



Engineering and Testing for EMC and Safety Compliance

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

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<b>FCC ID/ IC ID:</b>	ACQBLUENILE/ 3231A-BLUENILE	<b>Test Report Date:</b>	January 26, 2006
<b>Platform:</b>	N/A	<b>RTL Work Order Number:</b>	2007108
<b>Model Name/ Model Numbers:</b>	Blue Nile OEM/ 533822-001-00	<b>RTL Quote Number:</b>	QRTL07-017
<b>American National Standard Institute:</b>	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		
<b>FCC Classification:</b>	DSS – Part 15 Spread Spectrum Transmitter		
<b>FCC Rule Part(s):</b>	FCC Rules Part 15.247: Operation within the bands 920-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Direct Sequence System		
<b>Industry Canada:</b>	RSS-210: Low Power License-Exempt Communications Devices		
<b>Digital Interface Information</b>	Digital Interface was found to be compliant		
<b>Frequency Range (MHz)</b>	<b>Output Power (W)</b>	<b>Frequency Tolerance</b>	<b>Emission Designator</b>
2402-2480	0.003	N/A	846KFXD

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: Desmond A. Fraser

Date: January 26, 2007

Typed/Printed Name: Desmond A. Fraser

Position: President

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The test results relate only to the item(s) tested.*

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## 1 General Information

### 1.1 Scope

This is an original certification application request.

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

<b>Equipment Under Test</b>	Radio PCB
<b>Model #</b>	533822-001-00
<b>Power Supply</b>	+13.8V DC
<b>Modulation Type</b>	FHSS - Bluetooth
<b>Frequency Range</b>	2402 – 2480 MHz
<b>Antenna Connector Type</b>	Antenna is PCB trace
<b>Antenna Types</b>	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 certification application for FULL MODULAR APPROVAL for Model Blue Nile OEM, Model # 533822-001-00, FCC ID: ACQBLUENILE, IC: 3231A-BLUENILE.

### 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 FHSS – 1 Mbps**

Channel	Frequency
0	2402
39	2441
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 2-2: Test Result 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(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 samples were received on January 22, 2007. The FCC identifiers for all applicable equipment, plus descriptions of all cables used in the tested system, are identified in the following tables.

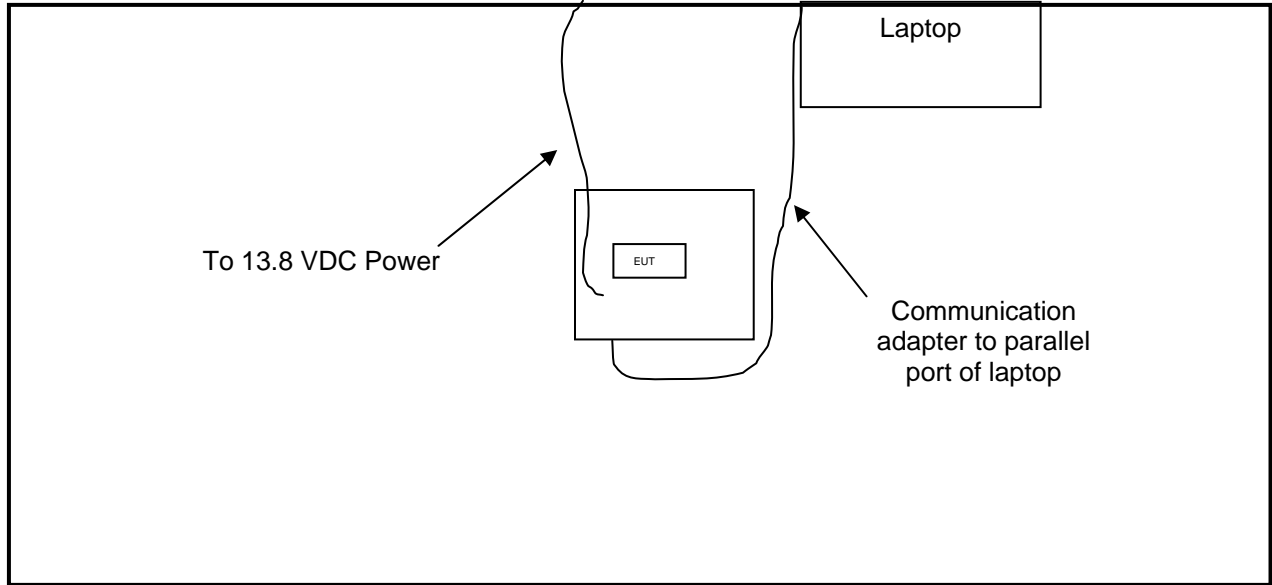
**Table 2-3: Equipment Under Test**

Part	Manufacturer	Model #	Serial Number	FCC/IC ID	Cable Description	RTL Bar Code
Radio PCB (EUT)	Motorola CHS	533822-001-00	N/A	ACQBLUENILE/3231A-BLUENILE	N/A	17745
Radio PCB (EUT)	Motorola CHS	533822-001-00	02000438-JSZ0644	ACQBLUENILE/3231A-BLUENILE	N/A	17746
Carrier board	Motorola CHS	537330-001	N/A	N/A		17744

**Table 2-4: Additional Equipment Required for Testing**

Part	Manufacturer	Model	Serial Number	FCC/IC ID	Cable Description	RTL Bar Code
Laptop	Toshiba	Satellite 1905-S301	92043315C	N/A	3m unshielded power	16621
DC Power Supply	HP	6291A	1926A05365	N/A	900773	2679

## 2.5 Configuration of Tested System



**Figure 2-1: Configuration of System Under Test**



### 3 Peak Output Power - §15.247(b)(1); RSS-GEN

#### 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
901356	Agilent Technologies	E9323A	Power Sensor	31764-264	10/3/07
901184	Agilent Technologies	E4416A	EPM-P Power Meter, single channel	GB41050573	10/3/07

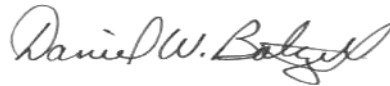
#### 3.2 Power Output Test Data

**Table 3-2: Power Output Test Data**

Channel	Frequency (MHz)	Peak Power Conducted Output (dBm)
0	2402	4.4
39	2441	3.5
78	2480	3.9

#### Test Personnel:

Daniel W. Baltzell  
 Test Engineer



Signature

January 25, 2007  
 Date Of Test

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

##### 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
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
901424	Insulated Wire Inc.	KPS-1503-360-KPS	RF cable 36"	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	5/20/07
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	9/13/07

## 4.2 Restricted Band Edge Test Results

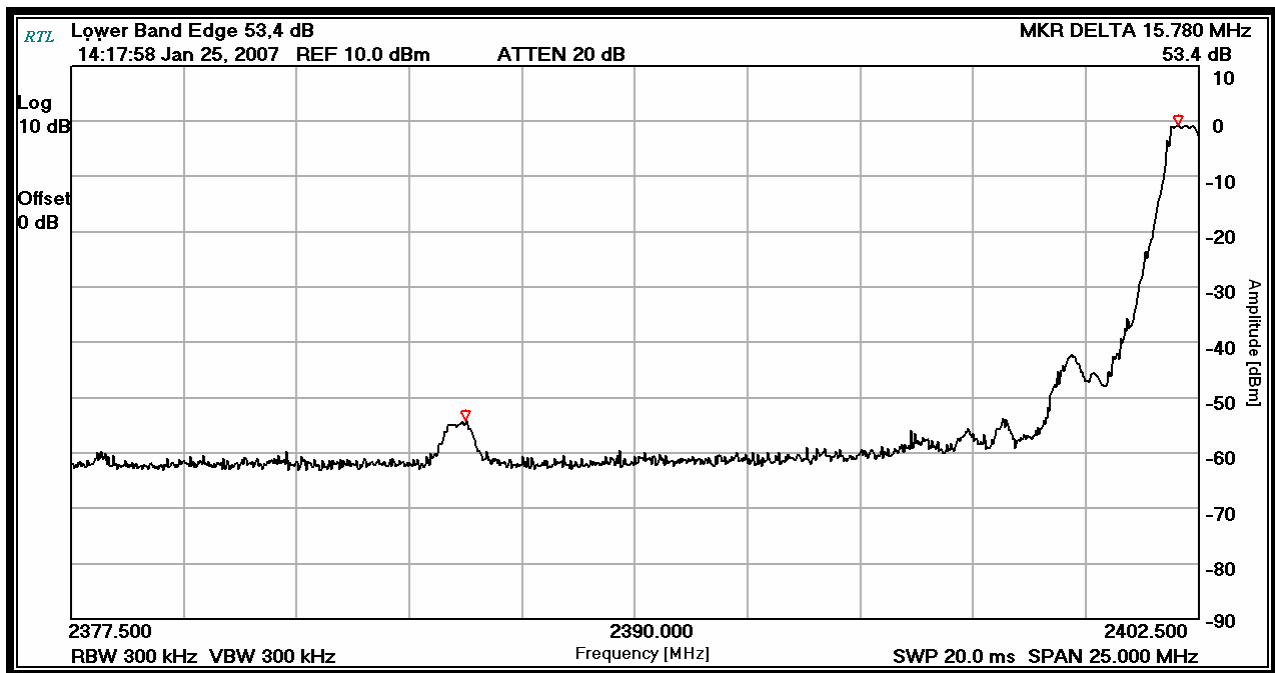
### 4.2.1 Calculation of Lower Band Edge

96.1 dBuV/m is the field strength measurement, from which the delta measurement of 53.4 dB is subtracted (reference plots), resulting in a level of 42.7 dB. This level has a margin of 11.3 dB below the limit of 54 dBuV/m.

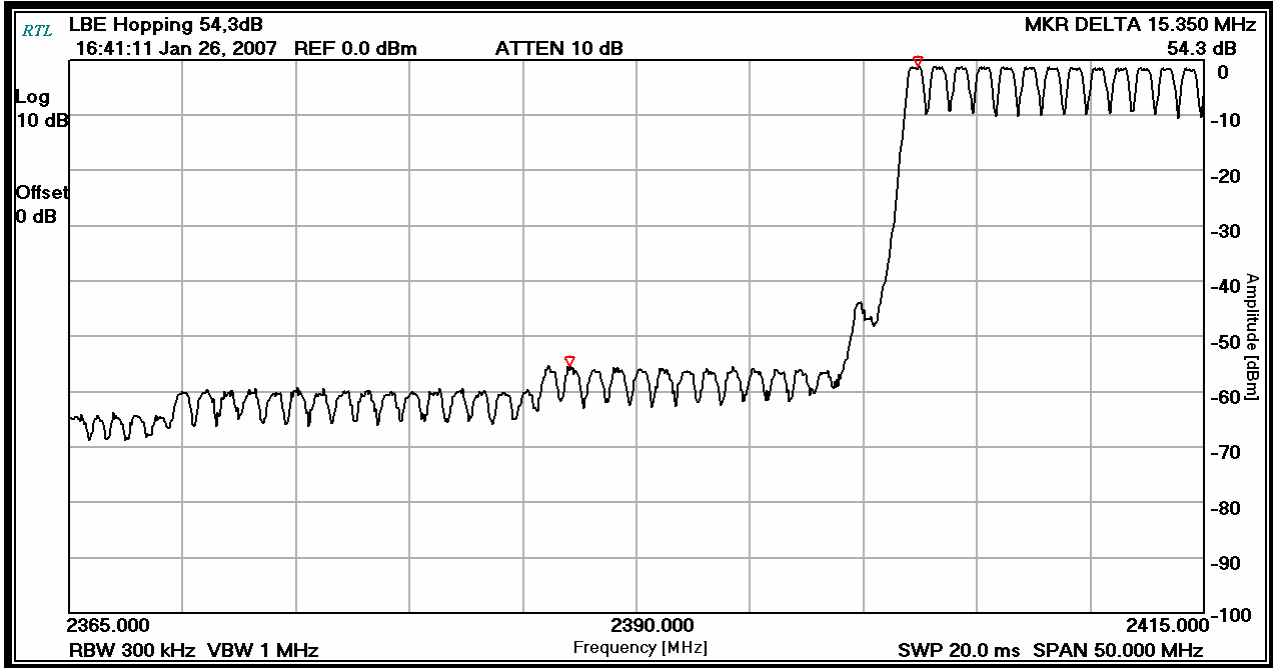
Calculation:  $96.1 \text{ dBuV/m} - 53.4 \text{ dB} - 54 \text{ dBuV/m} = -11.3 \text{ dB}$

Field Strength of Lower Band Edge (1 MHz RBW/1 MHz VBW) = 96.1 dBuV/m  
 Delta measurement = 53.4 dB

Plot 4-1: Lower Band Edge: Peak Measurement Channel 0 (TX Frequency: 2402 MHz)



**Plot 4-2: Lower Band Edge: Hopping Measurement Channel 0 (TX Frequency: 2402 MHz)**



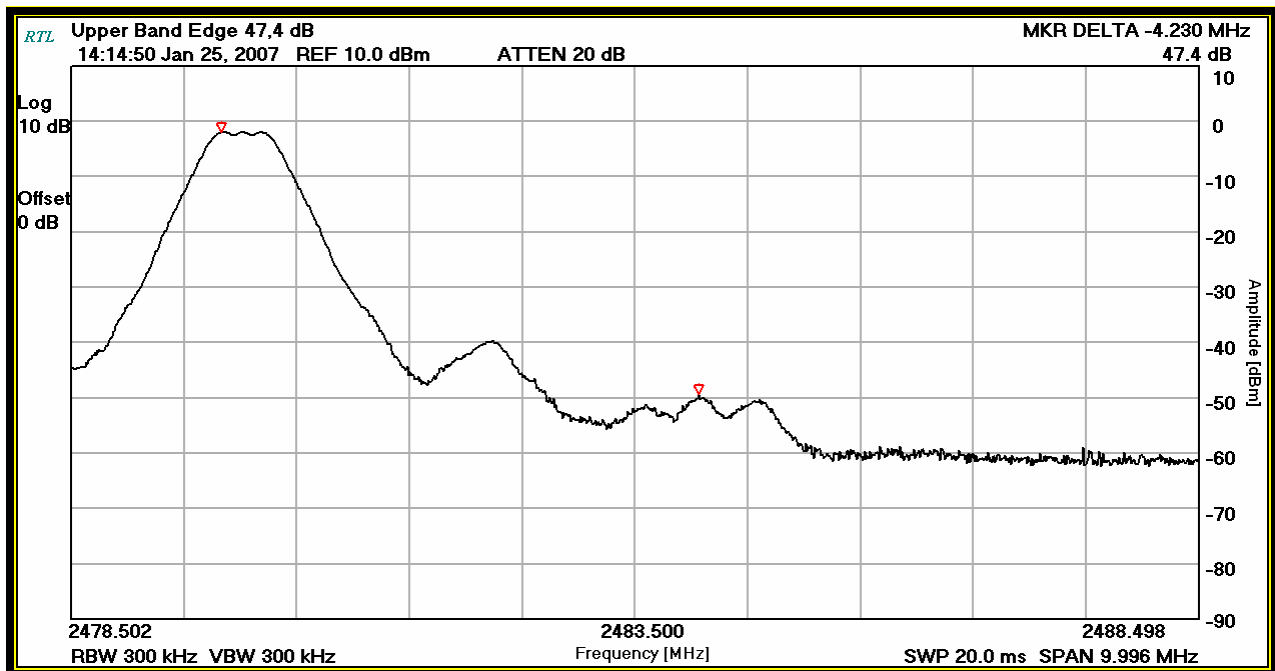
#### 4.2.2 Calculation of Upper Band Edge

95.2 dBuV/m is the field strength measurement, from which the delta measurement of 47.4 dB is subtracted (reference plots), resulting in a level of 47.8 dB. This level has a margin of 6.2 dB below the limit of 54 dBuV/m.

Calculation:  $95.2 \text{ dBuV/m} - 47.4 \text{ dB} - 54 \text{ dBuV/m} = -6.2 \text{ dB}$

Field Strength of Lower Band Edge (1 MHz RBW/1 MHz VBW) = 95.2 dBuV/m  
 Delta measurement = 47.4 dB

**Plot 4-3: Upper Band Edge: Peak Measurement Channel 78 (TX Frequency: 2480 MHz)**



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



**Test Personnel:**

Daniel W. Baltzell  
Test Engineer

Signature

January 25 & 26, 2007  
Dates Of Test

## 5 Antenna Conducted Spurious Emissions - §15.247(d); 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: 2402 MHz, 2441 MHz and 2480 MHz.

**Table 5-1: Antenna Conducted Spurious Emissions Test Equipment**

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	9/13/07

## 5.2 Antenna Conducted Spurious Emissions Test Results

No harmonics or spurs were found within 20 dB of the limit from the carrier to the 10<sup>th</sup> harmonic of the carrier frequency (note that we are reporting power as peak).

**Table 5-2: Antenna Conducted Spurious Emissions; 2402 MHz**

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Limit (20 dBc)	Margin (dB)
4804	-46.1	-15.6	-30.5
7206	-65.7	-15.6	-50.1
9608	-56.4	-15.6	-40.8
12010	-64.9	-15.6	-49.3
14412	-73.8	-15.6	-58.2
16814	-77.4	-15.6	-61.8

**Table 5-3: Antenna Conducted Spurious Emissions; 2441 MHz**

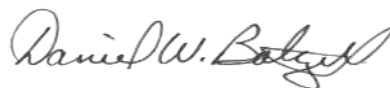
Frequency (MHz)	Spectrum Analyzer Level (dBm)	Limit (20 dBc)	Margin (dB)
4882	-42.7	-16.5	-26.2
7323.0	-69.3	-16.5	-52.8
9764.0	-56.0	-16.5	-39.5
12205.0	-64.1	-16.5	-47.6
14646.0	-74.2	-16.5	-57.7
17087.0	-77.2	-16.5	-60.7

**Table 5-4: Antenna Conducted Spurious Emissions; 2480 MHz**

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Limit (20 dBc)	Margin (dB)
4960.0	-40.6	-16.1	-24.5
7440.0	-65.0	-16.1	-48.9
9920.0	-59.9	-16.1	-43.8
12400.0	-66.3	-16.1	-50.2
14880.0	-75.1	-16.1	-59.0
17360.0	-77.7	-16.1	-61.6

### Test Personnel:

Daniel W. Baltzell  
 EMC Test Engineer



Signature

January 25, 2007  
 Date Of Test



**6 20 dB Bandwidth – FCC §15.247(a)(1)(ii); RSS-GEN**

**6.1 20 dB Bandwidth Test Procedure**

The minimum 20 dB bandwidths per RSS-210 were measured using a 50 ohm spectrum analyzer. The modulated carrier was adjusted on the analyzer so that it was displayed entirely on the Spectrum Analyzer. The sweep time was auto 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 1 MHz. The minimum 20 dB bandwidths were measured using the spectrum analyzer delta marker set 20 dB down from the peak of the carrier. The table below contains the bandwidth measurement results.

**Table 6-1: 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	9/13/07

**6.2 20 dB Modulated Bandwidth Test Data**

**Table 6-2: 20 dB Modulated Bandwidth Test Data**

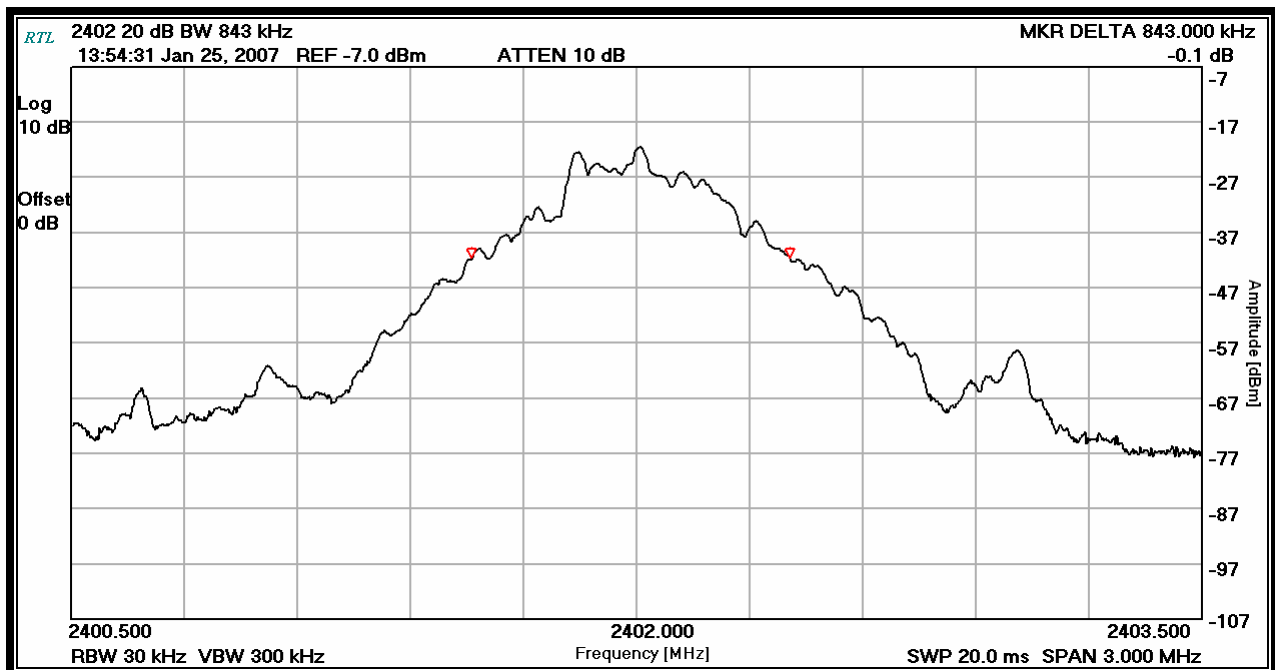
**Minimum 20 dB Bandwidths**

Channel	20 dB Bandwidth (MHz)
0	843.0
39	831.0
78	846.0

### 6.3 20 dB Bandwidth Plots

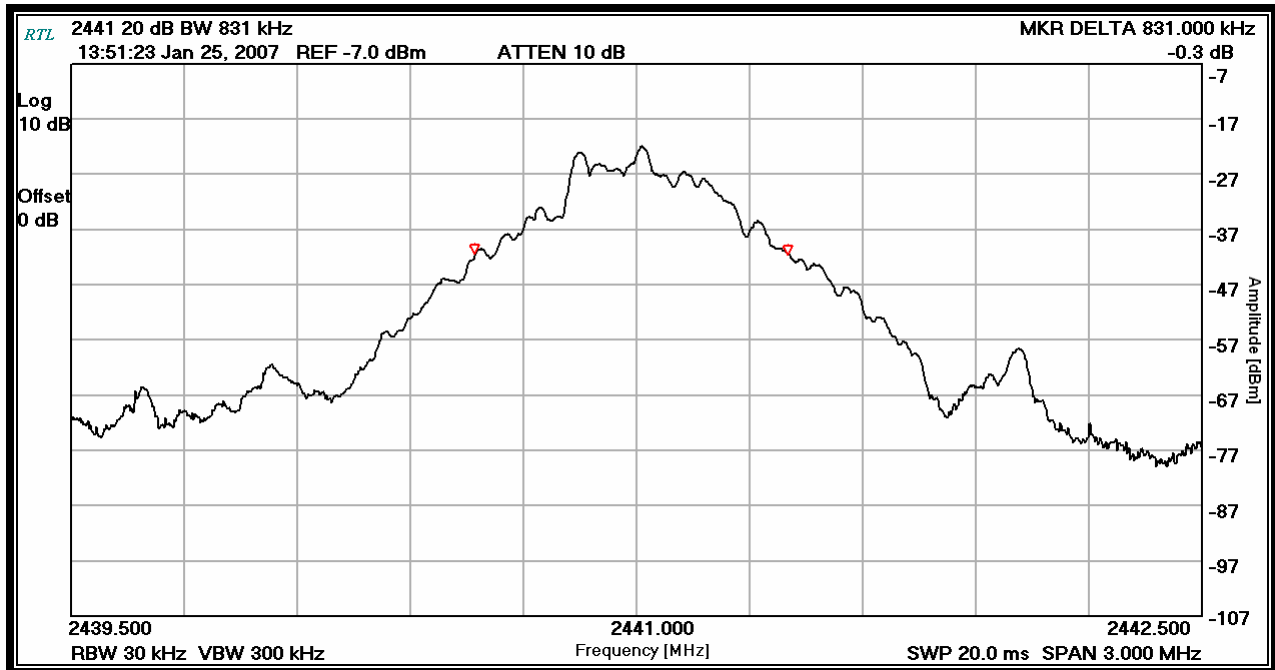
Channel: 0  
Channel Frequency (MHz): 2402  
Resolution Bandwidth (kHz): 30  
Video Bandwidth (kHz): 300  
Span (MHz): 3

Plot 6-1: 20 dB Bandwidth Channel 0



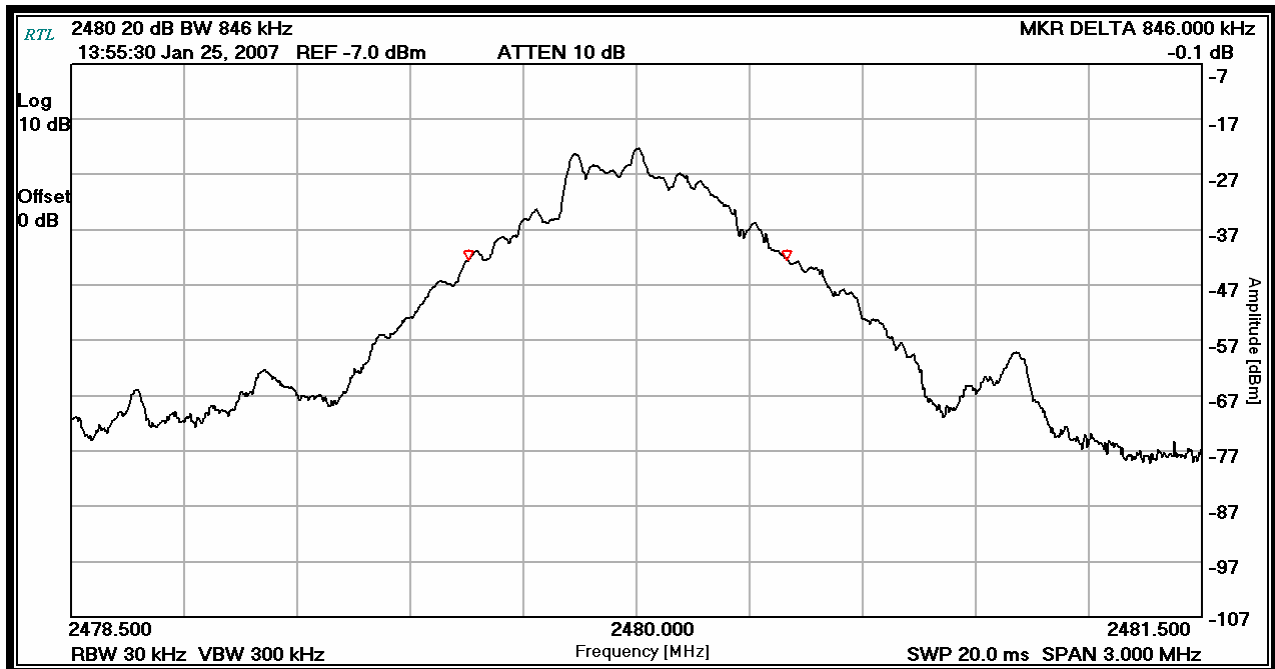
Channel: 39  
Channel Frequency (MHz): 2441  
Resolution Bandwidth (kHz): 30  
Video Bandwidth (kHz): 300  
Span (MHz): 3

Plot 6-2: 20 dB Bandwidth Channel 39



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

**Plot 6-3: 20 dB Bandwidth Channel 78**



**Test Personnel:**

Daniel W. Baltzell  
EMC Test Engineer

Signature

January 25, 2007  
Date Of Test

## 7 Carrier Frequency Separation - §15.247(a)(1)

### 7.1 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.

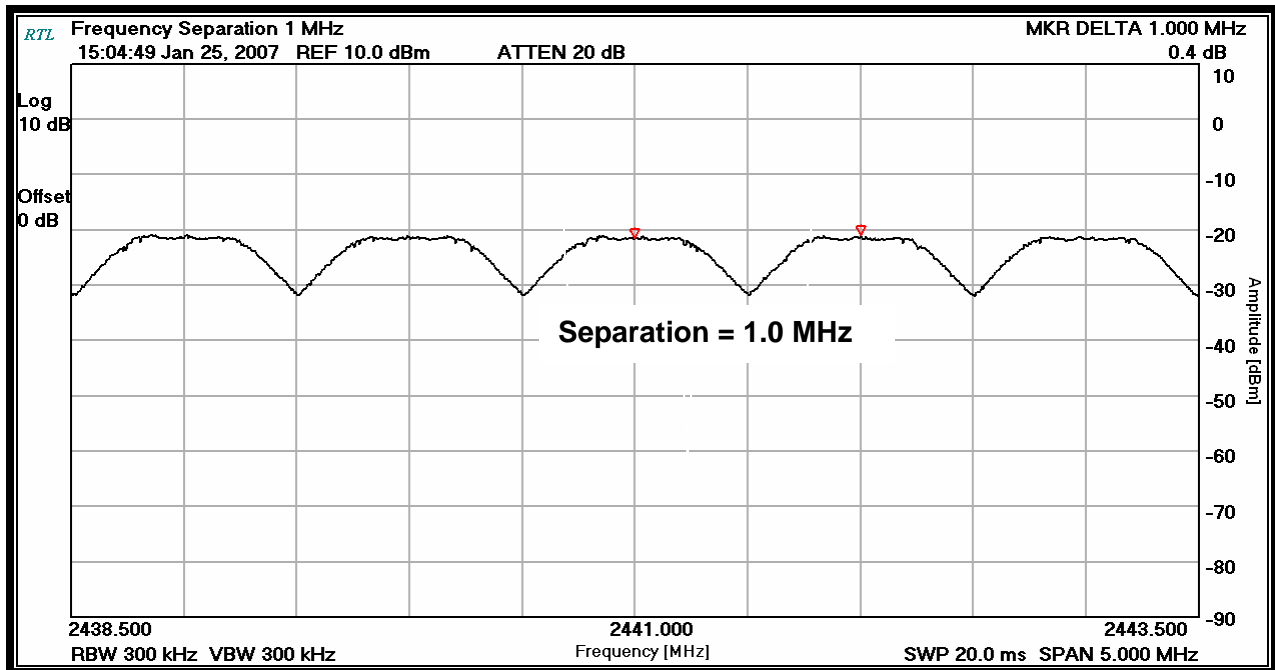
Measured frequency separation = 1.0 MHz

**Table 7-1: Carrier Frequency Separation Test Equipment**

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	9/13/07

### 7.2 Carrier Frequency Separation Test Data

**Plot 7-1: Carrier Frequency Separation**



Test Personnel:

Daniel W. Baltzell  
 EMC Test Engineer

Signature

January 25, 2007  
 Date Of Test

## 8 Hopping Characteristics – FCC §15.247(a)(1)(iii); RSS-GEN

### 8.1 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.

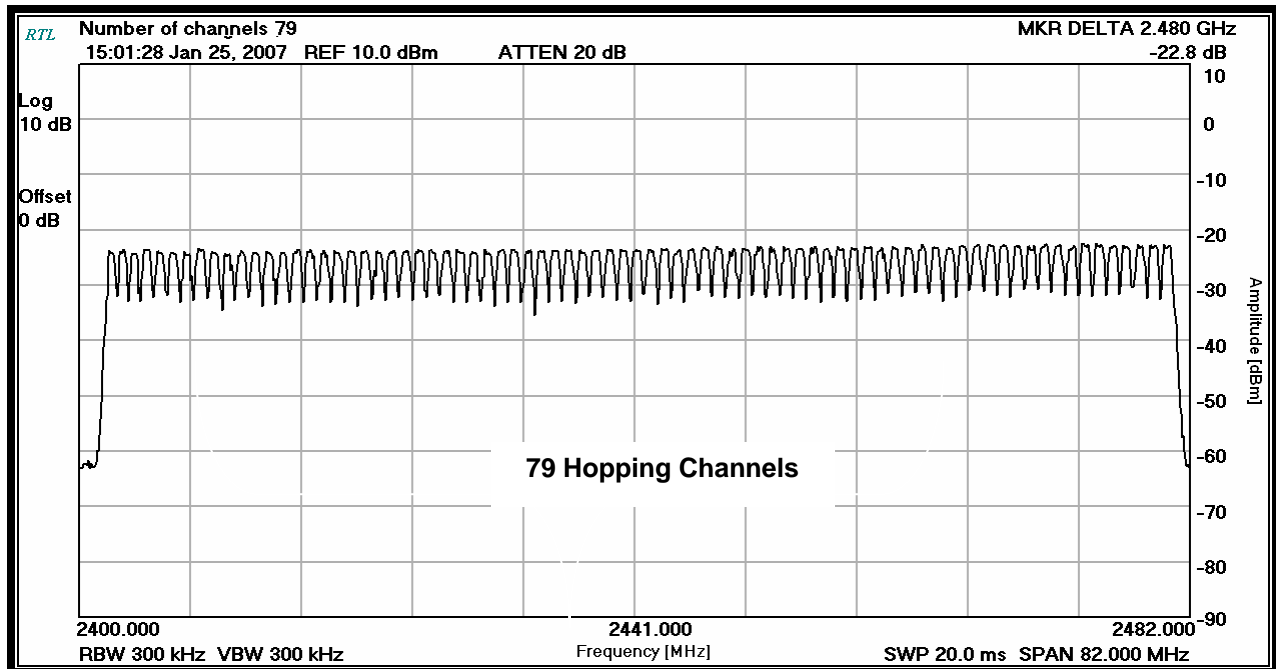
**Table 8-1: Hopping Characteristics Test Equipment**

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	9/13/07

### 8.2 Number of Hopping Frequencies

Measured number of hopping frequencies = 79

**Plot 8-1: Number of Hopping Frequencies**



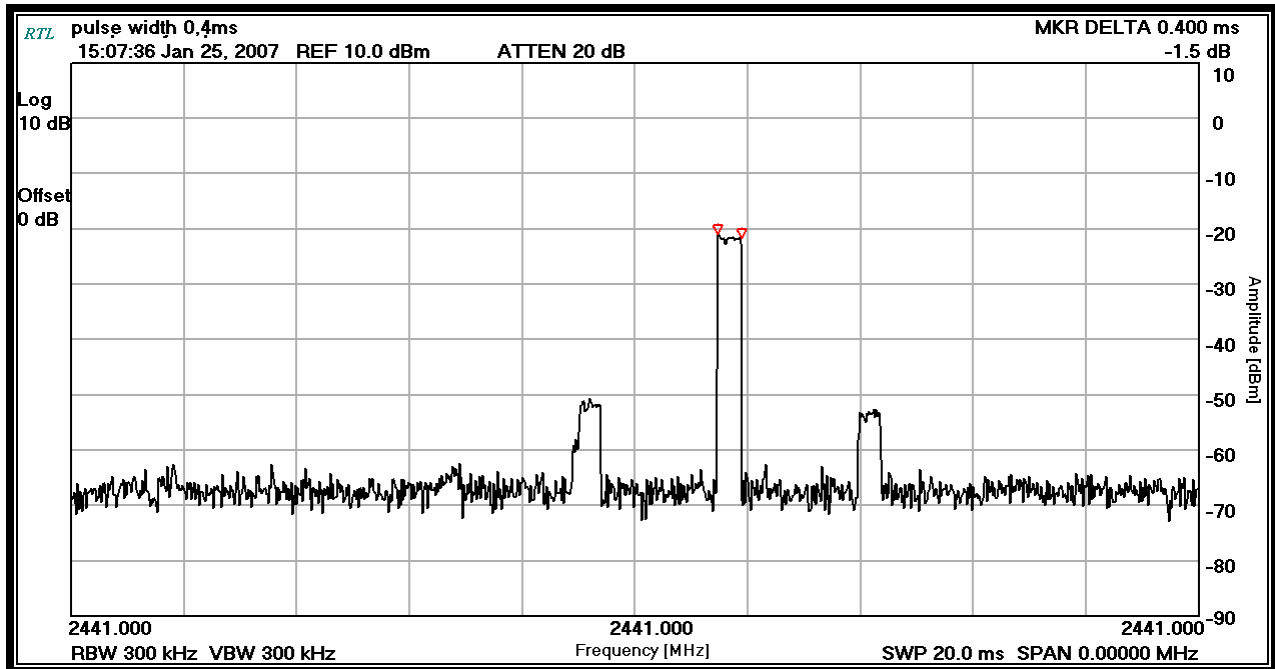
### 8.3 Average Time of Occupancy

The spectrum analyzer sweep was set to 20 ms, with a zero span and captured pulses from the device under test. 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).

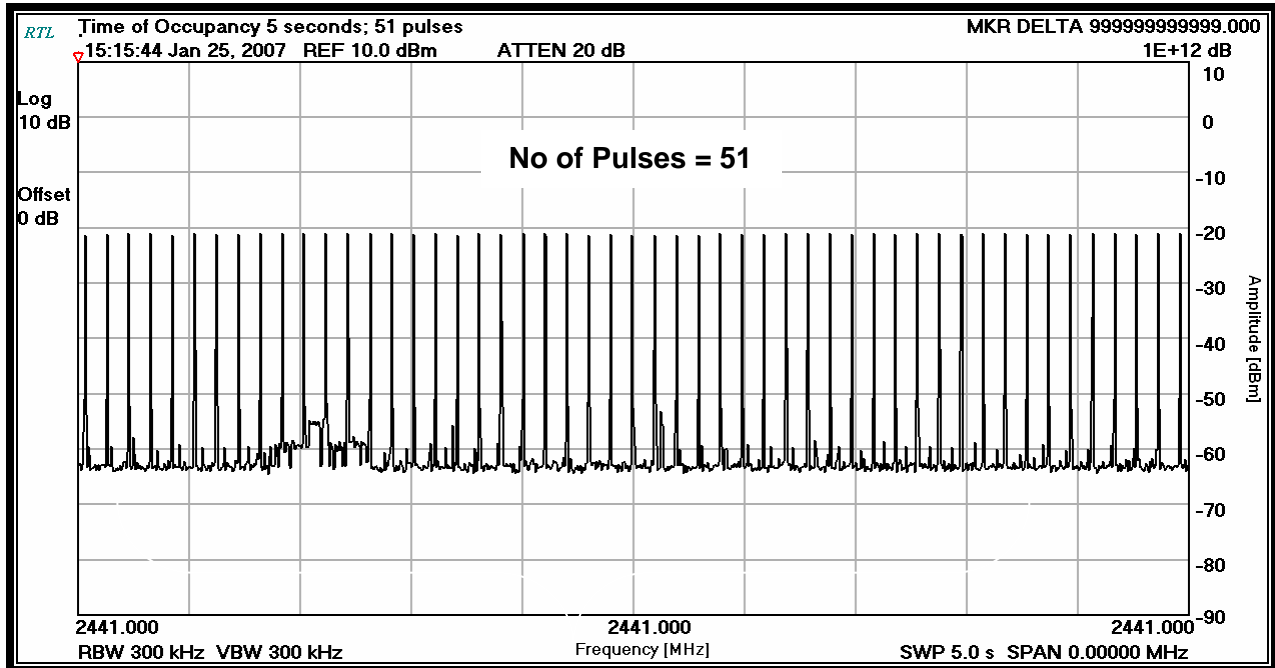
The number of pulses in 5 s was 51. Therefore, the number of pulses in a period of 0.4 seconds X 79 hopping channels (31.6 s) would be 322 pulses.

The average time of occupancy in the above period (31.6 s) is equal to 322 pulses X 400 us = 128.9 ms, which meets the limit as defined by 15.247(a)(1)(iii) of 0.4 seconds.

Plot 8-2: Time of Occupancy (Dwell Time)



**Plot 8-3: 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:**

Daniel W. Baltzell  
EMC Test Engineer

Signature

January 25, 2007  
Date Of Test



## 9 Conducted Emissions Measurement Limits – FCC §15.207; RSS-GEN

### 9.1 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

### 9.2 Conducted Emissions Measurement Test Procedure

The power line conducted emission 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 micro Henry Line Impedance Stabilization Network (EUT 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. 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. No video filter less than 10 times the resolution bandwidth was 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 limit were measured and have been recorded in this report.

### 9.3 Conducted Emissions Line Test Equipment

Table 9-1: Conducted Emissions Line Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900913	Hewlett Packard	85462A	EMI Receiver RF Section (9 kHz – 6.5 GHz)	3325A00159	2/28/07
901083	AFJ International	LS16	16A LISN	16010020080	3/28/08

#### 9.4 Conducted Line Emissions Test Data

**Table 9-2: Conducted Emissions (Neutral Side); Transmitting**

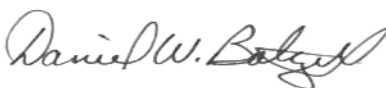
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail
0.150	Av	14.8	0.2	15.0	66.0	-51.0	56.0	-41.0	Pass
0.150	Qp	51.8	0.2	52.0	66.0	-14.0	56.0	-4.0	Pass
0.180	Av	9.1	0.2	9.3	64.5	-55.2	54.5	-45.2	Pass
0.180	Qp	47.8	0.2	48.0	64.5	-16.5	54.5	-6.5	Pass
0.193	Av	10.9	0.2	11.1	63.9	-52.8	53.9	-42.8	Pass
0.193	Qp	45.0	0.2	45.2	63.9	-18.7	53.9	-8.7	Pass
0.242	Av	4.4	0.1	4.5	62.0	-57.5	52.0	-47.5	Pass
0.242	Qp	38.0	0.1	38.1	62.0	-23.9	52.0	-13.9	Pass
0.291	Av	2.0	0.3	2.3	60.5	-58.2	50.5	-48.2	Pass
0.291	Qp	33.9	0.3	34.2	60.5	-26.3	50.5	-16.3	Pass
1.696	Av	15.8	0.6	16.4	56.0	-39.6	46.0	-29.6	Pass
1.696	Qp	37.0	0.6	37.6	56.0	-18.4	46.0	-8.4	Pass
1.974	Av	16.6	0.7	17.3	56.0	-38.7	46.0	-28.7	Pass
1.974	Qp	35.8	0.7	36.5	56.0	-19.5	46.0	-9.5	Pass
2.255	Av	18.4	0.8	19.2	56.0	-36.8	46.0	-26.8	Pass
2.255	Qp	34.6	0.8	35.4	56.0	-20.6	46.0	-10.6	Pass
4.813	Av	19.0	1.2	20.2	56.0	-35.8	46.0	-25.8	Pass
4.813	Qp	33.1	1.2	34.3	56.0	-21.7	46.0	-11.7	Pass
5.000	Pk	40.4	1.2	41.6	56.0	-14.4	46.0	-4.4	Pass
16.880	Pk	33.2	2.2	35.4	60.0	-24.6	50.0	-14.6	Pass
22.250	Pk	31.1	2.5	33.6	60.0	-26.4	50.0	-16.4	Pass

**Table 9-3: Conducted Emissions (Phase Side); Transmitting**

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail
0.150	Av	12.9	0.2	13.1	66.0	-52.9	56.0	-42.9	Pass
0.150	Qp	26.2	0.2	26.4	66.0	-39.6	56.0	-29.6	Pass
0.180	Av	9.3	0.2	9.5	64.5	-55.0	54.5	-45.0	Pass
0.180	Qp	47.4	0.2	47.6	64.5	-16.9	54.5	-6.9	Pass
0.195	Av	9.7	0.2	9.9	63.8	-53.9	53.8	-43.9	Pass
0.195	Qp	45.4	0.2	45.6	63.8	-18.2	53.8	-8.2	Pass
0.241	Av	3.7	0.1	3.8	62.1	-58.3	52.1	-48.3	Pass
0.241	Qp	39.6	0.1	39.7	62.1	-22.4	52.1	-12.4	Pass
0.244	Qp	35.9	0.1	36.0	62.0	-26.0	52.0	-16.0	Pass
2.244	Av	18.7	0.8	19.5	56.0	-36.5	46.0	-26.5	Pass
2.244	Qp	35.3	0.8	36.1	56.0	-19.9	46.0	-9.9	Pass
3.650	Av	18.3	1.0	19.3	56.0	-36.7	46.0	-26.7	Pass
3.650	Qp	32.0	1.0	33.0	56.0	-23.0	46.0	-13.0	Pass
3.943	Av	19.5	1.0	20.5	56.0	-35.5	46.0	-25.5	Pass
3.943	Qp	36.3	1.0	37.3	56.0	-18.7	46.0	-8.7	Pass
5.060	Pk	43.1	1.2	44.3	60.0	-15.7	50.0	-5.7	Pass
16.940	Pk	28.9	2.2	31.1	60.0	-28.9	50.0	-18.9	Pass
21.880	Pk	29.3	2.5	31.8	60.0	-28.2	50.0	-18.2	Pass

**Test Personnel:**

Daniel W. Baltzell  
 EMC Test Engineer



Signature

January 25, 2007  
 Date Of Test

## 10 Radiated Emissions - §15.209; RSS-210 §6.2.1

### 10.1 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.

### 10.2 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<sup>th</sup> 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 10-1: Radiated Emissions Test Equipment**

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901365	MITEQ	JS4-00102600-41-5P	Amplifier, 0.1-26 GHz, 28 dB gain	1094152	3/24/07
900811	Rhein Tech Labs	PR-1040	Amplifier	1003	3/15/07
900878	Rhein Tech Labs	AM3-1197-0005	3 meter Antenna Mast, polarizing	Outdoor Range 1	Not Required
901426	Insulated Wire Inc.	KPS-1503-3600-KPS	RF cable, 30'	NA	12/5/07
901425	Insulated Wire, Inc.	KPS-1503-2400-KPS	RF cable, 20'	NA	12/5/07
901424	Insulated Wire Inc.	KPS-1503-360-KPS	RF cable 36"	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	5/20/07
900321	EMCO	3161-03	Horn Antennas (4 - 8,2 GHz)	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
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	9/13/07
900930	Hewlett Packard	85662A	Spectrum Analyzer Display Section	3144A20839	9/13/07
900889	Hewlett Packard	85685A	RF Preselector (20 Hz - 2 GHz)	3146A01309	9/13/07

### 10.3 Radiated Emissions Test Results

#### 10.3.1 Radiated Emissions Digital/Receiver

**Table 10-2: Digital/Receiver Radiated Emissions Test Results**

Temperature: 19°F Humidity: 42%										
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
72.000	Qp	V	0	1.0	48.7	-23.4	25.3	40.0	-14.7	Pass
156.000	Qp	V	70	1.0	50.6	-18.2	32.4	43.5	-11.1	Pass
180.003	Qp	V	30	1.0	47.3	-18.7	28.6	43.5	-14.9	Pass
228.003	Qp	V	180	1.0	52.0	-17.0	35.0	46.0	-11.0	Pass
252.003	Qp	V	40	1.0	49.9	-14.8	35.1	46.0	-10.9	Pass
276.003	Qp	V	40	1.0	48.0	-14.2	33.8	46.0	-12.2	Pass
300.003	Qp	V	270	1.0	46.3	-13.5	32.8	46.0	-13.2	Pass
324.003	Qp	V	30	1.0	45.6	-12.8	32.8	46.0	-13.2	Pass
960.000	Qp	V	0	1.0	38.8	-0.4	38.4	46.0	-7.6	Pass

### 10.3.2 Radiated Emissions Harmonics/Spurious

**Table 10-3: 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)
4804.0	37.6	23.6	6.6	30.2	54.0	-23.8
7206.0	36.8	22.5	8.0	30.5	76.1	-45.6
9608.0	33.3	19.9	14.1	34.0	76.1	-42.1
12010.0	36.3	20.0	14.3	34.3	54.0	-19.7
14412.0	37.7	24.4	19.9	44.3	76.1	-31.8
16814.0	41.5	29.4	20.4	49.8	76.1	-26.3

**Table 10-4: Radiated Emissions Harmonics/Spurious Channel 39 (TX Frequency: 2441 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)
4882.0	37.2	23.3	6.5	29.8	54.0	-24.2
7323.0	36.4	22.1	8.0	30.1	54.0	-23.9
9764.0	32.5	20.4	14.1	34.5	79.3	-44.8
12205.0	31.7	20.2	15.0	35.2	54.0	-18.8
14646.0	37.1	25.3	20.1	45.4	79.3	-33.9
17087.0	37.4	24.6	21.3	45.9	79.3	-33.4

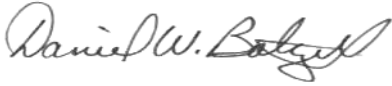
**Table 10-5: Radiated Emissions Harmonics/Spurious Channel 78 (TX Frequency: 2480 MHz)**

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)
4960.0	35.5	21.7	6.6	28.3	54.0	-25.7
7440.0	37.5	22.9	8.3	31.2	54.0	-22.8
9920.0	35.4	21.7	14.2	35.9	75.2	-39.3
12400.0	33.5	21.1	18.5	39.6	54.0	-14.4
14880.0	38.0	25.5	19.7	45.2	75.2	-30.0
17360.0	37.4	24.5	21.8	46.3	75.2	-28.9

**Table 10-6: Radiated Emissions Harmonics/Spurious Hopping Mode**

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)
4810.0	44.4	20.2	6.6	26.8	54.0	-27.2
4812.0	43.3	20.7	6.6	27.3	54.0	-26.7
4813.5	42.9	20.5	6.6	27.1	54.0	-26.9
4823.7	42.4	20.9	6.5	27.4	54.0	-26.6
4831.3	43.5	20.3	6.6	26.9	54.0	-27.1
4840.2	42.3	20.2	6.6	26.8	54.0	-27.2
4870.4	43.2	20.3	6.6	26.9	54.0	-27.1
7353.4	35.8	22.5	8.0	30.5	54.0	-23.5

**Test Personnel:**

Daniel W. Baltzell EMC Test Engineer	 Signature	January 26, 2007 Date Of Test
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**11 Conclusion**

The data in this measurement report shows that the EUT as tested, Motorola, Inc. Model Blue Nile OEM, Model # 533822-001-00, FCC ID: ACQBLUENILE, IC: 3231A-BLUENILE, 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.