



COMPLIANCE WORLDWIDE INC. TEST REPORT 438-10R3

In Accordance with the Requirements of

FCC PART 15.247, SUBPART C INDUSTRY CANADA RSS 210, ISSUE 8

Low Power License-Exempt Radio Communication Devices
Intentional Radiators

Issued to

Philips Medical Systems
3000 Minuteman Drive
Andover, MA 01810
978-659-2800

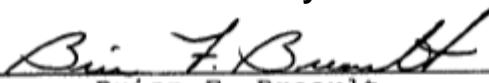
for the

Philips Telemetry System
ITS4852A 2.4 GHz Access Point
(RadioHead)

FCC ID: PQC-4852A
IC: 3549B-4852A

Original Report Issued on February 18, 2011
R2 report issued on April 29, 2011
R3 report issued on May 25, 2011

Tested by



Brian F. Breault

Reviewed by



Larry K. Stillings

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1. Scope

This test report certifies that the Philips Medical Telemetry System ITS4852A 2.4 GHz Access Point, as tested, meets the FCC Part 15, Subpart C and Industry Canada RSS 210, Issue 8 requirements. The scope of this test report is limited to the test sample provided by the client, only in as much as that sample represents other production units. If any significant changes are made to the unit, the changes shall be evaluated and a retest may be required. R1 report issued to correct serial number and test dates. Revision - R2 added IC RS-102 information to public exposure on page 29. Revision R3 – Reformatted the upper band edge tables in section 6.8 to provide a greater degree of clarity regarding the FCC OET Publication Number 913591 measurement methodology.

2. Product Details

2.1. Manufacturer: Philips Medical Systems

2.2. Model Number: ITS4852A 2.4 GHz Access Point

2.3. Serial Number: US00000066

2.4. Description: The ITS4852A 2.4 GHz Access Point is part of the Philips ITS4850A IntelliVue 2.4 GHz Smart Hopping Telemetry systems. The Access Point provides connectivity between Patient Worn Devices and the network. The Access Point interfaces between the IntelliVue Telemetry infrastructure and the IntelliVue PWDs. The AP connects to the Synchronization box in the IntelliVue infrastructure. Patient ECG signals will be generated by a simulator connected to a 2.4 GHz PWD and transmitted by the PWD to the 2.4 GHz Access Point. These signals will then traverse the IntelliVue Information Center network for display on the IntelliVue Information Center display.

2.5. Power Source: 48 Volts DC through Ethernet cable (POE)

2.6. EMC Modifications: None

3. Product Configuration

3.1. Operational Characteristics & Software

3.1.1 From APC Web interface,

- a) Go to 'WMTS AP Configuration' screen,
- b) Select 'ISM AREA' pull down menu to select area below:
 - 1) Europe
 - 2) Europe (non-hopping)
 - 3) North America
 - 4) North America (non-hopping)
 - 5) Select save after highlighting the desired mode

3.3.2 Use the IntelliVue Information Center to monitor the proper operation of the PWD.

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3. Product Configuration (continued)

3.2. EUT Hardware

Blk. Diag.	Device	Manufacturer	Model	Serial No.	Comment
1A	2.4 GHz Access Point	Philips Medical	ITS4852A	US00000066	

3.3. Support Equipment

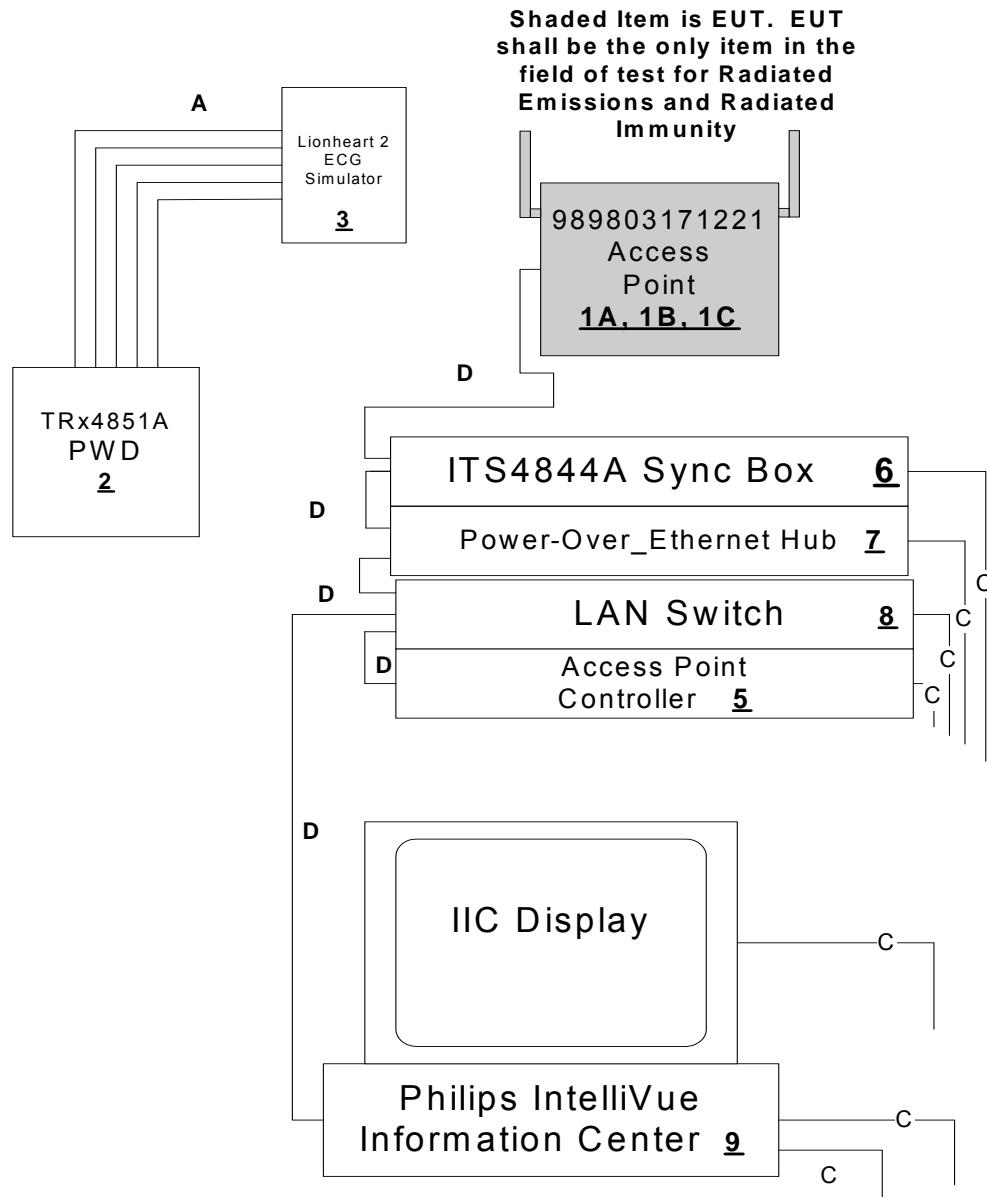
Blk #	Mfgr	Model / Part #	Opt	HW Rev.	FW Rev.	SW Rev.	Serial # (if available)	Nom. Voltage	Description
2	Philips	TRx4851A/86223 21/ABA, AAM, OSE, S01	N/A	N/A	N/A	N/A	US00610432	3 VDC	Patient Worn Device
3	Bio-Tek	Lionheart 2	N/A	N/A	N/A	N/A	203926	9 VDC	ECG simulator
5	Philips	865346	N/A				N/A	100-240 50-60	IntelliVue Access Point Controller S/N US00000001
6	Philips	ITS4844A/862114	ABA	Prd	N/A	N/A	US34300013	100-240 50-60	Synchronization Box
7	Power D-Sine	Philips P/N- ITS4845A	N/A	NA	NA	NA	N/A	100-240 50-60	Power Over Ethernet Hub 6 Port
8	Cisco	WS-C2950G-24	N/A	NA	NA	NA	F030732Z1WX	100-240 50-60	24 Port 10/100 Ethernet Switch
9	Philips	M3150A	N/A	NA	NA	NA	2UA6261RQY	100-240 50-60	IntelliVue Information Center

3.4. Cables

Blk Item	Part #	Shielded Y or N	Length	Function / Description
A	392 925	Y	1 m	Philips ECG leadset
C	N/A	N	Various	Category 5 UTP cable, various lengths
D	N/A	N	2 m	AC power cords

3 Product Configuration (continued)

3.5. Block Diagram



Support equipment (items #2, #3, #5, #6, #7, #8 & #9) were remotely located for radiated emissions testing.

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4. Measurements Parameters

4.1. Measurement Equipment Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due
Spectrum Analyzer	Agilent	E4407B	MY45104493	12/22/2012
Microwave Preamp	Hewlett Packard	83050A	3331A00404	10/20/2011
Spectrum Analyzer	Agilent	E7405A	MY45115430	10/22/2011
Bilog Antenna	Com-Power	AC-220	25509	8/30/2011
Horn Antenna	Electro-Metrics	EM-6961	6337	10/19/2012
Horn Antenna	ComPower	AH-118	10078	7/23/2011
Horn Antenna	ComPower	AH-840	03075	7/20/2012
DMM / Temperature	Fluke	187	79690058	11/29/2011
RF Signal Generator	Hewlett Packard	8648C	3642U01557	7/16/2011
2.4 GHz BP Filter	Micro-Tronics	BRM50702	14	8/11/2011
RF Power Meter	Boonton	4220A	203603AA	5/28/2012
Power Sensor	Boonton	51100 (9E)	24221	5/29/2012
Digital Barometer	Control Company	4195	ID236	11/9/2011
Thermal Chamber	Associated Testing Labs	SLHU-1-CRLC	N/A	Not Required

4.2. Measurement & Equipment Setup

Test Dates:	Nov. 11 th 2010 – Feb 17 th , 2010
Test Engineer:	Brian Breault
Normal Site Temperature (15 - 35°C):	21.6
Relative Humidity (20 -75%RH):	35
Frequency Range:	30 MHz to 40 GHz
Measurement Distance:	3 Meters
EMI Receiver IF/Resolution Bandwidth:	100 kHz - 30 MHz to 1 GHz 1 MHz - Above 1 GHz
EMI Receiver Average/Video Bandwidth:	300 kHz - 30 MHz to 1 GHz 3 MHz - Above 1 GHz
Detector Function:	Peak, Quasi-Peak & Average

4.3. Measurement Procedure

Test measurements were made in accordance FCC Part 15.247, IC RSS-210 Annex II: Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz.

The test methods used to generate the data in this test report is in accordance with ANSI C63.4: 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

The device under test is not a handheld device. Rotating the device through three orthogonal axes in accordance with ANSI C63.4-2003, section 13.1.4.1, c) was not required.

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5. Measurement Summary

Test Requirement	FCC Part 15.247 Reference	Test Report Section	Result	Comment
Antenna Requirement	15.203	N/A	Compliant	The unit uses a reverse polarity TNC Connector
Minimum 6 dB Bandwidth	(a) (2)	7.1	Compliant	
99% Bandwidth	N/A	7.2	Compliant	
Maximum Peak Conducted Output Power	(b) (1)	7.3	Compliant	
Operation with directional antenna gains greater than 6 dBi	(b) (4)	7.4	Compliant	
Spurious Radiated Emissions	15.247 (d)	7.5	Compliant	
Spurious Radiated Emissions (> GHz) - Harmonic Measurements	15.247 (d)	7.5	Compliant	
Receiver Spurious Radiated Emissions	15.247 (d)	7.5	Compliant	
Lower and Upper Band Edge	15.247 (d)	7.6	Compliant	
Power Spectral Density	15.247(e)	7.7	Compliant	
Conducted Emissions	FCC Part 15	7.8	Compliant	
Public Exposure to Radio Frequency Energy Levels	1.1307 (b) (1)	7.9	Compliant	

Statement from IC RSS-GEN

User Manual for Transmitters with Detachable Antennas

The user manual of transmitter devices equipped with detachable antennas shall contain the following information in a conspicuous location:

"This device has been designed to operate with the antennas listed below, and having a maximum gain of [x] dB. Antennas not included in this list or having a gain greater than [x] dB are strictly prohibited for use with this device. The required antenna impedance is [y] ohms."

Equipment manufacturers shall provide proper values of x and y to comply with the applicable RSS. Immediately following the above statement, the manufacturer shall provide a list of all antennas acceptable for use with the transmitter.

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6. Measurement Data

6.1. Antenna Requirement (15.203)

Requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section.

Status: The antennas utilize reverse SMA type connectors.

6.2. Minimum 6 dB Bandwidth (15.247 (a) (2), RSS 210 A8.2(a))

Requirement: Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Resolution Bandwidth : 100 kHz
Video Bandwidth : 300 kHz

6.2.1 Measurement Results

Channel	Frequency (MHz)	6 dB Bandwidth (kHz)	Minimum 6 dB Bandwidth (kHz)	Result
Low	2401.060	892.5	>500	Compliant
Middle	2442.320	877.5	>500	Compliant
High	2482.252	960.0	>500	Compliant

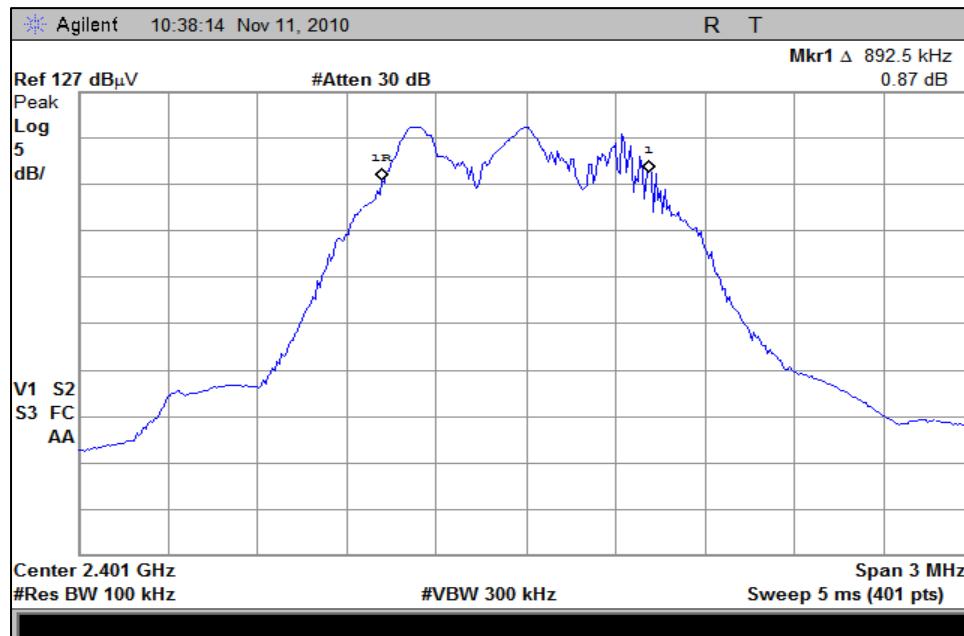
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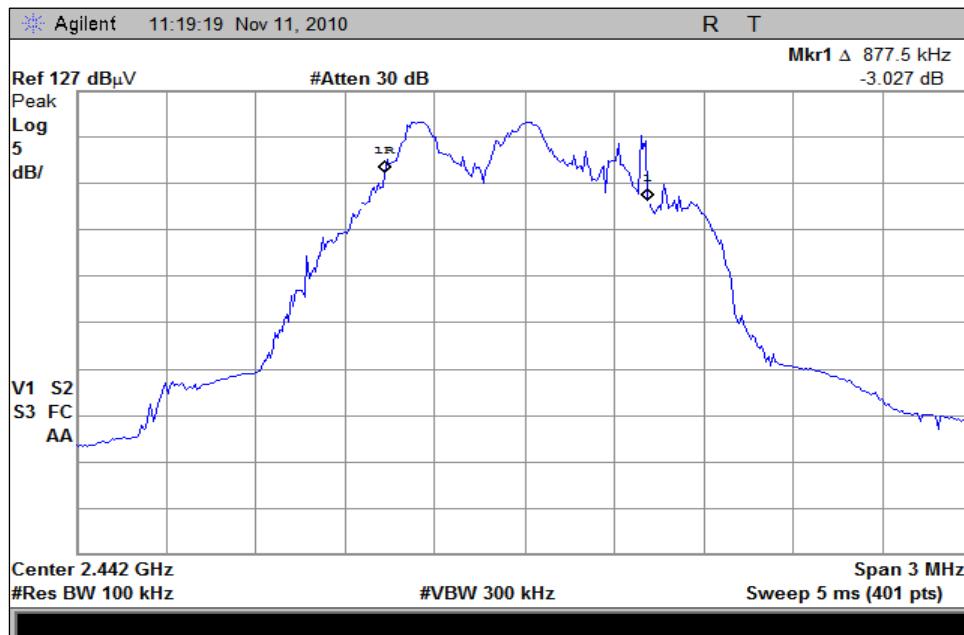
6. Measurement Data

6.2. Minimum 6 dB Bandwidth (15.247 (a) (2)) (continued)

6.2.2.1. Low Channel – 0



6.2.2.2. Mid Channel - 24

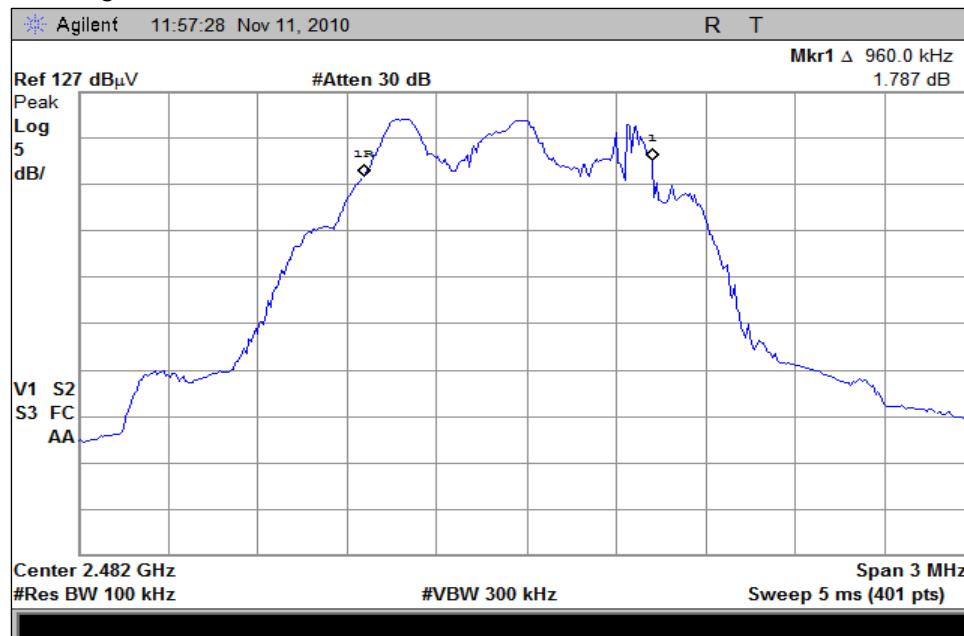


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6. Measurement Data (continued)

6.2. Minimum 6 dB Bandwidth (15.247 (a) (2)) (continued)

6.2.2.3. High Channel - 47



6.3. 99% Bandwidth (RSS 210)

Requirement: For devices operating above 900 MHz, the 99% bandwidth shall be no wider than 0.5% of the center frequency.

The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth.

Resolution Bandwidth: 100 kHz
 Video Bandwidth : 300 kHz

6.3.1. Measurement Results

Channel	Channel Frequency (MHz)	99% Power Bandwidth (MHz)	Acceptable Bandwidth (MHz)	Result
Low	2401.060	1.238	12.005	Compliant
Middle	2442.320	1.248	12.212	Compliant
High	2482.252	1.270	12.411	Compliant

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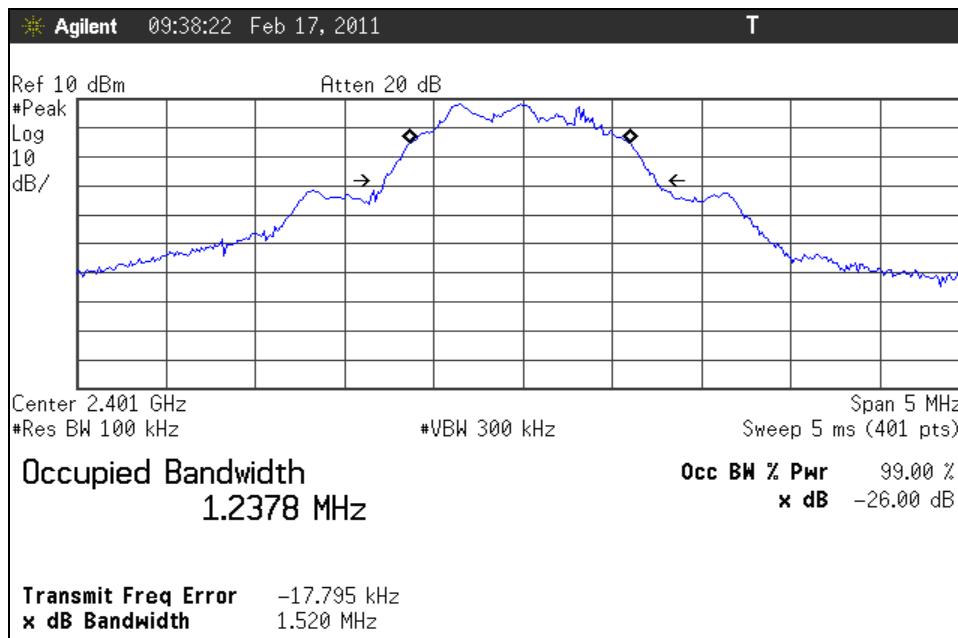
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6. Measurement Data (continued)

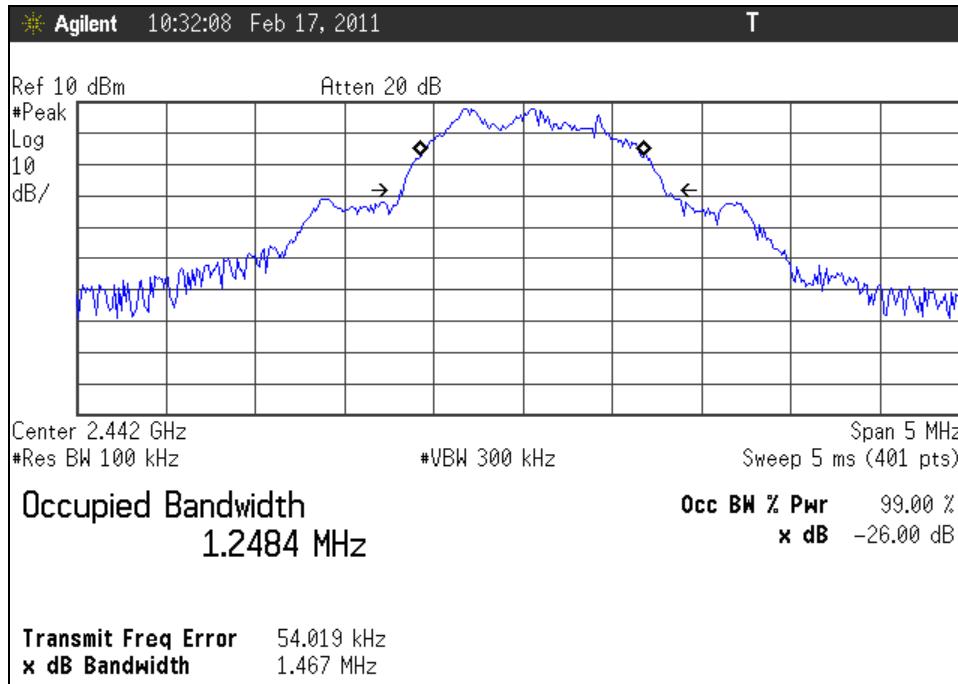
6.3. 99% Bandwidth (RSS 210) (continued)

6.3.2. Measurement Plots (continued)

6.3.2.1. Low Channel – 0



6.3.2.2. Mid Channel - 24



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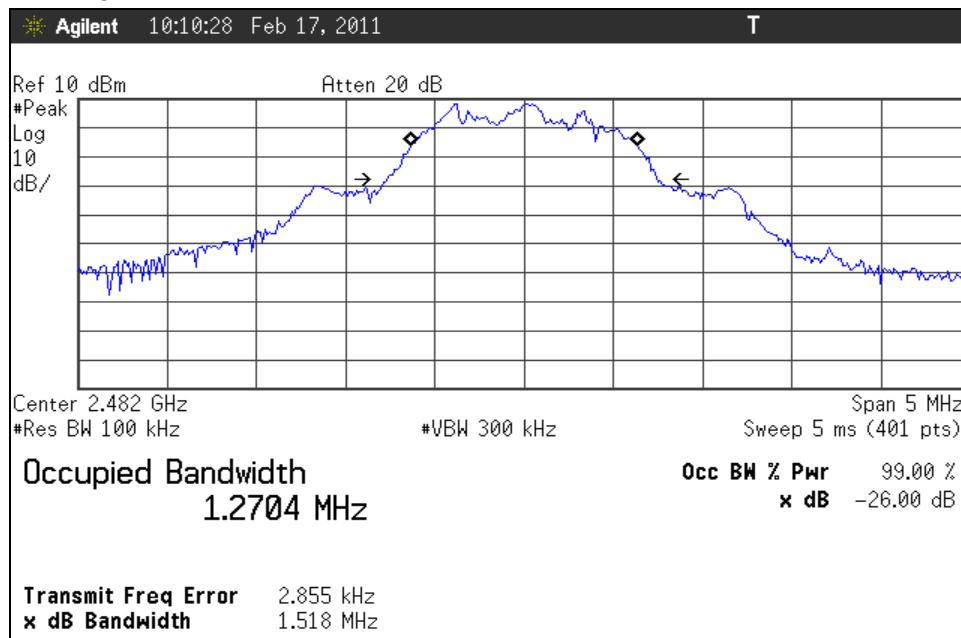
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6. Measurement Data (continued)

6.3. 99% Bandwidth (IC RSS 210) (cont.)

6.3.2. Measurement Plots (continued)

6.3.2.3. High Channel - 47



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6. Measurement Data (continued)

6.4. Maximum Peak Conducted Output Power (15.247 (b) (1))

Requirement: The maximum peak conducted output power of the intentional radiator shall not exceed the following: For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

Resolution Bandwidth : 1 MHz
Video Bandwidth : 3 MHz

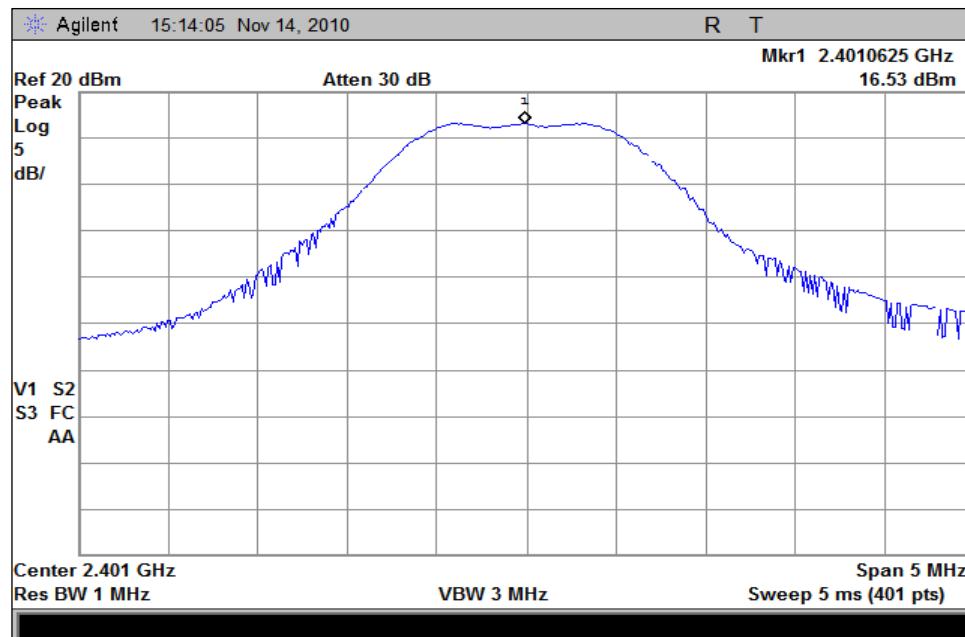
6.4.1. Measurement Results

Channel	Frequency (MHz)	Peak Conducted Output Power (Watts)	Antenna Gain (dBi)	Limit (Watts)	Result
Low	2401.060	0.044977985	3.2	1	Compliant
Middle	2442.320	0.046773514		1	Compliant
High	2482.252	0.047206304		1	Compliant

¹ Gain value was taken from the antenna manufacture's data guide.

6.4.2. Measurement Plots

6.4.2.1. Low Channel - 0



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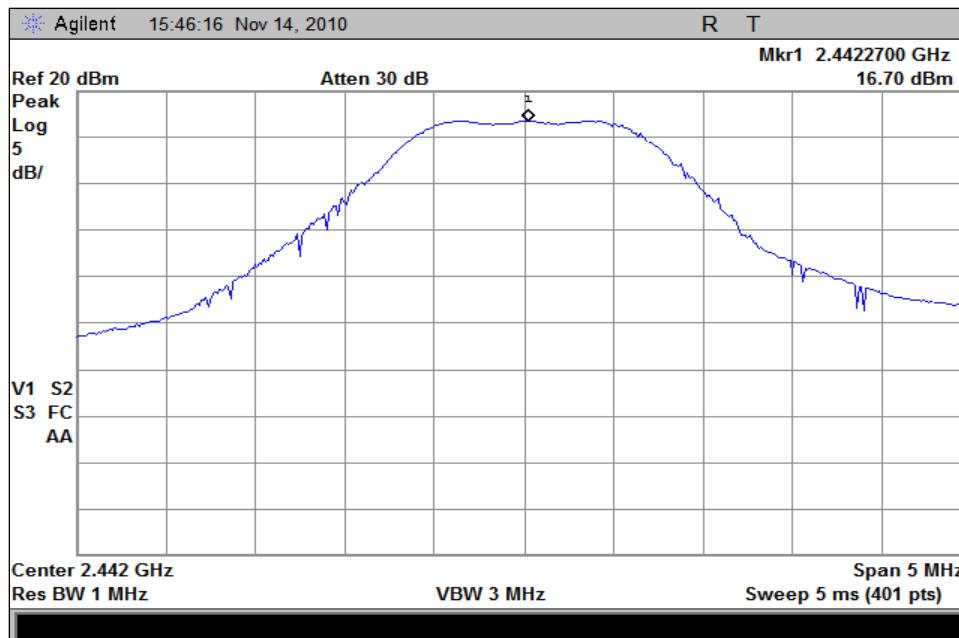
Issue Date: 05/25/2011

6. Measurement Data (continued)

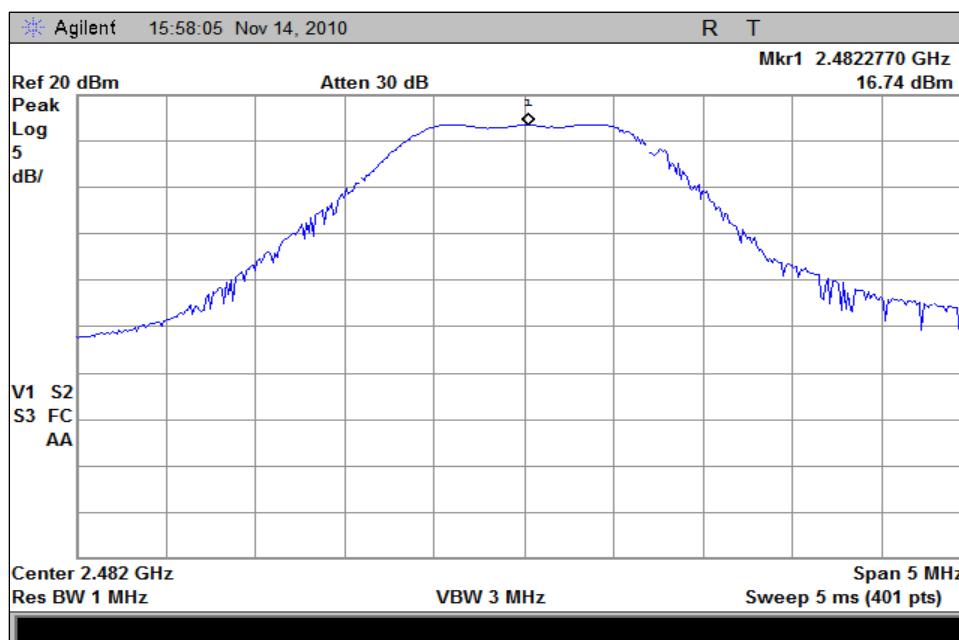
6.4. Maximum Peak Conducted Output Power (15.247 (b) (1))

6.4.2. Measurement Plots

6.4.2.2. Middle Channel - 24



6.4.2.3. Low Channel - 47



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6. Measurement Data (continued)

6.5. Operation with directional antenna gains greater than 6 dBi

If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of FCC Part 15.247, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The device under test utilizes a Pulse Part Number W1037 wireless external antenna for 2.4 GHz applications. The antenna has a manufacturer's specified gain of 3.2 dBi and therefore is not affected by this clause.

6.6. Transmitter Spurious Radiated Emissions (30 MHz to 40 GHz)

6.6.1. Regulatory Limit: FCC Part 209, Quasi-Peak

Frequency Range (MHz)	Distance (Meters)	Limit (dB μ V/m)
30 to 88	3	40.0
88 to 216	3	43.5
216 to 960	3	46.0
>960	3	54.0

6.6.2. Measurement & Equipment Setup

Test Date:	11/29/2010
Test Engineer:	Brian Breault
Site Temperature (°C):	21.3
Relative Humidity (%RH):	31
Frequency Range:	30 MHz to 40 GHz
Measurement Distance:	3 Meters
EMI Receiver IF Bandwidth:	120 kHz (30 MHz – 1 GHz) 1 MHz (>1GHz)
EMI Receiver Avg Bandwidth:	300 kHz (30 MHz – 1 GHz) 3 MHz (>1GHz)
Detector Functions:	Peak, Quasi-Peak, Average
Antenna Height:	1 to 4 meters

6.6.3. Test Procedure

Test measurements were made in accordance with ANSI C63.4-2003, Standard Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronics Equipment in the Range of 9 kHz to 40 GHz.

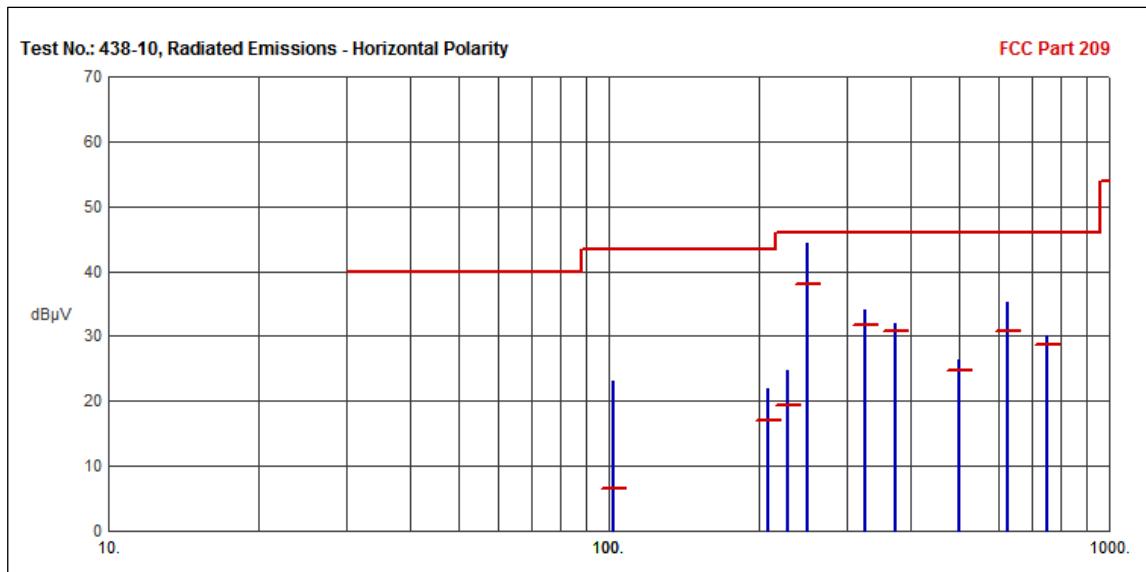
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6. Measurement Data (continued)

6.6. Transmitter Spurious Radiated Emissions (30 MHz to 40 GHz)

6.6.4. Spurious Radiated Emissions (30 MHz – 1 GHz) Test Results

6.6.4.1. Measurement Results – Horizontal Polarity



Frequency (MHz)	Pk Amp (dB μ V/m)	QP Amp (dB μ V/m)	QP Limit (dB μ V/m)	Margin (dB)	Ant Ht (cm)	Table (Deg)	Comments
101.9040	23.03	6.42	43.50	-37.08	N/A	N/A	
207.3528	21.96	16.96	43.50	-26.54	N/A	N/A	
228.1017	24.73	19.34	46.00	-26.66	N/A	N/A	
249.9913	44.23	38.00	46.00	-8.00	N/A	N/A	
325.0077	34.07	31.85	46.00	-14.15	N/A	N/A	
374.9975	31.89	30.69	46.00	-15.31	N/A	N/A	
500.0001	26.43	24.83	46.00	-21.17	N/A	N/A	
625.0409	35.12	30.82	46.00	-15.18	N/A	N/A	
750.0515	30.09	28.65	46.00	-17.35	N/A	N/A	

Result: Passed

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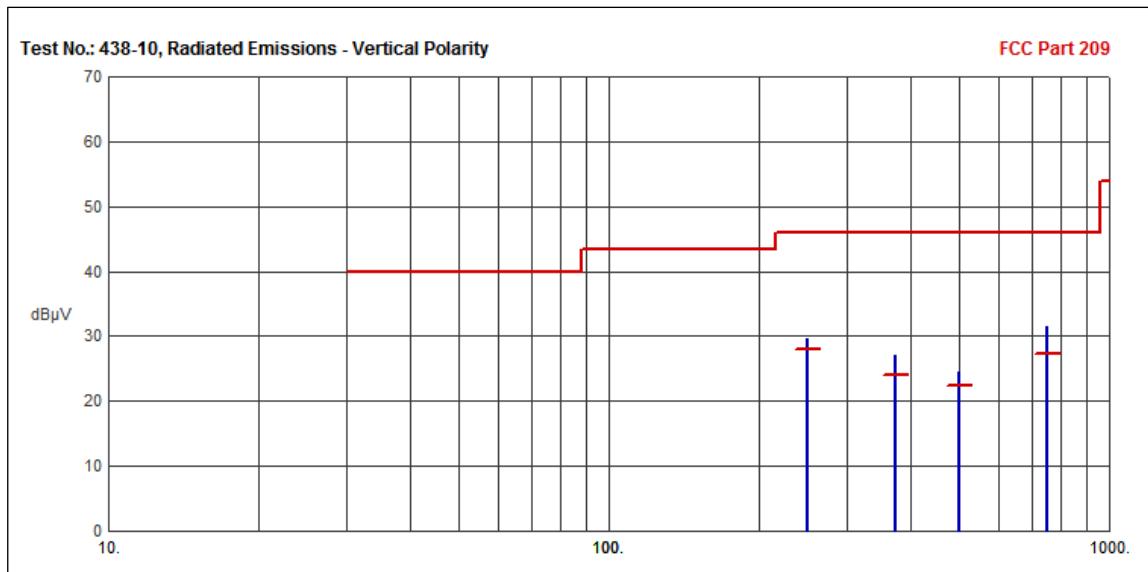
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6. Measurement Data (continued)

6.6. Transmitter Spurious Radiated Emissions (30 MHz to 40 GHz)

6.6.4. Spurious Radiated Emissions (30 MHz – 1 GHz) Test Results

6.6.4.2. Measurement Results – Vertical Polarity



Frequency (MHz)	Pk Amp (dB μ V/m)	QP Amp (dB μ V/m)	QP Limit (dB μ V/m)	Margin (dB)	Ant Ht (cm)	Table (Deg)	Comments
249.9915	29.73	27.92	46.00	-18.08	N/A	N/A	
375.0014	27.08	24.06	46.00	-21.94	N/A	N/A	
499.9984	24.47	22.40	46.00	-23.60	N/A	N/A	
750.0216	31.54	27.32	46.00	-18.68	N/A	N/A	

Result: Passed

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6. Measurement Data (continued)

6.6. Transmitter Spurious Radiated Emissions (30 MHz to 40 GHz)

6.6.5. Spurious Radiated Emissions (Above 1 GHz) Test Results

Channel	Frequency (MHz)	Amplitude (dB μ V/m)		Limit		Average Margin	Polarity	Antenna Height	Turntable Position
		Peak	Average	Peak	Average				
Low	1125.000	45.72	40.28	74	54	-13.72	H	80 cm	0
Middle	1125.000	46.80	39.76	74	54	-14.24	H	80 cm	0
High	1125.000	45.72	40.21	74	54	-13.79	H	80 cm	0

6.6.6. Transmitter Spurious Radiated Emissions (Harmonic Meas.) Test Results

Frequency (MHz)	Peak (dB μ V/m) ¹	Avg (dB μ V/m) ¹	Peak Limit (dB μ V/m)	Avg Limit (dB μ V/m)	Avg Margin (dB)	Pol (H/V)	Ht (cm)	TT Pos (Deg)	Notes	Results
4802.12	61.10	38.00	74	54	-16.00	V	103	177		Compliant
4884.64	58.51	35.15	74	54	-18.85	V	100	181		Compliant
4964.50	50.06	33.36	74	54	-20.64	V	117	287		Compliant
7326.96	59.93	39.08	74	54	-14.92	V	100	90		Compliant
7446.76	56.48	38.39	74	54	-15.61	V	128	353		Compliant
12005.30	55.43	43.76	74	54	-10.24	V	103	180	Noise Floor	Compliant
12211.60	55.86	43.36	74	54	-10.64	V	100	0	Noise Floor	Compliant
12411.26	55.22	42.72	74	54	-11.28	V	110	0	Noise Floor	Compliant
19208.48	59.84	47.23	74	54	-6.77	V	100	0	Noise Floor	Compliant
19538.56	54.55	42.17	74	54	-11.83	V	100	0	Noise Floor	Compliant
19858.02	58.97	46.35	74	54	-7.65	V	100	0	Noise Floor	Compliant
21980.88	56.20	44.16	74	54	-9.84	V	100	0	Noise Floor	Compliant
22340.27	61.76	47.12	74	54	-6.88	V	100	0	Noise Floor	Compliant

¹ All correction factors are stored in the spectrum analyzer and applied to this column entry.

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6. Measurement Data (continued)

6.7. Receiver Spurious Emissions (RSS 213 6.8, RSS-Gen 4.10 & 7.2.3.1)

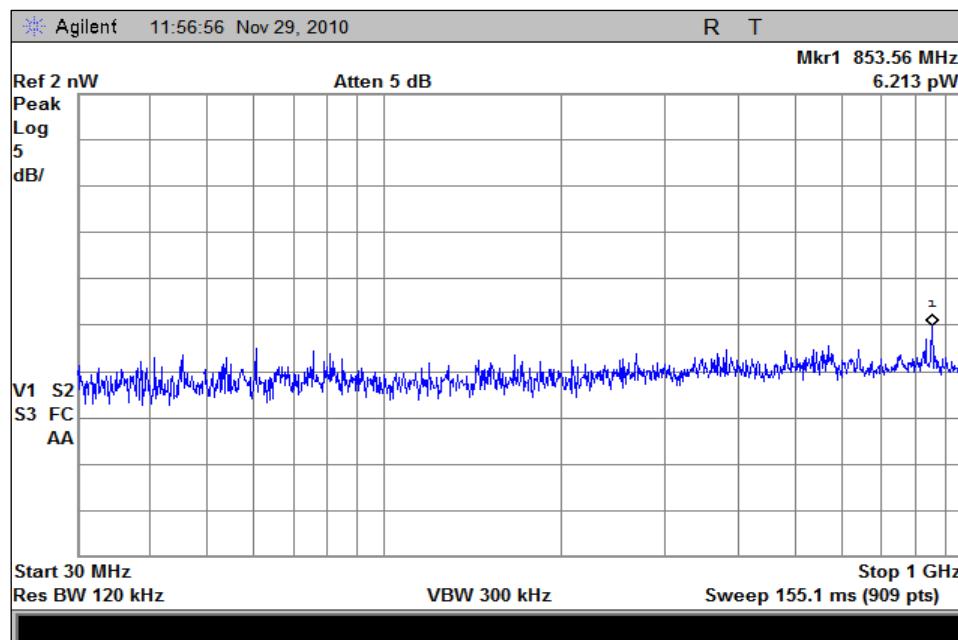
Requirement: RSS 213 6.8 - Receiver spurious emissions shall comply with the limits specified in RSS-Gen.

RSS-Gen 4.10 – Radiated emission measurements are to be performed using a calibrated open-area test site. As an alternative, the conducted measurement method may be used when the antenna is detachable. In such a case, the receiver spurious signal may be measured at the antenna port. The limits for this measurement were taken from section 7.2.3.1:

2 nW	30 MHz to 1 GHz
5 nW	above 1 GHz

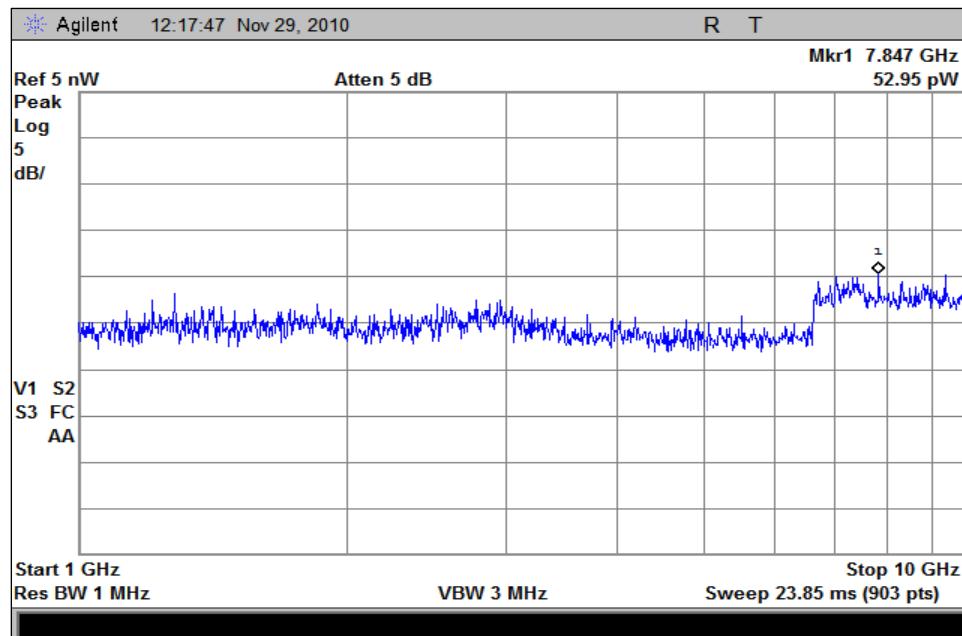
Status: The device under test requires that at least one channel is configured to transmit. Channel 24 (midpoint channel) was enabled.

6.7.1. Receiver Spurious Emissions, 30 MHz to 1 GHz



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6. Measurement Data (continued)**6.7. Receiver Spurious Emissions (RSS 213 6.8, RSS-Gen 4.10 & 7.2.3.1) (continued)****6.7.2. Receiver Spurious Emissions, Above 1 GHz**

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6. Measurement Data (continued)

6.8. Band Edge Measurements

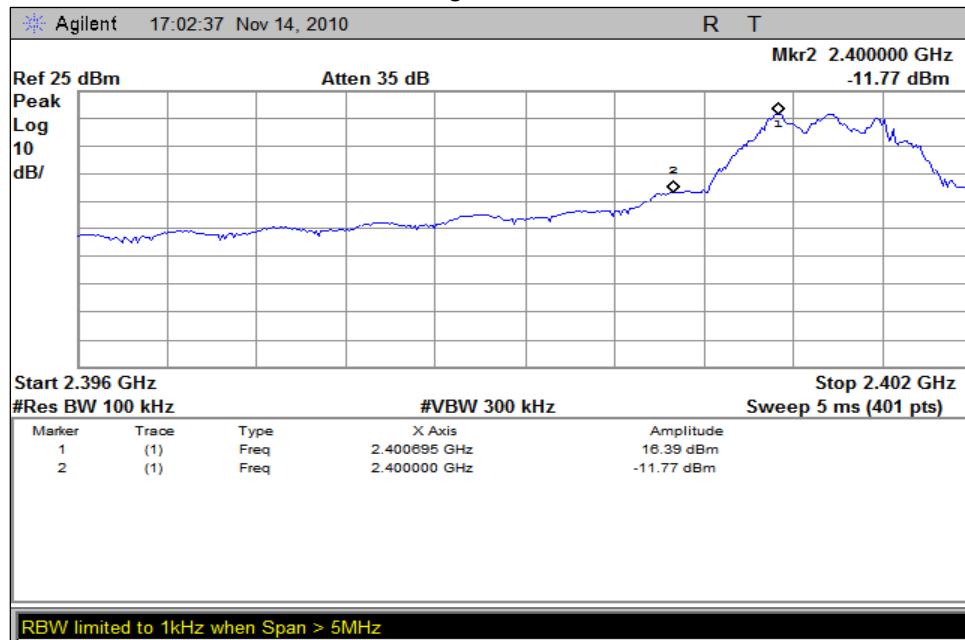
Requirement: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Test Note: For the upper band edge measurement, the procedure detailed in the FCC Office of Engineering and Technology (FCC OET) Publication Number 913591 was used in determining the measurement results.

6.8.1 Measurement Results – Lower Band Edge

Lowest Channel (MHz)	Field Strength (dBm)		Band Edge Frequency (MHz)	Field Strength (dBm)		Margin (dB)		Result
	Peak	Average		Peak	Average	Peak	Avg	
2401.056	16.39	---	2400.0	-11.8	---	>20 dB	N/A	Compliant

6.8.2 Measurement Plot – Lower Band Edge



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6. Measurement Data (continued)

6.8. Band Edge Measurements (continued)

6.8.3. Measurement Results – Upper Band Edge

FCC OET Publication Number KDB 913591 Calculator

Highest Channel Frequency (MHz)	Highest Channel Field Strength (dB μ V/m)		Band Edge & W/C Out of Band Calculator		Corrected Band Edge & Worst Case Out of Band (dB μ V/m)	
			Freq. (MHz)	30 kHz BW Offset (dB) ³	Peak	Average
	Peak ¹	Average ²	2483.500	44.65	71.65	32.29
2482.252	116.3	76.94	2483.578	44.08	72.22	32.86

Notes: 1 – Peak value from plot in 6.8.3.1

2 – Average value from plot in 6.8.3.2

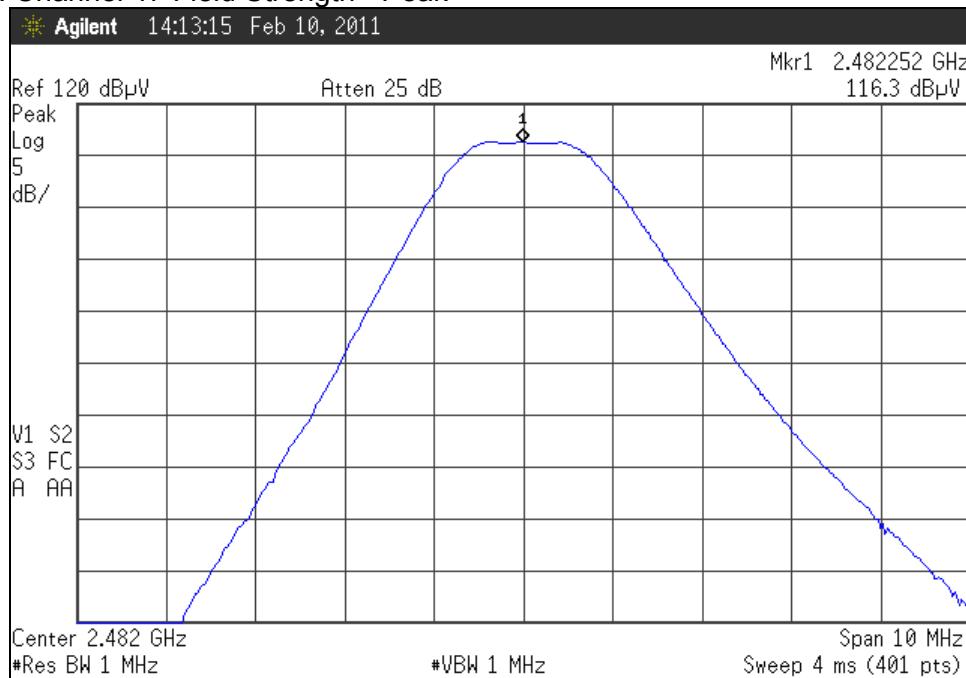
3 – Delta values from plot in 6.8.3.3

Delta values are subtracted from peak & average values

Corrected Measurement Results (Delta values vs limits)

	Freq. (MHz)	Field Strength (dB μ V/m)		Limit (dB μ V/m)		Margin (dB μ V/m)		Result
		Peak	Average	Peak	Average	Peak	Average	
Upper Band Edge	2483.500	71.65	32.29	74	54	-2.35	-21.71	Compliant
Worst Case Out of Band	2483.578	72.22	32.86	74	54	-1.78	-21.14	Compliant

6.8.3.1. Channel 47 Field Strength - Peak



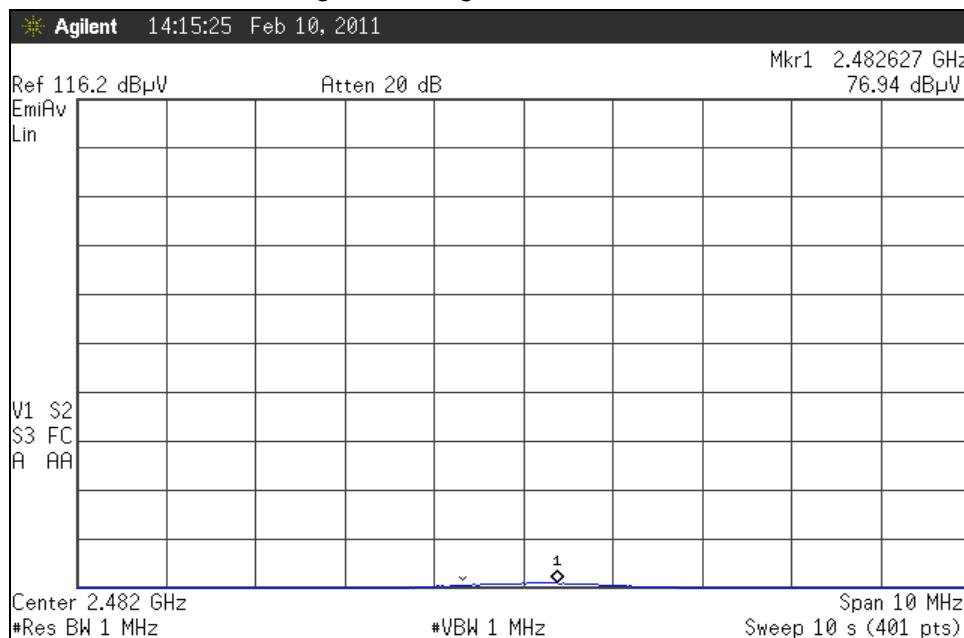
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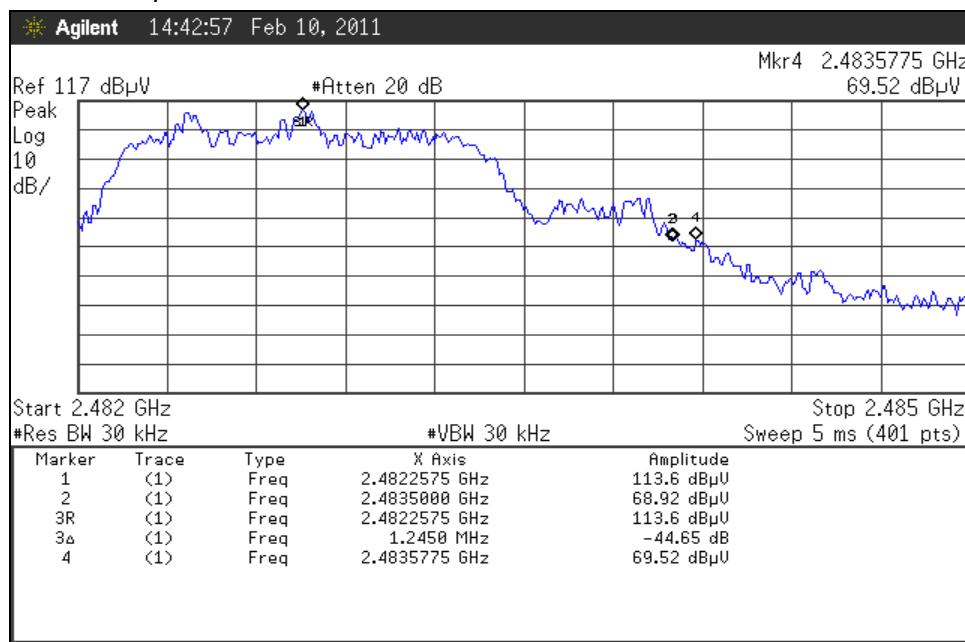
6. Measurement Data (continued)

6.8. Band Edge Measurements

6.8.3.2. Channel 47 Field Strength - Average



6.8.3.3. 30 kHz Amplitude Offset



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6. Measurement Data (continued)

6.9. Power Spectral Density (15.247(e))

Requirement: For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Channel	Channel Frequency (GHz)	Measured Frequency (GHz)	Power Spectral Density (dBm)	Limit (dBm)	Result
Low	2401.060	2.4010551	1.570	8	Compliant
Middle	2442.320	2.4425050	0.878	8	Compliant
High	2482.252	2.4822345	2.321	8	Compliant

6.9.1. Power Spectral Density Measurement Plot, Low Channel – 0



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6. Measurement Data (continued)

6.9. Power Spectral Density (15.247(e))

6.9.2. Power Spectral Density Measurement Plot, Mid Channel – 24



6.9.3. Power Spectral Density Measurement Plot, High Channel – 24



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6. Measurement Data (continued)

6.10. Power Line Conducted Emissions (15.207), IC RSS-GEN

Requirement: For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

Test Note: The DUT is powered by 48 volts DC supplied by the Ethernet cable. The power line conducted emissions test was performed on the Power-D-Sine POE Box that supplies the 48 VDC to the DUT via the Ethernet cable.

6.10.1 Power Line Conducted Emissions Test Setup

6.10.1.1 Regulatory Limit: (15.207) (FCC Part 15, Class B)

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-Peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5.0	56	46
5.0 to 30.0	60	50

* Decreases with the logarithm of the frequency.

6.10.1.2. Measurement & Equipment Setup

Test Date:	11/18/2010
Test Engineer:	Brian Breault
Site Temperature (°C):	20.8
Relative Humidity (%RH):	30
Frequency Range:	0.15 MHz to 30 MHz
EMI Receiver IF Bandwidth:	9 kHz
EMI Receiver Avg Bandwidth:	30 kHz
Detector Functions:	Peak, Quasi-Peak. & Average

6.10.1.3. Test Procedure

Test measurements were made in accordance with ANSI C63.4-2003, Standard Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronics Equipment in the Range of 9 kHz to 40 GHz.

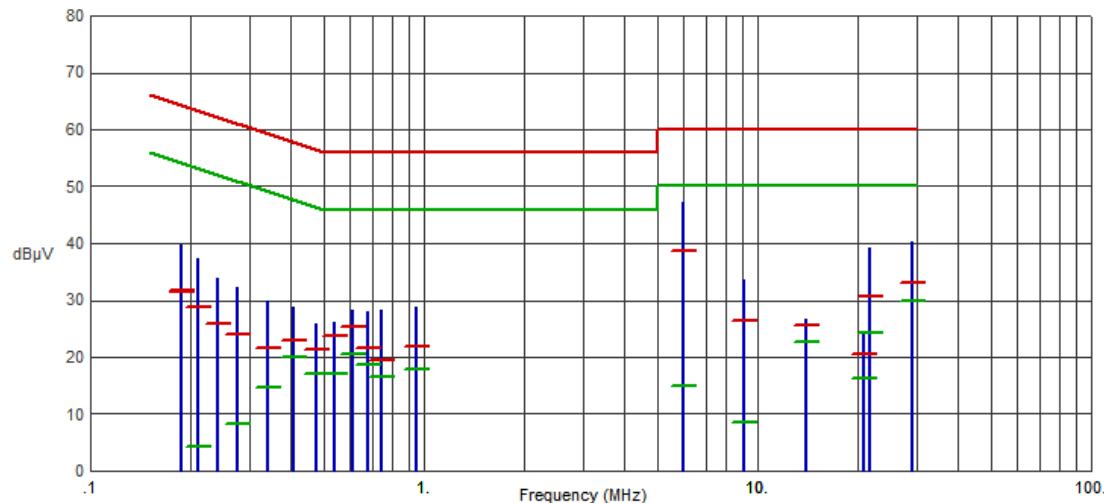
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6. Measurement Data (continued)

6.10. Power Line Conducted Emissions (15.207), IC RSS-GEN

6.10.2 Conducted Emissions Test Data

6.10.2.1 120 Volts, 60 Hz Phase

Test No.: 438-10, 120 Volts, 60 Hz Phase
FCC, Class B


Frequency (MHz)	Pk Amp (dBμV)	QP Amp (dBμV)	QP Limit (dBμV)	QP Margin (dB)	Avg Amp (dBμV)	Avg Limit (dBμV)	Avg Margin (dB)	Comments
.1866	39.80	31.62	64.19	-32.57	-1.21	54.19	-55.40	
.1874	39.40	31.50	64.15	-32.65	-1.12	54.15	-55.27	
.2101	37.45	28.82	63.20	-34.38	4.25	53.20	-48.95	
.2418	33.92	25.92	62.03	-36.11	-6.38	52.03	-58.41	
.2759	32.39	24.12	60.94	-36.82	8.29	50.94	-42.65	
.3386	29.79	21.59	59.24	-37.65	14.65	49.24	-34.59	
.4049	28.74	22.88	57.75	-34.87	20.04	47.75	-27.71	
.4756	25.75	21.41	56.42	-35.01	17.01	46.42	-29.41	
.5417	26.00	23.72	56.00	-32.28	16.95	46.00	-29.05	
.6105	28.19	25.27	56.00	-30.73	20.42	46.00	-25.58	
.6765	28.13	21.54	56.00	-34.46	18.68	46.00	-27.32	
.7457	28.27	19.59	56.00	-36.41	16.65	46.00	-29.35	
.9510	28.93	21.95	56.00	-34.05	17.81	46.00	-28.19	
5.9847	47.13	38.61	60.00	-21.39	14.87	50.00	-35.13	
9.0822	33.57	26.46	60.00	-33.54	8.51	50.00	-41.49	
14.0305	26.62	25.62	60.00	-34.38	22.65	50.00	-27.35	
20.8691	24.27	20.63	60.00	-39.37	16.16	50.00	-33.84	
21.6622	39.27	30.57	60.00	-29.43	24.28	50.00	-25.72	
29.1141	40.31	33.03	60.00	-26.97	29.78	50.00	-20.22	

Result: Passed

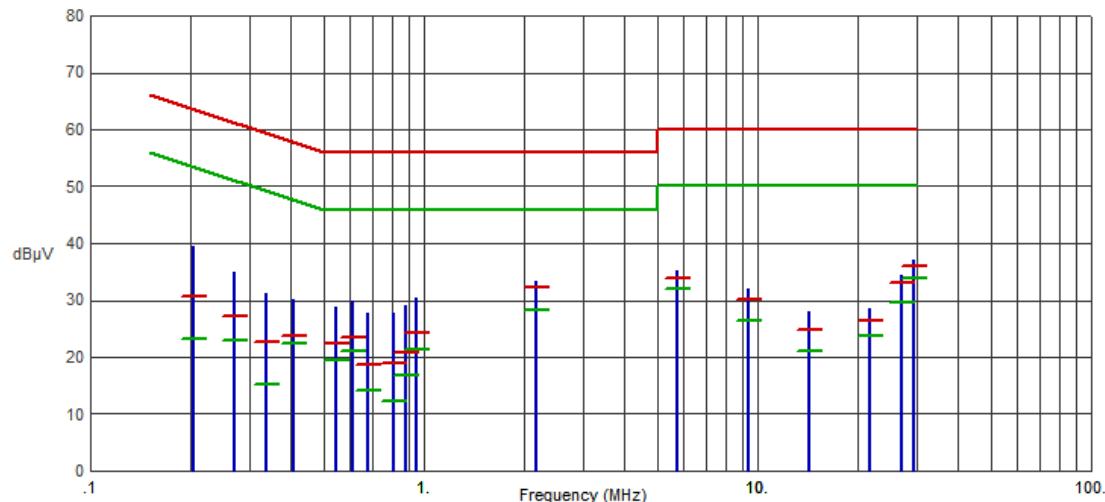
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6. Measurement Data (continued)

6.10. Power Line Conducted Emissions (15.207), IC RSS-GEN

6.10.2. Conducted Emissions Test Data (continued)

6.10.2.2 120 Volts, 60 Hz Neutral

Test No.: 438-10, 120 Volts, 60 Hz Neutral
FCC, Class B


Frequency (MHz)	Pk Amp (dBµV)	QP Amp (dBµV)	QP Limit (dBµV)	QP Margin (dB)	Avg Amp (dBµV)	Avg Limit (dBµV)	Avg Margin (dB)	Comments
.2046	39.54	30.67	63.42	-32.75	23.30	53.42	-30.12	
.2696	35.06	27.09	61.13	-34.04	22.89	51.13	-28.24	
.3374	31.17	22.55	59.27	-36.72	15.33	49.27	-33.94	
.4077	30.11	23.74	57.70	-33.96	22.39	47.70	-25.31	
.5422	28.73	22.41	56.00	-33.59	19.35	46.00	-26.65	
.6105	29.87	23.36	56.00	-32.64	21.14	46.00	-24.86	
.6803	27.70	18.72	56.00	-37.28	14.17	46.00	-31.83	
.8120	27.72	18.90	56.00	-37.10	12.27	46.00	-33.73	
.8826	29.13	20.90	56.00	-35.10	16.89	46.00	-29.11	
.9478	30.35	24.34	56.00	-31.66	21.46	46.00	-24.54	
2.1672	33.41	32.38	56.00	-23.62	28.27	46.00	-17.73	
5.7565	35.18	33.93	60.00	-26.07	32.06	50.00	-17.94	
9.4131	31.88	30.07	60.00	-29.93	26.51	50.00	-23.49	
14.2131	28.12	24.77	60.00	-35.23	20.98	50.00	-29.02	
21.6642	28.59	26.45	60.00	-33.55	23.66	50.00	-26.34	
27.1593	34.34	32.94	60.00	-27.06	29.67	50.00	-20.33	
29.2356	37.15	35.87	60.00	-24.13	33.87	50.00	-16.13	

Result: Passed

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6. Measurement Data (continued)

6.11. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1)) RSS-GEN 5.5, RSS 102

Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm ²)	Result
				(mW/cm ²)	(W/m ²)		
				(1)	(2)	(3)	(4)
2401.060	20.0	0.04498	3.2	0.0004200	0.0041998	1	Compliant
2442.320	20.0	0.04677	3.2	0.0004202	0.0042015	1	Compliant
2482.252	20.0	0.04721	3.2	0.0004202	0.0042019	1	Compliant

$$PD = \frac{OP + AG}{(4 \times \pi \times d^2)}$$

- **PD** = Power Density (mW/cm²)
- **OP** = DUT Output Power (dBm)
- **AG** = DUT Antenna Gain (dBi)
- **d** = MPE Distance (cm)

1. Reference CFR 2.1093(b): For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.
2. Section 6.2 of this test report.
3. Data supplied by the client. Antenna specification data of worst case antenna used by the DUT.
4. Power density is calculated from field strength measurement and antenna gain.
5. Reference CFR 1.1310, Table 1: Limits for Maximum Permissible Exposure (MPE), Section (B): Limits for General Population/Uncontrolled Exposure.

RSS-102 Section 2.5, 2.5.1 & 2.5.2 Requirements:

2.5 - All transmitters are exempt from routine SAR and RF exposure evaluations provided that output power complies with the power levels of sections 2.5.1 or 2.5.2. If the equipment under test (EUT) meets the requirements of sections 2.5.1 or 2.5.2, applicants are only required to submit a properly signed declaration of compliance (see Annex C).

2.5.1 - SAR evaluation is required if the separation distance between the user and the radiating element of the device is less than or equal to 20 cm, except when the device operates as follows:

- above 2.2 GHz and up to 3 GHz inclusively, and with output power (i.e. the higher of the conducted or radiated (e.i.r.p.) source-based, time-averaged output power) that is less than or equal to 20 mW for general public use and 100 mW for controlled use

2.5.2 - RF exposure evaluation is required if the separation distance between the user and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- at or above 1.5 GHz and the maximum e.i.r.p. of the device is equal to or less than 5 W.

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7. Test Setup Photographs

7.1. Radiated Emissions Front:



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7. Test Setup Photographs

7.2. Radiated Emissions Rear:

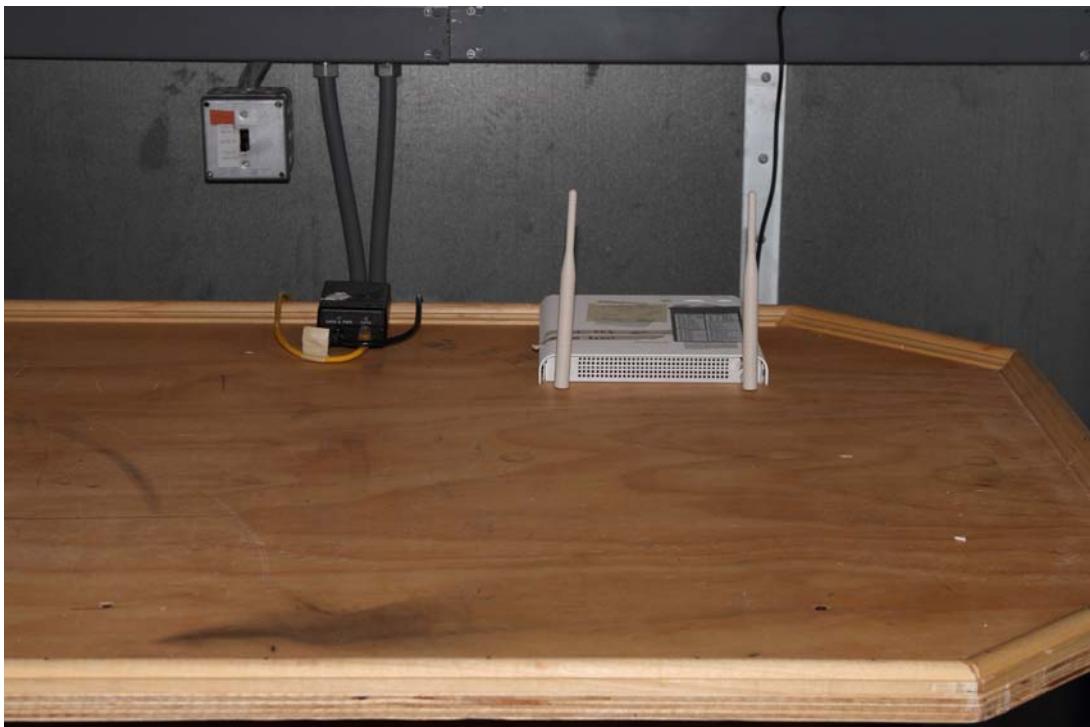


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7. Test Setup Photographs

7.3. Conducted Emissions Front:



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7. Test Setup Photographs

7.4. Conducted Emissions Rear:



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8. Test Site Description

Compliance Worldwide is located at 357 Main Street in Sandown, New Hampshire. The test sites at Compliance Worldwide are used for conducted and radiated emissions testing in accordance with Federal Communications Commission (FCC) and Industry Canada standards. A description of the test sites is on file with the FCC (registration number **96392**) and Industry Canada (file number **IC 3023A-1**).

The radiated emissions test site is a 3 and 10 meter enclosed open area test site (OATS). Personnel, support equipment and test equipment are located in the basement beneath the OATS ground plane.

The conducted emissions site is part of a 16' x 20' x 12' ferrite tile chamber and uses one of the walls for the vertical ground plane required by EN 55022.

Both sites are designed to test products or systems 1.5 meter W x 1.5 meter L x 2.0 meter H, floor standing or table top.