



Engineering and Testing for EMC and Safety Compliance

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

Test Lab: Rhein Tech Laboratories, Inc. Tel: 703-689-0368 360 Herndon Parkway Fax: 703-689-2056 Suite 1400 www.rheintech.com Herndon, VA 20170 E-Mail: atcbinfo@rheintech.com		Applicant: Evolve Guest Controls Inc. Tel: 516-328-6900 85 Denton Avenue Fax: 516-238-6622 New Hyde Park, NY 11040 www.eguestcontrols.com	
FCC ID/ IC:	Y3K-ENR/ TBD	Test Report Date:	December 21, 2010
Platform:	N/A	RTL Work Order #:	2010222
Model:	EvolveNet Router	RTL Quote #:	QRTL10-460
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)/Guidance:	FCC Rules Part 15.247: Operation within the bands 920-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Direct Sequence System November 1, 2009, DA 00-705		
Industry Canada:	RSS-210 Issue 7: 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
2405 – 2475	0.003	N/A	1M50FXD

* 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, Industry Canada RSS-210 and ANSI C63.4.

Signature: 

Date: December 21, 2010

Typed/Printed Name: Desmond A. Fraser

Position: President

This report may not be reproduced, except in full, without the written approval of Rhein Tech Laboratories, Inc. and Evolve Guest Controls Inc. The test results relate only to the item(s) tested.

These tests are accredited and meet the requirements of ISO/IEC 17025 as verified by ANSI-ASQ National Accreditation Board/ACLASS. Refer to certificate and scope of accreditation AT-1445.

Table of Contents

1	General Information	5
1.1	Scope	5
1.2	Description of EUT	5
1.3	Test Facility	5
1.4	Related Submittal(s)/Grant(s)	5
1.5	Required Grant Notes	5
1.6	Modifications	5
2	Test Information	6
2.1	Description of Test Modes	6
2.2	Exercising the EUT	6
2.3	Test Result Summary.....	6
2.4	Test System Details	7
2.5	Configuration of Tested System.....	7
3	Peak Output Power – FCC 15.247(b)(3); IC RSS-Gen	8
3.1	Power Output Test Procedure.....	8
3.2	Power Output Test Data.....	8
4	Compliance with the Band Edge – FCC 15.247(d); IC RSS-Gen	9
4.1	Band Edge Test Procedure.....	9
4.2	Band Edge Test Results	10
4.2.1	Calculation of Lower Band Edge.....	10
4.2.2	Lower Band Edge – Conducted Delta Plot	10
4.2.3	Calculation of Upper Band Edge.....	11
4.2.4	Upper Band Edge – Conducted Delta Plot	11
5	Antenna Conducted Spurious Emissions – FCC 15.247(d); IC RSS-Gen	12
5.1	Antenna Conducted Spurious Emissions Test Procedures	12
6	6 dB Bandwidth – FCC 15.247(a)(2); IC RSS-210 A8.2(a)	13
6.1	6 dB Bandwidth Test Procedure – Minimum 6 dB Bandwidth	13
6.2	6 dB Bandwidth Test Results	13
7	Power Spectral Density – FCC 15.247(e); IC RSS-210 A8.2(b)	16
7.1	Power Spectral Density Test Procedure	16
7.2	Power Spectral Density Test Data	16
8	Conducted Emissions – FCC 15.207.....	20
8.1	Limits of Conducted Emissions Measurement.....	20
8.2	Site and Test Description	20
8.3	Conducted Emissions Test Data.....	21
9	Radiated Emissions – FCC 15.209.....	23
9.1	Limits of Radiated Emissions Measurement.....	23
9.2	Radiated Emissions Measurement Test Procedure.....	23
9.3	Radiated Emissions Test Results	25
9.3.1	Radiated Emissions Digital Test Data.....	25
9.3.2	Radiated Emissions Harmonics/Spurious Test Data	25
10	99% Bandwidth – IC RSS-Gen 4.6.1	27
10.1	99% Bandwidth Test Data.....	27
11	Conclusion	30

Figure Index

Figure 2-1:	Configuration of System under Test.....	7
-------------	---	---

Table Index

Table 2-1:	Channels Tested	6
Table 2-2:	Test Result Summary – FCC Part 15 Subpart C (Section 15.247).....	6
Table 2-3:	Equipment under Test.....	7
Table 3-1:	Power Output Test Equipment	8
Table 3-2:	Power Output Test Data.....	8
Table 4-1:	Band Edge Test Equipment (Field Strength)	9
Table 4-2:	Conducted Delta Test Equipment	9
Table 5-1:	Antenna Conducted Spurious Emissions Test Equipment	12
Table 6-1:	6 dB Bandwidth Test Equipment.....	13
Table 6-2:	6 dB Bandwidth Test Data	13
Table 7-1:	Power Spectral Density Test Equipment.....	16
Table 7-2:	Power Spectral Density Test Data	16
Table 8-1:	Conducted Emissions Test Equipment	20
Table 9-1:	Radiated Emissions Test Equipment	24
Table 9-2:	Digital Radiated Emissions Test Data.....	25
Table 9-3:	Radiated Emissions Harmonics/Spurious - 2405 MHz	25
Table 9-4:	Radiated Emissions Harmonics/Spurious - 2440 MHz	25
Table 9-5:	Radiated Emissions Harmonics/Spurious - 2475 MHz	26
Table 10-1:	99% Bandwidth Test Equipment.....	27
Table 10-2:	99% Bandwidth Test Data.....	27

Plot Index

Plot 4-1:	Lower Band Edge.....	10
Plot 4-2:	Upper Band Edge.....	11
Plot 6-1:	6 dB Bandwidth – 2405 MHz.....	13
Plot 6-2:	6 dB Bandwidth – 2440 MHz.....	14
Plot 6-3:	6 dB Bandwidth – 2475 MHz.....	15
Plot 7-1:	Power Spectral Density – 2405 MHz	17
Plot 7-2:	Power Spectral Density – 2440 MHz	18
Plot 7-3:	Power Spectral Density – 2475 MHz	19
Plot 8-1:	Conducted Emissions Test Data – Neutral - TX Mode	21
Plot 8-2:	Conducted Emissions Test Data – Hot – TX Mode	21
Plot 8-3:	Conducted Emissions Test Data – Neutral - RX Mode.....	22
Plot 8-4:	Conducted Emissions Test Data – Hot – RX Mode	22
Plot 10-1:	99% Bandwidth – 2405 MHz.....	27
Plot 10-2:	99% Bandwidth – 2440 MHz.....	28
Plot 10-3:	99% Bandwidth – 2475 MHz.....	29

Appendix Index

Appendix A:	FCC Part 1.1307, 1.1310, 2.1091, 2.1093; IC RSS-Gen: RF Exposure.....	31
Appendix B:	ATCB Agency Authorization Letter	32
Appendix C:	FCC Confidentiality Request Letter.....	33
Appendix D:	IC Letters	34
Appendix E:	IC Confidentiality Request.....	35
Appendix F:	ID Label and Label Location	36
Appendix G:	Technical Operational Description	37
Appendix H:	Schematics.....	38
Appendix I:	Block Diagram	39
Appendix J:	Manual.....	40
Appendix K:	Test Configuration Photographs	41
Appendix L:	External Photographs.....	47
Appendix M:	Internal Photographs	50

Photograph Index

Photograph 1:	ID Label Sample	36
Photograph 2:	ID Label Location on Bottom of EUT.....	36
Photograph 3:	Radiated Emissions Testing – Front View	41
Photograph 4:	Radiated Emissions Testing – Back View.....	42
Photograph 5:	Intermodulation Radiated Emissions Testing – Front View	43
Photograph 6:	Intermodulation Radiated Emissions Testing – Back View.....	44
Photograph 7:	Conducted Emissions Testing – Front View	45
Photograph 8:	Conducted Emissions Testing – Back View.....	46
Photograph 9:	Top View	47
Photograph 10:	Side View	48
Photograph 11:	Side View 2	49
Photograph 12:	PCB Top View	50
Photograph 13:	PCB Bottom View.....	51
Photograph 14:	PCB in Chassis - Top View	52
Photograph 15:	PCB in Chassis – Side View	53

1 General Information

1.1 Scope

This is an original certification application request.

Applicable Standards:

- FCC 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	Transceiver
Model	EvolveNet Router
Power Supply	+5V DC
Modulation Type	DSSS
Frequency Range	2405 – 2475 MHz
Antenna Type	2.4GHz Duck Antenna with Reverse Polarized - SMA RF

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 Evolve Guest Controls Inc. Model EvolveNet Router, FCC ID: Y3K-ENR, IC: TBD.

1.5 Required Grant Notes

This application should include the following FCC Grant Notes:

This transmitter may be co-located with up to three transmitters covered under FCC ID: Y3K-PORT.

Note that the subject EUT of this application was tested with three instances of the EUT certified under Y3K-PORT with all four transmitters transmitting simultaneously. Inter-mod and spurious emissions were investigated and all found to be compliant. Per FCC guidance, no co-location data is being reported. Please see test photographs 5 and 6 which show the test setup with all transmitters present.

1.6 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	2475

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	Pass

Intermodulation product emissions were verified with three 900 MHz installed radios and emissions were found to be compliant.

2.4 Test System Details

The test samples were received on November 11, 2010. 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	Evolve Guest Controls Inc.	EvolveNet Router	N/A	Y3K-ENR	1m shielded I/O	19963
Antenna	N/A	2.4GHz Duck Antenna with Reverse Polarized SMA RF	N/A	N/A	N/A	N/A
5VDC to AC Adapter	V Infinity	EPS050100	N/A	N/A	1.8m unshielded	19958

2.5 Configuration of Tested System

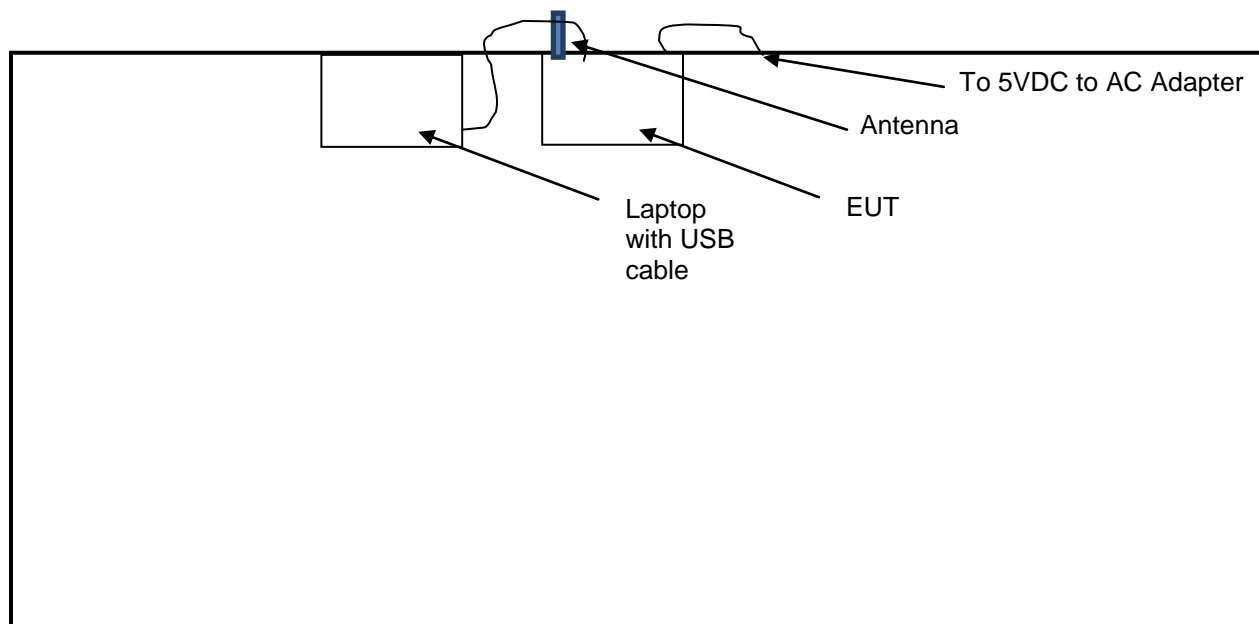


Figure 2-1: Configuration of System under Test

3 Peak Output Power – FCC 15.247(b)(3); IC 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)	US44020346	11/11/11


3.2 Power Output Test Data

Table 3-2: Power Output Test Data

Channel	Frequency (MHz)	Peak Power Conducted Output (dBm)
Low	2405	5.1
Middle	2440	4.9
High	2475	4.5

Test Personnel:

Dan Baltzell
Test Engineer



Signature

November 15, 2010
Date Of Test

4 Compliance with the Band Edge – FCC 15.247(d); IC 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 (Field Strength)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900772	EMCO	3161-02	Horn Antenna (2–4 GHz)	9804-1044	6/13/11
900878	Rhein Tech Laboratories	AM3-1197-0005	3 meter Antenna Mast, polarizing	Outdoor Range 1	Not Required
901516	Insulated Wire, Inc.	KPS-1503-2400-KPS-09302008	RF cable, 20'	NA	4/5/11
901517	Insulated Wire Inc.	KPS-1503-360-KPS-09302008	RF cable 36"	NA	4/5/11
901242	Rhein Tech Laboratories	WRT-000-0003	Wood Rotating Table	N/A	Not Required
901413	Agilent Technologies	E4448A	Spectrum Analyzer	US44020346	11/11/11
901365	MITEQ	JS4-00102600-41-5P	Amplifier, 15 V, 0.1-26 GHz, 28dB gain, power 5dB	1094152	11/16/11

Table 4-2: Conducted Delta Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer	US44020346	11/11/11

4.2 Band Edge Test Results

4.2.1 Calculation of Lower Band Edge

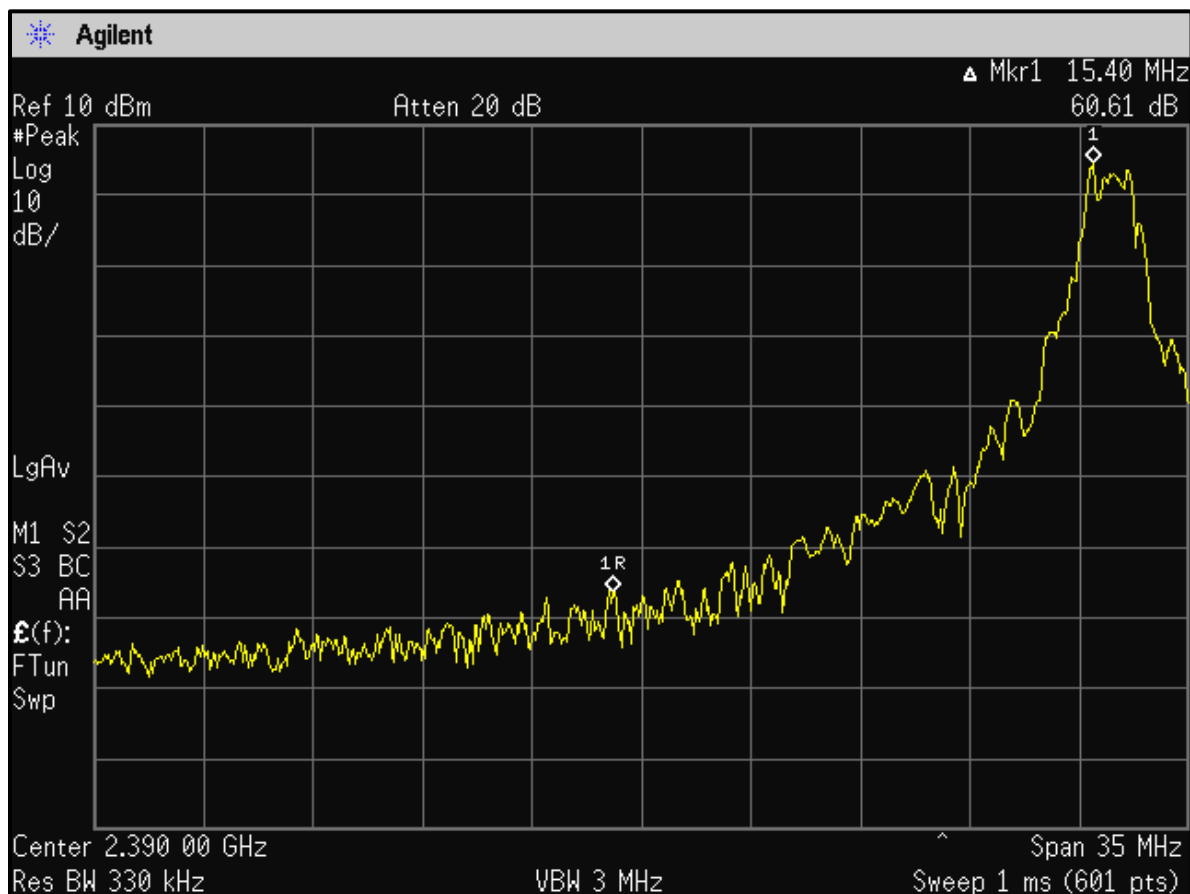
98.4 dBuV/m is the field strength measurement, from which the delta measurement of 60.6 dB is subtracted, resulting in a level of 37.8 dB. This level has a margin of 16.2 dB below the limit of 54 dBuV/m.

Calculation: $98.4 \text{ dBuV/m} - 60.6 \text{ dB} - 54 \text{ dBuV/m} = -16.2 \text{ dB}$

Peak Field Strength of Lower Band Edge (1 MHz RBW/8 MHz VBW) = 100.6 dBuV/m
 Average Field Strength of Lower Band Edge (1 MHz RBW/10 Hz VBW) = 98.4 dBuV/m
 Delta measurement = 60.6 dB

4.2.2 Lower Band Edge – Conducted Delta Plot

Plot 4-1: Lower Band Edge



4.2.3 Calculation of Upper Band Edge

97.3 dBuV/m is the field strength measurement, from which the delta measurement of 53.1 dB is subtracted, resulting in a level of 44.2 dB. This level has a margin of 9.8 dB below the limit of 54 dBuV/m.

Calculation: $97.3 \text{ dBuV/m} - 53.1 \text{ dB} - 54 \text{ dBuV/m} = -9.8 \text{ dB}$

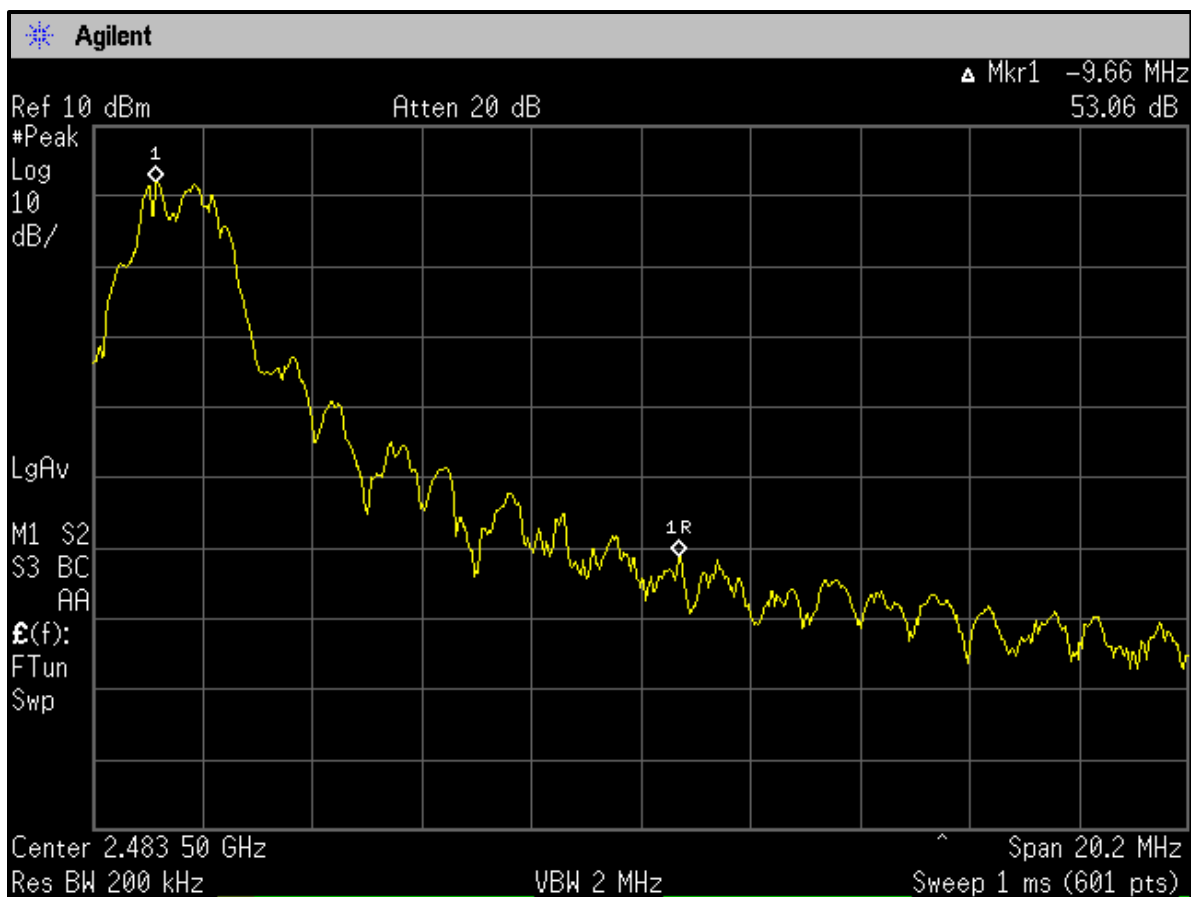
Peak Field Strength of Lower Band Edge (1 MHz RBW/8 MHz VBW) = 99.9 dBuV/m

Average Field Strength of Lower Band Edge (1 MHz RBW/10 Hz VBW) = 53.3 dBuV/m

Delta measurement = 53.1 dB

4.2.4 Upper Band Edge – Conducted Delta Plot

Plot 4-2: Upper Band Edge



Test Personnel:

Dan Baltzell
 Test Engineer

Daniel W. Baltzell

Signature

November 15, 2010
 Date Of Test

5 Antenna Conducted Spurious Emissions – FCC 15.247(d); IC RSS-Gen

5.1 Antenna Conducted Spurious Emissions Test Procedures

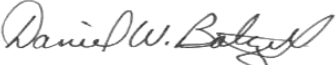
Antenna spurious emissions per FCC 15.247(c) were measured from the EUT antenna port using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 1 MHz. The modulated carrier was identified at the following frequencies: 2405 MHz, 2440 MHz and 2475 MHz.

No harmonics or spurs were found within 20 dB of the limit from the carrier to the 10th harmonic of the carrier frequency (note that we are reporting power as peak). Per FCC 15.31(o), no 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	11/11/11

Test Personnel:

Dan Baltzell		November 16, 2010
Test Engineer	Signature	Date Of Test

6 6 dB Bandwidth – FCC 15.247(a)(2); IC 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 1 MHz. The device was modulated. The minimum 6 dB bandwidths are presented below.

Table 6-1: 6 dB Bandwidth Test Equipment

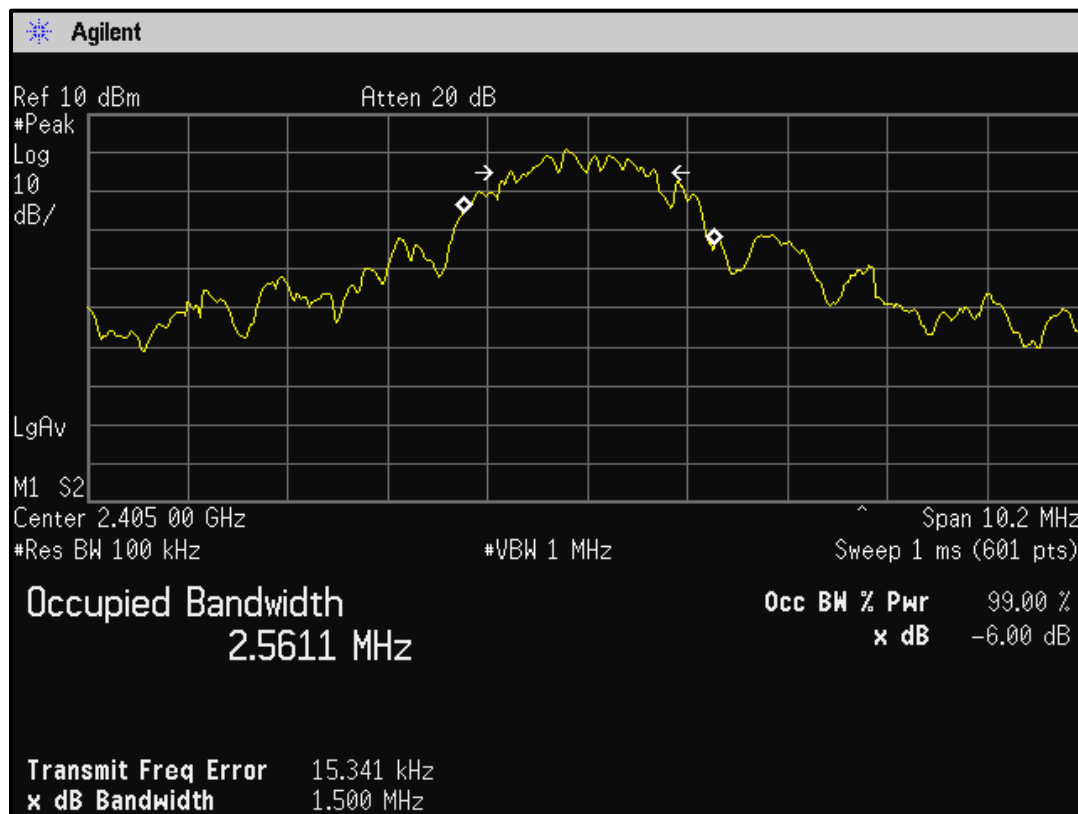
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer (3 Hz–50 GHz)	US44020346	11/11/11

6.2 6 dB Bandwidth Test Results

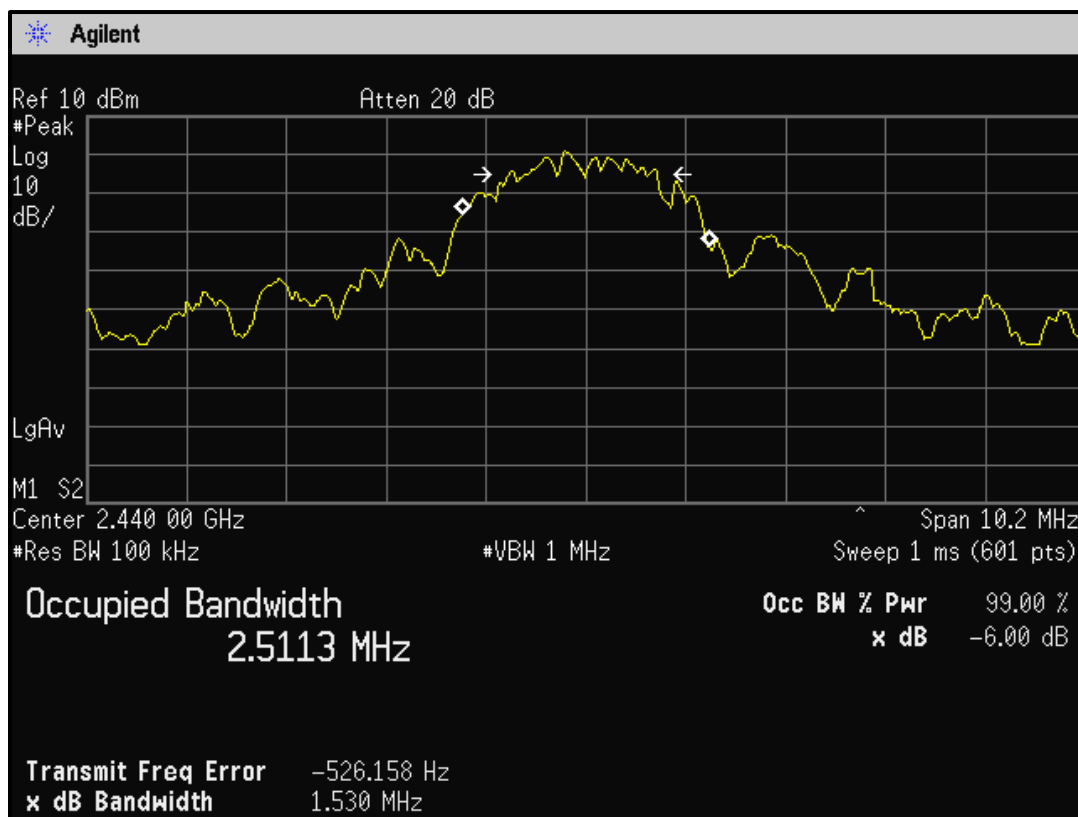
Table 6-2: 6 dB Bandwidth Test Data

Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/Fail
2405	1.5	0.5	Pass
2440	1.5	0.5	Pass
2475	1.5	0.5	Pass

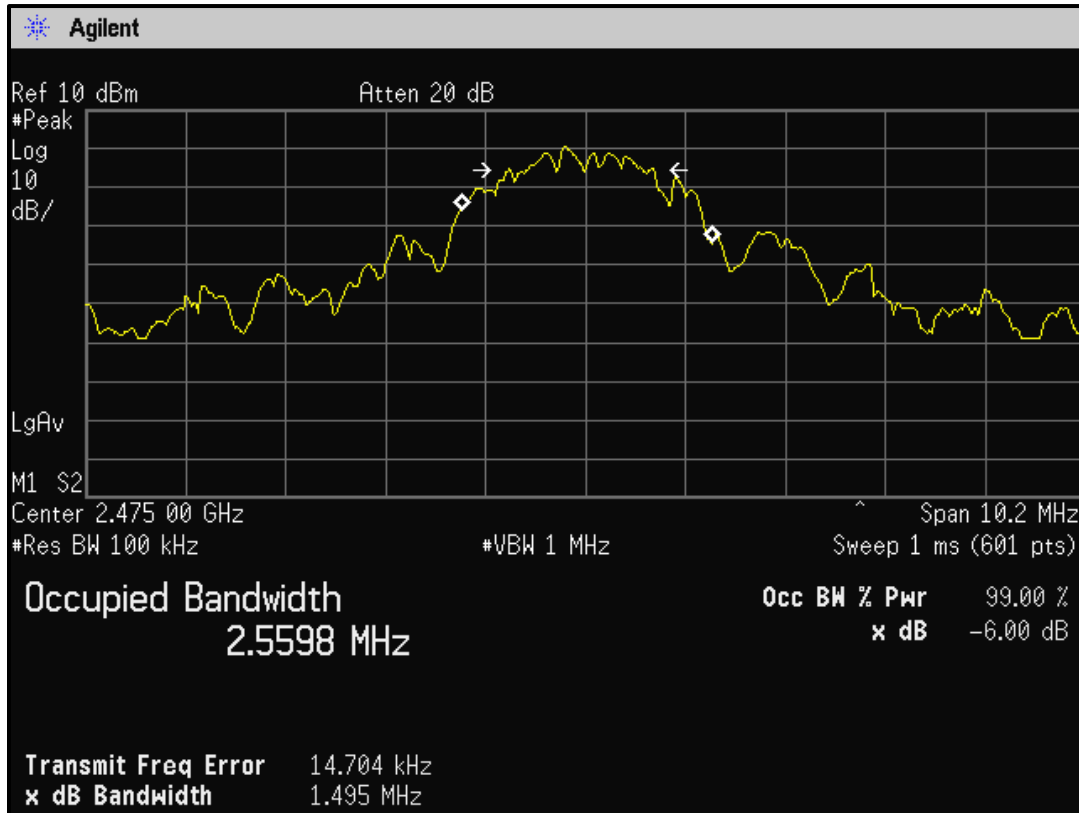
Plot 6-1: 6 dB Bandwidth – 2405 MHz



Plot 6-2: 6 dB Bandwidth – 2440 MHz



Plot 6-3: 6 dB Bandwidth – 2475 MHz



Test Personnel:

Dan Baltzell
Test Engineer

Daniel W. Baltzell

Signature

November 15, 2010
Date Of Test

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

7.1 Power Spectral Density Test Procedure

The power spectral density per FCC 15.247(e) 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 2475 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

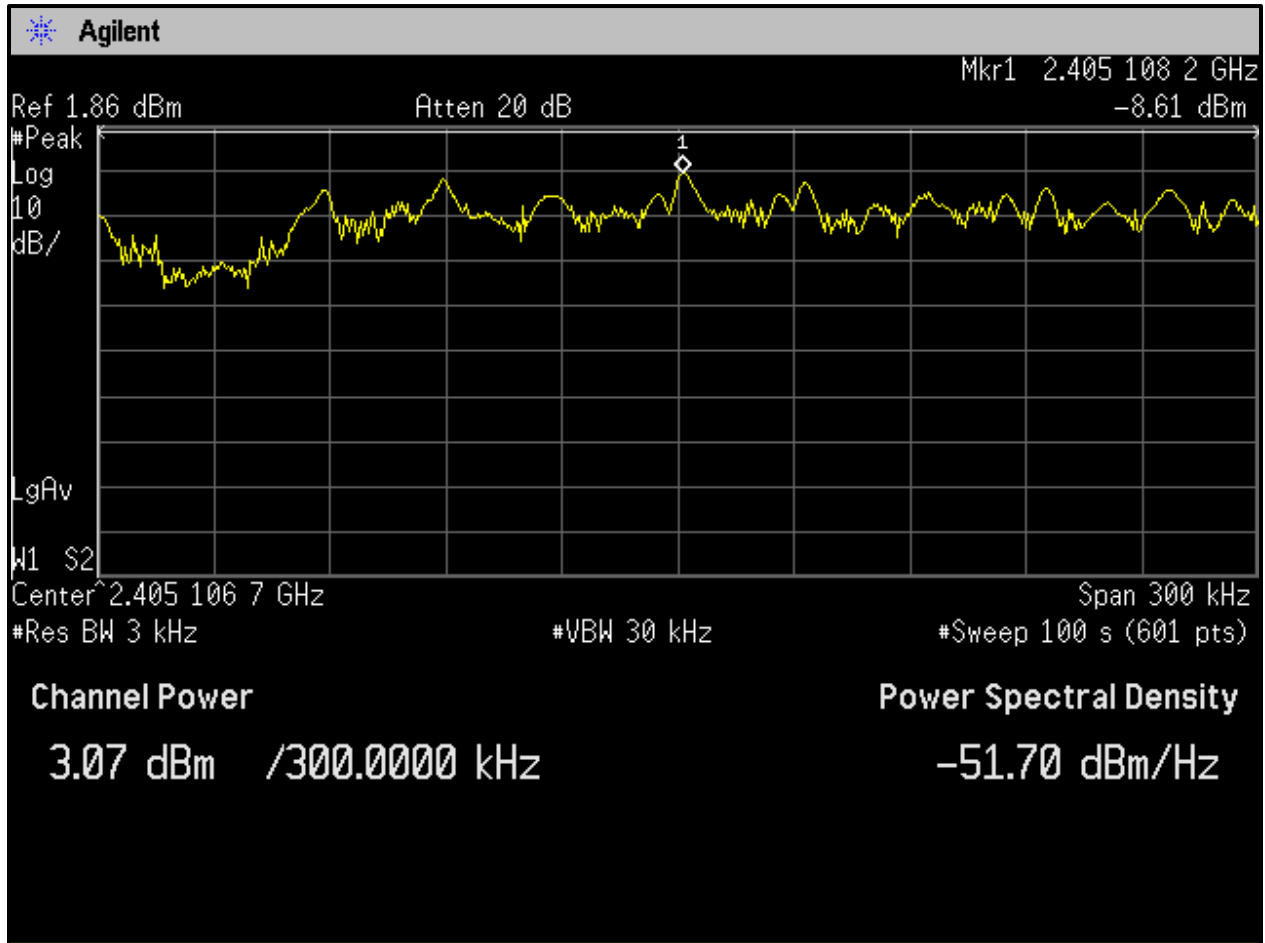
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer (3 Hz–50 GHz)	US44020346	11/11/11

7.2 Power Spectral Density Test Data

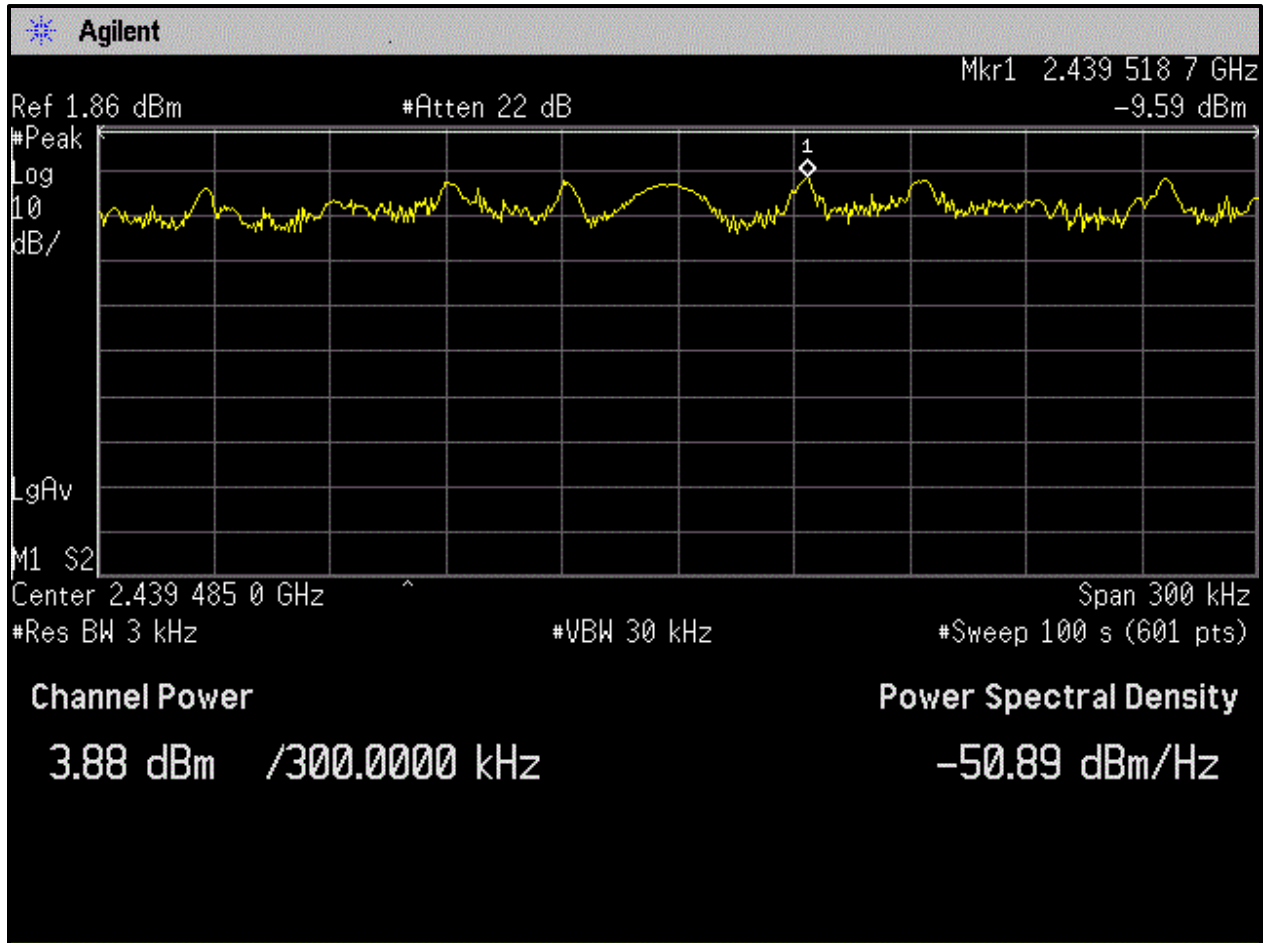
Table 7-2: Power Spectral Density Test Data

Frequency (MHz)	RF Power Level (dBm)	Maximum Limit +8dBm	Pass/Fail
2405	-8.6	8	Pass
2440	-9.6	8	Pass
2475	-10.1	8	Pass

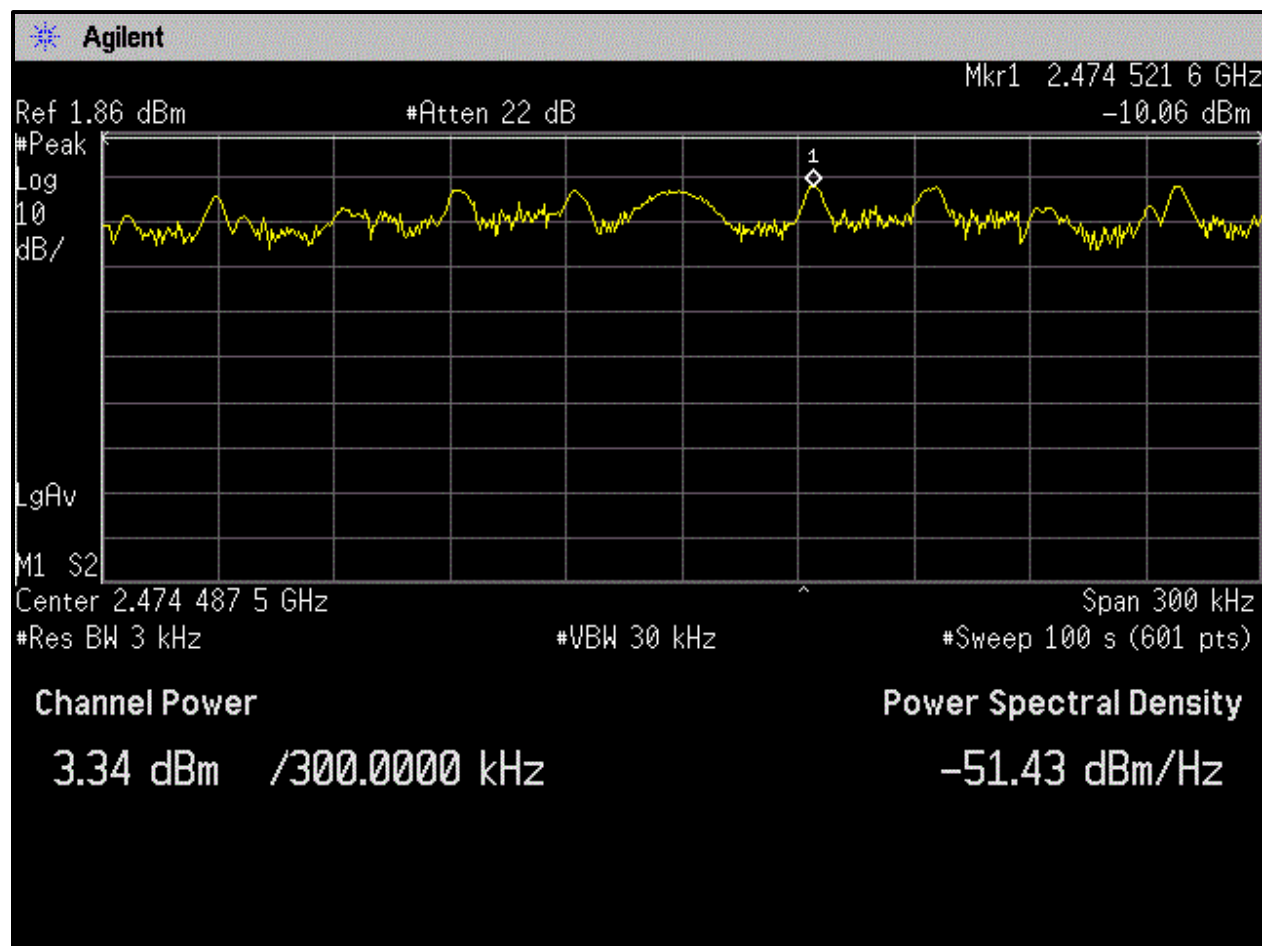
Plot 7-1: Power Spectral Density – 2405 MHz



Plot 7-2: Power Spectral Density – 2440 MHz



Plot 7-3: Power Spectral Density – 2475 MHz



Test Personnel:

Dan Baltzell
Test Engineer

Daniel W. Baltzell
Signature

November 16, 2010
Date Of Test

8 Conducted Emissions – FCC 15.207

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).

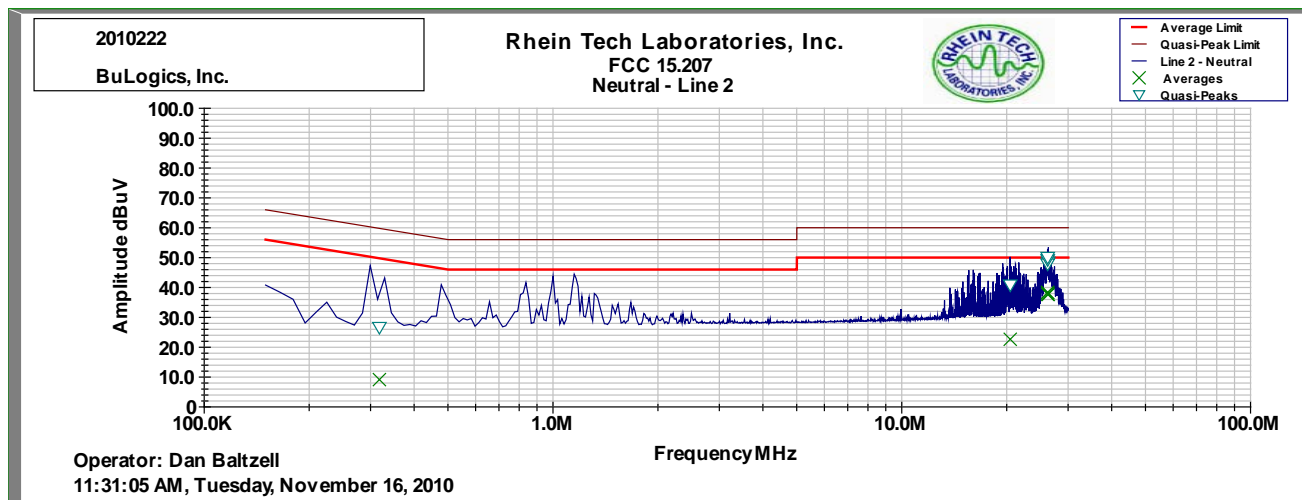
The analyzer's 6 dB bandwidth was set to 9 kHz. Video filter less than 10 times the resolution bandwidth is not used. Average measurements are performed in linear mode using a 10 kHz resolution bandwidth, a 1 Hz video bandwidth, and by increasing the sweep time in order to obtain a calibrated measurement. 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

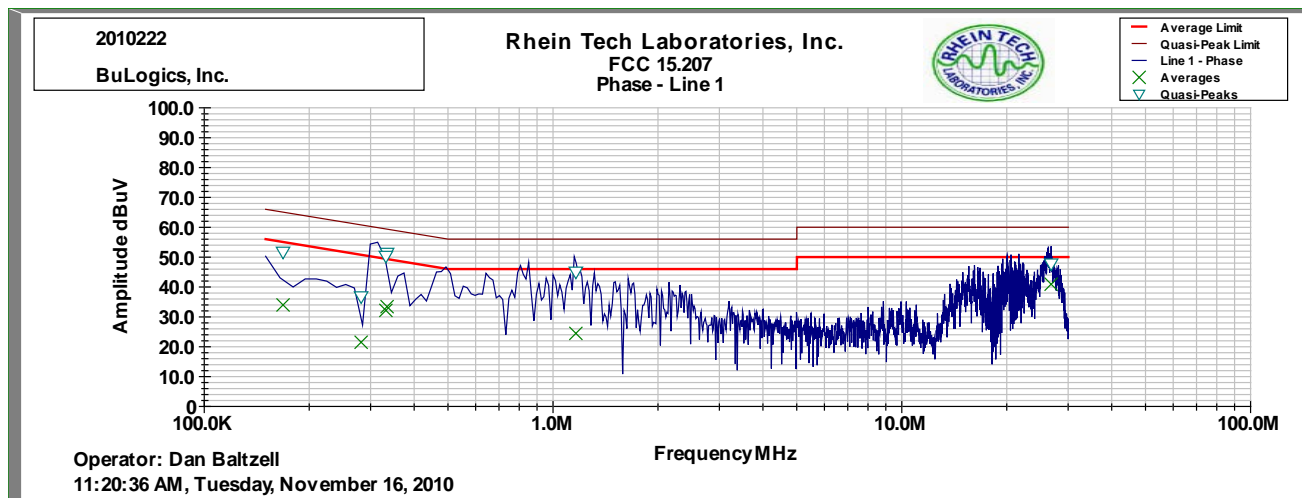
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901215	Hewlett Packard	8596EM	Spectrum Analyzer (9 kHz-12.8 GHz)	3826A00144	11/23/11
901082	AFJ International	LS16	16A LISN (110 V)	16010020081	4/13/11

8.3 Conducted Emissions Test Data

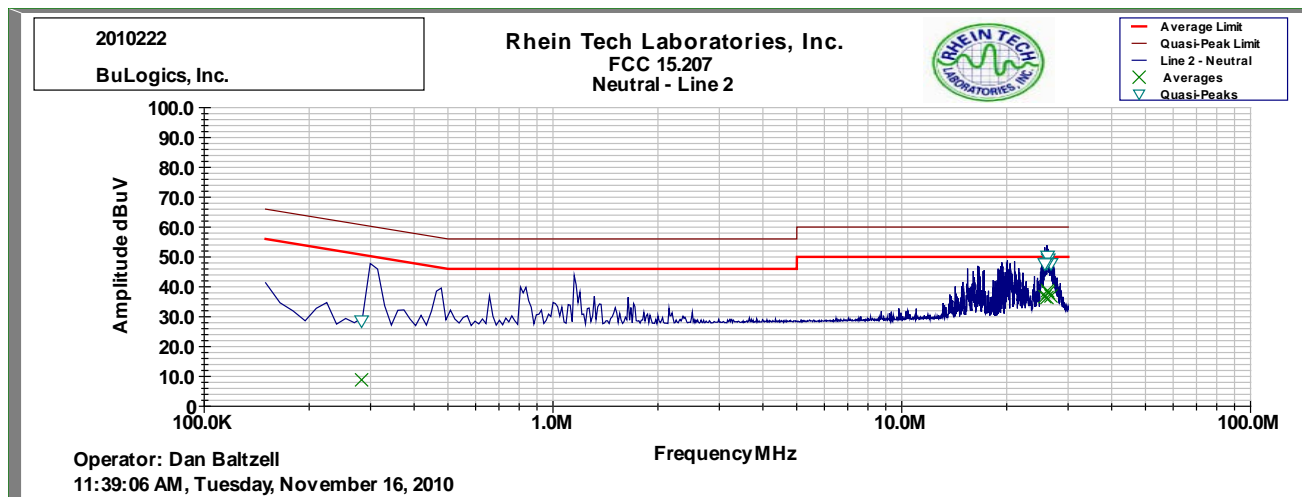
Plot 8-1: Conducted Emissions Test Data – Neutral - TX Mode



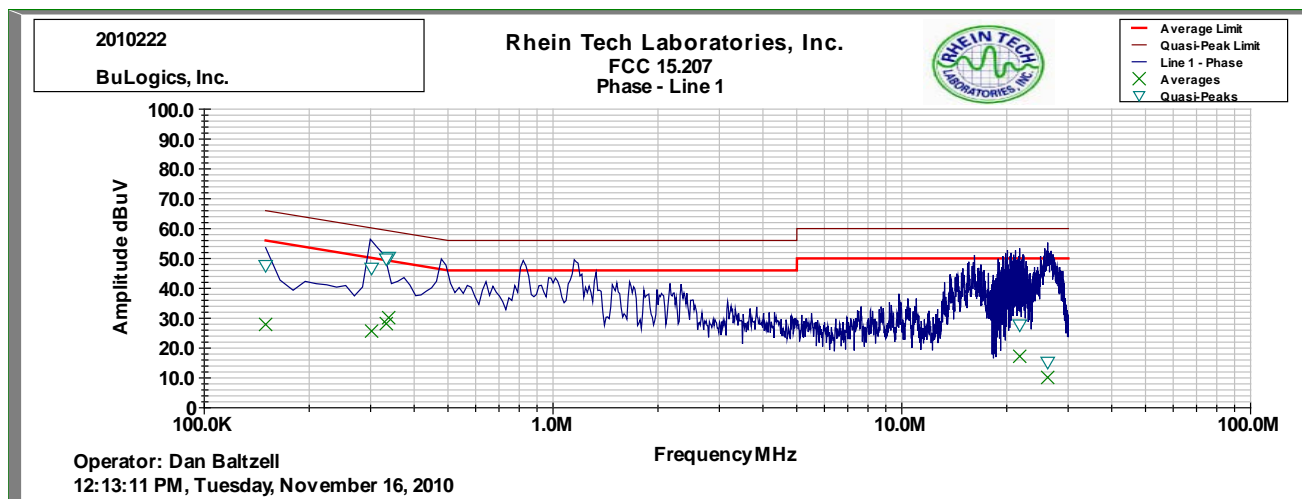
Plot 8-2: Conducted Emissions Test Data – Hot – TX Mode



Plot 8-3: Conducted Emissions Test Data – Neutral - RX Mode



Plot 8-4: Conducted Emissions Test Data – Hot – RX Mode



Test Personnel:

Daniel W. Baltzell
 Test Engineer

Daniel W. Baltzell

Signature

November 16, 2010
 Date Of Test

9 Radiated Emissions – FCC 15.209

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 10th harmonic of the highest fundamental transmitter frequency (24.75 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
901365	MITEQ	JS4-00102600-41-5P	Amplifier, 15 V, 0.1-26 GHz	1094152	11/16/11
900905	Rhein Tech Laboratories	PR-1040	OATS 1 Preamplifier 40dB (30 MHz–2 GHz)	1006	4/10/11
900878	Rhein Tech Laboratories	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
901516	Insulated Wire, Inc.	KPS-1503-2400-KPS-09302008	RF cable, 20'	NA	10/19/11
901517	Insulated Wire Inc.	KPS-1503-360-KPS-09302008	RF cable 36"	NA	10/19/11
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	8/2/11
900772	EMCO	3161-02	Horn Antenna (2-4 GHz)	9804-1044	6/13/11
900321	EMCO	3161-03	Horn Antenna (4.0-8.2 GHz)	9508-1020	6/13/11
900323	EMCO	3160-07	Horn Antenna (8.2-12.4 GHz)	9605-1054	6/13/11
900356	EMCO	3160-08	Horn Antenna (12.4-18 GHz)	9607-1044	6/13/11
900325	EMCO	3160-9	Horn Antennas (18-26.5 GHz)	9605-1051	6/13/11
901413	Agilent Technologies	E4448A	Spectrum Analyzer	US44020346	11/11/10

9.3 Radiated Emissions Test Results

9.3.1 Radiated Emissions Digital Test Data

Table 9-2: Digital Radiated Emissions Test Data

Temperature: 52°F Humidity: 100%										
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
143.900	Qp	H	250	2.0	42.5	-18.3	24.2	43.5	-19.3	Pass
147.458	Qp	V	180	1.0	45.4	-18.4	27.0	43.5	-16.5	Pass
193.103	Qp	H	90	1.4	41.9	-18.7	23.2	43.5	-20.3	Pass
194.725	Qp	H	90	2.0	44.0	-18.6	25.4	43.5	-18.1	Pass
217.234	Qp	H	120	1.4	44.6	-18.9	25.7	46.0	-20.3	Pass
241.375	Qp	H	90	1.3	37.4	-17.5	19.9	46.0	-26.1	Pass
313.793	Qp	H	240	1.0	33.9	-14.4	19.5	46.0	-26.5	Pass
410.327	Qp	V	180	1.0	31.1	-10.8	20.3	46.0	-25.7	Pass

9.3.2 Radiated Emissions Harmonics/Spurious Test Data

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

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4810.0	42.6	34.7	2.3	37.0	54.0	-17.0
12025.0	37.4	23.9	13.8	37.7	54.0	-16.3

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


Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4880.0	42.3	33.9	2.4	36.3	54.0	-17.7
7320.0	43.7	35.8	5.6	41.4	54.0	-12.6
12200.0	36.6	23.6	14.3	37.9	54.0	-16.1

Table 9-5: Radiated Emissions Harmonics/Spurious - 2475 MHz

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4950.0	44.6	39.1	2.7	41.8	54.0	-12.2
7425.0	42.1	34.3	5.8	40.1	54.0	-13.9
12375.0	36.6	23.4	14.7	38.1	54.0	-15.9

Test Personnel:

Daniel W. Baltzell
Test Engineer



Signature

November 16, 2010
Date Of Test

10 99% Bandwidth – IC RSS-Gen 4.6.1

Table 10-1: 99% Bandwidth Test Equipment

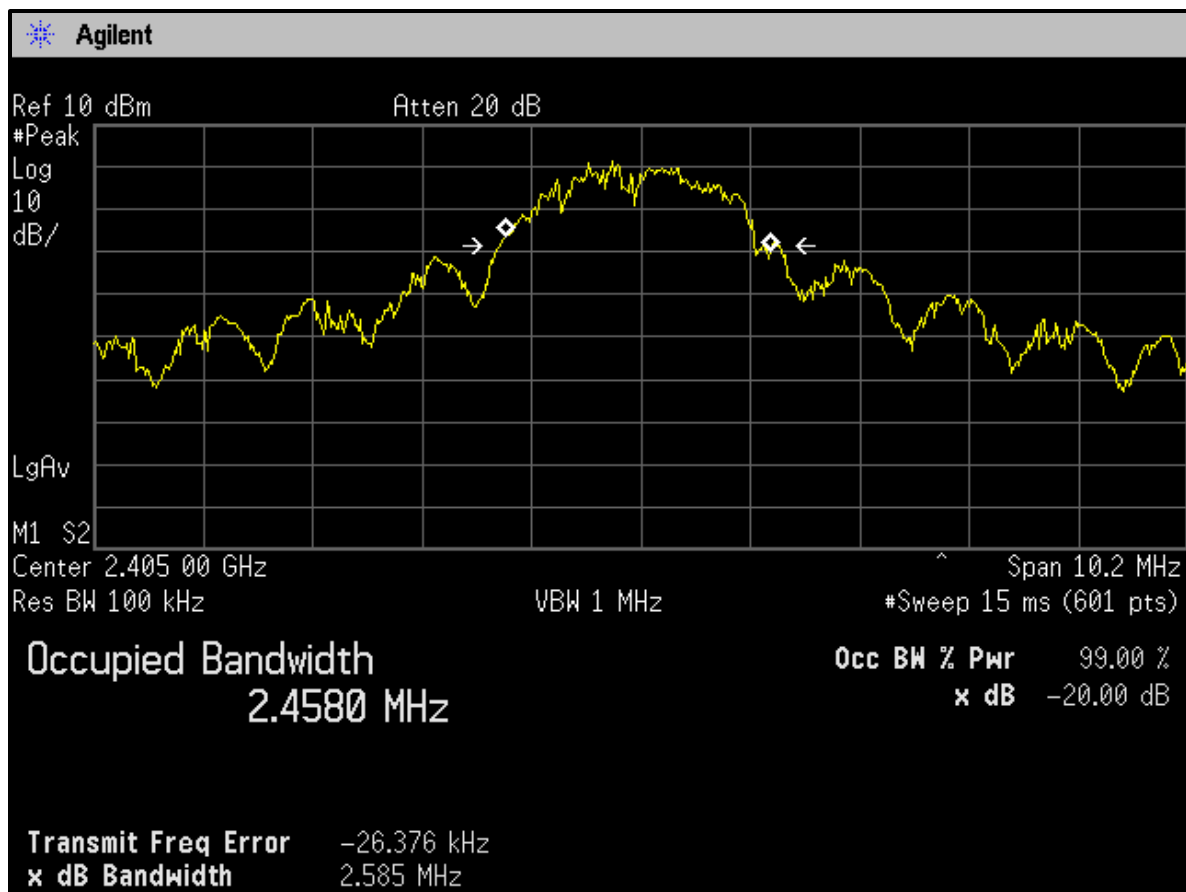
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer	US44020346	11/11/11

10.1 99% Bandwidth Test Data

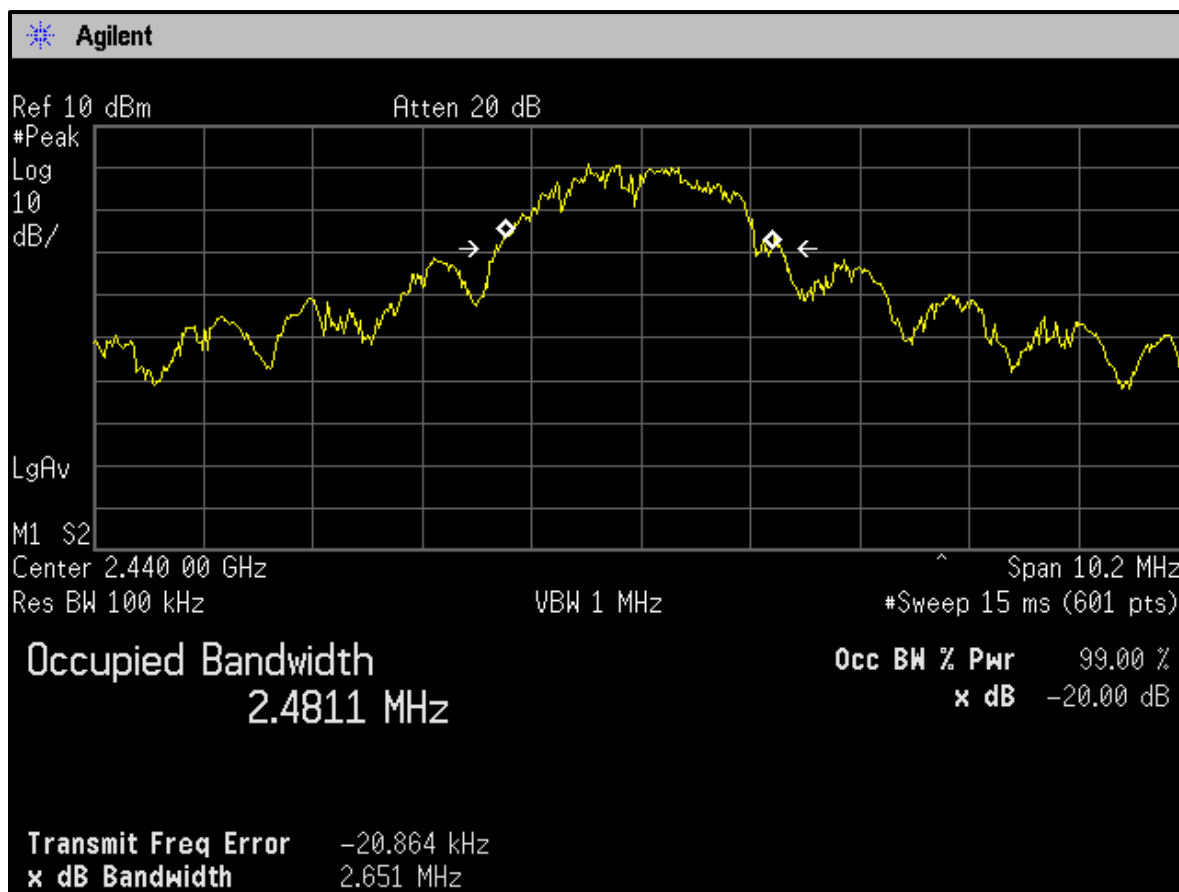
Table 10-2: 99% Bandwidth Test Data

Frequency (MHz)	99% Bandwidth (MHz)
2405	2.458
2440	2.481
2475	2.484

Plot 10-1: 99% Bandwidth – 2405 MHz



Plot 10-2: 99% Bandwidth – 2440 MHz



Plot 10-3: 99% Bandwidth – 2475 MHz



Test Personnel:

Dan Baltzell
Test Engineer

Signature

November 15, 2010
Date Of Test

Rhein Tech Laboratories, Inc.
360 Herndon Parkway
Suite 1400
Herndon, VA 20170
<http://www.rheintech.com>

Client: Evolve Guest Controls Inc.
Model: EvolveNet Router
Standards: FCC 15.247/IC RSS-210
ID's: Y3K-ENR / TBD
Report #: 2010222

11 Conclusion

The data in this measurement report shows that the EUT as tested, Evolve Guest Controls Inc. Model EvolveNet Router, FCC ID: Y3K-ENR, IC: TBD, complies with all the applicable requirements of Parts 2 and 15 of the FCC Rules and Regulations and Industry Canada RSS-210.