EMC TEST REPORT

Report Number: 101275145BOX-001
Project Number: G101275145

Report Issue Date: 11/07/2013

Product Designation: PiiX

Standards: FCC Part 15:2013 Subpart C Section 15.247,
FCC Part 15:2013 Subpart B Class B,
RSS-210 Issue 8 December 2010,
ICES-003 Issue 5 August 2012
RSS-Gen Issue 3 December 2010

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

Client:
Corventis
1410 Energy Park Drive
Suite #1
St. Paul, MN 55108
USA

Report prepared by Reviewer

Vathana Ven / Senior Project Engineer

Report reviewed by

Michael F. Murphy / Sr. Staff Engineer, EMC

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	Maximum Peak Output Power, Human RF Exposure and Duty Cycle FCC 15:2011 Subpart C, Section 15.247 (b) (1), (4) RSS-210 Issue 8 December 2010, A8.4 (2), IC RSS-102 Issue 4 March 2010, CFR47 Part 2.1093	Pass
7	Transmitter Radiated Spurious Emissions FCC 15:2013 Subpart C Section 15.247 (d) RSS-210 Issue 8 December 2010, A8.5	Pass
8	Hopping Channel Separation FCC 15:2013 Subpart C Section 15.247 (a)(1) RSS-210 Issue 8 December 2010, A8.1 (b)	Pass
9	Number of Hopping Frequency FCC 15:2013 Subpart C Section 15.247 (a)(1) (iii) RSS-210 Issue 8 December 2010, A8.1 (d)	Pass
10	Hopping Channel Bandwidth FCC 15:2013 Subpart C Section 15.247 (a)(1) RSS-210 Issue 8 December 2010, A8.1 (b)	Pass
11	Hopping Dwell time FCC 15:2011 Subpart C Section 15.247 (a)(1) (iii) RSS-210 Issue 8 December 2010, A8.1 (d)	Pass
12	Band-edge Compliance FCC 15:2013 Subpart C Section 15.247 (d) RSS-210 Issue 8 December 2010, A8.5	Pass
13	Receiver Radiated Spurious FCC Part 15:2013 Subpart B Section 15.109 (a) RSS-Gen Issue 3 December 2010, Section 6.1 (Table 2)	Pass
14	Revision History	

3 Client Information

This EUT was tested at the request of:

Client: Corventis
1410 Energy Park Drive Suite #1
St. Paul, MN 55108
USA

Contact: Mr. Brett Landrum
Telephone: 651-925-3778
Fax: None
Email: Brett.Landrum@corventis.com

4 Description of Equipment Under Test

Manufacturer: Corventis
1410 Energy Park Drive Suite #1
St. Paul, MN 55108
USA

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Wireless Transmitter	Corventis	PiiX	N111306130000E1
Wireless Transmitter	Corventis	PiiX	N111306130000DE
Wireless Transmitter	Corventis	PiiX	N11130802000022340172 82
Wireless Transmitter	Corventis	PiiX	N11130802000022340172 79

Receive Date:	07/24/2013
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)
The PiiX is a wearable device that automatically collects and wirelessly transmits physiological data. Designed for patient comfort, PiiX is light-weight, leadless and water resistant to support continuous use. Bluetooth utilizes 79 channels starting at 2402 MHz and extending to 2480 MHz. Channels 0 (2402 MHz), 39 (2441 MHz) and 79 (2480 MHz) were selected for testing.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
3.7	N/A	N/A	N/A

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Transmit mode – hopping enabled (DH1, DH3, and DH5) or hopping disabled, modulated on a single channel
2	Receive mode

Software used by the EUT:

No.	Descriptions of EUT Exercising
1	Pre-programmed using Tera Term 4.61

5 System Setup and Method

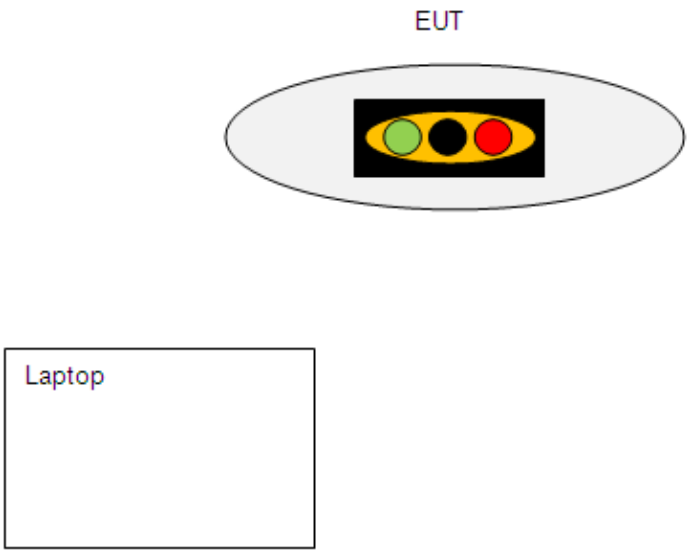
Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
	None				

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Laptop	Dell	Latitude D630	JX7XX61 43367588497

5.1 Method:

Configuration as required by ANSI C 63.10:2013, FCC Part 15:2013 Subpart C Section 15.247, RSS-210 Issue 8 December 2010, RSS-Gen Issue 3 December 2010, IC RSS-102 Issue 4 March 2010, CFR47 Part 2.1093.

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 FCC Part 15 Subpart C Section 15.247, CFR47 Part 2.1093, ANSI C63.10, RSS-Gen, RSS-210 Annex 8, and IC RSS-102 Issue 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 Styrofoam 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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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 dBμV 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 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

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

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

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

6.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004	Weather Station	Davis Instruments	7400	PE80529A61 A	09/25/2012	09/25/2014
145128	EMI Receiver 40 GHz (20 Hz - 40 Ghz)	Rohde & Schwarz	ESI	8392831001	10/01/2013	10/01/2014
ETS001	1-18GHz DRG Horn Antenna	ETS-Lindgren	3117	00143259	12/17/2012	12/17/2013
145-416	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	10/04/2013	10/04/2014

Software Utilized:

Name	Manufacturer	Version
EMI Boxborough.xls	Intertek	08/27/2010

Note: Your Laptop may use a different version of Excel. Record the version you actually used!

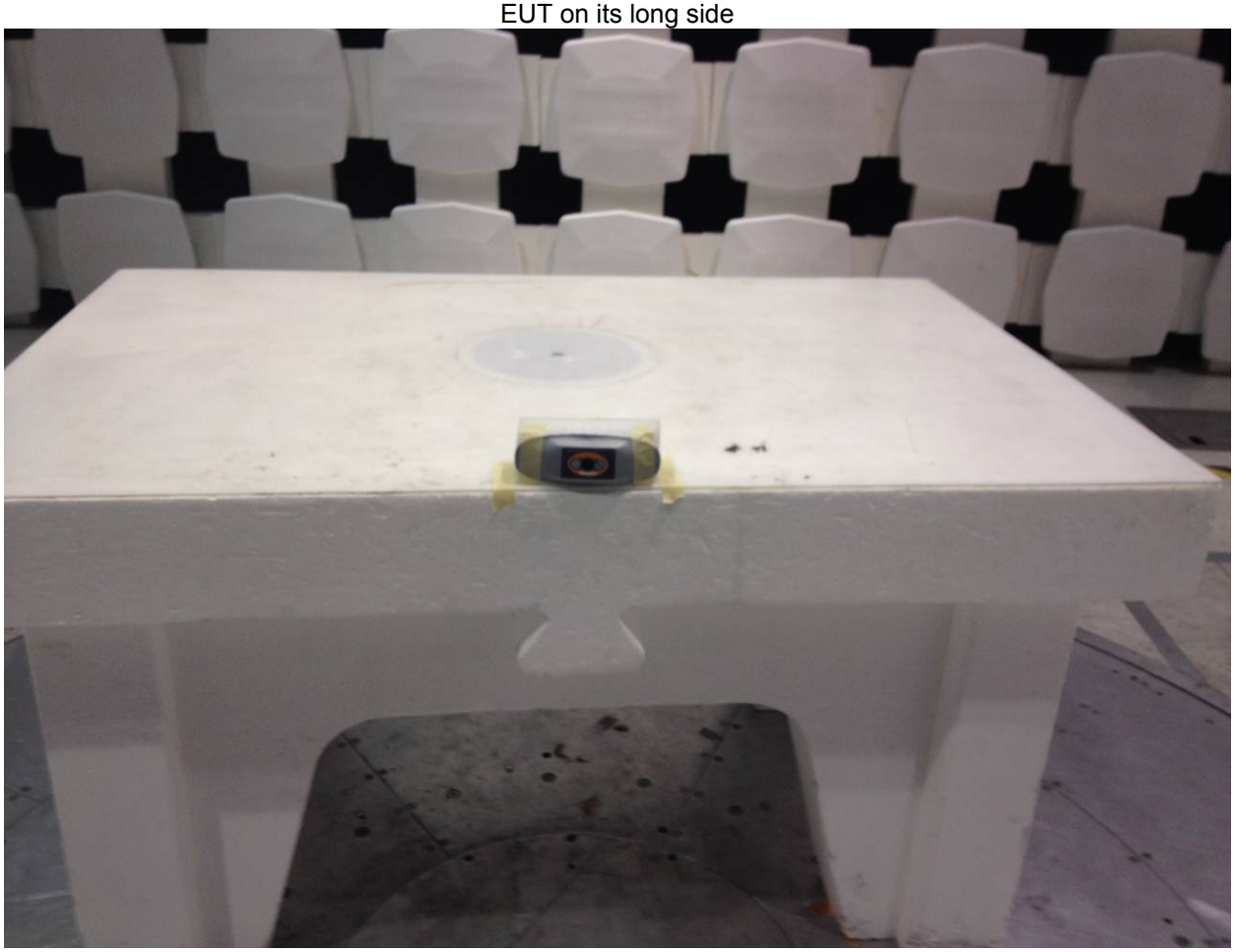
6.3 Results:

The sample tested was found to Comply.

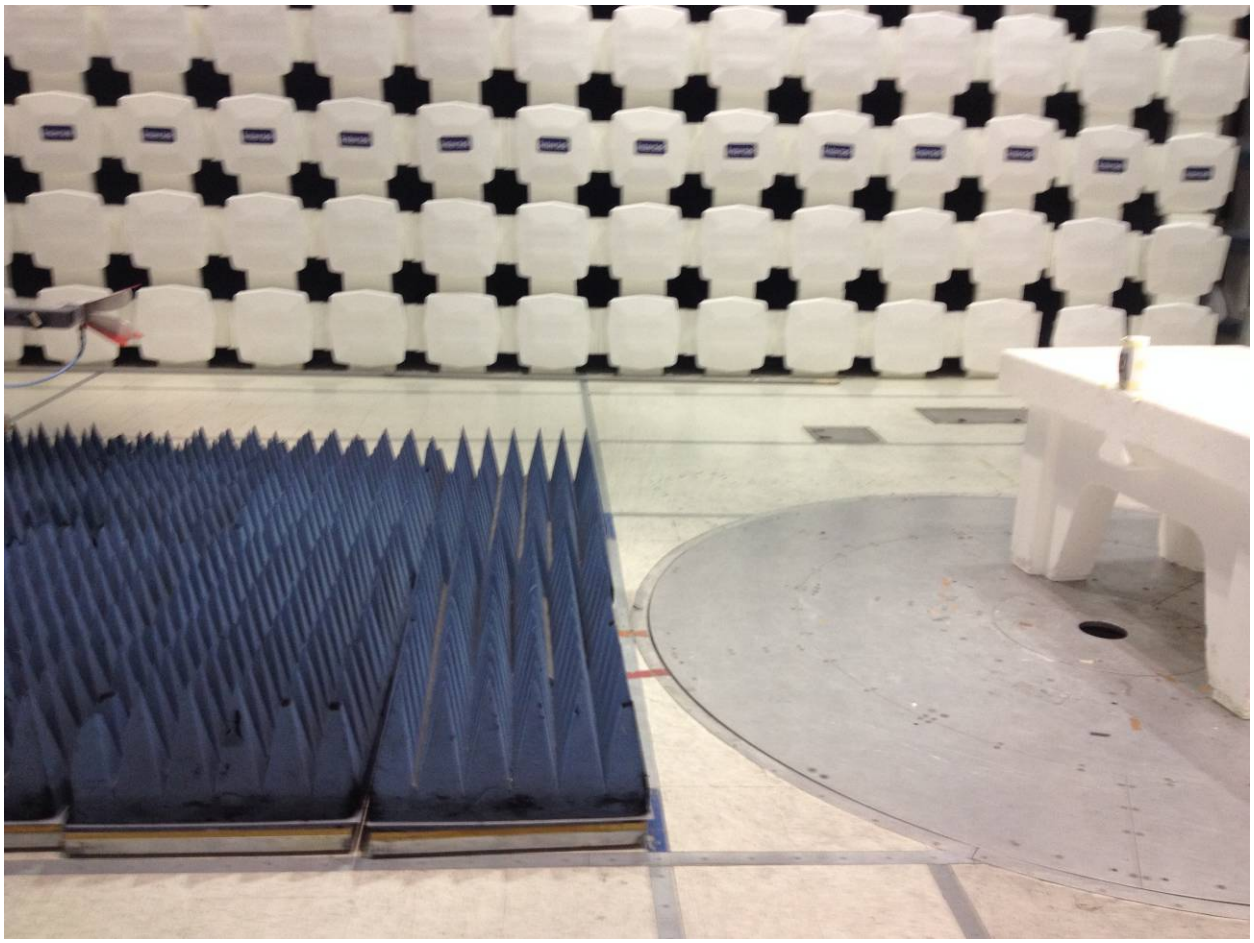
6.4 Setup Photographs:

EUT on its back

EUT on its long side



EUT on its short side



6.5 Plots/Data:

Intertek

Fundamental Frequency Radiated Emissions

Company: Corventis — Antenna & Cables: SHF — Bands: N, LF, HF, SHF
Model #: PiiX — Antenna: ETS001 12-17-2013.txt — ETS001 12-17-2013.txt
Serial #: N111306130000D6 — Cable(s): 145-416 3mTrkB 10-04-2013.txt — NONE.
Engineers: Kouma Sinn — Location: 10m Chamber — Barometer: DAV004 — Filter: NONE
Project #: G101275145 — Date(s): 10/06/13
Standard: FCC Part 15 Subpart C 15.247 — Temp/Humidity/Pressure: 21C — 59% — 1012mbar
Receiver: R&S ESI (145-128) 09-28-2013 — Limit Distance (m): 3
PreAmp: PRE145014 12-16-2012.txt — Test Distance (m): 3
PreAmp Used? (Y or N): N — Voltage/Frequency: Battery power — Frequency Range: Fundamental

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
Note: RF Output Power PiiX											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
X - Axis. The EUT sits on its back											
PK	H	2402.000	58.53	32.34	5.85	0.00	0.00	1.51	36.00	-34.49	1/3 MHz
PK	H	2440.000	57.47	32.40	5.91	0.00	0.00	0.56	36.00	-35.44	1/3 MHz
PK	H	2480.000	56.38	32.47	5.97	0.00	0.00	-0.40	36.00	-36.40	1/3 MHz
Y - Axis. The EUT sits on its long side (arrow on bottom)											
PK	H	2402.000	58.14	32.34	5.85	0.00	0.00	1.12	36.00	-34.88	1/3 MHz
PK	H	2440.000	58.68	32.40	5.91	0.00	0.00	1.77	36.00	-34.23	1/3 MHz
PK	H	2480.000	57.78	32.47	5.97	0.00	0.00	1.00	36.00	-35.00	1/3 MHz
Z - Axis. The EUT sits on its short side											
PK	V	2402.000	56.59	32.35	5.86	0.00	0.00	-0.42	36.00	-36.42	1/3 MHz
PK	V	2440.000	56.09	32.40	5.91	0.00	0.00	-0.82	36.00	-36.82	1/3 MHz
PK	H	2480.000	54.46	32.47	5.97	0.00	0.00	-2.32	36.00	-38.32	1/3 MHz

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/cm^2. The power density S generated by some value of EIRP at a given distance d is related by the equation:

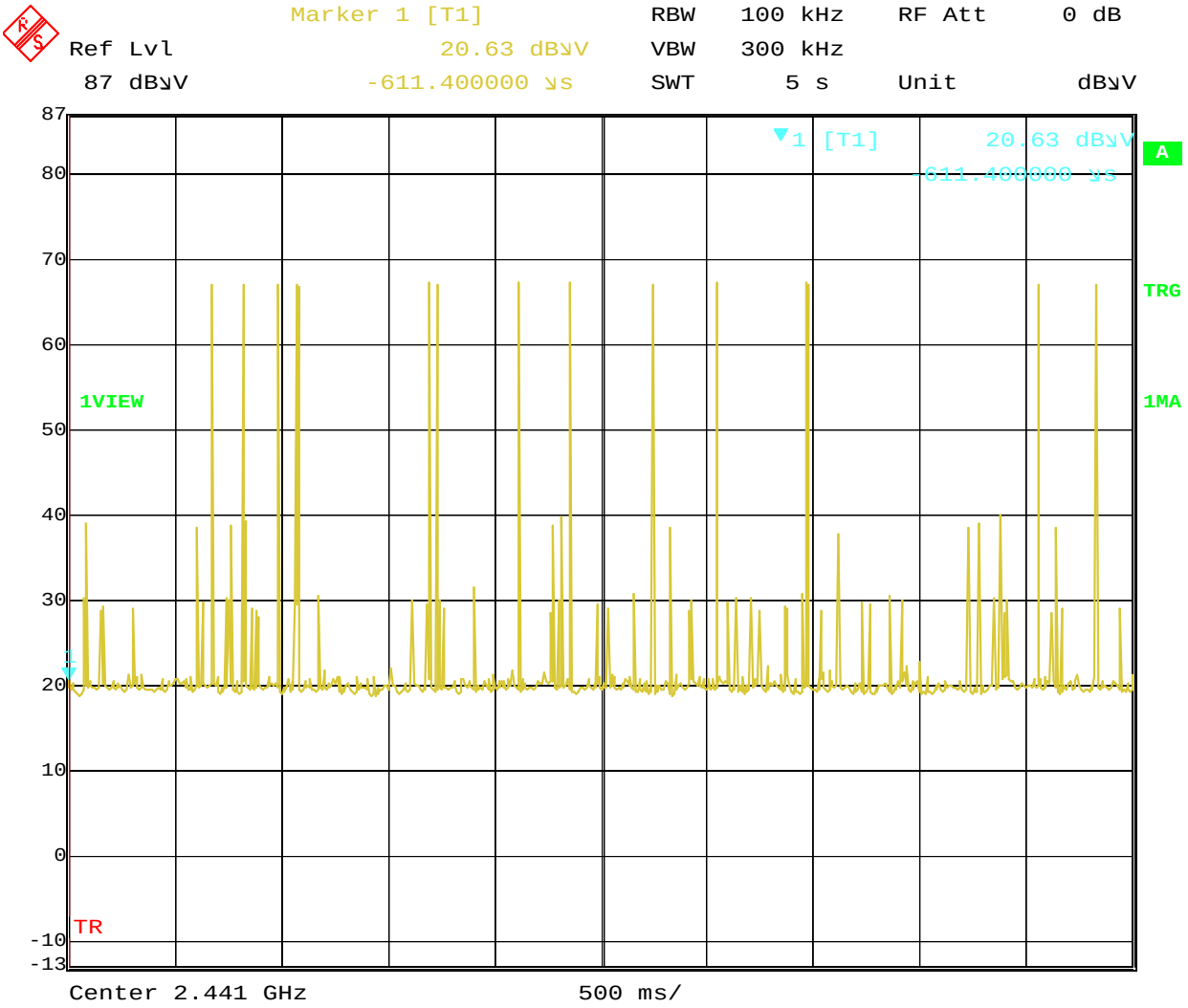
$$S=EIRP / (4\pi d^2)$$

The distance, given a maximum EIRP of 1.77 dBm (1.503 mW), at which the radiated power density of the EUT is equal to the human RF exposure limit is 0.346 cm from the antenna. This result does not take averaging into account. The EUT is exempt from FCC SAR RF Exposure evaluation because the output power is below the 60/f(GHz) average power exemption threshold of 24.2 mW.

The EUT is exempt from Industry Canada SAR RF Exposure evaluation as referenced in RSS-102 because the operating frequency is between 2.2 and 3.0 GHz and the EIRP does not exceed 20 milliwatts.

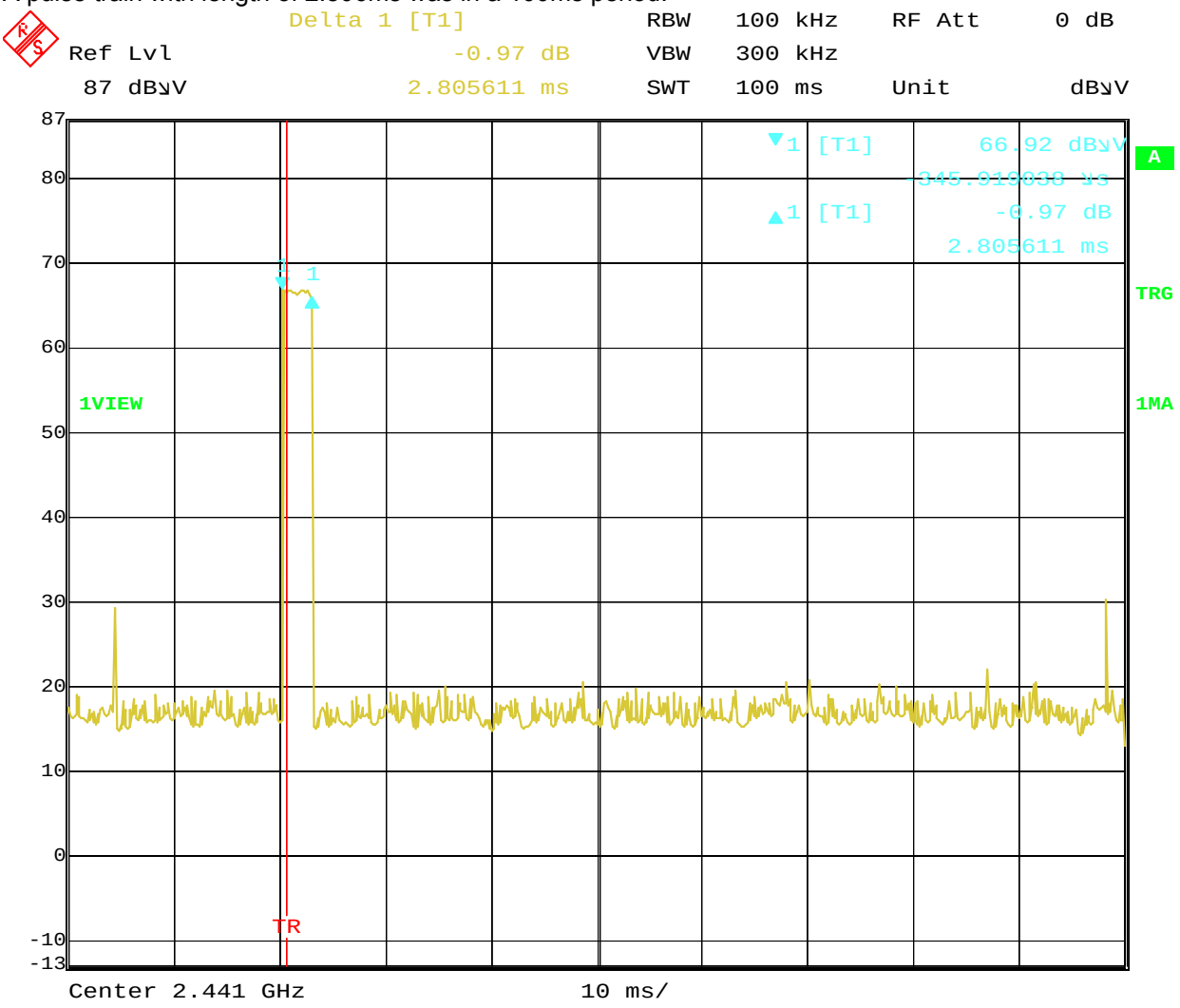
Duty Cycle

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



Date: 30.OCT.2013 20:56:22

A pulse train with length of 2.806ms was in a 100ms period.



The duty cycle = 2.806ms/100ms = 0.02806
Average factor = 20*LOG(0.02806) = 31 dB

Test Personnel:	Kouma Sinn KPS Vathana Ven VJV	Test Date:	10/06/2013, 10/30/2013
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	15.247, CFR47 Part 2.1093, RSS-Gen, RSS-210, IC RSS-102	Limit Applied:	Below specified limits
Input Voltage:	Internal Battery Powered		
Pretest Verification w/ Ambient Signals or BB Source:	**BB Source**	Ambient Temperature:	21, 22 ºC
		Relative Humidity:	59, 50 %
		Atmospheric Pressure:	1012, 1009 mbars

Deviations, Additions, or Exclusions: None

7 Transmitter Radiated Spurious Emissions

7.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C Section 15.247, ANSI C63.10, RSS-Gen, 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 Styrofoam 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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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.

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RA = 52.0 dBμV
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FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

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

7.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004	Weather Station	Davis Instruments	7400	PE80529A61A	09/25/2012	09/25/2014
145128	EMI Receiver 40 GHz (20 Hz - 40 Ghz)	Rohde & Schwarz	ESI	8392831001	10/01/2013	10/01/2014
145106	Bilog Antenna (30MHz - 5GHz)	Sunol Sciences	JB5	A111003	10/01/2013	10/01/2014
145003	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	10/07/2013	10/07/2014
145-410	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	10/04/2013	10/04/2014
145-416	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	10/04/2013	10/04/2014
145014	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	12/13/2012	12/13/2013
ETS001	1-18GHz DRG Horn Antenna	ETS-Lindgren	3117	00143259	12/17/2012	12/17/2013

Software Utilized:

Name	Manufacturer	Version
C5	Teseq	Build 5.26.00.3
Excel 2003	Microsoft	(11.8231.8221) SP3
EMI Boxborough.xls	Intertek	08/27/10

Note: Your Laptop may use a different version of Excel. Record the version you actually used!

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

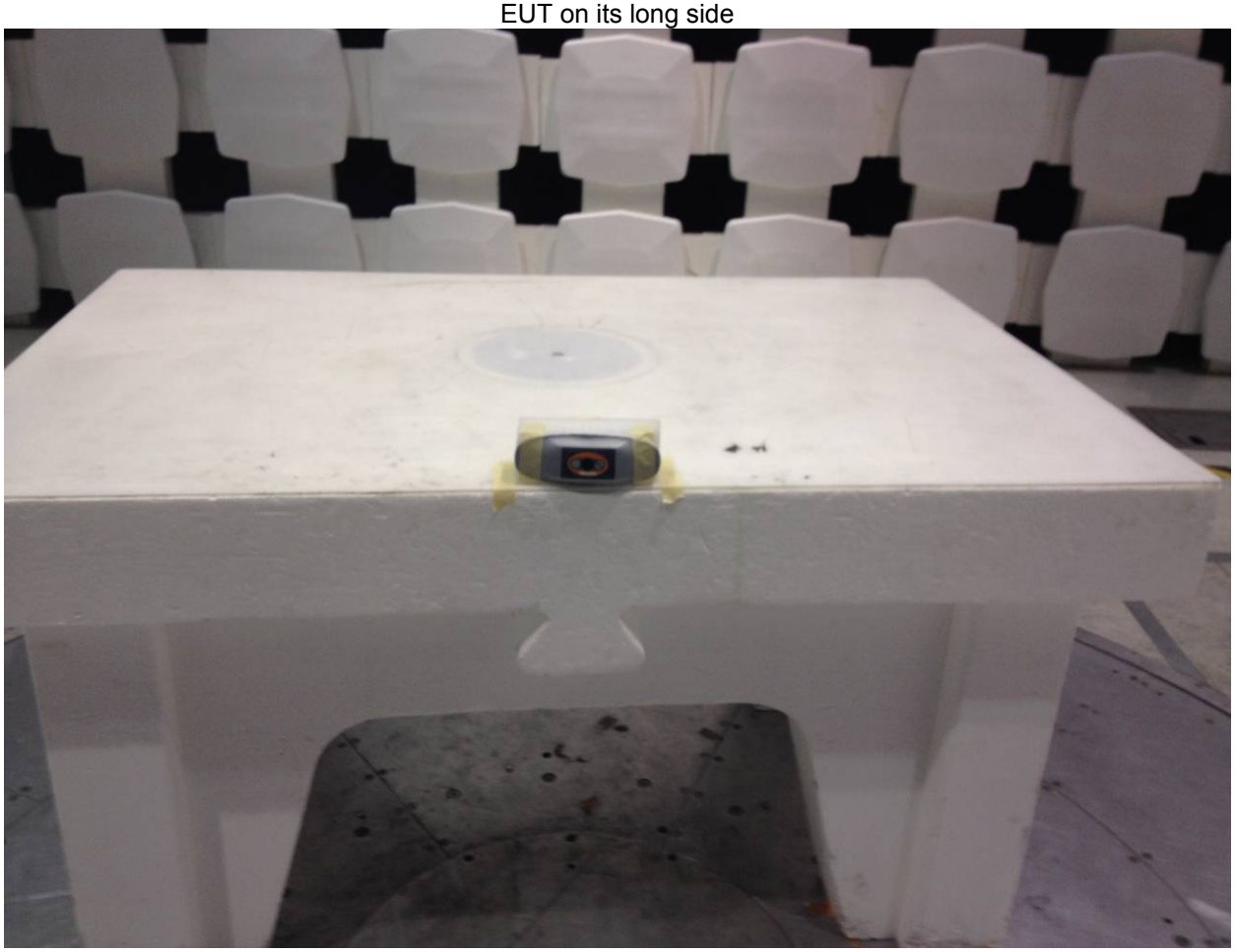
FCC Part 15.247(d) & RSS-210 A8.5 – Non Restricted Band Radiated Spurious/Harmonics Limits

Channels	Fundamental Field Strength (dBuV/m)	Spurious/Harmonics Limits (dBuV/m)	Test Distance (meters)
0	83.49	63.49	3
39	85.91	65.91	3
79	88.22	68.22	3

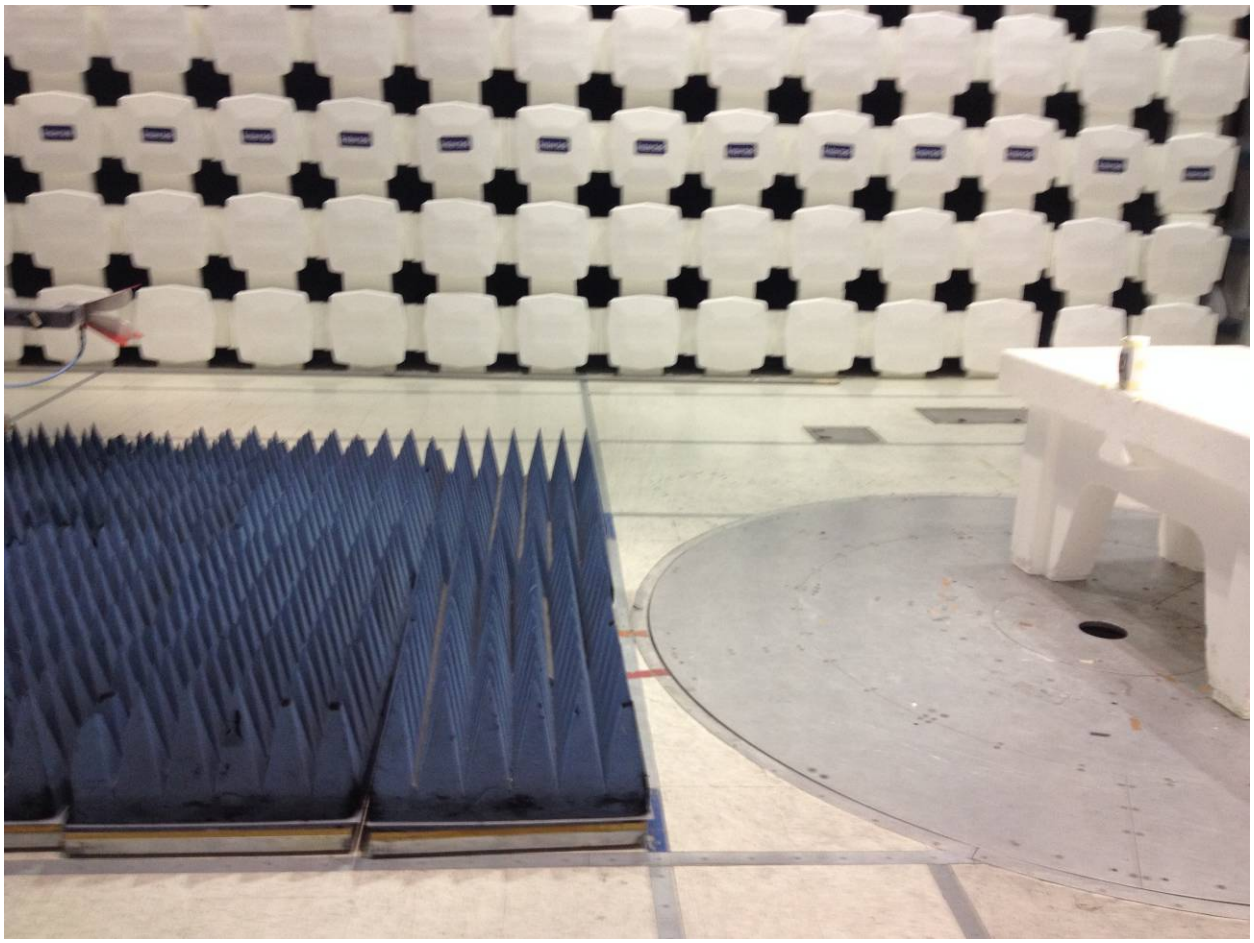
7.4 Setup Photographs:

EUT on its back

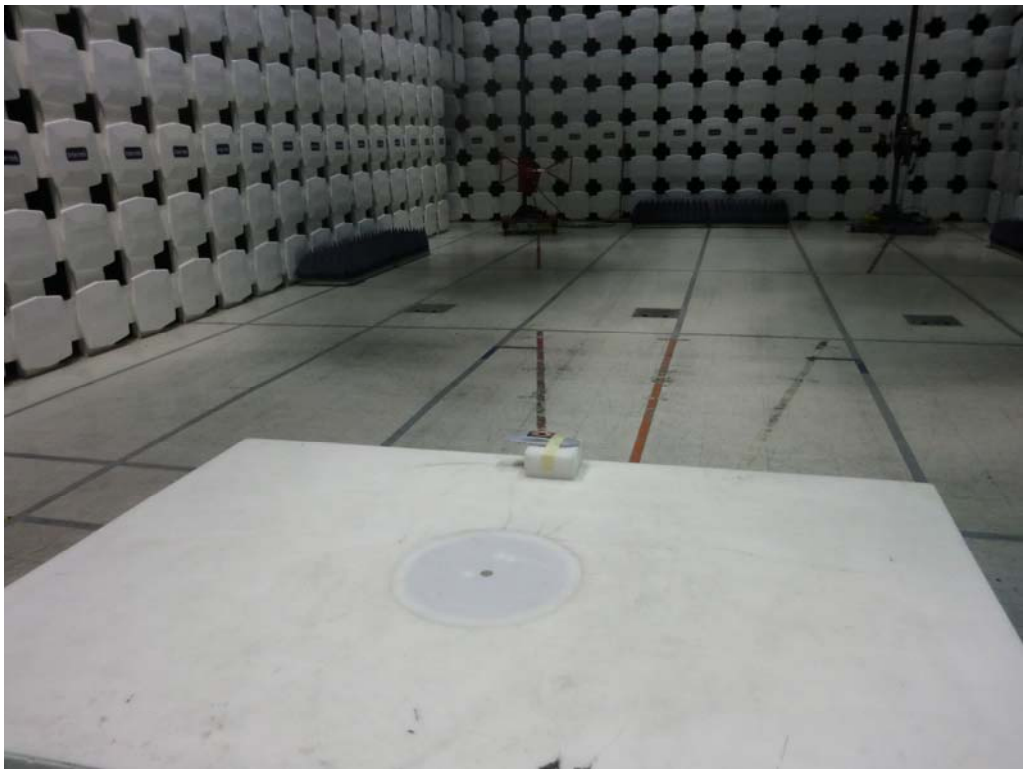
EUT on its long side



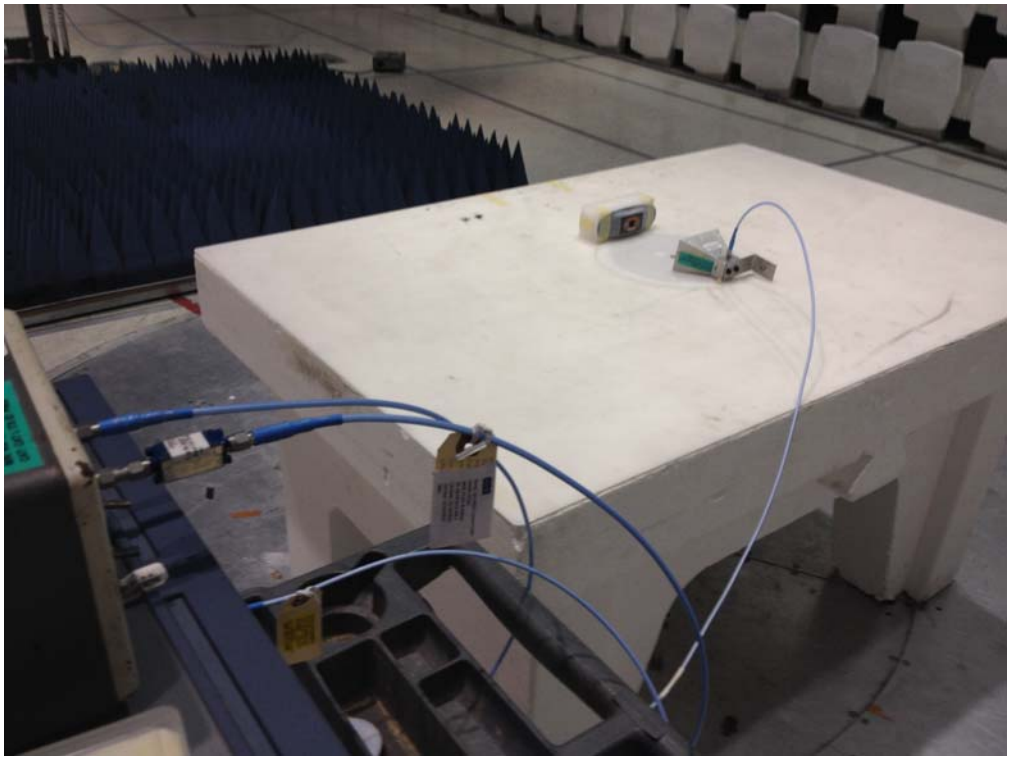
EUT on its short side



1-18 GHz scan



30 – 1000 MHz scan



18 – 25 GHz Hand scan

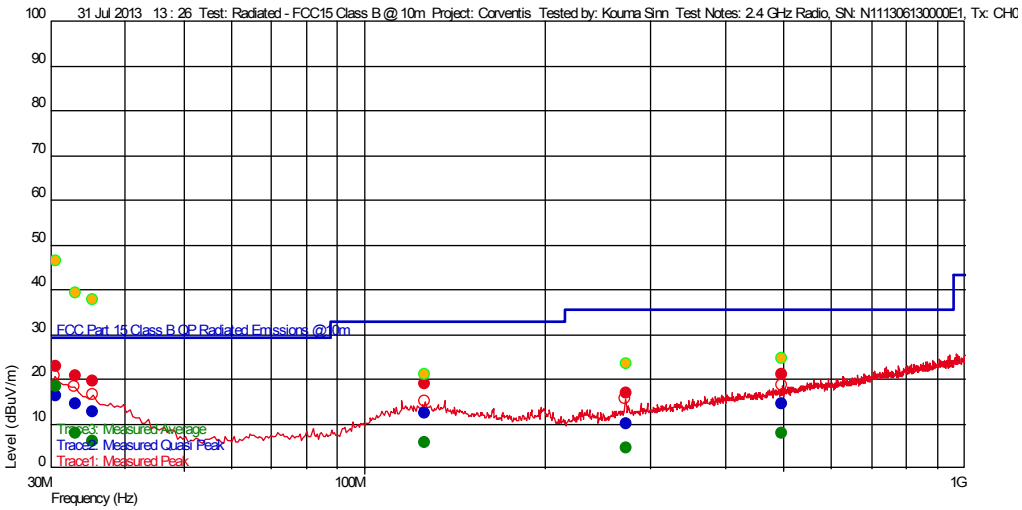
7.5 Plots/Data:

Model: PiiX, Tx:CH0, FCC Part 15:209, 30-1000 MHz

Test Information

Test Details	User Entry	Additional Information
Test:	Radiated - FCC15 Class B @ 10m	
Project:	Corventis	
Test Notes:	2.4 GHz Radio, SN: N111306130000E1, Tx: CH0	
Temperature:	24C	
Humidity:	42%, 1009	
Tested by:	Kouma Sinn	
Test Started:	31 Jul 2013 13 : 26	

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

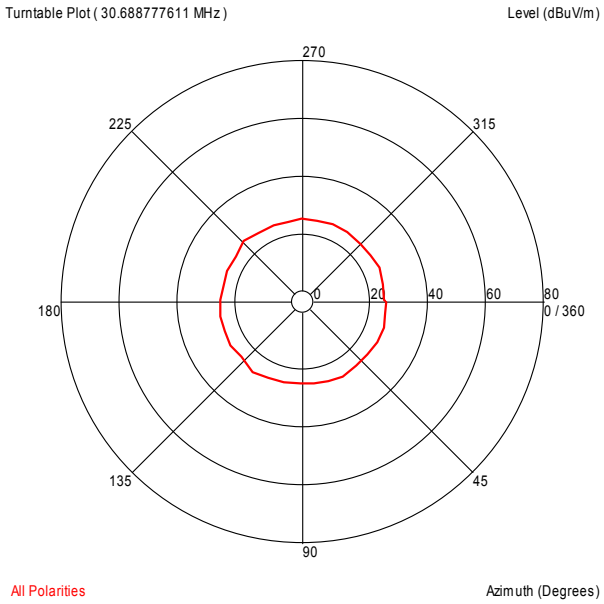
Frequency(Hz)	Level dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver (|)	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
273.13006012 M	16.72	13.425	-24.065	--	--	|	103	1.46	120 k	
496.896593166 M	21.10	17.700	-24.724	--	--	--	235	4.00	120 k	
126.317034178 M	18.90	13.974	-24.663	--	--	--	1	3.17	120 k	
35.266332283 M	19.42	17.124	-26.378	--	--	--	64	3.51	120 k	
33.081763864 M	20.80	18.643	-26.415	--	--	--	87	3.99	120 k	
30.688777611 M	22.75	20.318	-26.458	--	--	|	138	3.80	120 k	

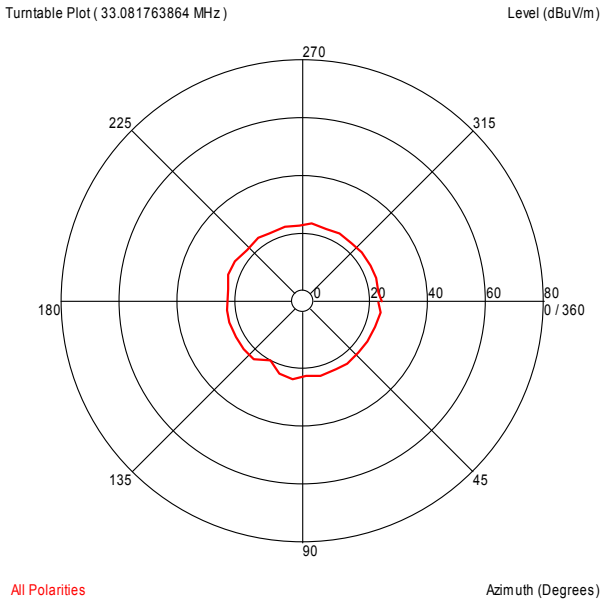
Trace2: Measured Quasi Peak

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
273.13006012 M	10.05	13.425	-24.065	35.540	-25.49	|	103	1.46	120 k	
496.896593166 M	14.56	17.700	-24.724	35.540	-20.98	--	235	4.00	120 k	
126.317034178 M	12.33	13.974	-24.663	33.040	-20.71	--	1	3.17	120 k	
35.266332283 M	12.80	17.124	-26.378	29.540	-16.74	--	64	3.51	120 k	
33.081763864 M	14.39	18.643	-26.415	29.540	-15.15	--	87	3.99	120 k	
30.688777611 M	16.25	20.318	-26.458	29.540	-13.29	|	138	3.80	120 k	

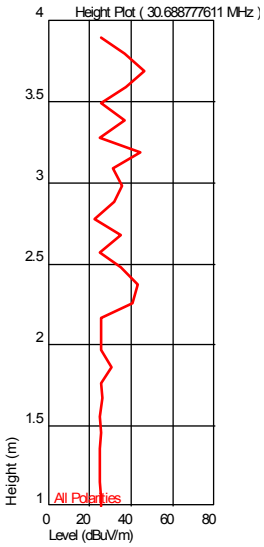
Notes: Noise floor readings. No emissions were detected.

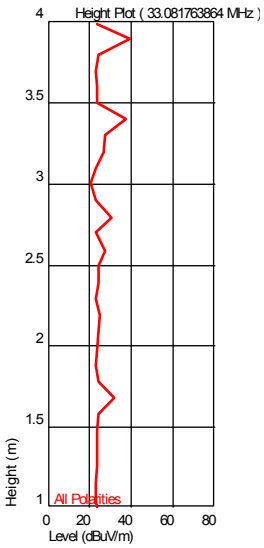
Azimuth Plots

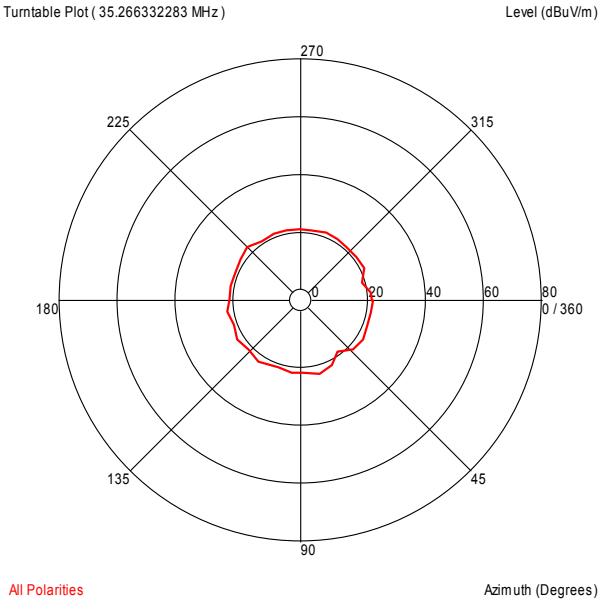


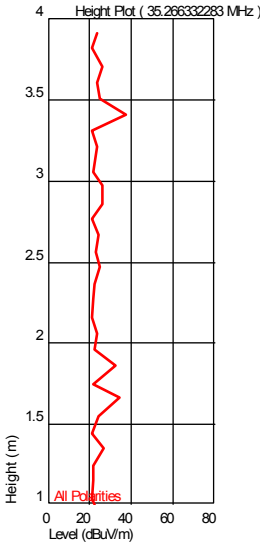


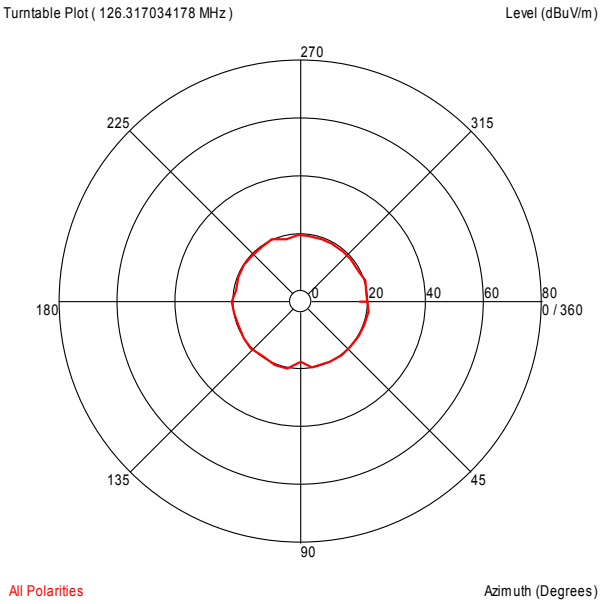
Turntable Plots

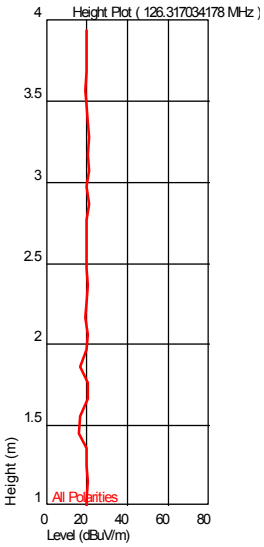


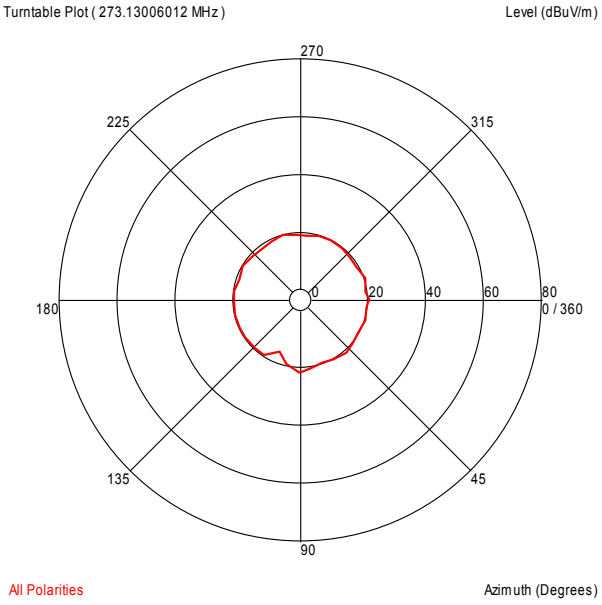


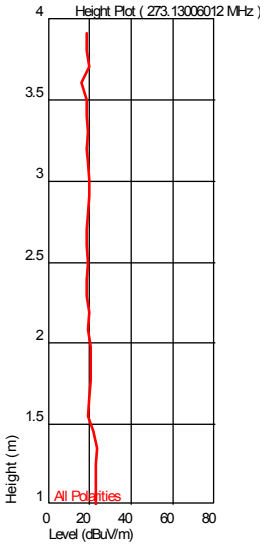

Turntable Plot (35.266332283 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)

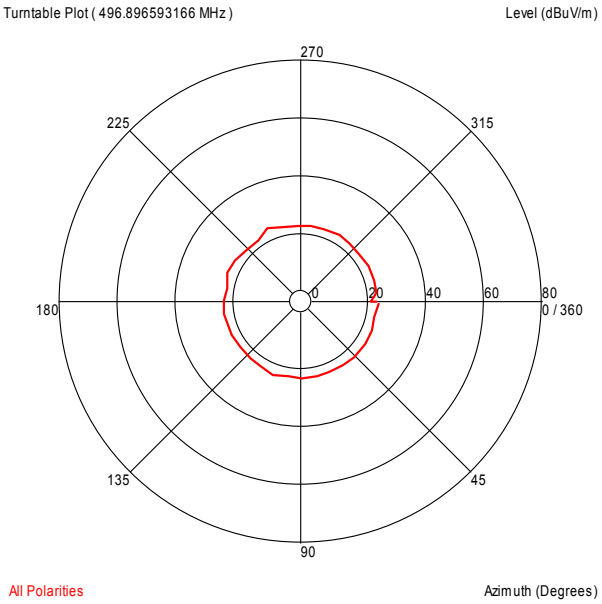

Height Plot (35.266332283 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)

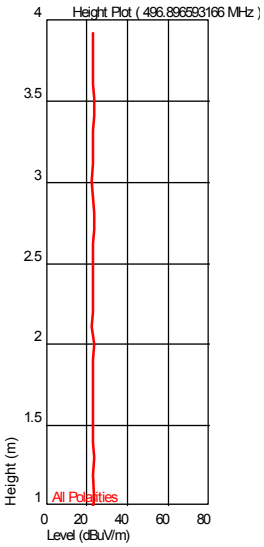

Turntable Plot (126.317034178 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)


Height Plot (126.317034178 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)


Turntable Plot (273.13006012 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)


Height Plot (273.13006012 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)


Turntable Plot (496.896593166 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)

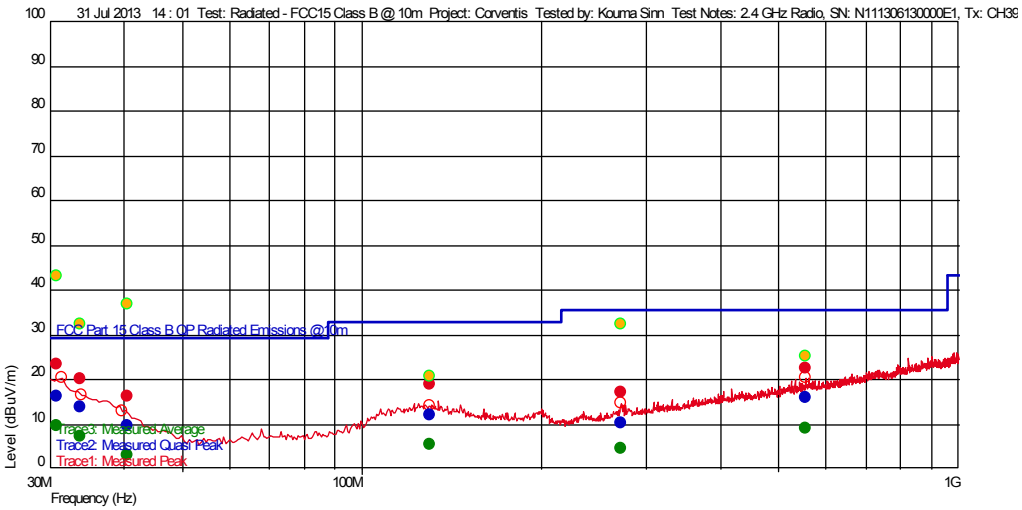

Height Plot (496.896593166 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)

Model: PiiX, Tx:CH39, FCC Part 15:209, 30-1000 MHz

Test Information

Test Details	User Entry	Additional Information
Test:	Radiated - FCC15 Class B @ 10m	
Project:	Corventis	
Test Notes:	2.4 GHz Radio, SN: N111306130000E1, Tx: CH39	
Temperature:	24C	
Humidity:	42%, 1009	
Tested by:	Kouma Sinn	
Test Started:	31 Jul 2013 14 : 01	

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

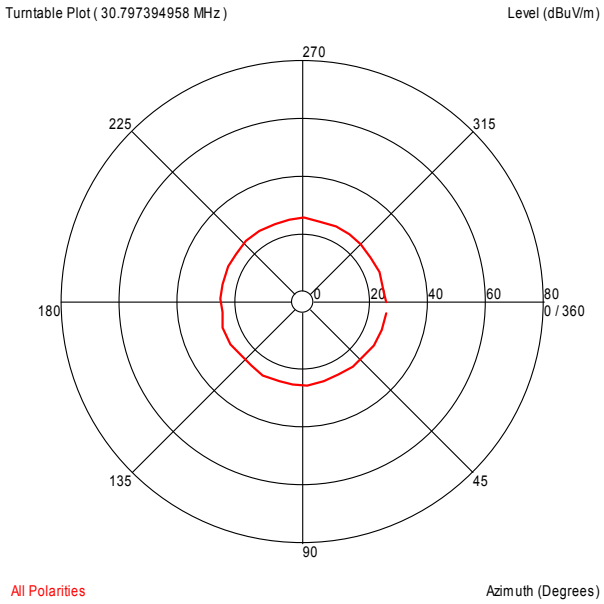
Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver (|)	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
272.398196393 M	17.05	13.396	-24.068	--	--	|	360	1.05	120 k	
130.058115792 M	18.83	13.898	-24.656	--	--	|	181	2.85	120 k	
40.496192507 M	16.25	13.653	-26.340	--	--	--	205	3.59	120 k	
553.989178846 M	22.53	18.760	-24.637	--	--	|	196	1.36	120 k	
33.745892232 M	20.24	18.178	-26.403	--	--	--	158	2.67	120 k	
30.797394958 M	23.33	20.242	-26.456	--	--	--	260	3.53	120 k	

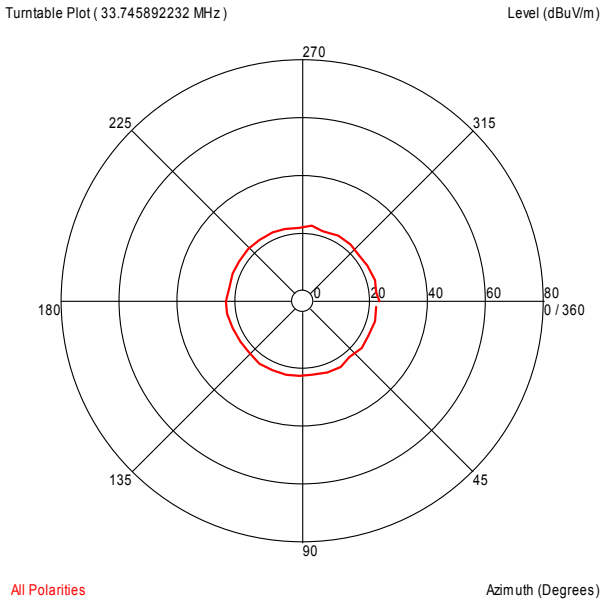
Trace2: Measured Quasi Peak

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
272.398196393 M	10.15	13.396	-24.068	35.540	-25.39	|	360	1.05	120 k	
130.058115792 M	12.16	13.898	-24.656	33.040	-20.88	|	181	2.85	120 k	
40.496192507 M	9.81	13.653	-26.340	29.540	-19.73	--	205	3.59	120 k	
553.989178846 M	15.94	18.760	-24.637	35.540	-19.60	|	196	1.36	120 k	
33.745892232 M	13.94	18.178	-26.403	29.540	-15.60	--	158	2.67	120 k	
30.797394958 M	16.17	20.242	-26.456	29.540	-13.37	--	260	3.53	120 k	

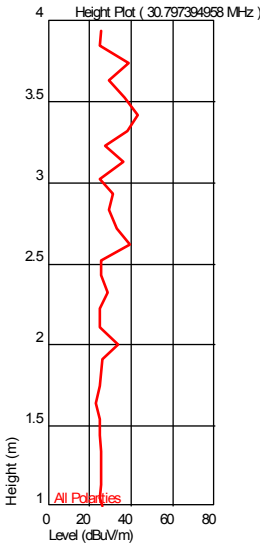
Notes: Noise floor readings. No emissions were detected.

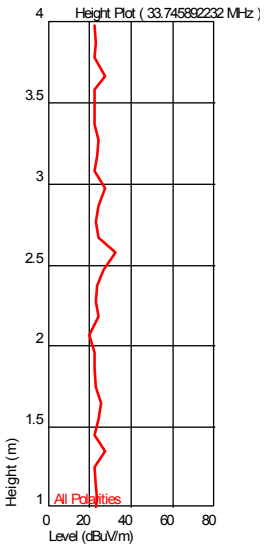
Azimuth Plots

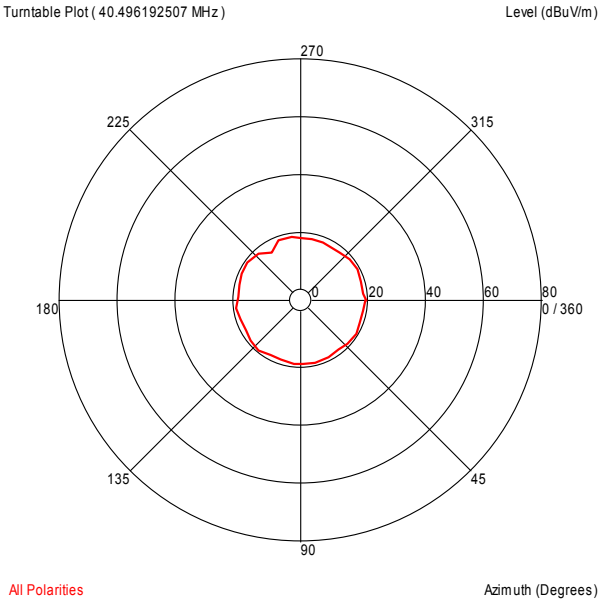


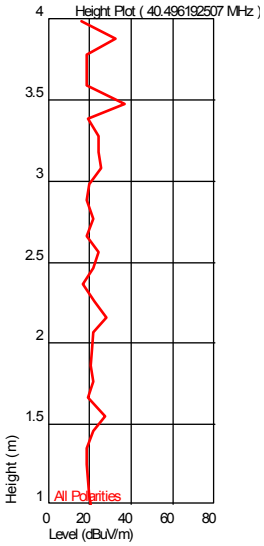


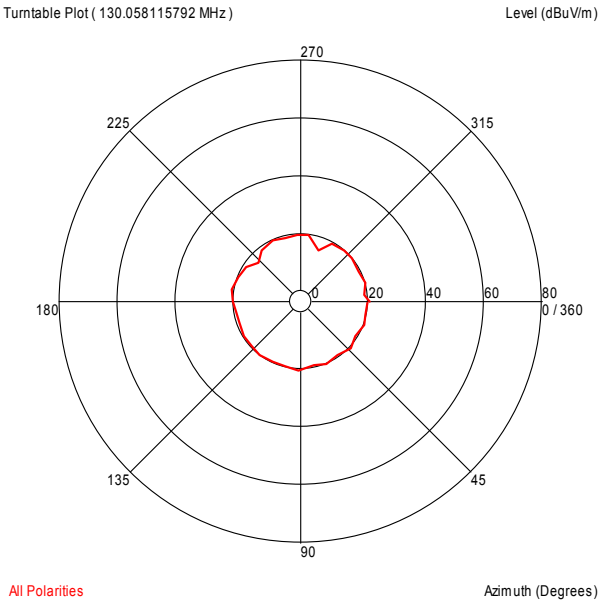
Turntable Plots

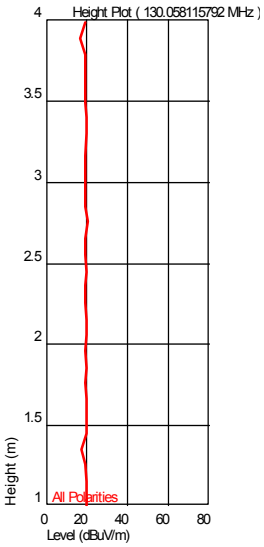


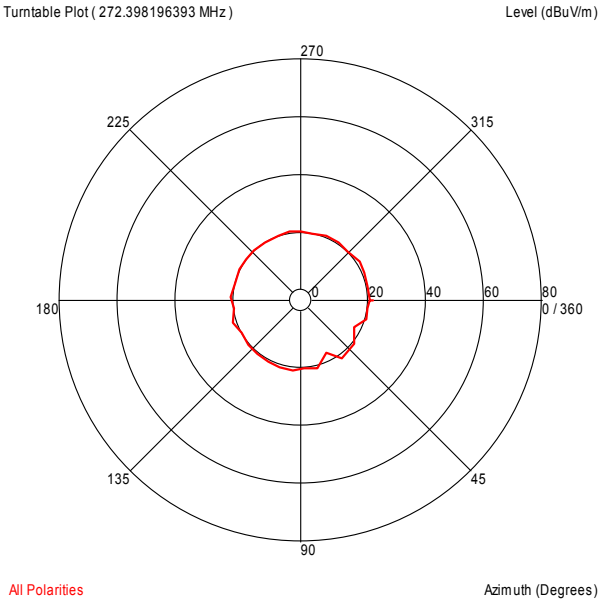


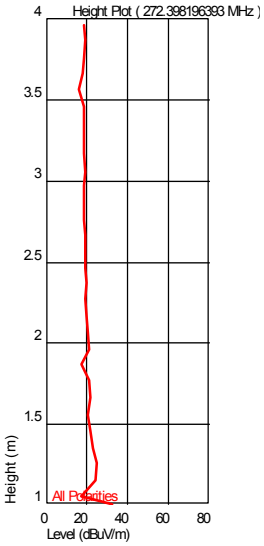

Turntable Plot (40.496192507 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)

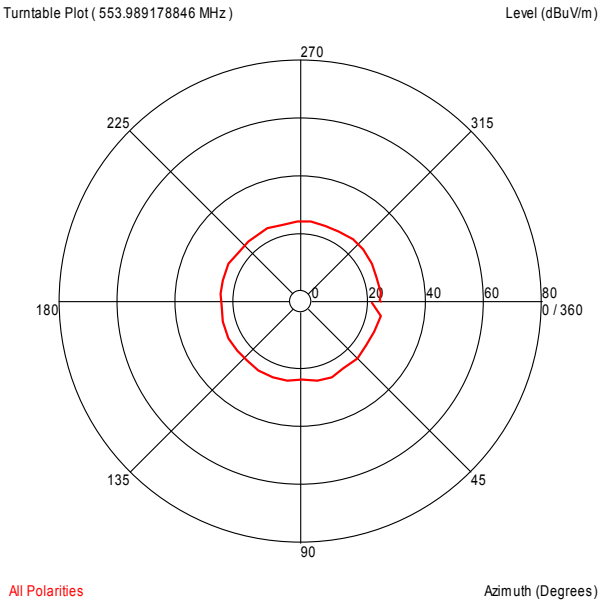

Height Plot (40.496192507 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)

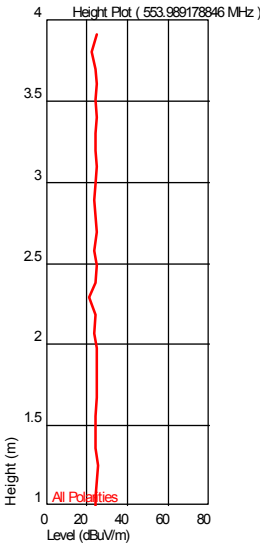

Turntable Plot (130.058115792 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)


Height Plot (130.058115792 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)


Turntable Plot (272.398196393 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)


Height Plot (272.398196393 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)


Turntable Plot (553.989178846 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)

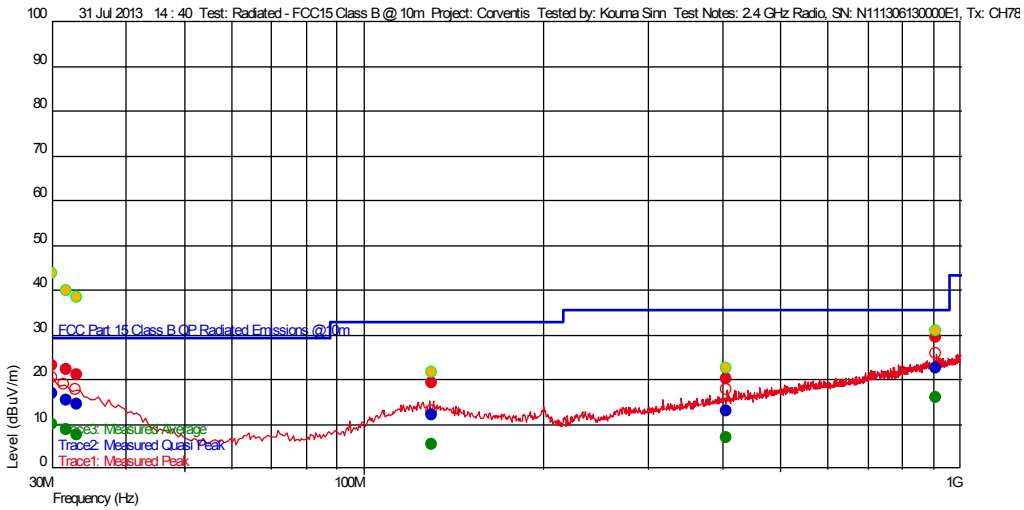

Height Plot (553.989178846 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)

Model: PiiX, Tx:CH78, FCC Part 15:209, 30-1000 MHz

Test Information

Test Details	User Entry	Additional Information
Test:	Radiated - FCC15 Class B @ 10m	
Project:	Corventis	
Test Notes:	2.4 GHz Radio, SN: N111306130000E1, Tx: CH78	
Temperature:	24C	
Humidity:	42%, 1009	
Tested by:	Kouma Sinn	
Test Started:	31 Jul 2013 14 : 40	

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

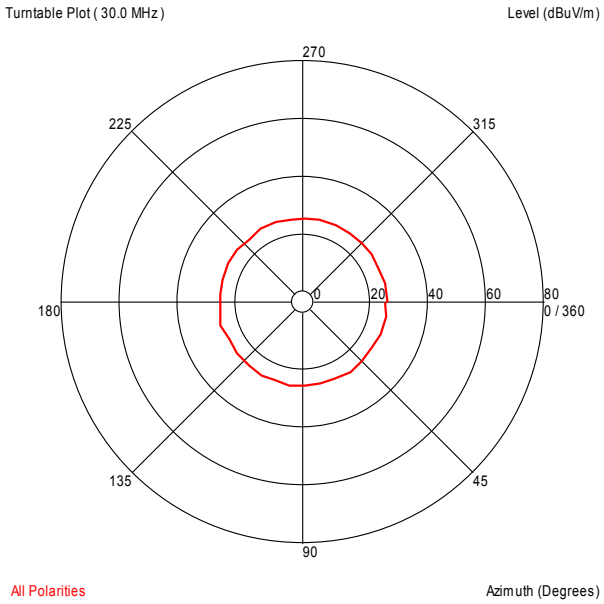
Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver (|)	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
405.715030491 M	20.13	15.929	-24.206	--	--	--	82	3.83	120 k	
130.435670902 M	19.24	13.883	-24.655	--	--	--	0	1.04	120 k	
33.130661659 M	21.14	18.609	-26.414	--	--	--	18	3.83	120 k	
31.845090349 M	22.37	19.508	-26.437	--	--	|	1	3.08	120 k	
30.0 M	23.27	20.800	-26.470	--	--	--	153	2.61	120 k	
911.496192172 M	29.35	22.870	-22.869	--	--	--	1	2.40	120 k	

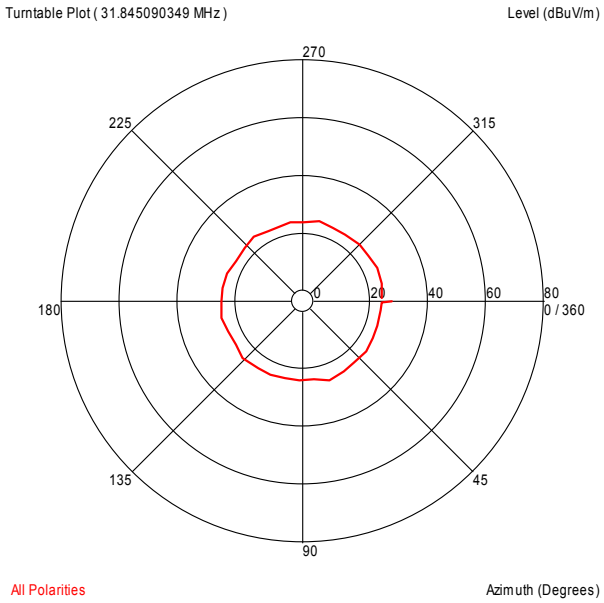
Trace2: Measured Quasi Peak

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
405.715030491 M	12.93	15.929	-24.206	35.540	-22.61	--	82	3.83	120 k	
130.435670902 M	12.15	13.883	-24.655	33.040	-20.89	--	0	1.04	120 k	
33.130661659 M	14.36	18.609	-26.414	29.540	-15.18	--	18	3.83	120 k	
31.845090349 M	15.46	19.508	-26.437	29.540	-14.08	|	1	3.08	120 k	
911.496192172 M	22.61	22.870	-22.869	35.540	-12.93	--	1	2.40	120 k	
30.0 M	16.72	20.800	-26.470	29.540	-12.82	--	153	2.61	120 k	

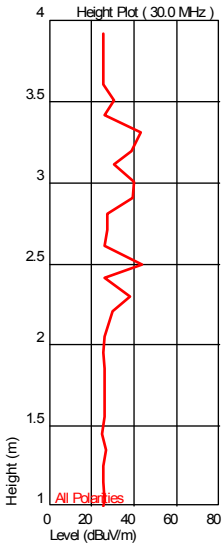
Notes: Noise floor readings. No emissions were detected.

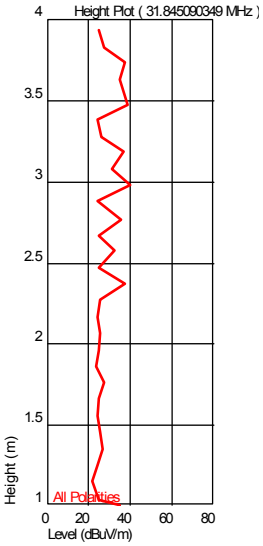
Azimuth Plots

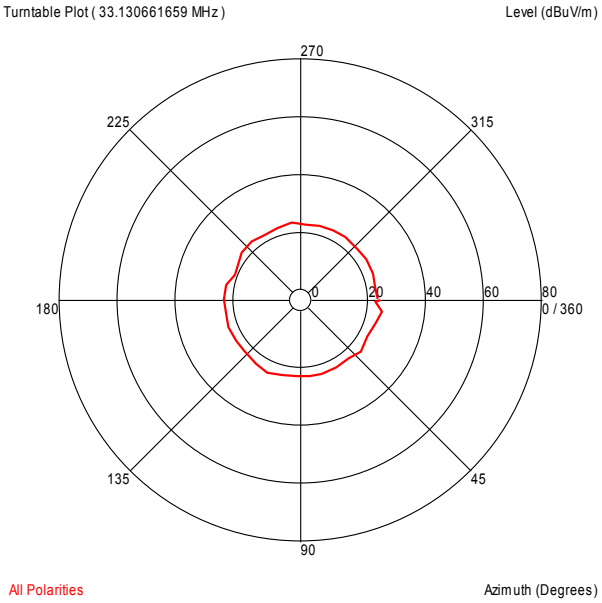


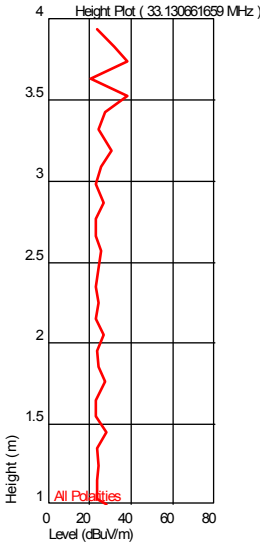


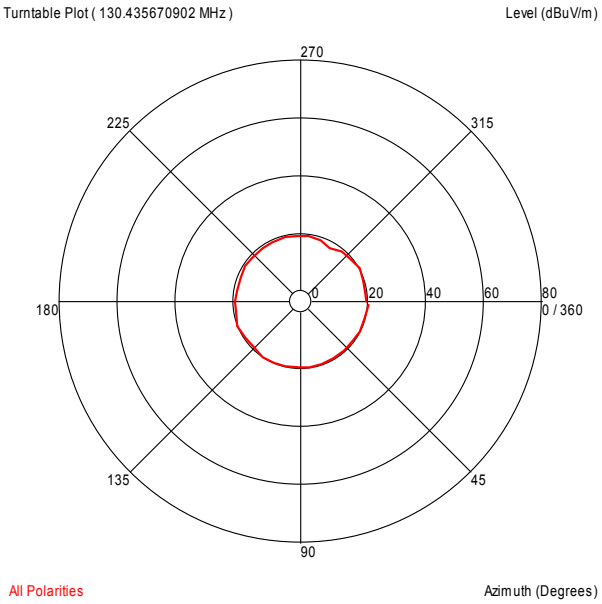
Turntable Plots

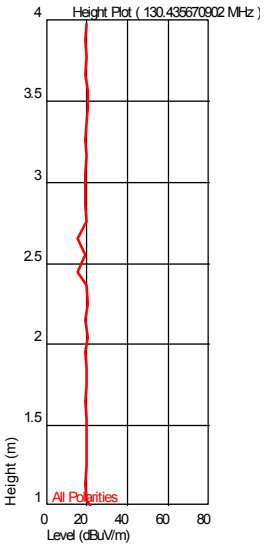


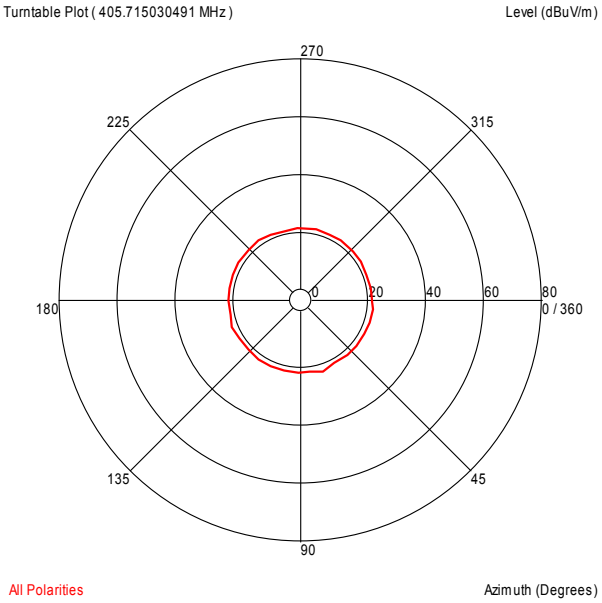


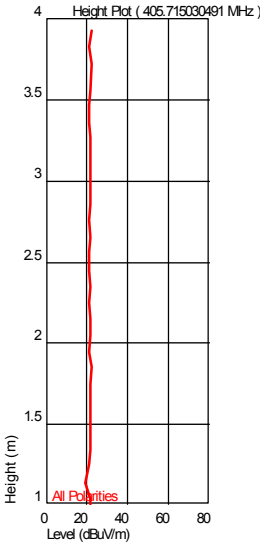

Turntable Plot (33.130661659 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)

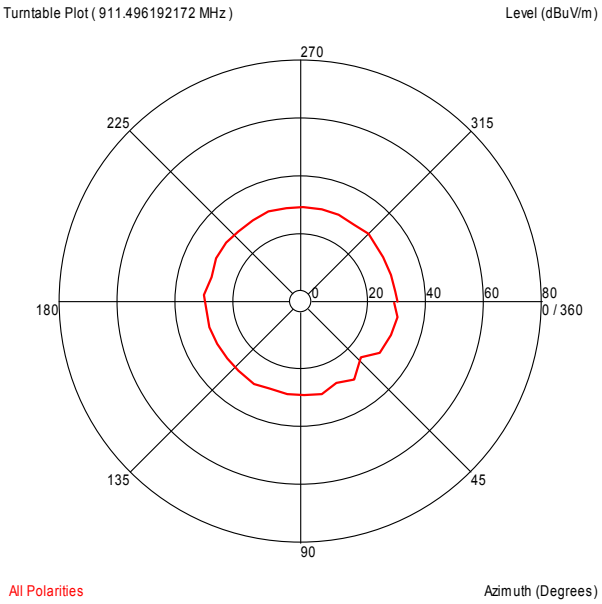

Height Plot (33.130661659 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)

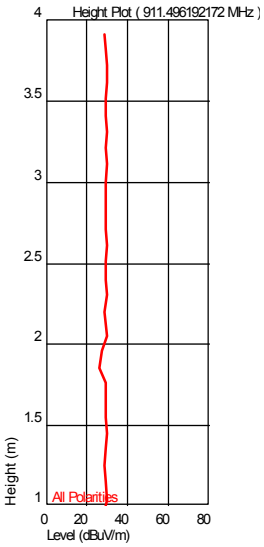

Turntable Plot (130.435670902 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)


Height Plot (130.435670902 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)


Turntable Plot (405.715030491 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)


Height Plot (405.715030491 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)


Turntable Plot (911.496192172 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)


Height Plot (911.496192172 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)

Intertek

Harmonics/Spuiours Radiated Emissions

Company: Corventis — Antenna & Cables: SHF — Bands: N, LF, HF, SHF
Model #: PiiX — Antenna: ETS001 12-17-2013.txt — ETS001 12-17-2013.txt
Serial #: N111306130000D6 — Cable(s): 145-416 3mTrkB 10-04-2013.txt — NONE.
Engineers: Kouma Sinn — Location: 10m Chamber — Barometer: DAV004 — Filter: REA004
Project #: G101275145 — Date(s): 10/06/13
Standard: FCC Part 15 Subpart C 15.247 — Temp/Humidity/Pressure: 21C — 59% — 1012mbar
Receiver: R&S ESI (145-128) 09-28-2013 — Limit Distance (m): 3
PreAmp: PRE145014 12-16-2012.txt — Test Distance (m): 3
PreAmp Used? (Y or N): Y — Voltage/Frequency: Battery power — 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	FCC	IC
Tx, F = 2402 MHz, Spurious emissions (EUT on its back, worst-case). Average Readings = Peak - Average factor of 31 dB													
PK	H	4804.000	42.91	34.58	8.58	34.55	0.00	51.51	74.00	-22.49	1/3 MHz	RB	RB
AVG	H	4804.000	11.91	34.58	8.58	34.55	0.00	20.51	54.00	-33.49	1/3 MHz	RB	RB
PK	H	7206.000	49.68	35.98	10.91	35.65	0.00	60.92	74.00	-13.08	100/300 kHz		
AVG	H	7206.000	18.68	35.98	10.91	35.65	0.00	29.92	54.00	-24.08	100/300 kHz		
PK	H	9608.000	30.25	37.49	12.67	35.89	0.00	44.52	74.00	-29.48	100/300 kHz		
AVG	H	9608.000	-0.75	37.49	12.67	35.89	0.00	13.52	54.00	-40.48	100/300 kHz		
PK	H	12010.000	33.20	39.40	15.02	35.37	0.00	52.25	74.00	-21.75	1/3 MHz	RB, NF	RB
AVG	H	12010.000	2.20	39.40	15.02	35.37	0.00	21.25	54.00	-32.75	1/3 MHz	RB, NF	RB
PK	H	14412.000	31.41	39.86	15.16	34.65	0.00	51.78	74.00	-22.22	1/3 MHz		
AVG	H	14412.000	0.41	39.86	15.16	34.65	0.00	20.78	54.00	-33.22	1/3 MHz		
PK	H	16814.000	32.48	42.32	17.58	37.73	0.00	54.65	74.00	-19.35	1/3 MHz		
AVG	H	16814.000	1.48	42.32	17.58	37.73	0.00	23.65	54.00	-30.35	1/3 MHz		
Tx, F = 2440 MHz, Spurious emissions, (EUT on its long side, worst-case)													
PK	H	4880.000	45.56	34.55	8.67	34.41	0.00	54.37	74.00	-19.63	1/3 MHz	RB	RB
AVG	H	4880.000	14.56	34.55	8.67	34.41	0.00	23.37	54.00	-30.63	1/3 MHz	RB	RB
PK	H	7320.000	43.94	36.03	11.06	35.73	0.00	55.30	74.00	-18.70	1/3 MHz	RB	RB
AVG	H	7320.000	12.94	36.03	11.06	35.73	0.00	24.30	54.00	-29.70	1/3 MHz	RB	RB
PK	H	9760.000	24.70	37.61	13.03	35.35	0.00	40.00	74.00	-34.00	100/300 kHz		
AVG	H	9760.000	-6.30	37.61	13.03	35.35	0.00	9.00	54.00	-45.00	100/300 kHz	NF	
PK	H	12200.000	32.25	39.40	14.83	35.45	0.00	51.04	74.00	-22.96	1/3 MHz	RB, NF	RB
AVG	H	12200.000	1.25	39.40	14.83	35.45	0.00	20.04	54.00	-33.96	1/3 MHz	RB, NF	RB
PK	H	14640.000	31.73	40.11	15.24	34.87	0.00	52.21	74.00	-21.79	100/300 kHz	NF	
AVG	H	14640.000	0.73	40.11	15.24	34.87	0.00	21.21	54.00	-32.79	100/300 kHz	NF	
PK	H	17080.000	30.10	42.04	18.81	37.60	0.00	53.35	74.00	-0.65	100/300 kHz	NF	
AVG	H	17080.000	-0.90	42.04	18.81	37.60	0.00	22.35	54.00	-31.65	100/300 kHz	NF	
Tx, F = 2480 MHz, Spurious emissions, (EUT on its long side, worst-case)													
PK	H	4960.000	47.66	34.52	8.76	34.25	0.00	56.68	74.00	-17.32	1/3 MHz	RB	RB
AVG	H	4960.000	16.66	34.52	8.76	34.25	0.00	25.68	54.00	-28.32	1/3 MHz	RB	RB
PK	H	7440.000	39.05	36.08	11.22	35.81	0.00	50.54	74.00	-23.46	1/3 MHz	RB	RB
AVG	H	7440.000	8.05	36.08	11.22	35.81	0.00	19.54	54.00	-34.46	1/3 MHz	RB	RB
PK	H	9920.000	31.84	37.80	13.42	34.78	0.00	48.28	74.00	-25.72	100/300 kHz		
AVG	H	9920.000	0.84	37.80	13.42	34.78	0.00	17.28	54.00	-36.72	100/300 kHz		
PK	H	12400.000	32.50	39.52	14.64	35.52	0.00	51.14	74.00	-22.86	1/3 MHz	RB, NF	RB
AVG	H	12400.000	1.50	39.52	14.64	35.52	0.00	20.14	54.00	-33.86	1/3 MHz	RB, NF	RB
PK	H	14880.000	22.27	40.20	15.67	35.32	0.00	42.82	74.00	-31.18	100/300 kHz	NF	
AVG	H	14880.000	-8.73	40.20	15.67	35.32	0.00	11.82	54.00	-42.18	100/300 kHz	NF	
PK	H	17360.000	22.63	41.99	20.07	36.91	0.00	47.78	74.00	-26.22	100/300 kHz	NF	
AVG	H	17360.000	-8.37	41.99	20.07	36.91	0.00	16.78	54.00	-37.22	100/300 kHz	NF	

Average factor = 20*LOG(2.806ms/100ms) = 31 dB
Hand scan was performed from 18 to 25 GHz at a distance less 0.5 m. No emissions were detected above the equipment noise floor.

Test Personnel:	Kouma Sinn KPS	Test Date:	07/31/2013, 10/06/2013
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	15.247, RSS-Gen, RSS-210	Limit Applied:	Below specified limits
Input Voltage:	Internal Battery Powered	Ambient Temperature:	24, 21 ºC
Pretest Verification w/ Ambient Signals or BB Source:	**BB Source**	Relative Humidity:	42, 59 %
		Atmospheric Pressure:	1009, 1012 mbars

Deviations, Additions, or Exclusions: None

8 Hopping Channel Separation

8.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C Section 15.247, ANSI C63.10, RSS-Gen, RSS-210 Annex 8.

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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 Styrofoam 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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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 dBμV 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 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

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

To convert from dBμV to μV or mV the following was used:

UF = $10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

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

8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004	Weather Station	Davis Instruments	7400	PE80529A61 A	09/25/2012	09/25/2014
ROS001	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	04/25/2013	04/25/2014
CBLHF20 12-2M-2	2m 40GHz Coaxial Cable	Huber & Suhner	SF102	252675002	12/18/2012	12/18/2013
HORN2	HORN ANTENNA	EMCO	3115	9602-4675	12/19/2012	12/19/2013

Software Utilized:

Name	Manufacturer	Version
None		

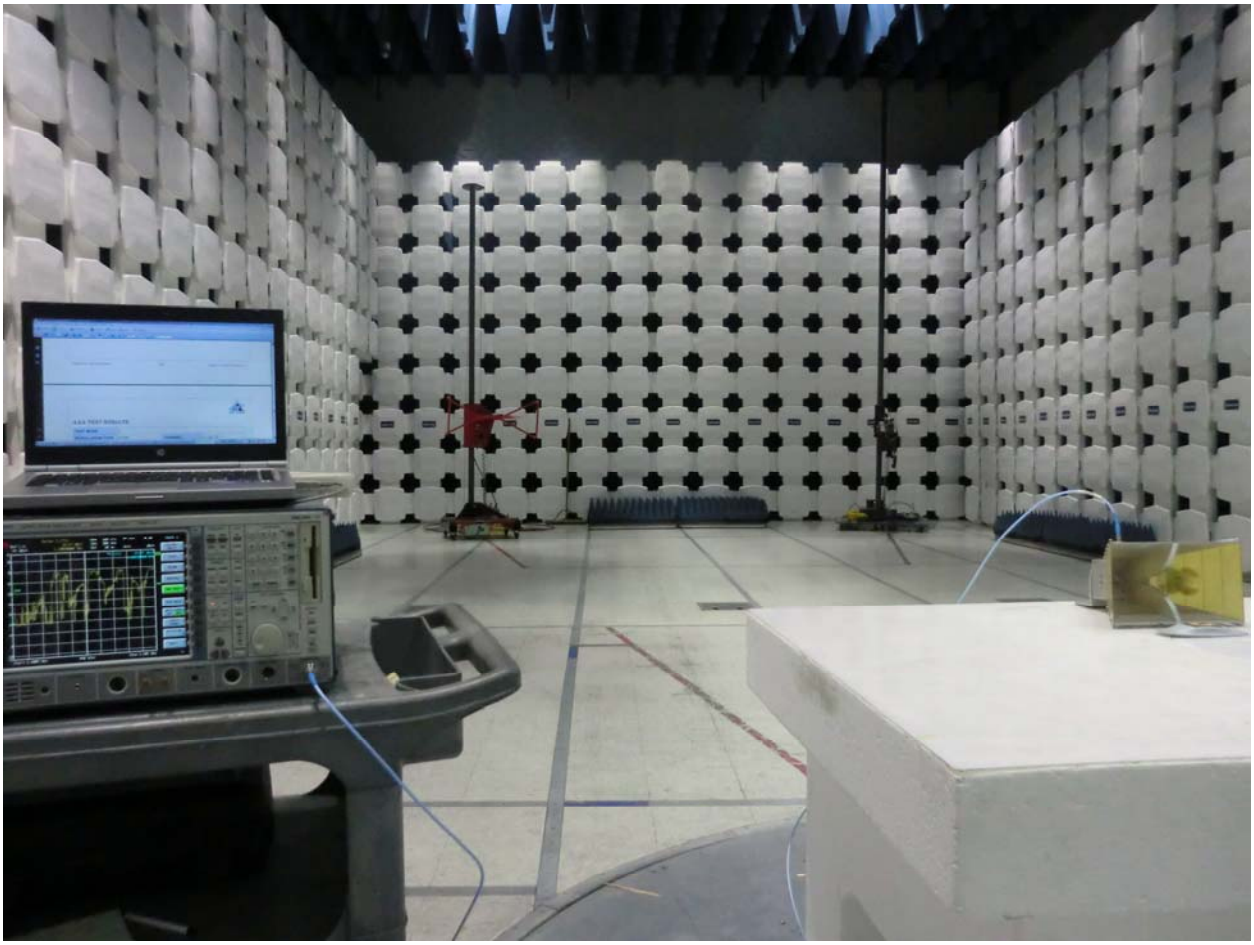
8.3 Results:

The sample tested was found to comply, since output power is below 125 mW and therefore the channel separation must be at least 2/3 of the 20 dB bandwidth.

FCC Part 15.247 (1) & RSS-210 A8.1 (b)
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is

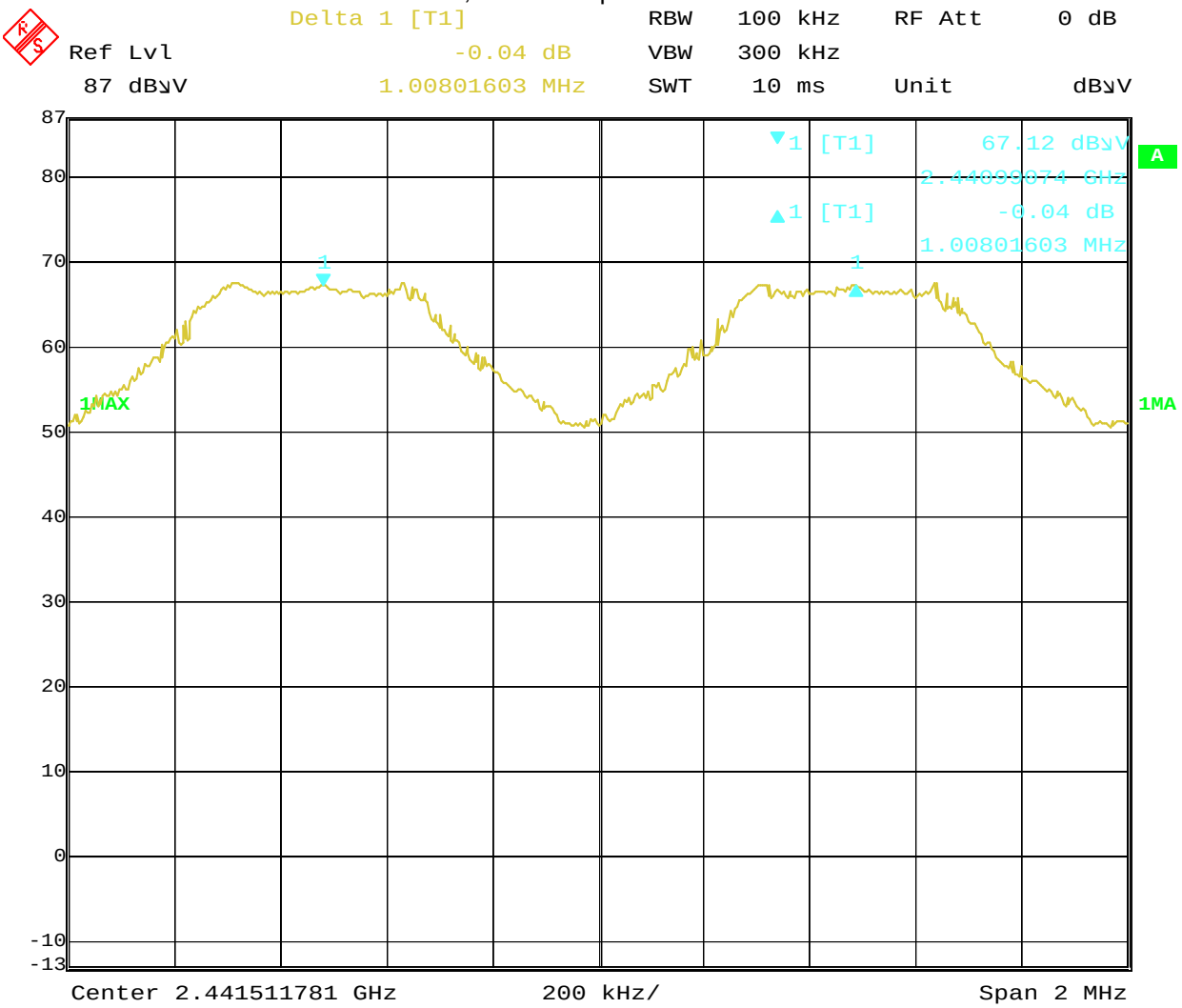
greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

8.4 Setup Photographs:

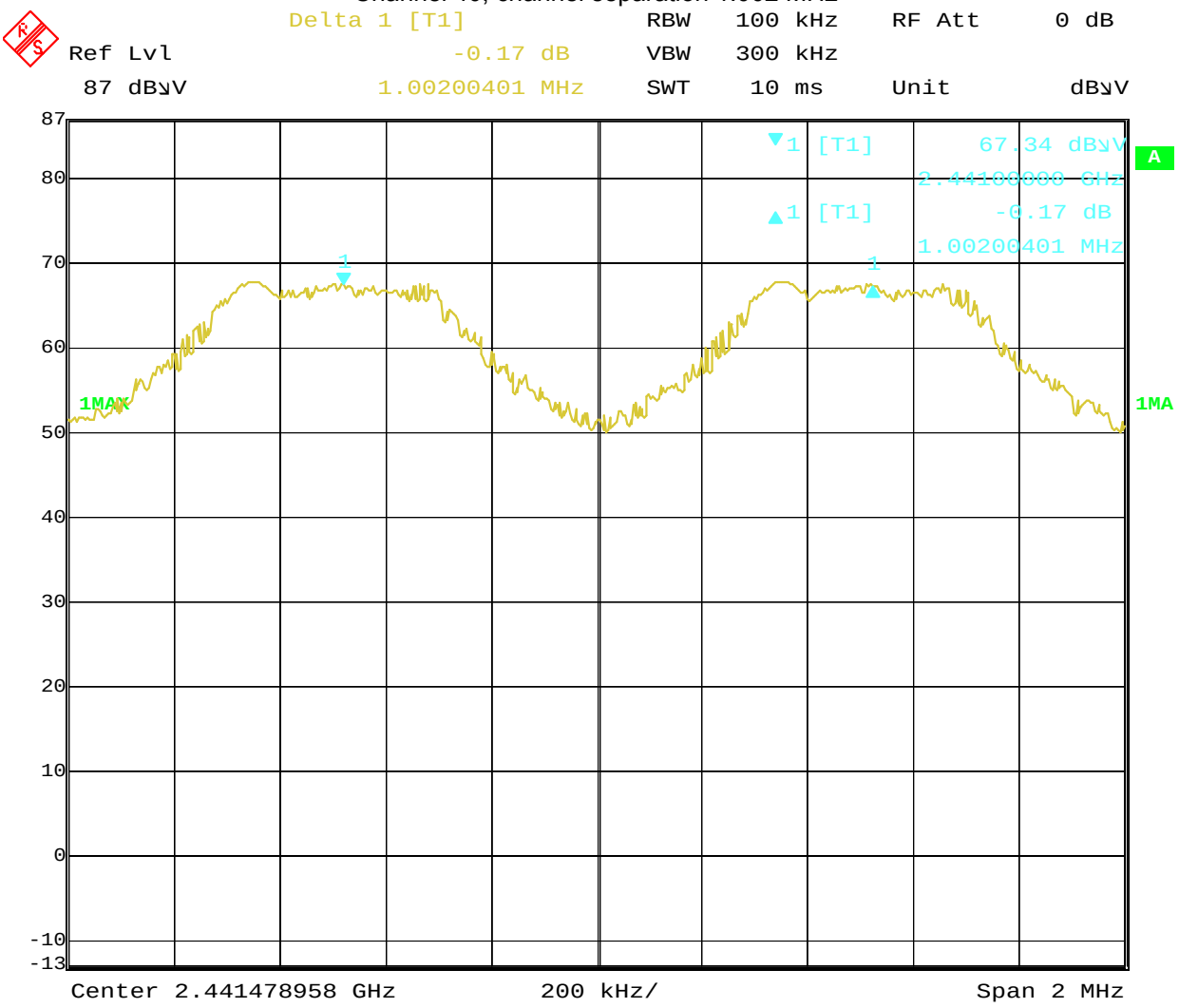


8.5 Plots/Data:

Channel 0, channel separation is 1.008 MHz

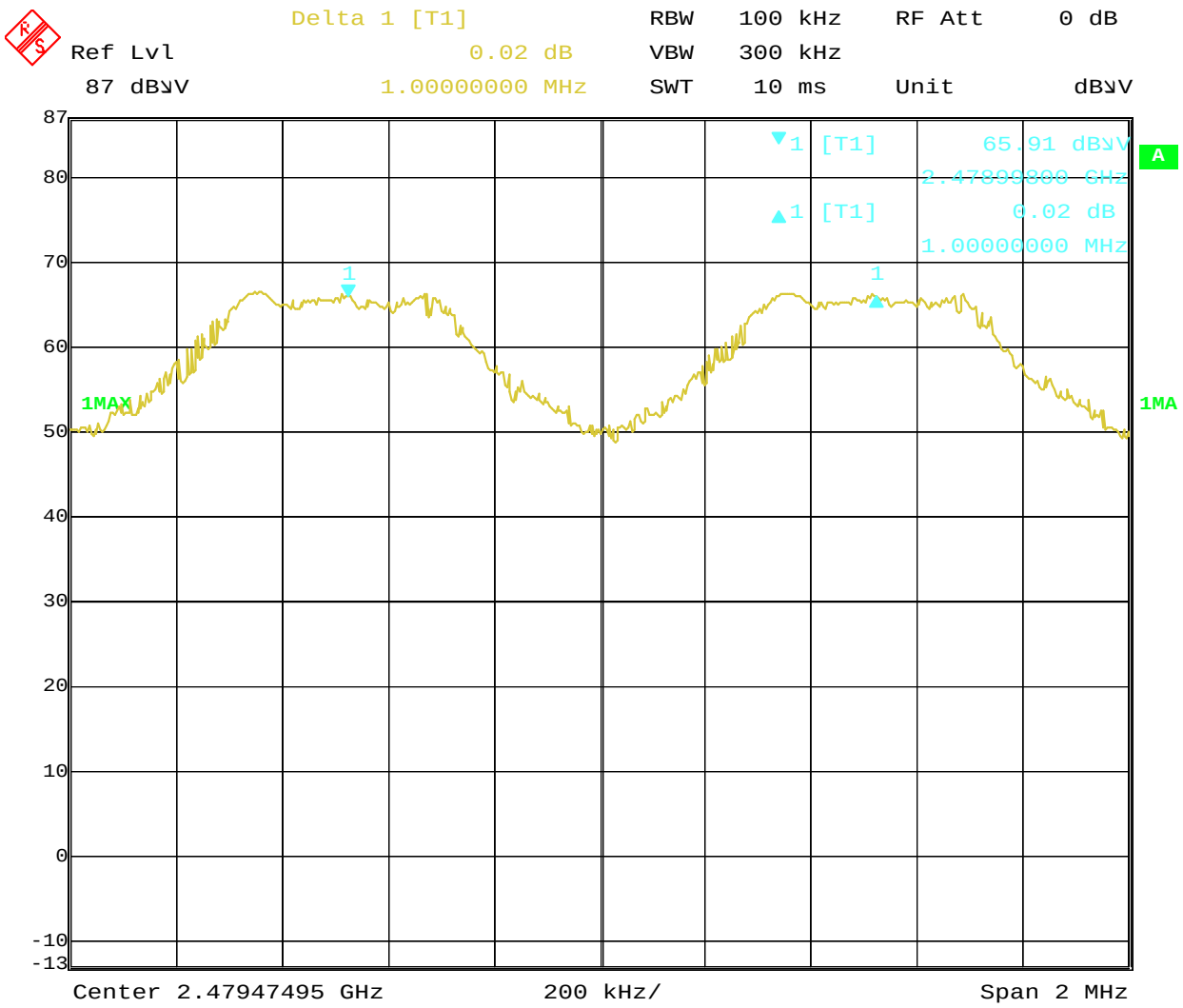


Channel 40, channel separation 1.002 MHz



Date: 30.OCT.2013 22:14:23

Channel 79, channel separation 1.000 MHz



Test Personnel:	Vathana Ven VV	Test Date:	10/30/2013
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	15.247, CFR47 Part 2.1093, RSS-Gen, RSS-210, IC RSS-102	Limit Applied:	Below specified limits
Input Voltage:	Internal Battery Powered		
Pretest Verification w/ Ambient Signals or BB Source:	**BB Source**	Ambient Temperature:	22 ºC
		Relative Humidity:	50 %
		Atmospheric Pressure:	1009 mbars

Deviations, Additions, or Exclusions: None

9 Number of hopping frequency

9.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C Section 15.247, ANSI C63.10, RSS-Gen, 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 Styrofoam 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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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 dBμV 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 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

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

To convert from dBμV to μV or mV the following was used:

UF = $10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

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

9.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004	Weather Station	Davis Instruments	7400	PE80529A61 A	09/25/2012	09/25/2014
ROS001	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	04/25/2013	04/25/2014
CBLHF20 12-2M-2	2m 40GHz Coaxial Cable	Huber & Suhner	SF102	252675002	12/18/2012	12/18/2013
HORN2	HORN ANTENNA	EMCO	3115	9602-4675	12/19/2012	12/19/2013

Software Utilized:

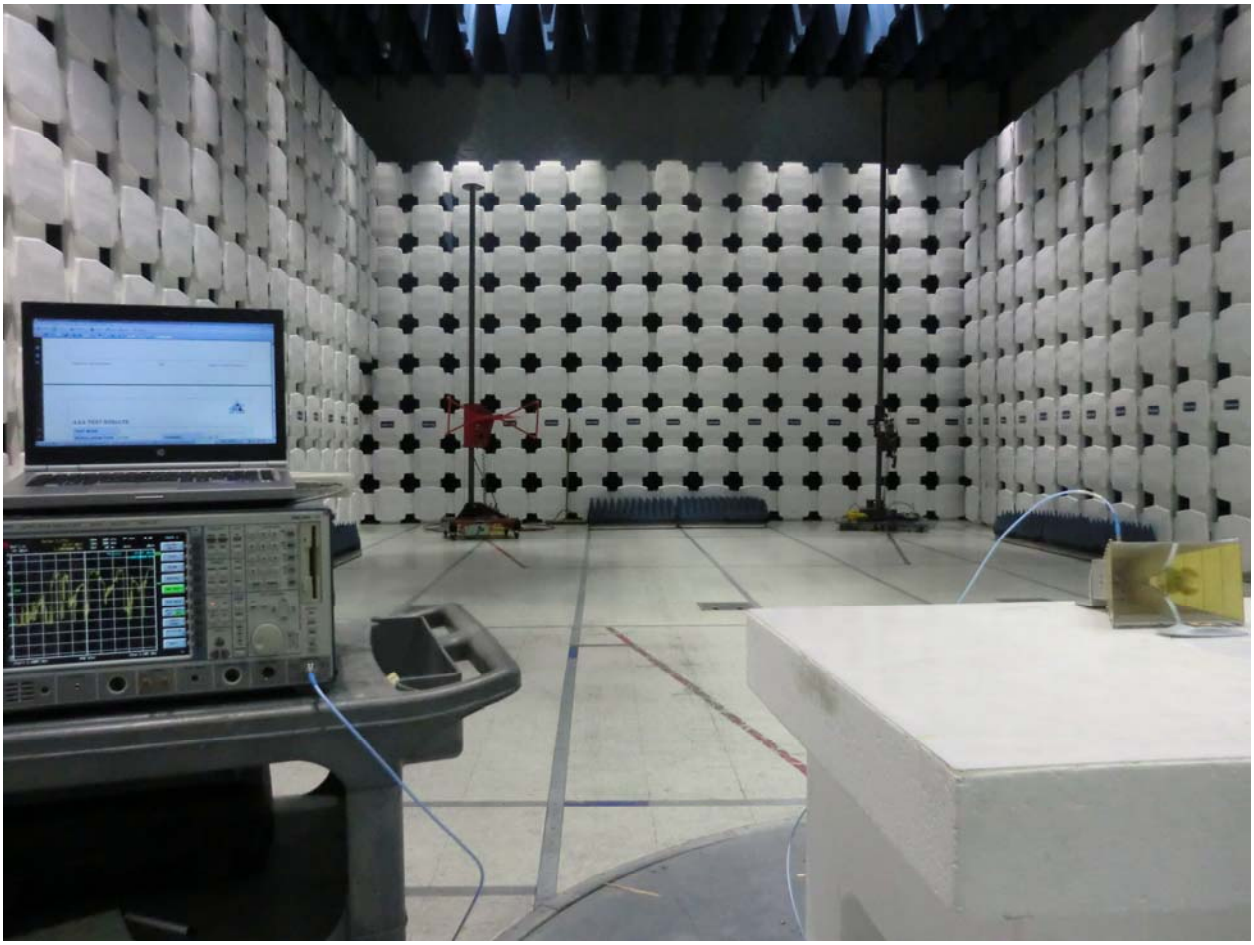
Name	Manufacturer	Version
None		

9.3 Results:

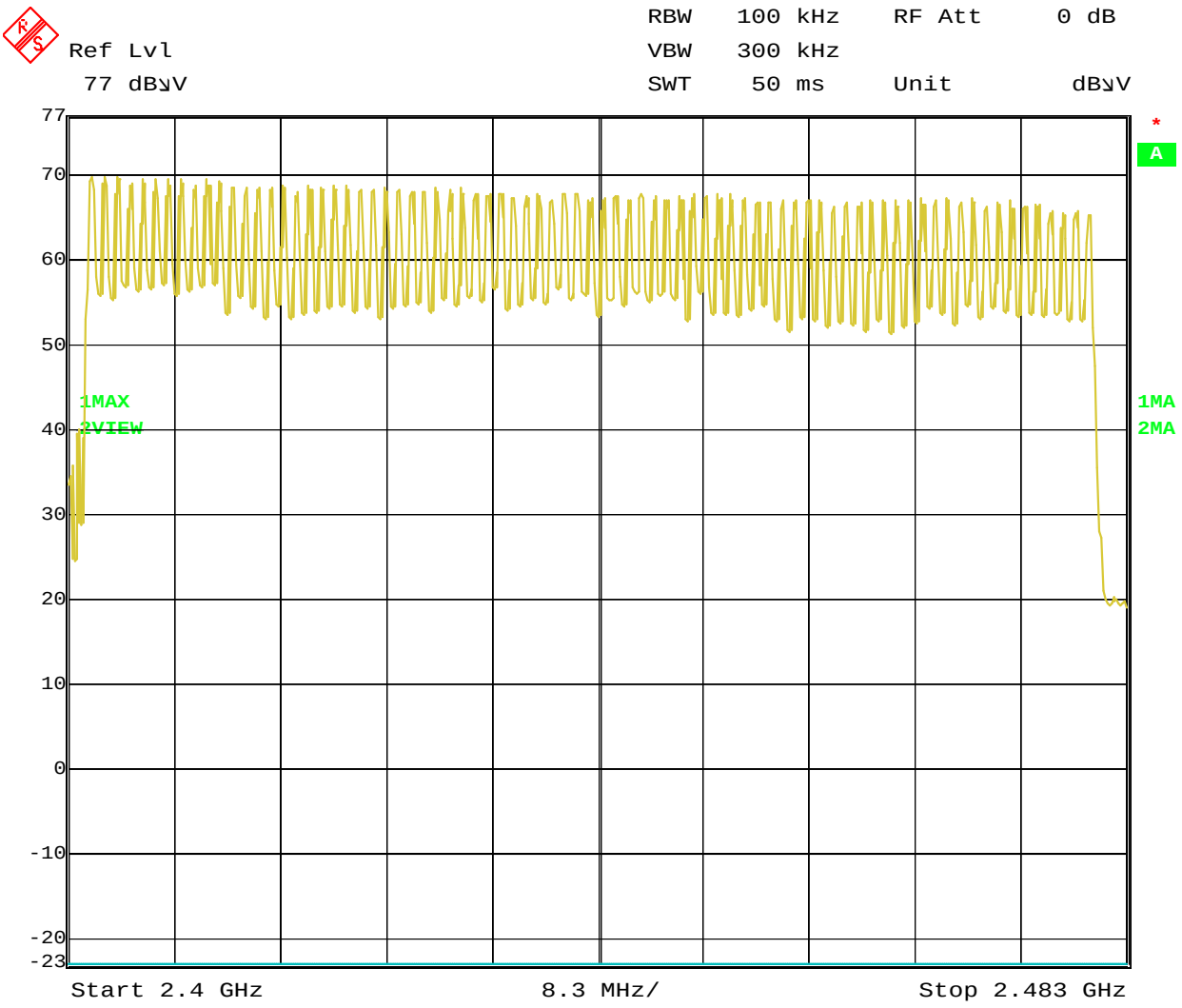
The sample tested was found to Comply.

FCC Part 15.247 (1) (iii) & RSS-210 A8.1 (d)
Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

9.4 Setup Photographs:



9.5 Plots/Data:



Test Personnel:	Vathana Ven VV	Test Date:	10/30/2013
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	15.247, CFR47 Part 2.1093, RSS-Gen, RSS-210, IC RSS-102	Limit Applied:	Below specified limits
Input Voltage:	Internal Battery Powered		
Pretest Verification w/ Ambient Signals or BB Source:	**BB Source**	Ambient Temperature:	22 ºC
		Relative Humidity:	50 %
		Atmospheric Pressure:	1009 mbars

Deviations, Additions, or Exclusions: None

10 Test Hopping Channel Bandwidth

10.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C Section 15.247, ANSI C63.10, RSS-Gen, RSS-210 Annex 8.

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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 Styrofoam 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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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 dBμV 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 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

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

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

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

10.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004	Weather Station	Davis Instruments	7400	PE80529A61 A	09/25/2012	09/25/2014
145-128	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	04/25/2013	04/25/2014
145-416	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	10/04/2013	10/04/2014
ETS001	1-18GHz DRG Horn Antenna	ETS-Lindgren	3117	00143259	12/17/2012	12/17/2013

Software Utilized:

Name	Manufacturer	Version
None		

10.3 Results:

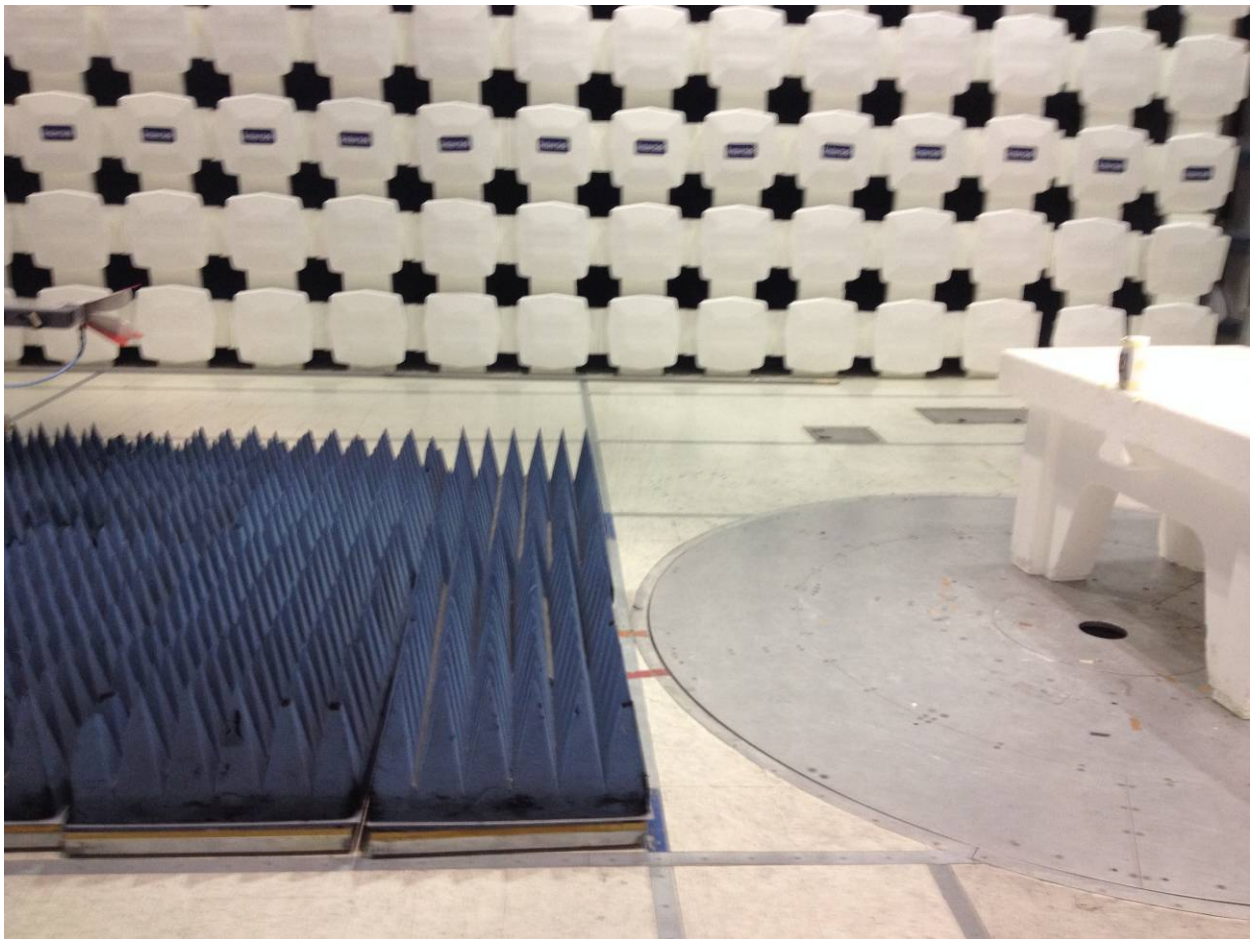
Test result of the 20-dB bandwidth – not the FCC requirements.

FCC Part 15.247 (1) & RSS-210 A8.1 (b)

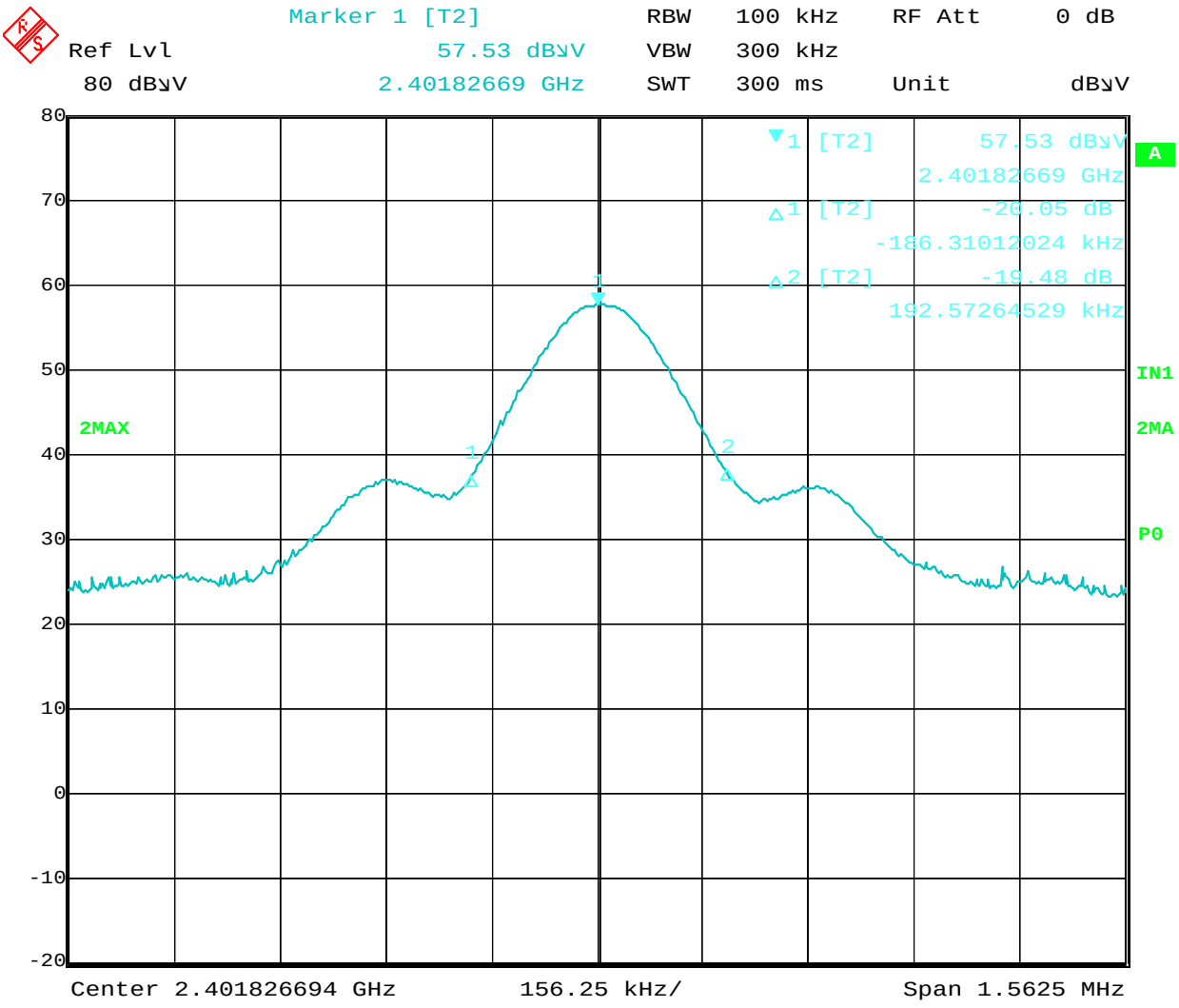
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping

rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

10.4 Setup Photographs:



10.5 Data:



Bandwidth 378.9kHz

Test Personnel:	Kouma Sinn KPS	Test Date:	07/31/2013
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	15.247, CFR47 Part 2.1093, RSS-Gen, RSS-210, IC RSS-102	Limit Applied:	Below specified limits
Input Voltage:	Internal Battery Powered		
Pretest Verification w/ Ambient Signals or BB Source:	**BB Source**	Ambient Temperature:	21ºC
		Relative Humidity:	59%
		Atmospheric Pressure:	1012mbars

Deviations, Additions, or Exclusions: None

11 Hopping Dwell time

11.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C Section 15.247, ANSI C63.10, RSS-Gen, 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 Styrofoam 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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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 dBμV 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 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

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

To convert from dBμV to μV or mV the following was used:

UF = $10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

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

11.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004	Weather Station	Davis Instruments	7400	PE80529A61 A	09/25/2012	09/25/2014
ROS001	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	04/25/2013	04/25/2014
CBLHF20 12-2M-2	2m 40GHz Coaxial Cable	Huber & Suhner	SF102	252675002	12/18/2012	12/18/2013
HORN2	HORN ANTENNA	EMCO	3115	9602-4675	12/19/2012	12/19/2013

Software Utilized:

Name	Manufacturer	Version
None		

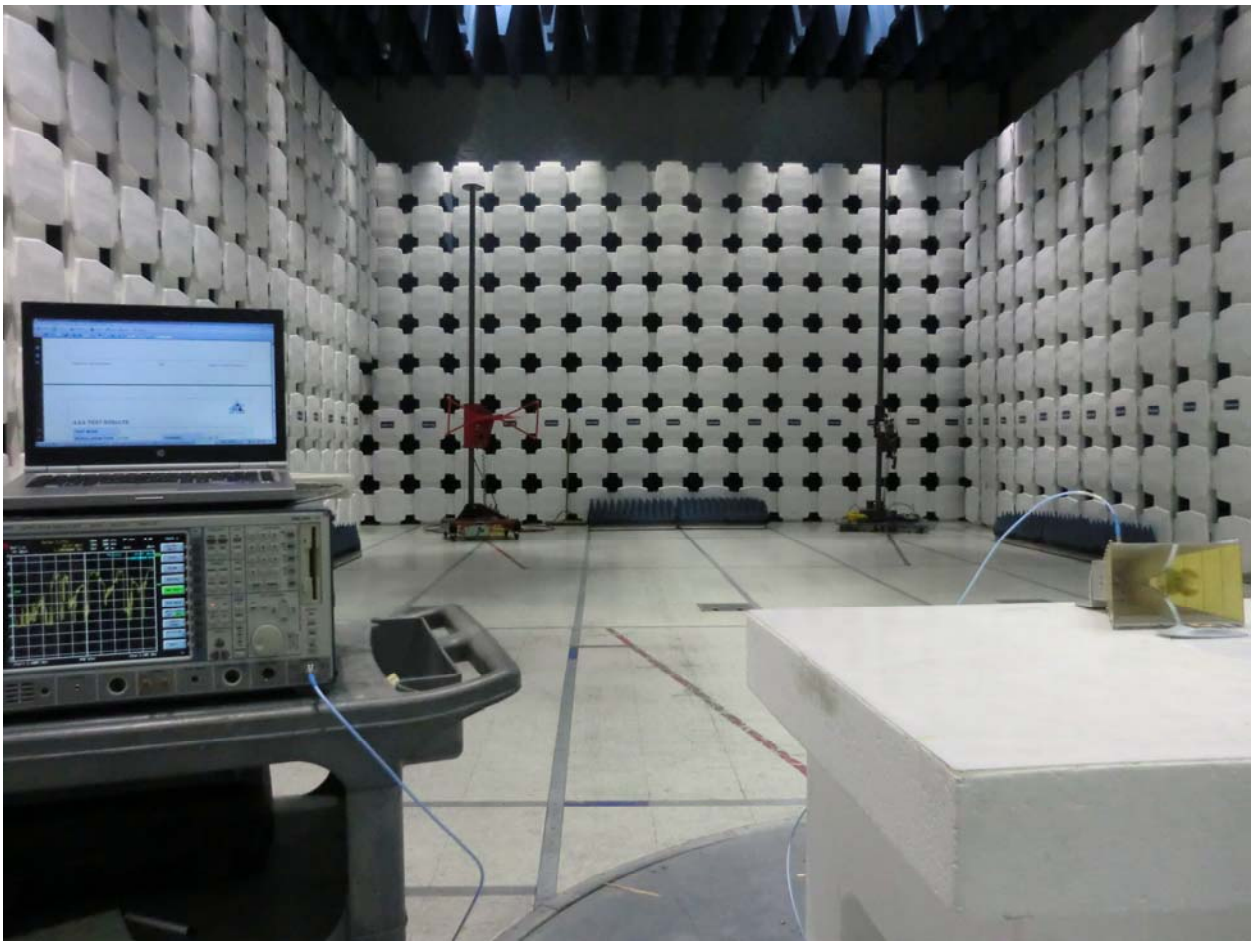
11.3 Results:

The sample tested was found to Comply.
FCC Part 15.247 (1) (iii) & RSS-210 A8.1 (c)

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Bluetooth utilizes 79 channels, therefore dwell time must not exceed 0.4 seconds in any 31.6 second period.

11.4 Setup Photographs:

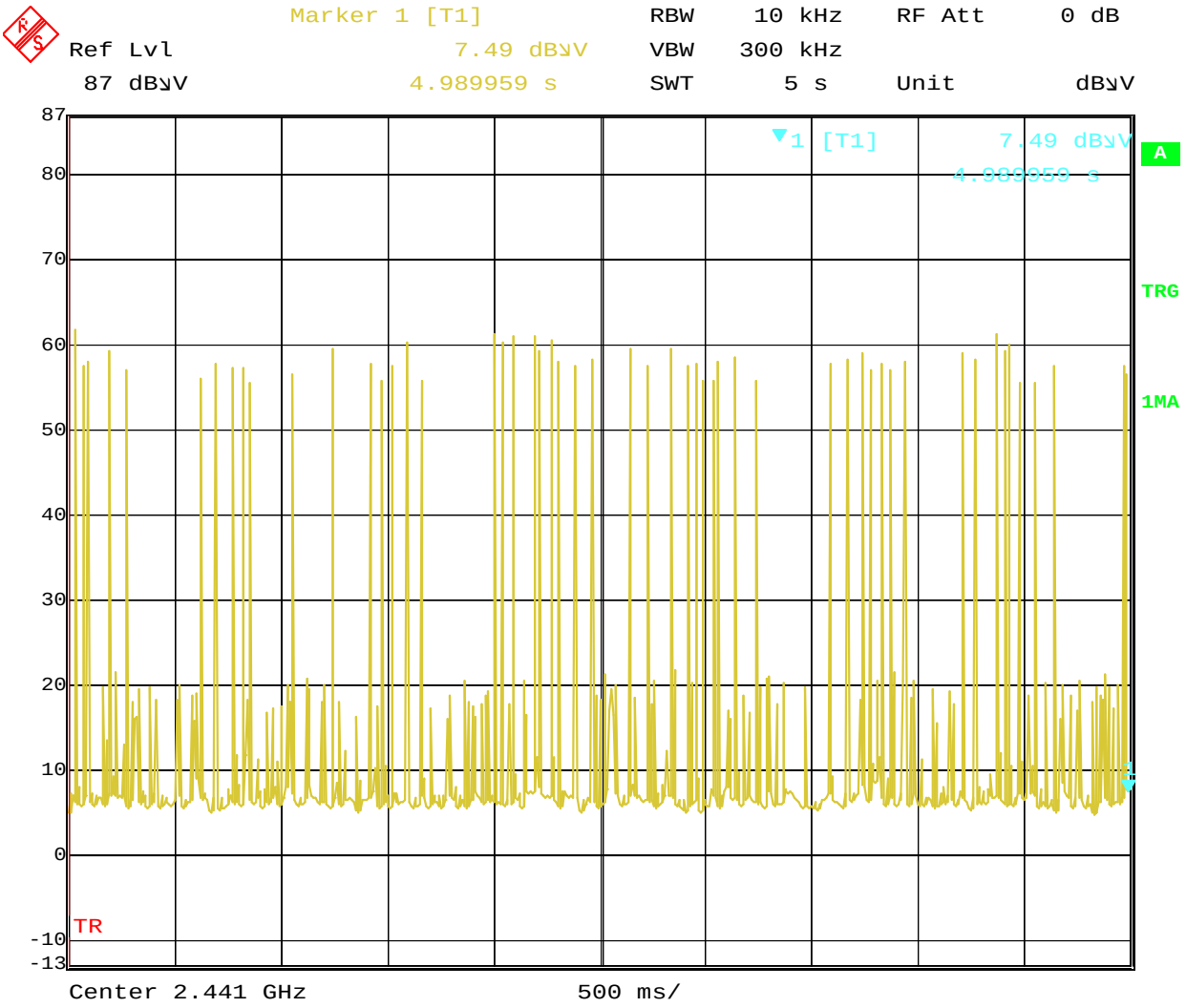


11.5 Data:

Mode	Number of transmissions in a 31.6 (79 hopping*0.4 seconds)	Length of transmission time (msec)	Results (msec)	Limit (msec)
DH1	53 (times/5s)*6.32 = 334.96 times	0.379	126.95	400
DH3	29 (times/5s)*6.32 = 183.29 times	1.635	299.66	400
DH5	15 (times/5s)*6.32 = 94.8 times	2.806	266.01	400

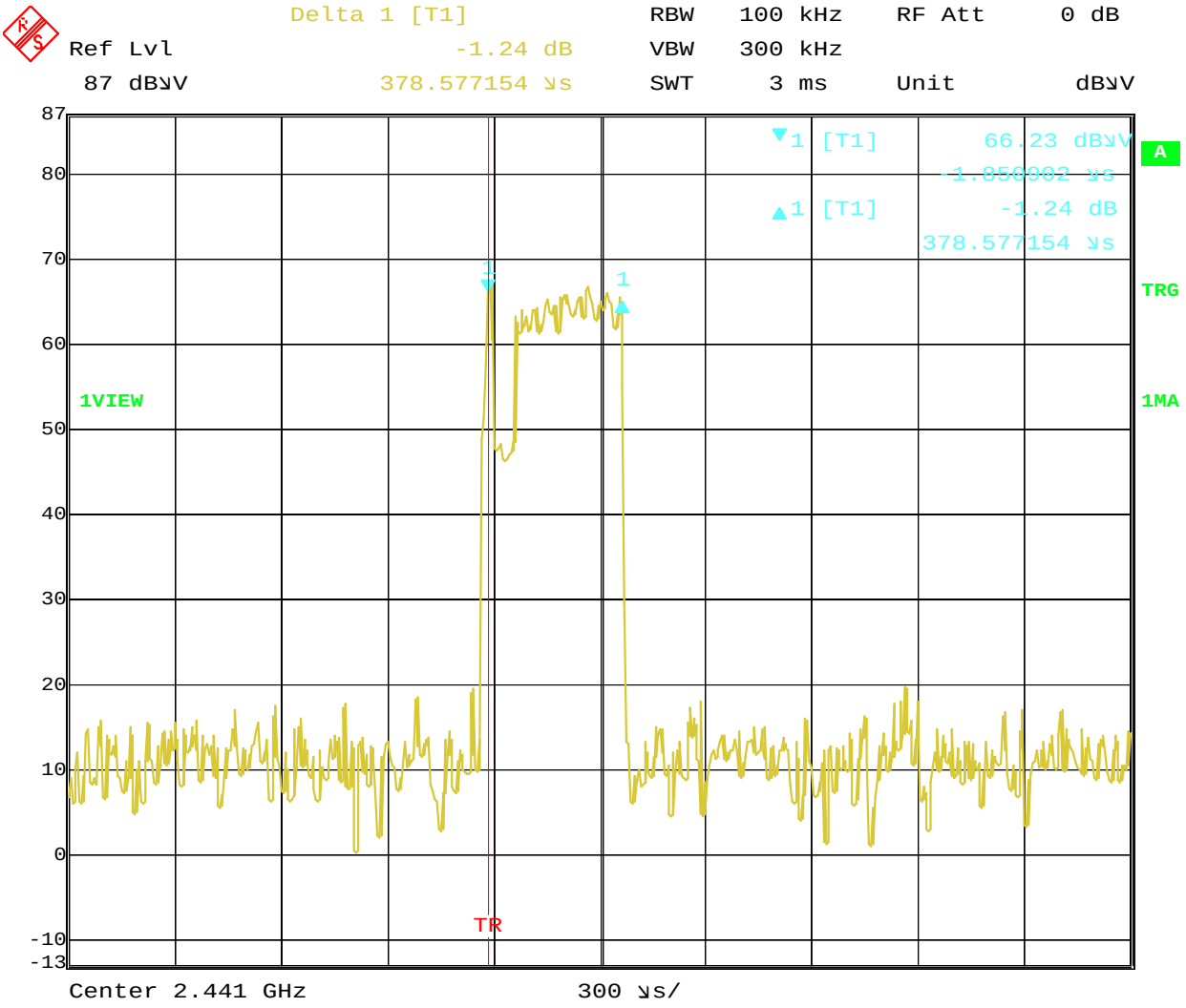
The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channel employed.

DH1



Date: 30.OCT.2013 20:39:43

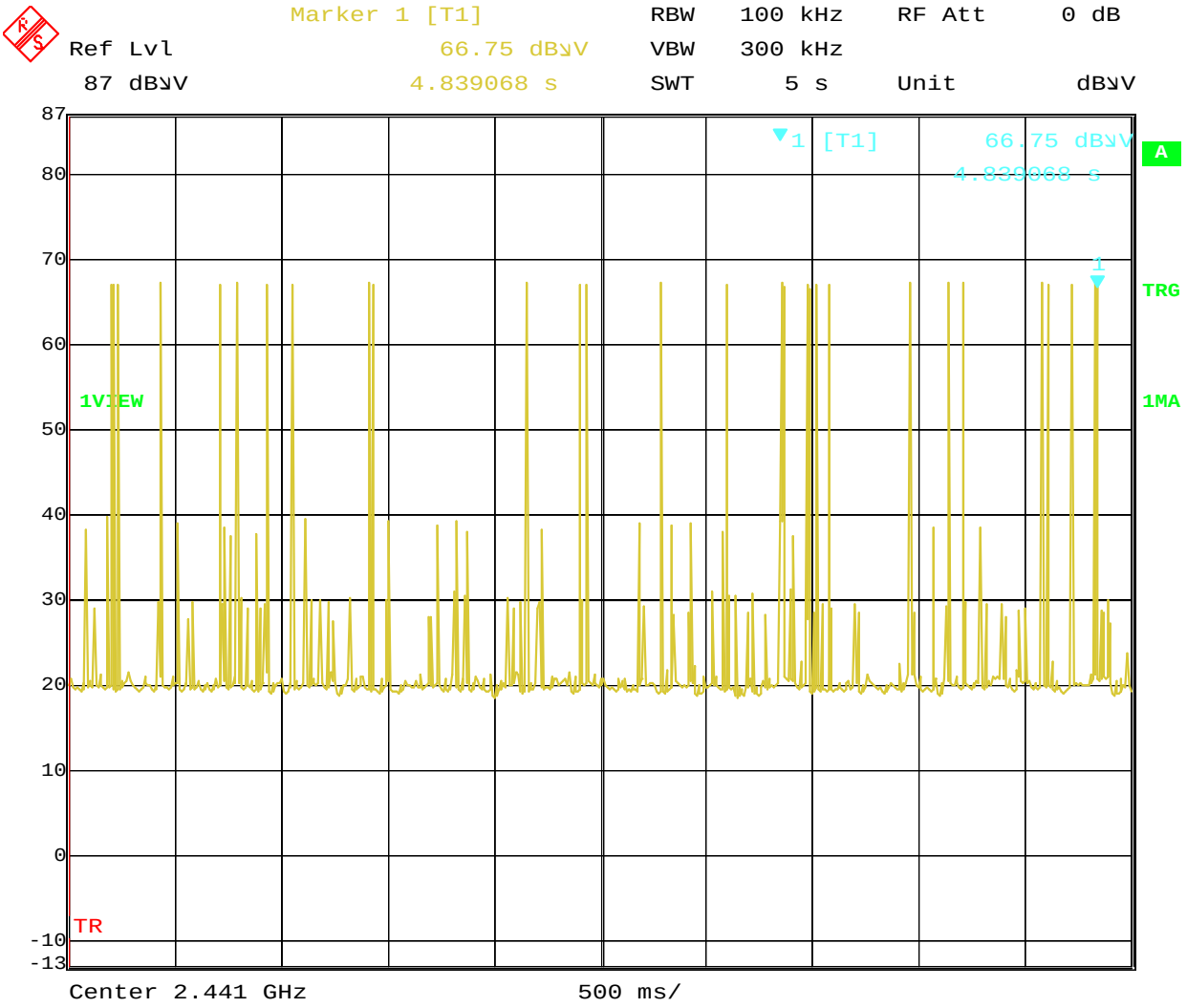
Number of hopping channels in 5s slot



Date: 30.OCT.2013 20:45:43

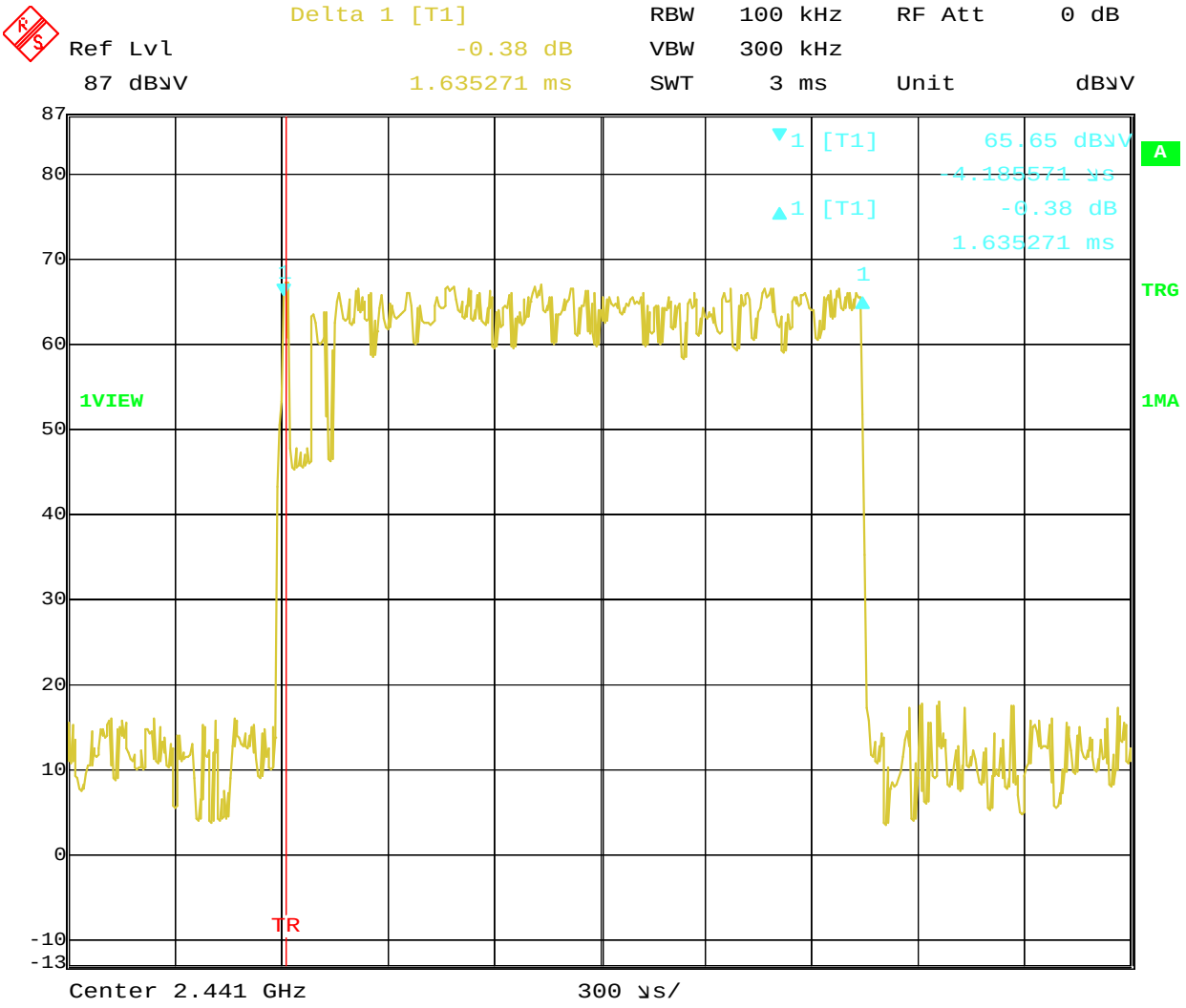
Length of transmission time

DH3



Date: 30.OCT.2013 20:52:33

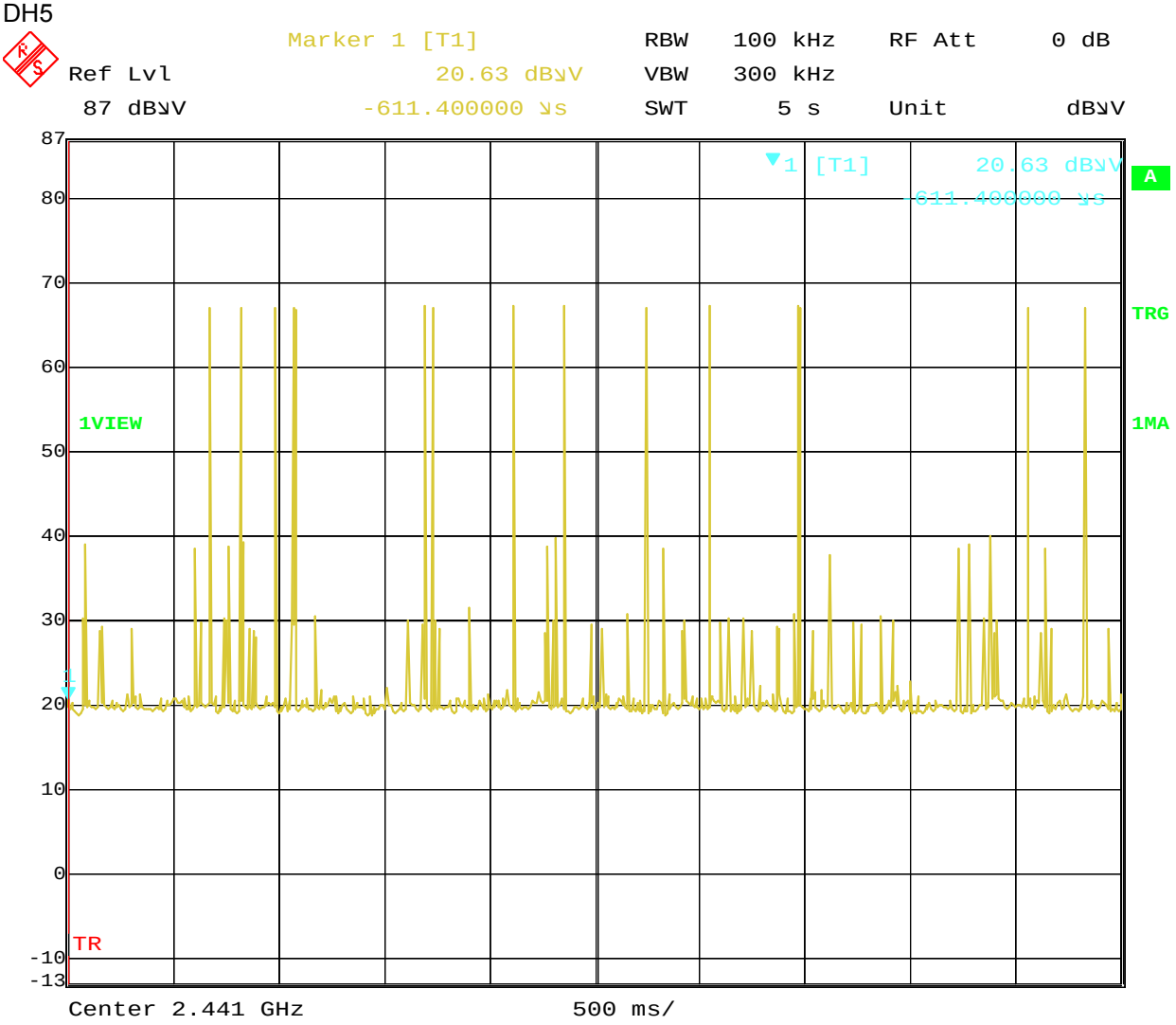
Number of hopping channels in 5s slot



Date: 30.OCT.2013 20:48:34

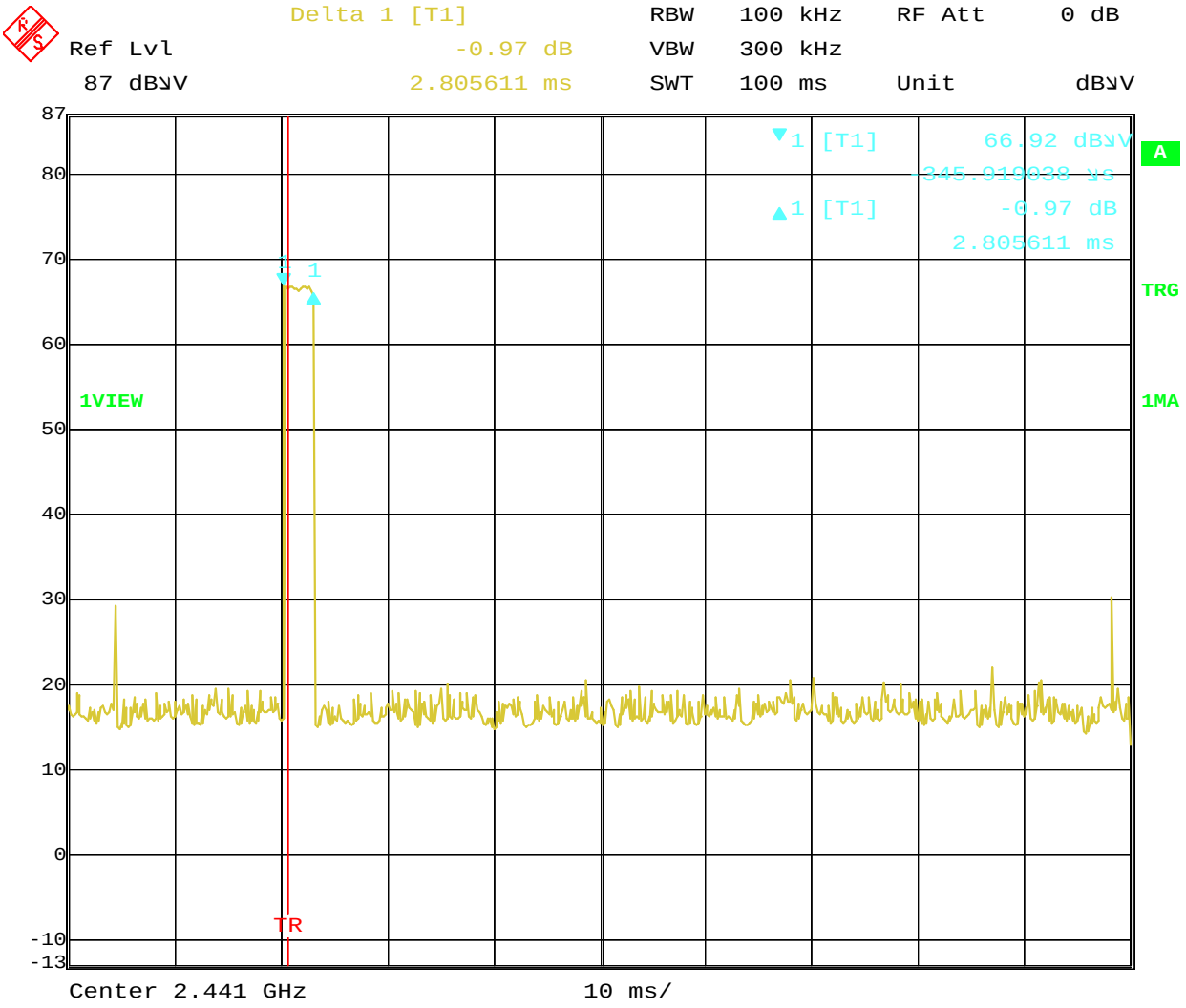
Length of transmission time

DH5



Date: 30.OCT.2013 20:56:22

Number of hopping channels in 5s slot



Test Personnel:	Vathana Ven VV	Test Date:	10/30/2013
Supervising/Reviewing Engineer: (Where Applicable)		Limit Applied:	Below specified limits
Product Standard:	15.247, CFR47 Part 2.1093, RSS-Gen, RSS-210, IC RSS-102		
Input Voltage:	Internal Battery Powered	Ambient Temperature:	22 ºC
Pretest Verification w/ Ambient Signals or BB Source:	**BB Source**	Relative Humidity:	50 %
		Atmospheric Pressure:	1009 mbars

Deviations, Additions, or Exclusions: None

12 Test Band-edge Compliance

12.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C Section 15.247, ANSI C63.10, RSS-Gen, RSS-210 Annex 8.

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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 Styrofoam 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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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 dBμV 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 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

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

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

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

12.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004	Weather Station	Davis Instruments	7400	PE80529A61 A	09/25/2012	09/25/2014
145-128	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	04/25/2013	04/25/2014
145-416	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	10/04/2013	10/04/2014
ETS001	1-18GHz DRG Horn Antenna	ETS-Lindgren	3117	00143259	12/17/2012	12/17/2013

Software Utilized:

Name	Manufacturer	Version
None		

12.3 Results:

The sample tested was found to comply. Note that the requirement is 20 dBc at the lower band edge, and the device must meet the general limits of 15.209 using the marker-delta method at the upper band edge due to the restricted band located there.

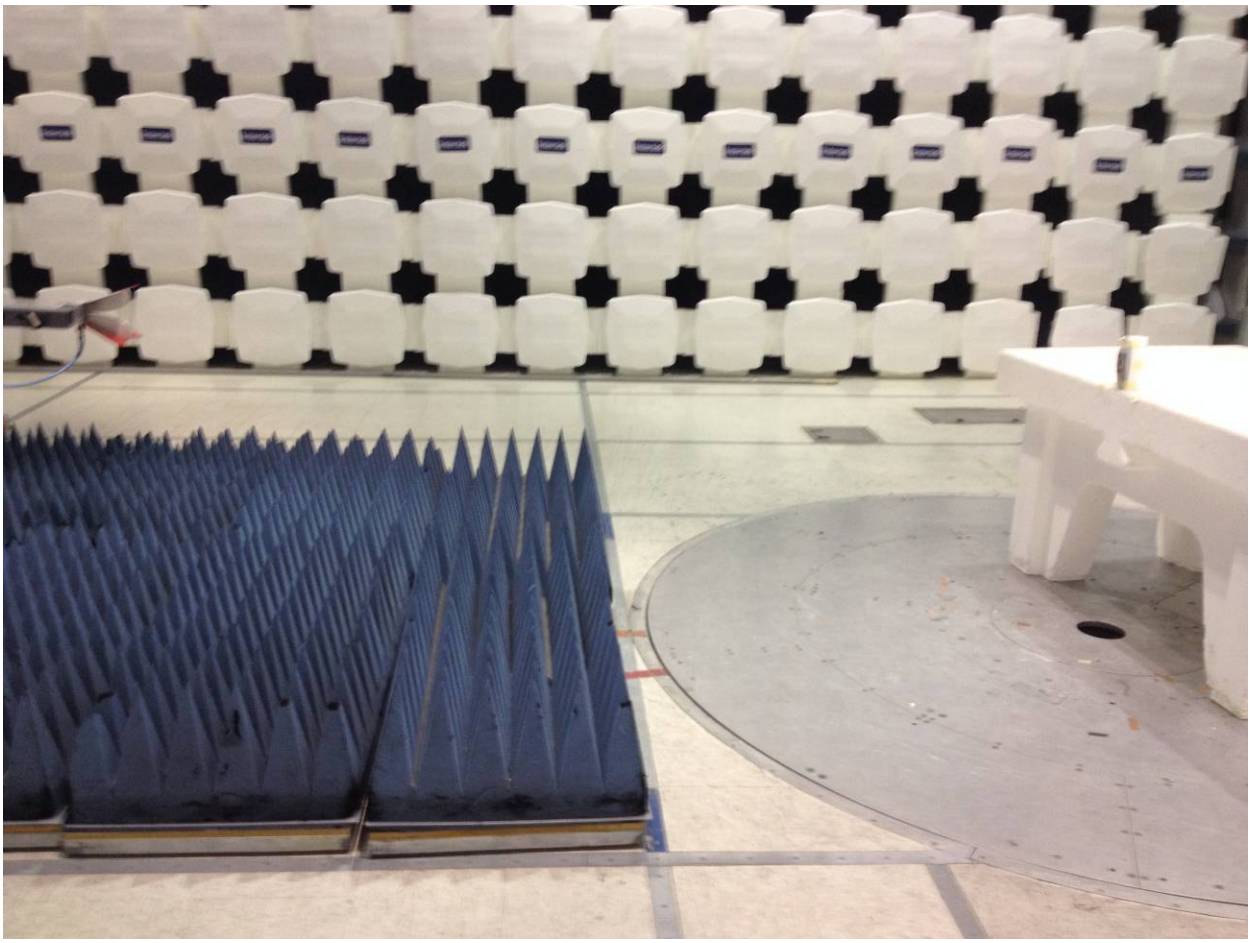
In any 100 kHz bandwidth outside the frequency band , the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated 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)).

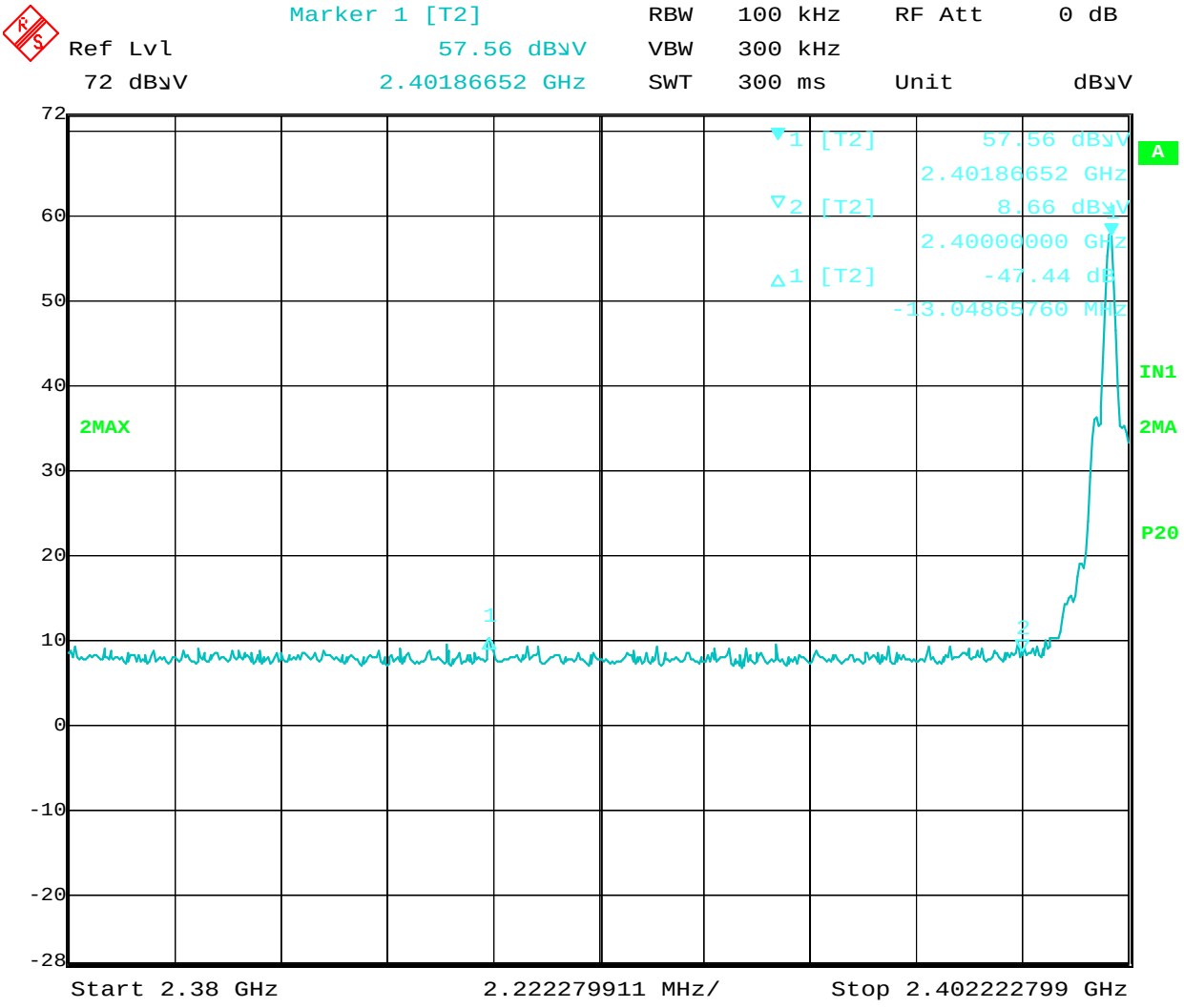
FCC Part 15.209(a) & RSS-210 A8.5 – Restricted Band Radiated Spurious/Harmonics Limits

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

12.4 Setup Photographs:



12.5 Test Data:



Lower Band Edge Compliance

Intertek

Upper Band Edge Radiated Emissions

Company: Corventis
Model #: PiiX
Serial #: N111306130000D6
Engineers: Kouma Sinn
Project #: G101275145
Standard: FCC Part 15 Subpart C 15.247
Receiver: R&S ESI (145-128) 09-28-2013
PreAmp: PRE145014 12-16-2012.txt
PreAmp Used? (Y or N): N

Antenna & Cables: SHF Bands: N, LF, HF, SHF
Antenna: ETS001 12-17-2013.txt ETS001 12-17-2013.txt
Cable(s): 145-416 3mTrkB 10-04-2013.txt NONE.
Location: 10m Chamber Barometer: DAV004 Filter: NONE
Date(s): 10/06/13
Temp/Humidity/Pressure: 21C 59% 1012mbar
Limit Distance (m): 3
Test Distance (m): 3
Voltage/Frequency: Battery power Frequency Range: Band Edge

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)	Margin dB	Bandwidth
Note: Upper Band Edge Compliance. The EUT sits on its back. AVG Readings = Peak Readings - Average Factor											
PK	H	2483.500	26.25	32.47	5.98	0.00	0.00	64.70	74.00	-9.30	1/3 MHz
AVG	H	2483.500	-4.75	32.47	5.98	0.00	0.00	33.70	54.00	-20.30	1/3 MHz
Note: Upper Band Edge Compliance, Integrated to 1 MHz RBW Equivalent. AVG Readings = Peak Readings - Average Factor											
PK	H	2483.500	11.19	32.47	5.98	0.00	0.00	49.64	74.00	-24.36	10 kHz/30 kHz
AVG	H	2483.500	-19.81	32.47	5.98	0.00	0.00	18.64	54.00	-35.36	10 kHz/30 kHz
Note: Upper Band Edge Compliance, Integrated to 1 MHz RBW Equivalent. AVG Readings = Peak Readings - Average Factor											
PK	H	2484.000	20.83	32.47	5.98	0.00	0.00	59.28	74.00	-14.72	100/300kHz
AVG	H	2484.000	-10.17	32.47	5.98	0.00	0.00	28.28	54.00	-25.72	100/300kHz
Note: Upper Band Edge Compliance, Integrated to 1 MHz RBW Equivalent. AVG Readings = Peak Readings - Average Factor											
PK	H	2484.000	23.31	32.47	5.98	0.00	0.00	61.76	74.00	-12.24	500kHz/3MHz
AVG	H	2484.000	-7.69	32.47	5.98	0.00	0.00	30.76	54.00	-23.24	500kHz/3MHz

Average factor = 20*LOG(2.806ms/100ms) = 31 dB

Test Personnel: Kouma Sinn KPS
Supervising/Reviewing Engineer: (Where Applicable) N/A
Product Standard: 15.247, CFR47 Part 2.1093, RSS-Gen, RSS-210, IC RSS-102
Input Voltage: Internal Battery Powered
Pretest Verification w/ Ambient Signals or BB Source: **BB Source**

Test Date: 07/31/2013, 10/06/2013
Limit Applied: Below specified limits
Ambient Temperature: 21ºC
Relative Humidity: 59%
Atmospheric Pressure: 1012mbars

Deviations, Additions, or Exclusions: None

13 Receiver Radiated Spurious

13.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C Section 15.247, ANSI C63.10, RSS-Gen, 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 Styrofoam 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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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 dBμV 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 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

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

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

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

13.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004	Weather Station	Davis Instruments	7400	PE80529A61A	09/25/2012	09/25/2014
145128	EMI Receiver 40 GHz (20 Hz - 40 Ghz)	Rohde & Schwarz	ESI	8392831001	10/01/2013	10/01/2014
145106	Bilog Antenna (30MHz - 5GHz)	Sunol Sciences	JB5	A111003	10/01/2013	10/01/2014
145003	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	10/07/2013	10/07/2014
145-410	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	10/04/2013	10/04/2014
145-416	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	10/04/2013	10/04/2014
145014	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	12/13/2012	12/13/2013
ETS001	1-18GHz DRG Horn Antenna	ETS-Lindgren	3117	00143259	12/17/2012	12/17/2013

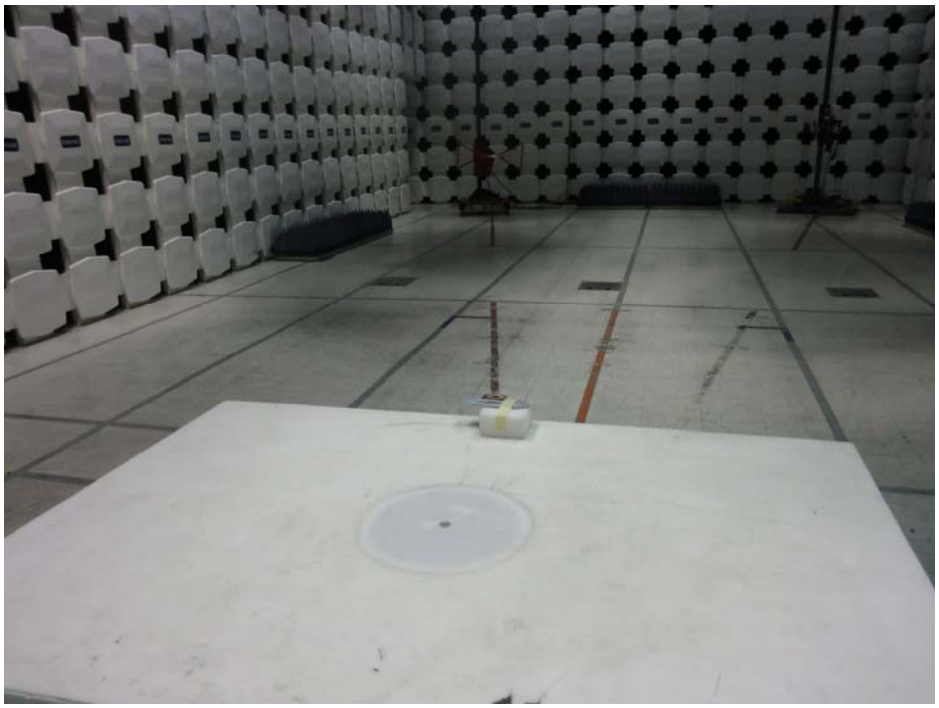
Software Utilized:

Name	Manufacturer	Version
C5	Teseq	5.26.46.46

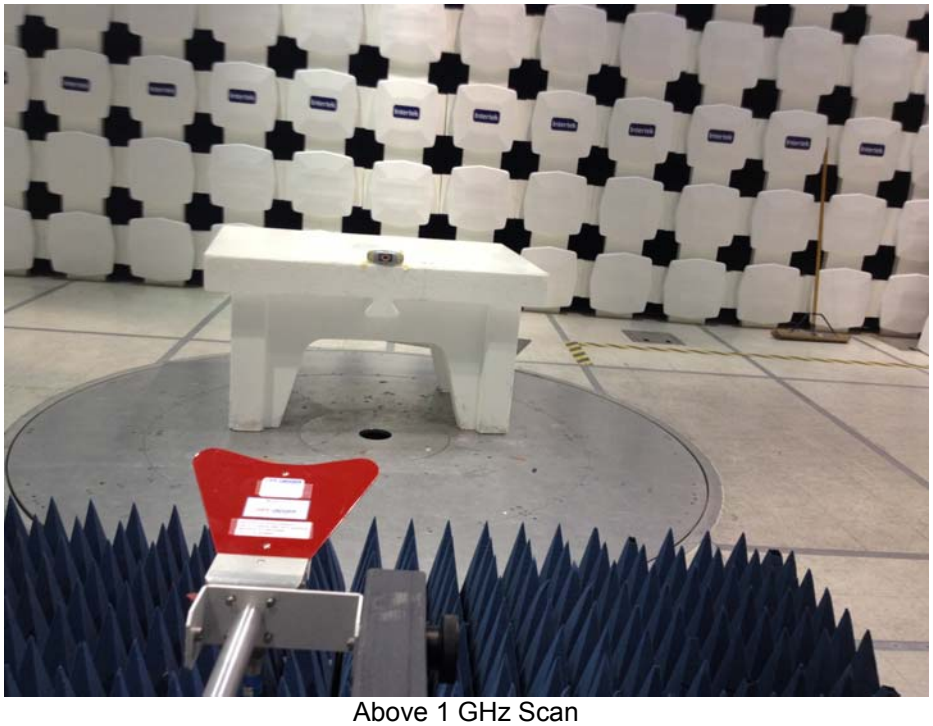
13.3 Results:

The sample tested was found to Comply.

13.4 Setup Photographs:



30 – 1000 MHz Scan



Above 1 GHz Scan

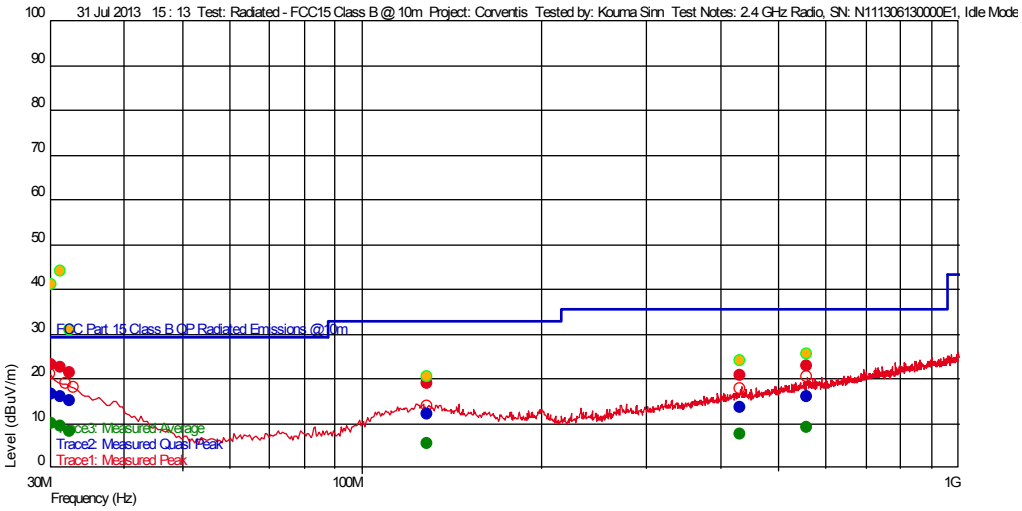
13.5 Test Data:

Model: PiiX, Idle Mode, FCC Part 15:209, 30-1000 MHz

Test Information

Test Details	User Entry	Additional Information
Test:	Radiated - FCC15 Class B @ 10m	
Project:	Corventis	
Test Notes:	2.4 GHz Radio, SN: N111306130000E1, Idle Mode	
Temperature:	24C	
Humidity:	42%, 1009	
Tested by:	Kouma Sinn	
Test Started:	31 Jul 2013 15 : 13	

Prescan Emission Graph



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

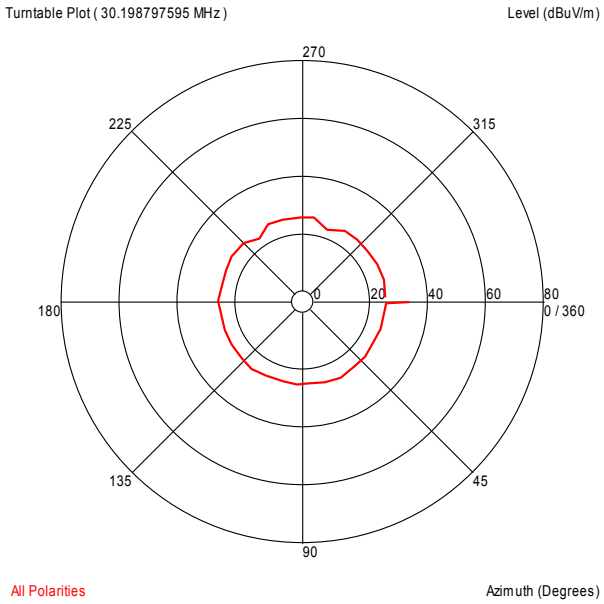
__ Swept Peak Data
__ Swept Quasi Peak Data
__ Swept Average Data

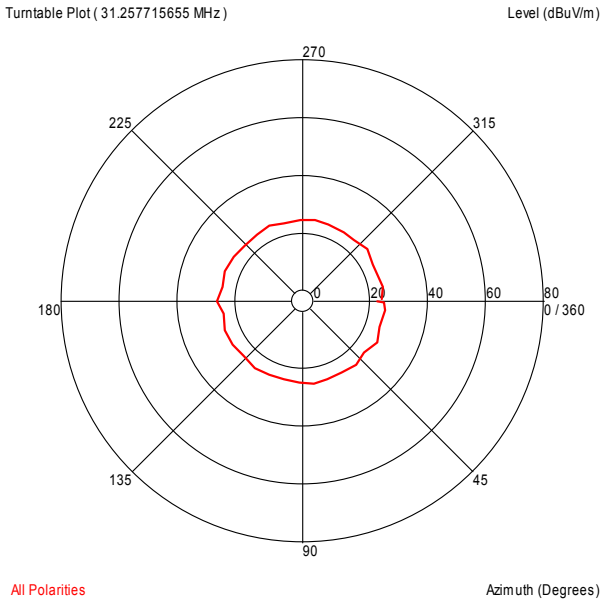
Emissions Test Data
Trace2: Measured Quasi Peak

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
431.015631499 M	13.48	16.720	-24.454	35.540	-22.06	--	148	2.67	120 k	
129.167936319 M	12.18	13.917	-24.657	33.040	-20.86	--	213	1.76	120 k	
558.101402743 M	15.99	18.800	-24.634	35.540	-19.55	|	114	3.06	120 k	
32.430060457 M	14.95	19.099	-26.426	29.540	-14.59	--	254	3.78	120 k	
31.257715655 M	15.86	19.920	-26.447	29.540	-13.68	|	40	2.28	120 k	
30.198797595 M	16.58	20.661	-26.466	29.540	-12.96	|	1	3.17	120 k	

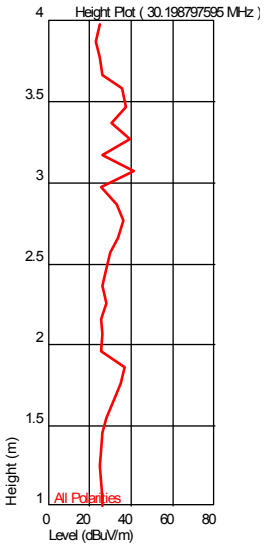
Notes: Noise floor readings. No emissions were detected.

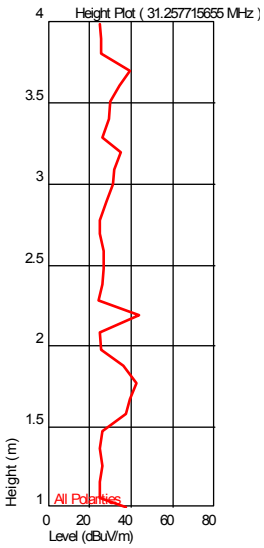
Azimuth Plots

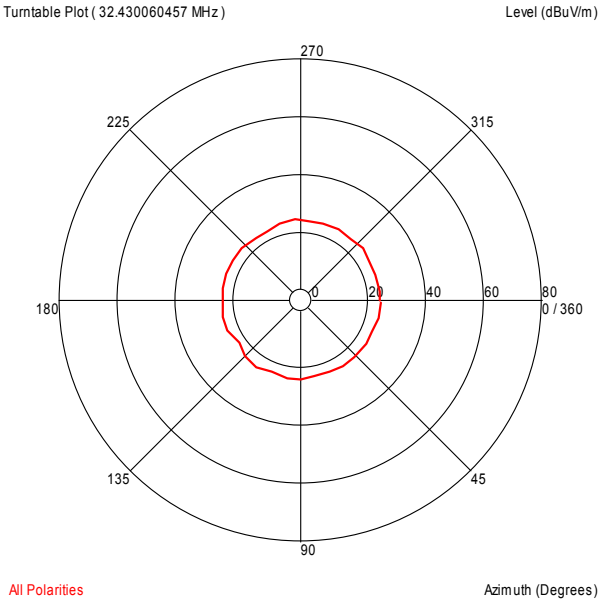


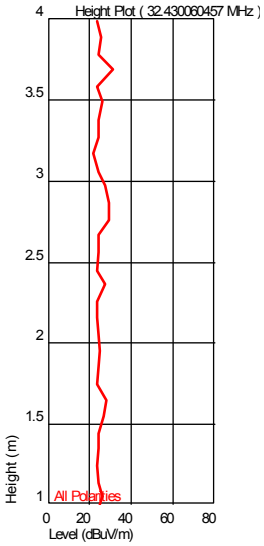


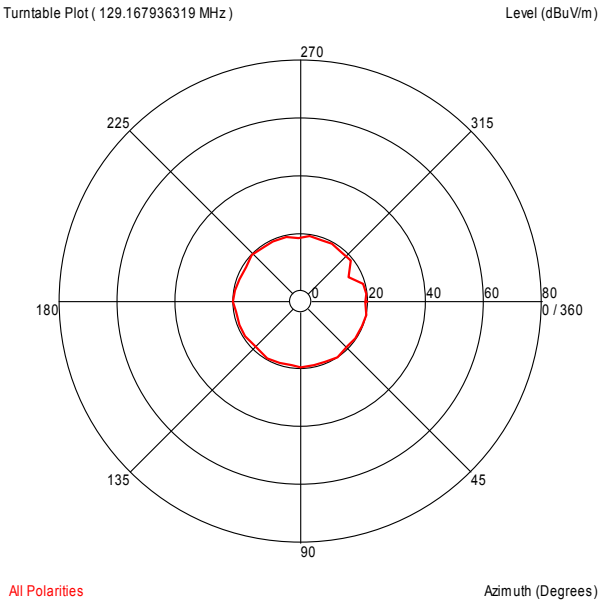
Turntable Plots

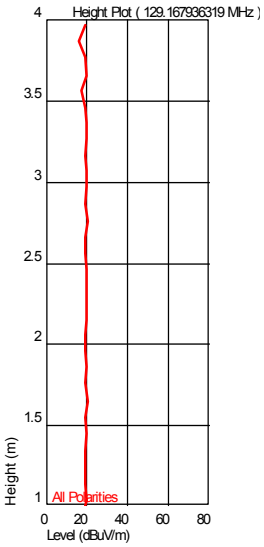


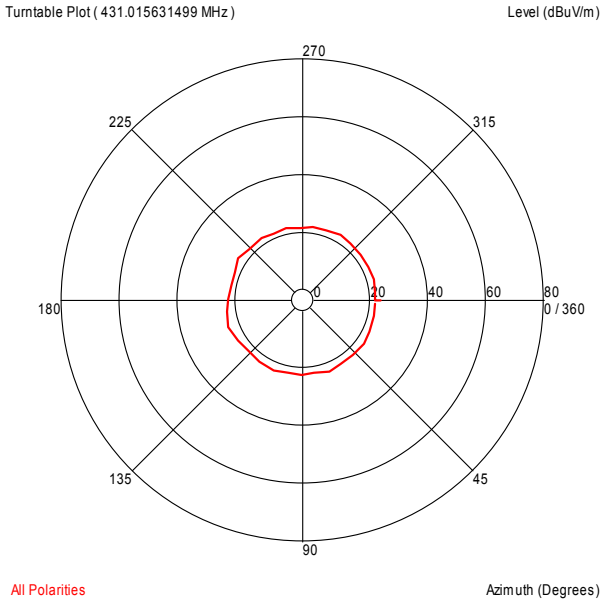


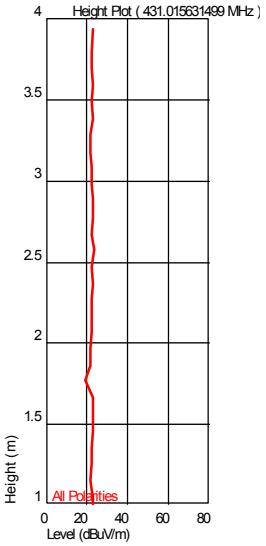

Turntable Plot (32.430060457 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)

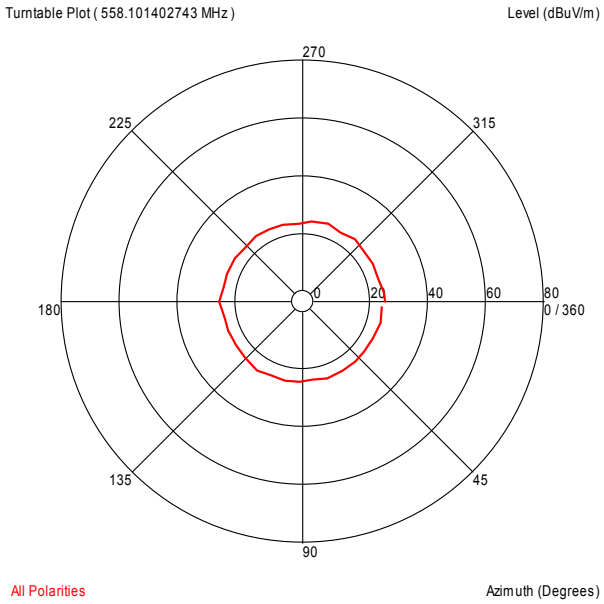

Height Plot (32.430060457 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)

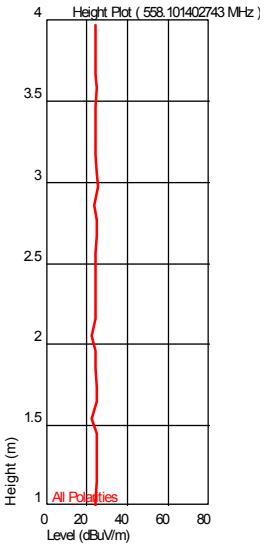

Turntable Plot (129.167936319 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)


Height Plot (129.167936319 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)









Test Personnel:	Kouma Sinn KPS	Test Date:	07/31/2013
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	15.247, CFR47 Part 2.1093, RSS-Gen, RSS-210, IC RSS-102	Limit Applied:	Below specified limits
Input Voltage:	Internal Battery Powered		
Pretest Verification w/ Ambient Signals or BB Source:	**BB Source**	Ambient Temperature:	24ºC
		Relative Humidity:	42%
		Atmospheric Pressure:	1009mbars

Deviations, Additions, or Exclusions: None

14 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	11/07/2013	101275145BOX-001	VJV	MFM	Original Issue