LS RESEARCH, LLC
WIRELESS PRODUCT DEVELOPMENT
ACCREDITED
Testing Cert. 1255.01
W66 N220 Commerce Court ● Cedarburg, WI 53012
Phone: 262.375.4400 ● Fax: 262.375.4248
www.lsr.com

TEST REPORT # 310300
LSR Job #: C-1071

Compliance Testing of:

Wireless Adapter

Test Date(s):
December 15th, 16th, and 28th 2010
January 5th, and 6th 2011

Prepared For:
Honeywell.
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
Frequency Hopping Spread Spectrum (FHSS) Operating in the Frequency Band 902 MHz – 928 MHz

This Test Report is issued under the Authority of:
Thomas T. Smith, Manager EMC Test Services

Signature: Thomas T. Smith Date: 1/24/2011

Test Report Reviewed by:	Project Engineer:
Peter Feilen	Khairul Aidi Zainal
Signature: Peter Feilen Date: 1/17/11	Signature: Khairul Aidi Date: 1/17/2011

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EXHIBIT 1. INTRODUCTION

1.1 - Scope

References:	FCC Part 15, Subpart C, Section 15.247 and 15.209 RSS GEN and RSS 210 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	Year	Title
47 CFR, Parts 0-15 (FCC)	2009-10	Code of Federal Regulations - Telecommunications
RSS 210 Annex 8	2007 June	Low-power License-exempt Radio-communication Devices (All Frequency Bands): Category I Equipment
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.
CISPR 16-1-1	2006-03 A1: 2006-09 A2: 2007-07	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus.
FCC ET Docket No. 99-231	2002	Amendment to FCC Part 15 of the Commission's Rules Regarding Spread Spectrum Devices.

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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. Accreditation status can be verified at A2LA's web site: www.a2la2.net.

1.4 – Location of Testing

All testing was performed at the following location utilizing the facilities listed below, unless otherwise noted.

LS Research, LLC
W66 N220 Commerce Court
Cedarburg, Wisconsin, 53012 USA,

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, Golden Valley, MN 55422
Contact Name:	Dave Mulhouse

2.2 - Equipment Under Test (EUT) Information

The following information has been supplied by the applicant.

Product Name:	Wireless Adapter
Model Number:	THM4000R1007
Serial Number:	28261025000011 (Conducted measurements) 28261025000010 (Radiated measurements)

2.3 - Associated Antenna Description

There are two antennas (Antenna A and Antenna B) of the same type used in the product. Both antennas are PCB inverted L antennas. Signal is routed to the appropriate antenna via a switch.

2.4 - EUT'S Technical Specifications

EUT Frequency Range (in MHz)	903.0 MHz – 926.4 MHz
RF Power in Watts (Radiated measurement)	
Minimum:	0.0177 Watts
Maximum:	0.0378 Watts
Max Conducted Output Power (in dBm)	11.1 dBm (at 903MHz)
Field Strength at 3 meters	111.0 dBµV/m (at 926.4 MHz)
Occupied Bandwidth (99% BW)	62.9 kHz
Type of Modulation	FSK
Emission Designator	62K9F1D
EIRP	37.8 mW (15.8 dBm)
Transmitter Spurious (worst case) at 3 meters	46.8 dBµV/m (5487.6 MHz)
Stepped (Y/N)	N
Step Value:	N/A
Frequency Tolerance %, Hz, ppm	Better than 100 ppm
Microprocessor Model # (if applicable)	MSP430F5524
Antenna Information	
Detachable/non-detachable	Non-Detacheable
Type	PCB Trace Inverted L
Gain (Measured over a conducting ground plane)	4.7 dBi (Maximum)
EUT will be operated under FCC Rule Part(s)	Title 47 part 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: 0.07564 ☐ V/m ☐ A/m ☒ W/m^2
☐ Measured ☐ Computed ☒ Calculated

2.5 - Product Description

The Wireless adapter is used to add Redlink connectivity to compatible Honeywell products. In addition to this, some Honeywell Redlink products will connect to this device to allow more flexibility in antenna placement. When connected to existing Redlink product, the host device's radio is disabled and the radio within the Wireless Adapter takes over.

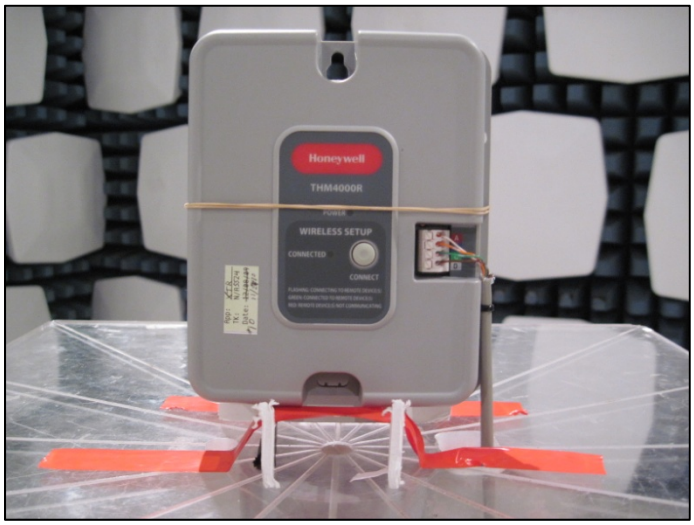


EXHIBIT 3. EUT OPERATING CONDITIONS & CONFIGURATIONS DURING TESTS

3.1 - Climate Test Conditions

Temperature:	71° F
Humidity:	35%
Pressure:	739 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	N/A
FCC : 15.247 (a)(1) IC : RSS 210 A8.1 (a)	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(d) IC : RSS 210 A8.5	RF Conducted Spurious Emissions at the Transmitter Antenna Terminal	YES
FCC:15.247 (a)(1)(i)(iii) IC: RSS 210 (b)	Carrier Frequency Separation	YES
FCC:15.247 (a)(1)(i),(ii),(iii) IC: RSS 210 (c),(d),(e)	Number of hopping channels	YES
FCC:15.247 (a)(1)(i),(ii),(iii) IC: RSS 210 (c),(d),(e)	Time of occupancy (Dwell Time)	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 Inocorporated In The EUT For Compliance Purposes

☒ None ☐ Yes (explain below)

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 7 (2007), Annex 8 (section 8.2).

Note: 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 C63.4-2003. 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 continuous transmit mode for final testing using power as provided by bench DC power supply. The unit has the capability to operate on 3 channels, controllable via a single button on the front/face of the EUT.

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 (903MHz), middle (914.6MHz) and high (926.4MHz) to comply with FCC Part 15.31(m). The channels and operating modes were changed via a single button on the front/face of the EUT.

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 10000 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 10 GHz. The maximum radiated RF emissions between 30MHz to 4 GHz were found by raising and lowering the sense antenna between 1 and 4 meters in height, using both horizontal and vertical antenna polarities. Between 4GHz to 10GHz, the sense antenna was raised and lowered between 1 and 1.8 meters in height.

The EUT was positioned in its intended orientation.

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. All calibrations of the antennas used were performed at a calibration laboratory accredited to ISO 17025, and are traceable to the SI standard. In addition, the Connecting Cables were measured for losses using a calibrated Signal Generator and an EMI Receiver. 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). From 4 GHz to 10 GHz, a Spectrum Analyzer and an EMCO Horn Antenna were used.

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 7 (2007), Annex 8 for an FHSS 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 and reported data.

Reported data:

For both fundamental and spurious emissions measurement, the data reported includes all necessary correction factors. These correction factors are loaded onto the EMI receiver when measurements are performed.

Reported Measurement data = Raw receiver measurement (dBµV/m) + Antenna correction Factor + Cable factor (dB) + Miscellaneous factors when applicable (dB) – amplification factor when applicable (dB).

Generic example of reported data at 200 MHz:

Reported Measurement data = 18.2 (raw receiver measurement) + 15.8 (antenna factor) + 1.45 (cable factor) = 35.45 (dBµV/m).

As specified in 15.247 (d) and RSS 210 A8.2 (b), radiated emissions that fall within the restricted band described in 15.205(c) for FCC and section 2.2, 2.6 and 2.7 of RSS 210 for IC, must comply with the general emissions limit.

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	-
960-24,000	500	54.0	63.5

Sample conversion of field strength (µV/m to dBµV/m):
dBµV/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 to 10,000 MHz
500µV/m or 54.0 dB/µV/m at 3 meters
54.0 + 9.5 = 63.5 dB/µV/m at 1 meter

5.6 - Radiated Emissions Test Data Chart

3 Meter Measurements of Electromagnetic Radiated Emissions
Frequency Range Inspected: 30 MHz to 10000 MHz

Manufacturer:	Honeywell						
Date(s) of Test:	December 28th 2010 and January 5th -6th 2011						
Project Engineer(s):	Khairul Aidi Zainal						
Test Engineer(s):	Khairul Aidi Zainal, Peter Feilen						
Voltage:	7.5 VDC						
Operation Mode:	continuous transmit, modulated						
Environmental Conditions in the Lab:	Temperature: 71˚F Relative Humidity: 35 %						
EUT Power:		Single Phase ___VAC		3 Phase ___VAC			
		Battery	X	Other: Bench DC supply			
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	X	Final	
Detectors Used:	X	Peak	X	Quasi-Peak	X	Average	

The following table depicts the level radiated Fundamental Emission:

FREQ (MHz)	ANT	EUT	HEIGHT (m)	AZIMUTH (°)	PEAK (dBµv/m)	Q.PEAK (dBµv/m)	AVERAGE (dBµv/m)	LIMIT (dBµv/m)	MARGIN (dB)	ANTENNA
903.00	H	V	1.39	346	108.6	108.4	108.1	125.2	16.8	A
914.60	H	V	1.40	9	108.4	108.3	107.9	125.2	17.0	A
926.40	H	V	1.37	0	107.8	107.7	107.2	125.2	17.5	A
926.40	V	V	1.04	95	111.1	111.0	110.5	125.2	14.2	B
903.00	V	V	1.11	103	110.9	110.8	110.3	125.2	14.4	B
914.60	V	V	1.08	102	110.8	110.8	110.3	125.2	14.4	B

Notes:

1. H: Horizontal, V: Vertical, S: Side, F:Flat
2. Refer to exhibit 5.5 on explanation of how data is reported.

RADIATED EMISSIONS DATA CHART (continued)

A. Antenna A

The following table depicts the level of significant radiated **harmonic** emissions of channel 903.0 MHz in the restricted band:

Antenna Polarization	Frequency (MHz)	Peak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Azimuth (°)	EUT Orientation
Vertical	5418.00	59.2	56.2	63.5	7.3	105.4	219	V
Vertical	9030.00	56.4	50.8	63.5	12.7	109.1	81	V

The following table depicts the level of significant radiated **harmonic** emissions of channel 914.6 MHz in the restricted band:

Antenna Polarization	Frequency (MHz)	Peak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Azimuth (°)	EUT Orientation
Vertical	9146.00	55.5	49.2	63.5	14.3	100.1	92	V

The following table depicts the level of significant radiated **harmonic** emissions of channel 926.4 MHz in the restricted band:

Antenna Polarization	Frequency (MHz)	Peak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Azimuth (°)	EUT Orientation
Horizontal	9264.00	54.3	47.6	63.5	15.9	113.2	199	V

Notes:

1. Measurements above 4 GHz were made at 1 meters of separation from the EUT. The limits were adjusted to reflect this measurement distance.
2. H: Horizontal, V: Vertical, S: Side, F:Flat
3. Refer to exhibit 5.5 on explanation of how data is reported.

B. Antenna B

The following table depicts the level of significant radiated **harmonic** emissions of channel 903.0 MHz in the restricted band:

Antenna Polarization	Frequency (MHz)	Peak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Azimuth (°)	EUT Orientation
Vertical	5418.00	60.2	57.2	63.5	6.3	102.4	211	V
Vertical	9030.00	56.7	51.7	63.5	11.8	101.3	165	V

The following table depicts the level of significant radiated **harmonic** emissions of channel 914.6 MHz in the restricted band:

Antenna Polarization	Frequency (MHz)	Peak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Azimuth (°)	EUT Orientation
Vertical	9146.00	53.8	46.3	63.5	17.2	104.8	162	V

The following table depicts the level of significant radiated **harmonic** emissions of channel 926.4 MHz in the restricted band:

Antenna Polarization	Frequency (MHz)	Peak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Azimuth (°)	EUT Orientation
Horizontal	9264.00	53.3	44.7	63.5	18.8	105.0	199	V

Notes:

1. Measurements above 4 GHz were made at 1 meters of separation from the EUT. The limits were adjusted to reflect this measurement distance.
2. H: Horizontal, V: Vertical, S: Side, F:Flat
3. Refer to exhibit 5.5 on explanation of how data is reported.

RADIATED EMISSIONS DATA CHART (continued)

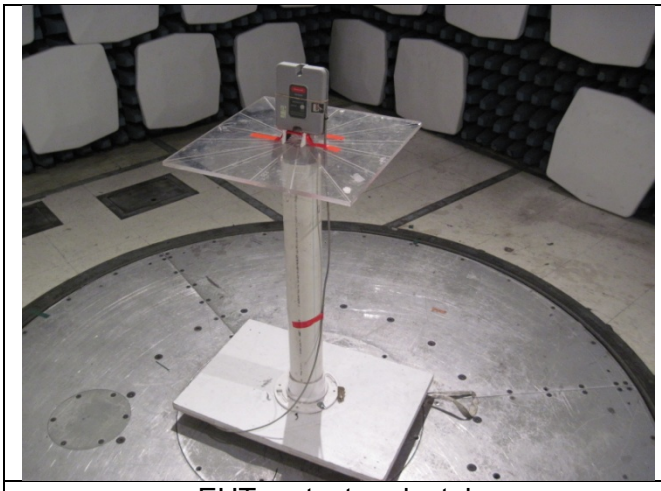
The following table depicts the level of significant radiated emissions **other** than fundamentals and its harmonics:

FREQ (MHz)	ANT	EUT	HEIGHT (m)	AZIMUTH (°)	PEAK (dBµv/m)	Q.PEAK (dBµv/m)	AVERAGE (dBµv/m)	LIMIT (dBµv/m)	MARGIN (dB)	EUT ANT
286.19	H	V	1.00	0	28.9	22.9	16.4	46.0	23.1	B
30.66	V	V	1.00	0	39.1	36.3	27.1	40.0	3.7	B
298.48	H	V	1.00	0	31.5	24.6	18.1	46.0	21.4	A
30.66	V	V	1.00	0	39.3	36.1	26.3	40.0	3.9	A

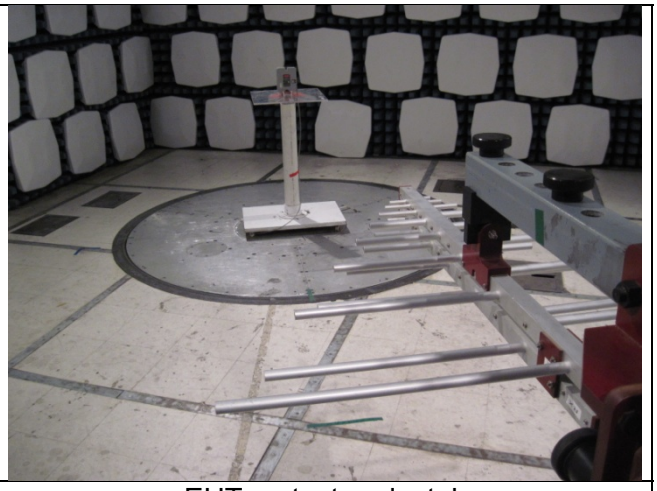
Notes:

1. Measurements below 4 GHz were made at a separation distance of 3 meters.
2. H: Horizontal, V: Vertical, S: Side, F:Flat
3. Refer to exhibit 5.5 on explanation of how data is reported.
4. Emissions listed in the table are independent of channel.

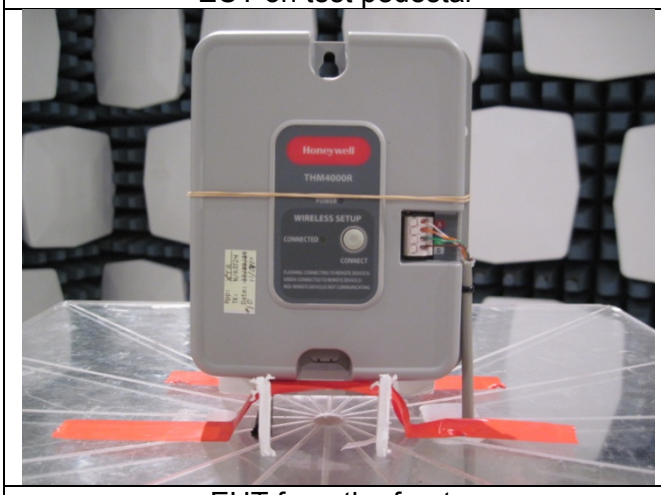
5.7 - Test Setup Photo(s) – Radiated Emissions Test



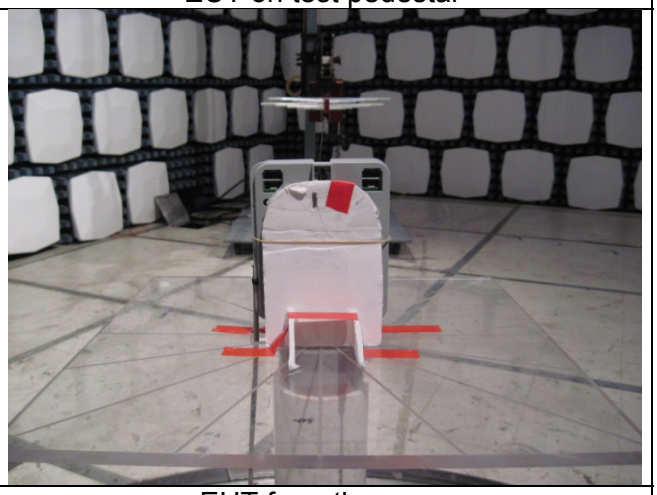
EUT on test pedestal



EUT on test pedestal



EUT from the front.

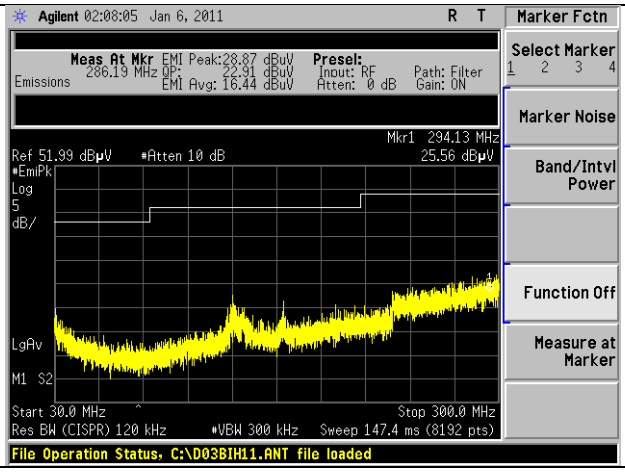


EUT from the rear.

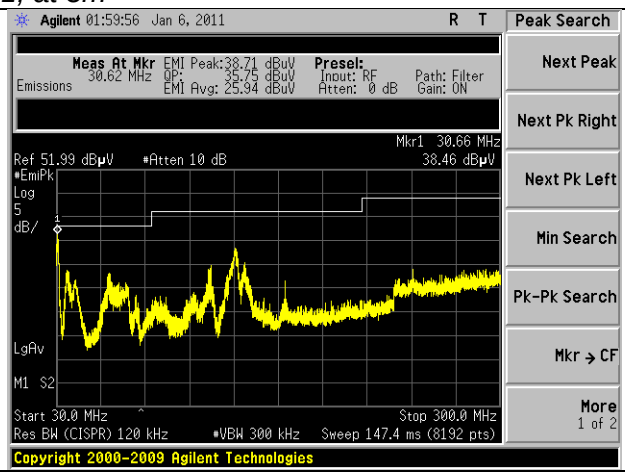
5.8 - Screen Captures - Radiated Emissions Test

These screen captures represent Peak Emissions. The signature scans shown here are representative of the worst case emissions.

30-300 MHz, at 3m

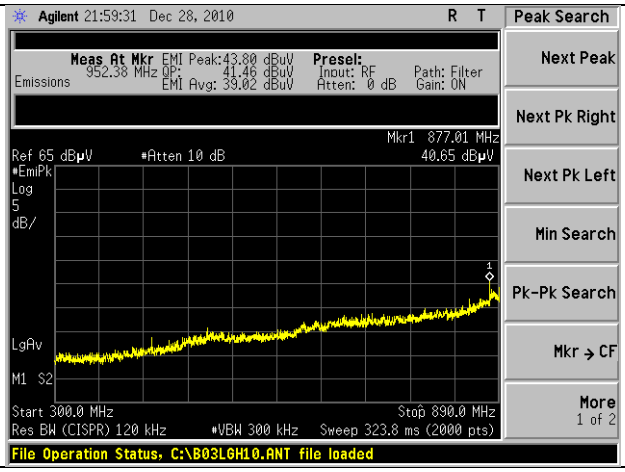


Horizontal

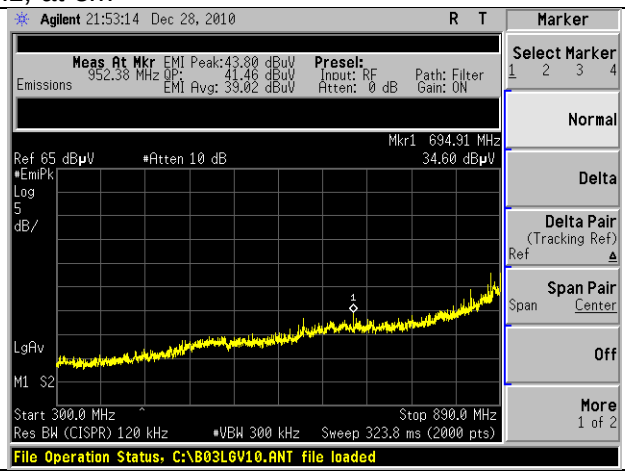


Vertical

300-890 MHz, at 3m



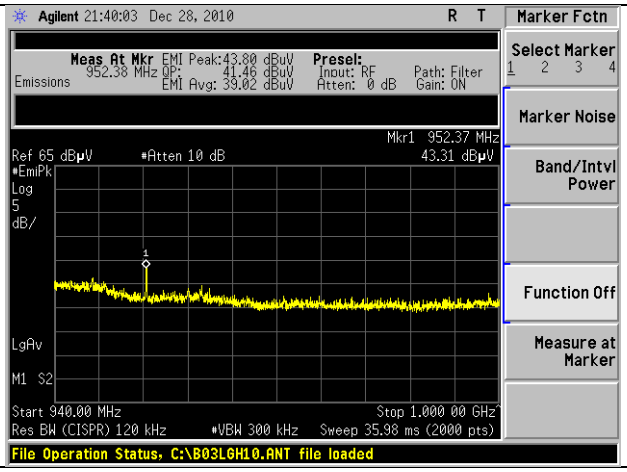
Horizontal



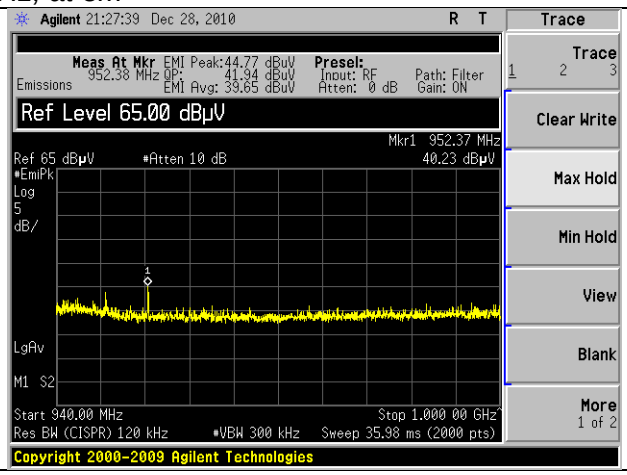
Vertical

Screen Captures - Radiated Emissions Testing *(continued)*

940-1000 MHz, at 3m

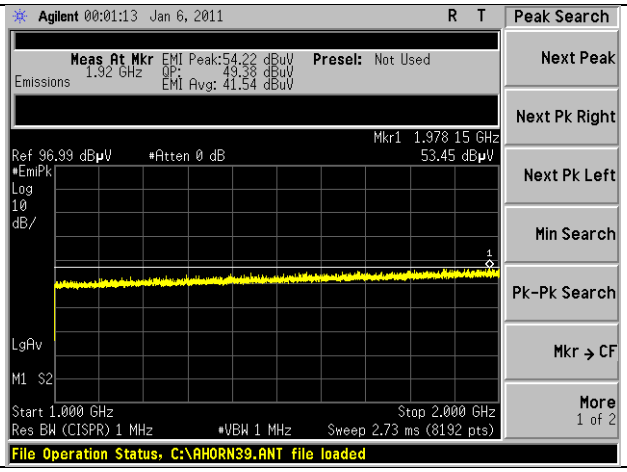


Horizontal

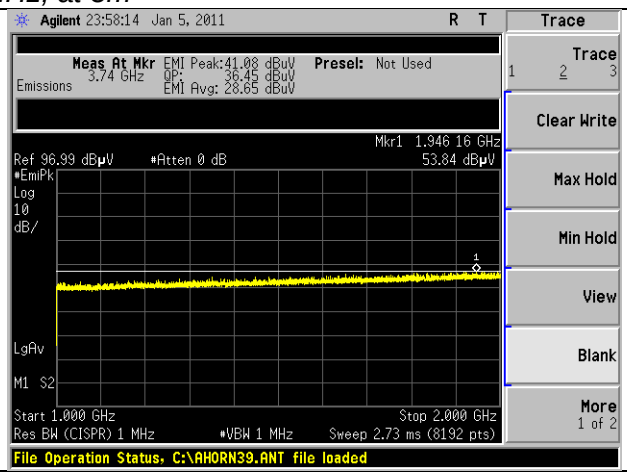


Vertical

1000-2000 MHz, at 3m



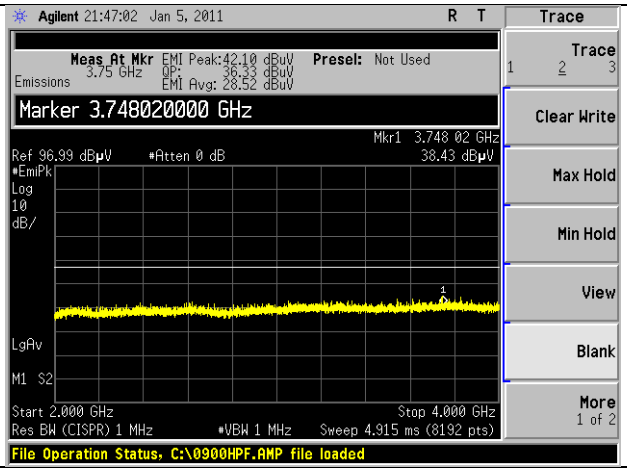
Horizontal



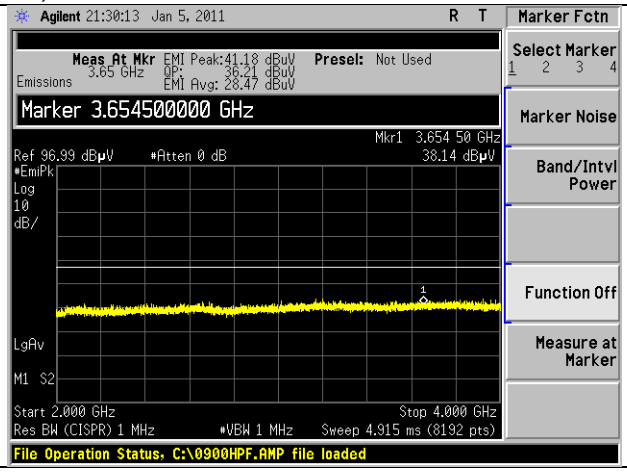
Vertical

Note: The scan for the ranges of 890 – 903 MHz and 926 - 940 MHz are in Exhibit 8 (Band-edges)

2000-4000 MHz, at 3m



Horizontal



Vertical

4000-10000 MHz, at 1m

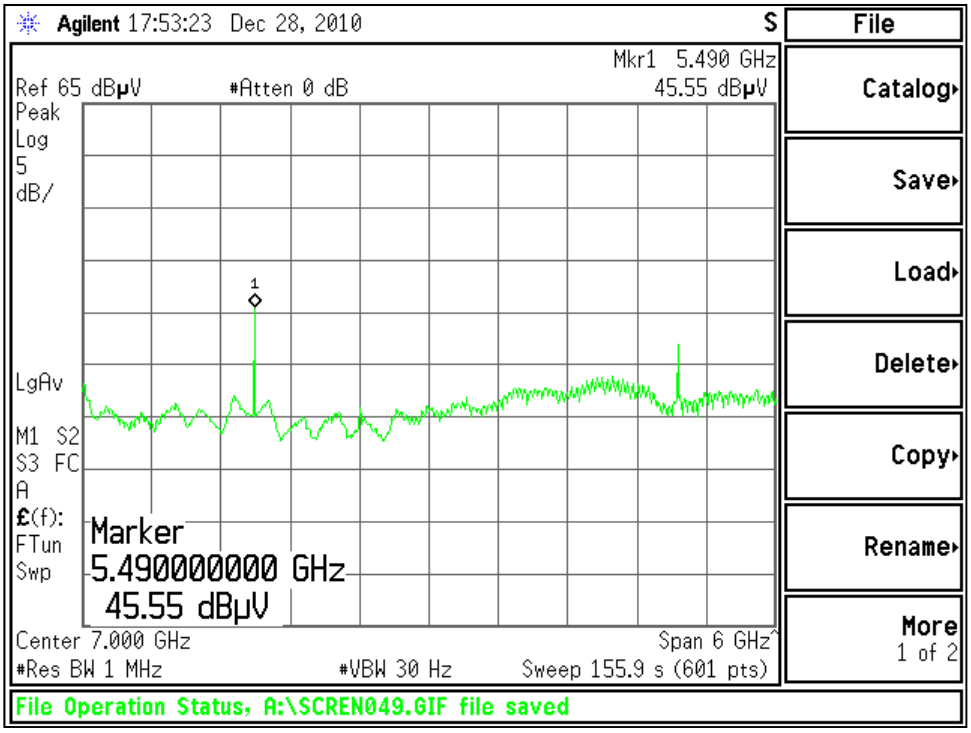


EXHIBIT 6. CONDUCTED EMISSIONS TEST, AC POWER LINE

This test was not performed since the EUT will never be connected to the AC Mains.

EXHIBIT 7. OCCUPIED BANDWIDTH

7.1 - Limits

For an FHSS system operating in the 902 to 928 MHz band, the maximum allowable 20dB bandwidth is 500 kHz.

7.2 - Method of Measurements

Industry Canada (IC RSS GEN 4.6.1) requires the measurement of the 99% bandwidth while CFR 47 part 15.247 requires the measurement of the 20dB 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 a spectrum analyzer. An attenuator was placed in series with the cable to protect the spectrum analyzer. The loss from the cable and the attenuator were added on the analyzer as gain offset settings there by allowing direct measurements, without the need for any further corrections. The EUT was configured to run in a continuous transmit mode, while being supplied with typical data as a modulation source. A bandwidth measurement function that is built into the spectrum analyzer was used to measure the appropriate bandwidths.

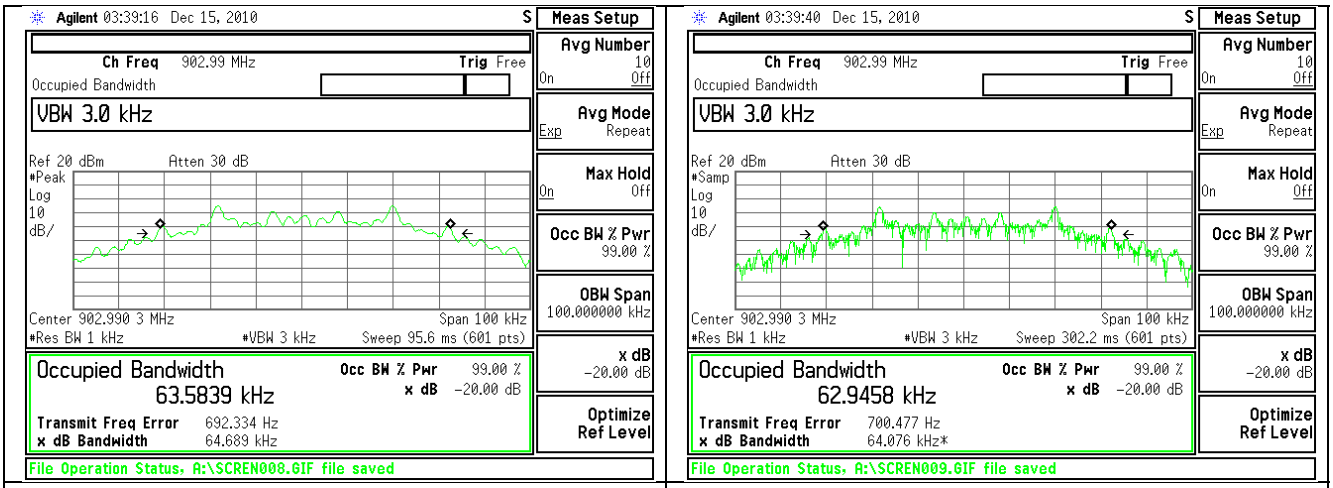
7.3 - Test Data

Channel (MHz)	20dB (kHz)	99% (kHz)
903.0	64.7	62.9
914.6	64.7	62.9
926.4	64.7	62.9

The closest bandwidth to the 20dB limit of 500 kHz is 64.7 kHz which is 435.3 kHz below the limit.

7.4 - Screen Captures - Occupied Bandwidth

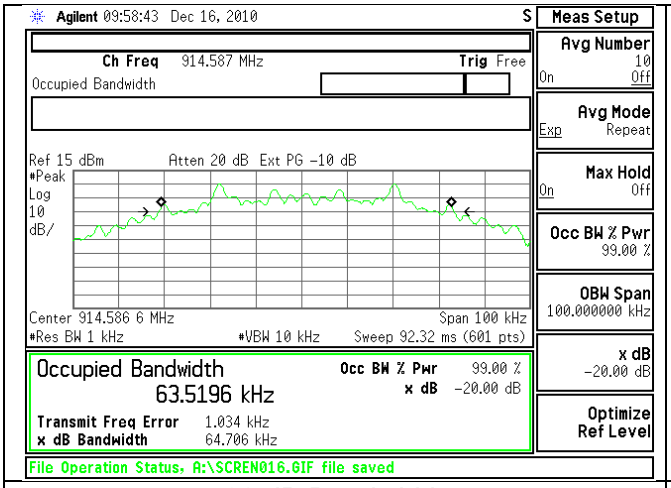
A. Low channel



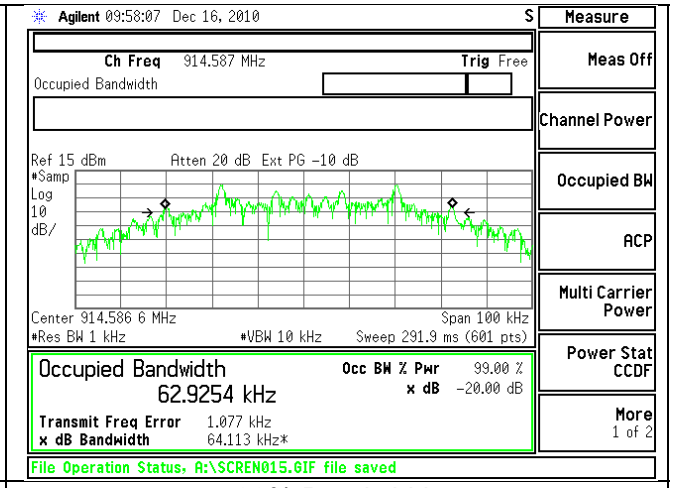
20 dB Bandwidth	99% Bandwidth

Note: In measuring the 20dB bandwidth, the measurement setup was set to maximum hold.

B. Mid channel

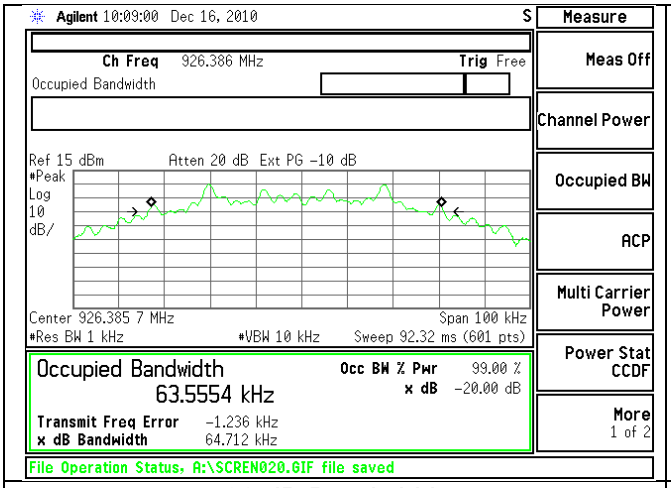


20 dB Bandwidth

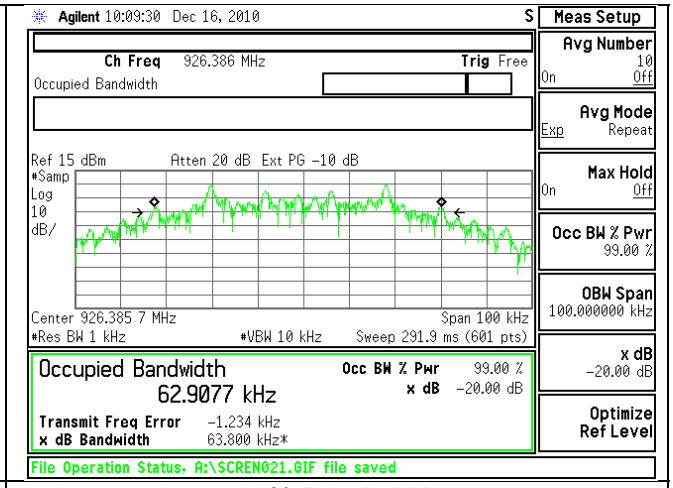


99% Bandwidth

C. High channel



20 dB Bandwidth



99% Bandwidth

Note: In measuring the 20dB bandwidth, the measurement setup was set to maximum hold.

EXHIBIT 8. BAND EDGE MEASUREMENTS

8.1 - 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 902 - 928 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.

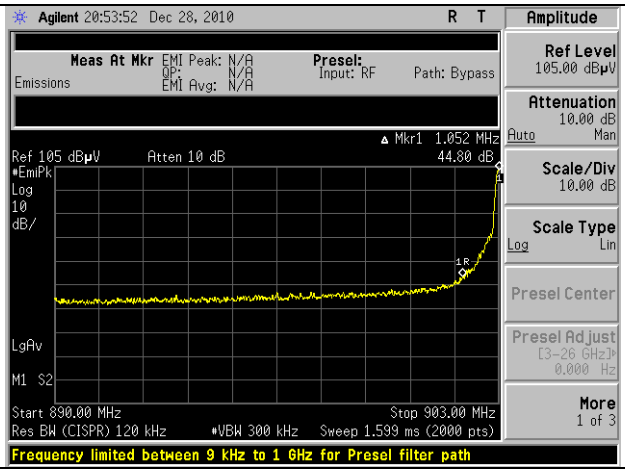
The Band-edge measurements were performed both radiated and conducted. The radiated measurement was performed to satisfy FCC 15.209 and15.205 while the conducted measurement of band-edge was performed to satisfy FCC 15.247(d).

All radiated measurements were performed using receiver bandwidth specifications as outlined in ANSI 63.4. Conducted measurements of the spurious emission were performed with a measurement bandwidth of 100kHz.

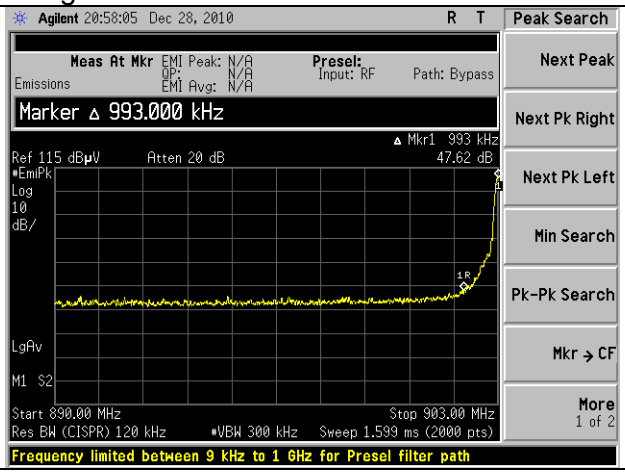
8.2. Band edge captures.

8.2.1 Radiated band edge.

Lower band edge



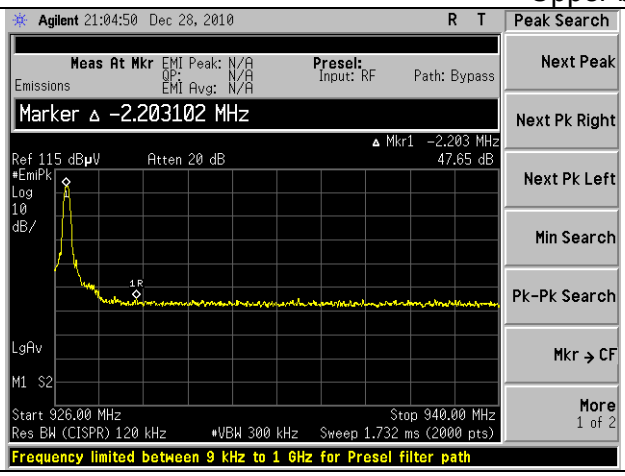
Antenna A



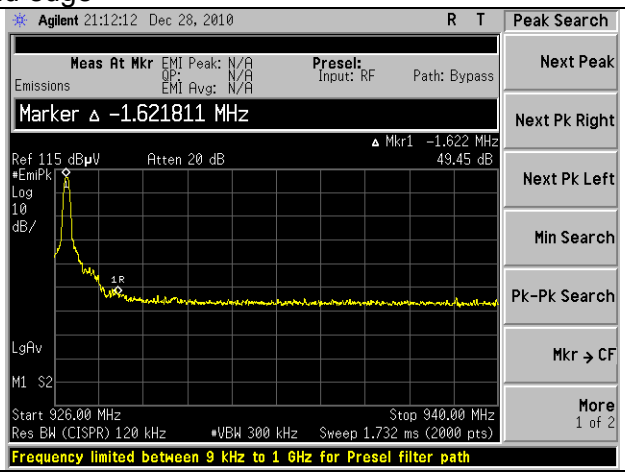
Antenna B

The limit at this band-edge is 20 dB below the fundamental.

Upper band edge



Antenna A

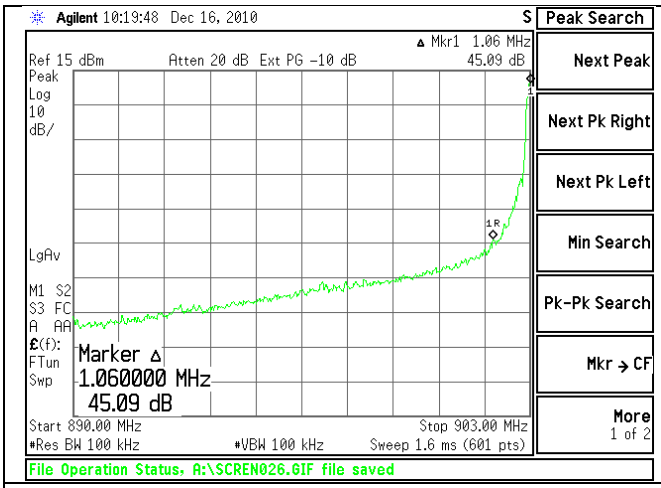


Antenna B

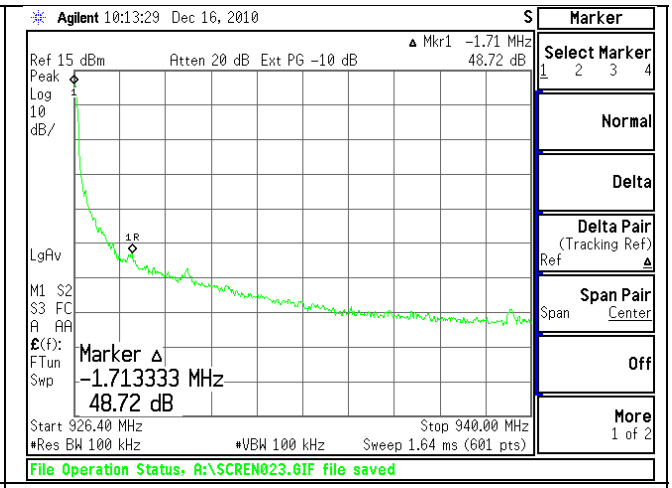
The limit at this band-edge is 20 dB below the fundamental.

8.2.2 Conducted band edge.

A. Continuously transmitting and modulated.

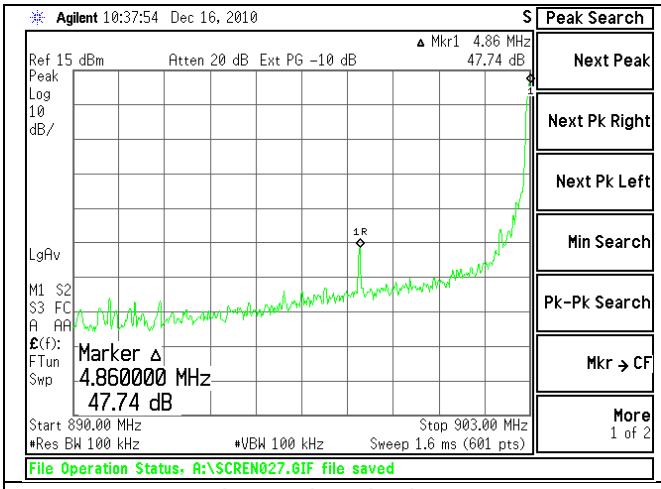


Lower band edge

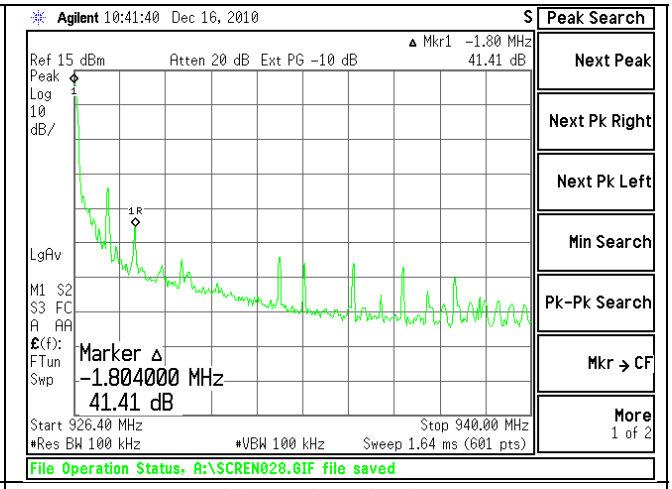


Upper band edge

B. **Hopping mode.**



Lower band edge



Upper band edge

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

9.1 - Method of Measurements

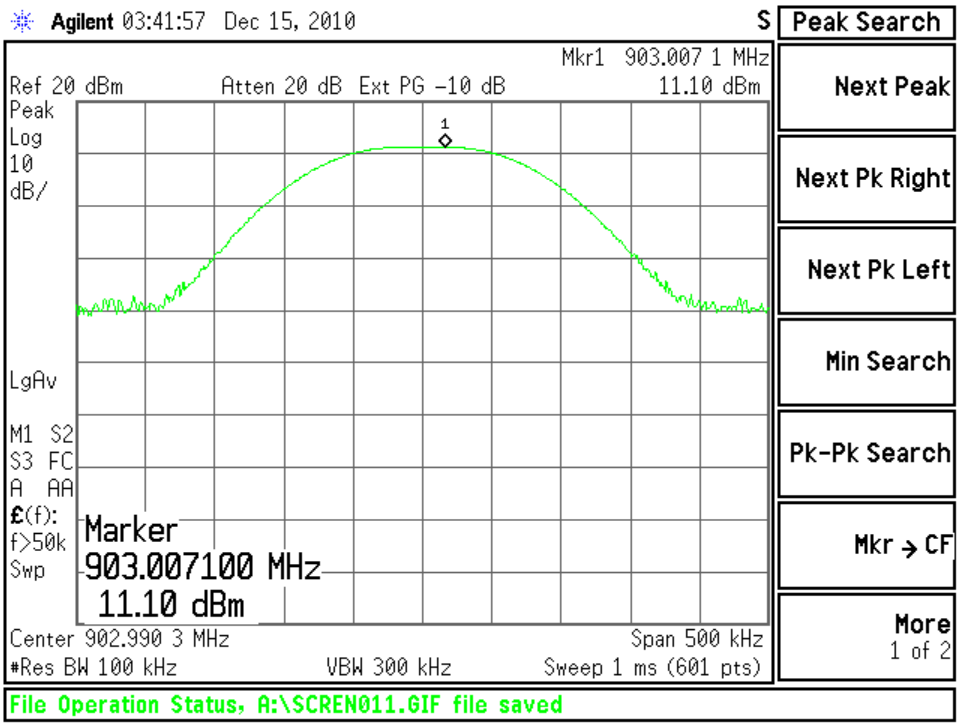
The conducted RF output power of the EUT was measured at the antenna port using a short RF cable along with an attenuator as protection for the spectrum analyzer. The loss from the cable and the attenuator were added on the analyzer as gain offset settings there by allowing direct measurements without the need for any further corrections. The unit was configured to run in a continuous transmit mode, while being supplied with typical data as a modulation source. The spectrum analyzer was used with the appropriate resolution bandwidth, with measurements from a peak detector presented in the chart below.

9.2 - Test Data

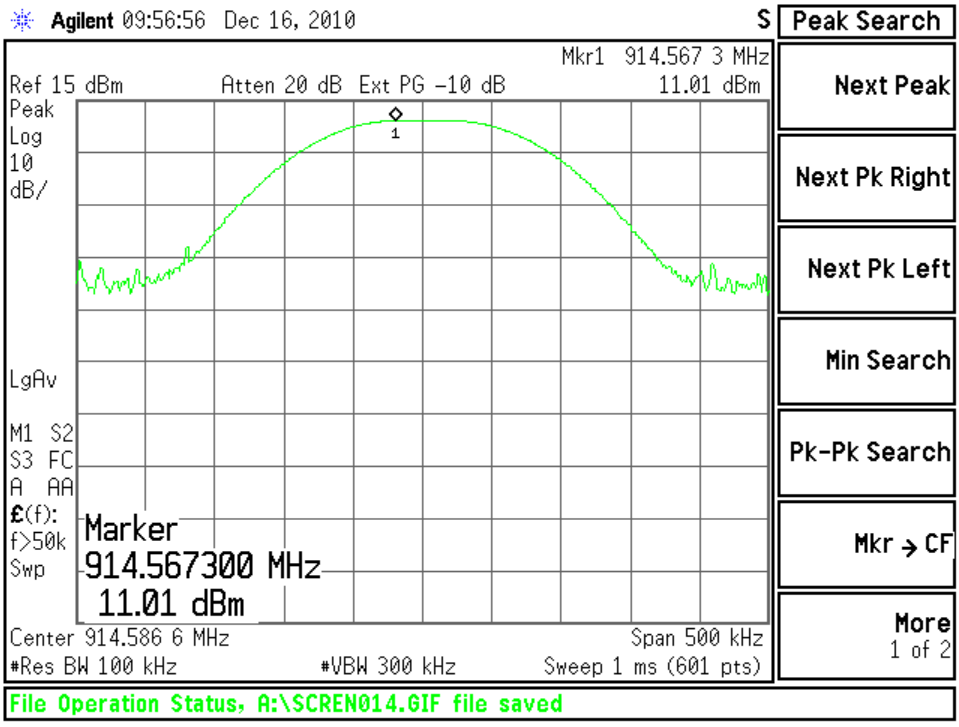
Channel (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
903.0	11.1	30.0	18.9
914.6	11.0	30.0	19.0
926.4	10.9	30.0	19.1

9.4 - Screen Captures – Power Output (Conducted)

A. Low channel



B. Middle channel



C. High channel

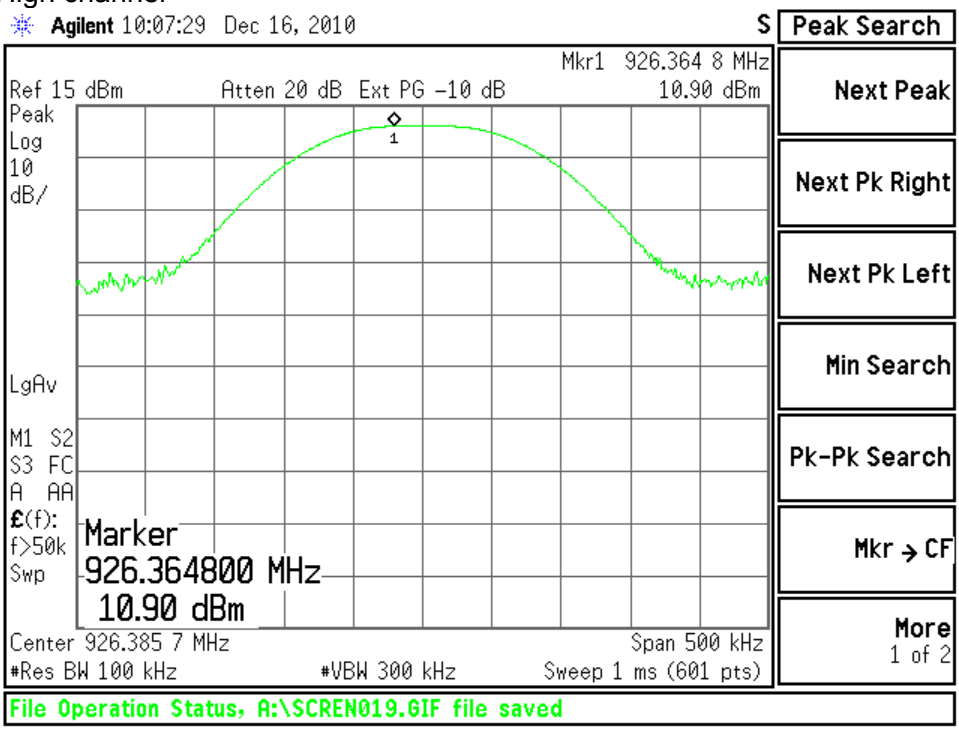


EXHIBIT 10. CONDUCTED SPURIOUS EMISSIONS: 15.247(d)

10.1 - 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.

10.2 – Conducted Harmonic And Spurious RF Measurements

FCC Part 15.247(d) and IC RSS 210 A8.5 both require 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 along with an attenuator as protection for the spectrum analyzer. The loss from the cable and the attenuator were added on the analyzer as gain offset settings, thereby allowing direct readings of the measurements made without the need for any further corrections. A 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.

10.3 - Test Data

	Channel low	Channel middle	Channel high
Fundamental	11.1	11.0	10.9
2nd Harmonic	-44.5	-44.3	-45.7
3rd Harmonic	Note 2	-66.2	Note 2
4th Harmonic	Note 2	Note 2	Note 2
5th Harmonic	Note 2	Note 2	Note 2
6th Harmonic	Note 2	Note 2	Note 2
7th Harmonic	-52.4	-50.9	-46.5
8th Harmonic	-48.6	-50.2	-49.6
9th Harmonic	Note 2	Note 2	Note 2
10th Harmonic	-52.5	-53.5	-54.9

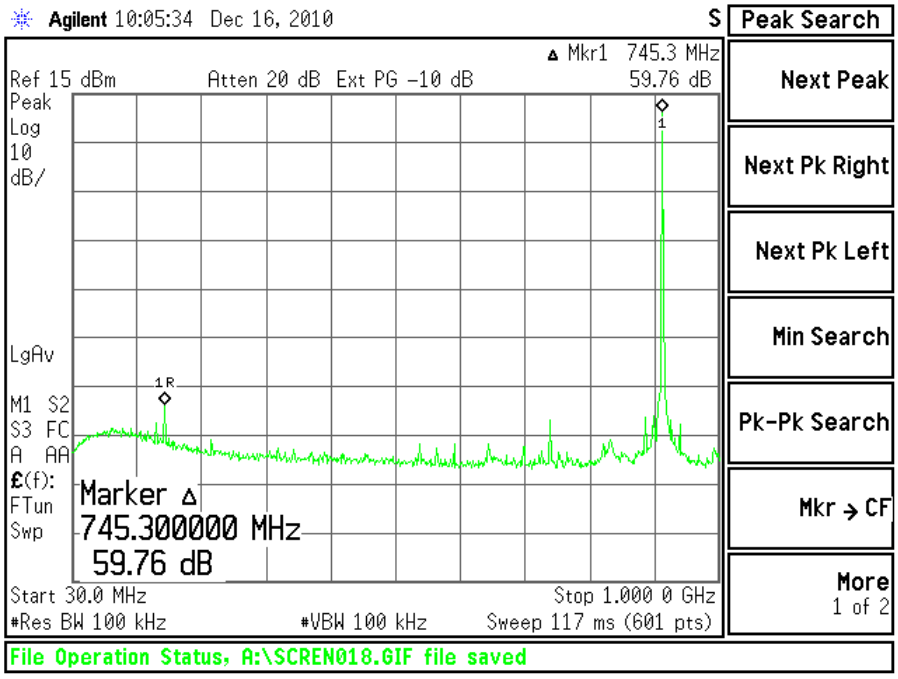
Note:
1. **All reported data are in dBm**.
2. **Spurious emission buried within system noise floor**.

The table below lists other notable spurious emissions other than the harmonics.

Freq(MHz)	Chan	level(dBm)
169.00	MID	-48.6
169.00	HIGH	-50.1

10.4 – Screen Captures – Spurious Radiated Emissions

30 MHz to 1000 MHz



1000 MHZ to 10000 MHz

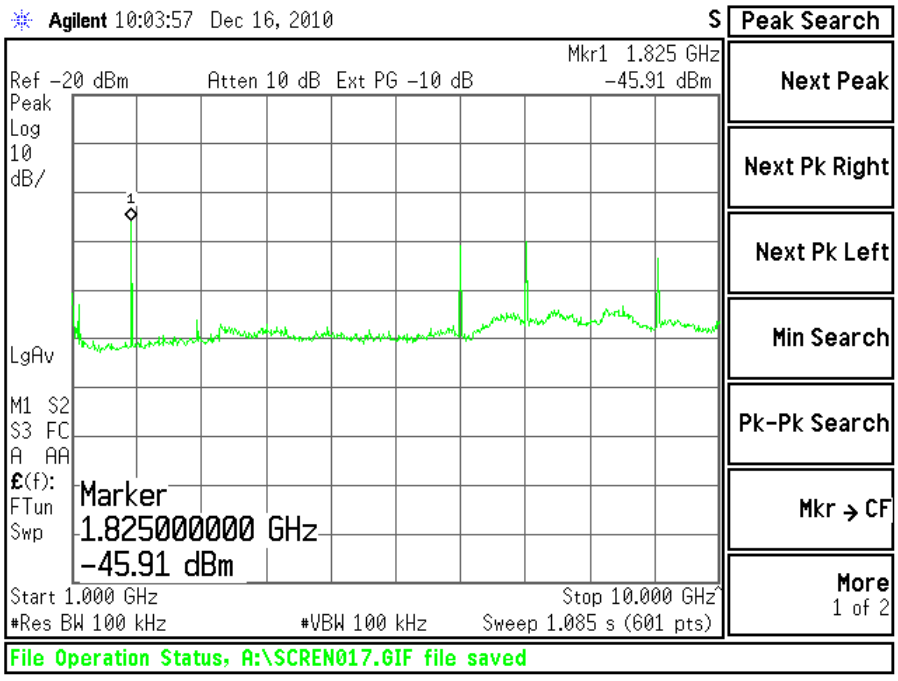


EXHIBIT 11. FREQUENCY & POWER STABILITY OVER VOLTAGE VARIATIONS

The power and frequency 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 power and frequency at the appropriate frequency markers. Power was supplied by an external bench-type DC power supply and was varied ±15% from the nominal.

6.4		7.5		8.6	
Power (dBm)	Frequency (Hz)	Power (dBm)	Frequency	Power (dBm)	Frequency
11.0	902999070	11.1	902999500	11.1	902999670
11.0	914596370	11.0	914596870	11.0	914596870
10.8	926394080	10.9	926394490	10.8	926394410

The table below shows the frequency drift on each channel:

Channel	maximum (Hz)	minimum (Hz)	freq drift (Hz)
LOW	902999670	902999070	**600**
MIDDLE	914596870	914596370	**500**
HIGH	926394490	926394080	**410**

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

EXHIBIT 12. CHANNEL PLAN AND SEPARATION

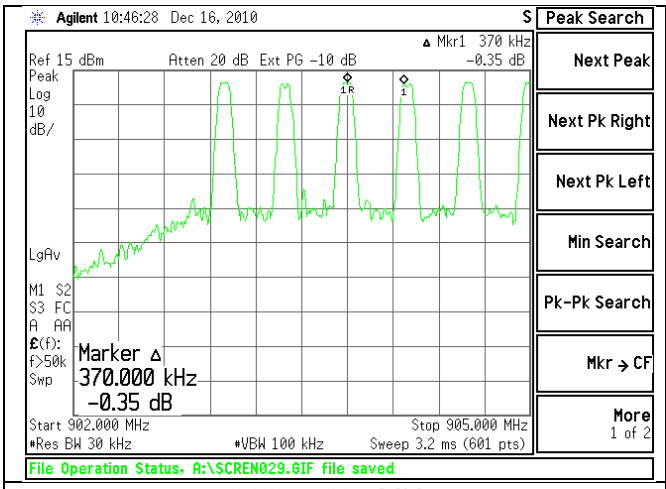
A spectrum analyzer was used with a resolution bandwidth of 100 kHz and 30kHz (when appropriate) to measure the channel separation of the EUT.

The minimum and maximum channel-separations measured for this device are 600 kHz and 320 kHz respectively. The maximum 20dB bandwidth of the device, as reported in the previous section is 64.7kHz. The following plots describe this spacing, and also establish the channel separation and plan.

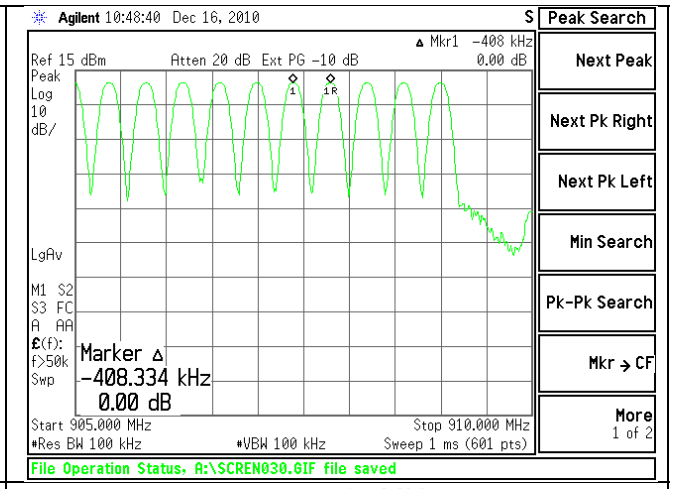
This EUT also satisfies the minimum number of hopping channels which is 50.

RANGE (MHz)	# OF CHANS
902-905	5.5
905-910	10.5
910-915	10.0
915-920	11.5
920-925	8.5
925-930	4.0

12.1 - Screen Captures – Channel Separation

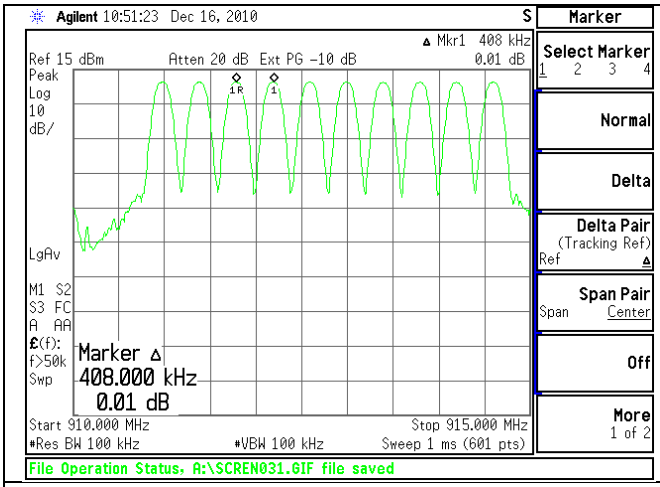


902 to 905 MHz

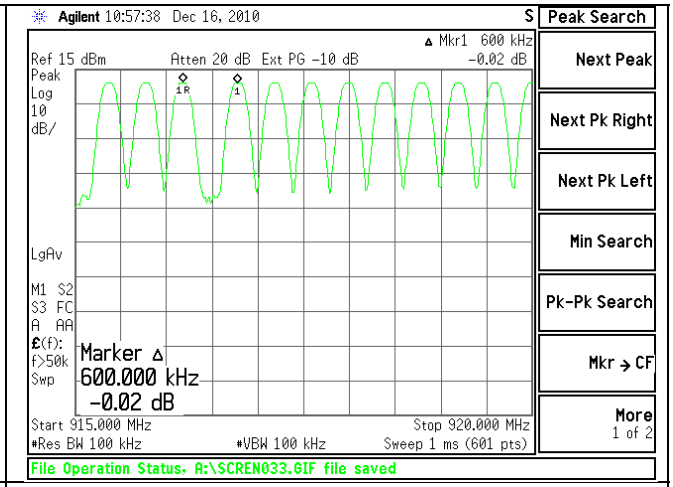


905 to 910 MHz

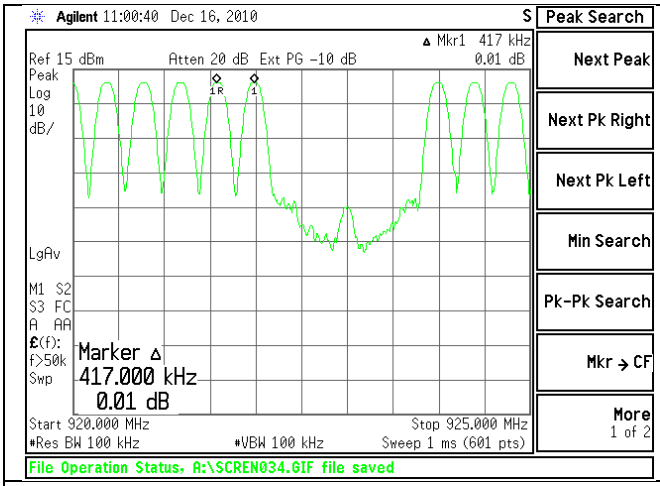
Screen Captures – Channel Separation *(continued)*



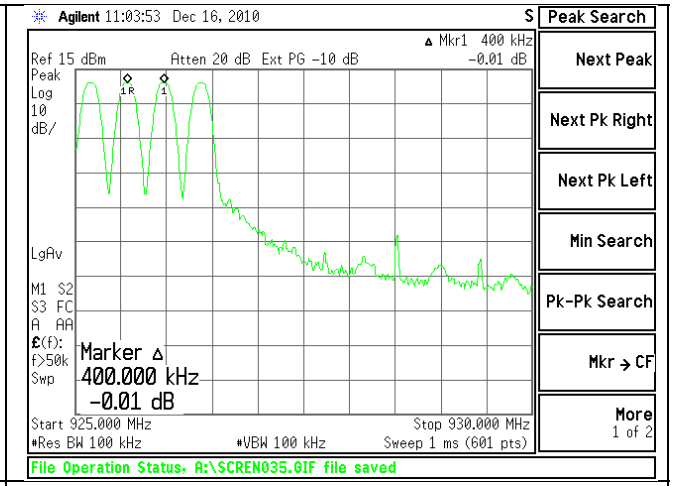
910 to 915 MHz



915 to 920 MHz



920 to 925 MHz



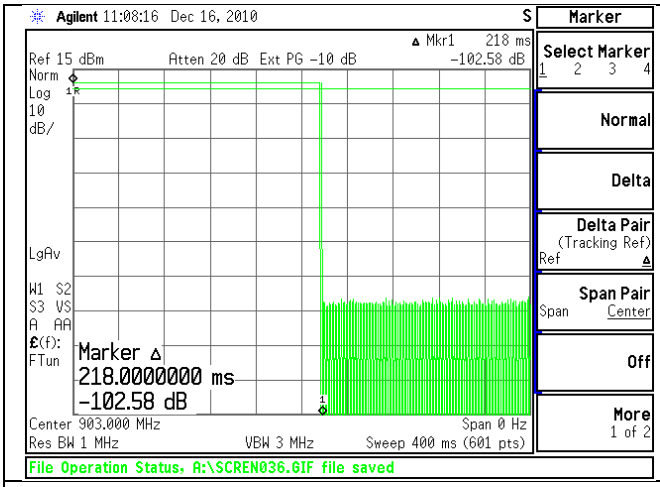
925 to 928 MHz

EXHIBIT 13. CHANNEL OCCUPANCY.

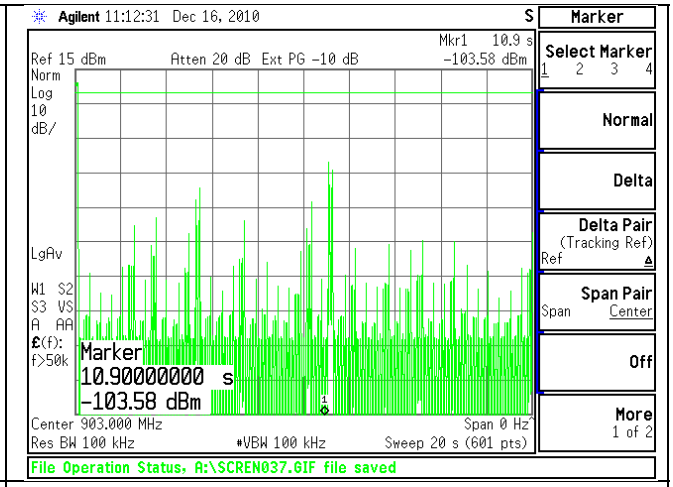
Part 15.247(a)(1)(iii) requires an average channel occupancy, for this device, of no more than 400 milliseconds in a 20second window .The channel occupancy for this EUT was measured using a spectrum analyzer, set to zero-span at the frequency of interest. With the analyzer in peak-hold mode, the transmission lengths can be measured by adjusting the sweep rate of the analyzer. A suitable sweep rate was used to measure the channel occupancy at the low, mid and high channels. The longest time any transmission will occur on a single channel is **218 ms**. The maximum occupancy in a **20** second window is **1** (one) transmission cycle which translates to **218 ms**.

13.1 Time occupancy captures.

Channel 903 MHz

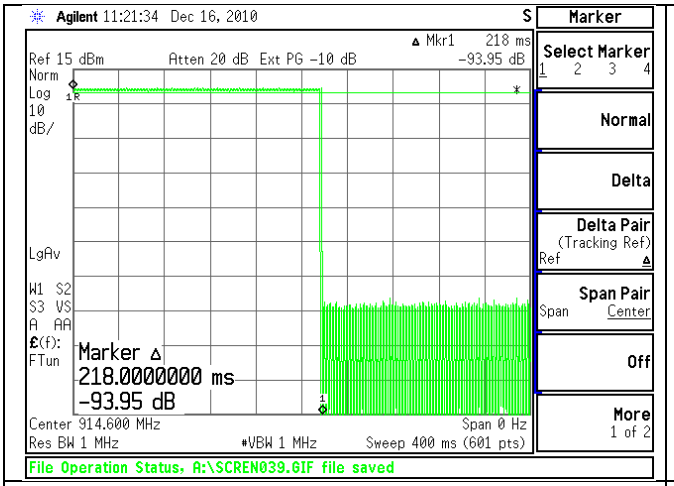


Single transmission

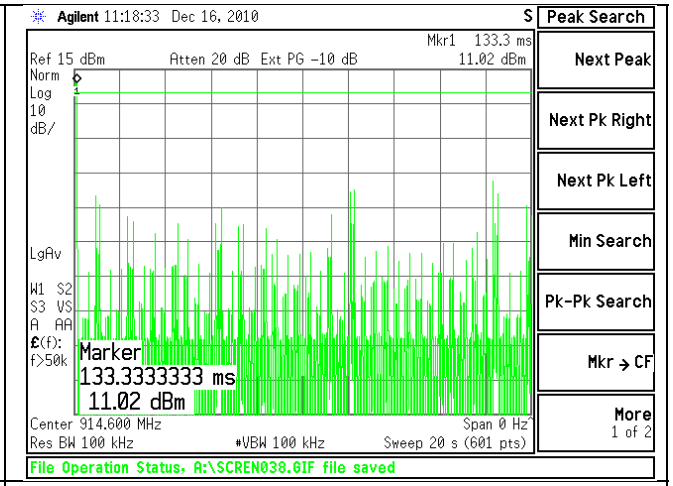


Maximum Occupancy in 20s

Channel 914.6 MHz

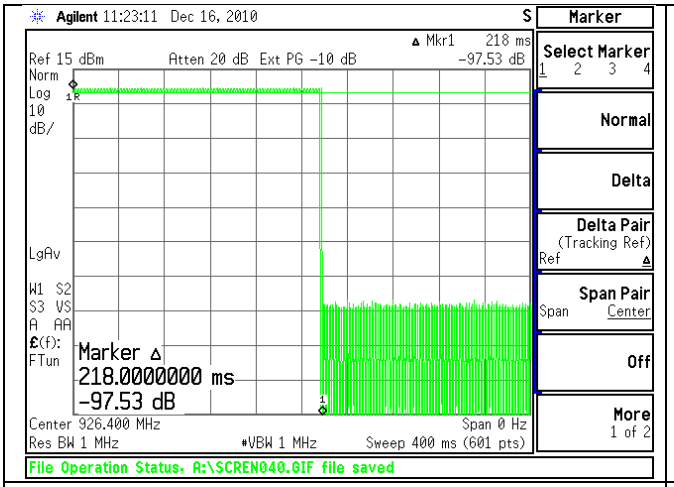


Single transmission

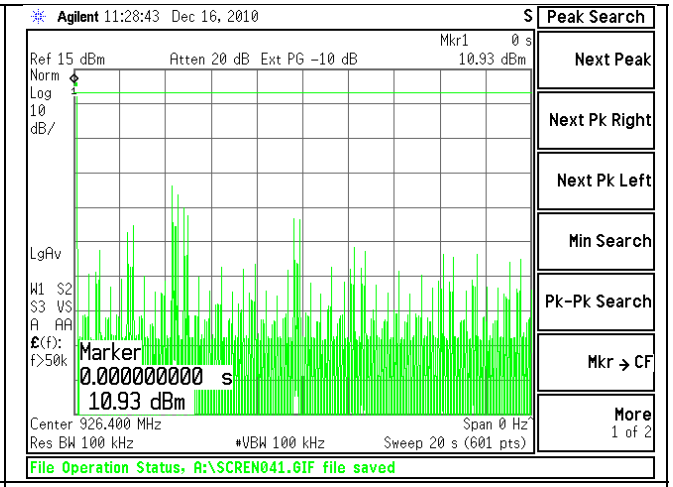


Maximum Occupancy in 100ms

Channel 926.4 MHz



Single transmission



Maximum Occupancy in 100ms

EXHIBIT 14. EQUAL CHANNEL USAGE

Note: This section is provided by the manufacturer.

Table 2 (typical hop sequence)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Transmission #
6	31	33	8	48	23	26	1	17	42	38	13	19	44	35	10	Channel used
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Transmission #
9	34	37	12	0	25	3	28	16	41	24	49	18	43	45	20	Channel used
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	Transmission #
21	46	30	5	7	32	47	22	29	4	40	15	14	39	27	2	Channel used
48	49	50														Transmission #
11	36	repeat														Channel used

This sample hop sequence shows equal usage of all channels

Each EUT has its own pseudorandom frequency sequence use for the transmitting channel. The transmit sequences are derived from a 15 bit seed value chosen randomly and automatically at the time the system is commissioned with client devices. The characteristics of the pseudorandom frequency sequence are:

- Each possible random seed value results in a unique pseudorandom frequency sequence.
- Each of the 50 frequencies occurs in the sequence once and only once before the sequence repeats.
- There are no circumstances or special conditions that skip frequencies in the sequence.

Once chosen, the sequence does not change unless re-commissioned.

EXHIBIT 15. PSEUDORANDOM HOPPING SEQUENCE.

Note: This section is provided by the manufacturer.

Table 2 (typical hop sequence)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Transmission #
6	31	33	8	48	23	26	1	17	42	38	13	19	44	35	10	Channel used
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Transmission #
9	34	37	12	0	25	3	28	16	41	24	49	18	43	45	20	Channel used
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	Transmission #
21	46	30	5	7	32	47	22	29	4	40	15	14	39	27	2	Channel used
48	49	50														Transmission #
11	36	repeat														Channel used

This sample hop sequence shows usage of all channels and randomness of channel selections.

Each EUT has its own pseudorandom frequency sequence use for the transmitting channel. The transmit sequences are derived from a 15 bit seed value chosen randomly and automatically at the time the system is commissioned with client devices. The characteristics of the pseudorandom frequency sequence are:

- Each possible random seed value results in a unique pseudorandom frequency sequence.
- Each of the 50 frequencies occurs in the sequence once and only once before the sequence repeats.
- There are no circumstances or special conditions that skip frequencies in the sequence.

Once chosen, the sequence does not change unless re-commissioned.

EXHIBIT 16. RECEIVER SYNCHRONIZATION AND INPUT BANDWIDTH.

Note: This section is provided by the manufacturer.

At the core of the radio block is an integrated transceiver, CC1101 manufactured by Texas Instruments. The CC1101 is configured by the RF protocol microcontroller to operate at frequencies as determined by a frequency sequencing algorithm. The bandwidth, transmit power, and modulation rate and type are set identically for all of the 50 frequencies utilized by this system.
The protocol microcontroller provides the commissioned network with a synchronization signal periodically.

EXHIBIT 17. MPE CALCULATIONS

The following MPE calculations are based on a measured ERP of 111.1 dBµV/m at 3m and conducted RF power of +11.1 dBm as presented to the antenna. The calculated gain of this antenna, based on the ERP measurements (over a conducting ground plane) is 4.7 dBi.

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density
P = power input to the antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	11.10	(dBm)
Maximum peak output power at antenna input terminal:	12.882	(mW)
Antenna gain(typical):	4.7	(dBi)
Maximum antenna gain:	2.951	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	900	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	0.6	(mW/cm^2)
Power density at prediction frequency:	0.007564	(mW/cm^2)
Maximum allowable antenna gain:	23.7	(dBi)
Margin of Compliance at 20 cm =	19.0	dB

APPENDIX A – Test Equipment List

LS RESEARCH LLC
Wireless Product Development
Equipment Calibration

Date : 16-Dec-2010 Type Test : Conducted measurements Job # : C-1071

Prepared By: Aidi Customer : Honeywell Quote #: 310300

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	AA 960144	Phaseflex	Gore	EKD01D010720	5800373	6/4/2010	6/4/2011	Active Calibration
2	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	9/22/2010	9/22/2011	Active Calibration

Project Engineer: AIDI Quality Assurance: MIKE HINTZKE

LS RESEARCH LLC
Wireless Product Development
Equipment Calibration

Date : 16-Dec-2010 Type Test : Radiated Emissions (109) Job # : C-1071

Prepared By: AIDI Customer : Honeywell Quote #: 310300

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	9/22/2010	9/22/2011	Active Calibration
2	AA 960144	Phaseflex	Gore	EKD01D010720	5800373	6/4/2010	6/4/2011	Active Calibration
3	AA 960156	900MHz High Pass Filter	KWM	HPF-L-14185	unknown	6/4/2010	6/4/2011	Active Calibration
4	AA 960081	Double Ridge Horn Antenna	EMCO	3115	6707	12/8/2010	12/8/2011	Active Calibration
5	EE 960147	Pre-Amp	Adv. Micro	WLA612	123101	12/8/2010	12/8/2011	Active Calibration
6	AA 960158	Double Ridge Horn Antenna	EMCO	3117	109300	8/19/2010	8/19/2011	Active Calibration
7	AA 960078	Log Periodic Antenna	EMCO	93146	9701-4855	10/19/2010	10/19/2011	Active Calibration
8	AA 960150	Bicon Antenna	ETS	3110B	0003-3346	10/19/2010	10/19/2011	Active Calibration
9	EE 960159	0.8 - 21GHz LNA	Mini-Circuits	ZVA-213X-S+	740411007	8/19/2010	8/19/2011	Active Calibration
10	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	9/22/2010	9/22/2011	Active Calibration

Project Engineer: AIDI Quality Assurance: MIKE HINTZKE

LS RESEARCH LLC
Wireless Product Development
Equipment Calibration

Date : 16-Dec-2010 Type Test : Radiated Emissions (209) Job # : C-1071

Prepared By: AIDI Customer : Honeywell Quote #: 310300

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	9/22/2010	9/22/2011	Active Calibration
2	AA 960144	Phaseflex	Gore	EKD01D010720	5800373	6/4/2010	6/4/2011	Active Calibration
3	AA 960156	900MHz High Pass Filter	KWM	HPF-L-14185	unknown	6/4/2010	6/4/2011	Active Calibration
4	AA 960081	Double Ridge Horn Antenna	EMCO	3115	6707	12/8/2010	12/8/2011	Active Calibration
5	EE 960147	Pre-Amp	Adv. Micro	WLA612	123101	12/8/2010	12/8/2011	Active Calibration
6	AA 960158	Double Ridge Horn Antenna	EMCO	3117	109300	8/19/2010	8/19/2011	Active Calibration
7	AA 960078	Log Periodic Antenna	EMCO	93146	9701-4855	10/19/2010	10/19/2011	Active Calibration
8	AA 960150	Bicon Antenna	ETS	3110B	0003-3346	10/19/2010	10/19/2011	Active Calibration
9	EE 960159	0.8 - 21GHz LNA	Mini-Circuits	ZVA-213X-S+	740411007	8/19/2010	8/19/2011	Active Calibration
10	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	9/22/2010	9/22/2011	Active Calibration
11	AA 960007	Double Ridge Horn Antenna	EMCO	3115	9311-4138	11/9/2010	11/9/2011	Active Calibration

Project Engineer: AIDI Quality Assurance: MIKE HINTZKE

LS RESEARCH LLC
Wireless Product Development
Equipment Calibration

Date : 16-Dec-2010 Type Test : Channel Plan & Separation Job # : C-1071

Prepared By: AIDI Customer : Honeywell Quote #: 310300

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	AA 960144	Phaseflex	Gore	EKD01D010720	5800373	6/4/2010	6/4/2011	Active Calibration
2	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	9/22/2010	9/22/2011	Active Calibration

Project Engineer: AIDI Quality Assurance: MIKE HINTZKE

LS RESEARCH LLC
Wireless Product Development
Equipment Calibration

Date : 16-Dec-2010 Type Test : Channel Occupancy Job # : C-1071

Prepared By: AIDI Customer : Honeywell Quote #: 310300

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	AA 960144	Phaseflex	Gore	EKD01D010720	5800373	6/4/2010	6/4/2011	Active Calibration
2	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	9/22/2010	9/22/2011	Active Calibration

Project Engineer: AIDI Quality Assurance: MIKE HINTZKE

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, 90, 95	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	2010		
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	2010		
RSS 213	2005-12		
RSS 243	2010-02		
RSS 310	2007-06		

Note 1: Test not on LSR Scope of Accreditation.

Updated on 04-27-10 P=Project FD= Final Draft

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

APPENDIX D – EUT firmware instructions.

1. Minimum hardware for FCC code is dual colored (red/green) LED and single push button.
    a. LED has three different states
        i. Solid
        ii. Slow blink = 1Hz
        iii. Fast blink = 4Hz
    b. Push button has 5 states
        i. Press and hold on power up
        ii. Short Press. Press and Hold < 2 seconds
        iii. Medium Press. 2 sec < Press and Hold < 6 sec
        iv. Long Press. 6 sec < Press and Hold < 10 sec
        v. No Button press. 10 sec < Press and Hold
    c. Button and LED behavior.
        i. LED will not be constantly on. LED will flash to indicate change of state on button press and release.
        ii. Button action will be processed on button release. LED will flash to indicate the new mode on button release.
        iii. When button is being pressed and held, the LED will indicate the button state (short, medium, long, no button). For example, when the button is pressed and held, on the initial press the LED will turn solid green to indicate button press is in short press time window. Once press time has exceeded two seconds the LED will turn solid red to indicate that press time is in the medium press time window. Once press time has exceeded six seconds the LED will turn solid amber to indicate that press time is in the long press time window. Once press time has exceeded ten seconds the LED will turn off to indicate that press time is in the no button press time window. The user will release the button when the LED corresponds to the desired button press type.
2. FCC modes (FR1, FT1 and FT2) and Qualification modes (Q1 and Q2)
    a. Power up (Mode selection)
        i. If button is not pressed and held during power up then enter RX mode FR1. On power up fast blink amber LED for two seconds then transition into FR1 mode.
            1. Default Settings for FR1 mode
                a. Antenna A
                b. Freq low
        ii. If button is pressed and held down during power up for less then 2 seconds (Short button press = LED is solid green) then enter TX mode FT1. On button release fast blink green LED for two seconds and then transition into FT1 mode.
            1. Default Settings for FT1 mode
                a. Antenna A (and max power)
                b. Freq low
                c. Modulated Data
        iii. If button is pressed and held down during power up for between 2 to 6 seconds (Medium button press = LED is solid red) then enter into TX mode

FT2. On button release fast blink red LED for two seconds and then transition into FT2 mode.

1. Default setting for FT2 mode
    a. Antenna A
    b. Modulated Data

iv. If button is pressed and held down during power up for between 6 to 10 seconds (Long button press = LED is solid amber) then enter into Q1. On button release fast blink amber and green LED for two seconds and then transition into Q1 mode.

1. Default setting for Q1 mode
    a. Antenna A

v. If button is pressed and held down during power up for more than 10 seconds – fast blink red and green LED for two seconds and then transition into Q2 mode.

1. Setting for Q2 mode
    a. TWO_ANTENNAS macro defined
    b. TWO_ANTENNAS macro removed

b. Freq Switch (low, mid, high)
    i. Short button press (button released when LED is green).
    ii. On button release the LED turns off and frequency incremented (low, mid, high)(high wraps back to low)
    iii. Green LED flashes new mode at slow rate
        1. 1 flash = low freq
        2. 2 flash = mid freq
        3. 3 flash = high freq

c. Ant Switch (Ant A, Ant B) or Power Level Selection (max = 0xC0, 0xC2, 0xC4, 0xC6, min = 0xC8)
    i. Medium button press (button released when LED is red)
    ii. On button release LED turns off and antenna (or power) is switched
    iii. Red LED flashes new mode at slow rate
        1. 1 flash = antenna A
        2. 2 flash = antenna B
        3. 3 flash = antenna A and B (only available for Q1 mode)

        Or for Power Level (only available on single antenna devices with special software build)

        1. 1 flash = max power 0xC0
        2. 2 flash = power 0xC2
        3. 3 flash = power 0xC4
        4. 4 flash = power 0xC6
        5. 5 flash = min power 0xC8

d. Modulation Switch (Modulated data, Un-modulated data)
    i. Long button press (button released when LED is amber)
    ii. On button release LED turns off and modulation is switched
    iii. Amber LED flashes new mode at slow rate
        1. 1 flash = Modulated data
        2. 2 flash = Un-modulated data

e. Freq Switch would not apply to FT2, Q1 and Q2 modes (when short button press is released, green LED does not flash new mode)
f. Antenna Switch would not apply to Q2 mode (when long button press is released, red LED does not flash new mode).
g. Modulation Switch would not apply to FR1, Q1 and Q2 modes (when long button press is released, amber LED does not flash new mode).