LS RESEARCH, LLC
WIRELESS PRODUCT DEVELOPMENT
ACCREDITED
Testing Cert. 1255.01
W66 N220 Commerce Court ● Cedarburg, WI 53012 ● USA
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TEST REPORT # 311182
LSR Job #: C-1224

Compliance Testing of:
EHUB

Test Date(s):
June 30-July 3, July 13, August 9, 2011

Prepared For:
Honeywell
Attn: Robert Juntunen
1985 Douglas Drive North
Golden Valley, MN 55422

In accordance with:
Federal Communications Commission (FCC)
Part 15, Subpart C, Section 15.247
Industry Canada (IC) RSS 210 Annex 8
Digital Modulation Transmitters (DTS) Operating in the
Frequency Band 2400 MHz – 2483.5 MHz

This Test Report is issued under the Authority of:
Peter Feilen, EMC Engineer

Signature: Peter Feilen Date: 8/9/11

Test Report Reviewed by:	**Tested by:**
Shane Rismeyer, EMC Engineer	Peter Feilen, EMC Engineer
Signature: Date: 8/4/11	Signature: Peter Feilen Date: 7/19/11

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EXHIBIT 1. INTRODUCTION

1.1 SCOPE

References:	FCC Part 15, Subpart C, Section 15.247 and 15.209 FCC Part 2, Section 2.1043 paragraph (b)1. RSS GEN Issue 3 and RSS 210 Issue 8 Annex 8
Title:	FCC : Telecommunication – Code of Federal Regulations, CFR 47, Part 15. IC : Low-power License-exempt Radio-communication Devices (All Frequency Bands): Category I Equipment
Purpose of Test:	To gain FCC and IC Certification Authorization for Low-Power License-Exempt Transmitters.
Test Procedures:	Both conducted and radiated emissions measurements were conducted in accordance with American National Standards Institute ANSI C63.4 – 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.
Environmental Classification:	• Commercial, Industrial or Business • Residential

1.2 NORMATIVE REFERENCES

Publication	Title
47 CFR, Parts 0-15 (FCC)	Code of Federal Regulations - Telecommunications
RSS 210 Issue 8 Annex 8	Low-power License-exempt Radio-communication Devices (All Frequency Bands): Category I Equipment
ANSI C63.4	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.
CISPR 16-1-1	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus.
CISPR 16-2-1	Specification for radio disturbance and immunity measuring apparatus and methods. Part 201: Conducted disturbance measurement.
FCC ET Docket No. 99-231	Amendment to FCC Part 15 of the Commission's Rules Regarding Spread Spectrum Devices.
FCC Procedures	Measurement of Digital Transmission Systems operating under Section 15.247.

1.3 LS Research, LLC TEST FACILITY

LS Research, LLC is accredited by A2LA (American Association for Laboratory Accreditation) to conform to ISO/IEC 17025, 2005 “General Requirements for the Competence of Calibration and Testing Laboratories”.

LS Research, LLC’s scope of accreditation includes all test methods listed herein, unless otherwise noted. A copy of the accreditation may be accessed on our web site: www.lsr.com. Accreditation status can be verified at A2LA’s web site: www.a2la2.net.

1.4 LOCATION OF TESTING

All testing was performed at LS Research, LLC, W66 N220 Commerce Court, Cedarburg, Wisconsin, 53012 USA, utilizing the facilities listed below, unless otherwise noted.

List of Facilities Located at LS Research, LLC:

- Compact Chamber
- Semi-Anechoic Chamber
- Open Area Test Site (OATS)

1.5 TEST EQUIPMENT UTILIZED

A complete list of equipment utilized in testing is provided in Appendix A of this test report. Calibration dates are indicated in Appendix A. All test equipment is calibrated in accordance with A2LA standards.

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1 CLIENT INFORMATION

Manufacturer Name:	**Honeywell**
Address:	**1985 Douglas Drive North, Golden Valley, MN 55422**
Contact Name:	**Robert Juntunen**

2.2 EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information has been supplied by the applicant.

Product Name:	EHUB
Model Number:	TH8320EM1009
Serial Number:	Radiated: 37637015000196 Conducted: 37637015000255

2.3 ASSOCIATED ANTENNA DESCRIPTION

Two PCB antennas are on board the device.

2.4 EUT'S TECHNICAL SPECIFICATIONS

Additional Information:

EUT Frequency Range (in MHz)	2405-2480 MHz
RF Power in Watts (ERP)	
Minimum:	$3.63x10^{-8}$ W
Maximum:	0.078 W
Conducted Output Power (in dBm)	18.9 dBm
Maximum Field Strength at 3 meters	118.62 dBuV/m
Occupied Bandwidth (99% BW)	2.590 MHz
Type of Modulation	O-QPSK
Emission Designator	2M59G1D
EIRP (in mW)	240 mW
Transmitter Spurious (worst case) at 3 meters	31.11 dBuV/m @ 198.5 MHz
Receiver Spurious (worst case) at 3 meters	23.04 dBuV/m @ 2462.8 MHz
Stepped (Y/N)	N
Frequency Tolerance %, Hz, ppm	Better than 100 ppm
Microprocessor Model # (if applicable)	Atmen ATXMega128D3, EM357
Highest Frequency on the board	24 MHz (LO)
Antenna Information	
Detachable/non-detachable	Antenna A detachable, Antenna B is non-detachable
Type	PIFA – Planer Inverted F Antenna and Inverted F PCB Antenna
Gain (in dBi)	Antenna A: 4.89 dBi Antenna B: 2.71 dBi *Note: measured over a conductive ground plane
EUT will be operated under FCC Rule Part(s)	15.247
EUT will be operated under RSS Rule Part(s)	RSS 210
Modular Filing	☐ Yes ☒ No
Portable or Mobile?	Mobile

RF Technical Information:

Type of Evaluation (check one)		SAR Evaluation: Device Used in the Vicinity of the Human Head
		SAR Evaluation: Body-worn Device
	X	RF Evaluation

If RF Evaluation checked above, test engineer to complete the following:

- Evaluated against exposure limits: ☒ General Public Use ☐ Controlled Use
- Duty Cycle used in evaluation: 100 %
- Standard used for evaluation: OET 65
- Measurement Distance: 20 cm
- RF Value: 0.476 ☐ V/m ☐ A/m ☒ W/m^2
  ☐ Measured ☐ Computed ☒ Calculated

2.5 PRODUCT DESCRIPTION

General description of application

TH8320EM1009 is a complete residential electronic thermostat, with
Demand Control capability enabled with a ZigBee transceiver integrated into it. The electronic thermostat consists of two pieces, a user interface module and a wall plate. The wall plate is attached to the wall and contains wiring terminals that attach to the equipment wiring. User interface contains Atxmega128D3 microcontroller, LCD with touch screen and backlight, relays, sensors, power supply and RF module and is attached to the wall plate.

Note: Product description provided by the manufacturer

EXHIBIT 3. EUT OPERATING CONDITIONS & CONFIGURATIONS DURING TESTS

3.1 CLIMATE TEST CONDITIONS

Temperature:	20-25 ˚C
Humidity:	35-65 % R.H.
Pressure:	645-795 mmHg

3.2 APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC and IC Paragraph	Test Requirements	Compliance (yes/no)
FCC : 15.207 IC : RSS GEN sect. 7.2.2	Power Line Conducted Emissions Measurements	Yes
FCC : 15.247(a)(2) IC : RSS 210 A8.2(a)	6 dB Bandwidth of a Digital Modulation System	Yes
IC : RSS GEN section 4.6.1	20 dB Bandwidth	Yes
FCC : 15.247(b) & 1.1310 IC : RSS 210 A8.4	Maximum Output Power	Yes
FCC : 15.247(i), 1.1307, 1.1310, 2.1091 & 2.1093 IC : RSS 102	RF Exposure Limit	Yes
FCC :15.247(c) IC : RSS 210 A8.5	RF Conducted Spurious Emissions at the Transmitter Antenna Terminal	Yes
FCC : 15.247(d) IC : RSS 210 A8.2(b)	Transmitted Power Spectral Density of a Digital Modulation System	Yes
FCC : 15.247(c), 15.209 & 15.205 IC : RSS 210 A8.2(b), section 2.2, 2.6 and 2.7	Transmitter Radiated Emissions	Yes
The digital circuit portion of the EUT has been tested and verified to comply with FCC Part 15, Subpart B, Class B Digital Devices (RSS GEN and RSS 210 of IC) and the associated Radio Receiver has also been tested and found to comply with Part 15, Subpart B – Radio Receivers (RSS GEN and RSS 210 of IC). The Receiver Test Report is available upon request.		

3.3 MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

☐ None ☒ Yes (explain below)

In order to meet the limit in the 2483.5-2500.0 MHz restricted band, power reduction from the maximum was necessary on the highest two channels.

Channel	Power Setting on EUT	Measured Conducted Output Power (dBm)
11	+03	18.5
18	+03	18.9
24	+03	18.6
25	-12	8.6
26	-43	-44.4

3.4 DEVIATIONS & EXCLUSIONS FROM TEST SPECIFICATIONS

☒ None ☐ Yes (explain below)

EXHIBIT 4. DECLARATION OF CONFORMITY

The EUT was found to MEET the requirements as described within the specification of FCC Title 47, CFR Part 15.247, and Industry Canada RSS-210, Issue 8, Section Annex 8 (section 8.2) for a Digital Spread Spectrum (DTS) Transmitter.

If some emissions are seen to be within 3 dB of their respective limits:
As these levels are within the tolerances of the test equipment and site employed, there is a possibility that this unit, or a similar unit selected out of production may not meet the required limit specification if tested by another agency.

LS Research, LLC certifies that the data contained herein was taken under conditions that meet or exceed the requirements of the test specifications. The results in this Test Report apply only to the item(s) tested on the above-specified dates. Any modifications made to the EUT subsequent to the indicated test date(s) will invalidate the data herein, and void this certification.

EXHIBIT 5. RADIATED EMISSIONS TEST

5.1 Test Setup

The test setup was assembled in accordance with Title 47, CFR FCC Part 15, RSS GEN and ANSI C63.4. The EUT was placed on an 80cm high non-conductive pedestal, centered on a flush mounted 2-meter diameter turntable inside a 3 meter Semi-Anechoic, FCC listed Chamber. The EUT was operated in, and final testing was performed using transmit mode, using power as provided by 24VAC. The unit has the capability to operate on 16 channels, controllable via the touch screen display, using firmware programmed to the unit for test purposes.

The applicable limits apply at a 3 meter distance. Measurements above 4 GHz were performed at a 1.0 meter separation distance. The calculations to determine these limits are detailed in the following pages. Please refer to Appendix A for a complete list of test equipment. The test sample was operated on one of three (3) standard channels: low (2405 MHz), middle (2440 MHz) and high (2480 MHz) to comply with FCC Part 15.31(m).

5.2 Test Procedure

Radiated RF measurements were performed on the EUT in a 3 meter Semi-Anechoic, FCC listed Chamber. The frequency range from 30 MHz to 25000 MHz was scanned and investigated. The radiated RF emission levels were manually noted at the various fixed degree settings of azimuth on the turntable and antenna height. The EUT was placed on a non-conductive pedestal in the 3 meter Semi-Anechoic Chamber, with the antenna mast placed such that the antenna was 3 meters from the EUT. A Biconical Antenna was used to measure emissions from 30 MHz to 300 MHz, and a Log Periodic Antenna was used to measure emissions from 300 MHz to 1000 MHz. A Double-Ridged Waveguide Horn Antenna was used from 1 GHz to 18 GHz. The maximum radiated RF emissions were found by raising and lowering the antenna between 1 and 4 meters in height, using both horizontal and vertical antenna polarities. From 18 GHz to 25 GHz, the EUT was measured at a 1 meter separation, using a standard gain Horn Antenna and pre-amplifier.

The EUT was placed in one orientation, as it is intended for wall mounting with a display that must remain legible

5.3 Test Equipment Utilized

A list of the test equipment and antennas utilized for the Radiated Emissions test can be found in Appendix A. This list includes calibration information and equipment descriptions. All equipment is calibrated and used according to the operation manuals supplied by the manufacturers. In addition, the Connecting Cables were measured for losses using a calibrated Signal Generator and an Agilent E4445A/N9039A EMI System. The resulting correction factors and the cable loss factors from these calibrations were entered into the EMI Receiver database. As a result, the data taken from the EMI Receiver accounts for the antenna correction factor as well as cable loss or other corrections, and can therefore be entered into the database as a corrected meter reading. The EMI Receiver was operated with a resolution bandwidth of 120 kHz for measurements below 1 GHz (video bandwidth of 300 kHz), and a bandwidth of 1 MHz for measurements above 1 GHz (video bandwidth of 1 MHz.

5.4 Test Results

The EUT was found to **MEET** the Radiated Emissions requirements of Title 47 CFR, FCC Part 15.247 and Canada RSS-210, Issue 8, Annex 8 for a DTS transmitter. The frequencies with significant RF signal strength were recorded and plotted as shown in the Data Charts and Graphs.

5.5 CALCULATION OF RADIATED EMISSIONS LIMITS

The maximum peak output power of an intentional radiator in the 2400-2483.5 MHz band, as specified in Title 47 CFR 15.247 (b)(3) and RSS 210 A8.4 is 1 Watt. The harmonic and spurious RF emissions, as measured in any 100 kHz bandwidth, as specified in 15.247 (d) and RSS 210 A8.2(b), shall be at least 20 dB below the measured power of the desired signal, and must also meet the requirements described in 15.205(c) for FCC and section 2.2,2.6 and 2.7 of RSS 210 for IC.

The following table depicts the general radiated emission limits above 30 MHz. These limits are obtained from Title 47 CFR, Part 15.209, for radiated emissions measurements. These limits were applied to any signals found in the 15.205 restricted bands. The mentioned limits correspond to those limits listed in RSS 210 section 2.7.

Frequency (MHz)	3 m Limit μV/m	3 m Limit (dBμV/m)	1 m Limit (dBμV/m)
30-88	100	40.0	-
88-216	150	43.5	-
216-960	200	46.0	-
> 960	500	54.0	63.5

Sample conversion from field strength μV/m to dBμV/m:

$dB\mu V/m = 20 \log_{10} (100)$

= 40 dBμV/m (from 30-88 MHz)

For measurements made at 1.0 meter, a 9.5 dB correction has been invoked.

> 960 MHz

500μV/m or 54.0 dB/μV/m at 3 meters

54.0 + 9.5 = 63.5 dB/μV/m at 1 meter

Example of what constitutes reported data:

Raw Data + Antenna Factor + Cable Factor = Reported Data

82.35 dBμV/m + 28.52 dB + 4.93 dB = 115.8dBμV/m

Note: The number above is merely an example.

5.6 RADIATED EMISSIONS TEST DATA CHART

3 Meter Measurements of Electromagnetic Radiated Emissions
Frequency Range Inspected: 30 MHz to 25000 MHz

Manufacturer:	Honeywell						
Date(s) of Test:	June 29, 2011						
Test Engineer(s):	Peter Feilen						
Operation Mode:	continuous transmit, modulated mode						
Environmental Conditions in the Lab:	Temperature: 20 – 25˚C Relative Humidity: 30 – 60 %						
EUT Power:	X	Single Phase 24VAC		3 Phase ___VAC			
		Battery		Other:			
EUT Placement:	X	80cm non-conductive table		10cm Spacers			
EUT Test Location:	X	3 Meter Semi-Anechoic FCC Listed Chamber		3/10m OATS			
Measurements:		Pre-Compliance		Preliminary		Final	
Detectors Used:	X	Peak	X	Quasi-Peak	X	Average	

The following table depicts the level of fundamental radiated RF emissions:

Channel	Frequency	Maximum Field Strength (dBuV/m) @ 3m
11	2405	118.6
18	2440	118.3
24	2470	117.2
25	2475	109.1
26	2480	53.1

The following table depicts the level of significant spurious radiated RF emissions found:

EUT Channel	EUT Power Level	EUT Antenna	Frequency (MHz)	Height (m)	Azimuth (degree)	Quasi Peak Reading (dBµV/m)	Quasi Peak Limit (dBµV/m)	Margin (dB)	Antenna Polarity	EUT orientation
18	+03	0	198.6	1.00	0	27.94	43.5	15.6	H	TT
18	+03	0	59.6	1.00	0	18.04	40.0	22.0	V	TT
18	+03	1	60.0	1.00	0	18.27	40.0	21.7	V	TT
18	+03	1	30.7	1.00	0	14.07	40.0	25.9	V	TT
18	+03	1	198.5	1.18	179	31.11	43.5	12.4	H	TT
18	+03	1	32.2	2.49	0	14.39	40.0	25.6	H	TT

Note: Emissions did not vary with antenna or channel selected. The table given is exemplary of the device

RADIATED EMISSIONS DATA CHART *(continued)*

The following table depicts the level of significant radiated RF harmonic emissions falling in the 15.205 restricted band as seen on Channel 11:

Polarity	Frequency (MHz)	Height (m)	Azimuth (deg)	Peak (dBuV/m)	Average (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
Vertical	4810	1.08	177	62.9	53.5	63.5	10.0
	7215	1.03	203	63.2	53.0	63.5	10.5
	12025	1.17	212	66.7	56.1	63.5	7.4
	19240	*Note 1*					
Horizontal	4810	1.39	125	54.7	45.1	63.5	18.4
	7215	1.09	231	65.5	55.0	63.5	8.5
	12025	1.09	231	65.5	55.0	63.5	8.0
	19240	*Note 1*					

The following table depicts the level of significant radiated RF harmonic emissions falling in the 15.205 restricted band as seen on Channel 18:

Polarity	Frequency (MHz)	Height (m)	Azimuth (deg)	Peak (dBuV/m)	Average (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
Vertical	4880	1.02	154	66.7	56.6	63.5	6.9
	7320	1.20	188	63.6	53.1	63.5	10.4
	12200	1.06	8	49.4	37.8	63.5	25.7
	19520	1.00	217	53.8	43.6	63.5	19.9
Horizontal	4880	1.04	5	45.7	33.9	63.5	29.6
	7320	1.04	13	48.0	35.7	63.5	27.8
	12200	1.08	6	50.2	38.1	63.5	25.4
	19520	1.00	182	50.39	38.7	63.5	24.8

Notes:

1) Measurement at receiver system noise floor.
2) A Quasi-Peak Detector was used in measurements below 1 GHz, and a Peak as well as an Average Detector was used in measurements above 1 GHz.. The peak detector was used to ensure the peak emissions did not exceed 20 dB above the limits.
3) Measurements above 4 GHz were made at 1 meters of separation from the EUT. Limits were adjusted to reflect this distance.

The following table depicts the level of significant radiated RF harmonic emissions falling in the 15.205 restricted band as seen on Channel 26:

Polarity	Frequency (MHz)	Height (m)	Azimuth (deg)	Peak (dBuV/m)	Average (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
Vertical	4960	1.04	110	63.2	53.1	63.5	10.4
	7440	1.26	193	62.3	52.0	63.5	11.5
	12400	1.23	187	58.2	48.0	63.5	15.5
	19840	*Note 1*				63.5	
	22320	*Note 1*				63.5	
Horizontal	4960	1.13	214	61.2	51.1	63.5	12.4
	7440	1.06	214	72.2	60.8	63.5	2.7
	12400	1.02	218	58.2	48.0	63.5	15.5
	19840	*Note 1*				63.5	
	22320	*Note 1*				63.5	

Notes:

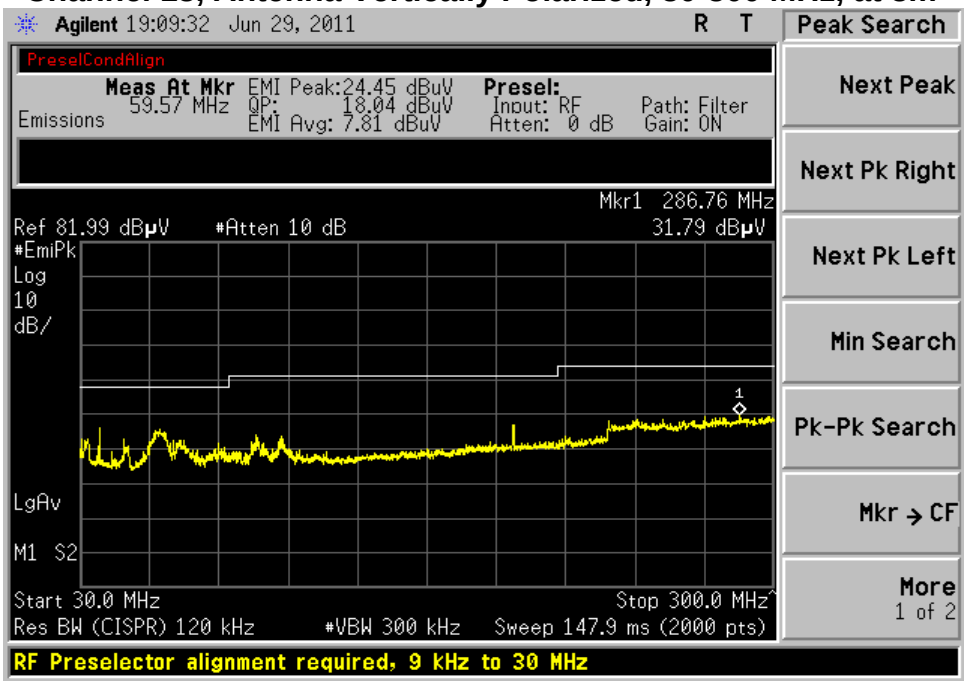
1) Measurement at receiver system noise floor.
2) A Quasi-Peak Detector was used in measurements below 1 GHz, and a Peak as well as an Average Detector was used in measurements above 1 GHz.. The peak detector was used to ensure the peak emissions did not exceed 20 dB above the limits.
3) Measurements above 4 GHz were made at 1 meters of separation from the EUT. Limits were adjusted to reflect this distance.

5.7 Screen Captures - Radiated Emissions Test

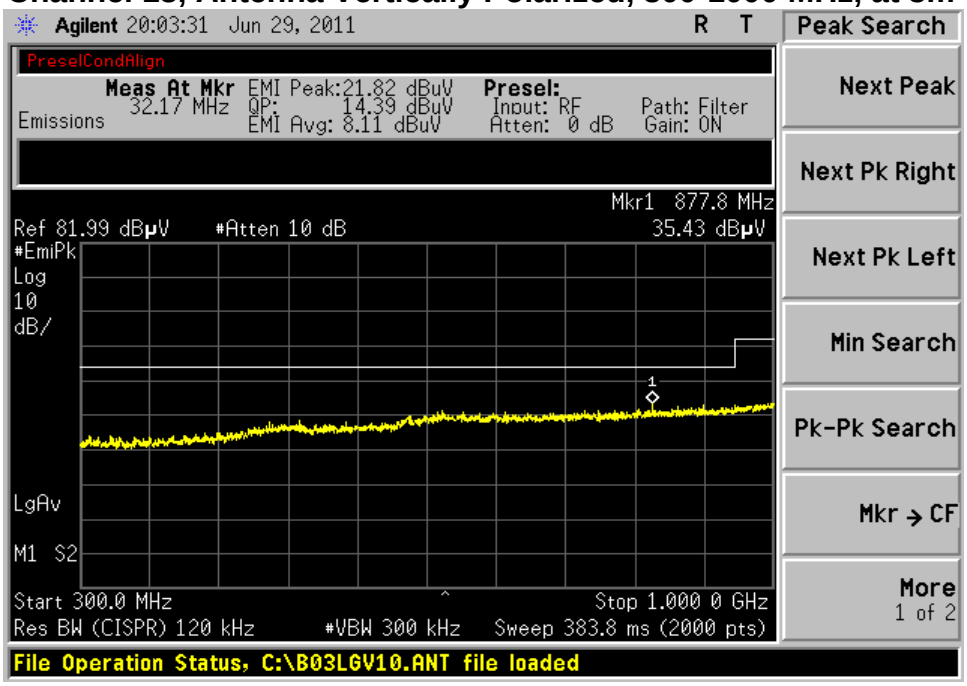
These screen captures represent Peak Emissions. For radiated emission measurements, a Quasi-Peak detector function is utilized when measuring frequencies below 1 GHz, and an Average detector function is utilized when measuring frequencies above 1 GHz.

The signature scans shown here are from worst-case emissions, as measured on channels 11, 18, 24, 25 or 26, with the sense antenna both in vertical and horizontal polarity for worst case presentations. There was not a significant difference depending on which EUT antenna was active.

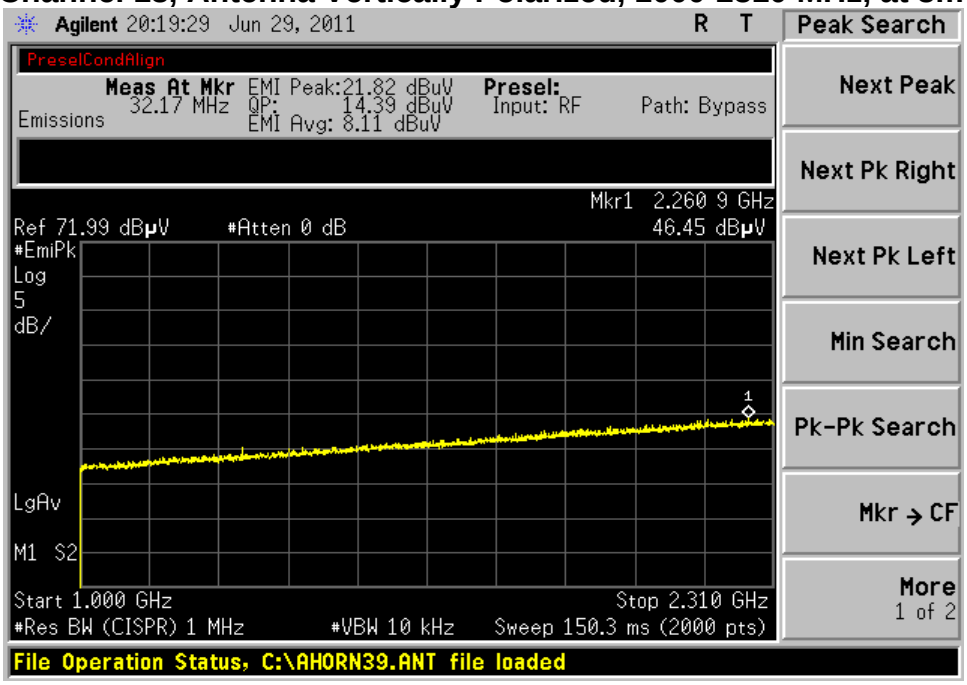
Channel 18, Antenna Vertically Polarized, 30-300 MHz, at 3m



Channel 18, Antenna Vertically Polarized, 300-1000 MHz, at 3m

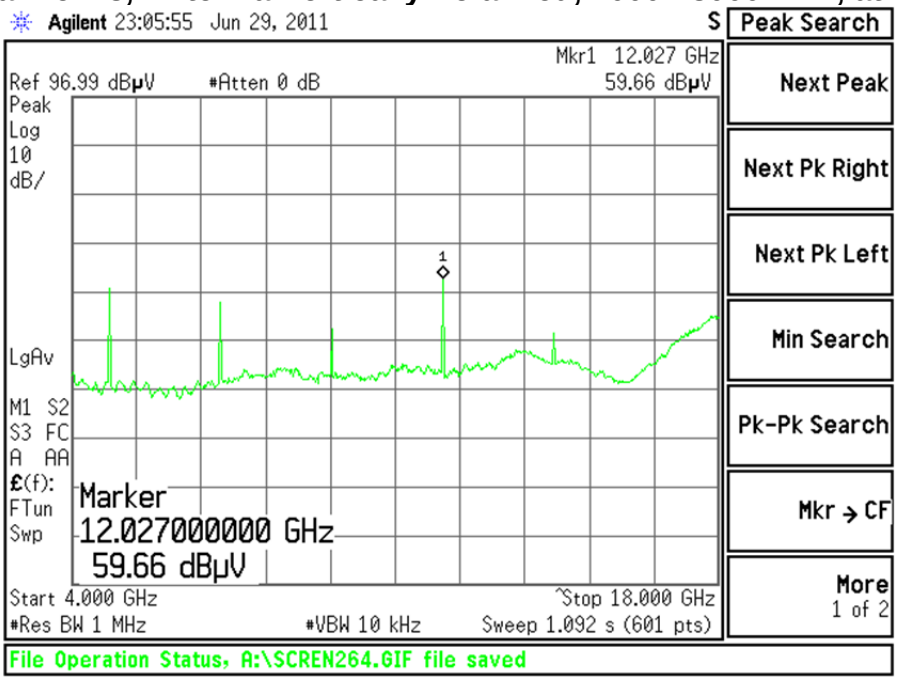


Channel 18, Antenna Vertically Polarized, 1000-2310 MHz, at 3m

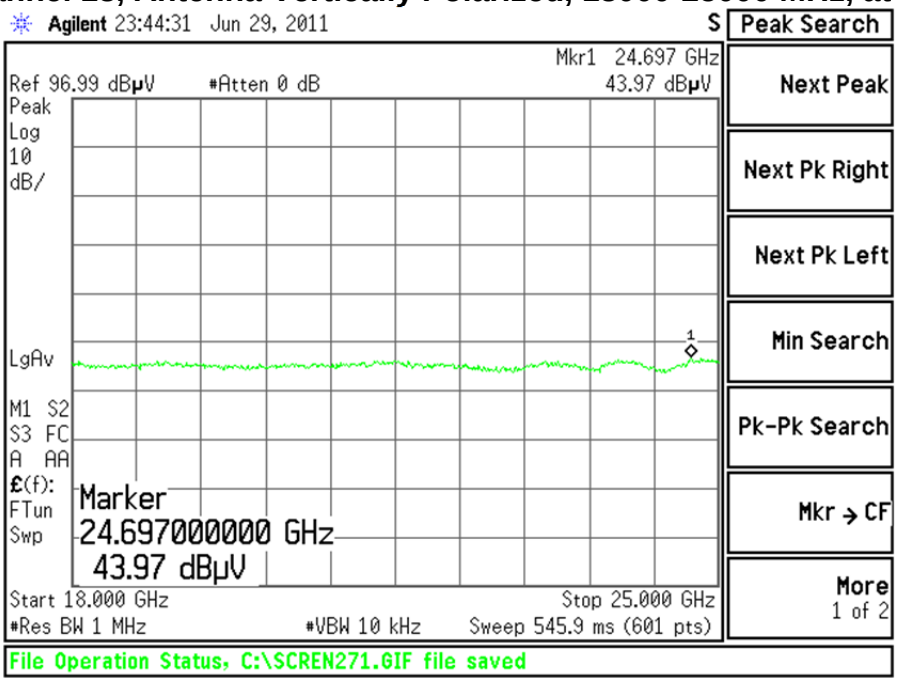


Screen Captures - Radiated Emissions Testing *(continued)*

Channel 18, Antenna Vertically Polarized, 4000-18000 MHz, at 1m



Channel 18, Antenna Vertically Polarized, 18000-25000 MHz, at 1m



5.8 Receive Mode Testing

Per the requirements of RSS-210, the EUT was placed in continuous receive mode and the radiated spurious emissions were measured and compared to the limits stated in RSS-Gen Section 4.10. Measurements were taken from 30-25000 MHz, in both sense antenna polarizations and with the EUT in its prescribed wall-mounting position.

The test setup, procedure, and equipment utilized were identical to that described in sections 5.1, 5.2, and 5.3 of this document.

Measurement data and screen captures from the receive tests are presented below:

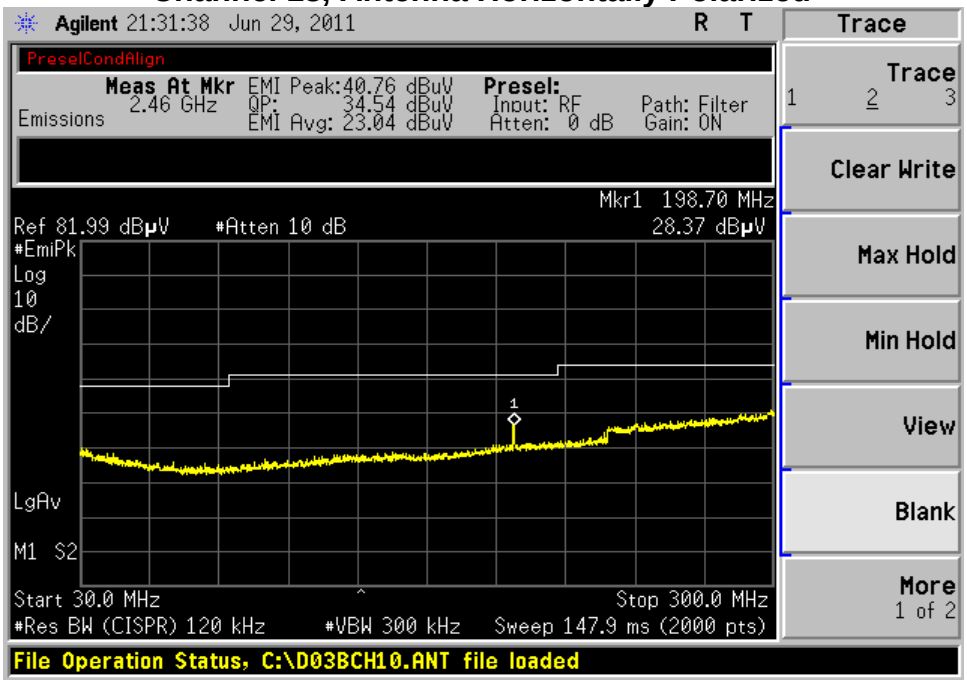
Frequency (MHz)	Height (m)	Azimuth (degree)	EFI Reading (dBµV/m)	EFI Limit (dBµV/m)	Margin (dB)	Antenna Polarity
2464.9	1.72	0	23.01	54.0	31.0	V
2462.8	1.16	268	23.04	54.0	31.0	H
198.7	1.82	0	26.03	43.5	17.5	H
198.7	1.00	24	14.06	43.5	29.4	V

Screen Captures - Radiated Emissions Testing – Receive Mode

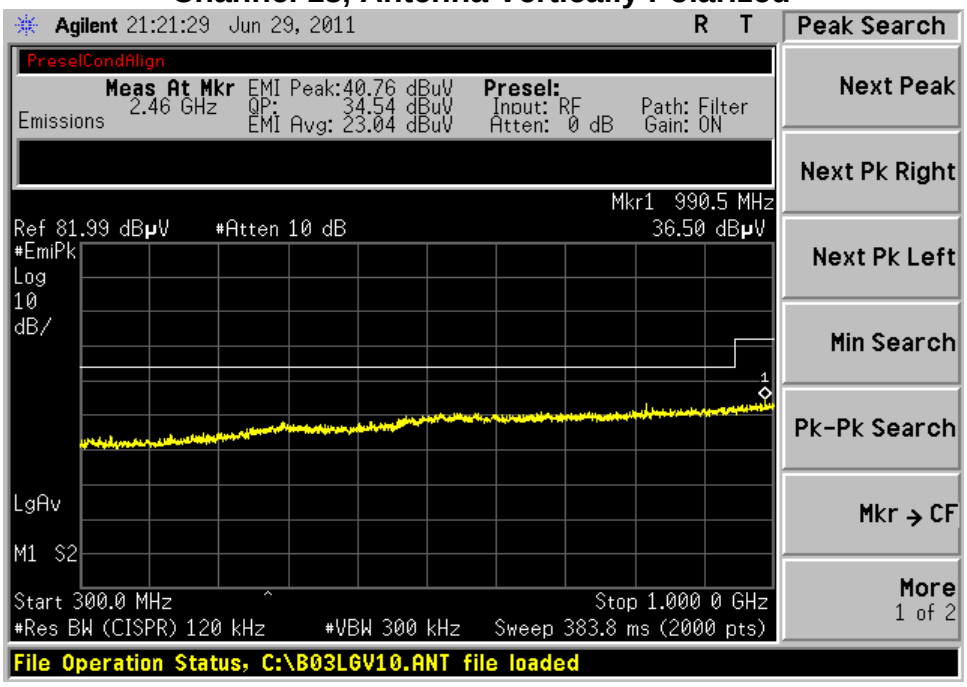
These screen captures represent Peak Emissions. For radiated emission measurements, a Quasi-Peak detector function is utilized when measuring frequencies below 1 GHz, and an Average detector function is utilized when measuring frequencies above 1 GHz.

The signature scans shown here are from worst-case emissions, as measured on channels 11, 18 and 26, with the sense antenna both in vertical and horizontal polarity for worst case presentations.

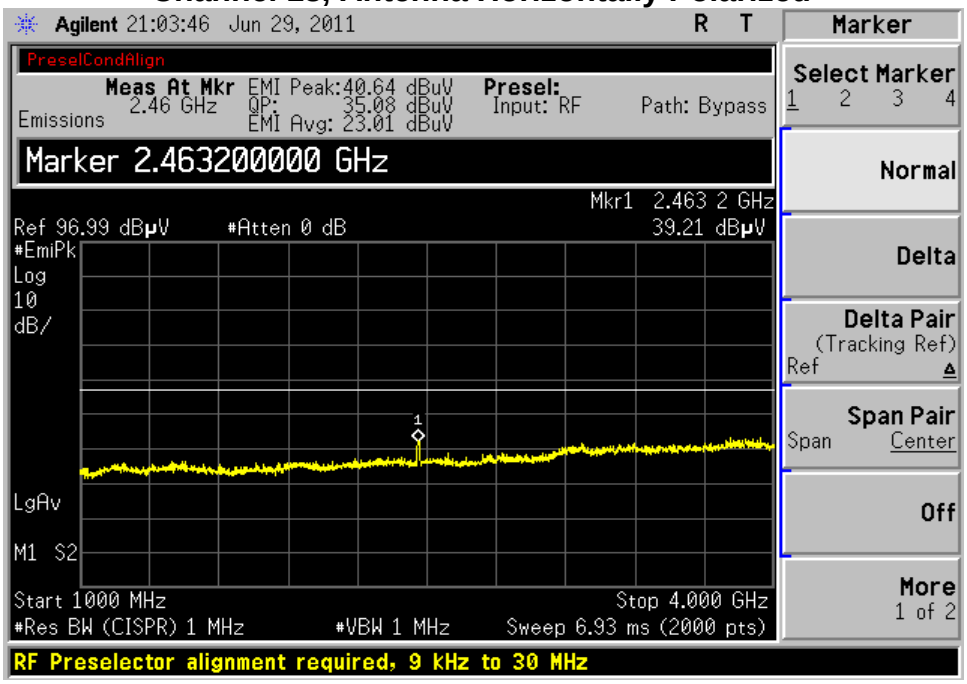
Channel 18, Antenna Horizontally Polarized



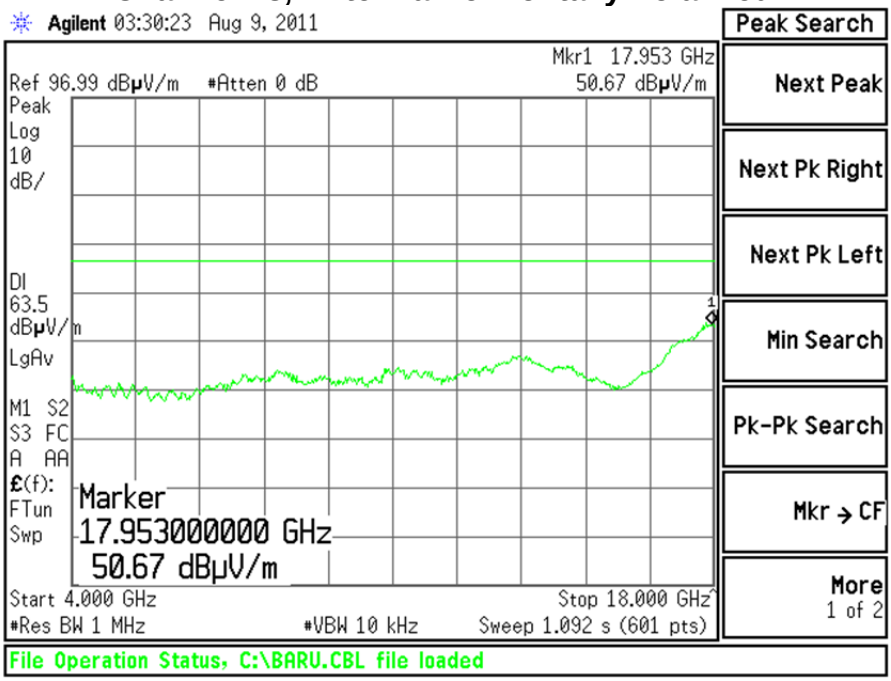
Channel 18, Antenna Vertically Polarized



Channel 18, Antenna Horizontally Polarized



Channel 18, Antenna Horizontally Polarized



Channel 18, Antenna Horizontally Polarized

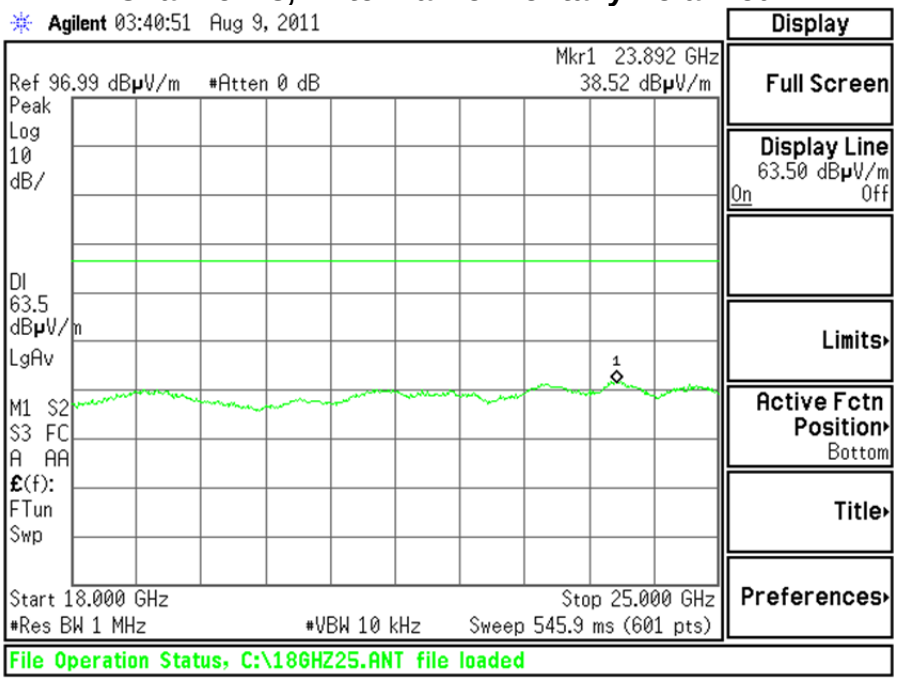


EXHIBIT 6. CONDUCTED EMISSIONS TEST, AC POWER LINE:

6.1 Test Setup

The test area and setup are in accordance with ANSI C63.4 and with Title 47 CFR, FCC Part 15, Industry Canada RSS-210 and RSS GEN. The EUT was placed on a non-conductive wooden table, with a height of 80 cm above the reference ground plane. The EUT was connected to a Honeywell class II transformer, converting 120 VAC to 24 VAC. The transformer is connected to a series of latch relays, which were not switching during the testing. From the transformer, a power cable was plugged into a 50Ω (ohm), 50/250 μH Line Impedance Stabilization Network (LISN). The AC power supply of 120V was provided in via an appropriate broadband EMI Filter, and then to the LISN line input. Final readings were then taken and recorded. After the EUT was setup and connected to the LISN, the RF Sampling Port of the LISN was connected to a 10 dB Attenuator-Limiter, and then to the Agilent E4445A/N9039A EMI System. The EMCO LISN used has the ability to terminate the unused port with a 50Ω (ohm) load when switched to either L1 (line) or L2 (neutral).

6.2 Test Procedure

The EUT was investigated in continuous modulated transmit mode for this portion of the testing. The appropriate frequency range and bandwidths were selected on the EMI Receiver, and measurements were made. The bandwidth used for these measurements is 9 kHz, as specified in CISPR 16-1, Section 1, Table 1, for Quasi-Peak and Average detectors in the frequency range of 150 kHz to 30 MHz. Final readings were then taken and recorded.

6.3 Test Equipment Utilized

A list of the test equipment and accessories utilized for the Conducted Emissions test is provided in Appendix A. This list includes calibration information and equipment descriptions. All equipment is calibrated and used according to the operation manuals supplied by the manufacturers. Calibrations of the LISN and Limiter are traceable to N.I.S.T. All cables are calibrated and checked periodically for conformance. The emissions are measured on the HP8546 EMI System, which has automatic correction for all factors stored in memory and allows direct readings to be taken.

6.4 Test Results

The EUT was found to **MEET** the Conducted Emission requirements of FCC Part 15.207 Conducted Emissions for an Intentional Radiator. See the Data Charts and Graphs for more details of the test results.

6.5 FCC Limits of Conducted Emissions at the AC Mains Ports

Frequency Range (MHz)	Class B Limits (dBμV)		Measuring Bandwidth
	Quasi-Peak	Average	
0.150 -0.50 *	66-56	56-46	RBW = 9 kHz VBW = 1 Hz for Average
0.5 – 5.0	56	46	
5.0 – 30	60	50	
* The limit decreases linearly with the logarithm of the frequency in this range.			

6.6 CONDUCTED EMISSIONS TEST DATA CHART

Frequency Range inspected: 150 KHz to 30 MHz

Manufacturer:	Honeywell					
Date(s) of Test:	July 13, 2011					
Test Engineer:	Peter Feilen					
Voltage:	24VAC (Class II transformer used)					
Operation Mode:	continuous transmit					
Environmental Conditions in the Lab:	Temperature: 20 – 25° C Relative Humidity: 30 – 60 %					
Test Location:	X	Immunity test area				Chamber
EUT Placed On:	X	40cm from Vertical Ground Plane				10cm Spacers
	X	80cm above Ground Plane				Other:
Measurements:		Pre-Compliance		Preliminary	X	Final
Detectors Used:	X	Peak	X	Quasi-Peak	X	Average

Transmit Mode

		Quasi-Peak			Average		
Frequency (MHz)	Line	Q-Peak Reading (dBµV)	Q-Peak Limit (dBµV)	Quasi-Peak Margin (dB)	Average Reading (dBµV)	Average Limit (dBµV)	Average Margin (dB)
0.157	L1	36.3	65.62126	29.321264	29.3	55.621264	26.3213
0.158	L2	35.8	65.57906	29.779059	28.8	55.579059	26.7791

Receive Mode

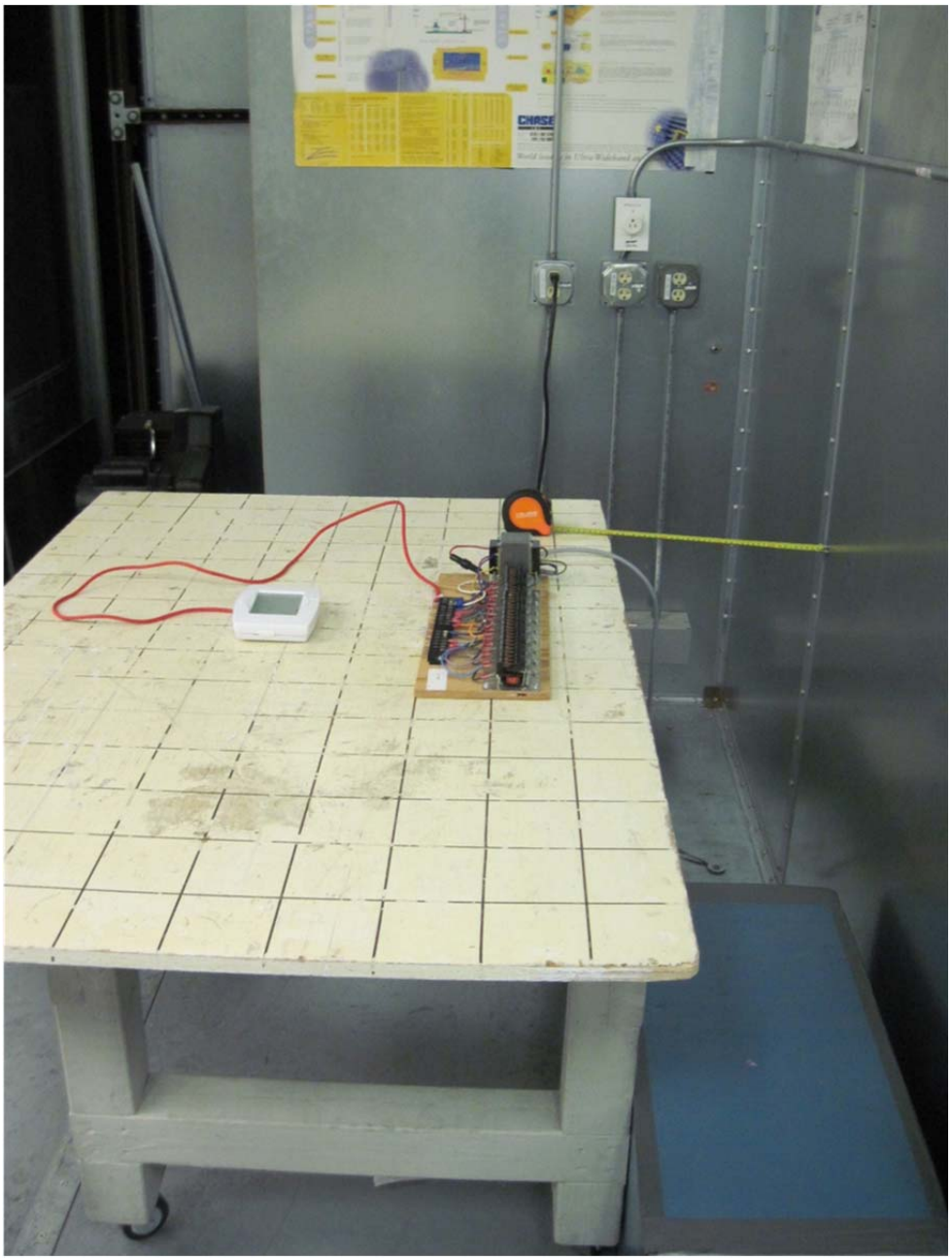
		Quasi-Peak			Average		
Frequency (MHz)	Line	Q-Peak Reading (dBµV)	Q-Peak Limit (dBµV)	Quasi-Peak Margin (dB)	Average Reading (dBµV)	Average Limit (dBµV)	Average Margin (dB)
0.157	L1	36.6	65.62655	29.026554	29.9	55.626554	25.7266
0.158	L2	40.2	65.5738	25.373799	29.2	55.573799	26.3738

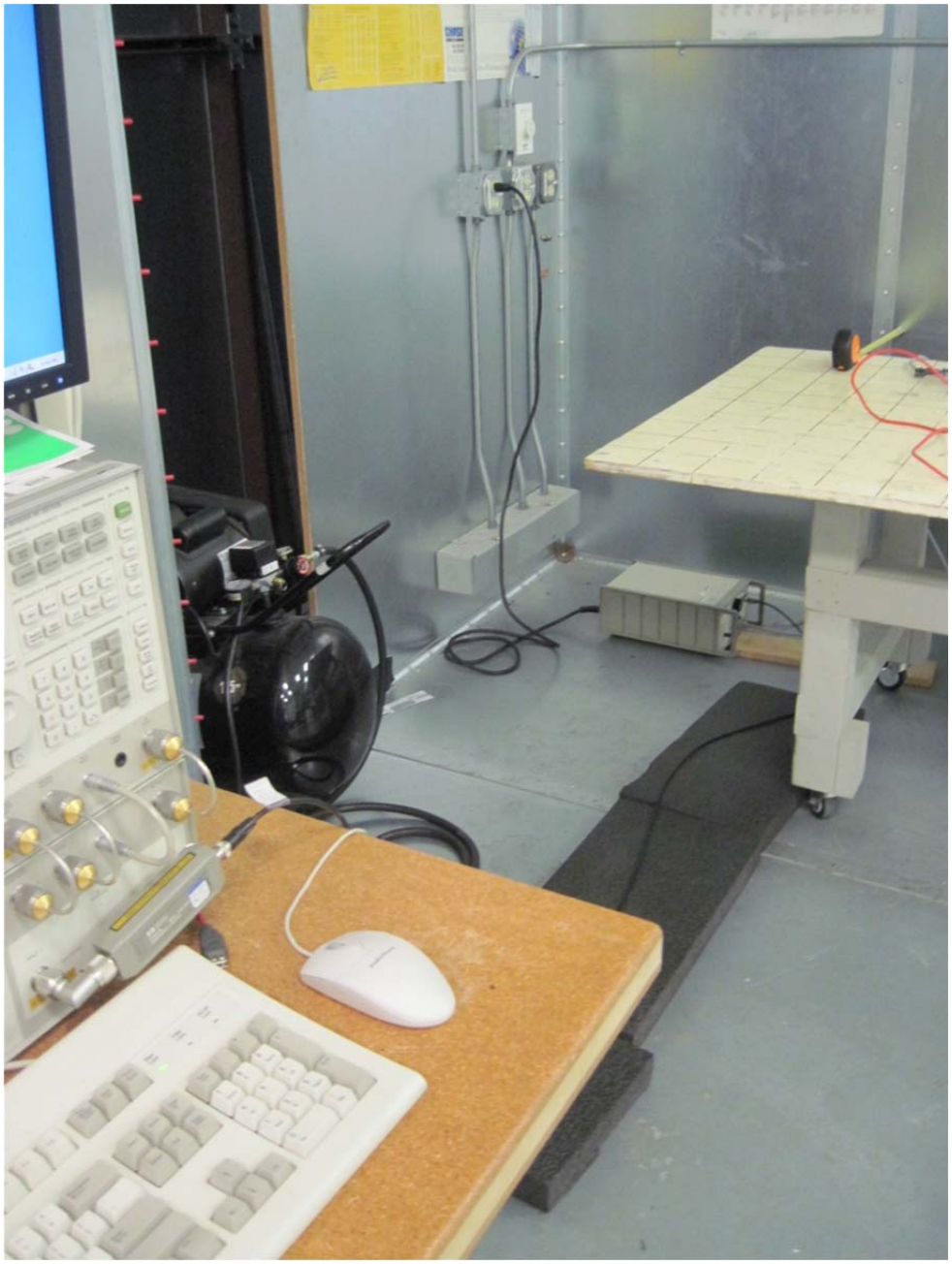
Notes:

1) All other emissions were better than 20 dB below the limits.

2) The EUT exhibited similar emissions in any combination of mode (transmit and receive), channel, (Low, Middle and High) and EUT antenna active (Antenna 1 or Antenna 2) when tested.

6.7 Test Setup Photo(s) – Conducted Emissions Test



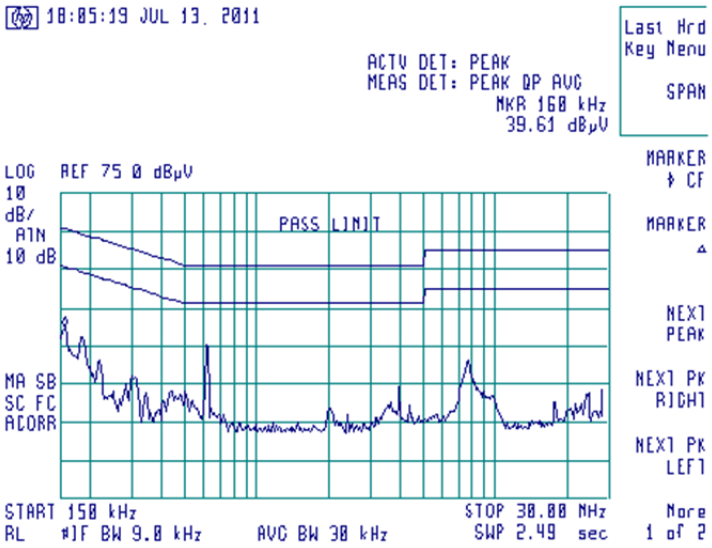


6.8 Screen Captures – Conducted Emissions Test

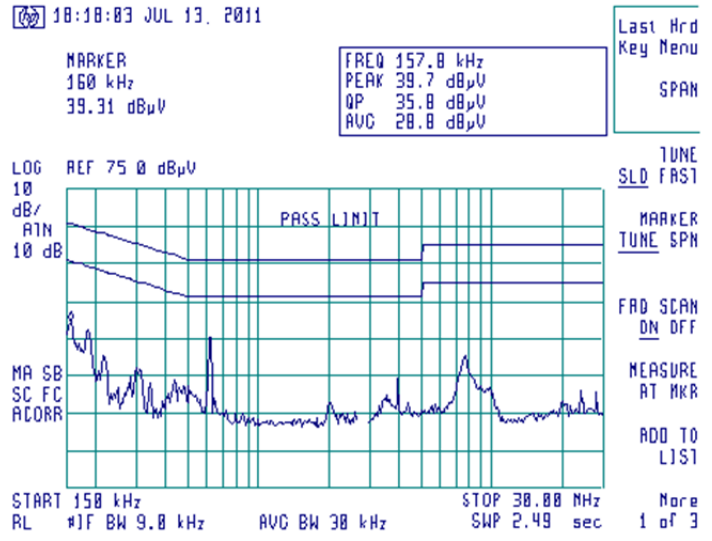
These screen captures represent Peak Emissions. For conducted emission measurements, both a Quasi-Peak detector function and an Average detector function are utilized. The emissions must meet both the Quasi-peak limit and the Average limit as described in 47 CFR 15.207 and RSS GEN 7.2.2 (Table 2).

The signature scans shown here are from channel 11, chosen as being a good representative of channels.

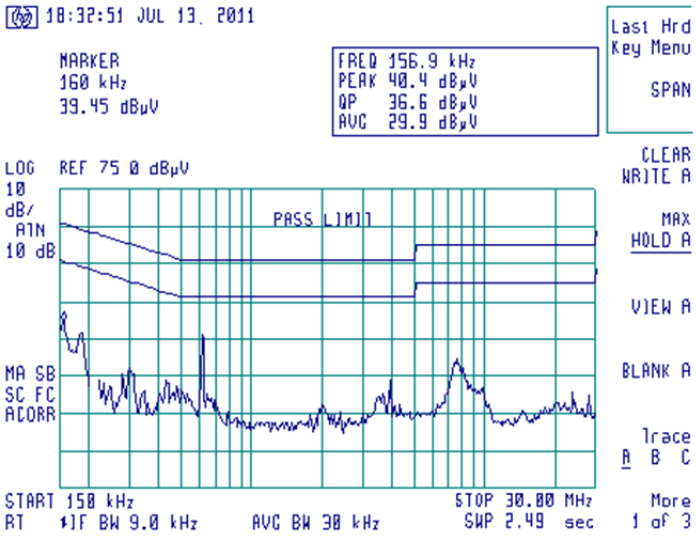
Channel 11, Line 1, Transmit Mode



Channel 11, Line 2, Transmit Mode



Channel 11, Line 1, Receive Mode



Channel 11, Line 2, Receive Mode

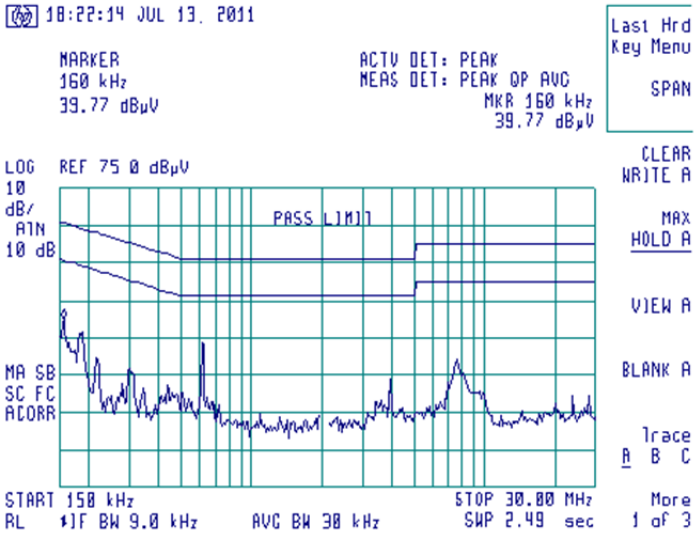


EXHIBIT 7. OCCUPIED BANDWIDTH:

7.1 Limits

For a Digital Modulation System, the 6 dB bandwidth shall be at least 500 kHz.

7.2 Method of Measurements

Refer to ANSI C63.4 and FCC Procedures (2007) for Digital Transmission Systems operating under 15.247.

The transmitter output was connected to the Spectrum Analyzer. The 6dB bandwidth of the fundamental frequency was measured with the Spectrum Analyzer using 100 kHz RBW and VBW=300 kHz. To measure the 20 dB and 99% occupied bandwidth, a build-in function of the spectrum analyzer was utilized.

The bandwidth requirement found in FCC Part 15.247(a)(2) and RSS 210 A8.2(a) requires a minimum -6dBc occupied bandwidth of 500 kHz. In addition, Industry Canada (IC RSS GEN 4.6.1) requires the measurement of the -20dBc occupied bandwidth. For this portion of the tests, a direct measurement of the transmitted signal was performed at the antenna port of the EUT, via a cable connection to the Agilent E4446A spectrum analyzer. The loss from the cable and the attenuator were added on the analyzer as gain offset settings, thereby allowing direct measurements, without the need for any further corrections. An Agilent E4446A spectrum analyzer was used with the resolution bandwidth set to 100 kHz for this portion of the tests. The EUT was configured to run in a continuous transmit mode, while being supplied with typical data as a modulation source. The spectrum analyzer was used in peak-hold mode while measurements were made, as presented in the chart below.

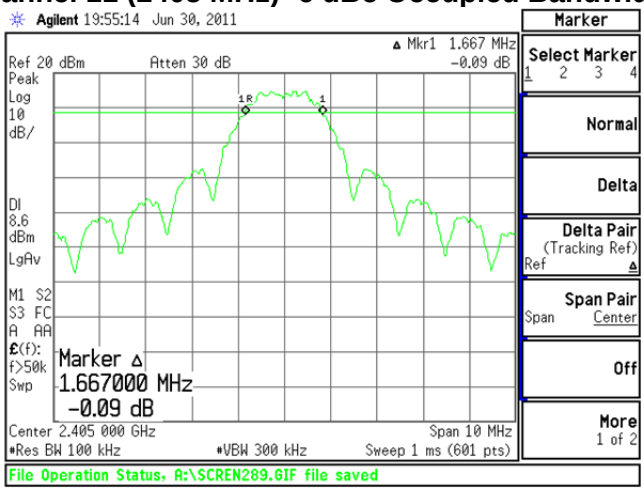
From this data, the closest measurement (6 dB bandwidth) when compared to the specified limit, is 1150 kHz, which is above the minimum of 500 kHz.

7.3 Test Data

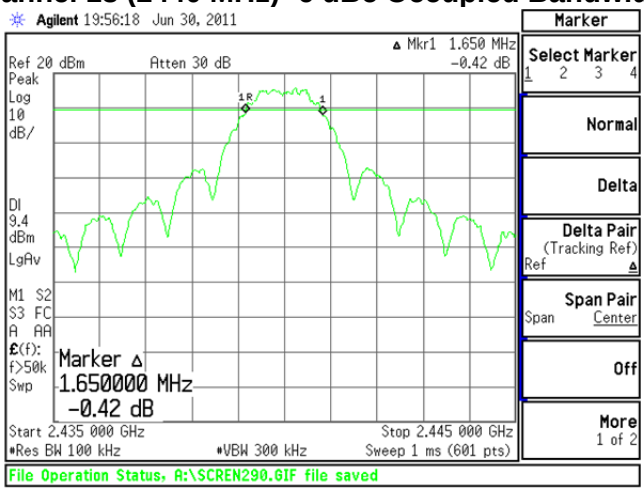
Channel	Center Frequency (MHz)	Minimum -6 dBc Limit (kHz)	Measured -6 dBc Occ. BW (kHz)	Measured -20 dBc Occ.Bw (kHz)	Measured 99% Occ.Bw (kHz)
11	2405	500	1667	2227	2590
18	2440	500	1650	2218	2587
24	2470	500	1650	2186	2520
25	2475	500	1650	2193	2507
26	2480	500	1667	2240	2492

7.4 Screen Captures - OCCUPIED BANDWIDTH

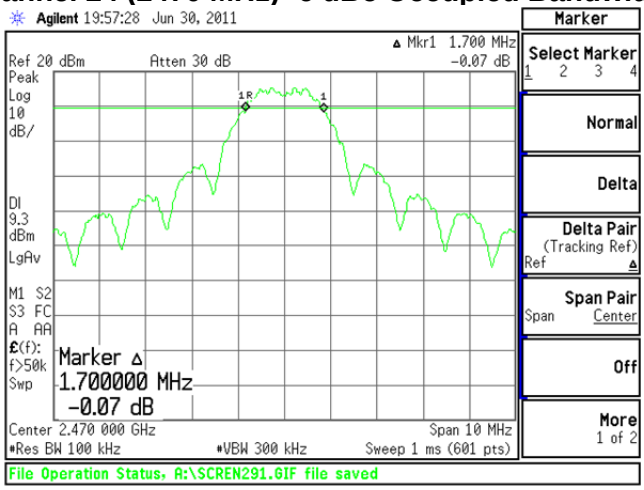
Channel 11 (2405 MHz) -6 dBc Occupied Bandwidth



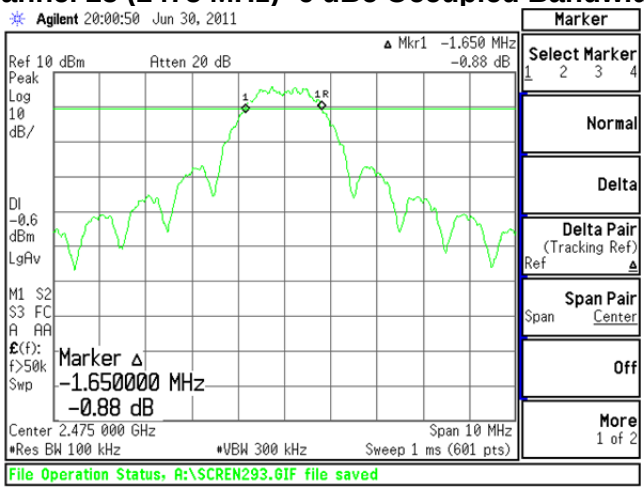
Channel 18 (2440 MHz) -6 dBc Occupied Bandwidth



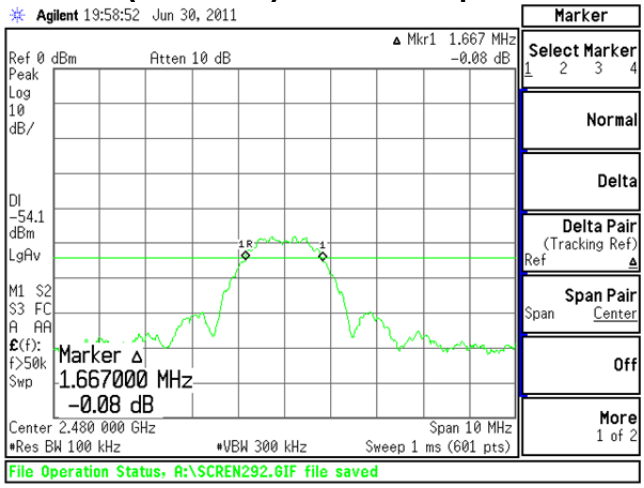
Channel 24 (2470 MHz) -6 dBc Occupied Bandwidth



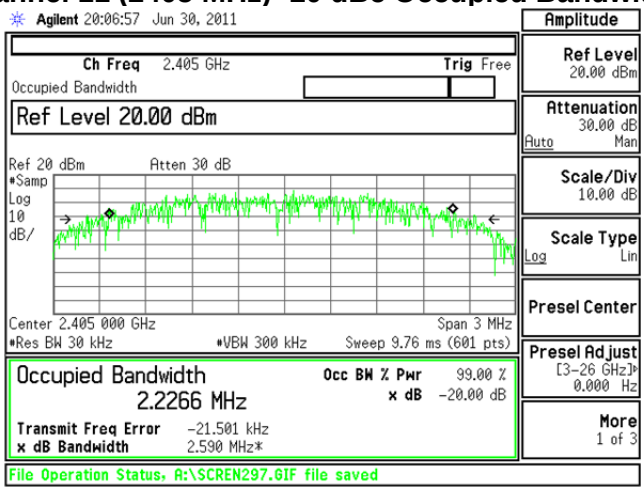
Channel 25 (2475 MHz) -6 dBc Occupied Bandwidth



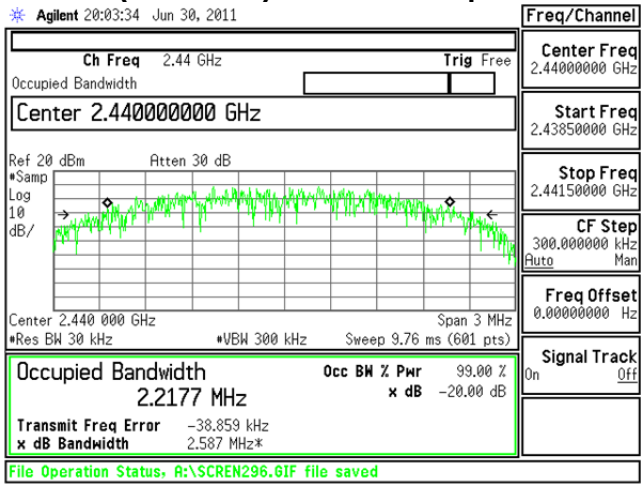
Channel 26 (2480 MHz) -6 dBc Occupied Bandwidth



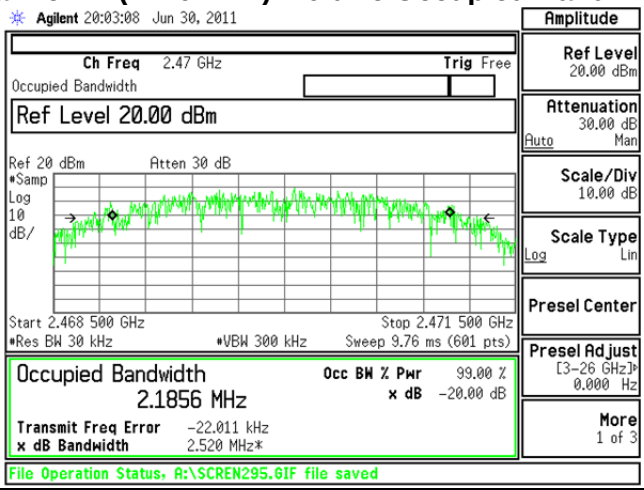
Channel 11 (2405 MHz) -20 dBc Occupied Bandwidth



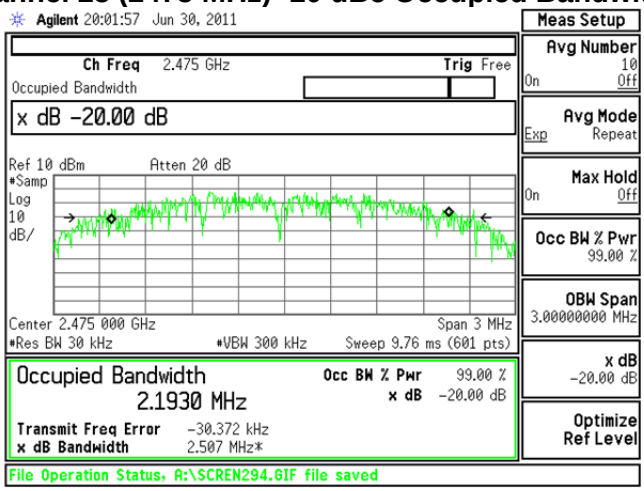
Channel 18 (2440 MHz) -20 dBc Occupied Bandwidth



Channel 24 (2470 MHz) -20 dBc Occupied Bandwidth



Channel 25 (2475 MHz) -20 dBc Occupied Bandwidth



Channel 26 (2480 MHz) -20 dBc Occupied Bandwidth

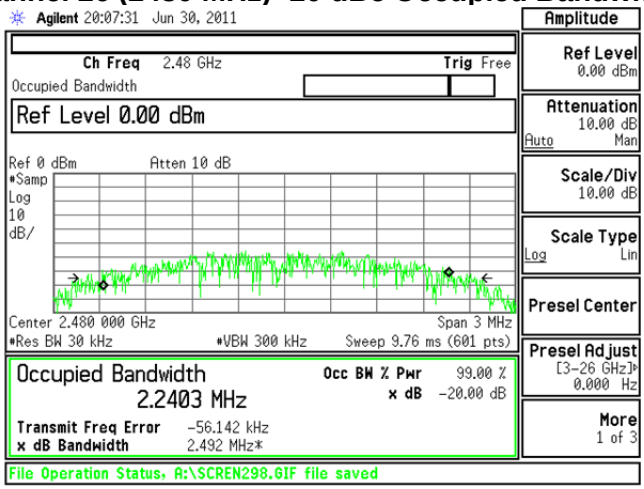


EXHIBIT 8. BAND-EDGE MEASUREMENTS

Method of Measurements

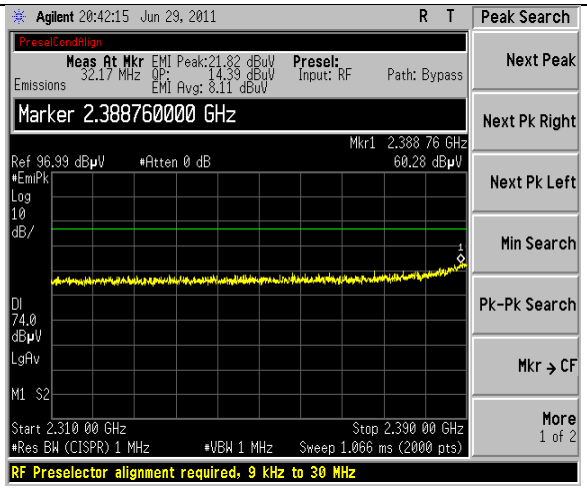
FCC 15.209(b) and 15.247(d) require a measurement of spurious emission levels to be at least 20 dB lower than the fundamental emission level, in particular at the Band-Edges where the intentional radiator operates. Also, RSS 210 Section 2.2 requires that unwanted emissions meet limits listed in tables 2 and 3 of the same standard and also to the limits in the applicable annex. The following screen captures demonstrate compliance of the intentional radiator at the 2400-2483.5 MHz Band-Edges. The EUT was operated in continuous transmit mode with continuous modulation, with internally generated data as the modulating source. The EUT was operated at the lowest channel for the investigation of the lower Band-Edge, and at the highest channel for the investigation of the higher Band-Edge.

The Lower Band-Edge limit, from 2310-2390 MHz, would be 54 dBuV/m for the average limit and the peak limit of 74 dBuV/m. From 2390-2400 MHz, the limit would be -20 dBc with respect to the fundamental level.

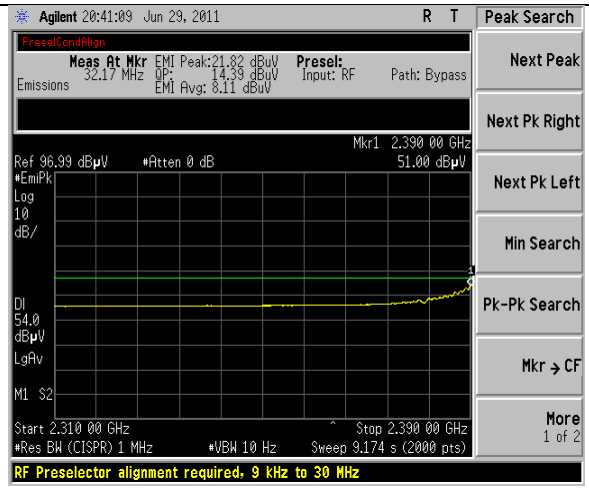
The Upper Band-Edge limit, in this case, would be + 54 dBµV/m at 3m (average measurement) and + 74 dBµV/m at 3m (peak measurement).

Screen Capture Demonstrating Compliance at the Lower Band-Edge, 2310-2390 MHz

Channel 11, Power Level +03 (maximum)



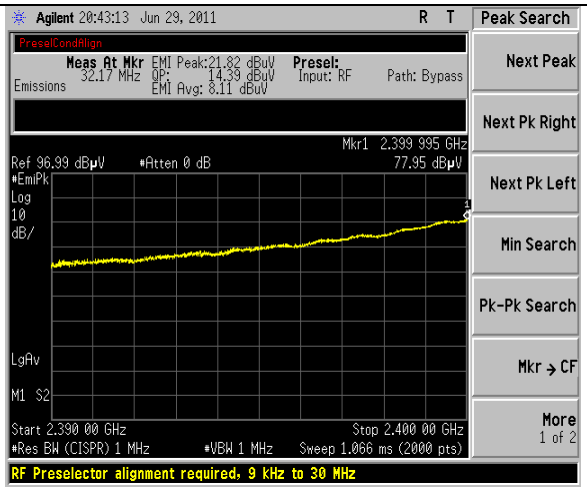
2310-2390 MHz Peak



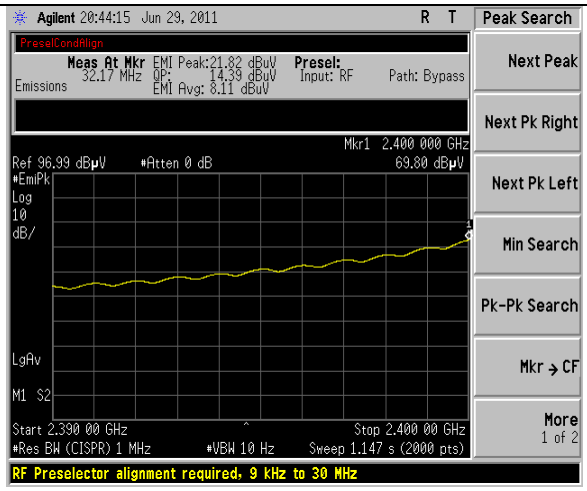
2310-2390 MHz Average

Screen Capture Demonstrating Compliance at the Lower Band-Edge, 2310-2390 MHz

Channel 11, Power Level +03 (maximum)

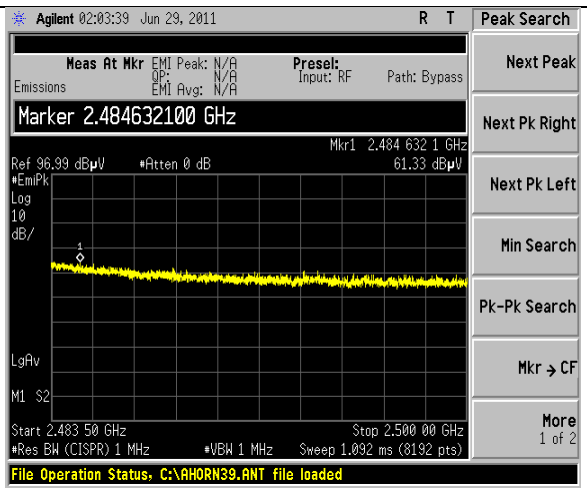


2390-2400 MHz Peak

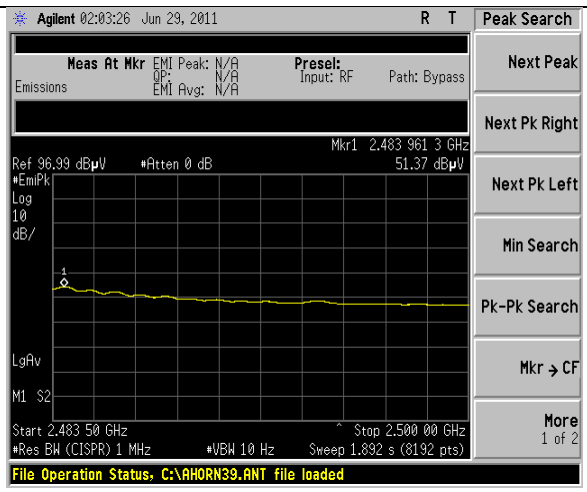


2390-2400 MHz Average

Screen Capture Demonstrating Compliance at the Higher Band-Edge
Channel 24, Power Level +03 (maximum)

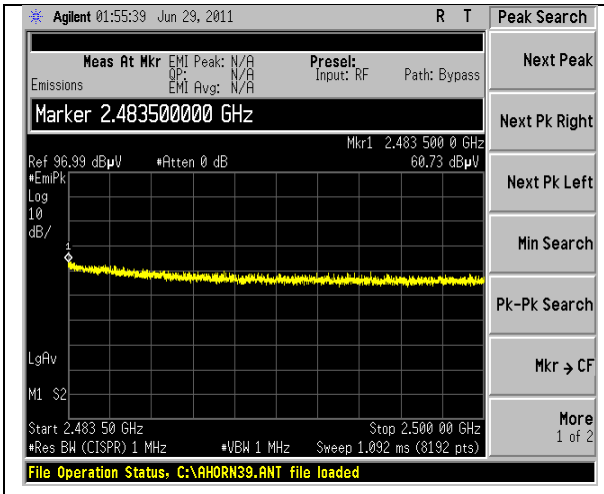
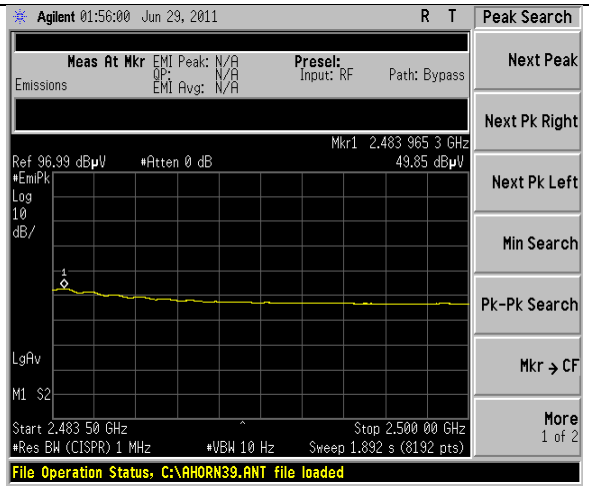


2483.5-2500 MHz Peak



2483.5-2500 MHz Average

Screen Capture Demonstrating Compliance at the Higher Band-Edge
Channel 25, Power Level -12

	
2483.5-2500 MHz Peak	2483.5-2500 MHz Average

Screen Capture Demonstrating Compliance at the Higher Band-Edge
Channel 26, Power Level -43

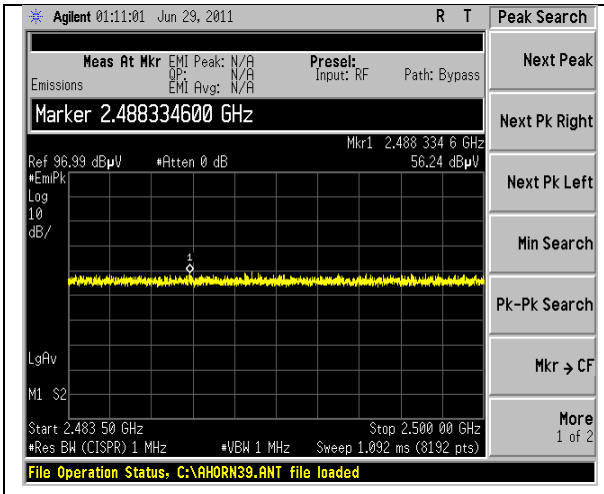
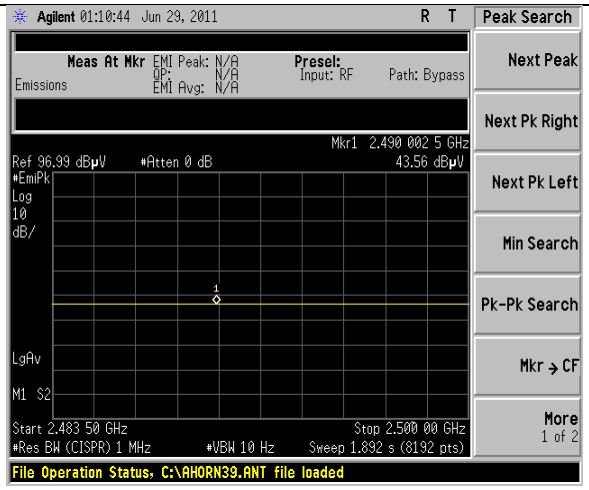
	
2483.5-2500 MHz Peak	2483.5-2500 MHz Average

EXHIBIT 9. POWER OUTPUT (CONDUCTED): 15.247(b)

9.1 Method of Measurements

The conducted RF output power of the EUT was measured at the antenna port using a short RF cable. The loss from the cable is loaded from a calibration file on the hard drive of the analyzer, thereby allowing direct measurements without the need for any further corrections. The unit was configured to run in a continuous transmit mode, while being supplied with typical data from an internal source as a modulation source. The spectrum analyzer was used with resolution and video bandwidths set to 3 MHz, and a span of 10 MHz, with measurements from a peak detector presented in the chart below.

9.2 Test Data

ERP

CHANNEL	CENTER FREQ (MHz)	LIMIT (dBm)	MEASURED POWER (dBm)	MARGIN (dB)
11	2405	+30 dBm	18.5	11.5
18	2440	+30 dBm	18.9	11.1
24	2470	+30 dBm	18.6	11.4
25	2475	+30 dBm	8.6	21.4
26	2480	+30 dBm	-44.4	74.4

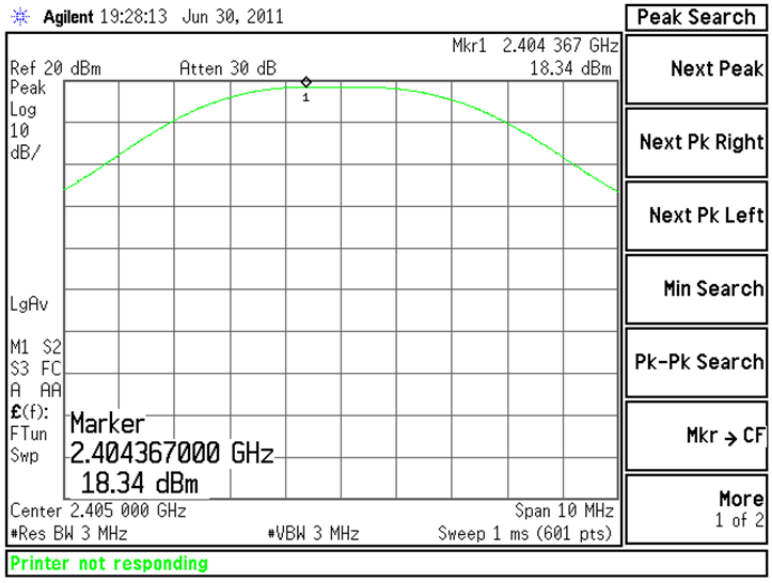
EIRP

Transmitter Channel	Freq. (MHz)	Peak Power at Antenna Terminal (dBm)	(1) Calculated EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin
11	2405	18.5	23.4	36.0	12.6
18	2440	18.9	23.8	36.0	12.2
24	2470	18.6	23.5	36.0	12.5
25	2475	8.6	13.5	36.0	22.5
26	2480	-44.4	-39.5	36.0	75.5

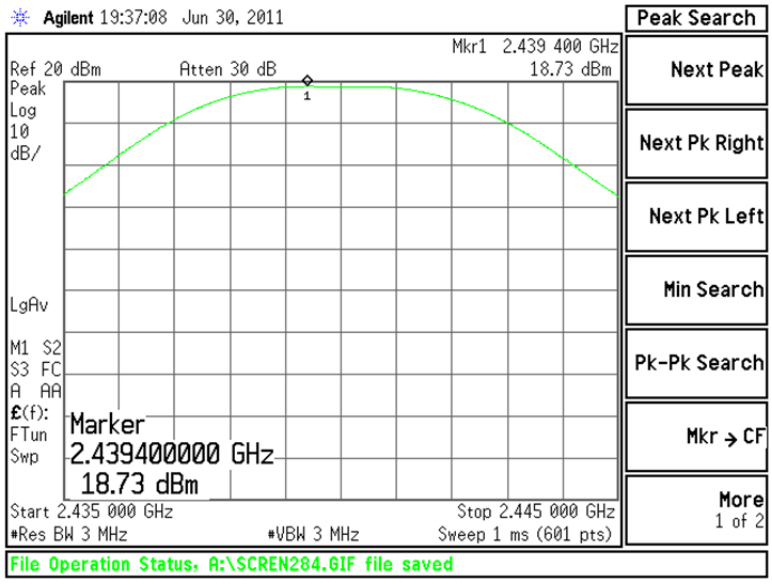
(1) EIRP Calculation:
EIRP = (Peak power at antenna terminal in dBm) + (EUT Antenna gain in dBi)

9.3 Screen Captures – Power Output (Conducted)

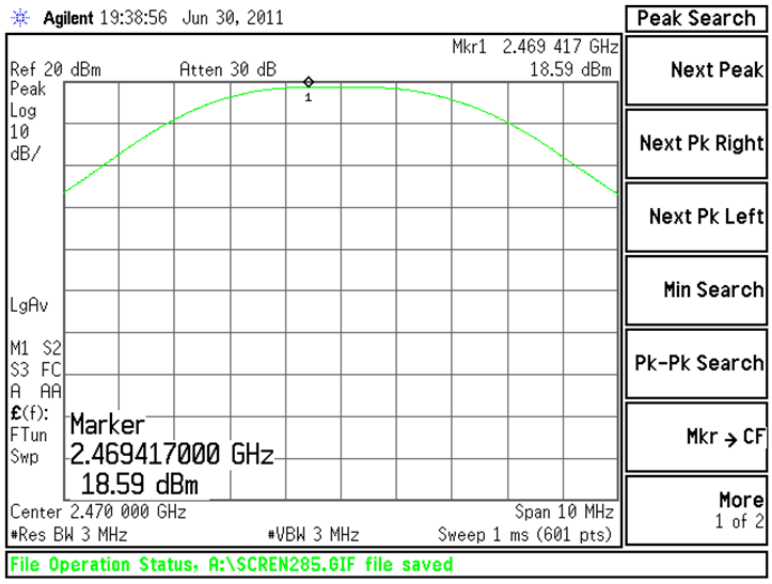
Channel 11



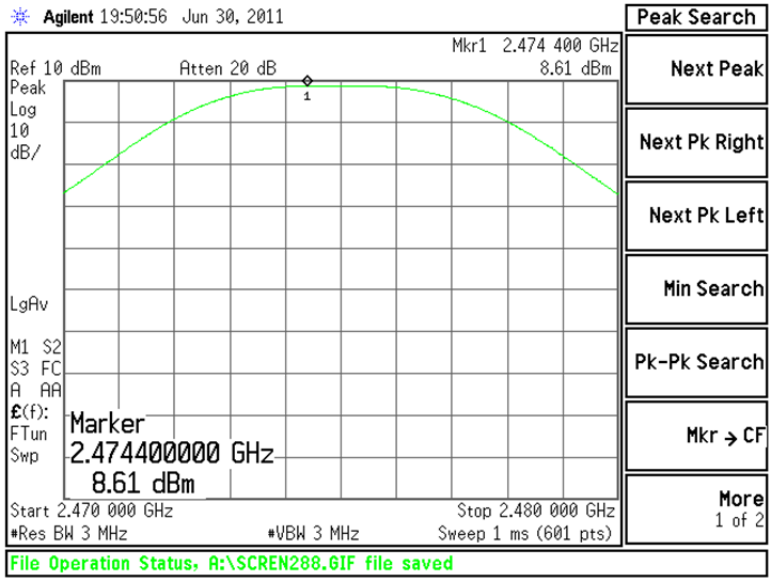
Channel 18



Channel 24



Channel 25



Channel 26

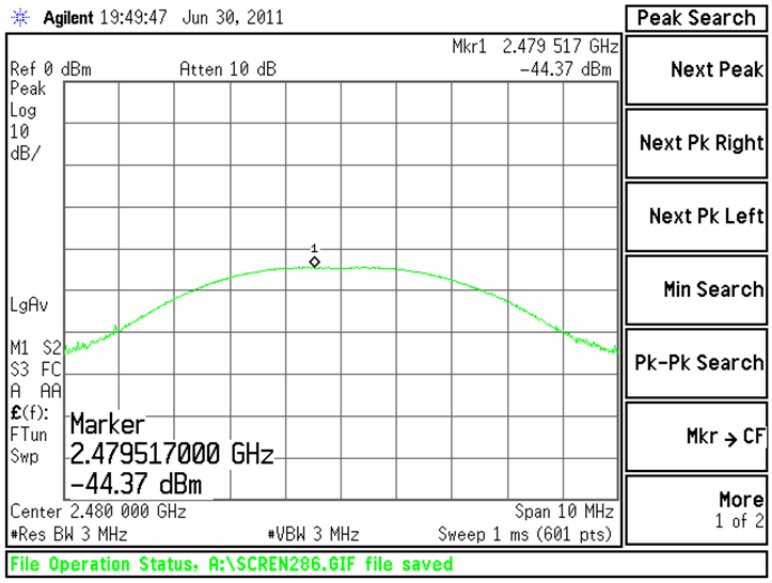

Agilent 19:49:47 Jun 30, 2011
Peak Search
Mkr1 2.479 517 GHz
Ref 0 dBm
Atten 10 dB
-44.37 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Min Search
LgAv
M1 S2
S3 FC
A AA
£(f):
FTun
Swp
Pk-Pk Search
Marker
2.479517000 GHz
-44.37 dBm
Mkr → CF
More
1 of 2
Center 2.480 000 GHz
Span 10 MHz
#Res BW 3 MHz
#VBW 3 MHz
Sweep 1 ms (601 pts)
File Operation Status, A:\SCREN286.GIF file saved

EXHIBIT 10. POWER SPECTRAL DENSITY: 15.247(e)

10.1 Limits

For digitally modulate 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.

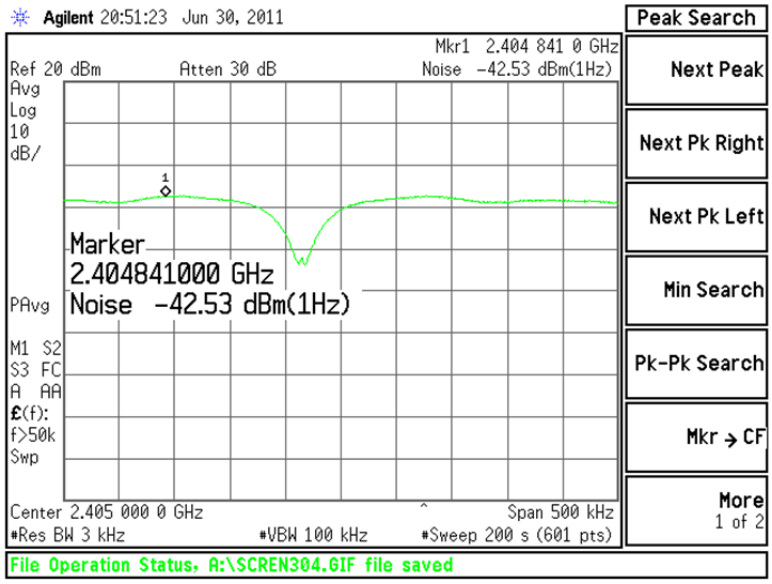
In accordance with FCC Part 15.247(e) and RSS 210 A8.2(b), the peak power spectral density should not exceed +8 dBm in any 3 kHz band. This measurement was performed along with the conducted power output readings performed as described in previous sections. The peak output frequency for each representative frequency was scanned, with a narrow bandwidth, and reduced sweep, and a power density measurement was performed using the utility built into the HP Analyzer. The resultant density was then corrected to a 3 kHz bandwidth. The highest density was found to be no greater than -7.0 dBm, which is under the allowable limit by 15.0 dB.

10.2 Test Data

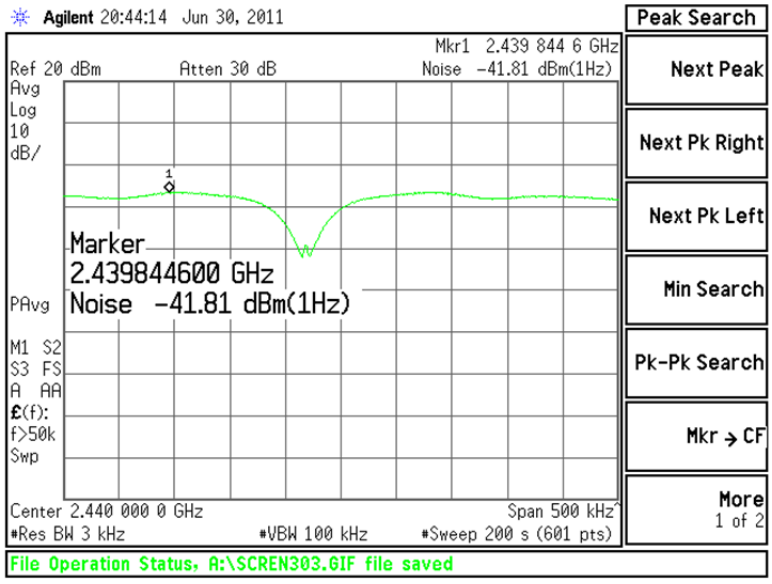
Chan	Noise M	PSD/3kHz	limit	Margin
11	-42.53	-7.8	8	15.8
18	-41.81	-7.0	8	15.0
24	-42.43	-7.7	8	15.7
25	-52.07	-17.3	8	25.3
26	-105.41	-70.6	8	78.6

10.3 Screen Captures – Power Spectral Density

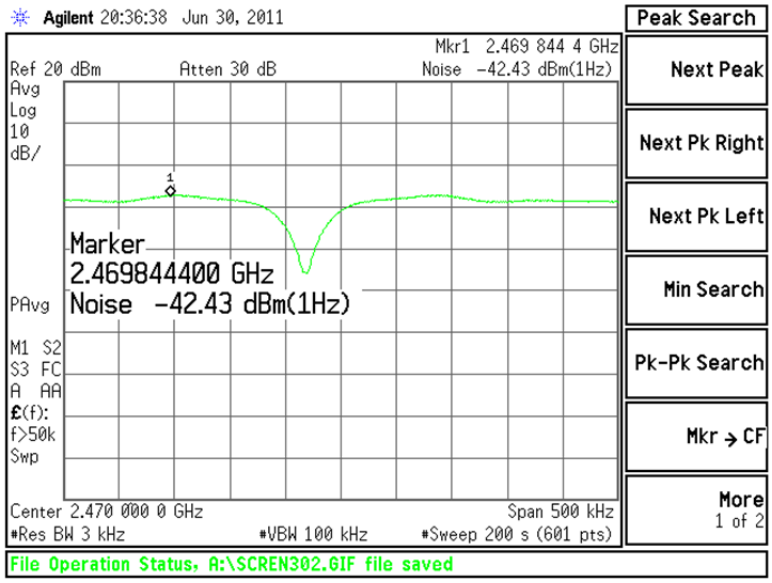
Channel 11



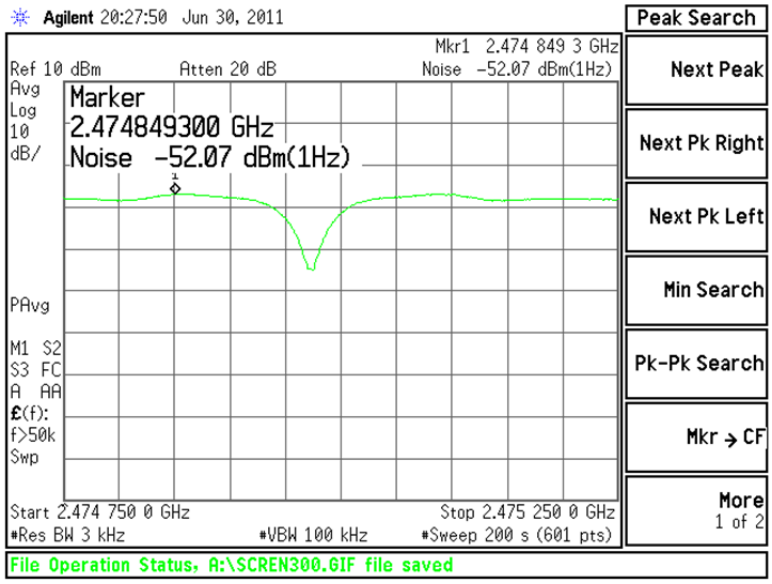
Channel 18



Channel 24



Channel 25



Channel 26

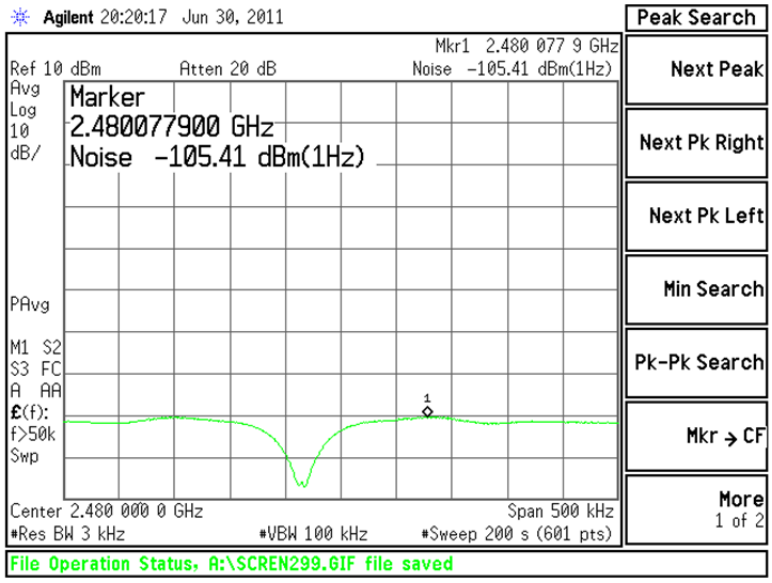

Agilent 20:20:17 Jun 30, 2011
Peak Search
Mkr1 2.480 077 9 GHz
Ref 10 dBm
Atten 20 dB
Noise -105.41 dBm(1Hz)
Next Peak
Avg
Log
10
dB/
Marker
2.480077900 GHz
Noise -105.41 dBm(1Hz)
Next Pk Right
Next Pk Left
Min Search
PAvg
M1 S2
S3 FC
A AA
£(f):
f>50k
Swp
Pk-Pk Search
Mkr → CF
More
1 of 2
Center 2.480 000 0 GHz
Span 500 kHz
#Res BW 3 kHz
#VBW 100 kHz
#Sweep 200 s (601 pts)
File Operation Status, A:\SCREN299.GIF file saved

EXHIBIT 11. SPURIOUS CONDUCTED EMISSIONS: 15.247(d)

11.1 Limits

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.

Remarks:

- Applies to harmonics/spurious emissions that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209.
- The emission limits as specified above are based on measurement instrument employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

FCC 47 CFR 15.205(a) – Restricted Frequency Bands

MHz	MHz	MHz	GHz
0.090 – 0.110	162.0125 – 167.17	2310 – 2390	9.3 – 9.5
0.49 – 0.51	167.72 – 173.2	2483.5 – 2500	10.6 – 12.7
2.1735 – 2.1905	240 – 285	2655 – 2900	13.25 – 13.4
8.362 – 8.366	322 – 335.4	3260 – 3267	14.47 – 14.5
13.36 – 13.41	399.9 – 410	3332 – 3339	14.35 – 16.2
25.5 – 25.67	608 – 614	3345.8 – 3358	17.7 – 21.4
37.5 – 38.25	960 – 1240	3600 – 4400	22.01 – 23.12
73 – 75.4	1300 – 1427	4500 – 5250	23.6 – 24.0
108 – 121.94	1435 – 1626.5	5350 – 5460	31.2 – 31.8
123 – 138	1660 – 1710	7250 – 7750	36.43 – 36.5
149.9 – 150.05	1718.8 – 1722.2	8025 – 8500	Above 38.6
156.7 – 156.9	2200 – 2300	9000 – 9200	

FCC Part 15.247(d) and IC RSS 210 A8.5 requires a measurement of conducted harmonic and spurious RF emission levels, as reference to the carrier level when measured in a 100 kHz bandwidth. For this test, the spurious and harmonic RF emissions from the EUT were measured at the EUT antenna port using a short RF cable there by allowing direct readings of the measurements made without the need for any further corrections. An Agilent model E4446A spectrum analyzer was used with the resolution bandwidth set to 100 kHz for this portion of the tests. The unit was configured to run in a continuous transmit mode, while being supplied with typical data as a modulation source. The spectrum analyzer was used with measurements from a peak detector presented in the chart below. Screen captures were acquired and any noticeable spurious and harmonic signals were identified and measured.

11.2 Test Data

Modulation: O-QPSK
Frequency Test Range: 2405-2480 MHz

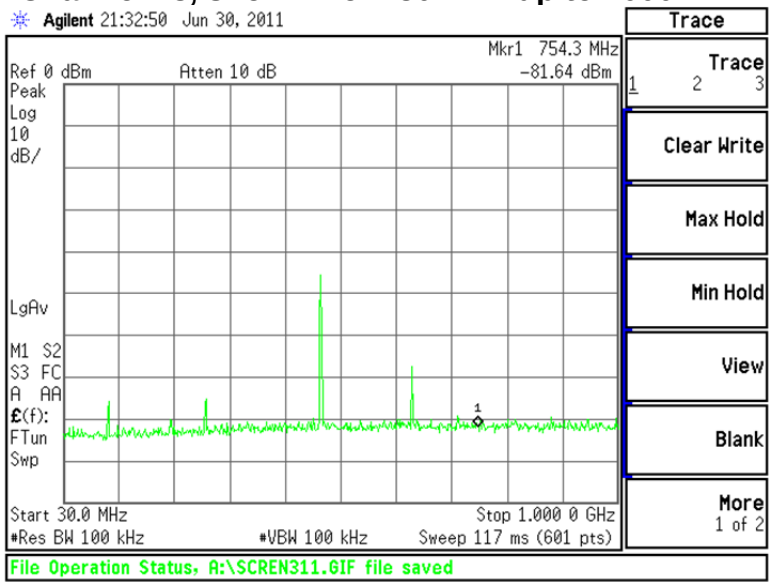
Freq\Chan	11\2405 MHz	18\2440	24\2470	25/2475	26/2480
fo	18.5	18.7	18.6	8.6	-44.4
2fo	-49.1	-48.9	-49.0	-58.4	-87.7
3fo	nf	-55.4	-56.1	-55.6	nf
4fo	-55.3	-57.5	-56.9	-57.1	nf
5fo	nf	nf	nf	nf	nf
6fo	nf	nf	nf	nf	nf
7fo	nf	nf	nf	nf	nf
8fo	nf	nf	nf	nf	nf
9fo	nf	nf	nf	nf	nf
10fo	nf	nf	nf	nf	nf

Notes:
(1) All measurements given in dBm
(2) No significant emissions could be noted within -50 dBc of the fundamental level for this product where “nf” is denoted, representing system noise floor

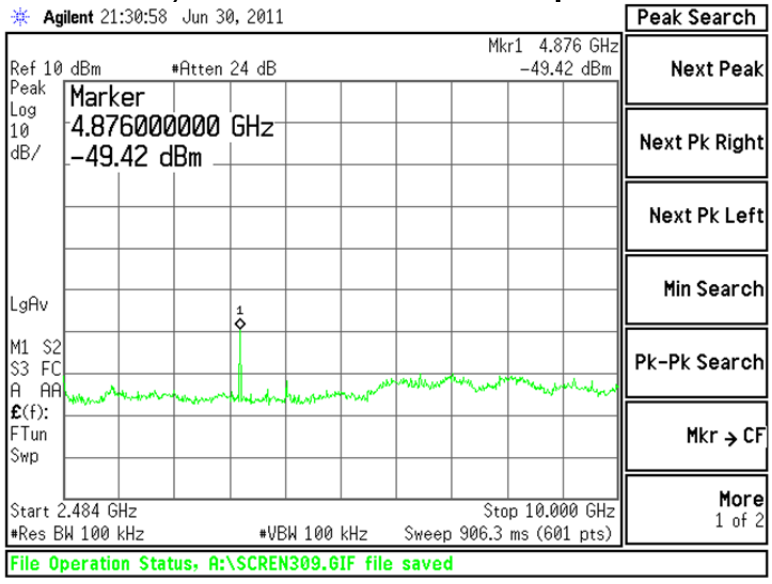
Freq(MHz)	Chan	level(dBm)
107.60	18	-75.67
219.20	18	-77.71
279.00	18	-73.62
479.40	18	-45.72
639.50	18	-65.62
720.30	18	-77.22
2043.00	18	-60.57
2400.00	18	-61.20
4876.00	18	-49.79
445.50	11	-46.52
2400.00	11	-21.85
4814.00	11	-49.72
2484.00	24	-34.73
4939.00	24	-48.93
2087.30	24	-62.3
510.20	24	-51.09
679.90	24	-66.95
146.40	24	-70.81
515.00	25	-77.54
2092	25	-67.67
1623	26	-75.78
384	26	-78.62

11.3 Screen Captures – Spurious Radiated Emissions

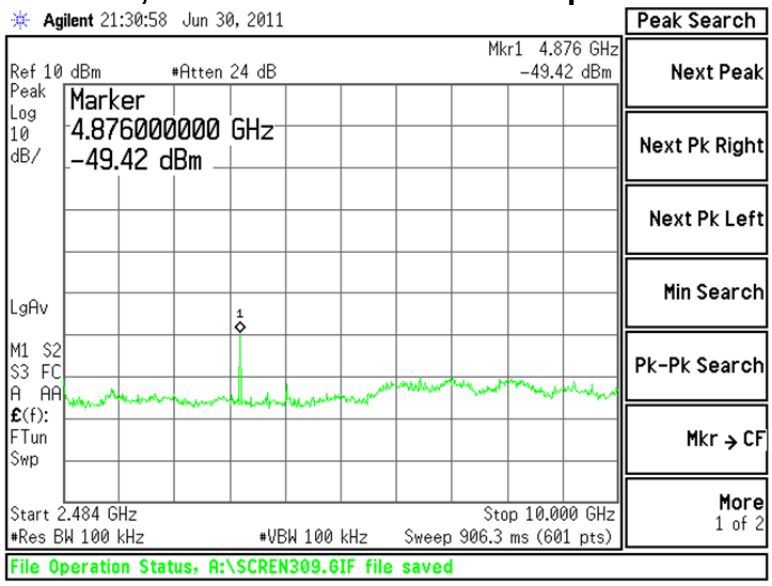
Channel 18, shown from 30 MHz up to 1000 MHz



Channel 18, shown from 1000 MHz up to 2400 MHz



Channel 18, shown from 2483.50 MHz up to 10000 MHz



Channel 18, shown from 10000 MHz up to 25000 MHz

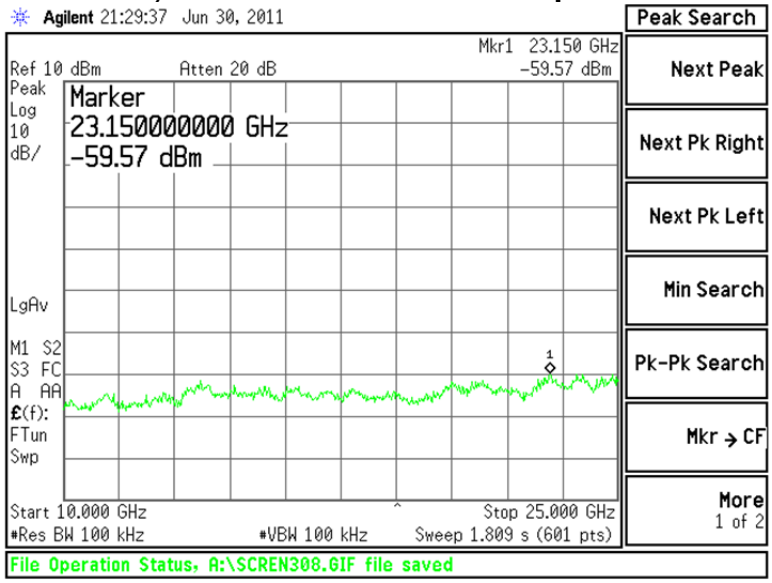


EXHIBIT 12. FREQUENCY & POWER STABILITY OVER VOLTAGE VARIATIONS

The stability of the device was examined as a function of the input voltage available to the EUT. A Spectrum Analyzer was used to measure the frequency at the appropriate frequency markers. For this test, the EUT was place inside a temperature chamber, with the transmitter portion of the EUT placed in CW modulated continuous transmit mode. Power was supplied by an external bench-type variable power supply, and the frequency of operation was monitored using the spectrum analyzer, with the antenna placed inside the chamber. The power supply and spectrum analyzer were located outside the temperature chamber. In this case, the EUT is powered by a Honeywell transformer that is supplied by a variable AC voltage supply from 102 to 138VAC .

A spectrum analyzer was used to measure the frequency at the appropriate frequency markers. For this test, the EUT was placed in continuous transmit CW mode. Power to the EUT was supplied by an external bench-type variable power supply. The frequency of operation was monitored using the spectrum analyzer with RBW=VBW=1 kHz settings while the voltage was varied.

102 VAC		120 VAC		138 VAC		
Power (dBm)	Frequency (MHz)	Power (dBm)	Frequency (MHz)	Power (dBm)	Frequency (MHz)	Channel
18.31	2404.960250	18.53	2404.960250	18.5	2404.960750	11
18.91	2439.963750	18.87	2439.963750	18.89	2439.964000	18
18.63	2469.961000	18.59	2469.963250	18.61	2469.963500	24
8.65	2474.967250	8.62	2474.967000	8.68	2474.967250	25
-44.27	2479.959250	-44.37	2479.959250	-44.22	2479.959250	26

The power was then cycled On/Off to observe system response. No unusual response was observed, the emission characterizes were well behaved, and the system returned to the same state of operation as before the power cycle.

No anomalies were noted, in the measured transmit power, varying less than 1 dB, during the voltage variation tests.

Sample Frequency Tolerance Calculation:

$$\boldsymbol{tolerance = 100ppm}$$

$$\left(\frac{\mathbf{100}}{\mathbf{1000000}}\right) * \left(\boldsymbol{fundamental\ (Hz)}\right) = \boldsymbol{Allowable\ Drift\ (Hz)}$$

$$<$$

$$\boldsymbol{@\ 2.400\ GHz, less\ than\ 240\ kHz\ of\ drift\ is\ less\ than\ 100\ ppm}$$

APPENDIX A

LS RESEARCH LLC
Wireless Product Development
Equipment Calibration

Date : 13-Jun-2011 Type Test : Conducted AC Emission Measurements Job # : C-1224

Prepared By: Peter Customer : Honeywell Quote #: 311182

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	AA 960031	Transient Limiter	HP	11947A	3107A01708	9/28/2010	9/28/2011	Active Calibration
2	AA 960008	LISN	EMCO	3816/2NM	9701-1057	1/4/2011	1/4/2012	Active Calibration
3	EE 960013	EMI Receiver	HP	8546A System	3617A00320;3448A	10/29/2010	10/29/2011	Active Calibration
4	EE 960014	EMI Receiver-filte	HP	85460A	3448A00296	10/29/2010	10/29/2011	Active Calibration

Project Engineer: Peter Felix Quality Assurance:

LS RESEARCH LLC
Wireless Product Development
Equipment Calibration

Date : 13-Jun-2011 Type Test : Conducted Radio Measurements Job # : C-1224

Prepared By: Peter Customer : Honeywell Quote #: 311182

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	AA 960144	Phaseflex	Gore	EKD01D010720	5800373	6/1/2011	6/1/2012	Active Calibration
2	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	9/22/2010	9/22/2011	Active Calibration

Project Engineer: Peter Felix Quality Assurance:

LS RESEARCH LLC
Wireless Product Development
Equipment Calibration

Date : 13-Jun-2011 Type Test : Radiated Emissions Job # : C-1224

Prepared By: Peter Customer : Honeywell Quote #: 311182

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960013	EMI Receiver	HP	8546A System	3617A00320;3448A	10/29/2010	10/29/2011	Active Calibration
2	EE 960014	EMI Receiver-filter section	HP	85460A	3448A00296	10/29/2010	10/29/2011	Active Calibration
3	AA 960078	Log Periodic Antenna	EMCO	93146	9701-4855	10/19/2010	10/19/2011	Active Calibration
4	AA 960150	Bicon Antenna	ETS	3110B	0003-3346	10/19/2010	10/19/2011	Active Calibration
5	AA 960007	Double Ridge Horn Antenna	EMCO	3115	9311-4138	4/27/2011	4/27/2012	Active Calibration
6	EE 960147	Pre-Amp	Adv. Micro	WLA612	123101	1/4/2011	1/4/2012	Active Calibration
7	EE 960146	Std. Gain Horn Ant. w/preamp	Adv. Micro	WLA622-4	123001	10/13/2010	10/13/2011	Active Calibration

Project Engineer: Peter Felix Quality Assurance:

APPENDIX B
TEST STANDARDS – CURRENT PUBLICATION DATES RADIO

STANDARD #	DATE	Am. 1	Am. 2
ANSI C63.4	2003		
ANSI C63.10	2009		
CISPR 11	2009-05	2009-12 P	
CISPR 12	2007-05		
CISPR 14-1	2005-11	2008-11	
CISPR 14-2	2001-11	2001-11	2008-05
CISPR 16-1-1 Note 1	2010-01		
CISPR 16-1-2 Note 1	2003	2004-04	2006-07
CISPR 22	2008-09		
CISPR 24	1997-09	2001-07	2002-10
EN 55011	2009		
EN 55014-1	2006		
EN 55014-2	1997		
EN 55022	2006	2007	
EN 60601-1-2	2007-03		
EN 61000-3-2	2006-05		
EN 61000-3-3	2008-12		
EN 61000-4-2	2009-05		
EN 61000-4-3	2006-07	2008-05	
EN 61000-4-4	2004		
EN 61000-4-5	2006-12		
EN 61000-4-6	2009-05		
EN 61000-4-8	1994	2001	
EN 61000-4-11	2004-10		
EN 61000-6-1	2007-02		
EN 61000-6-2	2005-12		
EN 61000-6-3	2007-02		
EN 61000-6-4	2007-02		
FCC 47 CFR, Parts 0-15, 18,	2009		
FCC Public Notice DA 00-1407	2000		
FCC ET Docket # 99-231	2002		
FCC Procedures	2007		
ICES 001	2006-06		
ICES 002	2009-08		
ICES 003	2004-02		
IEC 60601-1-2 Note 1	2007-03		
IEC 61000-3-2	2005-11	2008-03	2009-02
IEC 61000-3-3	2008-06		
IEC 61000-4-2	2008-12		
IEC 61000-4-3	2008-04	incl in 2008-04	2009-12 FD

STANDARD #	DATE	Am. 1	Am. 2
IEC 61000-4-4	2004-07	2010-10	
IEC 61000-4-5	2005-11		
IEC 61000-4-6	2008-10		
IEC 61000-4-8	2009-09		
IEC 61000-4-11	2004-03		
IEC 61000-6-1	2005-03		
IEC 61326-1	2006-06		
ISO 14982	1998-07		
MIL Std. 461E	1999-08		
RSS GEN	2007-06		
RSS 119	2007-06		
RSS 123	1999-11		
RSS 125	2000-03		
RSS 131	2003-07		
RSS 136	2002-10		
RSS 137	2009-02		
RSS 210	2007-06		
RSS 213	2005-12		
RSS 243	2010-02		
RSS 310	2007-06		

Note 1: Test not on LSR Scope of Accreditation.

APPENDIX C
Uncertainty Statement

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of k=2.

Table of Expanded Uncertainty Values, (K=2) for Specified Measurements

Measurement Type	Particular Configuration	Uncertainty Values
Radiated Emissions	3 – Meter chamber, Biconical Antenna	4.24 dB
Radiated Emissions	3-Meter Chamber, Log Periodic Antenna	4.8 dB
Radiated Emissions	10-Meter OATS, Biconical Antenna	4.18 dB
Radiated Emissions	10-Meter OATS, Log Periodic Antenna	3.92 dB
Conducted Emissions	Shielded Room/EMCO LISN	1.60 dB
Radiated Immunity	3 Volts/Meter in 3-Meter Chamber	1.128 Volts/Meter
Conducted Immunity	3 Volts level	1.0 V