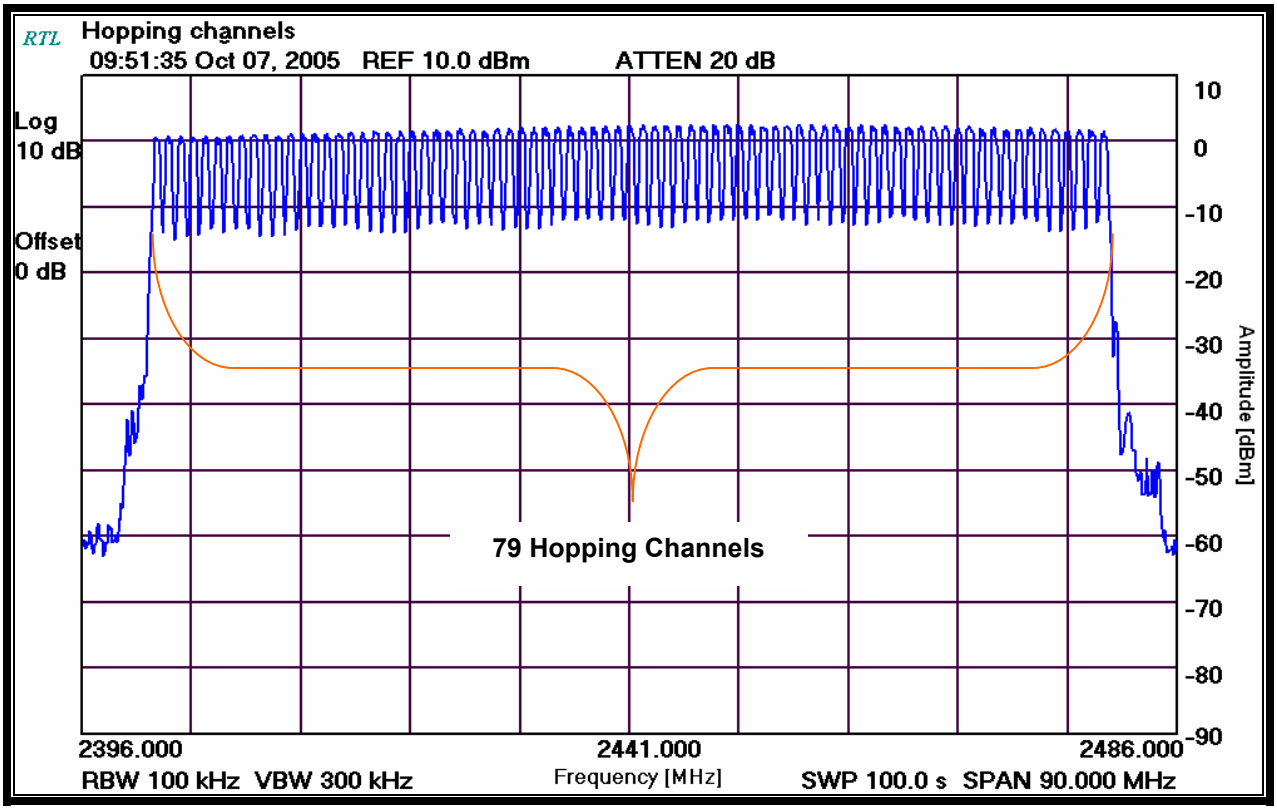
10.1 Hopping Characteristics Test Procedure

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

10.2 Number of Hopping Frequencies - Bluetooth

Measured number of hopping frequencies = 79

Plot 10-1: Number of Hopping Frequencies



Test Personnel:

Richard B. McMurray	Richard B. McMurray	October 7, 2005
EMC Test Engineer	Signature	Date Of Test

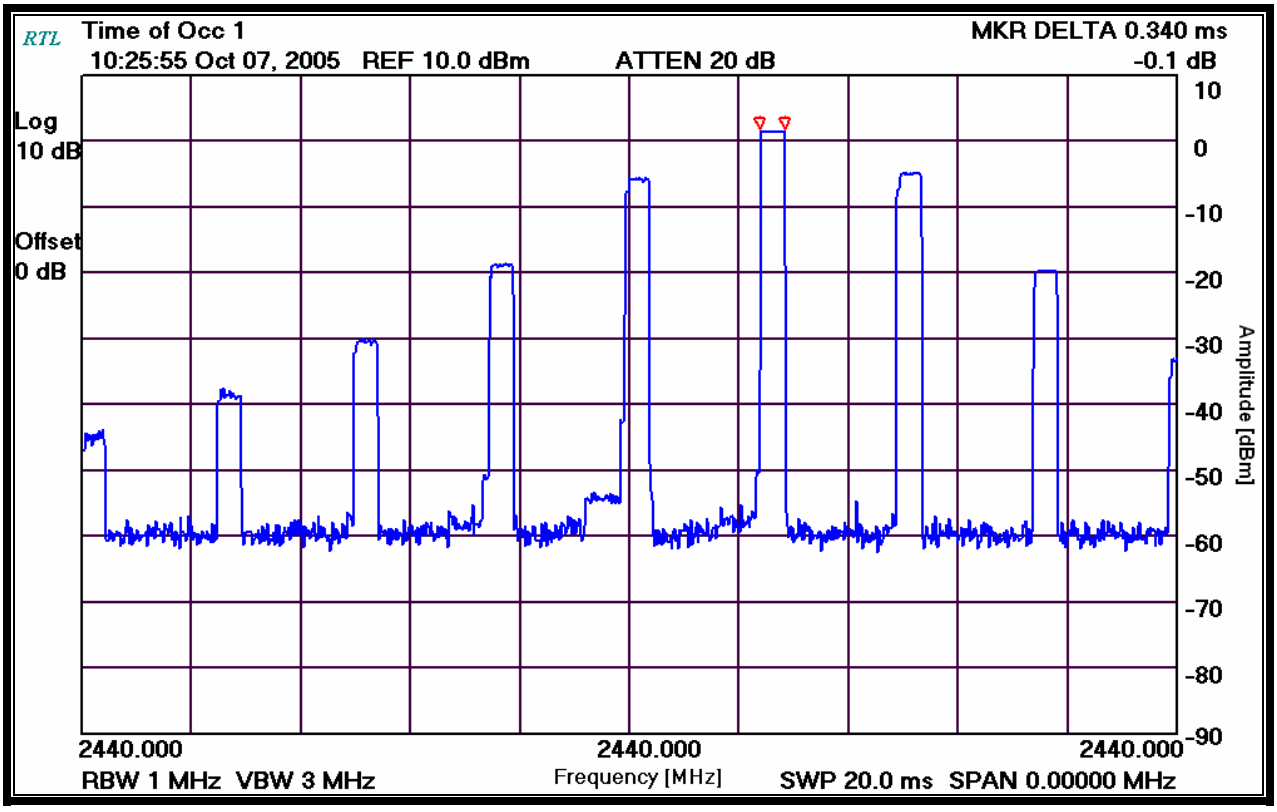
10.3 Average Time of Occupancy - Bluetooth

The spectrum analyzer sweep was set to 0.02 second, with a zero span and max hold until a pulse from the device under test was captured. A marker delta was used to measure the dwell time for this pulse. The sweep was then set to single sweep for 5 s (it was not possible to get a suitable display with a sweep time of 31.6 s).

The number of pulses in 5 s was 51. Therefore, the number of pulses in a period of 0.4 seconds X 79 hopping channels (31.6 s) would be 322 pulses.

The average time of occupancy in the above period (31.6 s) is equal to 322 pulses X 0.34 ms = 109 ms, which meets the limit as defined by 15.247(a)(1)(iii) of 0.4 seconds.

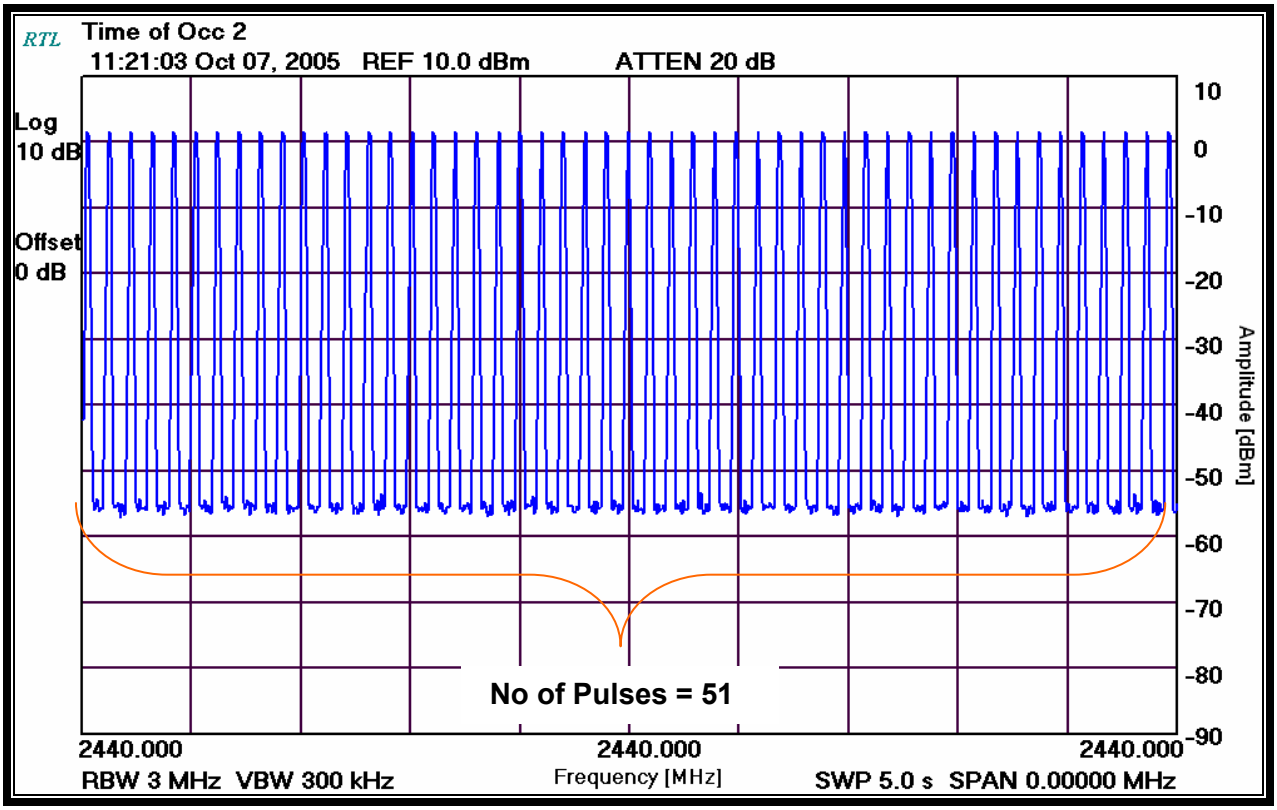
Plot 10-2: Time of Occupancy (Dwell Time)



Test Personnel:

Richard B. McMurray	Richard B. McMurray	October 7, 2005
EMC Test Engineer	Signature	Date Of Test

Plot 10-3: Time of Occupancy (Dwell Time 5 Second Sweep)



Number of pulses in 5 seconds: 51

Therefore, the number of pulses in the period of 0.4 s X 79 channels would be 322 pulses.

Test Personnel:

Richard B. McMurray	Richard B. McMurray	October 7, 2005
EMC Test Engineer	Signature	Date Of Test

11 Conducted Emissions Measurement Limits – FCC §15.207; RSS-210 §9

11.1 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

11.2 Conducted Emissions Measurement Test Procedure

Note: This test was not applicable as the EUT is battery operated.

12 Radiated Emissions - §15.209; RSS-210 §6.2.1

12.1 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.

12.2 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 12-1: Radiated Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900151	Rohde and Schwarz	HFH2-Z2	Antenna (Loop antenna, (9 kHz - 30 MHz)	827525/019	8/25/06
900932	Hewlett Packard	8449B OPT H02	Preamplifier (1 - 26.5 GHz)	3008A00505	5/20/06
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	9/14/06
900811	Rhein Tech Labs	PR-1040	Amplifier	1003	3/8/06
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"	9/1/06
901232	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	9/1/06
901235	IW Microwave Products	KPS-1503-360-KPS	High frequency RF cables	36"	9/1/06
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	5/20/07
900321	EMCO	3161-03	Horn Antennas (4 - 8,2GHz)	9508-1020	5/20/07
900323	EMCO	3160-7	Horn Antennas (8,2 - 12,4 GHz)	9605-1054	5/20/07
900356	EMCO	3160-08	Horn Antenna (12.4 - 18 GHz)	9607-1044	5/20/07
900325	EMCO	3160-9	Horn Antennas (18 - 26.5 GHz)	9605-1051	5/20/07
901218	EMCO	3301B	Horn Antenna (18 - 26.5 GHz)	960281-003	5/20/07
900392	Hewlett Packard	1197OK	Harmonic Mixer (18 – 26.5 GH)z	3525A00159	11/27/07
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	8/3/06
900930	Hewlett Packard	85662A	Spectrum Analyzer Display Section	3144A20839	8/3/06
900889	Hewlett Packard	85685A	RF Preselector (20 Hz - 2 GHz)	3146A01309	4/5/06

12.3 Radiated Emissions Test Results

12.3.1 Radiated Emissions Digital/Receiver - WLAN DSSS

Table 12-2: Digital/Receiver Radiated Emissions - WLAN DSSS

Temperature: 65°F Humidity: 90%										
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
44.400	Pk	H	0	1.0	25.6	-20.9	4.7	40.0	-35.3	Pass
44.400	Qp	H	0	1.0	27.4	-20.9	6.5	40.0	-33.5	Pass
132.400	Pk	H	0	1.0	37.0	-18.7	18.3	43.5	-25.2	Pass
132.400	Qp	H	0	1.0	32.8	-18.7	14.1	43.5	-29.4	Pass
140.100	Pk	H	0	1.0	36.9	-19.2	17.7	43.5	-25.8	Pass
140.100	Qp	H	0	1.0	32.9	-19.2	13.7	43.5	-29.8	Pass
212.300	Pk	H	0	1.0	25.1	-19.7	5.4	43.5	-38.1	Pass
212.300	Qp	H	0	1.0	25.0	-19.7	5.3	43.5	-38.2	Pass
344.023	Pk	H	0	1.0	39.6	-14.0	25.6	46.0	-20.4	Pass
344.023	Qp	H	355	1.0	36.2	-14.0	22.2	46.0	-23.8	Pass
415.986	Pk	H	225	1.0	46.5	-20.0	26.5	56.0	-29.5	Pass
415.986	Qp	H	225	1.0	41.5	-20.0	21.5	46.0	-24.5	Pass
831.971	Pk	H	225	1.0	46.2	-15.9	30.3	56.0	-25.7	Pass
831.971	Qp	H	225	1.0	37.3	-15.9	21.4	46.0	-24.6	Pass
1247.957	Pk	H	225	1.0	43.7	-11.3	32.4	56.0	-23.6	Pass
1247.957	Av	H	225	1.0	45.0	-11.3	33.7	46.0	-12.3	Pass

12.3.2 Radiated Emissions Harmonics/Spurious - WLAN DSSS

Table 12-3: Radiated Emissions Harmonics/Spurious Channel 1 (TX Frequency: 2412 MHz)

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)
4824.000	39.5	33.0	14.2	47.2	54.0	-6.8
7236.000	40.8	29.5	13.1	42.6	77.4	-34.8
9648.000	42.0	31.7	18.6	50.3	77.4	-27.1
12060.000	41.0	29.2	19.9	49.1	54.0	-4.9
14472.000	41.5	30.3	22.5	52.8	54.0	-1.2
16884.000	40.5	30.3	25.4	55.7	77.4	-21.7

Table 12-4: Radiated Emissions Harmonics/Spurious Channel 6 (TX Frequency: 2437 MHz)

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)
4874.000	42.5	32.0	14.4	46.4	54.0	-7.6
7311.000	41.7	30.3	13.1	43.4	54.0	-10.6
9748.000	42.2	31.2	18.1	49.3	79.6	-30.3
12185.000	40.8	30.0	18.5	48.5	54.0	-5.5
14622.000	41.0	30.3	23.4	53.7	79.6	-25.9
17059.000	42.7	30.0	25.9	55.9	79.6	-23.7

Table 12-5: Radiated Emissions Harmonics/Spurious Channel 11 (TX Frequency: 2462 MHz)

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)
4924.000	43.0	31.7	14.7	46.4	54.0	-7.6
7386.000	40.8	30.3	13.3	43.6	54.0	-10.4
9848.000	43.2	31.5	18.1	49.6	78.2	-28.6
12310.000	40.3	30.2	18.7	48.9	54.0	-5.1
14772.000	40.2	30.2	24.1	54.3	78.2	-23.9
17234.000	39.8	30.3	24.3	54.6	78.2	-23.6

12.3.3 Radiated Emissions Digital/Receiver - Bluetooth

Table 12-6: Digital/Receiver Radiated Emissions Test Results

Temperature: 65°F Humidity: 90%										
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**
2400.000	Pk	H	185	1.0	39.5	10.5	50.0	74.0	-24.0	Pass
2400.000	Av	H	185	1.0	27.2	10.5	37.7	54.0	-16.3	Pass
2438.487	Pk	H	185	1.0	37.2	11.0	48.2	74.0	-25.8	Pass
2438.487	Av	H	185	1.0	26.5	11.0	37.5	54.0	-16.5	Pass
2479.000	Pk	H	185	1.0	38.0	11.0	49.0	74.0	-25.0	Pass
2479.000	Av	H	185	1.0	26.8	11.0	37.8	54.0	-16.2	Pass

12.3.4 Radiated Emissions Harmonics/Spurious - Bluetooth

Table 12-7: Radiated Emissions Harmonics/Spurious Channel 0 (TX Frequency: 2402 MHz)

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)
4804.000	41.2	30.3	14.3	44.6	54.0	-9.4
7206.000	41.2	30.3	13.1	43.4	75.4	-32.0
9608.000	42.5	30.8	18.7	49.5	75.4	-25.9
12010.000	41.2	29.8	19.5	49.3	54.0	-4.7
14412.000	41.3	30.0	23.1	53.1	75.4	-22.3
16814.000	41.0	29.3	25.3	54.6	75.4	-20.8

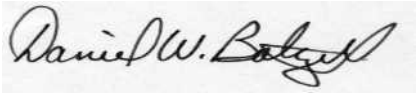
Table 12-8: Radiated Emissions Harmonics/Spurious Channel 38 (TX Frequency: 2440 MHz)

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)
4880.000	41.7	31.3	14.5	45.8	54.0	-8.2
7320.000	41.5	30.5	13.1	43.6	54.0	-10.4
9760.000	42.5	31.2	18.0	49.2	75.5	-26.3
12200.000	40.5	29.8	18.4	48.2	54.0	-5.8
14640.000	41.3	30.3	23.6	53.9	75.5	-21.6
17080.000	40.3	29.8	25.6	55.4	75.5	-20.1

Table 12-9: Radiated Emissions Harmonics/Spurious Channel 78 (TX Frequency: 2480 MHz)

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)
4960.000	41.8	31.5	14.6	46.1	54.0	-7.9
7440.000	43.0	30.7	13.4	44.1	54.0	-9.9
9920.000	43.5	31.7	18.4	50.1	74.8	-24.7
12400.000	42.3	30.7	22.0	52.7	54.0	-1.3
14880.000	39.7	29.7	24.4	54.1	74.8	-20.7
17360.000	42.5	30.3	23.9	54.2	74.8	-20.6

Test Personnel:



Daniel W. Baltzell		October 9, 2005
EMC Test Engineer	Signature	Date Of Test

13 Conclusion

The data in this measurement report shows that the EUT as tested, Vocollect, Inc. Model: TT-700, FCC ID: MQOTT700-10000, IC: 2570A-TT700100, complies with all the applicable requirements of Parts 2 and 15 of the FCC Rules and Regulations, and Industry Canada RSS-210.