



Engineering and Testing for EMC and Safety Compliance



Accredited under A2LA Certificate # 2653.01

**Certification Application Report for Full Modular Approval  
FCC Part 15.247 & Industry Canada RSS-210**

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<b>FCC ID/IC:</b>	LS3-45-1177/ 2938A-451177	<b>Test Report Date:</b>	September 14, 2007
<b>Platform:</b>	N/A	<b>RTL Work Order #:</b>	2007248
<b>Model:</b>	45-1177	<b>RTL Quote #:</b>	QRTL07-259
<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>	DTS – Part 15 Digital Transmission System		
<b>FCC Rule Part(s)/Guidance:</b>	FCC Rules Part 15.247: Operation within the bands 920-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Direct Sequence System October 1, 2006, DA 00-705		
<b>Industry Canada:</b>	RSS-210 Issue 7: 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>
2405 – 2480	0.0005	N/A	2M27FXD

\* power is peak conducted

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 and ANSI C63.4.

Signature: Desmond A. Fraser

Date: September 14, 2007

Typed/Printed Name: Desmond A. Fraser

Position: President

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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>	Transceiver
<b>Model</b>	45-1177
<b>Power Supply</b>	9V battery
<b>Modulation Type</b>	DSSS
<b>Frequency Range</b>	2405 – 2480 MHz
<b>Antenna Types</b>	PCB inverted F (3.3 dBi gain)

### 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 **full modular approval** for Hunter Engineering Company Model 45-1177, FCC ID: LS3-45-1177, IC: 2938A-451177.

### 1.5 Modifications

No modifications were made to the equipment during testing in order to achieve compliance with these standards.

## 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
Low	2405
Middle	2440
High	2480

### 2.2 Exercising the EUT

The EUT was supplied with test firmware programmed with a high, mid, and low channel for testing. 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(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	99% Bandwidth	N/A

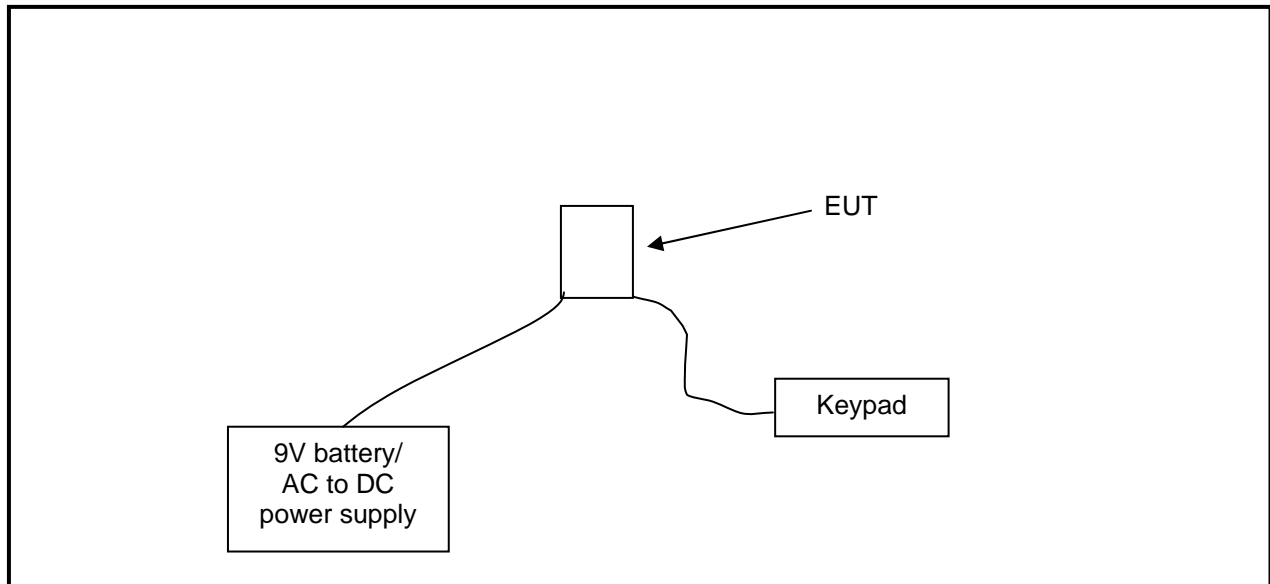
## 2.4 Test System Details

The test samples were received on September 7, 2007. The FCC identifiers for all applicable equipment, plus descriptions of all cables used in the tested system, are identified in the following table.

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

Part	Manufacturer	Model	Serial Number	FCC ID	Cable Description	RTL Bar Code
Transceiver	Hunter Engineering Company	45-1117	05794HR	LS3-45-1177	N/A	18114
Transceiver	Hunter Engineering Company	45-1117	05790HR	LS3-45-1177	N/A	18115
Keypad	Hunter Engineering Company	N/A	N/A	N/A	N/A	18116

## 2.5 Configuration of Tested System



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

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

#### 3.1 Power Output Test Procedure

A conducted power measurement of the EUT was taken.

**Table 3-1: Power Output Test Equipment**

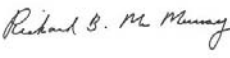
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer (3 Hz – 50 GHz)	US440203416	6/13/08

#### 3.2 Power Output Test Data

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

Channel	Frequency (MHz)	Peak Power Conducted Output (dBm)
Low	2405	-3.45
Middle	2440	-4.11
High	2480	-4.33

**Test Personnel:**

Richard B. McMurray Test Engineer	 Signature	September 7, 2007 Date Of Test
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#### 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. A conducted antenna port delta measurement was performed from the highest peak in the restricted band to the peak of the fundamental, and subtracted from the radiated field strength; the result was compared to the limit.

**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
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
900814	Electro-Metrics	EM-6961 (RGA-60)	Double Ridged Guide Antenna (1 - 18 GHz)	2310	3/30/09
901413	Agilent Technologies	E4448A	Spectrum Analyzer	US44020346	6/13/08
901215	Hewlett Packard	8596EM	Spectrum Analyzer (9 kHz - 12.8 GHz)	3826A00144	10/16/07

## 4.2 Band Edge Test Results

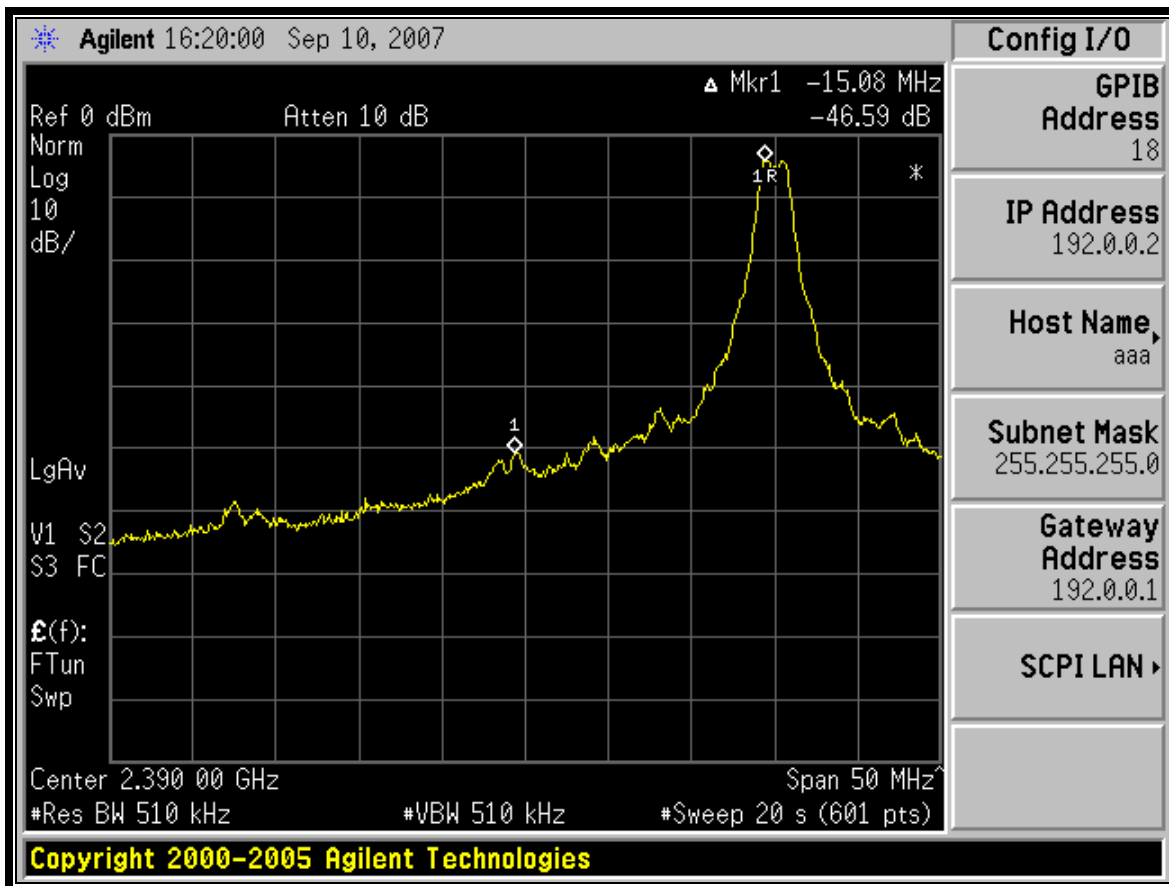
### 4.2.1 Calculation of Lower Band Edge

74.5 dBuV/m is the field strength measurement, from which the delta measurement of 46.6 dB is subtracted, resulting in a level of 27.9 dB. This level has a margin of 26.1 dB below the limit of 54 dBuV/m.

Calculation:  $74.5 \text{ dBuV/m} - 46.6 \text{ dB} - 54 \text{ dBuV/m} = -26.1 \text{ dB}$

Peak Field Strength of Lower Band Edge (1 MHz RBW/8 MHz VBW) = 94.5 dBuV/m  
 Average Field Strength of Lower Band Edge (1 MHz RBW/10 Hz VBW) = 74.5 dBuV/m  
 Delta measurement = 46.6 dB

### 4.2.2 Lower Band Edge Plot



Plot 4-1: Lower Band Edge

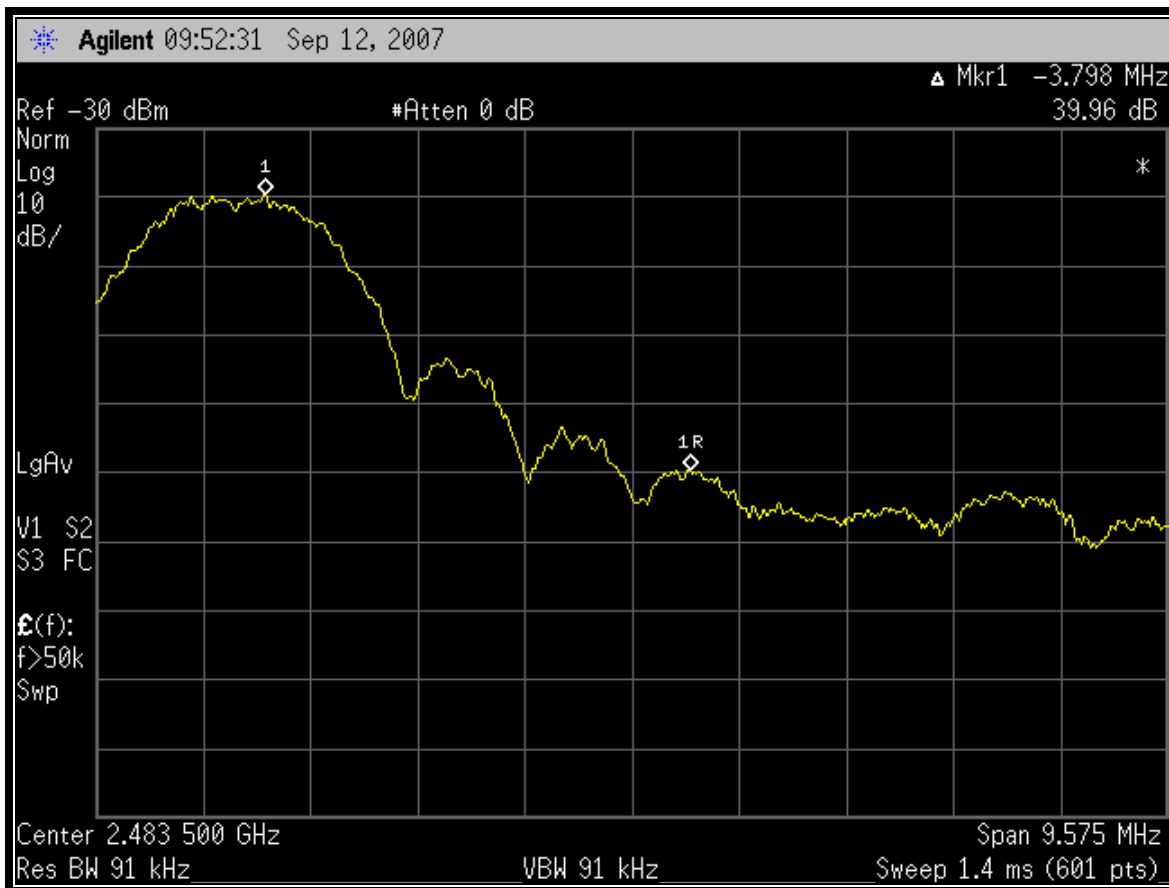
#### 4.2.3 Calculation of Upper Band Edge

72.5 dBuV/m is the field strength measurement, from which the delta measurement of 40 dB is subtracted (reference hopping plot), resulting in a level of 32.5 dB. This level has a margin of 21.5 dB below the limit of 54 dBuV/m.

Calculation:  $72.5 \text{ dBuV/m} - 40 \text{ dB} - 54 \text{ dBuV/m} = -21.5 \text{ dB}$

Peak Field Strength of Lower Band Edge (1 MHz RBW/8 MHz VBW) = 92.5 dBuV/m  
 Average Field Strength of Lower Band Edge (1 MHz RBW/10 Hz VBW) = 72.5 dBuV/m  
 Delta measurement = 40 dB

#### 4.2.4 Upper Band Edge Plot



Plot 4-2: Upper Band Edge

#### Test Personnel:

Daniel W. Baltzell  
 Test Engineer

Signature

September 10-12, 2007  
 Dates Of Tests

## 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) 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 1 MHz. The modulated carrier was identified at the following frequencies: 2405 MHz, 2440 MHz and 2480 MHz.

Other than the data presented below, 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 10<sup>th</sup> harmonic of the carrier frequency. Per FCC 15.31(o), no other data is being reported.

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

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer	US44020346	6/13/08

### 5.2 Antenna Conducted Spurious Emissions Test Results

**Table 5-2: Antenna Conducted Spurious Emissions - 2405 MHz (ref: -7.7 dBm)**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
4809	-32.4	-27.7	-4.7	Pass

**Table 5-3: Antenna Conducted Spurious Emissions - 2440 MHz (ref: -8.1 dBm)**

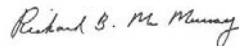
Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
4881	-33.4	-28.1	-5.3	Pass

**Table 5-4: Antenna Conducted Spurious Emissions - 2480 MHz (ref: -8.5 dBm)**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
4959	-36.1	-28.5	-7.6	Pass

#### Test Personnel:

Richard B. McMurray  
 Test Engineer



Signature

September 10, 2007  
 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**

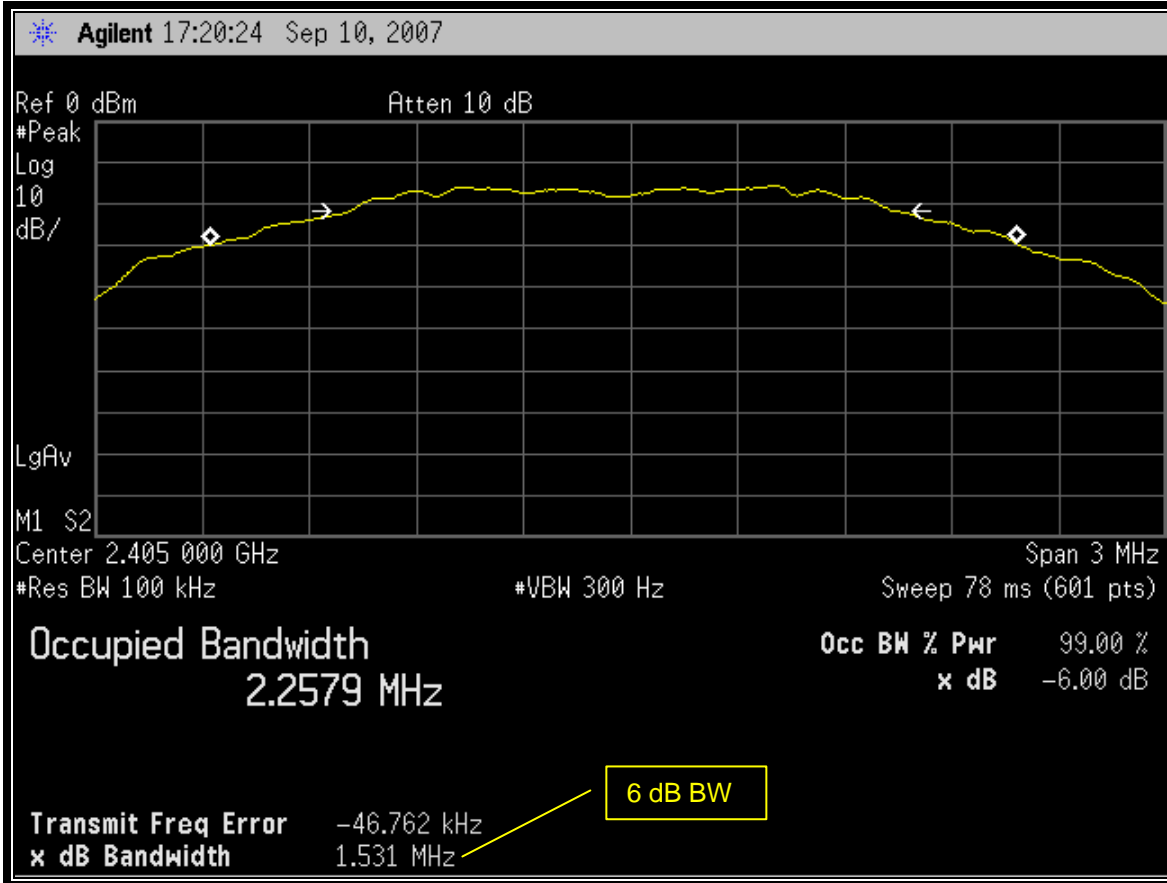
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer (3 Hz – 50 GHz)	US440203416	6/13/08

**6.2 6 dB Bandwidth Test Results**

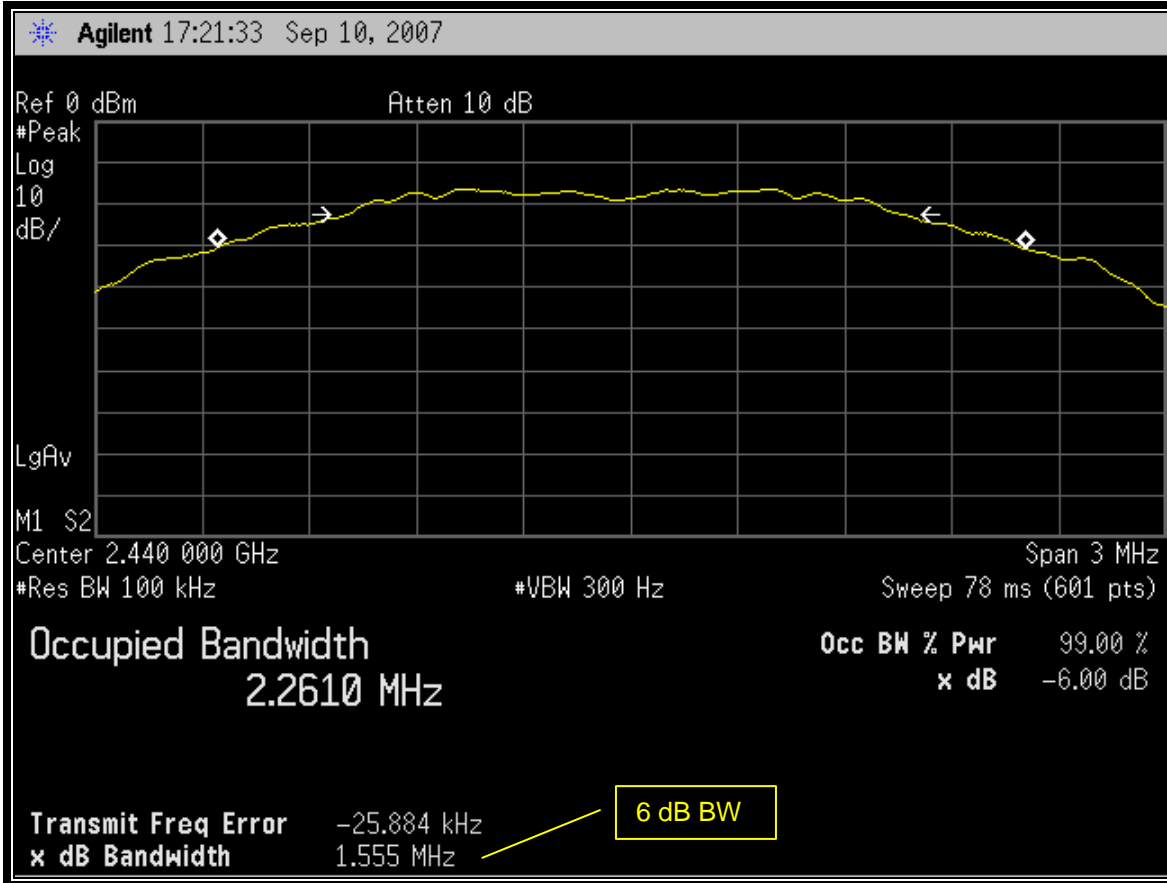
**Table 6-2: 6 dB Bandwidth Test Data**

Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/Fail
2405	1.53	0.5	Pass
2440	1.56	0.5	Pass
2480	1.56	0.5	Pass

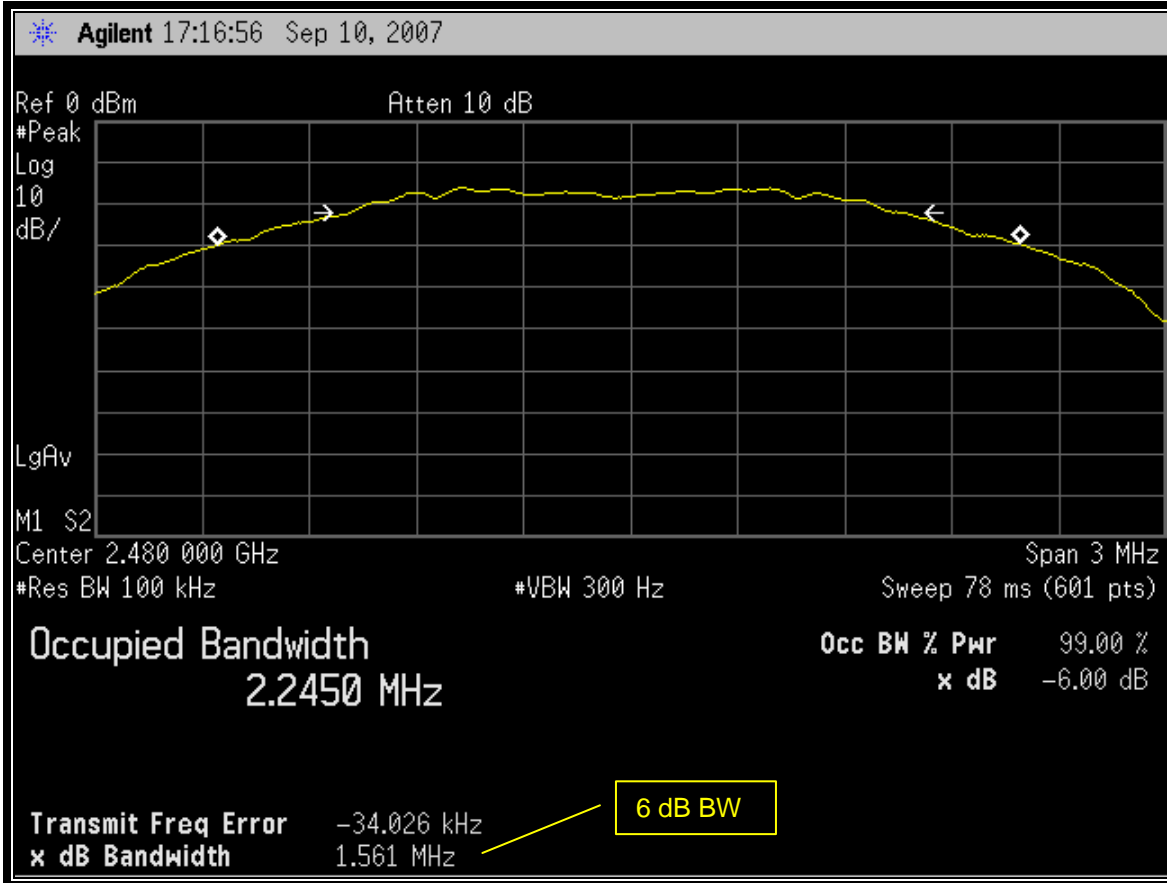
**Plot 6-1: 6 dB Bandwidth – 2405 MHz**



**Plot 6-2: 6 dB Bandwidth – 2440 MHz**



**Plot 6-3: 6 dB Bandwidth – 2480 MHz**



**Test Personnel:**

Richard B. McMurray  
 Test Engineer

*Richard B. McMurray*  
 Signature

September 10, 2007  
 Date Of Test



## 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 100 seconds. The spectral lines were resolved for the modulated carriers at 2405, 2440 and 2480 MHz. These levels are below the +8 dBm limit. See the power spectral density table and plots.

**Table 7-1: Power Spectral Density Test Equipment**

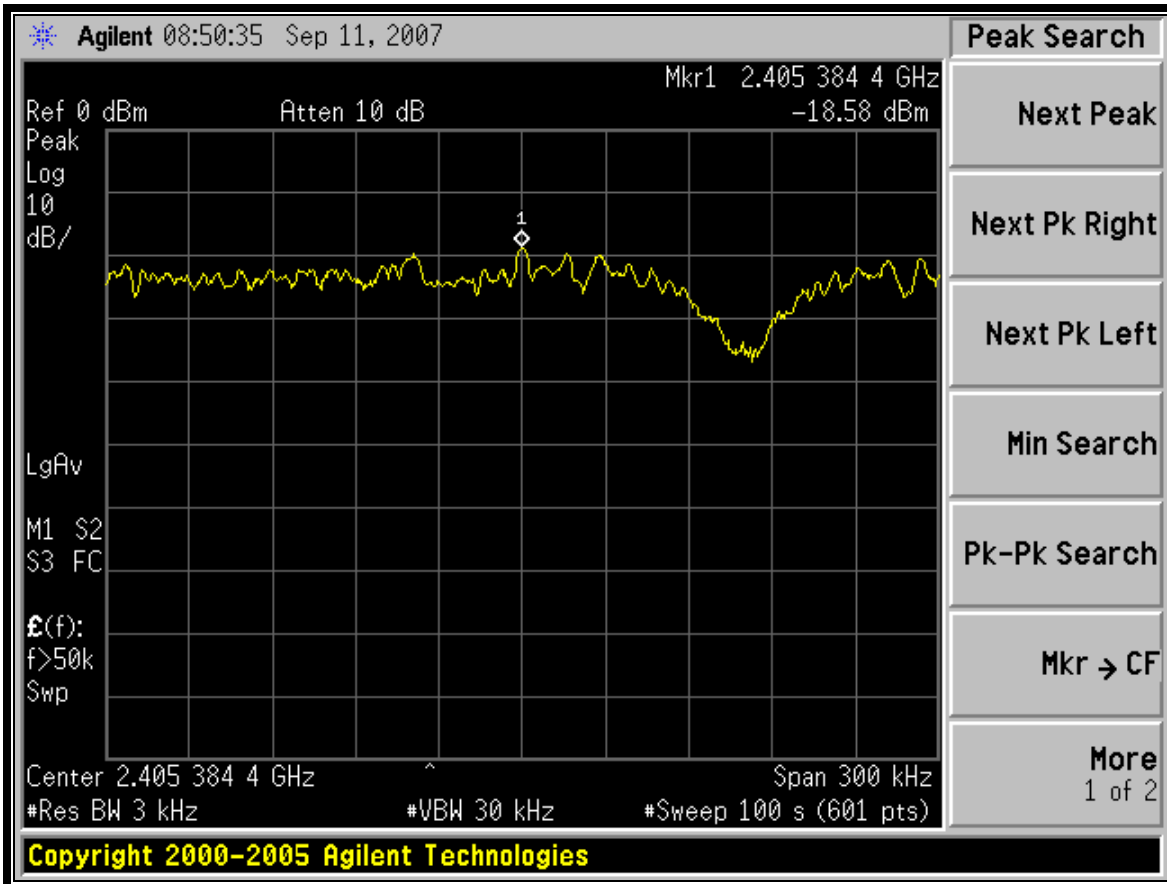
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer (3 Hz – 50 GHz)	US440203416	6/13/08

### 7.2 Power Spectral Density Test Data

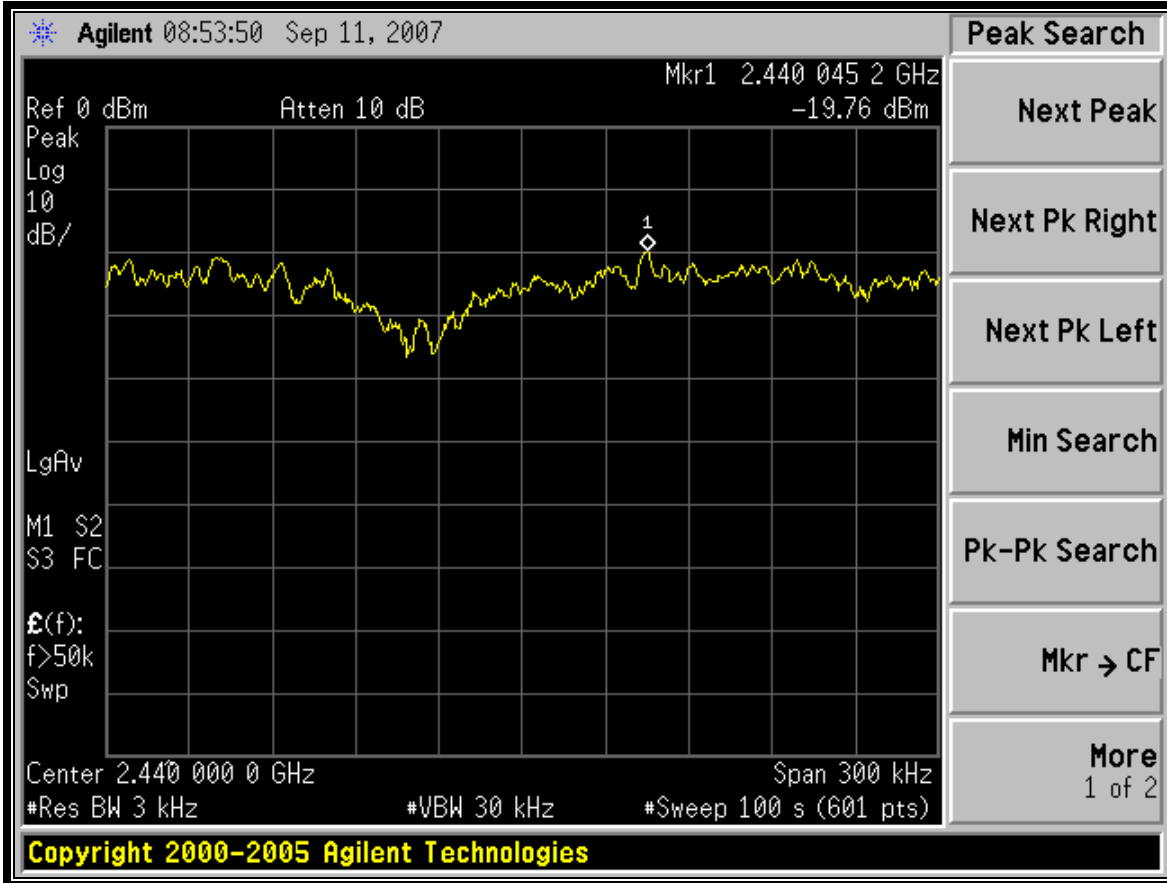
**Table 7-2: Power Spectral Density Test Data**

Frequency (MHz)	RF Power Level (dBm)	Maximum Limit +8dBm	Pass/Fail
2405	-18.6	8	Pass
2440	-19.8	8	Pass
2480	-19.2	8	Pass

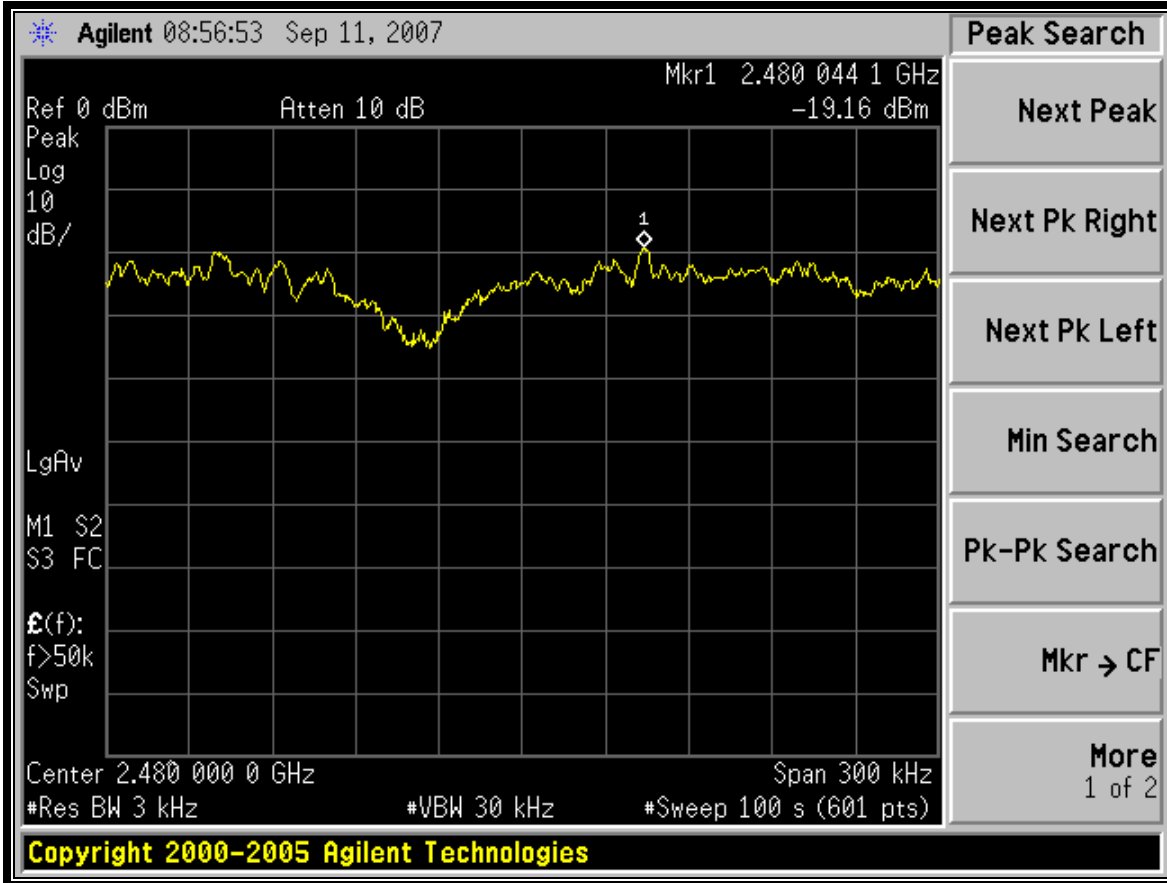
**Plot 7-1: Power Spectral Density – 2405 MHz**



**Plot 7-2: Power Spectral Density – 2440 MHz**



**Plot 7-3: Power Spectral Density – 2480 MHz**



**Test Personnel:**

Richard B. McMurray  
 Test Engineer

*Richard B. McMurray*  
 Signature

September 11, 2007  
 Date Of Test

## 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 - TX Mode**

Temperature: 74°F Humidity: 37%									
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
0.154	Pk	39.9	0.2	40.1	65.8	-25.7	55.8	-15.7	Pass
0.236	Pk	30.0	0.1	30.1	62.2	-32.1	52.2	-22.1	Pass
0.312	Pk	23.8	0.3	24.1	59.9	-35.8	49.9	-25.8	Pass
0.570	Pk	15.6	0.2	15.8	56.0	-40.2	46.0	-30.2	Pass
3.450	Pk	10.3	1.0	11.3	56.0	-44.7	46.0	-34.7	Pass
26.240	Pk	9.7	2.5	12.2	60.0	-47.8	50.0	-37.8	Pass

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

Temperature: 74°F Humidity: 37%									
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
0.161	Pk	38.9	0.2	39.1	65.4	-26.3	55.4	-16.3	Pass
0.216	Pk	32.3	0.2	32.5	63.0	-30.5	53.0	-20.5	Pass
0.252	Pk	28.7	0.1	28.8	61.7	-32.9	51.7	-22.9	Pass
0.650	Pk	12.9	0.2	13.1	56.0	-42.9	46.0	-32.9	Pass
3.750	Pk	9.0	1.0	10.0	56.0	-46.0	46.0	-36.0	Pass
28.300	Pk	11.4	2.3	13.7	60.0	-46.3	50.0	-36.3	Pass

**Table 8-4: Conducted Emissions Test Data – Neutral - RX Mode**

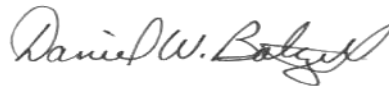
Temperature: 74°F Humidity: 37%									
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC 15.207 QP Limit (dBuV)	FCC 15.207 QP Margin (dBuV)	FCC 15.207 AV Limit (dBuV)	FCC 15.207 AV Margin (dBuV)	Pass/Fail
0.159	Pk	38.3	0.2	38.5	65.5	-27.0	55.5	-17.0	Pass
0.234	Pk	31.0	0.1	31.1	62.3	-31.2	52.3	-21.2	Pass
0.373	Pk	24.2	0.3	24.5	58.4	-33.9	48.4	-23.9	Pass
0.720	Pk	12.9	0.4	13.3	56.0	-42.7	46.0	-32.7	Pass
2.930	Pk	10.0	1.0	11.0	56.0	-45.0	46.0	-35.0	Pass
26.530	Pk	9.9	2.5	12.4	60.0	-47.6	50.0	-37.6	Pass

**Table 8-5: Conducted Emissions Test Data – Hot – RX Mode**

Temperature: 74°F Humidity: 37%									
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
0.154	Pk	39.9	0.2	40.1	65.8	-25.7	55.8	-15.7	Pass
0.236	Pk	30.0	0.1	30.1	62.2	-32.1	52.2	-22.1	Pass
0.312	Pk	23.8	0.3	24.1	59.9	-35.8	49.9	-25.8	Pass
0.570	Pk	15.6	0.2	15.8	56.0	-40.2	46.0	-30.2	Pass
3.450	Pk	10.3	1.0	11.3	56.0	-44.7	46.0	-34.7	Pass
26.240	Pk	9.7	2.5	12.2	60.0	-47.8	50.0	-37.8	Pass

**Test Personnel:**

Daniel W. Baltzell  
 Test Engineer



Signature

September 11, 2007  
 Date Of Test

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

### 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<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 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
900932	Hewlett Packard	8449B OPT H02	Preamplifier (1 - 26.5 GHz)	3008A00505	9/13/07
901281	Rhein Tech Laboratories	PR-1040	Amplifier (10 MHz - 2 GHz)	1004	1/19/08
900878	Rhein Tech Laboratories	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 Laboratories	WRT-000-0003	Wood rotating table	N/A	Not Required
900913	Hewlett Packard	85462A	EMI Receiver RF Section (9 kHz – 6.5 GHz)	3325A00159	3/21/08
901413	Agilent Technologies	E4448A	Spectrum Analyzer	US44020346	06/13/08
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	06/14/10
900321	EMCO	3161-03	Horn Antenna (4.0 - 8.2 GHz)	9508-1020	06/14/10
900323	EMCO	3160-07	Horn Antenna (8.2 - 12.4 GHz)	9605-1054	06/14/10
900356	EMCO	3160-08	Horn Antenna (12.4 - 18 GHz)	9607-1044	06/14/10
900325	EMCO	3160-9	Horn Antennas (18 - 26.5 GHz)	9605-1051	06/14/10

### 9.3 Radiated Emissions Test Results

#### 9.3.1 Radiated Emissions Digital Test Data

**Table 9-2: Digital Radiated Emissions Test Data**

Temperature: 75°F Humidity: 89%										
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
176.000	Qp	H	0	1.0	35.0	-18.5	16.5	43.5	-27.0	Pass
335.993	Qp	H	90	1.0	32.5	-12.3	20.2	46.0	-25.8	Pass
368.000	Qp	V	0	1.0	30.3	-11.4	18.9	46.0	-27.1	Pass
495.993	Qp	H	180	1.0	36.0	-8.0	28.0	46.0	-18.0	Pass
527.985	Qp	V	90	1.0	33.5	-7.6	25.9	46.0	-20.1	Pass
575.992	Qp	H	30	1.0	28.3	-6.6	21.7	46.0	-24.3	Pass

#### 9.3.2 Radiated Emissions Harmonics/Spurious Test Data

**Table 9-3: Radiated Emissions Harmonics/Spurious - 2405 MHz**

Fundamental amplitude = 74.5 dBuV/m

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (-20dB duty cycle correction)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4810.0	50.2	30.2	16.4	46.6	54.0	-7.4
7215.0	42.6	22.6	15.0	37.6	54.5	-16.9
9620.0	40.9	20.9	18.2	39.1	54.5	-15.4
12025.0	39.0	19.0	19.2	38.2	54.0	-15.8

**Table 9-4: Radiated Emissions Harmonics/Spurious - 2440 MHz**

Fundamental amplitude = 73.3 dBuV/m

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (-20dB duty cycle correction)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4880.0	48.2	28.2	16.2	44.4	54.0	-9.6
7320.0	43.0	23.0	14.8	37.8	54.0	-16.2
9760.0	39.6	19.6	17.9	37.5	53.3	-15.8
12200.0	38.3	18.3	19.5	37.8	54.0	-16.2

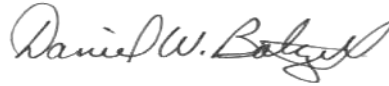
**Table 9-5: Radiated Emissions Harmonics/Spurious 2480 MHz**

Fundamental amplitude = 72.5 dBuV/m

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (-20dB duty cycle correction)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4960.0	46.6	26.6	16.5	43.1	54.0	-10.9
7440.0	39.1	19.1	15.2	34.3	54.0	-19.7
9920.0	40.9	20.9	18.1	39.0	52.5	-13.5
12400.0	37.1	17.1	22.2	39.3	54.0	-14.7

**Test Personnel:**

Daniel W. Baltzell  
 Test Engineer



Signature

September 11, 2007  
 Date Of Test

**10 99% Bandwidth - RSS-Gen §4.6.1**

**Table 10-1: 99% Bandwidth Test Equipment**

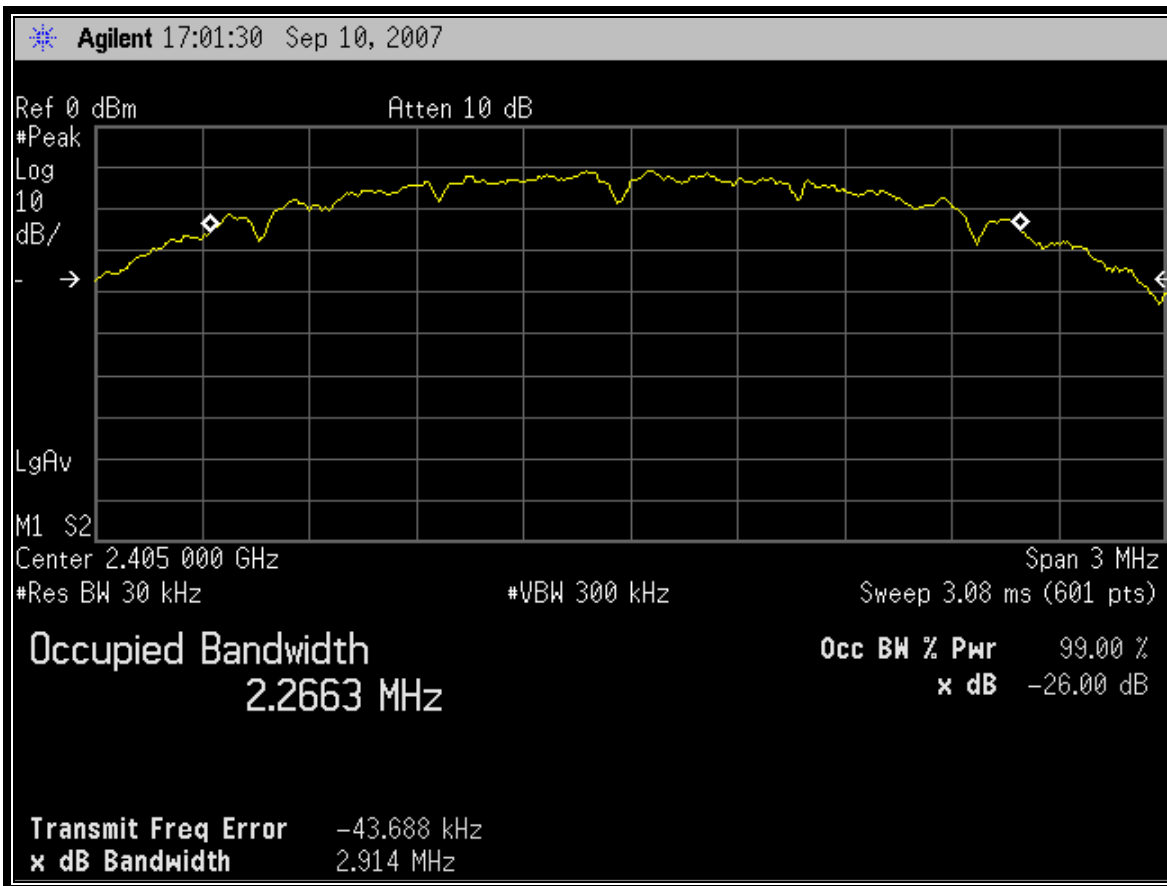
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer (3 Hz – 50 GHz)	US440203416	6/13/08

**10.1 99% Bandwidth Test Data**

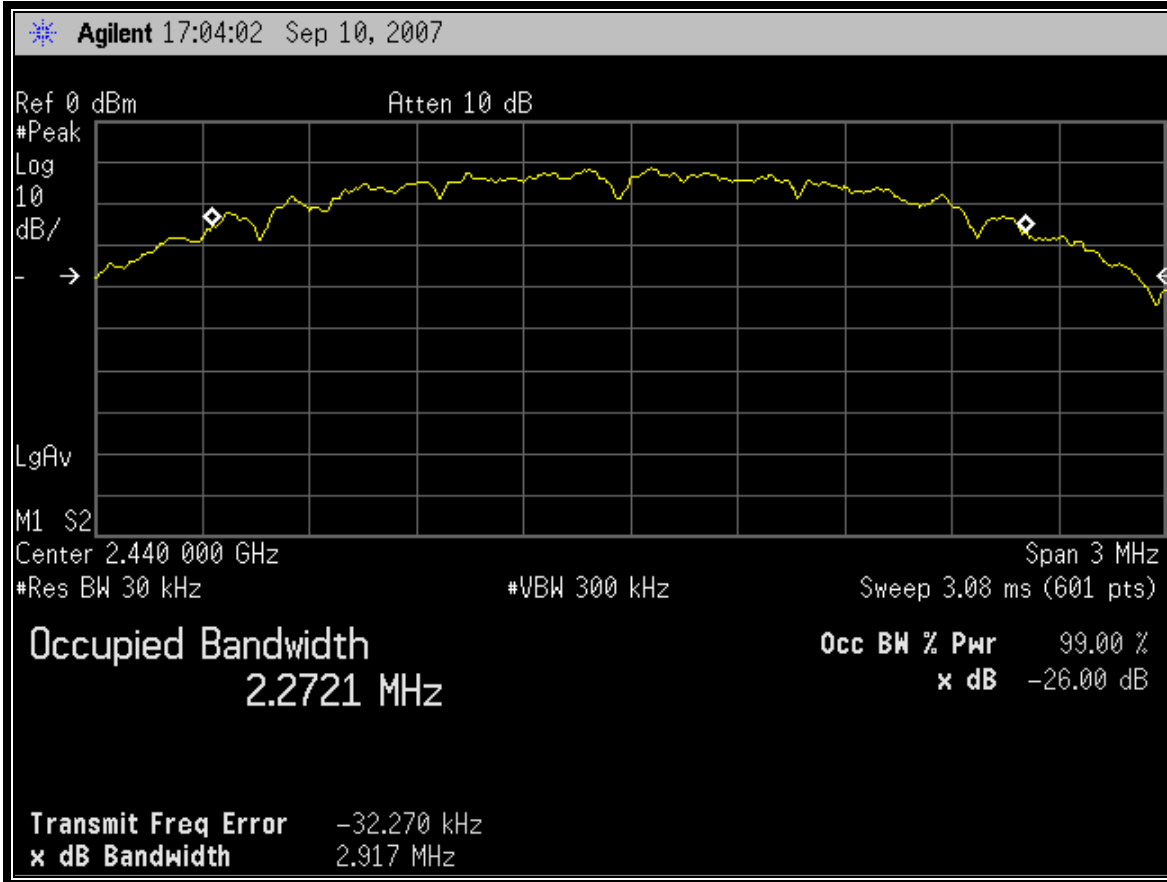
**Table 10-2: 99% Bandwidth Test Data**

Frequency (MHz)	99% Bandwidth (MHz)
2405	2.27
2440	2.27
2480	2.27

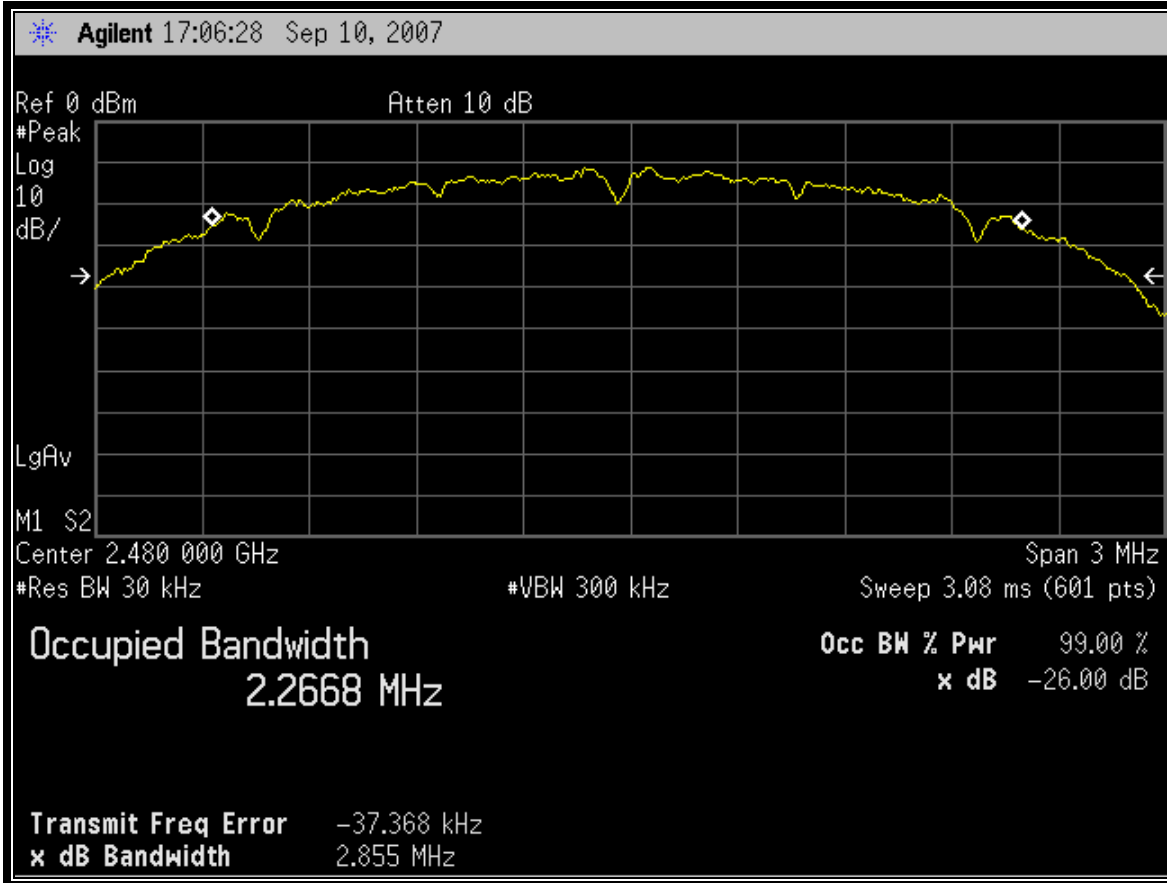
**Plot 10-1: 99% Bandwidth – 2405 MHz**



**Plot 10-2: 99% Bandwidth – 2440 MHz**



**Plot 10-3: 99% Bandwidth – 2480 MHz**



**Test Personnel:**

Richard B. McMurray  
Test Engineer

*Richard B. McMurray*  
Signature

September 10, 2007  
Date Of Test

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Suite 1400  
Herndon, VA 20170  
<http://www.rheintech.com>

Client: Hunter Engineering Company  
Model: 45-1177  
Standards: FCC 15.247/IC RSS-210  
ID's: LS3-45-1177/2938A-451177  
Report #: 2007248

## **11 Conclusion**

The data in this measurement report shows that the EUT as tested, Hunter Engineering Company, Model 45-1177, FCC ID: LS3-45-1177, IC: 2938A-451177, complies with all the applicable requirements of Parts 2 and 15 of the FCC Rules and Regulations and IC RSS-210.