



EMISSIONS TEST REPORT

Report Number: 100806529BOX-014a

Project Number: G100806529

Report Issue Date: 08/28/2012

Product Designation: Surface Power Unit

Standards: FCC Part 15:2012 Subpart C Section 15.247,
FCC Part 15:2012 Subpart B Class B,
RSS-210 Issue 8 December 2010,
ICES-003 Issue 4 February 2004,
RSS-Gen Issue 3 December 2010+Notice 2012 DRS-0126
IC RSS-102 Issue 4 March 2010

Tested by:
Intertek Testing Services NA, Inc.
70 Codman Hill Road
Boxborough, MA 01719

Client:
FXI, Inc.
120 Concord Road
Aston, PA 19014

Report prepared by

Kouma Sinn / Senior Project Engineer, EMC

Report reviewed by

Nicholas Abbondante / Transmitter Staff Engineer

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1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

2 Test Summary

Section	Test full name	Result
3	Client Information	--
4	Description of Equipment Under Test	--
5	System Setup and Method	--
6	RF Output Power, Human RF Exposure and Duty Cycle (CFR47 FCC Part 15 Subpart C 15.247(b)(3), KDB 558074v01 06/15/2012, IC RSS-210 A8.4(4), CFR47 Part 2.1091)	Pass
7	Transmitter Radiated Spurious Emissions (CFR47 FCC Part 15 Subpart C 15.247(d), IC RSS-210 A8.5, KDB 558074v01 06/15/2012 Section 5.4)	Pass
8	6 dB Bandwidth (CFR47 FCC Part 15 Subpart C 15.247(a)(2), IC RSS-210 A8.2(a), IC RSS-Gen Section 4.6.2, KDB 558074v01 06/15/2012 Section 5.1)	Pass
9	Peak Power Spectral Density (FCC 15:2011 Subpart C Section 15.247 (e), RSS-210 Issue 8 December 2010, A8.2 (b), KDB 558074v01 06/15/2012 Section 5.3)	Pass
10	Band Edge Compliance (FCC 15:2011 Subpart C Section 15.247 (d), RSS-210 Issue 8 December 2010, A8.5, KDB 558074v01 06/15/2012 Section 5.4.2.2.4)	Pass
--	Receiver Radiated Spurious FCC Part 15:2012 Subpart B Section 15.109 (a) RSS-Gen 3 December 2010, Section 6	Exempt, above 960MHz
11	Digital Device Radiated Spurious Emissions (CFR47 FCC Part 15 Subpart B 15.109, IC ICES-003 Issue 4 February 2004)	Pass
12	AC Mains Conducted Emissions FCC Part 15:2011 Section 15.207 (a) RSS-Gen Issue 3 December 2010, 7.2.2 (Table 2)	Pass
13	Revision History	--

3 Client Information

This EUT was tested at the request of:

Company: FXI, Inc.
120 Concord Road
Aston, PA 19014
Contact: Mr. Chris Weyl
Telephone: (610) 245-2742
Fax: None
Email: cweyl@fxi.com

4 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Surface Power Unit	FXI, Inc.	SPU	BOX1208061022-004

Receive Date:	08/06/2012
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)

The product will be a low-cost advanced pressure redistribution support surface for patients at risk from bed sores with the ability to deliver low air loss (LAL) therapy via modular plug-and-play variants. The support surface will maintain support characteristics in its static, non-powered state. The system will be comprised of a 12v powered blower/ pump control unit powered thru a Hospital grade, in line, power supply. The control unit is embedded in the side of a multilayer foam mattress. The Control unit shall actuated be from a wireless handheld pendant device.

This product is intended to service primarily the acute care and long term care environments. The device utilizes an integral antenna and operates in the range from 2405 to 2480 MHz.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
100-240 VAC	1.5 A	50-60 Hz	1

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Transmit
2	Idle/Receive

5 System Setup and Method

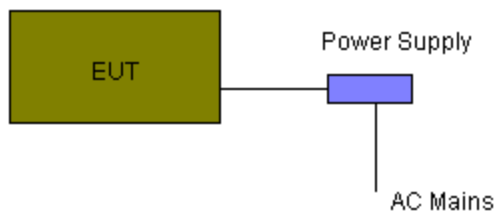
Cables					
Qty	Description	Length (m)	Shielding	Ferrites	Termination
1	AC Adapter	1.59	None	Yes	Power Supply
1	AC Mains	2.31	None	None	AC Mains

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
AC Power Adapter	GlobTek, Inc.	TR9CE5000LRP-C-MED	RoHS100136126/11

5.1 Method:

Configuration as required by ANSI C63.4:2003, FCC Part 15:2012 Subpart C Section 15.247, RSS-210 Issue 8 December 2010, RSS-Gen Issue 3 December 2010, and KDB 558074v01 06/15/2012.

5.2 EUT Block Diagram:



6 Maximum Peak Output Power, Human RF Exposure and Duty Cycle

6.1 Method

Tests are performed in accordance with ANSI C63.4:2003, CFR47 FCC Part 15 Subpart C 15.247, IC RSS-210 Issue 8 December 2010, IC RSS-Gen Issue 3 December 2010, KDB 558074v01 06/15/2012, KDB 447498, and IC RSS-102 Issue 4 March 2010.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A wooden table 80 cm high is used for table-top equipment.

Measurement Uncertainty

For radiated emissions, U_{lab} (3.5 dB at 3m and 3.5 dB at 10m below 1 GHz, and 4.2 dB at 3m above 1 GHz) < U_{CISPR} (5.2 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 52.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB/m}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$FS = 32 \text{ dB}\mu\text{V/m}$$

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$
$$NF = \text{Net Reading in dB}\mu\text{V}$$

Example:

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$

$$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$

6.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV003'	Weather Station	Davis Instruments	7400	PE80529A39A	08/17/2011	09/17/2012
HORN2'	HORN ANTENNA	EMCO	3115	9602-4675	10/24/2011	10/24/2012
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	09/04/2011	09/04/2012
145128'	EMI Receiver 40 GHz (20 Hz - 40 Ghz)	Rohde & Schwarz	ESI	8392831001	08/23/2011	09/23/2012

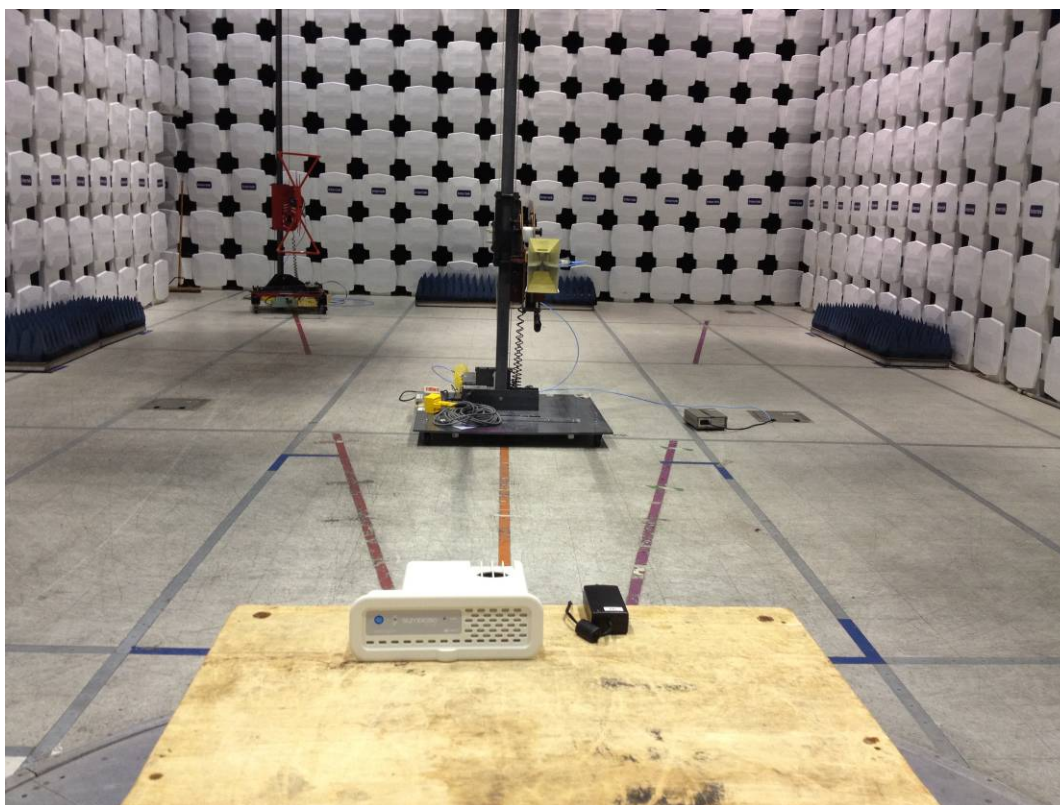
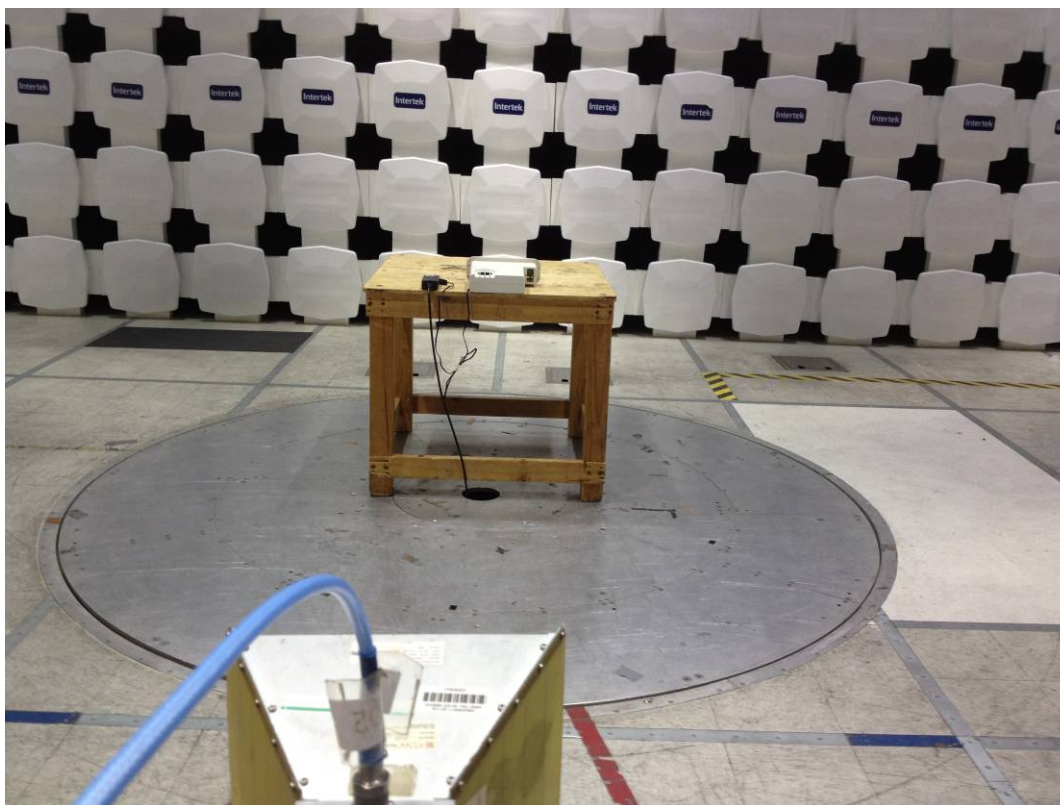
Software Utilized:

Name	Manufacturer	Version
Excel 2003	Microsoft	(11.8231.8221) SP3
EMI Boxborough.xls	Intertek	08/27/10

6.3 Results:

The EIRP must not exceed 36 dBm. The sample tested was found to comply.

6.4 Setup Photographs:



6.5 Test Data:

Channel 11, 18, 26 Power Radiated Emissions

Company: FXI, Inc. Antenna & Cables: SHF Bands: N, LF, HF, SHF
 Model #: SPU Antenna: HORN2 V3m 10-24-2012.txt HORN2 H3m 10-24-2012.txt
 Serial #: BOX1208061022-004 (Intertek Assigned) Cable(s): 145-416 3mTrkB 09-04-2012.txt NONE.
 Engineers: Kouma Sinn Location: 10m Chamber Barometer: DAV003 Filter: NONE
 Project #: G100806529 Date(s): 08/07/12
 Standard: FCC Part 15 Subpart C 15.247 Temp/Humidity/Pressure: 21C 72% 1006mbar
 Receiver: R&S ESI (145-128) 08-23-2012 Limit Distance (m): 3
 PreAmp: PRE145014 12-16-2012.txt Test Distance (m): 3
 PreAmp Used? (Y or N): N Voltage/Frequency: 120VAC/60Hz Frequency Range: Fundamental Frequencies
 Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	EIRP Net dBm	EIRP Limit dBm	Margin dB	Bandwidth
Kouma Sinn 08/07/12 - 21C/72/1006mbar DAV003, CH11, 18, 26 (120VAC/60Hz). Reduced power setting to -0.5dBm											
Note: EIRP was obtained by applying the path loss correction for a 3m test distance, E(dBuV/m) @3m - 95.22 = dBm EIRP											
PK	V	2440.000	59.19	28.60	5.98	0.00	0.00	-1.45	36.00	-37.45	5/10MHz
PK	H	2440.000	63.09	28.43	5.98	0.00	0.00	2.28	36.00	-33.72	5/10MHz
PK	V	2405.000	62.17	28.55	5.93	0.00	0.00	1.43	36.00	-34.57	5/10MHz
PK	H	2405.000	64.14	28.33	5.93	0.00	0.00	3.18	36.00	-32.82	5/10MHz
PK	V	2480.000	59.97	28.67	6.03	0.00	0.00	-0.55	36.00	-36.55	5/10MHz
PK	H	2480.000	61.84	28.54	6.03	0.00	0.00	1.20	36.00	-34.80	5/10MHz

The EUT was measured in a radiated fashion. The RF output power was measured using a resolution bandwidth which encompassed the entire emission bandwidth. The data obtained was adjusted for equipment losses and converted from a field strength reading to a power reading using the provisions of FCC KDB 558074 and RSS-Gen 4.6. The human RF exposure limit is 1 mW/cm². The power density S generated by some value of EIRP at a given distance d is related by the equation:

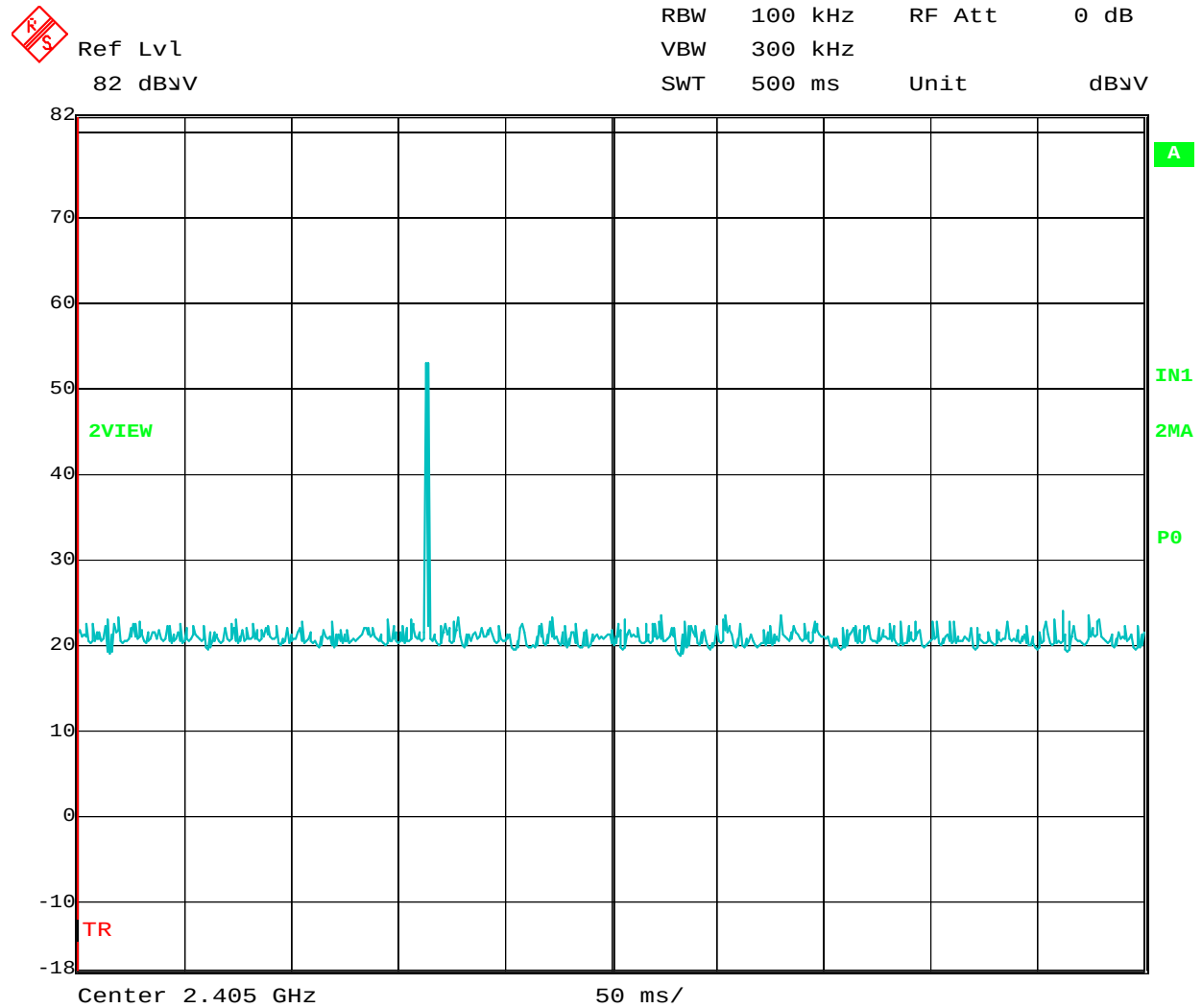
$$S = \text{EIRP} / (4\pi d^2)$$

The distance, given a maximum EIRP of 3.18 dBm (2.08 mW), at which the radiated power density of the EUT is equal to the human RF exposure limit is 0.41 cm from the antenna. This result does not take averaging into account.

The EUT is exempt from Industry Canada RF Exposure evaluation as referenced in RSS-102 because the operating frequency is above 1.5 GHz and the EIRP does not exceed 5 Watts.

Duty Cycle

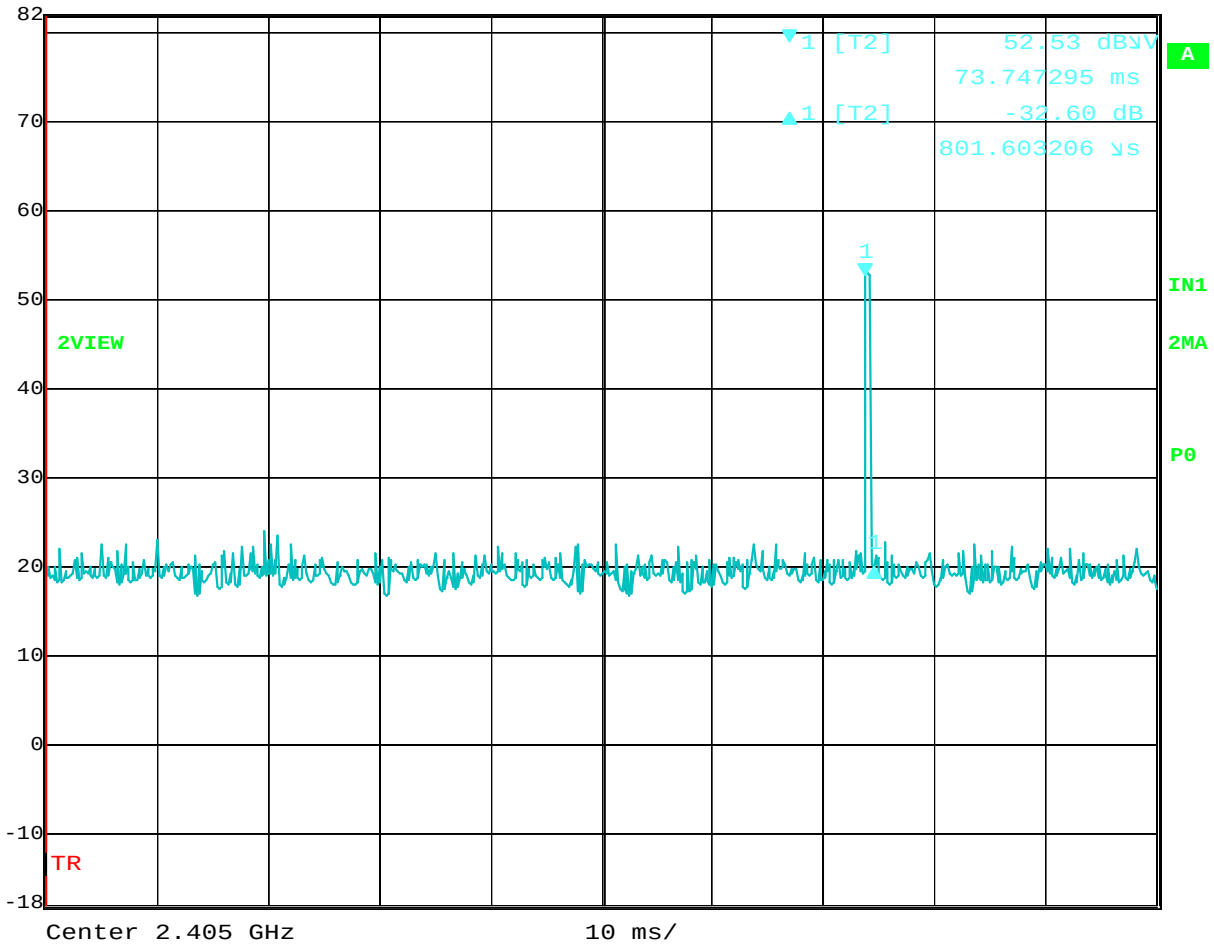
The worst-case duty cycle for typical EUT operation is shown below. The pulse train repeats over a larger than 100ms period.



Date: 7.AUG.2012 17:44:11



Ref Lvl	Delta 1 [T2]	RBW	100 kHz	RF Att	0 dB
82 dBμV	-32.60 dB	VBW	300 kHz		
	801.603206 μs	SWT	100 ms	Unit	dBμV



Date: 7.AUG.2012 17:46:04

Average Factor = $20 \cdot \text{LOG}(0.801/100) = 41.9 \text{ dB}$

Test Personnel: Kouma Sinn *KPS*
Vathana F. Ven *VFV*

Test Date: 08/07/2012

Supervising Engineer: N/A
 (Where Applicable)
 Product Standard: FCC Part 15.247, RSS-210
 Input Voltage: 120VAC/60Hz
 Pretest Verification w/ Ambient Signals or BB Source: Yes

Test Levels: Emissions below the limits specified in Section 6.3
 Ambient Temperature: 21 °C
 Relative Humidity: 72 %
 Atmospheric Pressure: 1006 mbar

Deviations, Additions, or Exclusions: None

7 Transmitter Radiated Spurious Emissions

7.1 Method

Tests are performed in accordance with CFR47 FCC Part 15 Subpart C 15.247(d), IC RSS-210 A8.5, KDB 558074v01 06/15/2012 Section 5.4.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A wooden table 80 cm high is used for table-top equipment.

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Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB μ V/m
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- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
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AG = 29.0 dB
FS = 32 dB μ V/m

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NF = Net Reading in dB μ V

Example:

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7.2 Test Equipment Used:

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HORN2'	HORN ANTENNA	EMCO	3115	9602-4675	10/24/2011	10/24/2012
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	09/04/2011	09/04/2012
CBL030'	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL030	02/08/2012	02/08/2013
HEW62'	Synthesized Sweep Generator	Hewlett Packard	83620A	3213A01244	04/16/2012	04/16/2014
MAN1	Digital 4 Line Barometer	Mannix	0ABA116	MAN1	08/13/2012	08/13/2014
145034	BiLog Antenna (30 MHz to 1GHz)	Schaffner Chase EMC	CBL6111C	2564	02/07/2012	02/07/2013
145-410	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	09/04/2011	09/04/2012
145003	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	10/04/2011	10/04/2012
145128	EMI Receiver 40 GHz (20 Hz - 40 Ghz)	Rohde & Schwarz	ESI	8392831001	08/23/2011	09/23/2012
ROS001'	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwarz	FSEK-30	100225	02/10/2012	02/10/2013
EMC02'	ANTENNA, RIDGED GUIDE, 1-18 GHZ	EMCO	3115	2784	01/18/2012	01/18/2013

Software Utilized:

Name	Manufacturer	Version
C5	Teseq	Build 5.26.46.46
Excel 2003	Microsoft	(11.8231.8221) SP3
EMI Boxborough.xls	Intertek	08/27/10

7.3 Results:

The sample tested was found to comply.

In any 100 kHz bandwidth outside the frequency band, 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. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see 15.205(c)).

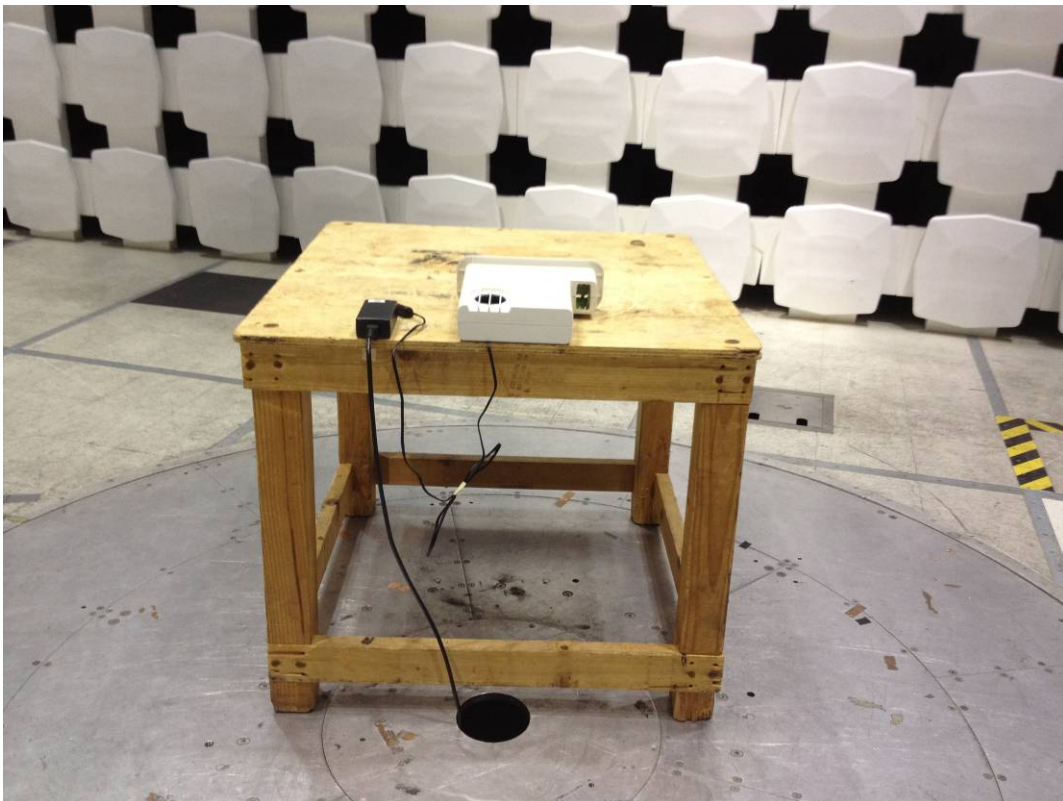
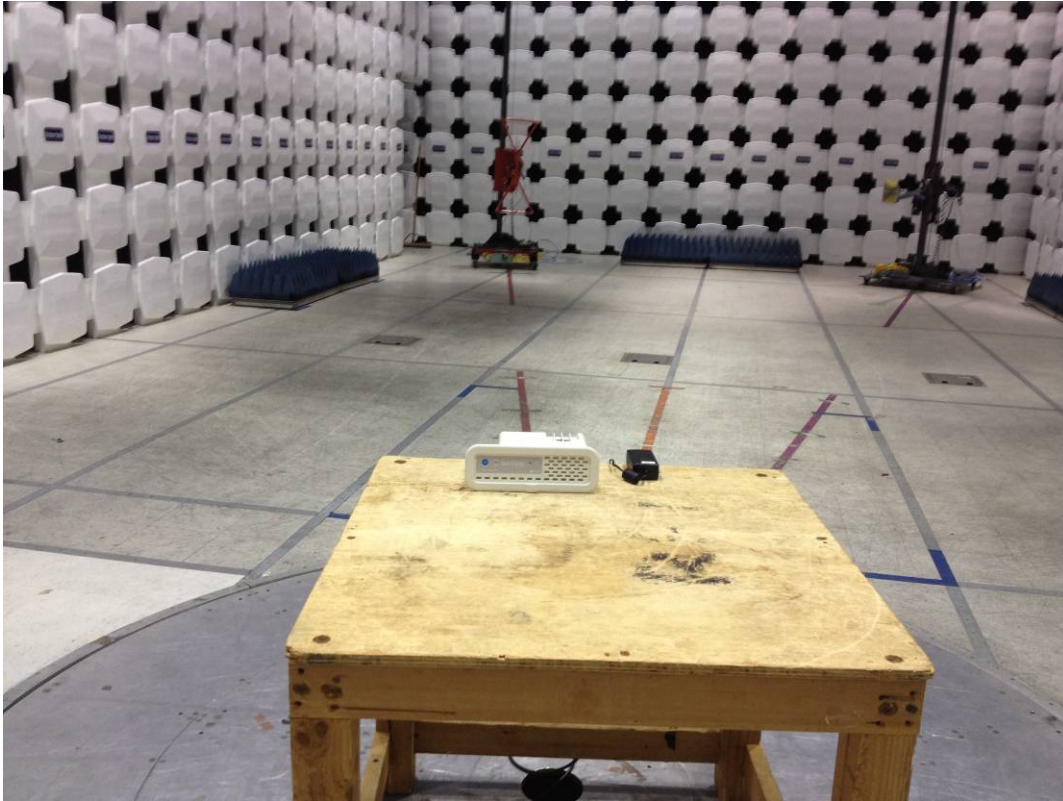
FCC Part 15.209(a) & RSS-210 A8.5 – Restricted Band Radiated Spurious/Harmonics Limits

Frequency (MHz)	Field Strength		Test Distance (meters)
	μV/m	dBμV/m	
30–88	100	40.00	3
88–216	150	43.52	3
216–960	200	46.02	3
Above 960	500	53.98	3

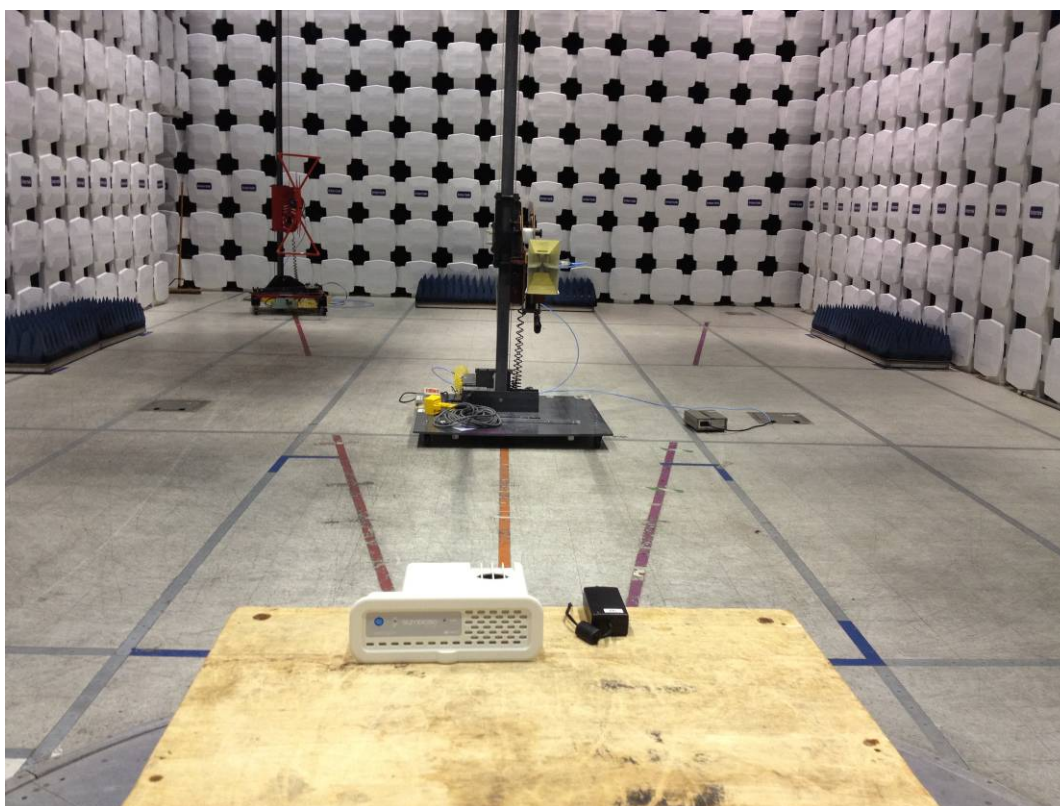
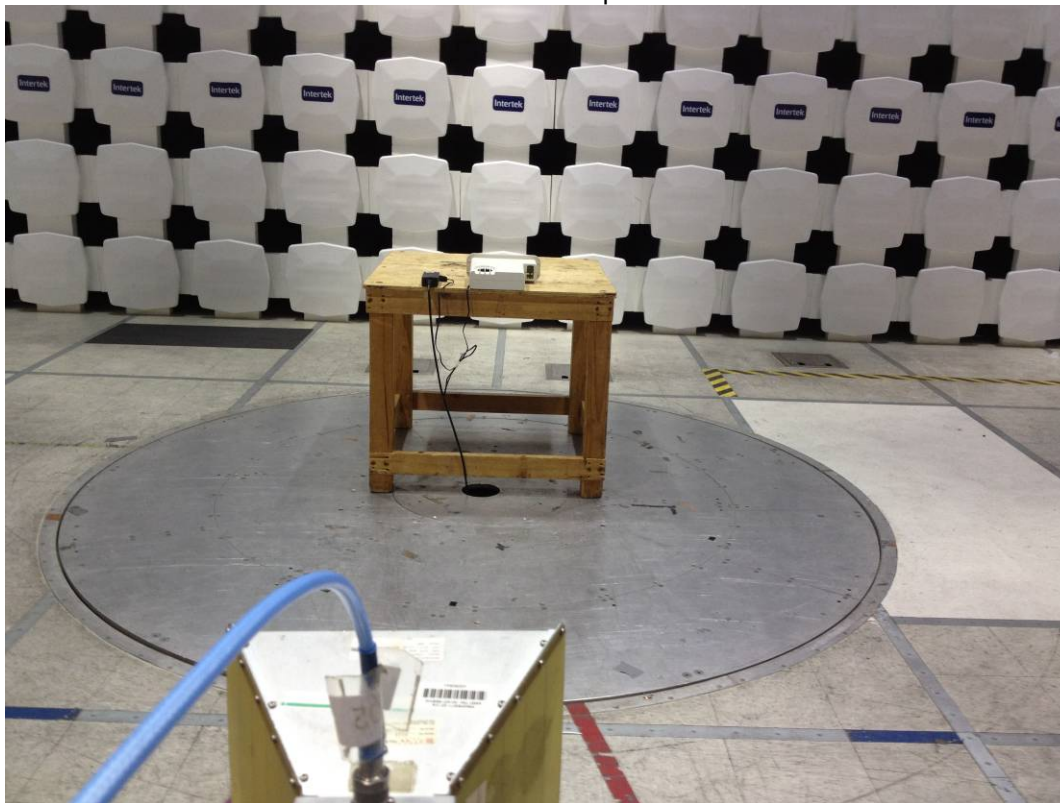
FCC Part 15.247(d) & RSS-210 A8.5 – Non Restricted Band Radiated Spurious/Harmonics Limits

7.4 Setup Photographs:

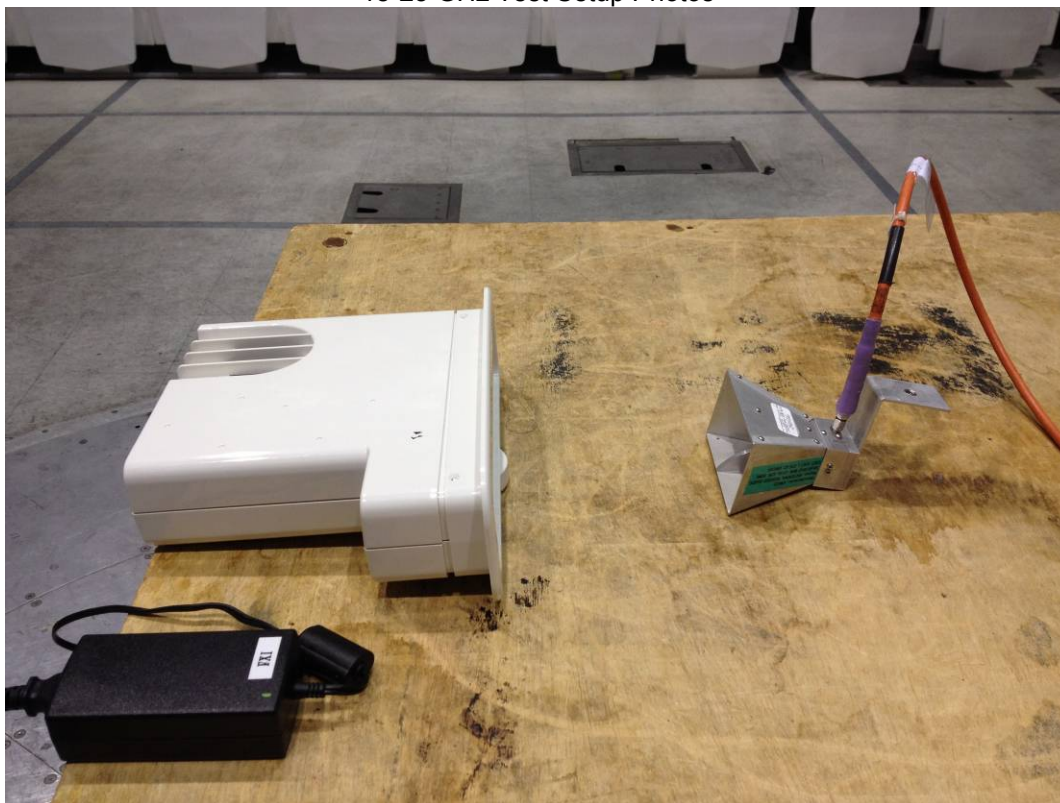
30-1000 MHz Test Setup Photos



1-18 GHz Test Setup Photos



18-25 GHz Test Setup Photos



7.5 Plots/Data:

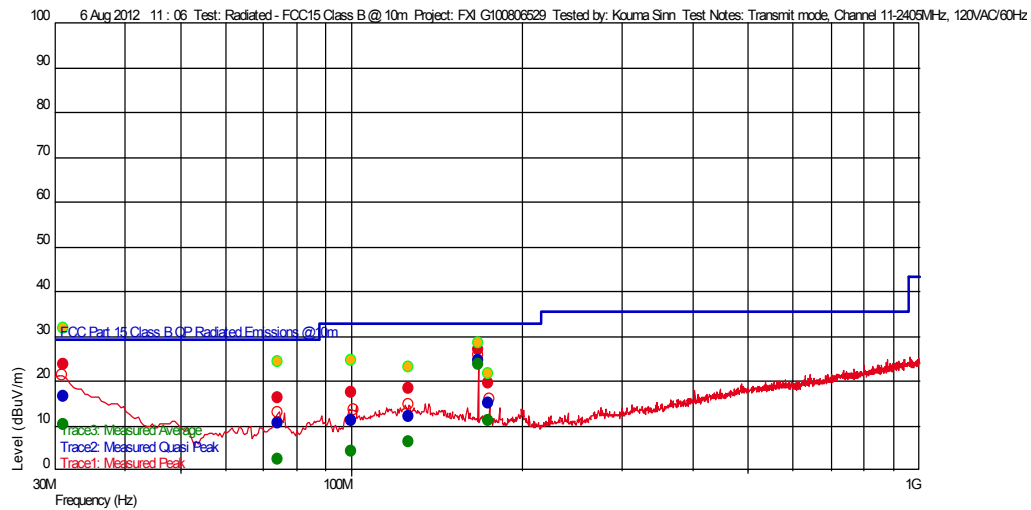
Channel 11 (2405MHz) Radiated Emissions, 30-1000MHz

Test Information

Test Details
 Test: Radiated - FCC15 Class B @ 10m
 Project: FXI G100806529
 Test Notes: Transmit mode, Channel 11-2405MHz, 120VAC/60Hz
 Temperature: 21c
 Humidity: 74%, 1004mbar
 Tested by: Kouma Sinn
 Test Started: 6 Aug 2012 11 : 06

Additional Information

Prescan Emission Graph



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable
- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

Emissions Test Data

Trace1: Measured Peak

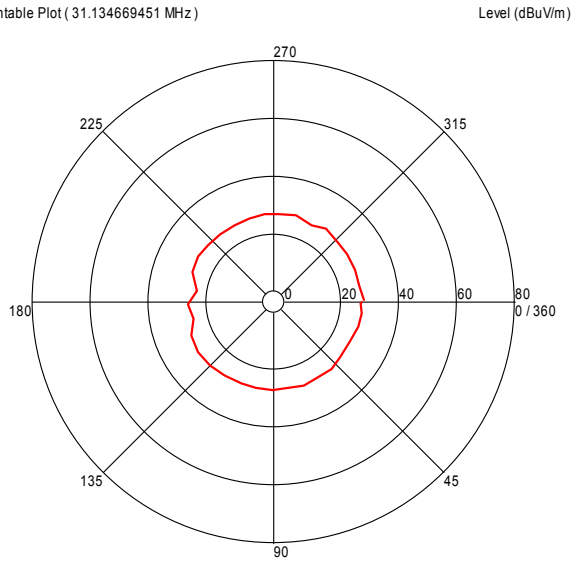
Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (-), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
100.204809812 M	17.41	10.361	-25.347	33.040	-15.63		104	2.45	120 k	
126.529459028 M	18.43	14.000	-25.013	33.040	-14.61		50	2.14	120 k	
174.929659096 M	19.44	11.600	-24.518	29.540	-10.11		92	1.24	120 k	
74.330060226 M	16.21	8.034	-25.748	33.040	-16.83		114	2.06	120 k	
167.334468818 M	26.89	11.967	-24.578	29.540	-2.65		119	1.25	120 k	
31.134669451 M	23.73	20.306	-26.111	33.040	-9.31		157	2.96	120 k	

Trace2: Measured Quasi Peak

Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (-), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
100.204809812 M	11.18	10.361	-25.347	33.040	-21.86		104	2.45	120 k	
126.529459028 M	12.21	14.000	-25.013	33.040	-20.83		50	2.14	120 k	
74.330060226 M	10.58	8.034	-25.748	29.540	-18.96		114	2.06	120 k	
174.929659096 M	14.98	11.600	-24.518	33.040	-18.06		92	1.24	120 k	
31.134669451 M	16.69	20.306	-26.111	29.540	-12.85		157	2.96	120 k	
167.334468818 M	24.69	11.967	-24.578	33.040	-8.35		119	1.25	120 k	

Azimuth Plots

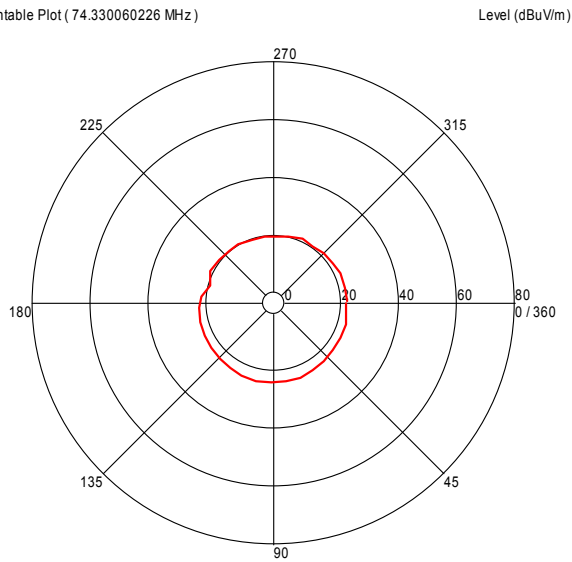
Turntable Plot (31.134669451 MHz)



All Polarities

Azimuth (Degrees)

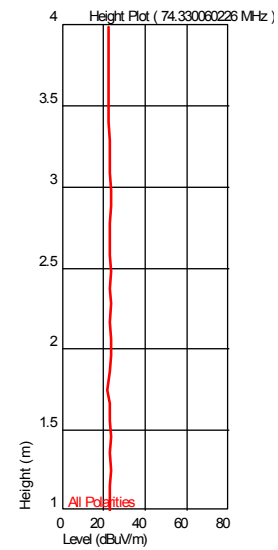
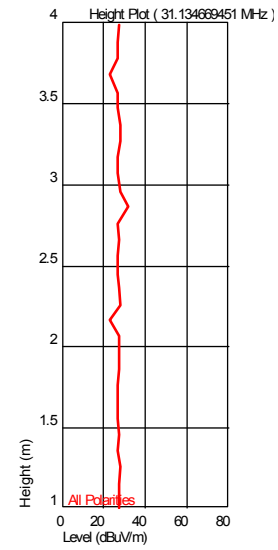
Turntable Plot (74.330060226 MHz)



All Polarities

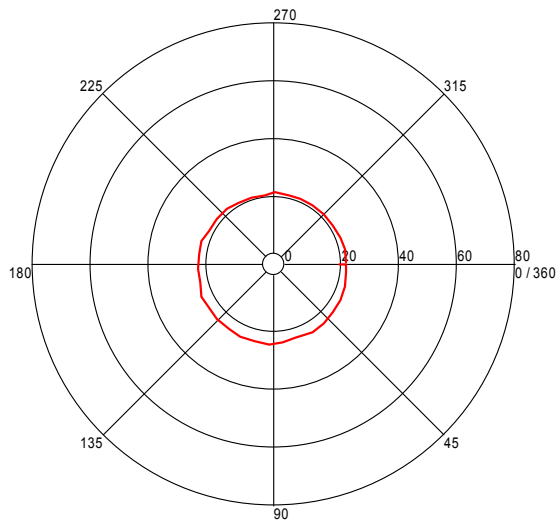
Azimuth (Degrees)

Turntable Plots



Turntable Plot (100.204809812 MHz)

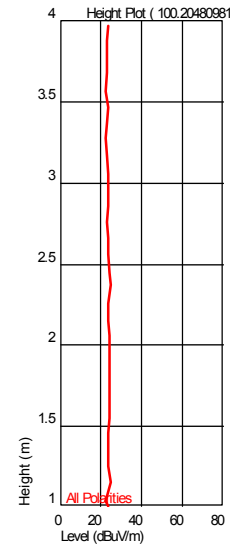
Level (dBuV/m)



All Polarities

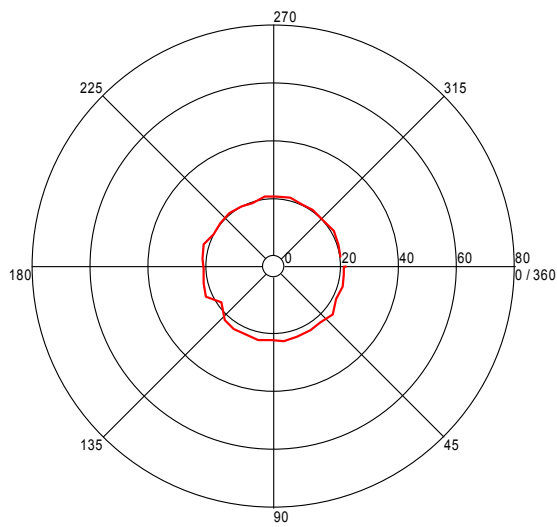
Azimuth (Degrees)

Height Plot (100.204809812 MHz)



Turntable Plot (126.529459028 MHz)

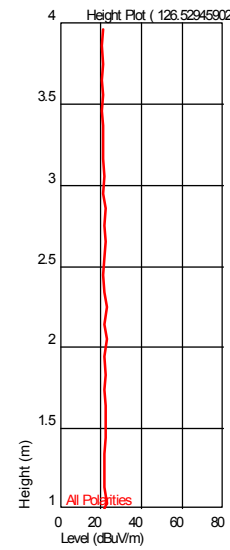
Level (dBuV/m)



All Polarities

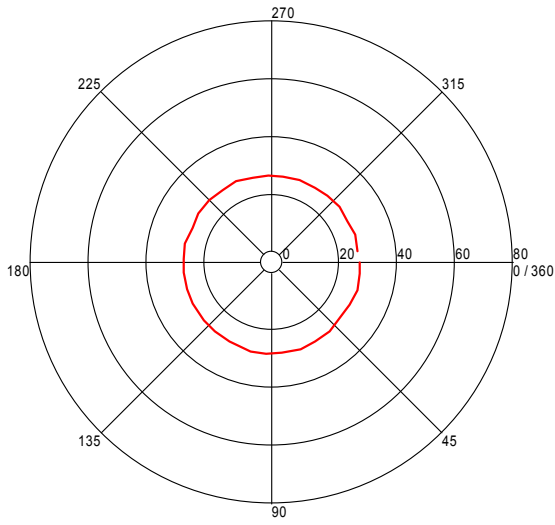
Azimuth (Degrees)

Height Plot (126.529459028 MHz)



Turntable Plot (167.334468818 MHz)

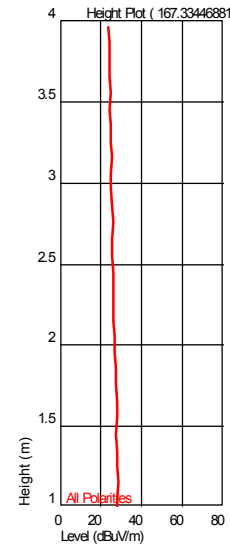
Level (dBuV/m)



All Polarities

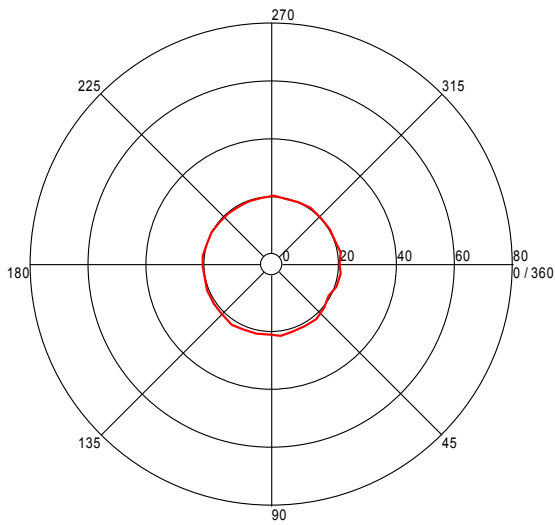
Azimuth (Degrees)

Height Plot (167.334468818 MHz)



Turntable Plot (174.929659096 MHz)

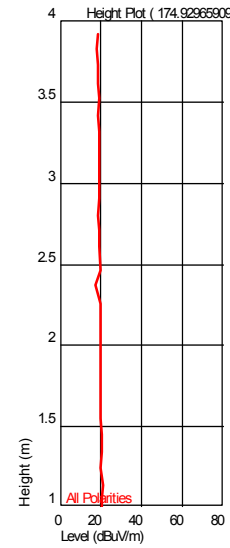
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (174.929659096 MHz)



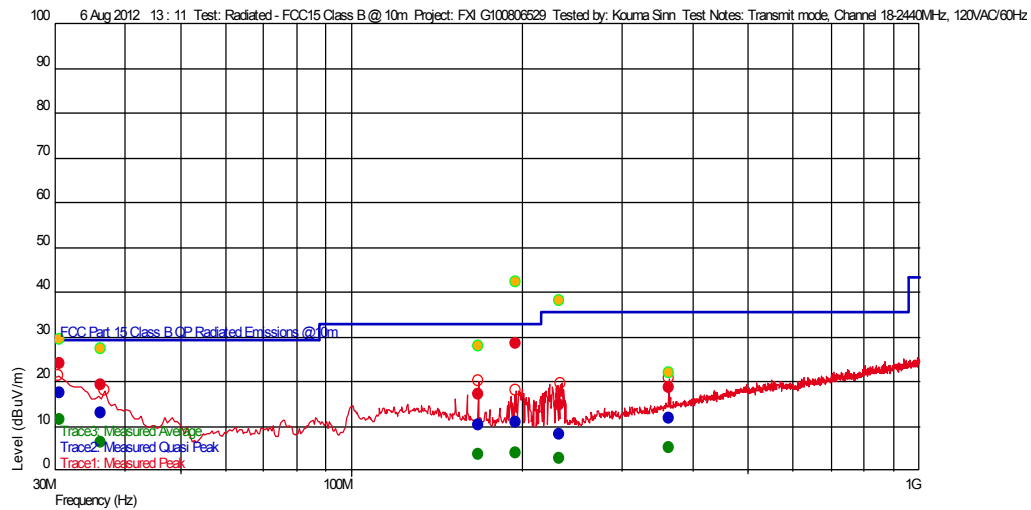
Channel 18 (2440MHz) Radiated Emissions, 30-1000MHz

Test Information

Test Details
Test: Radiated - FCC15 Class B @ 10m
Project: FXI G100806529
Test Notes: Transmit mode, Channel 18-2440MHz, 120VAC/60Hz
Temperature: 21c
Humidity: 74%, 1004mbar
Tested by: Kouma Sinn
Test Started: 6 Aug 2012 13 : 11

Additional Information

Prescan Emission Graph



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable

- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

Emissions Test Data

Trace1: Measured Peak

Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (-), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
233.279157828 M	14.85	11.331	-24.205	35.540	-20.69		195	1.94	120 k	
362.433667715 M	18.75	14.897	-23.924	35.540	-16.79		71	1.47	120 k	
167.460320521 M	17.06	11.954	-24.577	33.040	-15.98		310	3.50	120 k	
36.345089966 M	19.38	16.789	-26.093	33.040	-13.66		213	3.49	120 k	
30.728857772 M	24.04	20.617	-26.112	29.540	-5.05		29	1.04	120 k	
195.137475028 M	28.43	11.927	-24.358	29.540	-1.11		360	2.59	120 k	

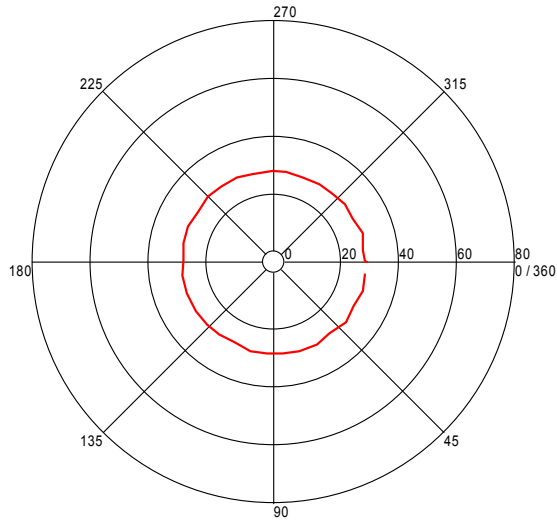
Trace2: Measured Quasi Peak

Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (-), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
233.279157828 M	8.08	11.331	-24.205	35.540	-27.46		195	1.94	120 k	
362.433667715 M	11.80	14.897	-23.924	35.540	-23.74		71	1.47	120 k	
167.460320521 M	10.19	11.954	-24.577	33.040	-22.85		310	3.50	120 k	
195.137475028 M	10.99	11.927	-24.358	33.040	-22.05		360	2.59	120 k	
36.345089966 M	12.86	16.789	-26.093	29.540	-16.68		213	3.49	120 k	
30.728857772 M	17.32	20.617	-26.112	29.540	-12.22		29	1.04	120 k	

Azimuth Plots

Turntable Plot (30.728857772 MHz)

Level (dBuV/m)

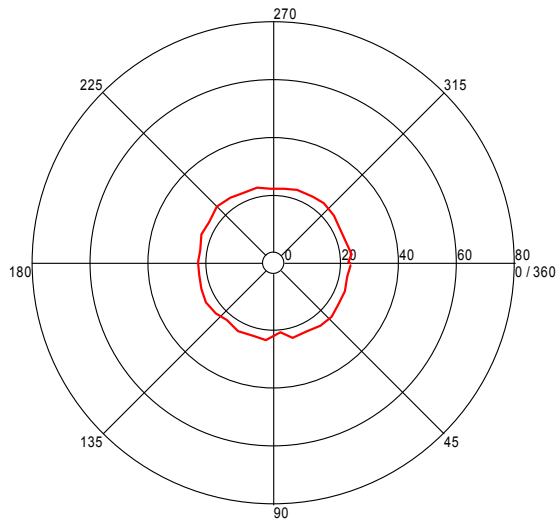


All Polarities

Azimuth (Degrees)

Turntable Plot (36.345089966 MHz)

Level (dBuV/m)

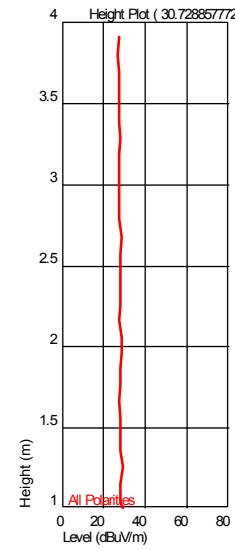


All Polarities

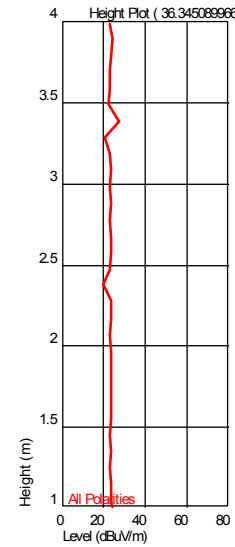
Azimuth (Degrees)

Turntable Plots

Height Plot (30.728857772 MHz)

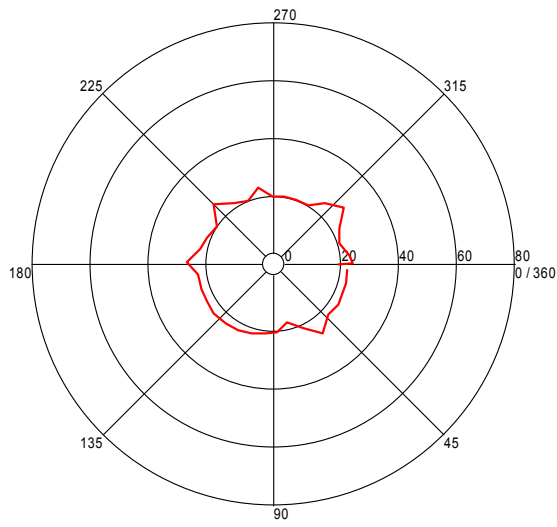


Height Plot (36.345089966 MHz)



Turntable Plot (167.460320521 MHz)

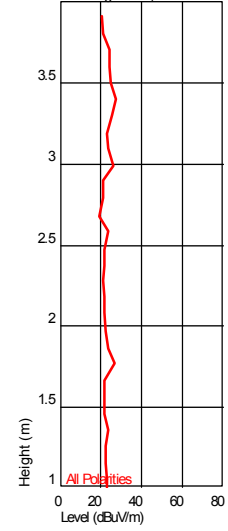
Level (dBuV/m)



All Polarities

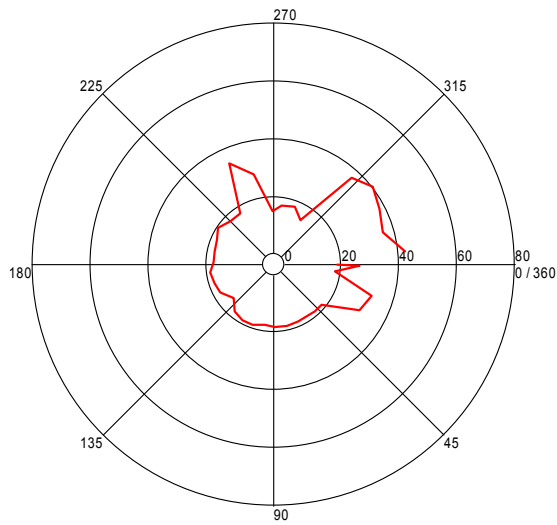
Azimuth (Degrees)

Height Plot (167.460320521 MHz)



Turntable Plot (195.137475028 MHz)

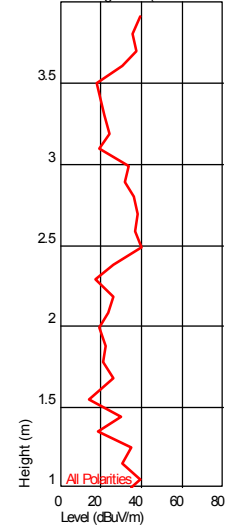
Level (dBuV/m)



All Polarities

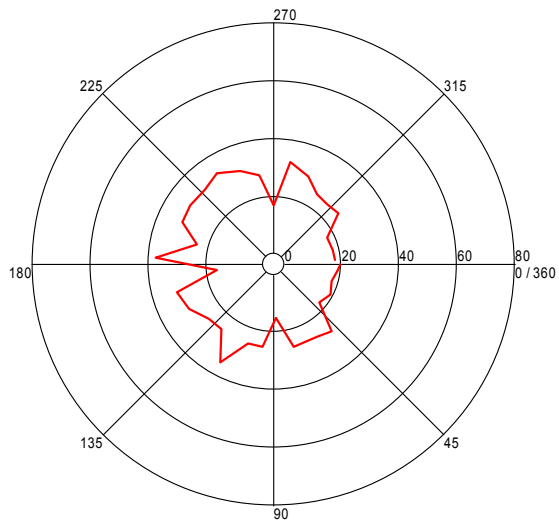
Azimuth (Degrees)

Height Plot (195.137475028 MHz)



Turntable Plot (233.279157828 MHz)

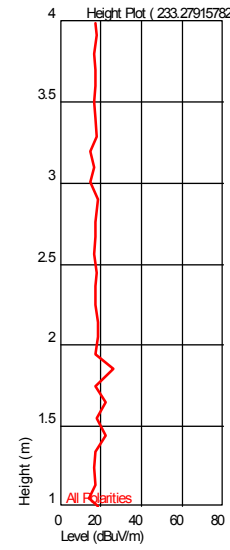
Level (dBuV/m)



All Polarities

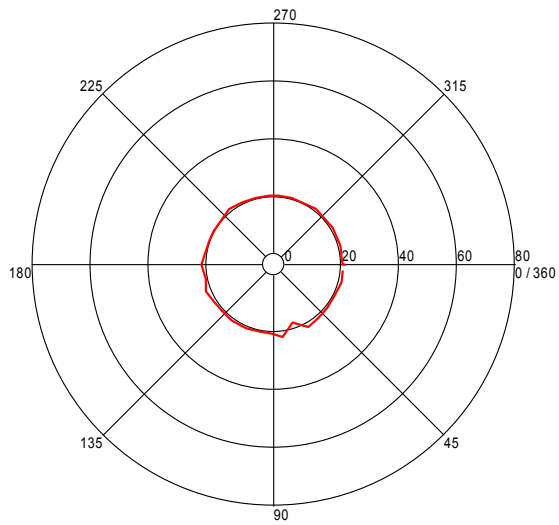
Azimuth (Degrees)

Height Plot (233.279157828 MHz)



Turntable Plot (362.433667715 MHz)

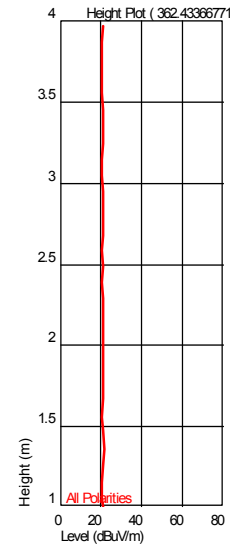
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (362.433667715 MHz)



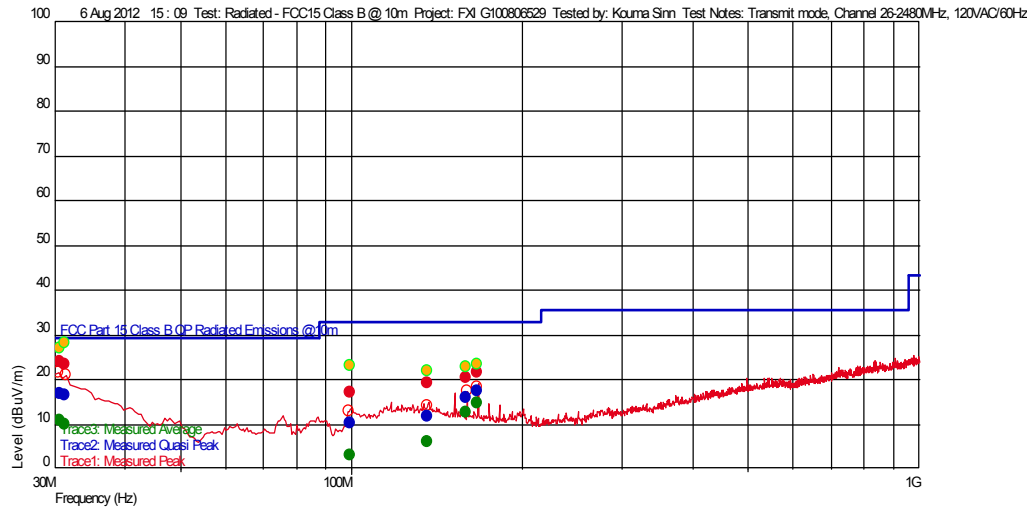
Channel 26 (2480MHz) Radiated Emissions, 30-1000MHz

Test Information

Test Details
 Test: Radiated - FCC15 Class B @ 10m
 Project: FXI G100806529
 Test Notes: Transmit mode, Channel 26-2480MHz, 120VAC/60Hz
 Temperature: 21c
 Humidity: 74%, 1004mbar
 Tested by: Kouma Sinn
 Test Started: 6 Aug 2012 15:09

Additional Information

Prescan Emission Graph



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable
- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

Emissions Test Data

Trace1: Measured Peak

Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (-), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
99.438476922 M	17.21	10.132	-25.354	33.040	-15.83		213	1.96	120 k	
136.074950132 M	19.18	13.700	-24.892	33.040	-13.86		71	1.85	120 k	
159.491583148 M	20.34	12.249	-24.640	33.040	-12.7		127	1.04	120 k	
167.058516858 M	21.51	11.994	-24.580	33.040	-11.53		150	1.30	120 k	
31.376954076 M	23.37	20.136	-26.110	29.540	-6.17		0	2.24	120 k	
30.687174405 M	23.88	20.650	-26.113	29.540	-5.66	--	273	1.15	120 k	

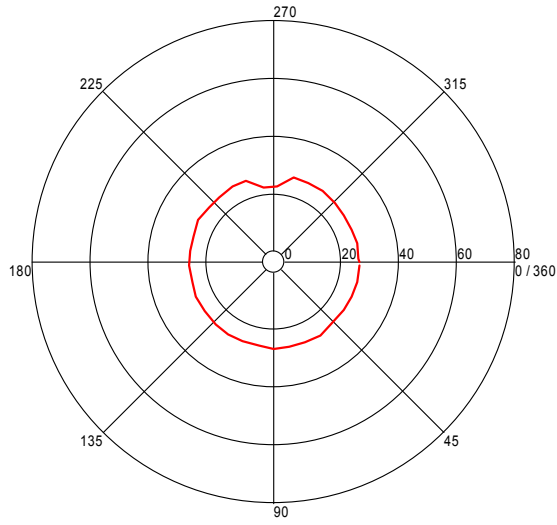
Trace2: Measured Quasi Peak

Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (-), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
99.438476922 M	10.35	10.132	-25.354	33.040	-22.69		213	1.96	120 k	
136.074950132 M	11.93	13.700	-24.892	33.040	-21.11		71	1.85	120 k	
159.491583148 M	16.02	12.249	-24.640	33.040	-17.02		127	1.04	120 k	
167.058516858 M	17.33	11.994	-24.580	33.040	-15.71		150	1.30	120 k	
31.376954076 M	16.63	20.136	-26.110	29.540	-12.91		0	2.24	120 k	
30.687174405 M	16.81	20.650	-26.113	29.540	-12.73	--	273	1.15	120 k	

Azimuth Plots

Turntable Plot (30.687174405 MHz)

Level (dBuV/m)

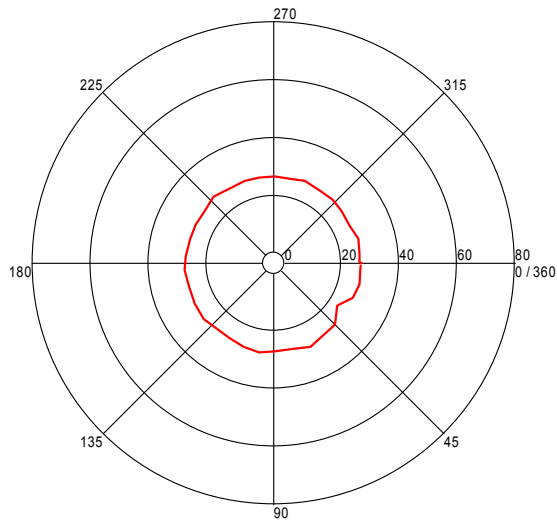


All Polarities

Azimuth (Degrees)

Turntable Plot (31.376954076 MHz)

Level (dBuV/m)

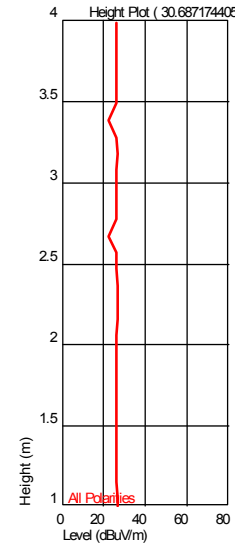


All Polarities

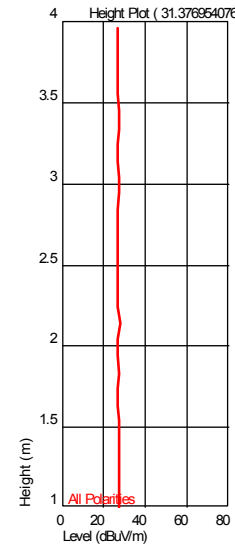
Azimuth (Degrees)

Turntable Plots

Height Plot (30.687174405 MHz)

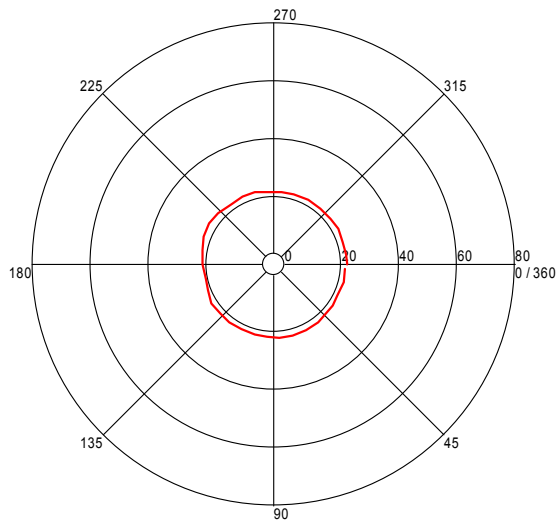


Height Plot (31.376954076 MHz)



Turntable Plot (99.438476922 MHz)

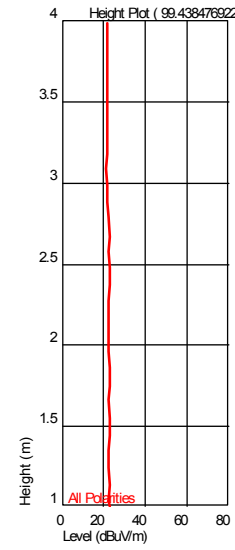
Level (dBuV/m)



All Polarities

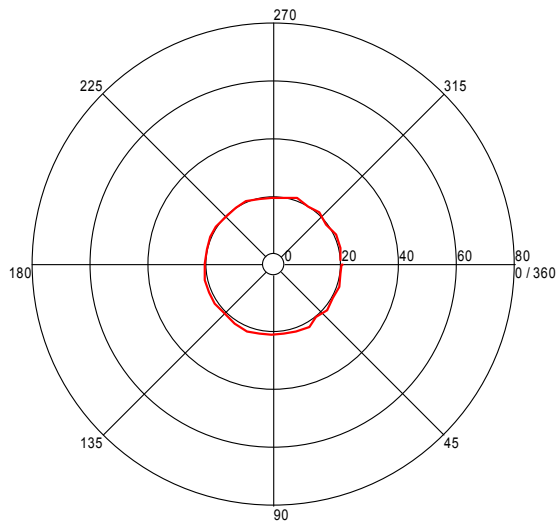
Azimuth (Degrees)

Height Plot (99.438476922 MHz)



Turntable Plot (136.074950132 MHz)

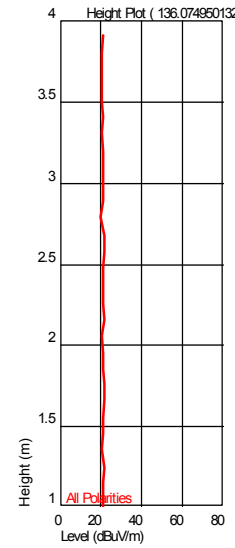
Level (dBuV/m)



All Polarities

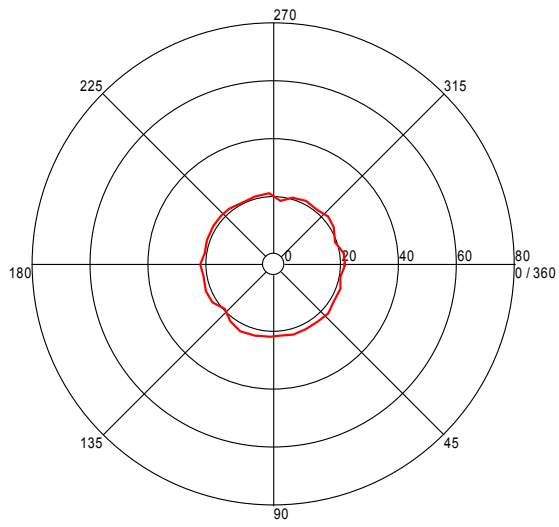
Azimuth (Degrees)

Height Plot (136.074950132 MHz)



Turntable Plot (159.491583148 MHz)

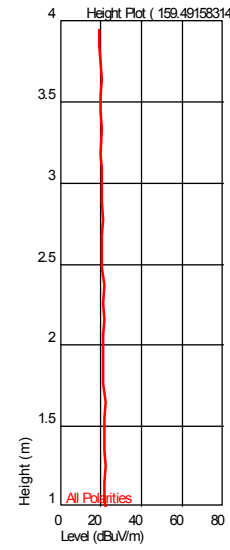
Level (dBuV/m)



All Polarities

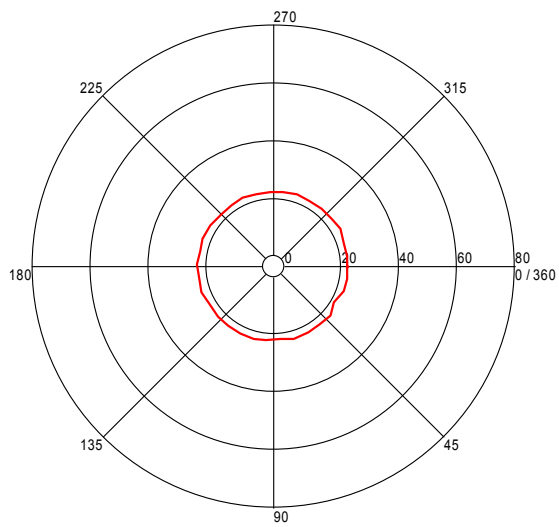
Azimuth (Degrees)

Height Plot (159.491583148 MHz)



Turntable Plot (167.058516858 MHz)

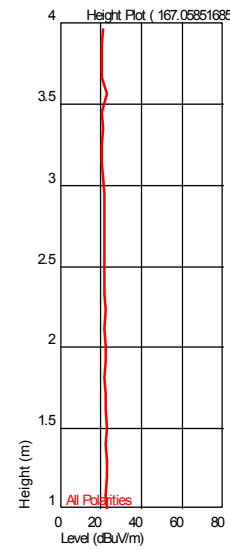
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (167.058516858 MHz)



Channel 11 (2405MHz) 1-25 GHz Radiated Emissions

Company: FXI, Inc. Antenna & Cables: SHF Bands: N, LF, HF, SHF
 Model #: SPU Antenna: HORN2 V3m 10-24-2012.txt HORN2 H3m 10-24-2012.txt
 Serial #: BOX1208061022-004 (Intertek Assigned) Cable(s): 145-416 3mTrkB 09-04-2012.txt
 Engineers: Kouma Sinn Location: 10m Chamber Barometer: DAV003 Filter: REA002
 Project #: G100806529 Date(s): 08/07/12
 Standard: FCC Part 15 Subpart C 15.247 Temp/Humidity/Pressure: 21C 72% 1006mbar
 Receiver: R&S ESI (145-128) 08-23-2012 Limit Distance (m): 3
 PreAmp: PRE145014 12-16-2012.txt Test Distance (m): 3
 PreAmp Used? (Y or N): Y Voltage/Frequency: 120VAC/60Hz Frequency Range: 1-25 GHz
 Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
08/07/12 - 21C/72/1006mbar DAV003, CH11 (120VAC/60Hz), pwr setting -0.5dBm											
PK	V	2405.000	58.32	28.55	5.93	0.00	0.00	92.80	-	-	100/300 kHz
PK	H	2405.000	60.26	28.33	5.93	0.00	0.00	94.52	-	-	100/300 kHz
08/07/12 - 21C/72/1006mbar DAV003, 145014, REA002.T x CH 11, F = 2405MHz, Spurious emissions, back to pwr setting -0.5 dBm											
PK	V	4810.000	57.71	33.08	9.17	34.54	0.00	65.41	74.00	-8.59	1/3 MHz RB
AVG	V	4810.000	15.81	33.08	9.17	34.54	0.00	23.51	54.00	-30.49	1/3 MHz RB
PK	V	7215.000	54.85	36.12	10.85	35.66	0.00	66.16	74.52	-8.36	100/300kHz
PK	V	9620.000	45.52	37.89	13.16	35.85	0.00	60.72	74.52	-13.80	100/300kHz
PK	V	12025.000	36.27	39.52	14.97	35.38	0.00	55.38	74.00	-18.62	1/3MHz RB, NF
AVG	V	12025.000	-5.63	39.52	14.97	35.38	0.00	13.48	54.00	-40.52	1/3 MHz RB, NF
PK	V	14430.000	22.92	42.14	15.16	34.64	0.00	45.58	74.52	-28.94	100/300kHz NF
PK	V	16835.000	13.61	39.85	25.50	37.74	0.00	41.23	74.52	-33.29	100/300kHz NF
18-25GHz hand scan at a distance < 1 meter. No emissions were detected. Equipment used: EMC04, CBL030, ROS001											

Notes: AVG = PK - Average Factor, where Average Factor = 20*LOG(0.801/100) = 41.9 dB,
 Non-restricted emission limit = 74.52 dBuV/m, 20dB from carrier signal with 100kHz ResBW

Channel 18 (2440MHz), 1-25 GHz Radiated Emissions

Company: FXI, Inc. Antenna & Cables: SHF Bands: N, LF, HF, SHF
 Model #: SPU Antenna: HORN2 V3m 10-24-2012.txt HORN2 H3m 10-24-2012.txt
 Serial #: BOX1208061022-004 (Intertek Assigned) Cable(s): 145-416 3mTrkB 09-04-2012.txt
 Engineers: Kouma Sinn Location: 10m Chamber Barometer: DAV003 Filter: REA002
 Project #: G100806529 Date(s): 08/07/12
 Standard: FCC Part 15 Subpart C 15.247 Temp/Humidity/Pressure: 21C 72% 1006mbar
 Receiver: R&S ESI (145-128) 08-23-2012 Limit Distance (m): 3
 PreAmp: PRE145014 12-16-2012.txt Test Distance (m): 3
 PreAmp Used? (Y or N): Y Voltage/Frequency: 120VAC/60Hz Frequency Range: 1-25 GHz
 Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
08/07/12 - 21C/72/1006mbar DAV003, CH18, CH11 (120VAC/60Hz), pwr setting -0.5dBm											
PK	V	2440.000	59.71	28.60	5.98	0.00	0.00	94.29	-	-	100/300 kHz
PK	H	2440.000	59.70	28.43	5.98	0.00	0.00	94.11	-	-	100/300 kHz
08/07/12 - 21C/72/1006mbar DAV003, 145014, REA002.T x CH 18, F = 2440MHz, Spurious emissions, back to pwr setting -0.5 dBm											
PK	H	4880.000	52.43	32.97	9.28	34.41	0.00	60.27	74.00	-13.73	1/3 MHz RB
AVG	H	4880.000	10.53	32.97	9.28	34.41	0.00	18.37	54.00	-35.63	1/3 MHz RB
PK	H	7320.000	56.93	36.42	10.97	35.73	0.00	68.58	74.00	-5.42	1/3 MHz RB
AVG	H	7320.000	15.03	36.42	10.97	35.73	0.00	26.68	54.00	-27.32	1/3 MHz RB
PK	V	9760.000	41.50	38.04	13.35	35.35	0.00	57.54	74.11	-16.57	100/300 kHz
PK	V	12200.000	36.60	39.18	14.88	35.45	0.00	55.22	74.00	-18.78	1/3 MHz NF
AVG	V	12200.000	-5.30	39.18	14.88	35.45	0.00	13.32	54.00	-40.68	1/3 MHz NF
PK	V	14640.000	24.93	41.60	15.25	34.87	0.00	46.91	74.11	-27.20	100/300 kHz NF
PK	V	17080.000	22.06	40.72	18.66	37.60	0.00	43.84	74.11	-30.27	100/300 kHz NF
18-25GHz hand scan at a distance < 1 meter. No emissions were detected. Equipment used: EMC04, CBL030, ROS001											

Notes: AVG = PK - Average Factor, where Average Factor = 20*LOG(0.801/100) = 41.9 Db,
 Non-restricted emission limit = 74.11 dBuV/m, 20dB from carrier signal with 100kHz ResBW

Channel 26 (2480MHz), 1-25 GHz Radiated Emissions

Company: FXI, Inc. Antenna & Cables: SHF Bands: N, LF, HF, SHF
 Model #: SPU Antenna: HORN2 V3m 10-24-2012.txt HORN2 H3m 10-24-2012.txt
 Serial #: BOX1208061022-004 (Intertek Assigned) Cable(s): 145-416 3mTrkB 09-04-2012.txt
 Engineers: Kouma Sinn Location: 10m Chamber Barometer: DAV003 Filter: REA002
 Project #: G100806529 Date(s): 08/07/12
 Standard: FCC Part 15 Subpart C 15.247 Temp/Humidity/Pressure: 21C 72% 1006mbar
 Receiver: R&S ESI (145-128) 08-23-2012 Limit Distance (m): 3
 PreAmp: PRE145014 12-16-2012.txt Test Distance (m): 3
 PreAmp Used? (Y or N): Y Voltage/Frequency: 120VAC/60Hz Frequency Range: 1-25 GHz
 Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
Kouma Sinn 08/07/12 - 21C/72/1006mbar DAV003,CH26 (120VAC/60Hz), pwr setting -0.5dBm											
PK	V	2480.000	55.88	28.67	6.03	0.00	0.00	90.58	-	-	100/300 kHz
PK	H	2480.000	57.93	28.54	6.03	0.00	0.00	92.51	-	-	100/300 kHz
Tx CH 26, F = 2480 MHz, Spurious emissions, pwr setting -0.5 dBm											
PK	V	4960.000	52.90	33.30	9.41	34.25	0.00	61.35	74.00	-12.65	1/3 MHz RB
AVG	V	4960.000	11.00	33.30	9.41	34.25	0.00	19.45	54.00	-34.55	1/3 MHz RB
PK	V	7440.000	53.67	36.58	11.10	35.81	0.00	65.53	74.00	-8.47	1/3 MHz RB
AVG	V	7440.000	11.77	36.58	11.10	35.81	0.00	23.63	54.00	-30.37	1/3 MHz RB
PK	V	9920.000	27.70	38.27	13.57	34.78	0.00	44.75	72.51	-27.76	100/300 kHz NF
PK	V	12400.000	37.23	38.98	14.79	35.52	0.00	55.48	74.00	-18.52	1/3 MHz RB, NF
AVG	V	12400.000	-4.67	38.98	14.79	35.52	0.00	13.58	54.00	-40.42	1/3 MHz RB, NF
PK	V	14880.000	24.65	40.37	15.75	35.32	0.00	45.45	72.51	-27.06	100/300 kHz NF
PK	V	17360.000	25.90	42.09	23.22	36.91	0.00	54.30	72.51	-18.21	100/300 kHz NF

18-25GHz hand scan at a distance < 1 meter. No emissions were detected. Equipment used: EMC04, CBL030, ROS001

Notes: AVG = PK - Average Factor, where Average Factor = 20*LOG(0.801/100) = 41.9 Db,

Non-restricted emission limit = 72.51 dBuV/m, 20dB from carrier signal with 100kHz ResBW

Test Personnel: Kouma Sinn *KPS*

Test Date: 08/07/2012

Supervising Engineer: N/A
 (Where Applicable)

Product Standard: FCC Part 15.247, RSS-210

Input Voltage: 120VAC/60Hz

Pretest Verification w/ Ambient Signals or BB Source: Yes

Test Levels: Emissions below the limits specified in Section 7.3

Ambient Temperature: 21 °C

Relative Humidity: 72 %

Atmospheric Pressure: 1006 mbar

Deviations, Additions, or Exclusions: None

8 6 dB Bandwidth

8.1 Method

Tests are performed in accordance with ANSI C63.4:2003, CFR47 FCC Part 15 Subpart C 15.247, IC RSS-210 Issue 8 December 2010, IC RSS-Gen Issue 3 December 2010, and KDB 558074v01 06/15/2012.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A wooden table 80 cm high is used for table-top equipment.

8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV003'	Weather Station	Davis Instruments	7400	PE80529A39A	08/17/2011	09/17/2012
HORN2'	HORN ANTENNA	EMCO	3115	9602-4675	10/24/2011	10/24/2012
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	09/04/2011	09/04/2012
145128'	EMI Receiver 40 GHz (20 Hz - 40 Ghz)	Rohde & Schwarz	ESI	8392831001	08/23/2011	09/23/2012

Software Utilized:

Name	Manufacturer	Version
None		

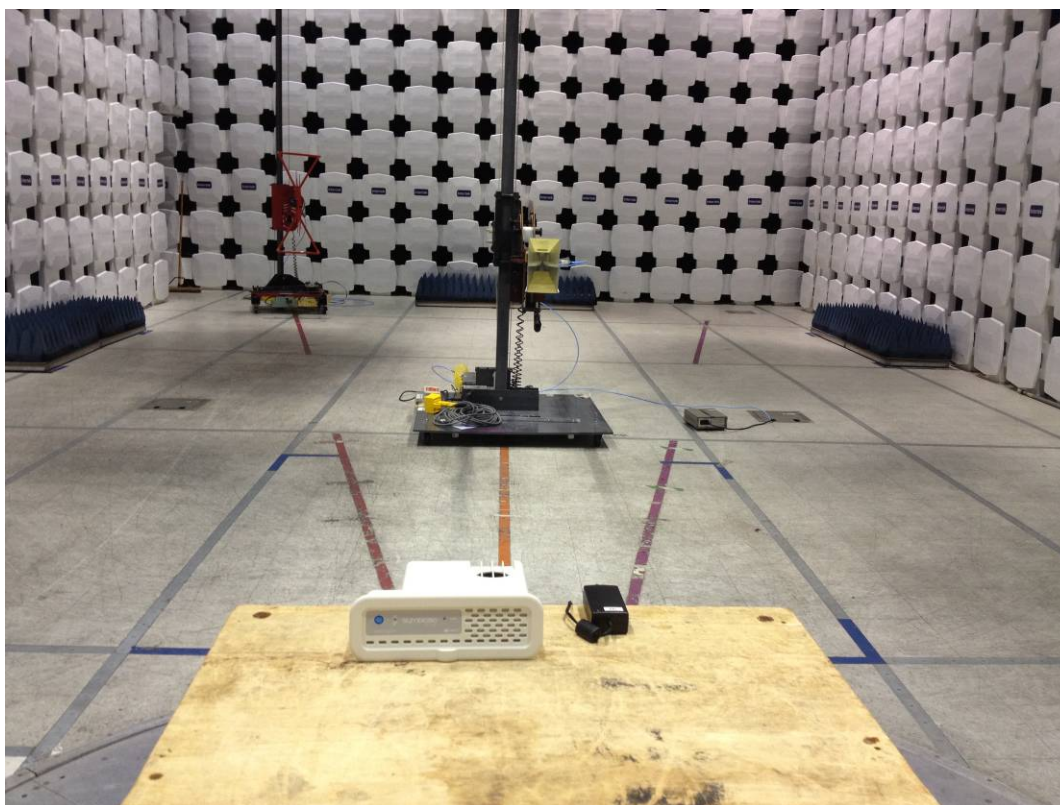
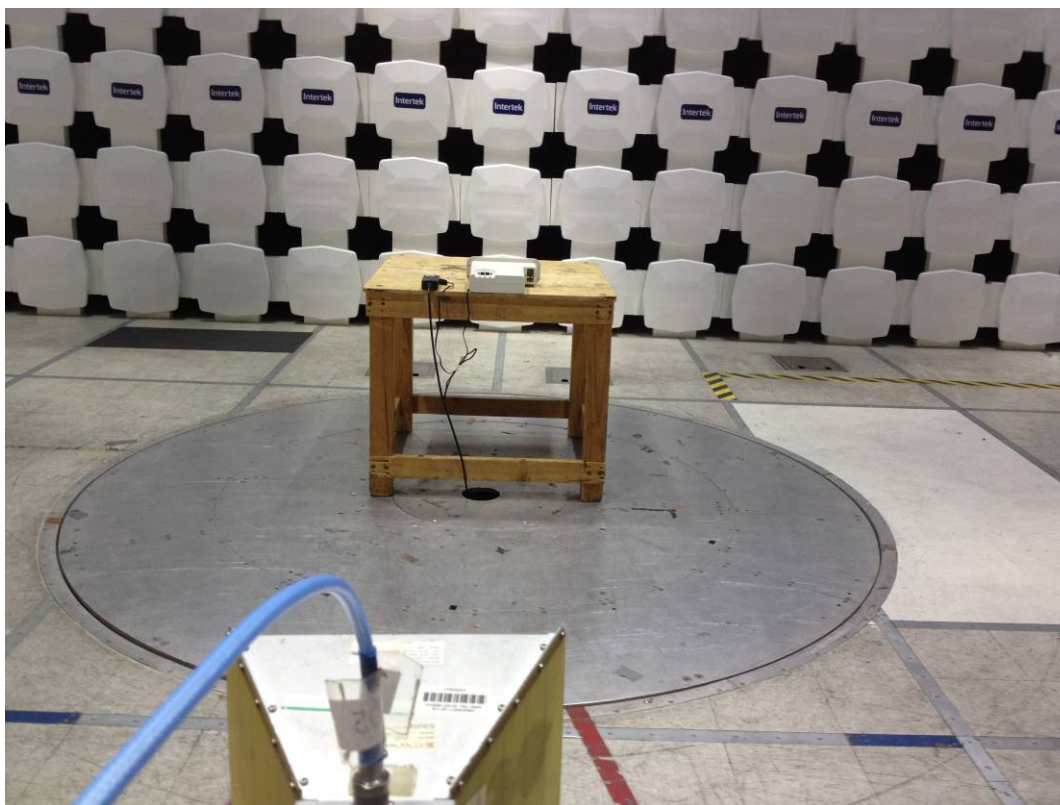
8.3 Results:

The 99% power bandwidth, or 6 dB bandwidth, must not be less than 500 kHz. The sample tested was found to comply.

Channels	6 dB Bandwidth	99% Power Bandwidth
Channel 11 (2405 MHz)	1.753 MHz	2.806 MHz
Channel 18 (2440 MHz)	1.854 MHz	2.790 MHz
Channel 26 (2480 MHz)	1.597 MHz	2.725 MHz

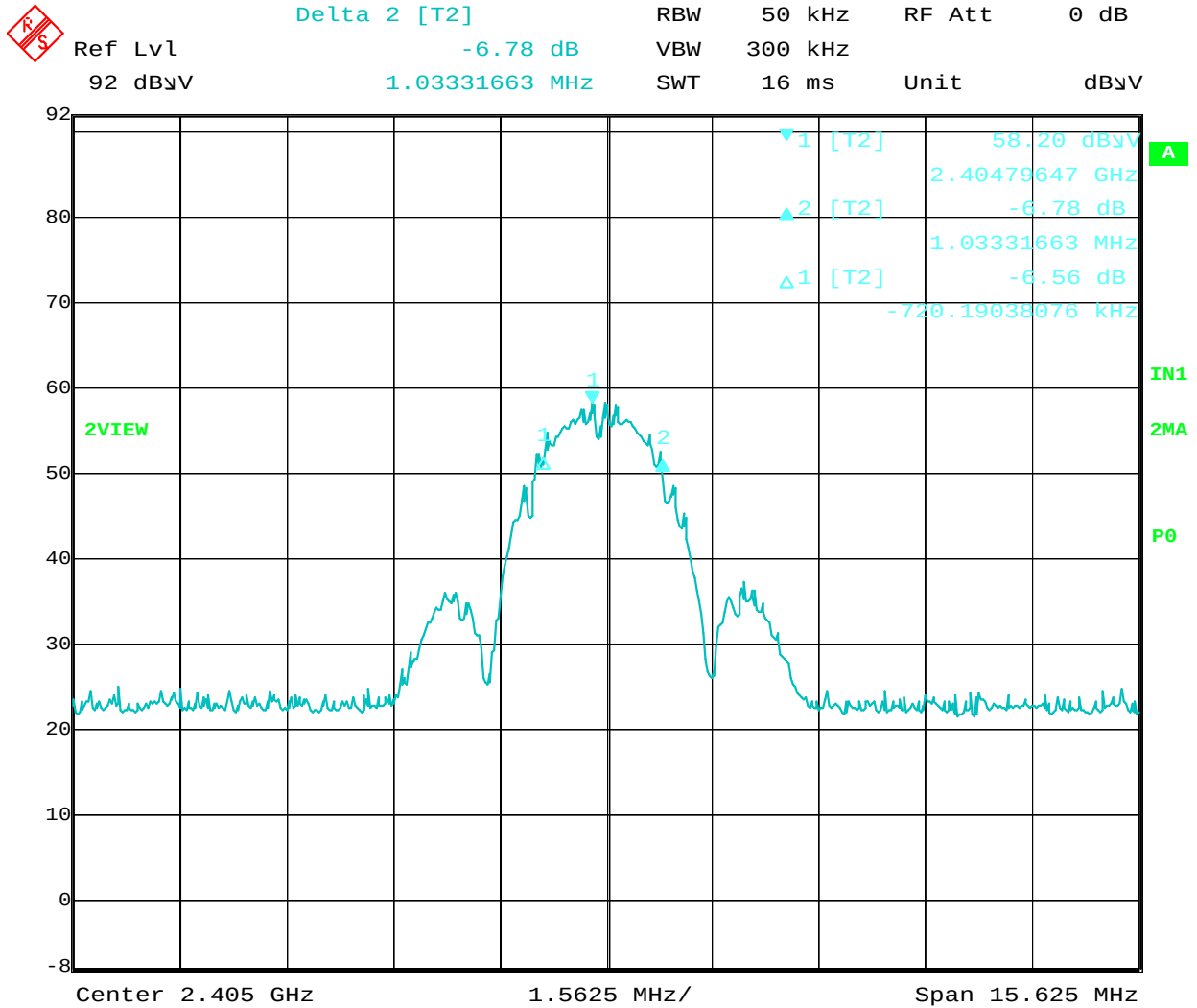
Plots were taken using an RBW of ~1-5% of the measured emission bandwidth, per KDB 558074v01 06/15/2012 and IC RSS-Gen Section 4.6.2.

8.4 Setup Photographs:



8.5 Test Data:

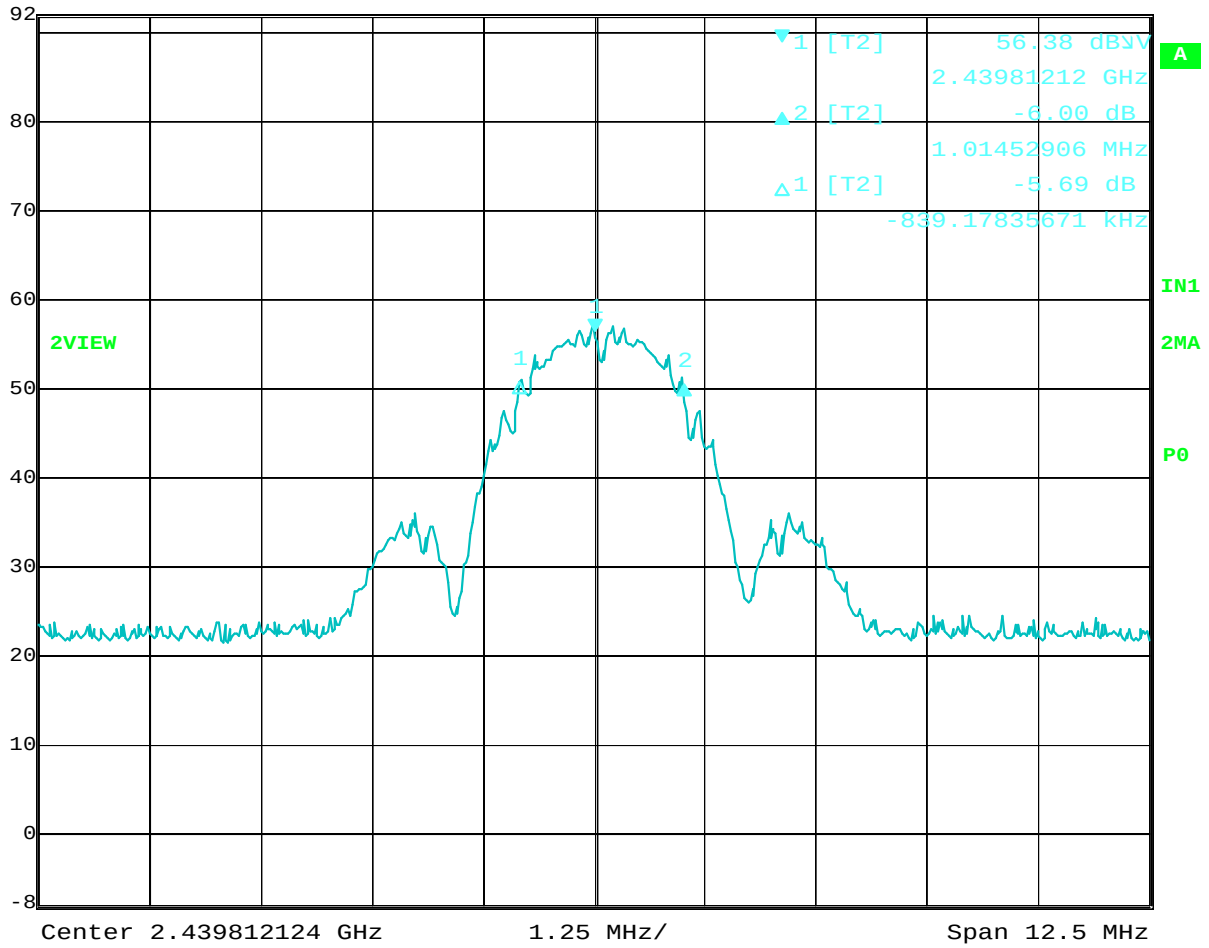
6 dB Bandwidth (Channel 11, 2405MHz)



6 dB Bandwidth (Channel 18, 2440MHz)



Ref Lvl	Delta 2 [T2]	RBW	50 kHz	RF Att	0 dB
92 dBμV	-6.00 dB	VBW	300 kHz		
	1.01452906 MHz	SWT	12.5 ms	Unit	dBμV

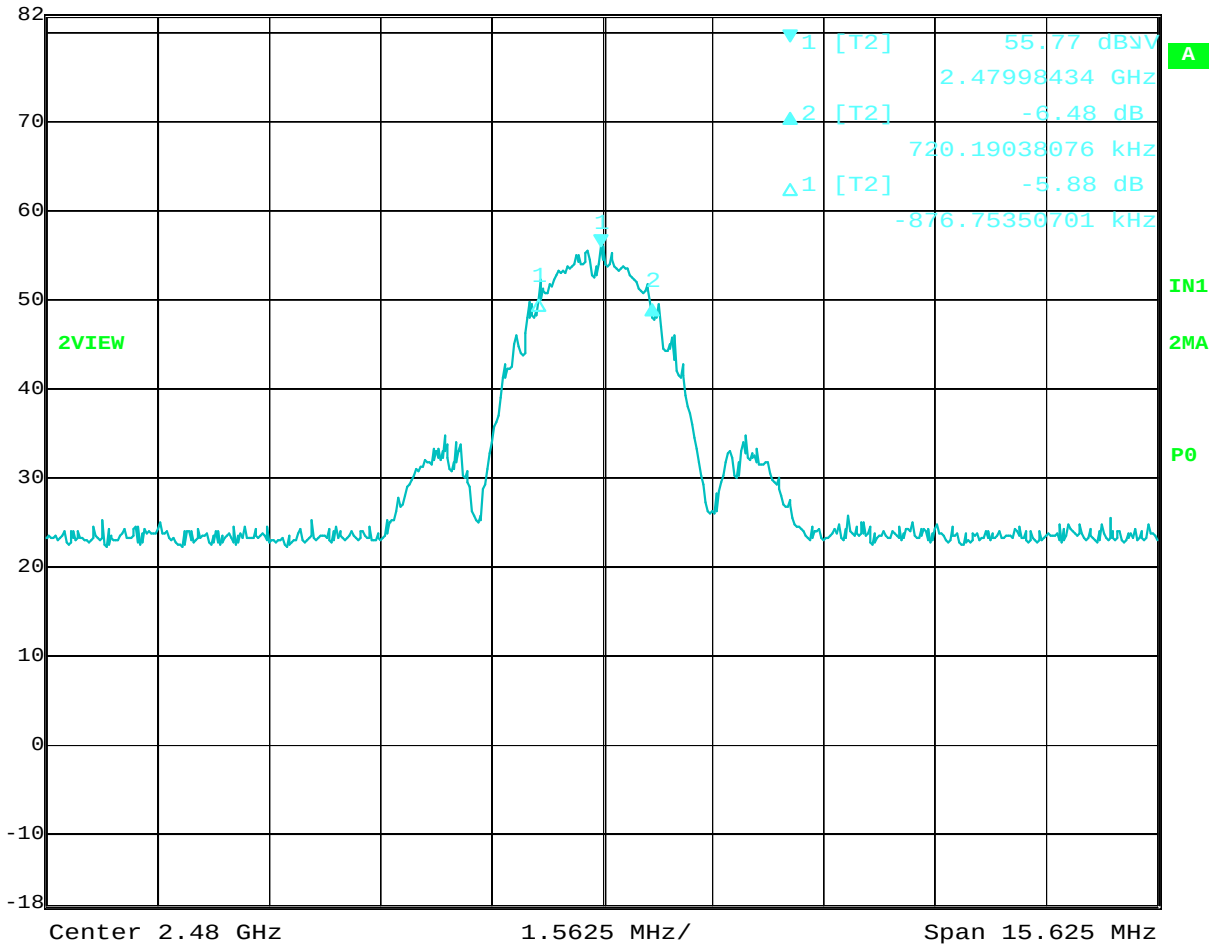


Date: 7.AUG.2012 13:23:40

6 dB Bandwidth (Channel 26, 2480MHz)



Ref Lvl	Delta 2 [T2]	RBW	50 kHz	RF Att	0 dB
82 dBμV	-6.48 dB	VBW	300 kHz		
	720.19038076 kHz	SWT	16 ms	Unit	dBμV

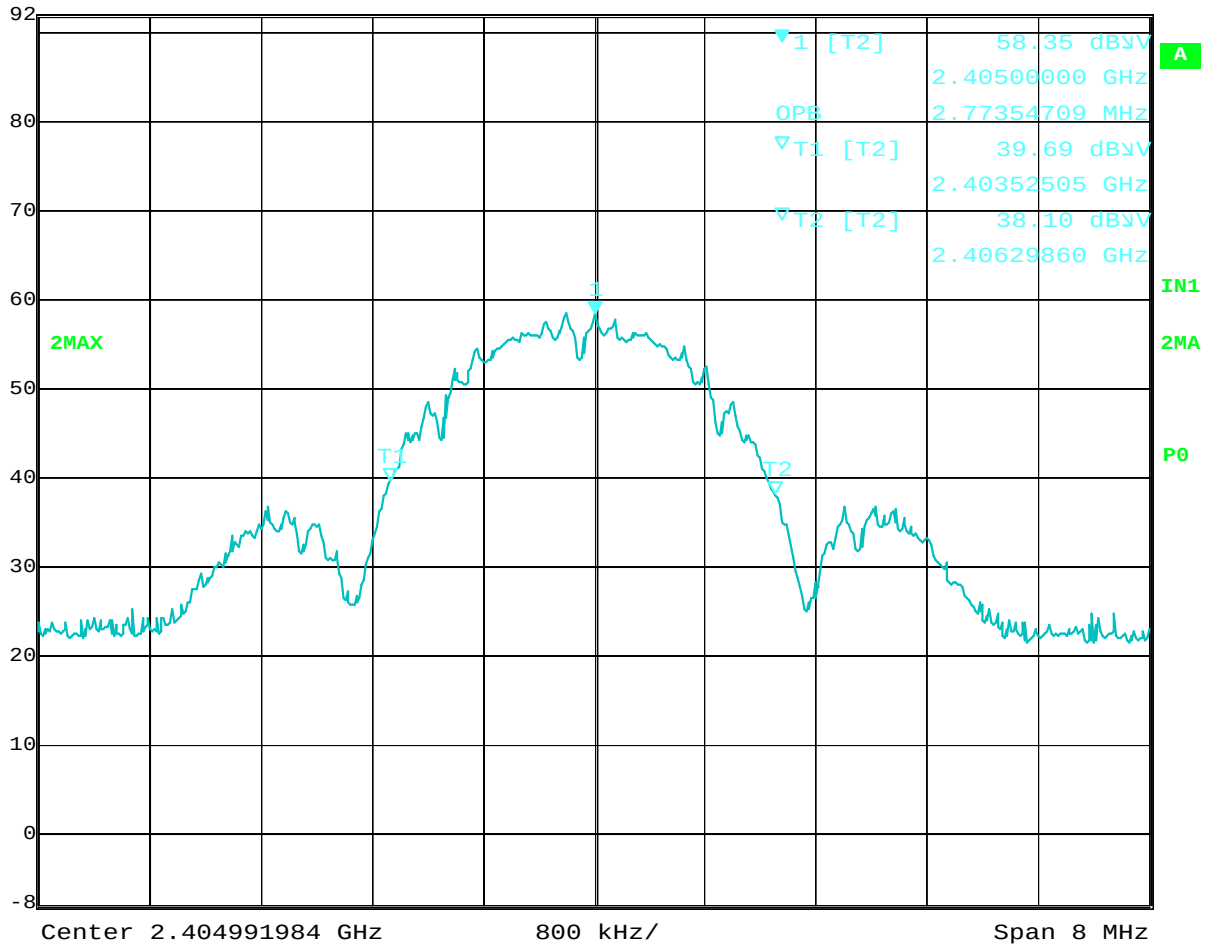


Date: 7.AUG.2012 16:40:39

99% Power Bandwidth (Channel 11, 2405MHz)



Ref Lvl	Marker 1 [T2]	RBW	50 kHz	RF Att	0 dB
92 dBμV	58.35 dBμV	VBW	300 kHz		
	2.40500000 GHz	SWT	8 ms	Unit	dBμV

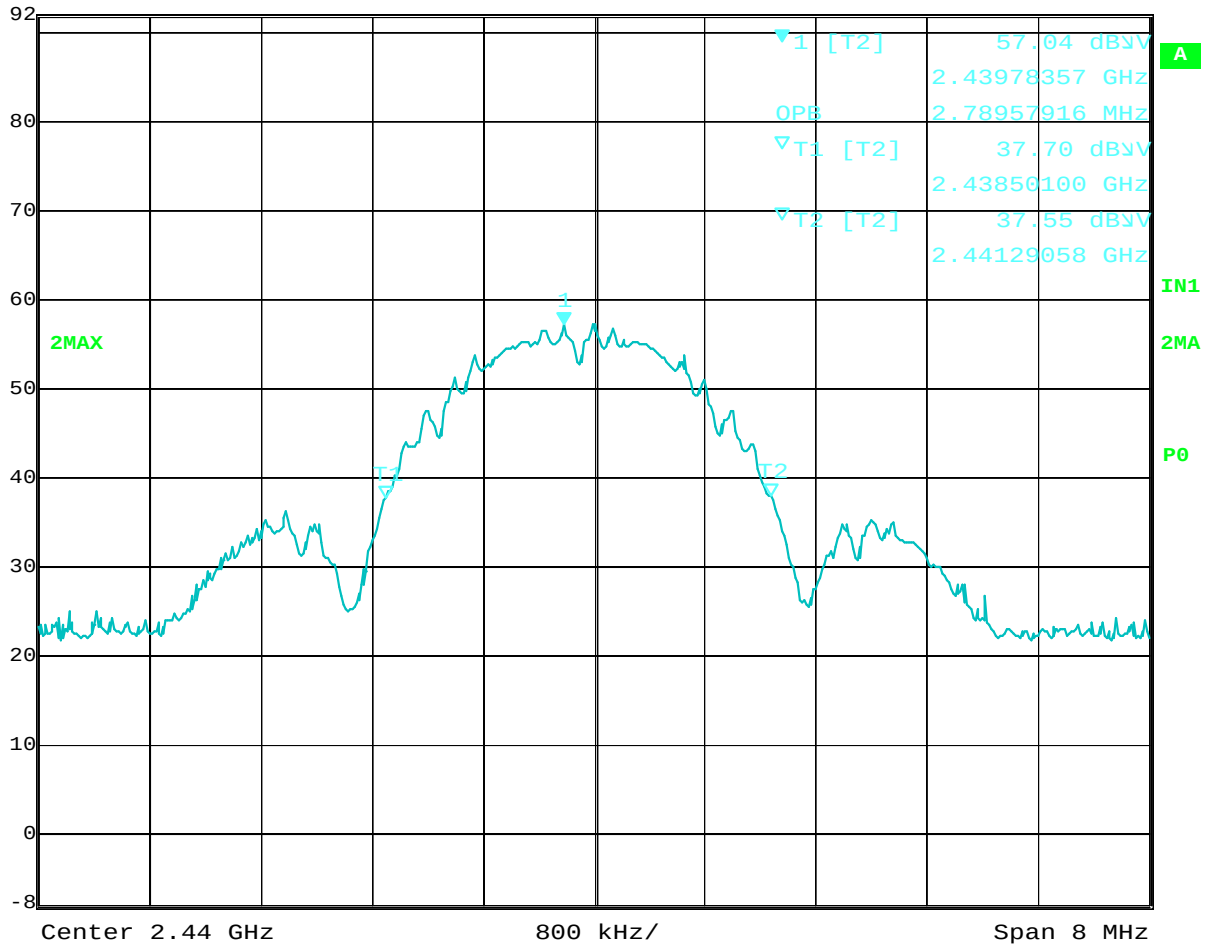


Date: 7.AUG.2012 15:04:51

99% Power Bandwidth (Channel 18, 2440MHz)



Marker 1 [T2] RBW 50 kHz RF Att 0 dB
 57.04 dBμV VBW 300 kHz
 Ref Lvl 92 dBμV 2.43978357 GHz SWT 8 ms Unit dBμV

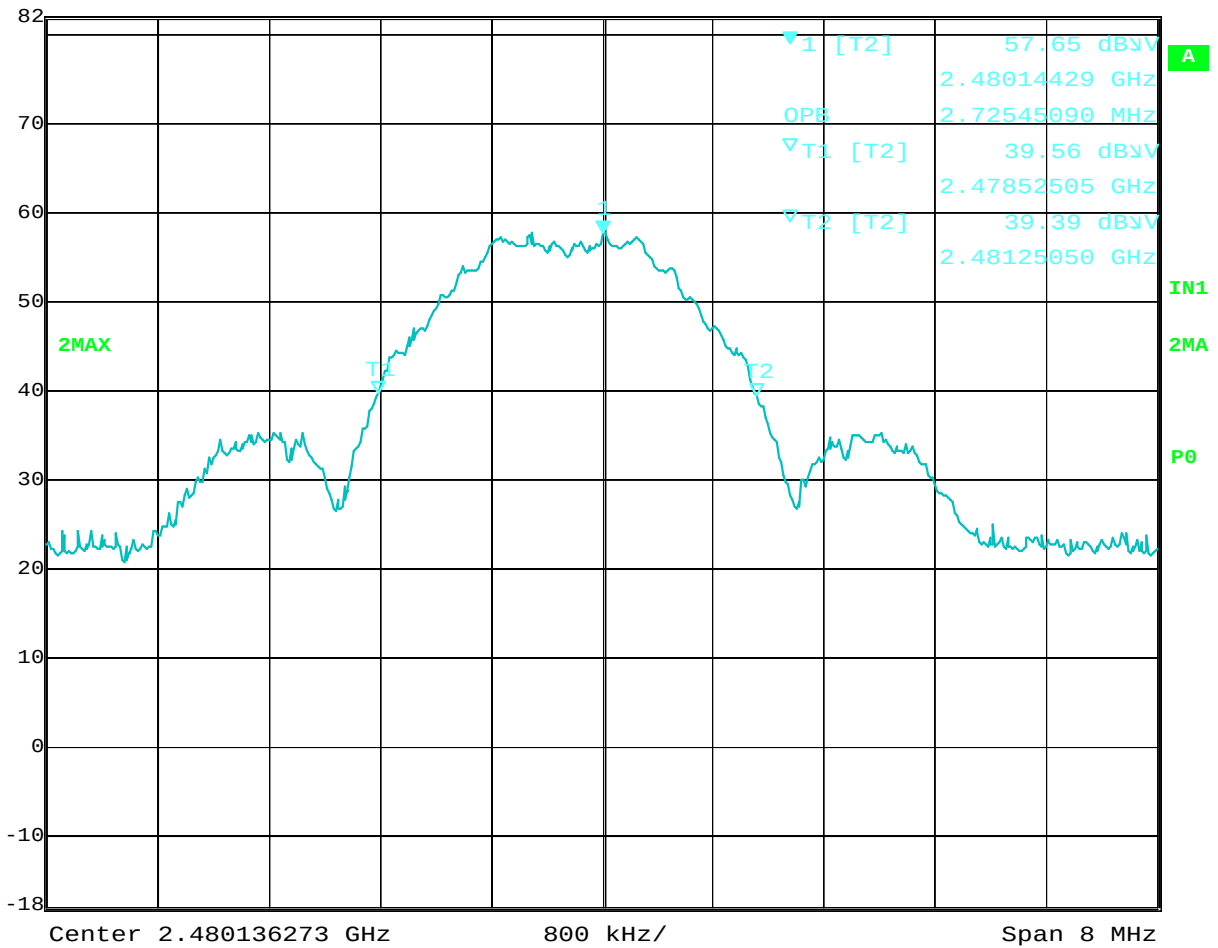


Date: 7.AUG.2012 13:35:13

99% Power Bandwidth (Channel 26, 2480MHz)



Marker 1 [T2] RBW 100 kHz RF Att 0 dB
57.65 dBμV
Ref Lvl 82 dBμV VBW 300 kHz
2.48014429 GHz SWT 5 ms Unit dBμV



Date: 7.AUG.2012 16:45:08

Test Personnel: Kouma Sinn *KPS*

Test Date: 08/07/2012

Supervising Engineer:
(Where Applicable) N/A

Test Levels: >500kHz

Product Standard: FCC Part 15.247, RSS-210 Annex 8

Ambient Temperature: 21 °C

Input Voltage: 120VAC/60Hz

Relative Humidity: 72 %

Pretest Verification w/ Ambient
Signals or BB Source: Ambient Signals

Atmospheric Pressure: 1006 mbar

Deviations, Additions, or Exclusions: None

9 Power Spectral Density

9.1 Method

Tests are performed in accordance with FCC 15 Subpart C Section 15.247 (e), RSS-210 Issue 8 December 2010, A8.2 (b), KDB 558074 Section 5.3.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A wooden table 80 cm high is used for table-top equipment.

9.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV003'	Weather Station	Davis Instruments	7400	PE80529A39A	08/17/2011	09/17/2012
HORN2'	HORN ANTENNA	EMCO	3115	9602-4675	10/24/2011	10/24/2012
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	09/04/2011	09/04/2012
145128'	EMI Receiver 40 GHz (20 Hz - 40 Ghz)	Rohde & Schwarz	ESI	8392831001	08/23/2011	09/23/2012

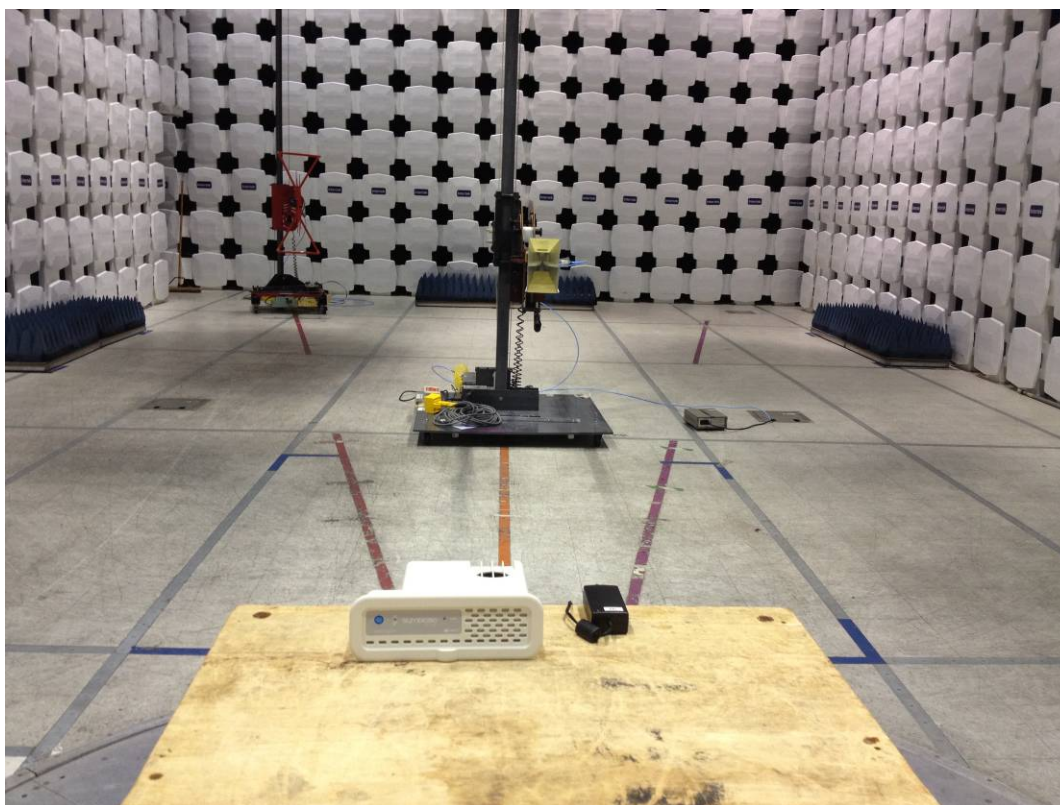
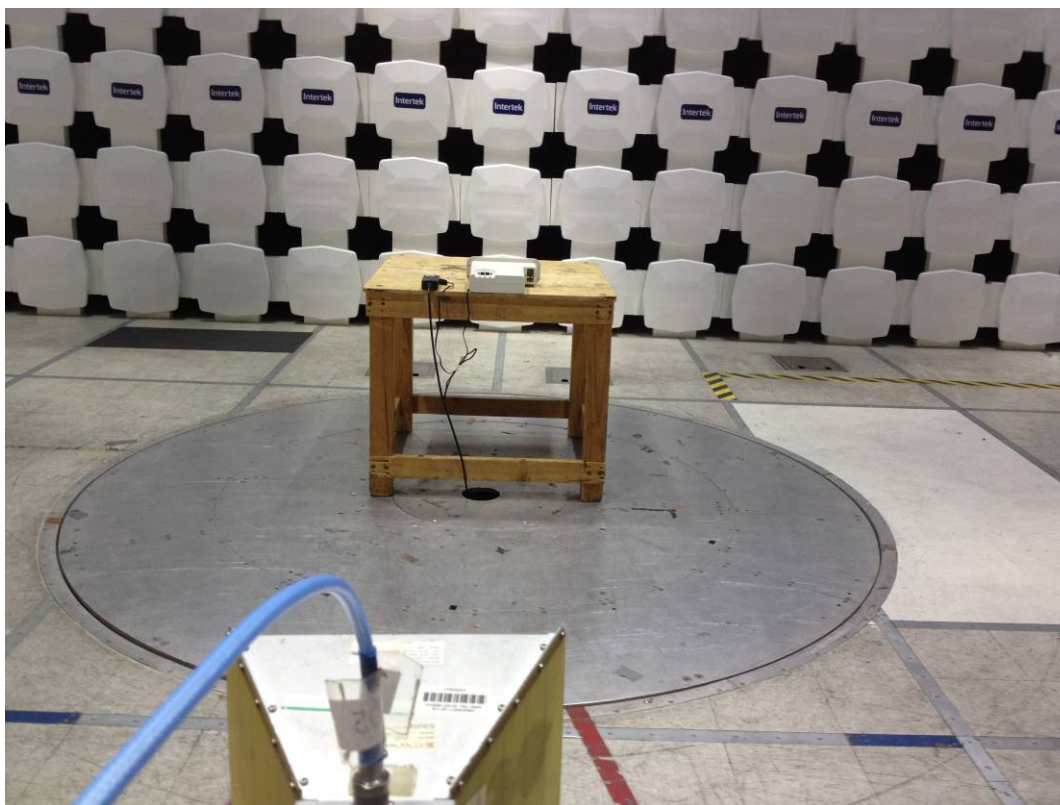
Software Utilized:

Name	Manufacturer	Version
Excel 2003	Microsoft	(11.8231.8221) SP3
EMI Boxborough.xls	Intertek	08/27/10

9.3 Results:

The peak power spectral density must not exceed 8 dBm in any 3 kHz bandwidth. The sample tested was found to comply.

9.4 Setup Photographs:



9.5 Test Data:

Channel 11, 18, 26, Power Spectral Density Radiated Emissions

Company: FXI, Inc. Antenna & Cables: SHF Bands: N, LF, HF, SHF
 Model #: SPU Antenna: HORN2 V3m 10-24-2012.txt HORN2 H3m 10-24-2012.txt
 Serial #: BOX1208061022-004 (Intertek Assigned) Cable(s): 145-416 3mTriB 09-04-2012.txt
 Engineers: Kouma Sinn Location: 10m Chamber Barometer: DAV003 Filter:
 Project #: G100806529 Date(s): 08/07/12
 Standard: FCC Part 15 Subpart C 15.247 Temp/Humidity/Pressure: 21C 72% 1006mbar
 Receiver: R&S ESI (145-128) 08-23-2012 Limit Distance (m): 3
 PreAmp: PRE145014 12-16-2012.txt Test Distance (m): 3
 PreAmp Used? (Y or N): N Voltage/Frequency: 120VAC/60Hz Frequency Range: Fundamental Frequencies
 Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dBm	Limit dBm	Margin dB	Bandwidth
08/07/12 - 21C/72/1006mbar DAV003, (120VAC/60Hz) Reduced power setting to -0.5dBm											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2440.000	43.37	28.60	5.98	0.00	0.00	-17.27	8.00	-25.27	3/10 kHz
PK	H	2440.000	46.24	28.43	5.98	0.00	0.00	-14.57	8.00	-22.57	3/10 kHz
PK	V	2405.000	45.92	28.55	5.93	0.00	0.00	-14.82	8.00	-22.82	3/10 kHz
PK	H	2405.000	47.29	28.33	5.93	0.00	0.00	-13.67	8.00	-21.67	3/10 kHz
PK	V	2480.000	43.62	28.67	6.03	0.00	0.00	-16.90	8.00	-24.90	3/10 kHz
PK	H	2480.000	45.21	28.54	6.03	0.00	0.00	-15.43	8.00	-23.43	3/10 kHz

Test Personnel: Kouma Sinn *KPS* Test Date: 08/07/2012
 Supervising Engineer: N/A Test Levels: PSD must be below 8 dBm
 Product Standard: FCC Part 15.247, RSS-210 Annex 8 Ambient Temperature: 21 °C
 Input Voltage: 120VAC/60Hz Relative Humidity: 72 %
 Pretest Verification w/ Ambient Signals or BB Source: Ambient Signals Atmospheric Pressure: 1006 mbar

Deviations, Additions, or Exclusions: None

10 Band-edge Compliance

10.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C Section 15.247, KDB558074, and RSS-210 Annex 8.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A wooden table 80 cm high is used for table-top equipment.

10.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV003'	Weather Station	Davis Instruments	7400	PE80529A39A	08/17/2011	08/17/2012
HORN2'	HORN ANTENNA	EMCO	3115	9602-4675	10/24/2011	10/24/2012
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	09/04/2011	09/04/2012
145128'	EMI Receiver 40 GHz (20 Hz - 40 GHz)	Rohde & Schwarz	ESI	8392831001	08/23/2011	08/23/2012

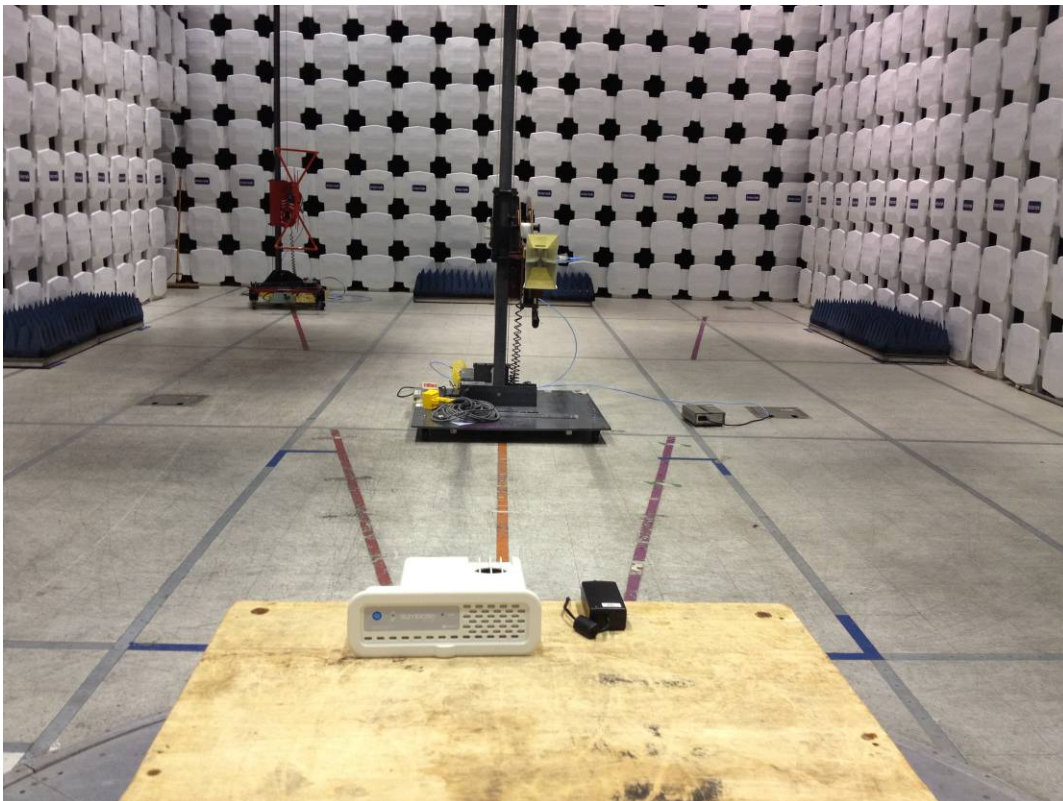
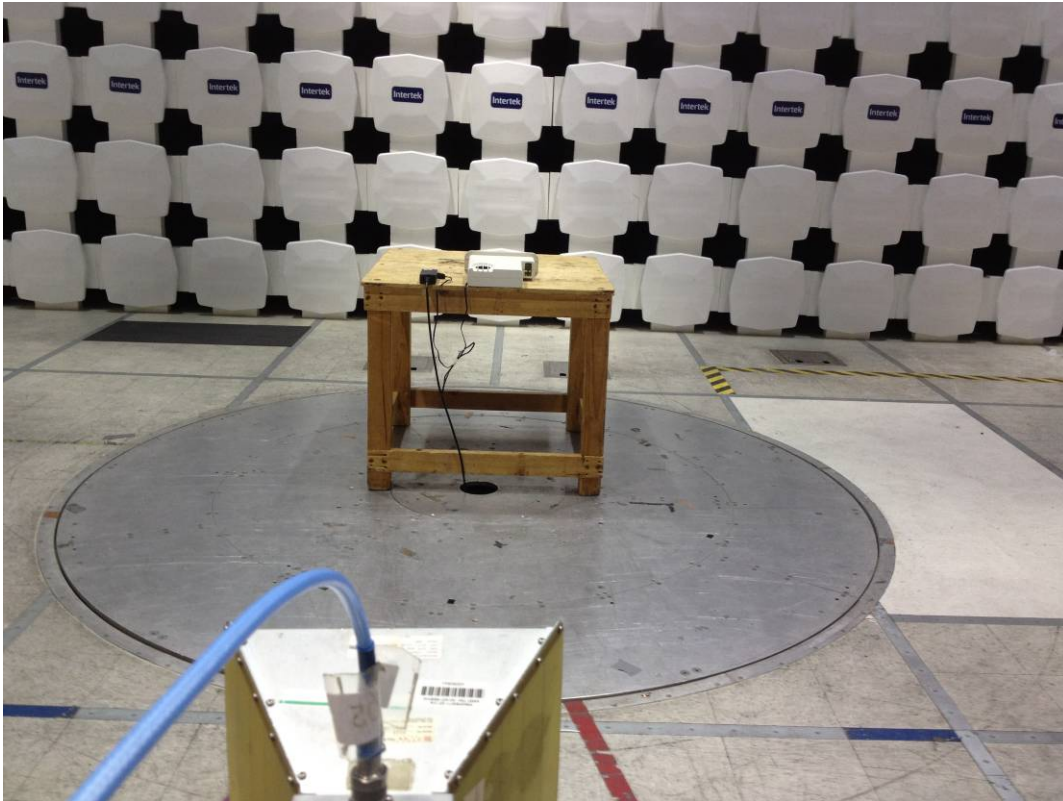
Software Utilized:

Name	Manufacturer	Version
Excel 2003	Microsoft	(11.8231.8221) SP3
EMI Boxborough.xls	Intertek	08/27/10

10.3 Results:

The sample tested was found to comply.

Spurious emissions at the band edges must be at least 20 dB lower than the fundamental field strength when measured with a 100 kHz bandwidth, without the need to be below the general limits of FCC Part 15 Section 15.209 and of RSS-Gen 7.2.5 Table 5. Emissions in restricted bands must meet the general limits of FCC Part 15 Section 15.209 and of RSS-Gen 7.2.5 Table 5.

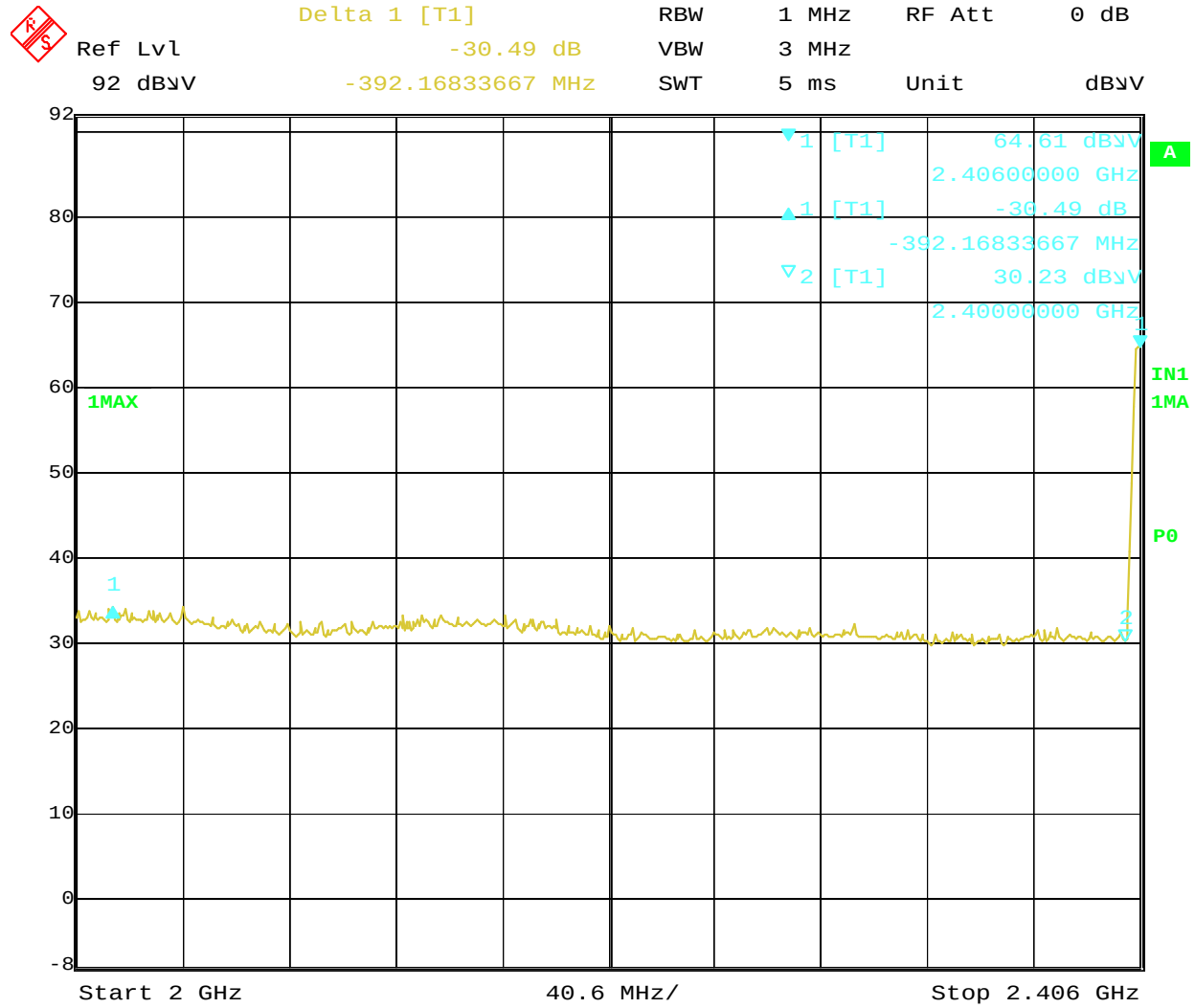
10.4 Setup Photographs:

10.5 Test Data:**Upper Band Edge****Radiated Emissions**

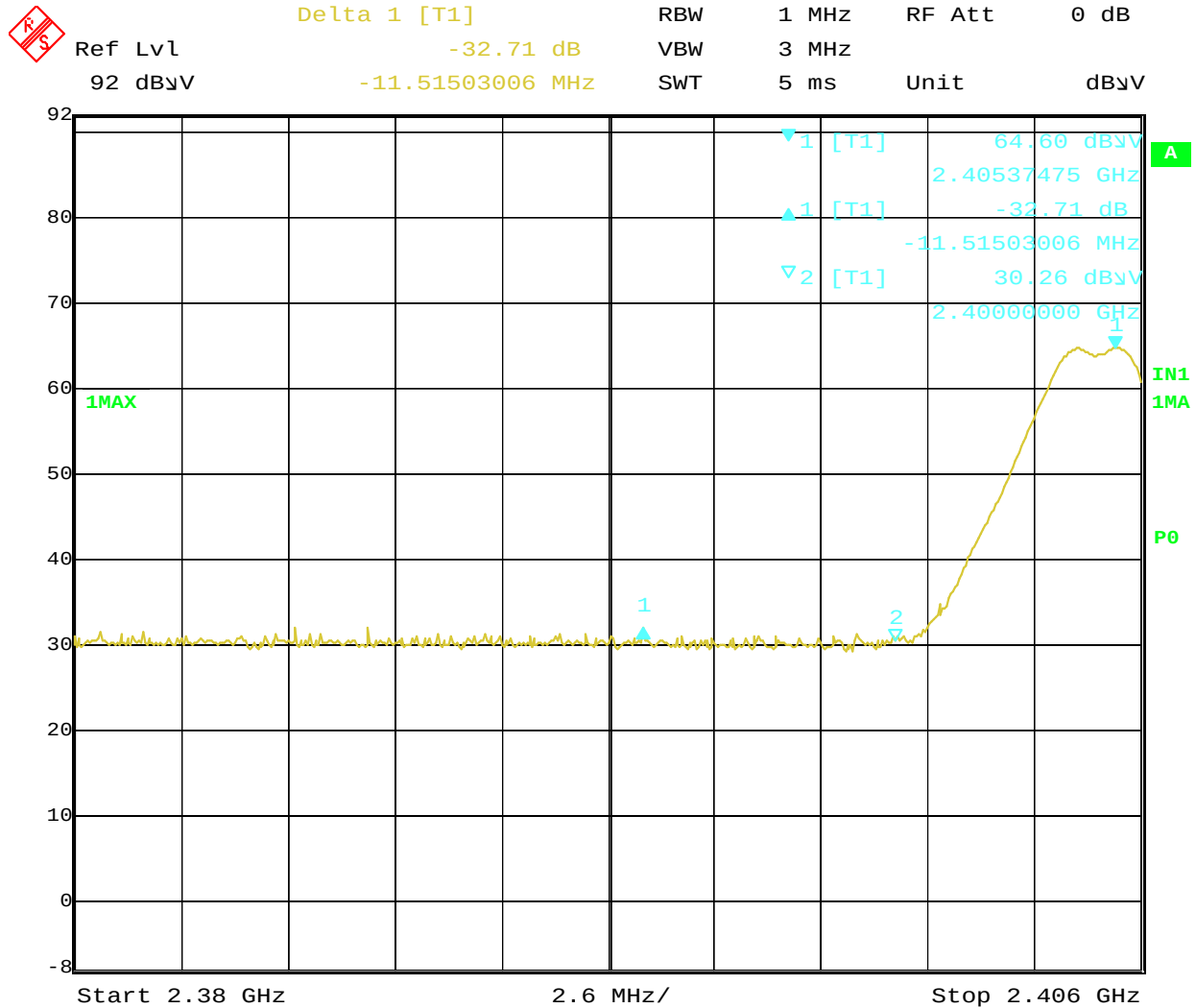
Company: FXI
 Model #: SPU
 Serial #: BOX1208061022-004 (Intertek Assigned)
 Engineers: Vathana Ven
 Project #: G100806529
 Standard: FCC Part 15 Subpart C 15.247
 Receiver: R&S ESI (145-128) 08-23-2012
 PreAmp: PRE145014 12-16-2012.txt
 PreAmp Used? (Y or N): N
 Antenna & Cables: SHF Bands: N, LF, HF, SHF
 Antenna: HORN2 V3m 10-24-2012.txt HORN2 H3m 10-24-2012.txt
 Cable(s): 145-416 3mTrkB 09-04-2012.txt
 Location: 10m Chamber Barometer: DAV003 Filter: None
 Date(s): 08/07/12
 Temp/Humidity/Pressure: 21C 72% 1006mbar
 Limit Distance (m): 3
 Test Distance (m): 3
 Voltage/Frequency: 120VAC/60Hz Frequency Range: See below
 Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
Note: Upper Band Edge Compliance											
PK	V	2483.500	32.09	28.67	6.04	0.00	0.00	66.80	74.00	-7.20	1/3 MHz RB
AVG	V	2483.500	-9.81	28.67	6.04	0.00	0.00	24.90	54.00	-29.10	1/3 MHz RB
Note: Upper Band Edge Compliance, Integrated to 1 MHz RBW Equivalent											
PK	V	2484.000	29.26	28.67	6.04	0.00	0.00	63.97	74.00	-10.03	10 kHz/30 kHz RB
AVG	V	2484.000	-12.64	28.67	6.04	0.00	0.00	22.07	54.00	-31.93	10 kHz/30 kHz RB
Note: Upper Band Edge Compliance, Integrated to 1 MHz RBW Equivalent											
PK	V	2484.000	31.60	28.67	6.04	0.00	0.00	66.31	74.00	-7.69	100/300kHz RB
AVG	V	2484.000	-10.30	28.67	6.04	0.00	0.00	24.41	54.00	-29.59	100/300kHz RB
Note: Upper Band Edge Compliance, Integrated to 1 MHz RBW Equivalent											
PK	V	2484.000	29.99	28.67	6.04	0.00	0.00	64.70	74.00	-9.30	500kHz/3MHz RB
AVG	V	2484.000	-11.91	28.67	6.04	0.00	0.00	22.80	54.00	-31.20	500kHz/3MHz RB

Lower Band Edge



Date: 7.AUG.2012 21:09:10



Date: 7.AUG.2012 21:13:54

Test Personnel: Vathana F. Ven *VFV*

Test Date: 08/07/2012

Supervising Engineer: _____
(Where Applicable) N/A
Product Standard: FCC Part 15.247, RSS-210 Annex 8

Test Levels:	Emissions below the limits specified in Section 10.3
Ambient Temperature:	21 °C

Input Voltage:	120VAC/60Hz
Pretest Verification w/ Ambient Signals or BB Source:	Ambient Signals

Relative Humidity: 72 %
Atmospheric Pressure: 1006 mbar

11 Digital Device Radiated Spurious Emissions

11.1 Method

Tests are performed in accordance with CFR47 FCC Part 15 Subpart B, IC ICES-003, ANSI C 63.4:2003, and RSS-Gen.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A wooden table 80 cm high is used for table-top equipment.

Measurement Uncertainty

For radiated emissions, U_{lab} (3.5 dB at 3m and 3.5 dB at 10m below 1 GHz, and 4.2 dB at 3m above 1

GHz) < U_{CISPR} (5.2 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 52.0 dB μ V
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dB μ V/m

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

NF = Net Reading in dB μ V

Example:

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$
$$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$

11.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
145128	EMI Receiver 40 GHz (20 Hz - 40 Ghz)	Rohde & Schwarz	ESI	8392831001	08/23/2011	09/23/2012
MAN1	Digital 4 Line Barometer	Mannix	0ABA116	MAN1	08/13/2012	08/13/2014
145034	BiLog Antenna (30 MHz to 1GHz)	Schaffner Chase EMC	CBL6111C	2564	02/07/2012	02/07/2013
145-410	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	09/04/2011	09/04/2012

Software Utilized:

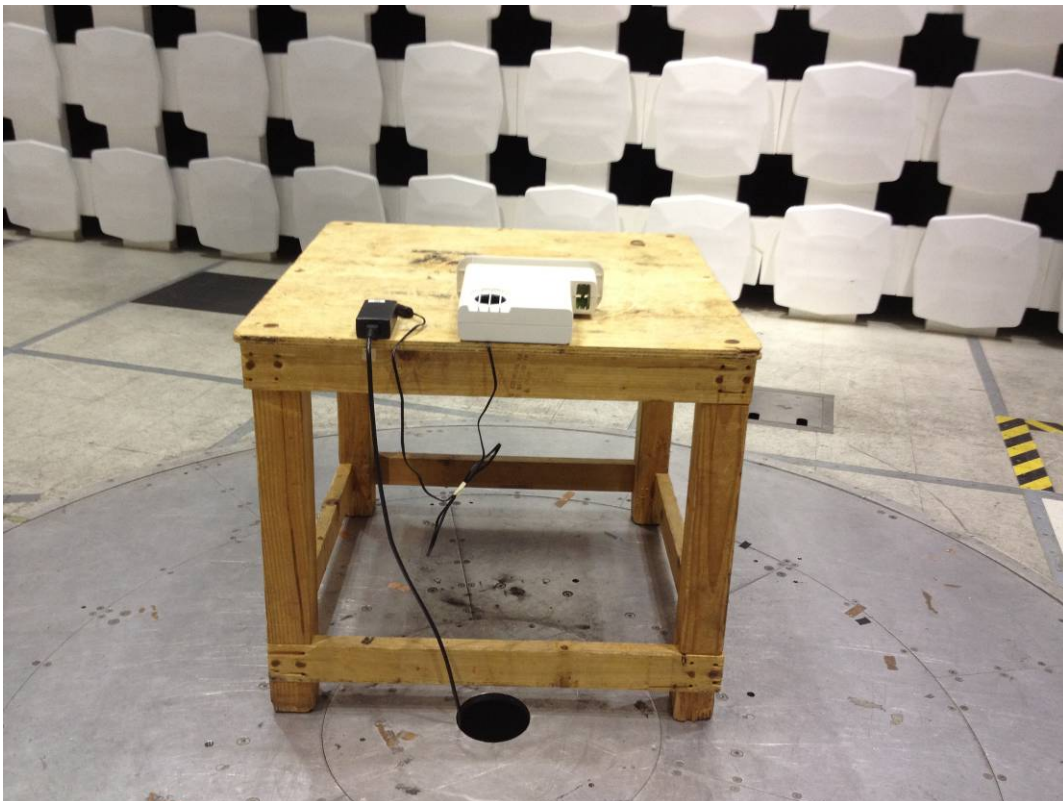
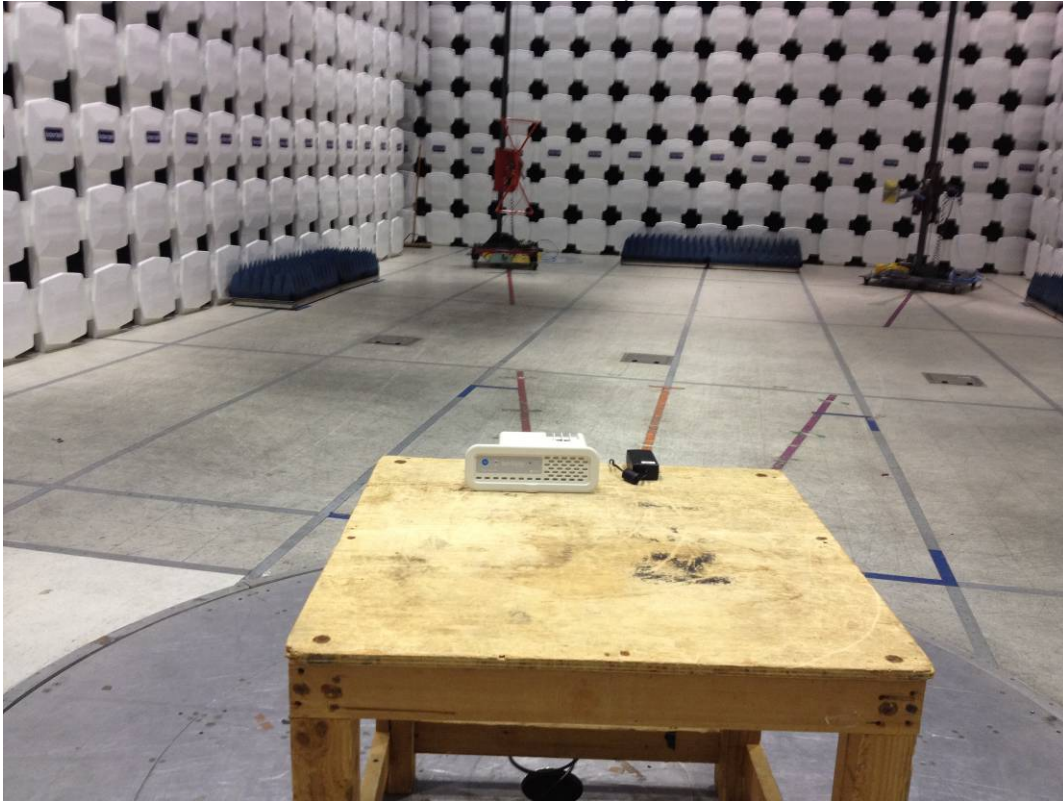
Name	Manufacturer	Version
C5	Teseq	Build 5.26.46.46

11.3 Results:

The sample tested was found to comply.

11.4 Setup Photograph:

30-1000 MHz Test Setup Photos



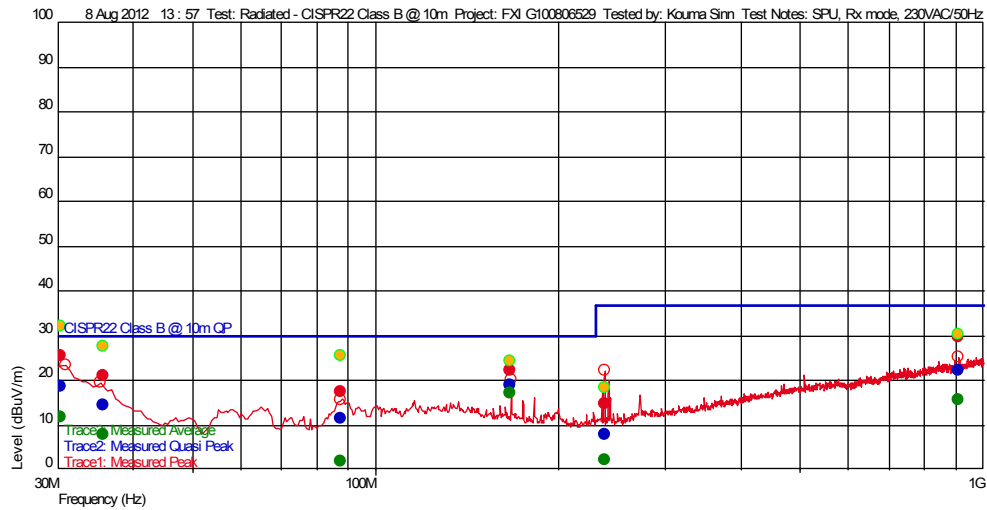
11.5 Test Data:

Test Information

Test Details
 Test: Radiated - CISPR22 Class B @ 10m
 Project: FXI G100806529
 Test Notes: SPU, Rx mode, 230VAC/50Hz
 Temperature: 21C
 Humidity: 72%, 1005mbar
 Tested by: Kouma Sinn
 Test Started: 8 Aug 2012 13 : 57

Additional Information

Prescan Emission Graph



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable
- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

Emissions Test Data

Trace2: Measured Quasi Peak

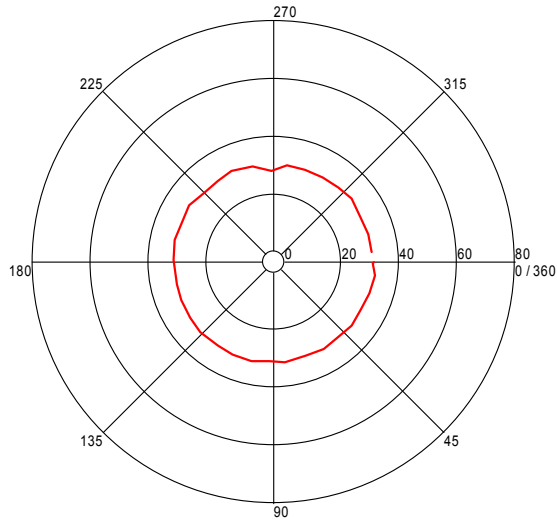
Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (-), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
238.695992056 M	7.92	11.548	-24.186	37.000	-29.08	--	187	1.77	120 k	
87.762524727 M	11.45	7.476	-25.470	30.000	-18.55		8	3.29	120 k	
35.636672964 M	14.45	17.318	-26.095	30.000	-15.55		310	2.37	120 k	
910.09619206 M	22.25	22.398	-22.641	37.000	-14.75		167	3.29	120 k	
30.421242597 M	18.65	20.863	-26.114	30.000	-11.35		18	2.16	120 k	
167.166132144 M	19.00	11.983	-24.579	30.000	-11.00		0	1.05	120 k	

Notes: Used CISPR 22 Class B limits as referenced in 15.109.

Azimuth Plots

Turntable Plot (30.421242597 MHz)

Level (dBuV/m)

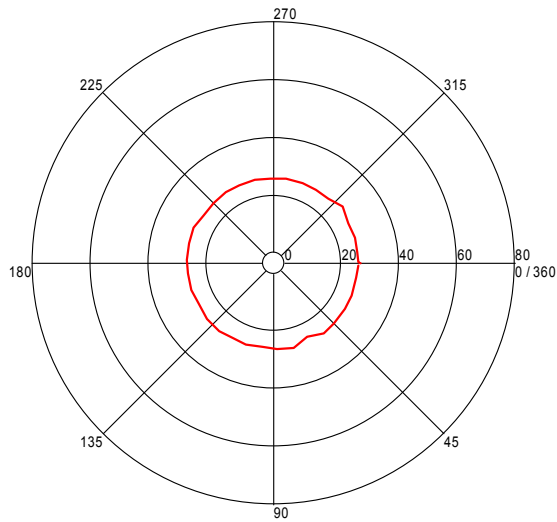


All Polarities

Azimuth (Degrees)

Turntable Plot (35.636672964 MHz)

Level (dBuV/m)

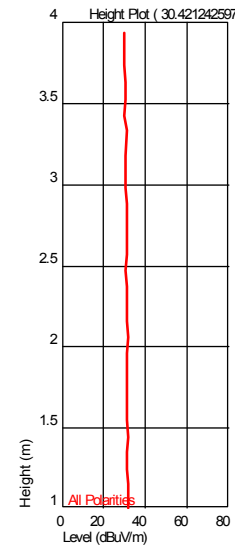


All Polarities

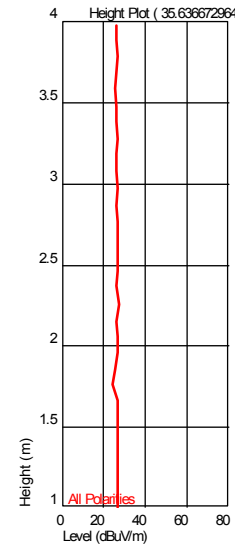
Azimuth (Degrees)

Turntable Plots

Height Plot (30.421242597 MHz)

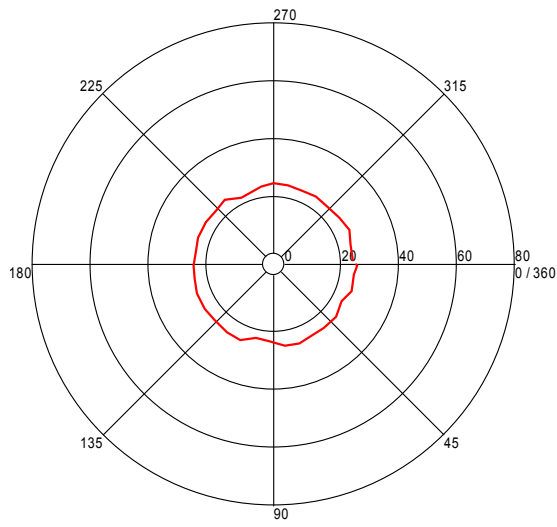


Height Plot (35.636672964 MHz)



Turntable Plot (87.762524727 MHz)

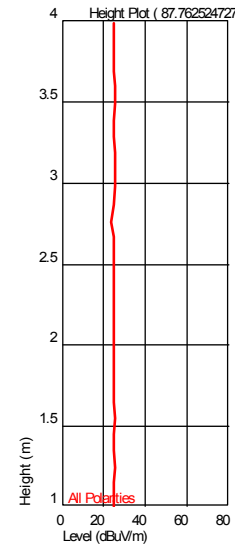
Level (dBuV/m)



All Polarities

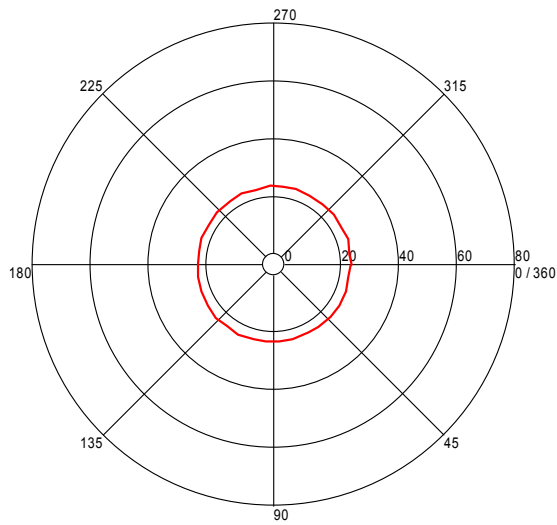
Azimuth (Degrees)

Height Plot (87.762524727 MHz)



Turntable Plot (167.166132144 MHz)

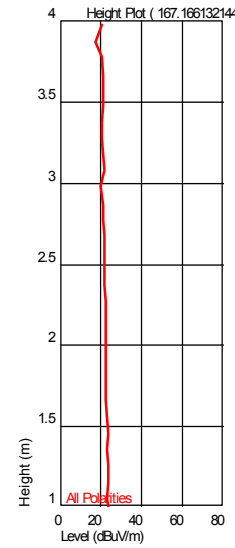
Level (dBuV/m)



All Polarities

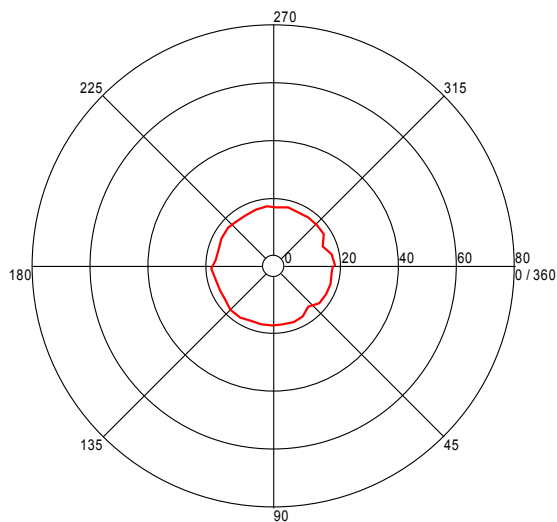
Azimuth (Degrees)

Height Plot (167.166132144 MHz)



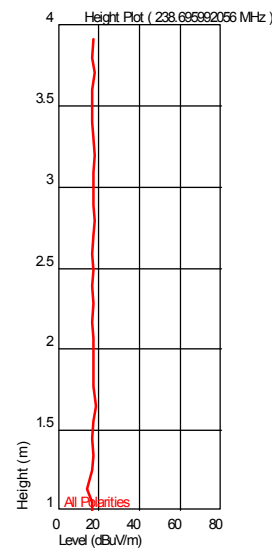
Turntable Plot (238.69592056 MHz)

Level (dBuV/m)



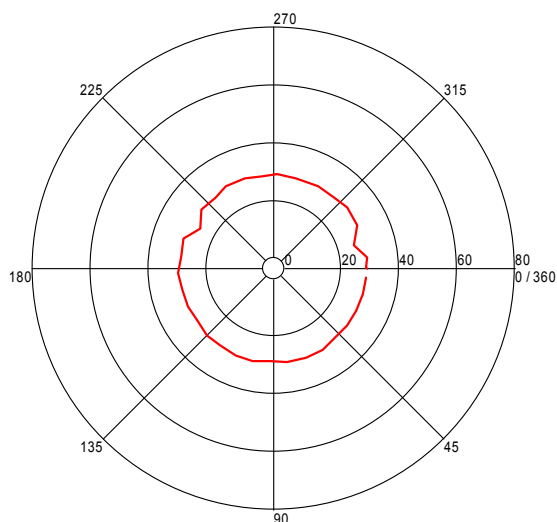
All Polarities

Azimuth (Degrees)



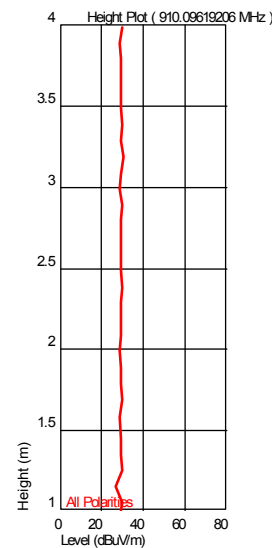
Turntable Plot (910.09619206 MHz)

Level (dBuV/m)



All Polarities

Azimuth (Degrees)



Test Personnel: Kouma Sinn *KPS*
Supervising/Reviewing Engineer:
(Where Applicable) N/A

Test Date: 08/08/2012

Product Standard: FCC Part 15.247 & RSS-210
Annex 8
Input Voltage: 120VAC/60Hz
Pretest Verification w/
Ambient Signals or
BB Source: Ambient Signals

Test Levels: Per standard
Ambient Temperature: 21 °C
Relative Humidity: 72 %
Atmospheric Pressure: 1005 mbars

Deviations, Additions, or Exclusions: None

12 AC Mains Conducted Emissions

12.1 Method

Tests are performed in accordance with FCC Part 15 Subpart B and ANSI C63.4:2003.

TEST SITE: Bump Out in AMAP Building

The EMC Lab has two Semi-anechoic Chambers and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

The AMAP Building and Lab includes general lab space that can be used for testing where a shielded/enclosed environment is not required.

Measurement Uncertainty

For conducted emissions, U_{lab} (3.2 dB in worst case) $< U_{CISPR}$ (3.6 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculations

The following is how net line-conducted readings were determined:

$$NF = RF + LF + CF + AF$$

Where NF = Net Reading in dB μ V

RF = Reading from receiver in dB μ V

LF = LISN Correction Factor in dB

CF = Cable Correction Factor in dB

AF = Attenuator Loss Factor in dB

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

NF = Net Reading in dB μ V

Example:

$$NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 \text{ dB}\mu\text{V}$$

$$UF = 10^{(49.1 \text{ dB}\mu\text{V} / 20)} = 285.1 \mu\text{V/m}$$

12.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
MAN1'	Digital 4 Line Barometer	Mannix	0ABA116	MAN1	08/13/2012	08/13/2014
ROS002'	9kHz to 3GHz EMI Test Receiver	Rohde & Schwartz	ESCI 1166.5950K03	100067	06/13/2012	06/13/2013
DS26A'	Attenuator, 20dB	Mini Circuits	20dB, 50 ohm	DS26A	10/04/2011	10/04/2012
CBLBNC51'	50 ohm Coaxial Cable	Coleman Cable	RG223/U	CBLBNC61	09/08/2011	09/08/2012
145015'	LISN: 50 Ohm/50 microHenry	Solar Electronics	9252-50-R-24-BNC	971617	02/06/2012	02/06/2013

Software Utilized:

Name	Manufacturer	Version
Compliance 5	Teseq	5.26.46.46

12.3 Results:

The sample tested was found [to Comply](#).

12.4 Setup Photographs:

12.5 Plots/Data:

Receive Mode – Digital Circuitry Emissions

Test Information

Test Details

Test:

Project:

Test Notes:

Temperature:

Humidity:

Tested by:

Test Started:

User Entry

LISN - FCC15 Class B

FXI G100806529

Rx, 120VAC/60Hz

24C

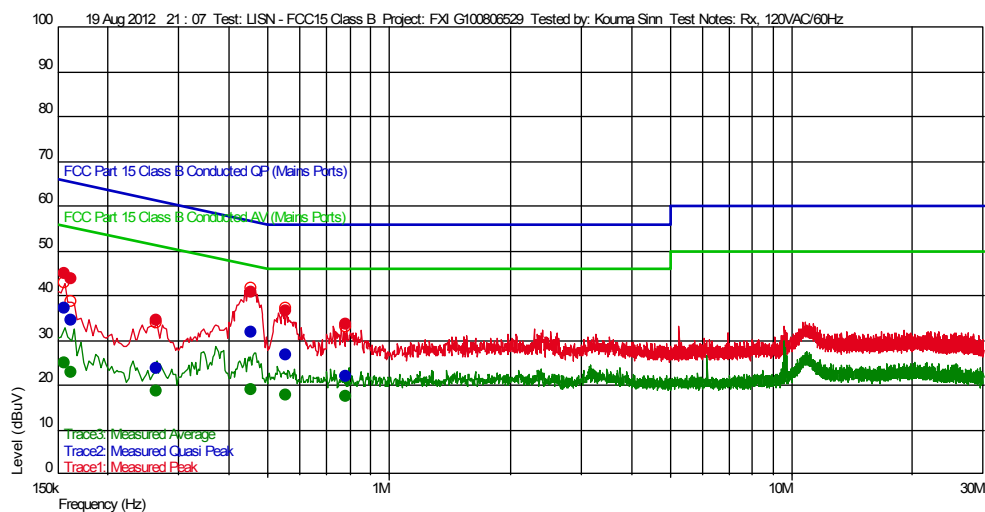
45%, 1005mbar

Kouma Sinn

19 Aug 2012 21 : 07

Additional Information

Prescan Emission Graph



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable

- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

Emissions Test Data

Trace2: Measured Quasi Peak

Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
264.0 k	23.82	0.107	20.800	61.305	-37.48	9 k		L1
786.0 k	21.95	0.107	20.800	56.000	-34.05	9 k		L1
162.0 k	34.51	0.124	20.800	65.361	-30.85	9 k		N
555.0 k	26.74	0.104	20.800	56.000	-29.26	9 k		L1
156.0 k	37.18	0.124	20.800	65.674	-28.49	9 k		N
456.0 k	31.83	0.102	20.800	56.765	-24.94	9 k		L1

Trace3: Measured Average

Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
264.0 k	18.52	0.107	20.800	51.305	-32.78	9 k		L1
162.0 k	22.71	0.124	20.800	55.361	-32.65	9 k		N
156.0 k	25.07	0.124	20.800	55.674	-30.61	9 k		N
786.0 k	17.42	0.107	20.800	46.000	-28.58	9 k		L1
555.0 k	17.82	0.104	20.800	46.000	-28.18	9 k		L1
456.0 k	18.82	0.102	20.800	46.765	-27.94	9 k		L1

Transmit Mode – Radiated Emissions

Test Information

Test Details

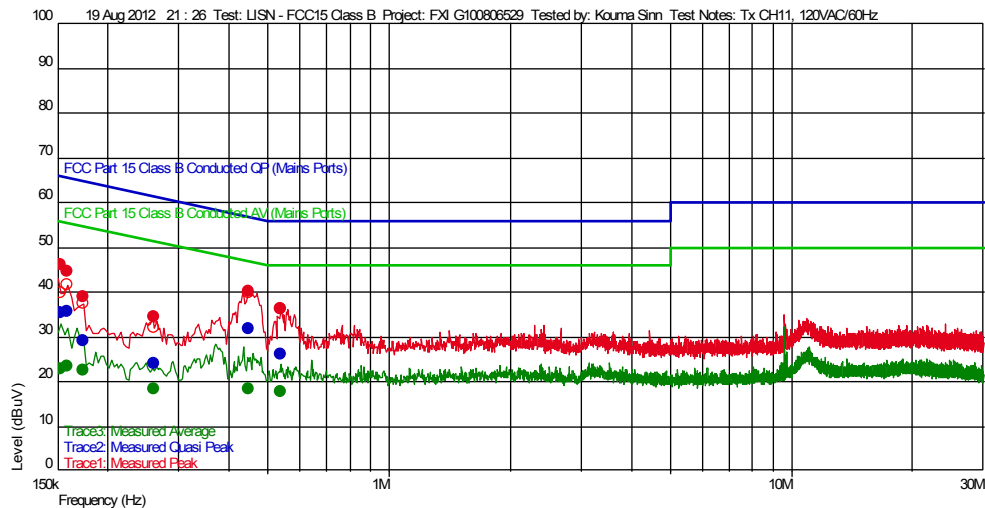
Test:
Project:
Test Notes:
Temperature:
Humidity:
Tested by:
Test Started:

User Entry

LISN - FCC15 Class B
FXI G100806529
Tx CH11, 120VAC/60Hz
24C
45%, 1005mbar
Kouma Sinn
19 Aug 2012 21 : 26

Additional Information

Prescan Emission Graph



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable

- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

Emissions Test Data

Trace2: Measured Quasi Peak

Frequency(Hz)	Level (dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
261.0 k	23.98	0.108	20.800	61.400	-37.42	9 k		L1
174.0 k	29.23	0.123	20.800	64.767	-35.54	9 k		N
153.0 k	35.46	0.125	20.800	65.836	-30.37	9 k		N
537.0 k	25.99	0.103	20.800	56.000	-30.01	9 k		L1
159.0 k	35.69	0.124	20.800	65.516	-29.82	9 k		N
447.0 k	31.66	0.102	20.800	56.931	-25.27	9 k		L1

Trace3: Measured Average

Frequency(Hz)	Level (dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
261.0 k	18.30	0.108	20.800	51.400	-33.10	9 k		L1
153.0 k	22.79	0.125	20.800	55.836	-33.05	9 k		N
174.0 k	22.41	0.123	20.800	54.767	-32.36	9 k		N
159.0 k	23.33	0.124	20.800	55.516	-32.19	9 k		N
447.0 k	18.47	0.102	20.800	46.931	-28.46	9 k		L1
537.0 k	17.82	0.103	20.800	46.000	-28.18	9 k		L1

Test Personnel: Kouma Sinn *KPS*
Supervising/Reviewing Engineer:
(Where Applicable) N/A
Product Standard: FCC Part 15.247 & RSS-210
Input Voltage: Annex 8
120VAC/60Hz
Pretest Verification w/
Ambient Signals or
BB Source: Ambient Signals

Test Date: 08/19/2012

Test Levels: Class B

Ambient Temperature: 24 °C

Relative Humidity: 45 %
Atmospheric Pressure: 1005 mbars

Deviations, Additions, or Exclusions: None

13 Revision History

Revision Level	Date	Report Number	Notes
0	08/28/2012	100806529BOX-014a	Original Issue