



EMISSIONS TEST REPORT

Report Number: 101902246BOX-001

Project Number: G101902246

Report Issue Date: 11/25/14

Product Designation: RPP-ARN-V4

Standards: FCC Part 15 Subpart F §15.517:2014,
FCC Part 15 Subpart B (2014),
RSS-220 Issue 1 March 2009,
ICES-003 Issue 5 August 2012

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

Client:
Red Point Positioning, Corp.
20 Webster Street, Suite 411
Brookline, MA 02446
USA

Report prepared by

Kouma Sinn / Sr. Project Engineer, EMC

Report reviewed by

Vathana F. Ven / Sr. Project Engineer, EMC

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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	Transmitter Radiated Emissions FCC Part 15 Subpart F §15.517:2014, §15.521:2014 RSS-220 Issue 1 March 2009	Pass
7	Receiver Radiated Emissions FCC Part 15 Subpart B (2014) Class B ICES-003 Issue 5 August 2012	Pass
8	AC Mains Conducted Emissions FCC Part 15 Subpart B (2014) Class B ICES-003 Issue 5 August 2012	Pass
9	10 dB Bandwidth FCC Part 15 Subpart F §15.503:2014 RSS-220 Issue 1 March 2009	Pass
10	Revision History	--

3 Client Information

This EUT was tested at the request of:

Client: Red Point Positioning, Corp.
20 Webster Street, Suite 411
Brookline, MA 02446
USA
Contact: Chunjie Duan
Telephone: (339) 222-0261
Fax: None
Email: cduan@redpointpositioning.com

4 Description of Equipment Under Test

Manufacturer: Red Point Positioning, Corp.
20 Webster Street, Suite 411
Brookline, MA 02446
USA

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Indoor Location System	Red Point Positioning, Corp.	RPP-ARN-V4	1 & 2

Receive Date:	11/22/2014
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)
The equipment under test is an Indoor Location System using ultra wideband operation from 3.5 GHz to 6 GHz.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
Single-cell Li-Ion	700 mAh	N/A	N/A

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	The device was set to channel 1 (3.4944 GHz), Channel 2 (3.9936 GHz), Channel 3 (4.4928 GHz), and channel 5 (6.4896GHz) for testing

Software used by the EUT:

No.	Descriptions of EUT Exercising
1	None – Pre-programmed

5 System Setup and Method

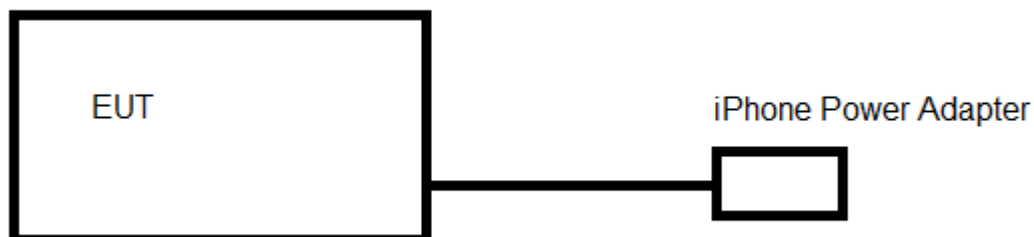
Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
--	Mini USB Cable	3	Braid	None	iPhone Power Adapter

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
iPhone Power Adapter	Apple	None	None

5.1 Method:

Configuration as required by FCC Part 15 Subpart F §15.517:2014, §15.521:2014, §15.503:2014, FCC Part 15 Subpart B (2014), RSS-220 Issue 1 March 2009, ICES-003 Issue 5 August 2012, and ANSI C63.4:2009.

5.2 EUT Block Diagram:



Notes: In normal operation the device is powered from internal battery. The iPhone power adapter is used to support the testing only.

6 Transmitter Radiated Emissions

6.1 Method

Tests are performed in accordance with FCC Part 15 Subpart F §15.517:2014, §15.521:2014, §15.503:2014, FCC Part 15 Subpart B, ICES-003, RSS-220, and ANSI C63.4:2009.

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

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6	6.3
Radiated Emissions, 3m	30-1000 MHz	5.3	6.3
Radiated Emissions, 3m	1-6 GHz	4.5	5.2
Radiated Emissions, 3m	6-15 GHz	5.2	5.5
Radiated Emissions, 3m	15-18 GHz	5.0	5.5
Radiated Emissions, 3m	18-40 GHz	5.0	5.5

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:

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

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

Alternately, when C5 Software is used, the "Level" includes all losses and gains and is compared directly in the "Margin" column to the "Limit". "AF" is the Antenna Factor; "PA+CL" are Preamp and Cable Loss. These are already accounted for in the "Level" column.

6.2 Test Equipment Used:

30-960MHz

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV002'	Weather Station	Davis Instruments	7400	PE80519A93	08/20/2013	08/20/2015
145145'	Receiving Antenna	Sunol Sciences	JB3	A122313	01/07/2014	01/07/2015
145-410'	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	10/04/2014	10/04/2015
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/17/2014	03/17/2015
145003'	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	10/11/2014	10/11/2015

960-1000MHz

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV002'	Weather Station	Davis Instruments	7400	PE80519A93	08/20/2013	08/20/2015
ROS001'	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	05/19/2014	05/19/2015
145-154'	ANTENNA, RIDGED GUIDE, 1-18 GHZ	EMCO	None	None	11/18/2014	11/18/2015
CBLHF2012-2M-1	2m 40GHz Coaxial Cable	Huber & Suhner	SF102	252675001	01/14/2014	01/14/2015
CBLHF2012-2M-2'	2m 40GHz Coaxial Cable	Huber & Suhner	SF102	252675002	01/14/2014	01/14/2015
145003'	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	10/11/2014	10/11/2015

1-15GHz

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV002'	Weather Station	Davis Instruments	7400	PE80519A93	08/20/2013	08/20/2015
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/17/2014	03/17/2015
145014'	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	12/19/2013	12/19/2014
ETS001'	1-18GHz DRG Horn Antenna	ETS-Lindgren	3117	00143259	01/06/2014	01/06/2015
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	10/04/2014	10/04/2015

15-18GHz

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV002'	Weather Station	Davis Instruments	7400	PE80519A93	08/20/2013	08/20/2015
145020'	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00948	04/22/2014	04/22/2015
ROS001'	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	05/19/2014	05/19/2015
CBLHF2012-2M-1'	2m 40GHz Coaxial Cable	Huber & Suhner	SF102	252675001	01/14/2014	01/14/2015
CBLHF2012-2M-2'	2m 40GHz Coaxial Cable	Huber & Suhner	SF102	252675002	01/14/2014	01/14/2015
145-154	ANTENNA, RIDGED GUIDE, 1-18 GHZ	EMCO	None	None	11/18/2014	11/18/2015
REA001'	6.0GHz High Pass Filter	Reactel, Inc	11HS-6G/18G-S11	06-1	12/30/2013	12/30/2015

18-26GHz

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV002	Weather Station	Davis Instruments	7400	PE80519A93	08/20/2013	08/20/2015
145020	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00948	04/22/2014	04/22/2015
ROS001	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	05/19/2014	05/19/2015
CBLHF2012-2M-1	2m 40GHz Coaxial Cable	Huber & Suhner	SF102	252675001	01/14/2014	01/14/2015
CBLHF2012-2M-2	2m 40GHz Coaxial Cable	Huber & Suhner	SF102	252675002	01/14/2014	01/14/2015
REA006	18GHz High Pass Filter	Reactel, Inc	7HS-18G/40G K11	(06)1	08/28/2014	08/28/2016
EMC04	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	03/31/2014	03/31/2015

26-40GHz

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV002'	Weather Station	Davis Instruments	7400	PE80519A93	08/20/2013	08/20/2015
ROS001'	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	05/19/2014	05/19/2015
CBLHF2012-2M-1'	2m 40GHz Coaxial Cable	Huber & Suhner	SF102	252675001	01/14/2014	01/14/2015
CBLHF2012-2M-2'	2m 40GHz Coaxial Cable	Huber & Suhner	SF102	252675002	01/14/2014	01/14/2015
REA006'	18GHz High Pass Filter	Reactel, Inc	7HS-18G/40G K11	(06)1	08/28/2014	08/28/2016
Emc04'	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	03/31/2014	03/31/2015

Software Utilized:

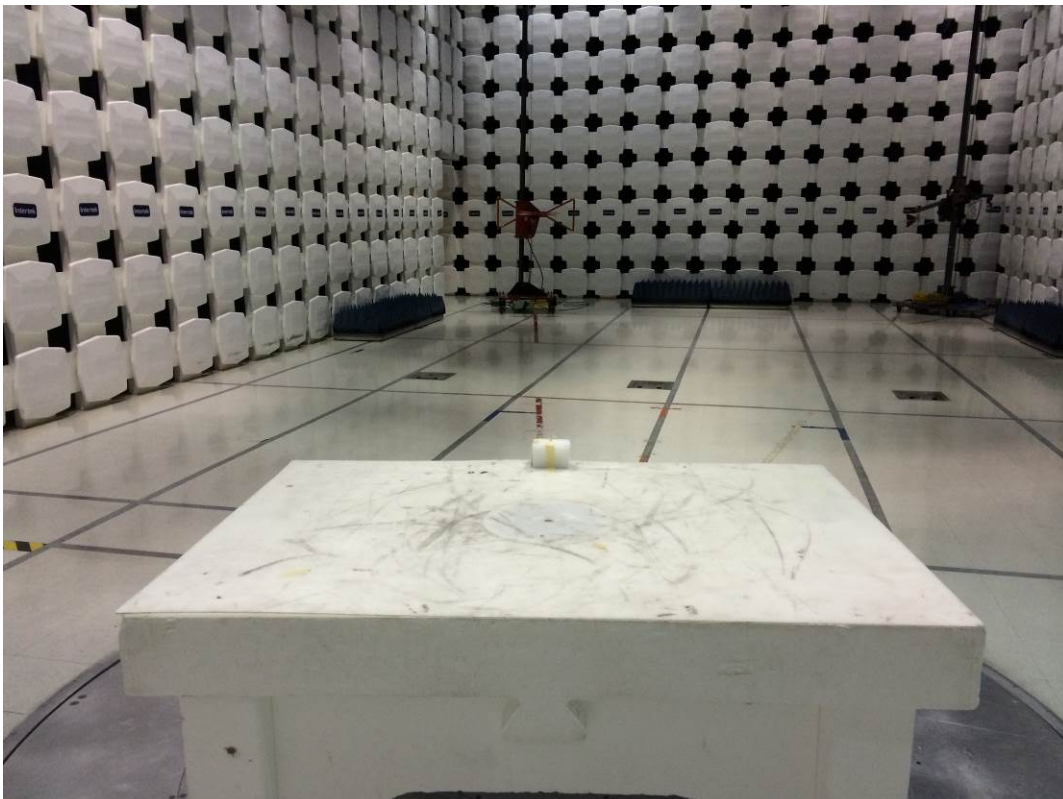
Name	Manufacturer	Version
C5 Emissions	TESEQ	5.26.46.46
EMI Boxborough.xls	Intertek	08/27/2010

6.3 Results:

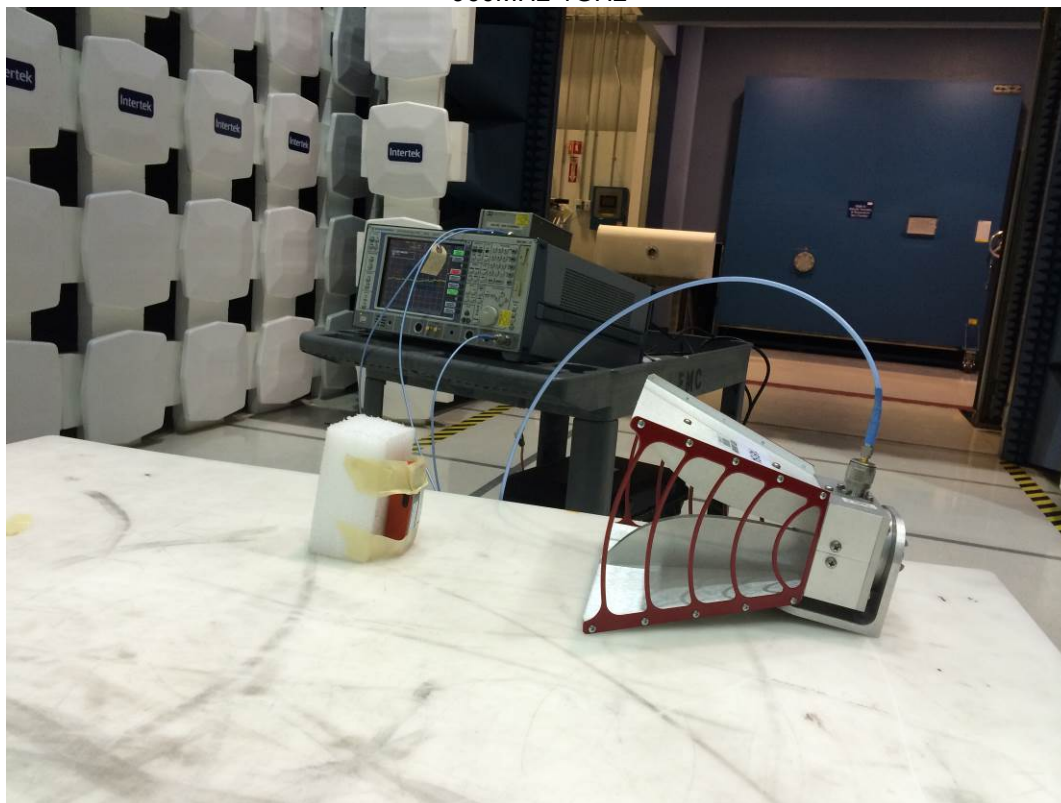
The sample tested was found to Comply.

6.4 Setup Photographs:

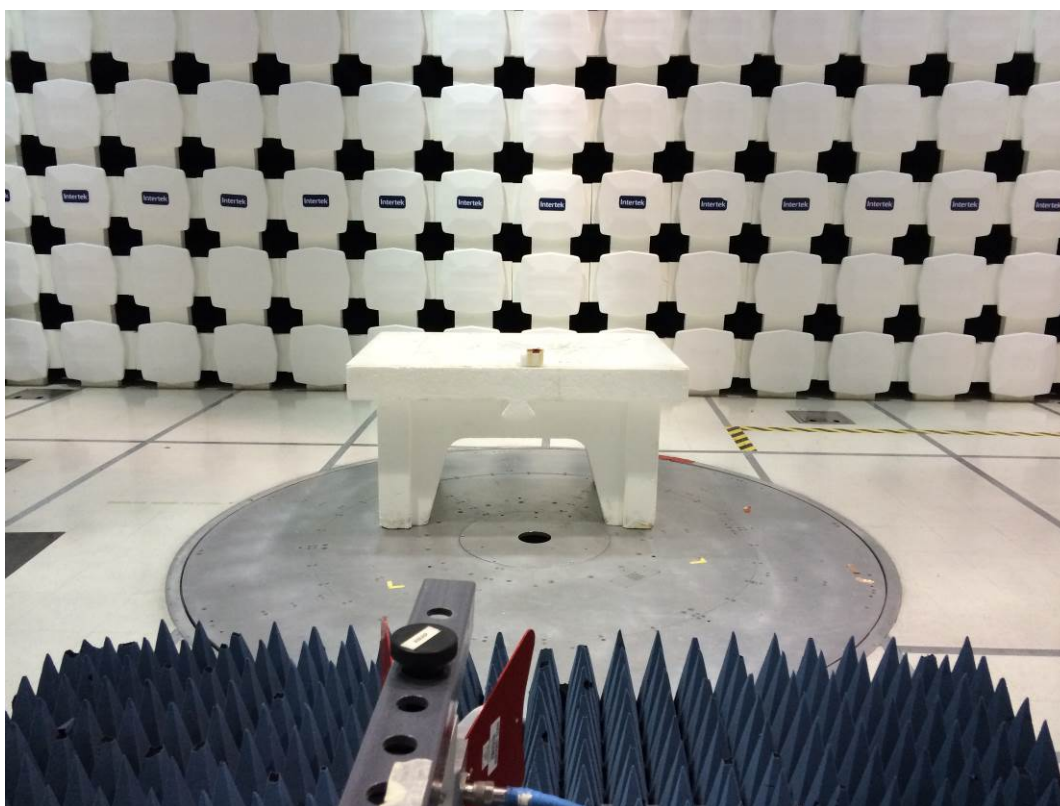
30-960MHz



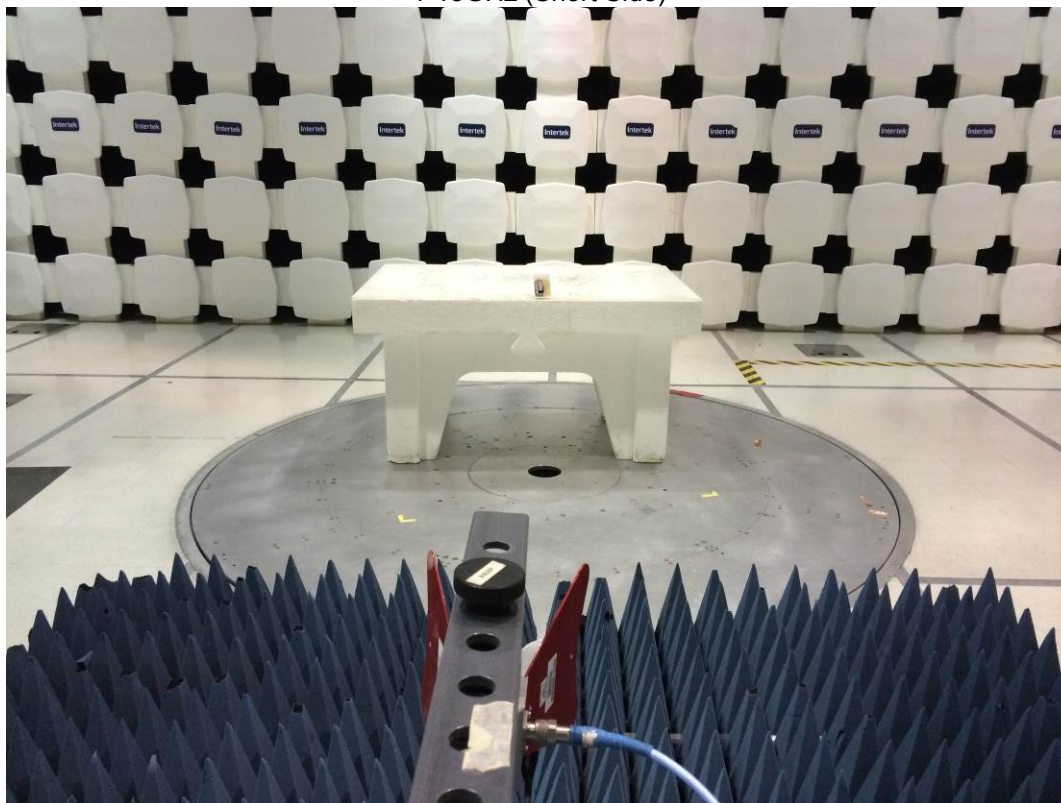
960MHz-1GHz



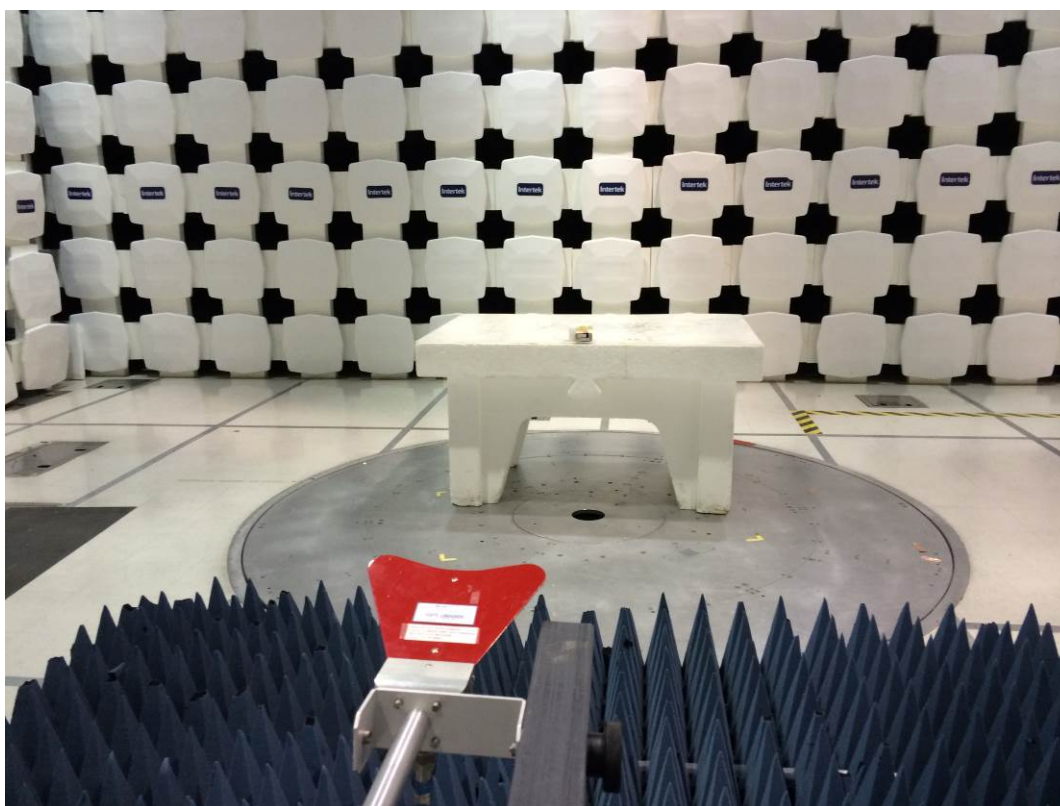
1-15GHz (Back Side)



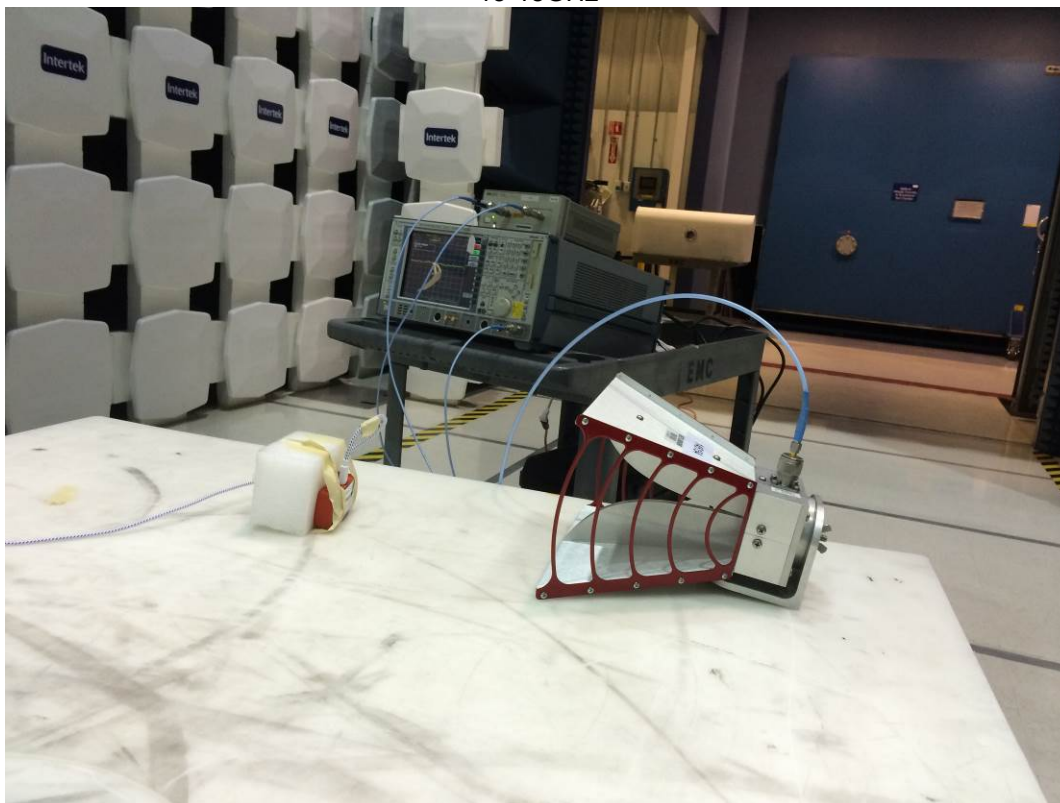
1-15GHz (Short Side)



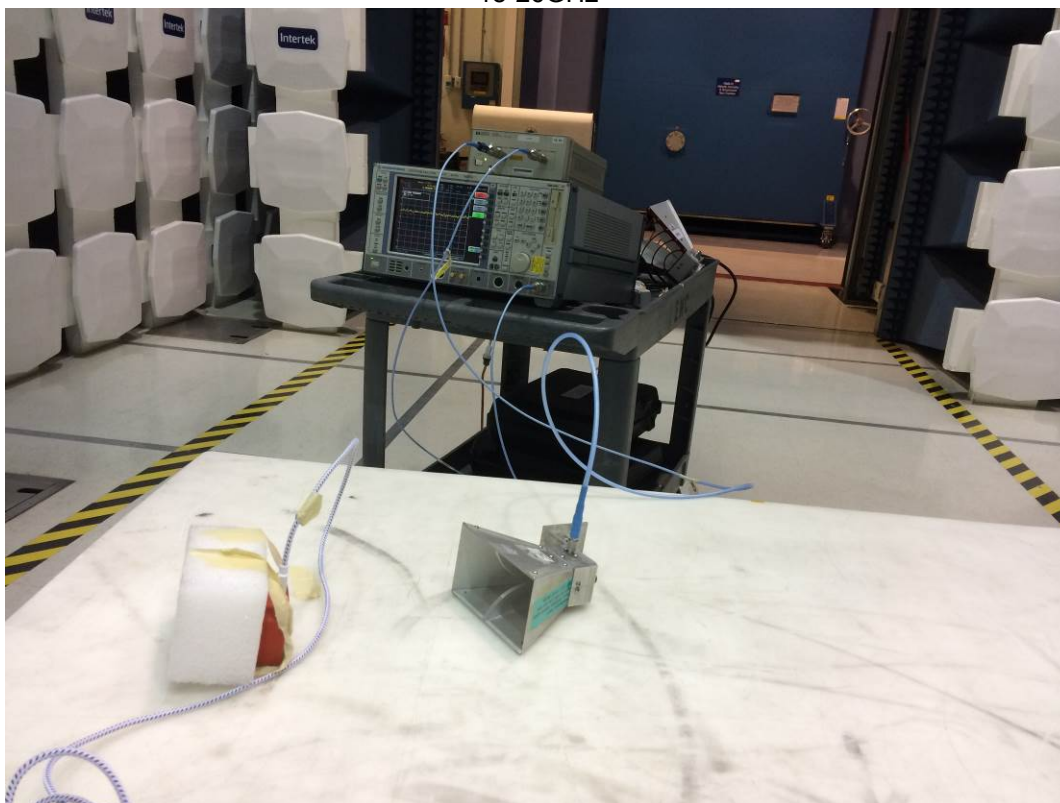
1-15GHz (Long Side)



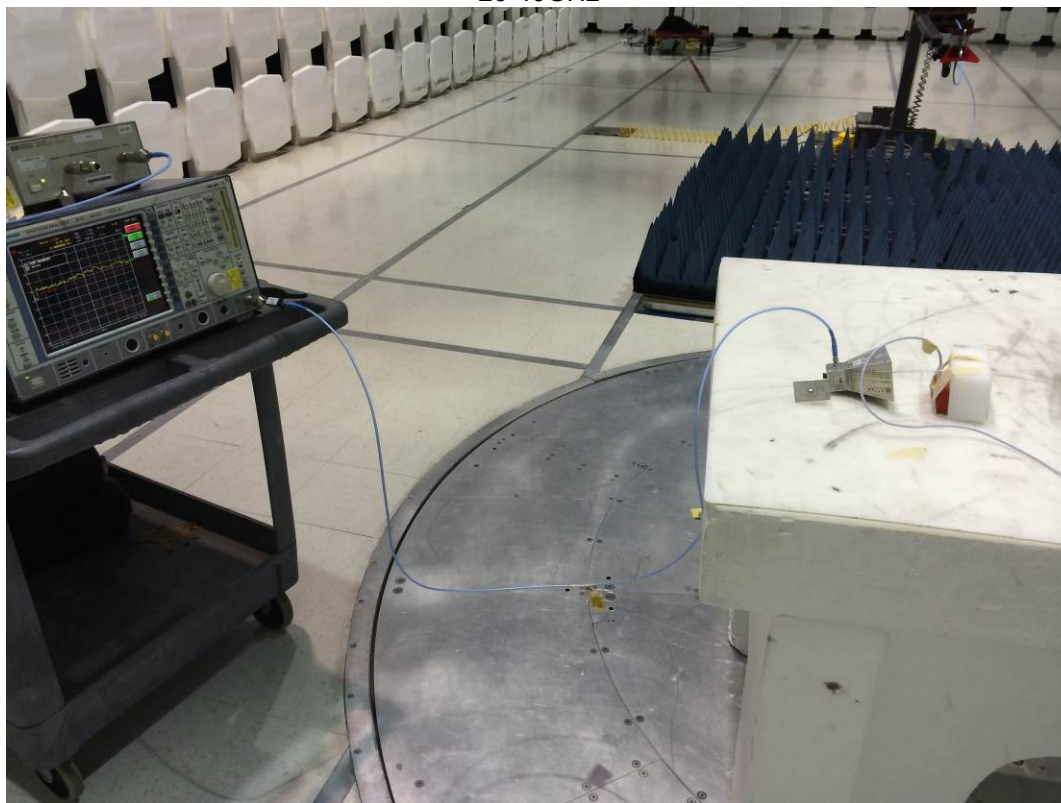
15-18GHz



18-26GHz



26-40GHz



6.5 Plots/Data:

Transmit Channel 1 (30-960 MHz)

Test Information

Test Details

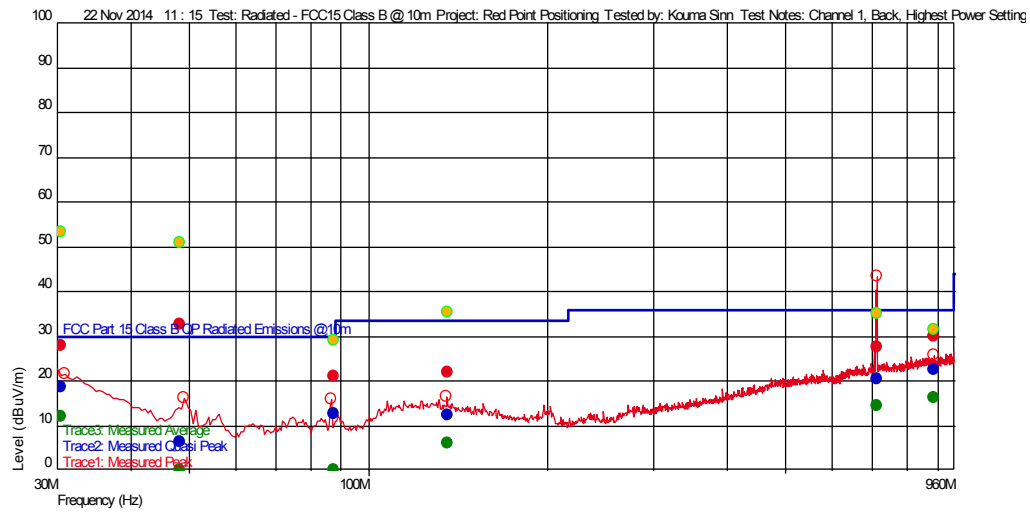
Test:
Project:
Test Notes:
Temperature:
Humidity:
Tested by:
Test Started:

User Entry

Radiated - FCC15 Class B @ 10m
Red Point Positioning
Channel 1, Back, Highest Power Setting
20C
15%, 1017mbar
Kouma Sinn
22 Nov 2014 11 : 15

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

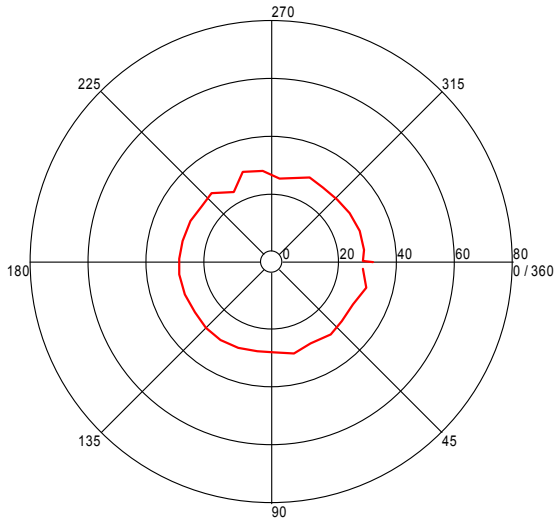
Trace2: Measured Quasi Peak

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
48.41428645 M	6.54	8.651	-24.924	30.000	-23.46		333	3.98	120 k	
135.64348715 M	12.37	13.736	-23.971	33.520	-21.15	--	199	3.27	120 k	
87.462324214 M	12.80	7.492	-24.381	30.000	-17.20		348	3.70	120 k	
712.422244214 M	20.59	20.397	-21.508	36.020	-15.43		295	1.72	120 k	
887.958717373 M	22.59	21.900	-21.015	36.020	-13.43	--	0	1.15	120 k	
30.453306725 M	18.72	20.983	-25.180	30.000	-11.28	--	359	3.87	120 k	

Azimuth Plots

Turntable Plot (30.453306725 MHz)

Level (dBuV/m)

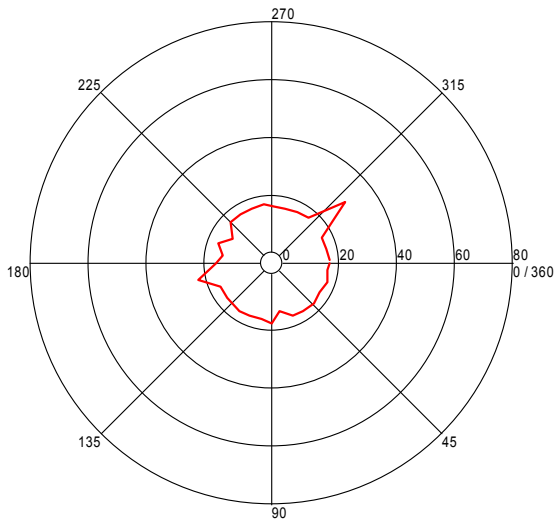


All Polarities

Azimuth (Degrees)

Turntable Plot (48.414228645 MHz)

Level (dBuV/m)

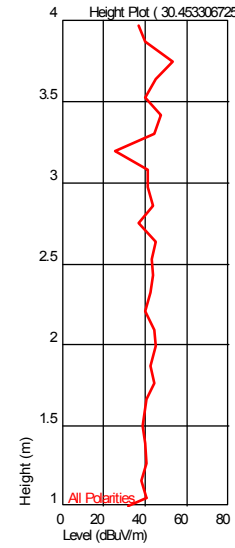


All Polarities

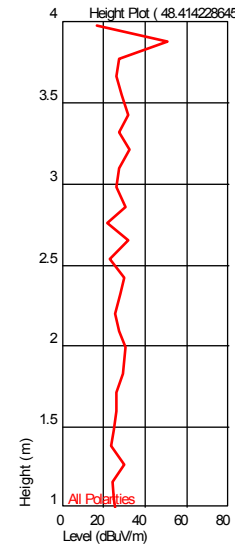
Azimuth (Degrees)

Turntable Plots

Height Plot (30.453306725 MHz)

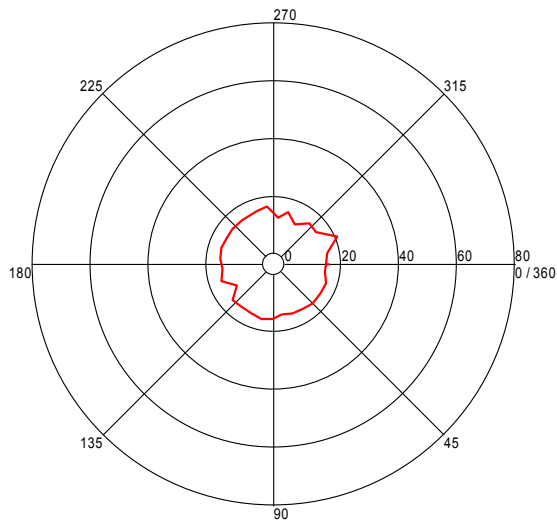


Height Plot (48.414228645 MHz)



Turntable Plot (87.462324214 MHz)

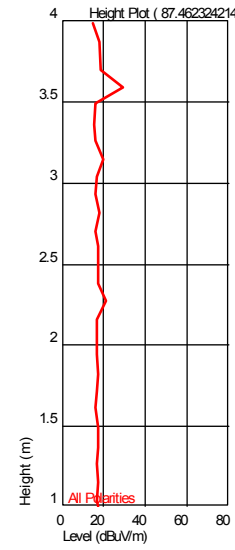
Level (dBuV/m)



All Polarities

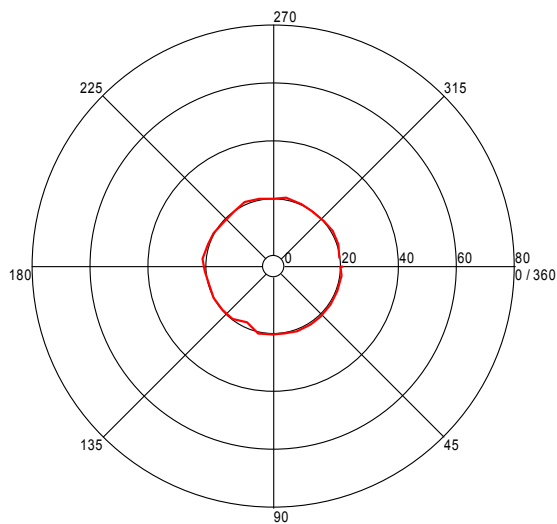
Azimuth (Degrees)

Height Plot (87.462324214 MHz)



Turntable Plot (135.64348715 MHz)

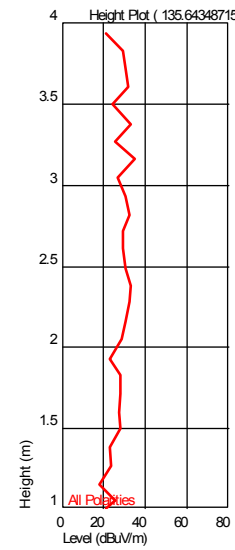
Level (dBuV/m)



All Polarities

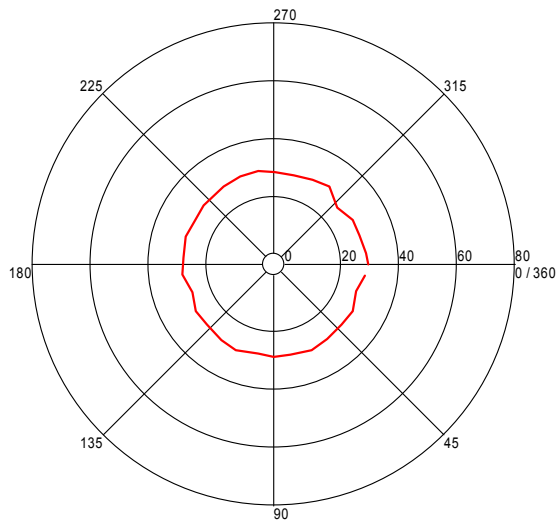
Azimuth (Degrees)

Height Plot (135.64348715 MHz)



Turntable Plot (712.422244214 MHz)

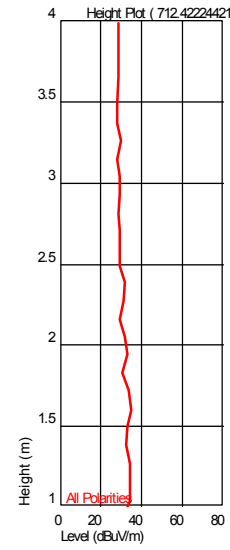
Level (dBuV/m)



All Polarities

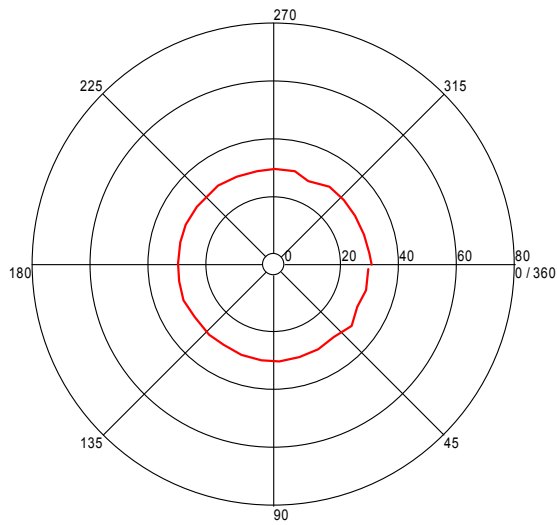
Azimuth (Degrees)

Height Plot (712.422244214 MHz)



Turntable Plot (887.958717373 MHz)

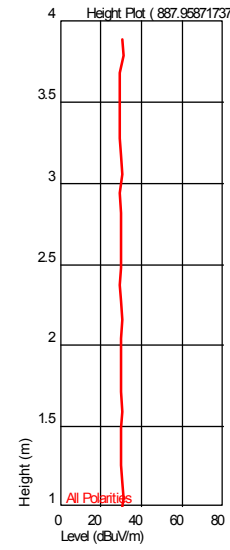
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (887.958717373 MHz)



Transmit Channel 1 (960MHz-1GHz)

Company: Red Point Positioning
 Model #: RPP-ARN-V4B
 Serial #: Sample # 1
 Engineers: Kouma Sinn
 Project #: G101902246
 Standard: FCC Part 15 Subpart F
 Receiver: ROS001
 PreAmp: 145-003 10-11-15.txt
 PreAmp Used? (Y or N): Y
 Antenna & Cables: N
 Antenna: ETS001 01-06-15.txt
 Cable(s): CBLHF2012-2M-1 01-14-2015.txt CBLHF2012-2M-2 01-14-2015.txt
 Location: 10M Chamber
 Barometer: DAV002
 Filter: NONE
 Date(s): 11/23/14
 Temp/Humidity/Pressure: 20C 21% 1005mbar
 Limit Distance (m): 3
 Test Distance (m): 0.2
 Voltage/Frequency: Internal Battery
 Frequency Range: 960MHz-1GHz
 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
No emisisions were detected at a distance of 0.2 meter											

Transmit Channel 1 (1-15GHz)

Company: Red Point Positioning

Model #: RPP-ARN-V4B

Serial #: Sample # 1 & 2

Engineers: Kouma Sinn

Project #: G101902246

Standard: FCC Part 15 Subpart F

Receiver: ROS001

PreAmp: PRE145014 12-18-2014.txt

PreAmp Used? (Y or N): Y

Limit Distance (m): 3

Test Distance (m): 3

Voltage/Frequency:

Internal Battery

Frequency Range:

1-15 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

Antenna & Cables: N

Bands: N, LF, HF, SHF

Antenna: ETS001 01-06-15.txt

ETS001 01-06-15.txt

Cable(s): 145-416 3mTrkB 10-04-2015.txt

NONE.

Location: 10M Chamber

Barometer: DAV002

Filter: NONE

Temp/Humidity/Pressure: 20C

21%

1005mbar

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
The EIRP, in terms of dBm, can be converted to a field strength by adding 95.2. ResBW = 1MHz, RMS Detector											
FCC 15.519(c), 960-1610 MHz = -75.3 dBm or 19.90 dBuV/m. 1610-1990 MHz = -63.3 dBm or 31.9 dBuV/m											
1990-3100 MHz = -61.3 dBm or 33.90 dBuV/m, 3100-10600 MHz = -41.3 dBm or 53.90 dBuV/m,											
Above 10600 MHz = -61.3 dBm or 33.90 dBuV/m											
Limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency											
at which the highest radiated emission occurs, fM. That limit is 0 dBm EIRP.											
Used 3MHz ResBW instead of 50MHz, Limit = 95.2-20*LOG[(ResBW in MHz)/50MHz] = 95.2-24.437 = 70.763 dBuV/m											
The EIRP, in terms of dBm, can be converted to a field strength by adding 95.2. ResBW = 1kHz, Average Detector											
FCC 15.519(d), 1164-1240 MHz = -85.3 dBm or 9.90 dBuV/m, 1559-1610 MHz = -85.3 dBm or 9.9 dBuV/m.											
Power set to normal setting with power amplifier low and pre-amp to high. Changed Pulse Repetition Rate to 16 MHz											
Channel 1 (3.4944MHz). EUT on its back. Receive Antenna fixed at 1 meter											
RMS	H	3599.580	42.72	33.13	7.58	32.62	0.00	50.81	53.90	-3.09	1/3MHz
PK	H	3599.580	61.23	33.13	7.58	32.62	0.00	69.32	70.76	-1.44	3/10MHz
RMS	V	3599.580	35.06	33.13	7.58	32.62	0.00	43.15	53.90	-10.75	1/3MHz
PK	V	3599.580	52.97	33.13	7.58	32.62	0.00	61.06	70.76	-9.70	3/10MHz
RMS	V	7199.160	29.92	35.76	11.01	32.32	0.00	44.38	53.90	-9.52	1/3MHz
RMS	V	1164.000	6.00	27.76	4.03	32.67	0.00	5.12	9.90	-4.78	1/3kHz
RMS	V	1200.000	6.54	28.13	4.09	32.64	0.00	6.12	9.90	-3.78	1/3kHz
RMS	V	1240.000	4.96	28.47	4.16	32.61	0.00	4.98	9.90	-4.92	1/3kHz
RMS	V	1559.000	3.20	28.43	4.68	32.45	0.00	3.86	9.90	-6.04	1/3kHz
RMS	V	1610.000	3.71	28.56	4.73	32.48	0.00	4.52	9.90	-5.38	1/3kHz
Channel 1 (3.4944MHz). EUT on its long side. Receive Antenna fixed at 1 meter											
RMS	H	3599.580	45.00	33.13	7.58	32.62	0.00	53.09	53.90	-0.81	1/3MHz
PK	H	3599.580	62.21	33.13	7.58	32.62	0.00	70.30	70.76	-0.46	3/10MHz
RMS	V	3599.580	40.00	33.13	7.58	32.62	0.00	48.09	53.90	-5.81	1/3MHz
PK	V	3599.580	57.99	33.13	7.58	32.62	0.00	66.08	70.76	-4.68	3/10MHz
RMS	V	7199.160	29.92	35.76	11.01	32.32	0.00	44.38	53.90	-9.52	1/3MHz
RMS	V	1164.000	6.00	27.76	4.03	32.67	0.00	5.12	9.90	-4.78	1/3kHz
RMS	V	1200.000	6.54	28.13	4.09	32.64	0.00	6.12	9.90	-3.78	1/3kHz
RMS	V	1240.000	4.96	28.47	4.16	32.61	0.00	4.98	9.90	-4.92	1/3kHz
RMS	V	1559.000	3.20	28.43	4.68	32.45	0.00	3.86	9.90	-6.04	1/3kHz
RMS	V	1610.000	3.71	28.56	4.73	32.48	0.00	4.52	9.90	-5.38	1/3kHz
Channel 1 (3.4944MHz). EUT on its short side. Receive Antenna fixed at 1 meter											
RMS	H	3599.580	40.65	33.13	7.58	32.62	0.00	48.74	53.90	-5.16	1/3MHz
PK	H	3599.580	59.92	33.13	7.58	32.62	0.00	68.01	70.76	-2.75	3/10MHz
RMS	V	3599.580	43.93	33.13	7.58	32.62	0.00	52.02	53.90	-1.88	1/3MHz
PK	V	3599.580	60.05	33.13	7.58	32.62	0.00	68.14	70.76	-2.62	3/10MHz
RMS	V	7199.160	0.00	35.76	11.01	32.32	0.00	14.46	53.90	-39.44	1/3MHz
RMS	V	1164.000	6.00	27.76	4.03	32.67	0.00	5.12	9.90	-4.78	1/3kHz
RMS	V	1200.000	6.54	28.13	4.09	32.64	0.00	6.12	9.90	-3.78	1/3kHz
RMS	V	1240.000	4.96	28.47	4.16	32.61	0.00	4.98	9.90	-4.92	1/3kHz
RMS	V	1559.000	3.20	28.43	4.68	32.45	0.00	3.86	9.90	-6.04	1/3kHz
RMS	V	1610.000	3.71	28.56	4.73	32.48	0.00	4.52	9.90	-5.38	1/3kHz

Notes: No emissions were detected from 15-40 GHz at a distance of 0.2 meter.

Transmit Channel 2 (30-960MHz)

Test Information

Test Details

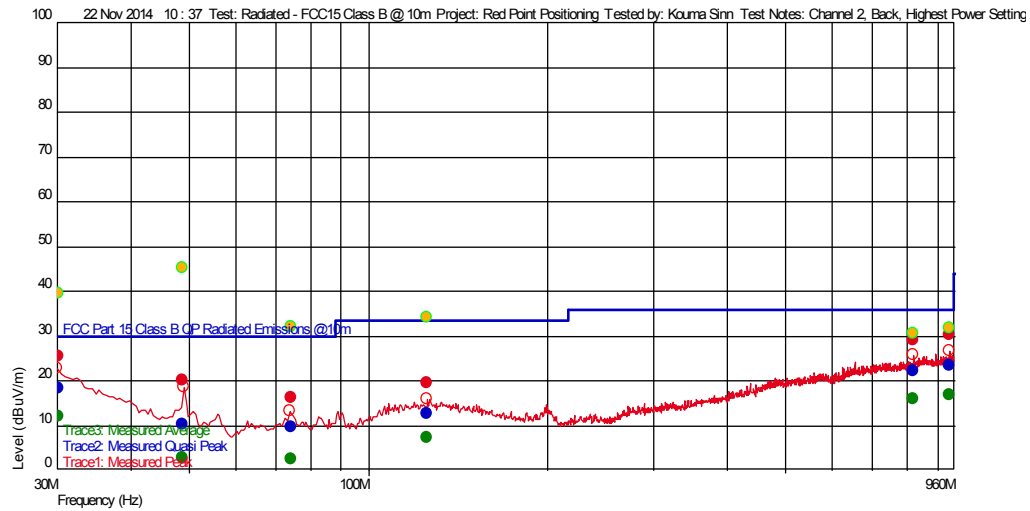
Test:
Project:
Test Notes:
Temperature:
Humidity:
Tested by:
Test Started:

User Entry

Radiated - FCC15 Class B @ 10m
Red Point Positioning
Channel 2, Back, Highest Power Setting
20C
15%, 1017mbar
Kouma Sinn
22 Nov 2014 10 : 37

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

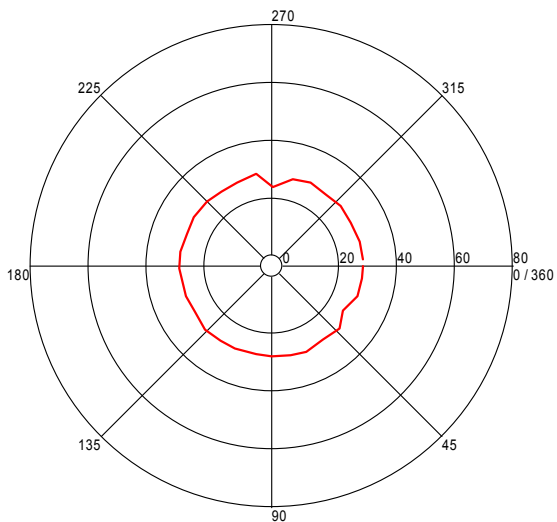
Trace2: Measured Quasi Peak

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
125.292384824 M	12.82	14.358	-24.032	33.520	-20.70	--	174	2.49	120 k	
74.116633317 M	9.62	7.900	-24.515	30.000	-20.38	--	354	1.50	120 k	
48.85030079 M	10.27	8.390	-24.897	30.000	-19.73	--	32	1.61	120 k	
821.732865259 M	22.11	21.535	-21.240	36.020	-13.91	--	247	4.00	120 k	
942.570741906 M	23.48	22.551	-20.895	36.020	-12.54	--	213	3.60	120 k	
30.29258517 M	18.43	21.095	-25.161	30.000	-11.57		271	2.99	120 k	

Azimuth Plots

Turntable Plot (30.29258517 MHz)

Level (dBuV/m)

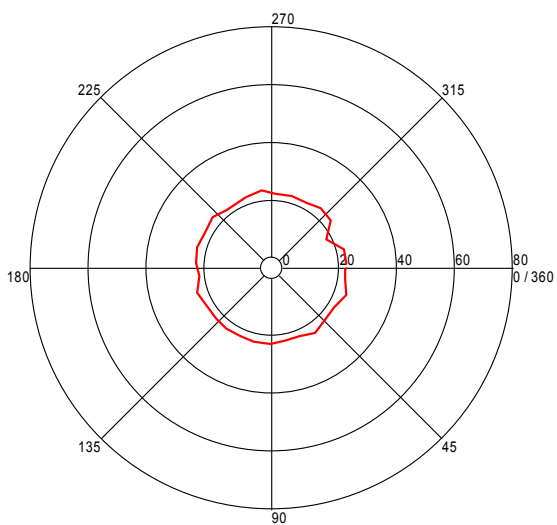


All Polarities

Azimuth (Degrees)

Turntable Plot (48.85030079 MHz)

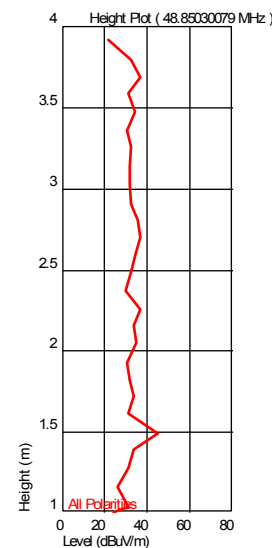
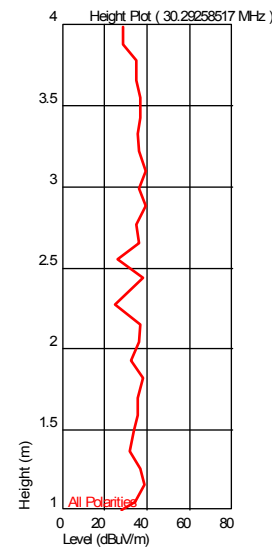
Level (dBuV/m)



All Polarities

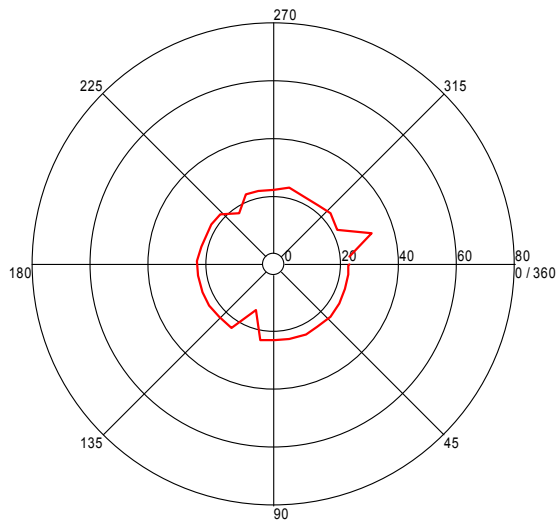
Azimuth (Degrees)

Turntable Plots



Turntable Plot (74.116633317 MHz)

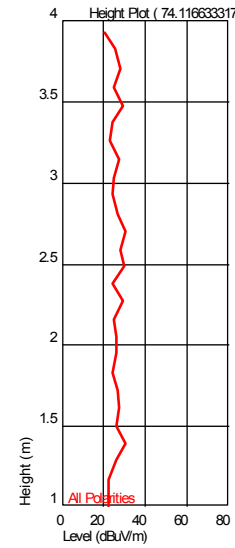
Level (dBuV/m)



All Polarities

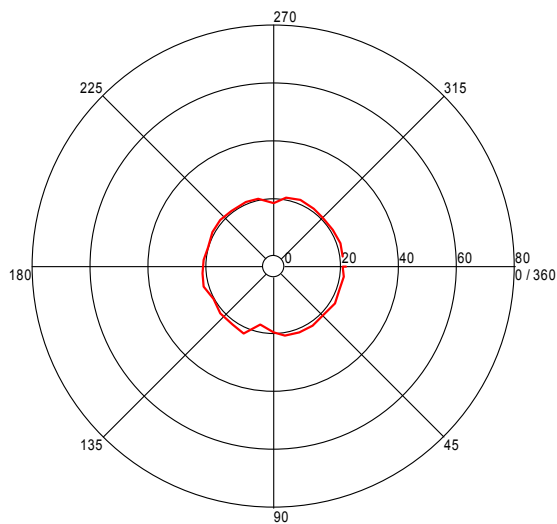
Azimuth (Degrees)

Height Plot (74.116633317 MHz)



Turntable Plot (125.292384824 MHz)

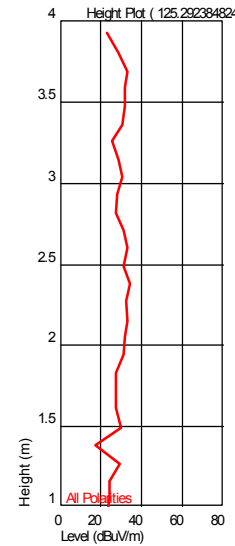
Level (dBuV/m)



All Polarities

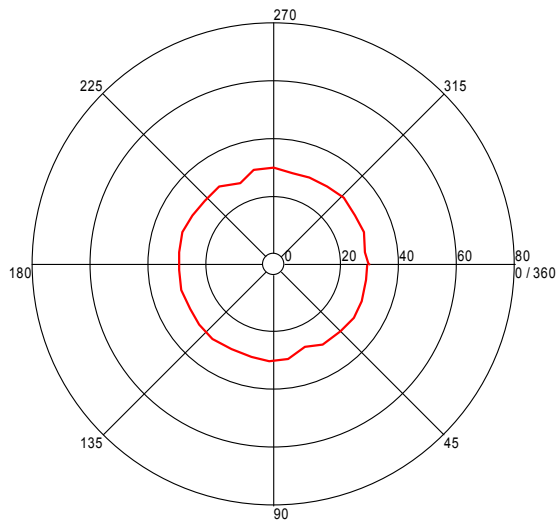
Azimuth (Degrees)

Height Plot (125.292384824 MHz)



Turntable Plot (821.732865259 MHz)

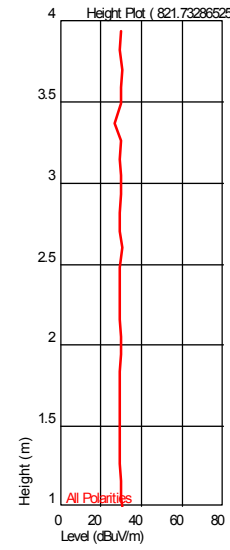
Level (dBuV/m)



All Polarities

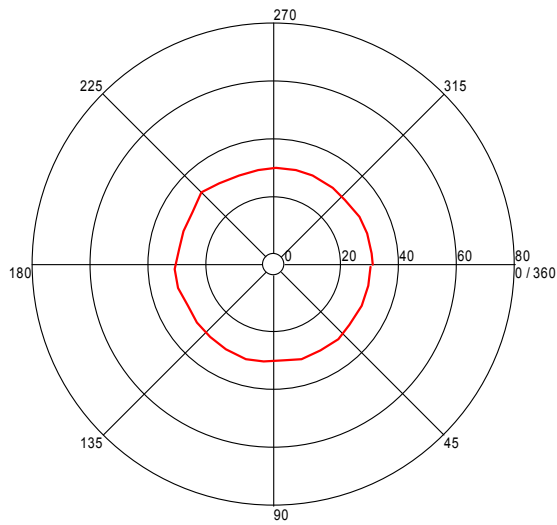
Azimuth (Degrees)

Height Plot (821.732865259 MHz)



Turntable Plot (942.570741906 MHz)

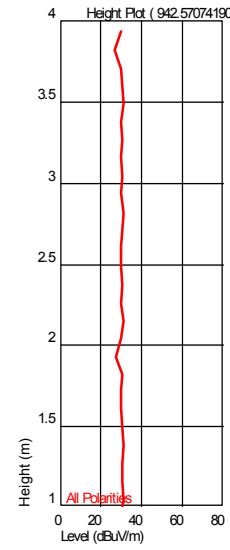
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (942.570741906 MHz)



Transmit Channel 2 (960MHz-1GHz)

Company: Red Point Positioning
 Model #: RPP-ARN-V4B
 Serial #: Sample # 1
 Engineers: Kouma Sinn
 Project #: G101902246
 Standard: FCC Part 15 Subpart F
 Receiver: ROS001
 PreAmp: 145-003 10-11-15.txt
 PreAmp Used? (Y or N): Y
 Antenna & Cables: N
 Antenna: ETS001 01-06-15.txt
 Cable(s): CBLHF2012-2M-1 01-14-2015.txt CBLHF2012-2M-2 01-14-2015.txt
 Location: 10M Chamber
 Barometer: DAV002
 Filter: NONE
 Date(s): 11/23/14
 Temp/Humidity/Pressure: 20C 21% 1005mbar
 Limit Distance (m): 3
 Test Distance (m): 0.2
 Voltage/Frequency: Internal Battery
 Frequency Range: 960MHz-1GHz
 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
No emisisions were detected at a distance of 0.2 meter											

Transmit Channel 2 (1-15GHz)

Company: Red Point Positioning

Model #: RPP-ARN-V4B

Serial #: Sample # 1 & 2

Engineers: Kouma Sinn

Project #: G101902246

Standard: FCC Part 15 Subpart F

Receiver: ROS001

PreAmp: PRE145014 12-18-2014.txt

PreAmp Used? (Y or N): Y

Date(s): 11/22/14

Limit Distance (m): 3

Test Distance (m): 3

Voltage/Frequency:

Internal Battery

Frequency Range:

1-15 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
The EIRP, in terms of dBm, can be converted to a field strength by adding 95.2. ResBW = 1MHz, RMS Detector											
FCC 15.519(c), 960-1610 MHz = -75.3 dBm or 19.90 dBuV/m. 1610-1990 MHz = -63.3 dBm or 31.9 dBuV/m											
1990-3100 MHz = -61.3 dBm or 33.90 dBuV/m, 3100-10600 MHz = -41.3 dBm or 53.90 dBuV/m,											
Above 10600 MHz = -61.3 dBm or 33.90 dBuV/m											
Limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency											
at which the highest radiated emission occurs, fM. That limit is 0 dBm EIRP.											
Used 3MHz ResBW instead of 50MHz, Limit = 95.2-20*LOG[(ResBW in MHz)/50MHz] = 95.2-24.437 = 70.763 dBuV/m											
The EIRP, in terms of dBm, can be converted to a field strength by adding 95.2. ResBW = 1kHz, Average Detector											
FCC 15.519(d), 1164-1240 MHz = -85.3 dBm or 9.90 dBuV/m, 1559-1610 MHz = -85.3 dBm or 9.9 dBuV/m.											
Changed Pulse Repetition Rate to 16 MHz. Reduced power											
Channel 2 (3.9936GHz). EUT sit on its back. Receive Antenna fixed at 1 meter											
RMS	V	3997.700	34.71	33.65	7.73	32.59	0.00	43.50	53.90	-10.40	1/3MHz
PK	V	3997.700	51.77	33.65	7.73	32.59	0.00	60.56	70.76	-10.20	3/10MHz
RMS	H	7987.369	33.71	35.96	11.77	33.56	0.00	47.88	53.90	-6.02	1/3MHz
RMS	H	7987.369	41.10	35.96	11.77	33.56	0.00	55.27	70.76	-15.49	3/10MHz
RMS	V	1164.000	6.00	27.76	4.03	32.67	0.00	5.12	9.90	-4.78	1/3kHz
RMS	V	1200.000	6.54	28.13	4.09	32.64	0.00	6.12	9.90	-3.78	1/3kHz
RMS	V	1240.000	4.96	28.47	4.16	32.61	0.00	4.98	9.90	-4.92	1/3kHz
RMS	V	1559.000	3.20	28.43	4.68	32.45	0.00	3.86	9.90	-6.04	1/3kHz
RMS	V	1610.000	3.71	28.56	4.73	32.48	0.00	4.52	9.90	-5.38	1/3kHz
Channel 2 (3.9936GHz). EUT sit on its long side. Receive Antenna fixed at 1 meter											
RMS	H	4005.690	41.46	33.65	7.74	32.60	0.00	50.24	53.90	-3.66	1/3MHz
PK	H	4005.690	61.58	33.65	7.74	32.60	0.00	70.36	70.76	-0.40	3/10MHz
RMS	V	4005.690	41.36	33.65	7.74	32.60	0.00	50.14	53.90	-3.76	1/3MHz
PK	V	4005.690	59.18	33.65	7.74	32.60	0.00	67.96	70.76	-2.80	3/10MHz
RMS	V	7987.369	34.00	35.96	11.77	33.56	0.00	48.17	53.90	-5.73	1/3MHz
PK	V	7987.369	35.79	35.96	11.77	33.56	0.00	49.96	70.76	-20.80	3/10MHz
RMS	H	7987.369	29.25	35.96	11.77	33.56	0.00	43.41	53.90	-10.49	1/3MHz
PK	H	7987.369	42.57	35.96	11.77	33.56	0.00	56.74	70.76	-14.02	3/10MHz
RMS	V	1164.000	6.00	27.76	4.03	32.67	0.00	5.12	9.90	-4.78	1/3kHz
RMS	V	1200.000	6.54	28.13	4.09	32.64	0.00	6.12	9.90	-3.78	1/3kHz
RMS	V	1240.000	4.96	28.47	4.16	32.61	0.00	4.98	9.90	-4.92	1/3kHz
RMS	V	1559.000	3.20	28.43	4.68	32.45	0.00	3.86	9.90	-6.04	1/3kHz
RMS	V	1610.000	3.71	28.56	4.73	32.48	0.00	4.52	9.90	-5.38	1/3kHz
Channel 2 (3.9936GHz). EUT sit on its short side. Receive Antenna fixed at 1 meter											
RMS	H	4005.690	35.97	33.65	7.74	32.60	0.00	44.75	53.90	-9.15	1/3MHz
PK	H	4005.690	55.83	33.65	7.74	32.60	0.00	64.61	70.76	-6.15	3/10MHz
RMS	V	4005.690	35.70	33.65	7.74	32.60	0.00	44.48	53.90	-9.42	1/3MHz
PK	V	4005.690	55.00	33.65	7.74	32.60	0.00	63.78	70.76	-6.98	3/10MHz
RMS	V	7987.369	36.27	35.96	11.77	33.56	0.00	50.44	53.90	-3.46	1/3MHz
PK	V	7987.369	43.95	35.96	11.77	33.56	0.00	58.12	70.76	-12.64	3/10MHz
RMS	H	7987.369	36.58	35.96	11.77	33.56	0.00	50.75	53.90	-3.15	1/3MHz
PK	H	7987.369	43.18	35.96	11.77	33.56	0.00	57.35	70.76	-13.41	3/10MHz
RMS	V	1164.000	6.00	27.76	4.03	32.67	0.00	5.12	9.90	-4.78	1/3kHz
RMS	V	1200.000	6.54	28.13	4.09	32.64	0.00	6.12	9.90	-3.78	1/3kHz
RMS	V	1240.000	4.96	28.47	4.16	32.61	0.00	4.98	9.90	-4.92	1/3kHz
RMS	V	1559.000	3.20	28.43	4.68	32.45	0.00	3.86	9.90	-6.04	1/3kHz
RMS	V	1610.000	3.71	28.56	4.73	32.48	0.00	4.52	9.90	-5.38	1/3kHz

Notes: No emissions were detected from 15-40 GHz at a distance of 0.2 meter

Transmit Channel 3 (30-960MHz)

Test Information

Test Details

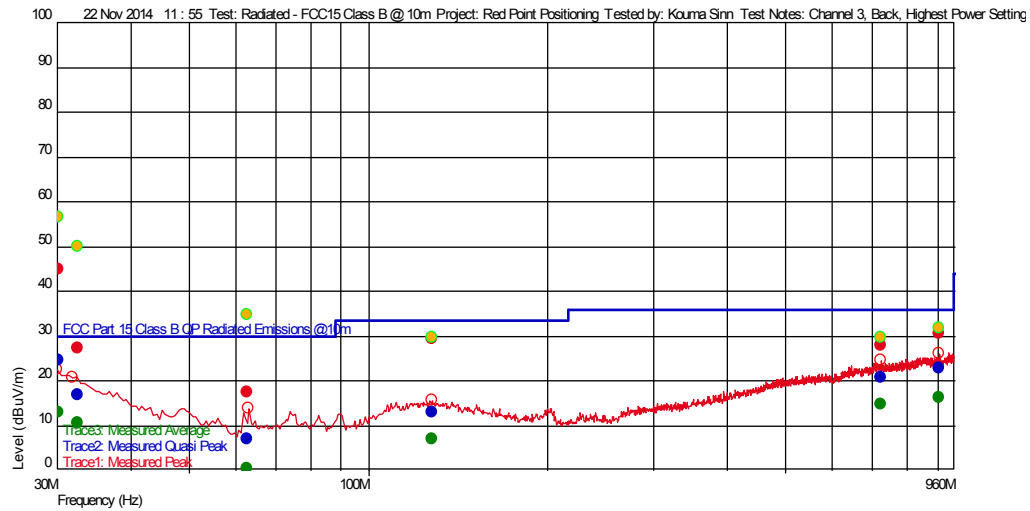
Test:
Project:
Test Notes:
Temperature:
Humidity:
Tested by:
Test Started:

User Entry

Radiated - FCC15 Class B @ 10m
Red Point Positioning
Channel 3, Back, Highest Power Setting
20C
15%, 1017mbar
Kouma Sinn
22 Nov 2014 11:55

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

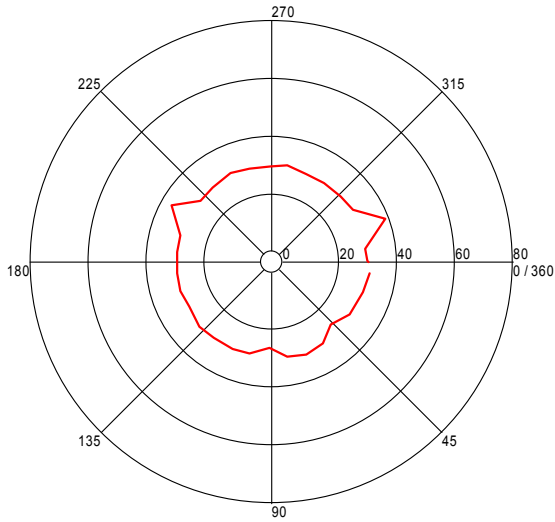
Trace2: Measured Quasi Peak

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
62.775951719 M	7.08	7.778	-24.685	30.000	-22.92	--	200	2.47	120 k	
128.018637553 M	12.88	14.398	-24.010	33.520	-20.64		18	4.00	120 k	
724.385170581 M	20.77	20.600	-21.409	36.020	-15.25	--	140	3.49	120 k	
32.57635293 M	16.83	19.554	-25.110	30.000	-13.17	--	173	2.60	120 k	
907.551503028 M	22.89	22.151	-21.080	36.020	-13.13		270	1.15	120 k	
30.23006012 M	24.61	21.139	-25.158	30.000	-5.39		327	3.80	120 k	

Azimuth Plots

Turntable Plot (30.23006012 MHz)

Level (dBuV/m)

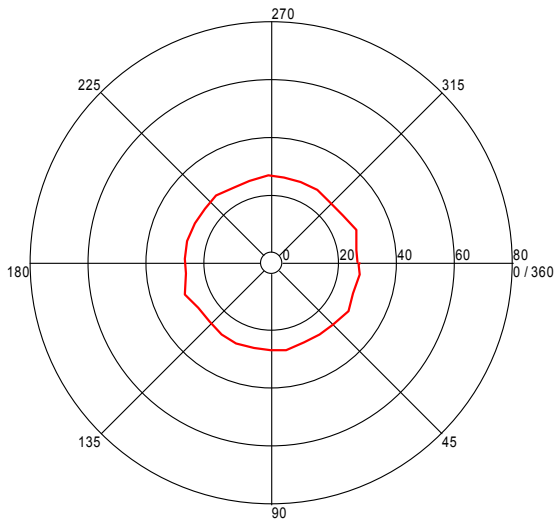


All Polarities

Azimuth (Degrees)

Turntable Plot (32.57635293 MHz)

Level (dBuV/m)

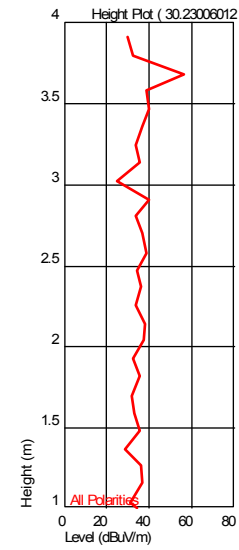


All Polarities

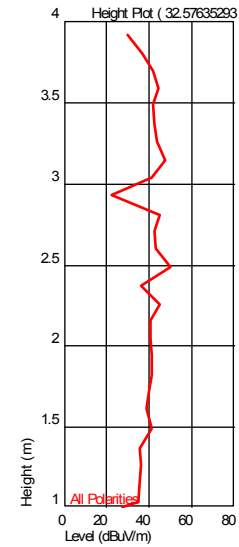
Azimuth (Degrees)

Turntable Plots

Height Plot (30.23006012 MHz)

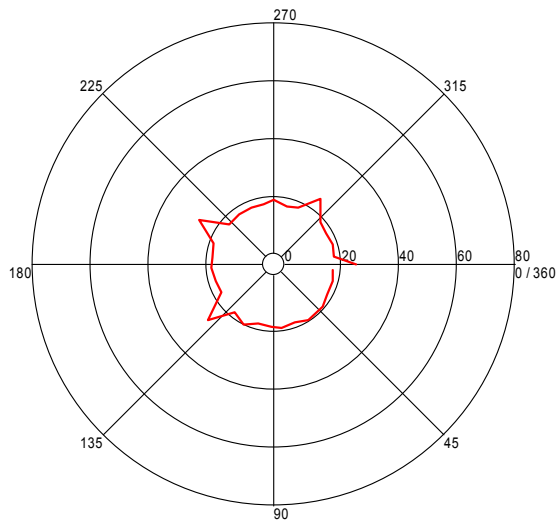


Height Plot (32.57635293 MHz)



Turntable Plot (62.775951719 MHz)

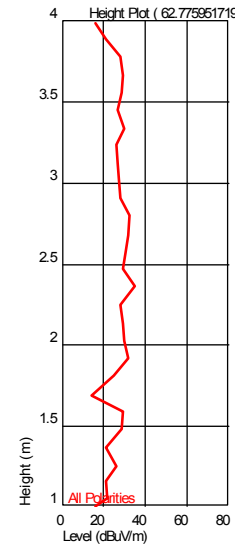
Level (dBuV/m)



All Polarities

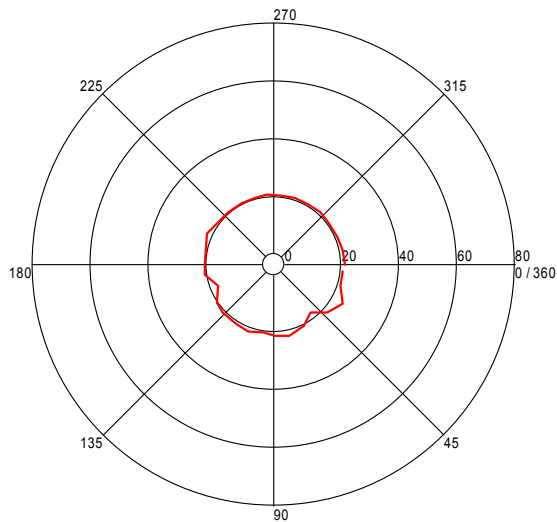
Azimuth (Degrees)

Height Plot (62.775951719 MHz)



Turntable Plot (128.018637553 MHz)

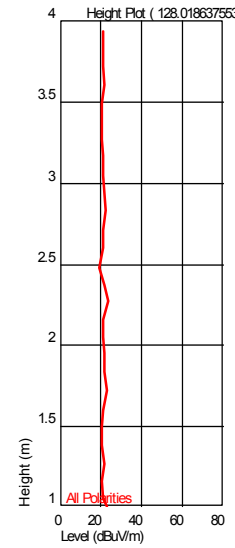
Level (dBuV/m)



All Polarities

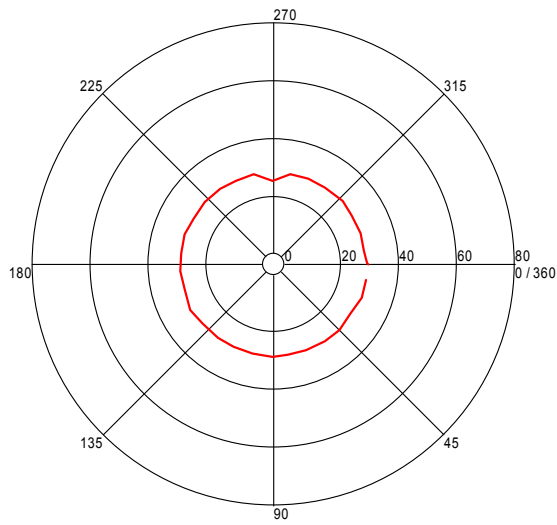
Azimuth (Degrees)

Height Plot (128.018637553 MHz)



Turntable Plot (724.385170581 MHz)

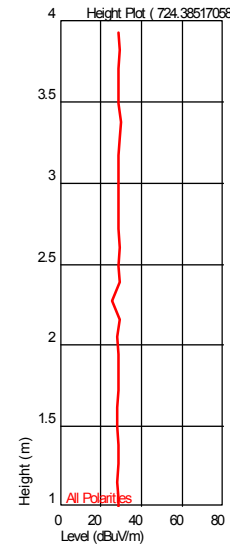
Level (dBuV/m)



All Polarities

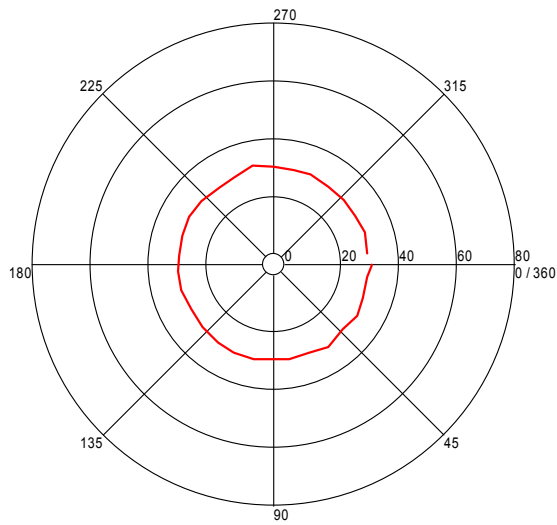
Azimuth (Degrees)

Height Plot (724.385170581 MHz)



Turntable Plot (907.551503028 MHz)

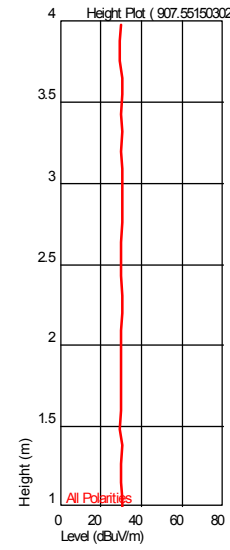
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (907.551503028 MHz)



Transmit Channel 3 (960MHz-1GHz)

Company: Red Point Positioning
 Model #: RPP-ARN-V4B
 Serial #: Sample # 1
 Engineers: Kouma Sinn
 Project #: G101902246
 Standard: FCC Part 15 Subpart F
 Receiver: ROS001
 PreAmp: 145-003 10-11-15.txt
 PreAmp Used? (Y or N): Y
 Antenna & Cables: N
 Antenna: ETS001 01-06-15.txt
 Cable(s): CBLHF2012-2M-1 01-14-2015.txt CBLHF2012-2M-2 01-14-2015.txt
 Location: 10M Chamber
 Barometer: DAV002
 Filter: NONE
 Date(s): 11/23/14
 Temp/Humidity/Pressure: 20C 21% 1005mbar
 Limit Distance (m): 3
 Test Distance (m): 0.2
 Voltage/Frequency: Internal Battery
 Frequency Range: 960MHz-1GHz
 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
No emisisions were detected at a distance of 0.2 meter											

Transmit Channel 3 (1-15GHz)

Company: Red Point Positioning

Model #: RPP-ARN-V4B

Serial #: Sample # 1 & 2

Engineers: Kouma Sinn

Project #: G101902246

Standard: FCC Part 15 Subpart F

Receiver: ROS001

PreAmp: PRE145014 12-18-2014.txt

PreAmp Used? (Y or N): Y

Date(s): 11/23/14

Limit Distance (m): 3

Test Distance (m): 3

Voltage/Frequency:

Internal Battery

Frequency Range:

1-15 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

Antenna & Cables: N

Bands: N, LF, HF, SHF

Antenna: ETS001 01-06-15.txt

ETS001 01-06-15.txt

Cable(s): 145-416 3mTrkB 10-04-2015.txt

NONE.

Location: 10M Chamber

Barometer: DAV002

Filter: NONE

Temp/Humidity/Pressure: 20C

21%

1005mbar

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
The EIRP, in terms of dBm, can be converted to a field strength by adding 95.2. ResBW = 1MHz, RMS Detector											
FCC 15.519(c), 960-1610 MHz = -75.3 dBm or 19.90 dBuV/m. 1610-1990 MHz = -63.3 dBm or 31.9 dBuV/m											
1990-3100 MHz = -61.3 dBm or 33.90 dBuV/m, 3100-10600 MHz = -41.3 dBm or 53.90 dBuV/m,											
Above 10600 MHz = -61.3 dBm or 33.90 dBuV/m											
Limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency											
at which the highest radiated emission occurs, fM. That limit is 0 dBm EIRP.											
Used 3MHz ResBW instead of 50MHz, Limit = 95.2-20*LOG[(ResBW in MHz)/50MHz] = 95.2-24.437 = 70.763 dBuV/m											
The EIRP, in terms of dBm, can be converted to a field strength by adding 95.2. ResBW = 1kHz, Average Detector											
FCC 15.519(d), 1164-1240 MHz = -85.3 dBm or 9.90 dBuV/m, 1559-1610 MHz = -85.3 dBm or 9.9 dBuV/m.											
Changed Pulse Repetition Rate to 16 MHz. Reduced power											
Channel 3 (4.4928GHz). EUT on its short side. Receive Antenna fixed at 1 meter											
RMS	V	4491.880	40.89	34.21	8.22	33.43	0.00	49.90	53.90	-4.00	1/3MHz
PK	V	4491.880	58.92	34.21	8.22	33.43	0.00	67.93	70.76	-2.83	3/10MHz
RMS	H	4491.880	41.26	34.21	8.22	33.43	0.00	50.27	53.90	-3.63	1/3MHz
PK	H	4491.880	60.44	34.21	8.22	33.43	0.00	69.45	70.76	-1.31	3/10MHz
RMS	V	8983.760	29.36	36.34	12.36	35.22	0.00	42.84	53.90	-11.06	1/3MHz
RMS	V	1164.000	6.00	27.76	4.03	32.67	0.00	5.12	9.90	-4.78	1/3kHz
RMS	V	1200.000	6.54	28.13	4.09	32.64	0.00	6.12	9.90	-3.78	1/3kHz
RMS	V	1240.000	4.96	28.47	4.16	32.61	0.00	4.98	9.90	-4.92	1/3kHz
RMS	V	1559.000	3.20	28.43	4.68	32.45	0.00	3.86	9.90	-6.04	1/3kHz
RMS	V	1610.000	3.71	28.56	4.73	32.48	0.00	4.52	9.90	-5.38	1/3kHz
Channel 3 (4.4928GHz). EUT on its long side. Receive Antenna fixed at 1 meter											
RMS	H	4491.880	40.86	34.21	8.22	33.43	0.00	49.87	53.90	-4.03	1/3MHz
PK	H	4491.880	60.44	34.21	8.22	33.43	0.00	69.45	70.76	-1.31	3/10MHz
RMS	V	4491.880	40.47	34.21	8.22	33.43	0.00	49.48	53.90	-4.42	1/3MHz
PK	V	4491.880	57.72	34.21	8.22	33.43	0.00	66.73	70.76	-4.03	3/10MHz
RMS	V	8983.760	32.70	36.34	12.36	35.22	0.00	46.18	53.90	-7.72	1/3MHz
RMS	V	1164.000	6.00	27.76	4.03	32.67	0.00	5.12	9.90	-4.78	1/3kHz
RMS	V	1200.000	6.54	28.13	4.09	32.64	0.00	6.12	9.90	-3.78	1/3kHz
RMS	V	1240.000	4.96	28.47	4.16	32.61	0.00	4.98	9.90	-4.92	1/3kHz
RMS	V	1559.000	3.20	28.43	4.68	32.45	0.00	3.86	9.90	-6.04	1/3kHz
RMS	V	1610.000	3.71	28.56	4.73	32.48	0.00	4.52	9.90	-5.38	1/3kHz
Channel 3 (4.4928GHz). EUT on its back. Receive Antenna fixed at 1 meter											
RMS	H	4491.880	39.63	34.21	8.22	33.43	0.00	48.64	53.90	-5.26	1/3MHz
PK	H	4491.880	58.39	34.21	8.22	33.43	0.00	67.40	70.76	-3.36	3/10MHz
RMS	V	4491.880	31.00	34.21	8.22	33.43	0.00	40.01	53.90	-13.89	1/3MHz
PK	V	4491.880	48.00	34.21	8.22	33.43	0.00	57.01	70.76	-13.75	3/10MHz
RMS	V	8983.760	32.70	36.34	12.36	35.22	0.00	46.18	53.90	-7.72	1/3MHz
RMS	V	1164.000	6.00	27.76	4.03	32.67	0.00	5.12	9.90	-4.78	1/3kHz
RMS	V	1200.000	6.54	28.13	4.09	32.64	0.00	6.12	9.90	-3.78	1/3kHz
RMS	V	1240.000	4.96	28.47	4.16	32.61	0.00	4.98	9.90	-4.92	1/3kHz
RMS	V	1559.000	3.20	28.43	4.68	32.45	0.00	3.86	9.90	-6.04	1/3kHz
RMS	V	1610.000	3.71	28.56	4.73	32.48	0.00	4.52	9.90	-5.38	1/3kHz

Notes: No emissions were detected from 15-40 GHz at a distance of 0.2 meter.

Transmit Channel 5 (30-960MHz)

Test Information

Test Details

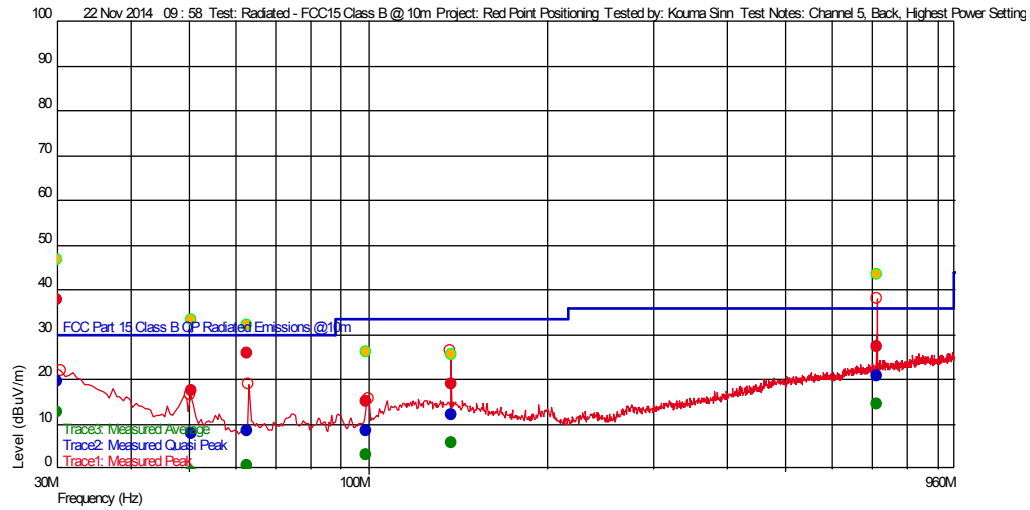
Test:
Project:
Test Notes:
Temperature:
Humidity:
Tested by:
Test Started:

User Entry

Radiated - FCC15 Class B @ 10m
Red Point Positioning
Channel 5, Back, Highest Power Setting
20C
15%, 1017mbar
Kouma Sinn
22 Nov 2014 09 : 58

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

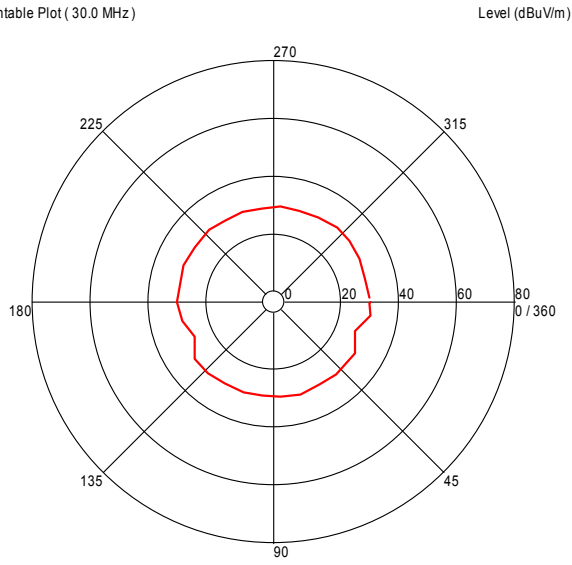
Emissions Test Data

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
99.337875832 M	8.63	10.135	-24.215	33.520	-24.89		71	3.57	120 k	
50.559118593 M	7.77	7.732	-24.900	30.000	-22.23		223	2.80	120 k	
62.812825467 M	8.43	7.781	-24.696	30.000	-21.57		329	1.15	120 k	
137.906413226 M	12.16	13.609	-23.946	33.520	-21.36		20	1.15	120 k	
713.166733361 M	20.62	20.427	-21.511	36.020	-15.40	--	269	2.13	120 k	
30.0 M	19.69	21.300	-25.221	30.000	-10.31	--	321	3.27	120 k	

Azimuth Plots

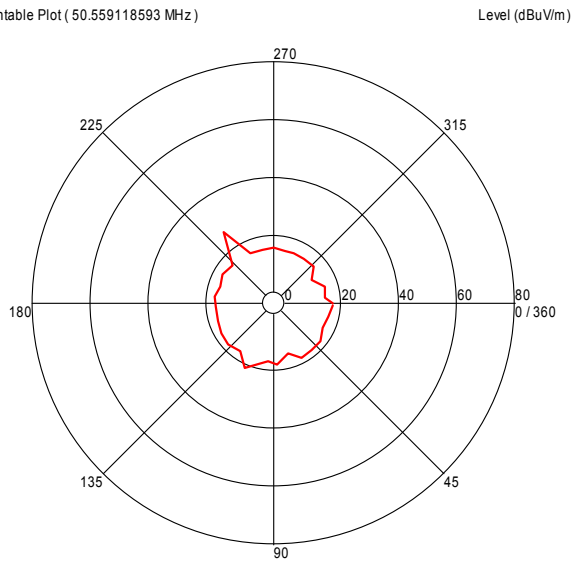
Turntable Plot (30.0 MHz)



All Polarities

Azimuth (Degrees)

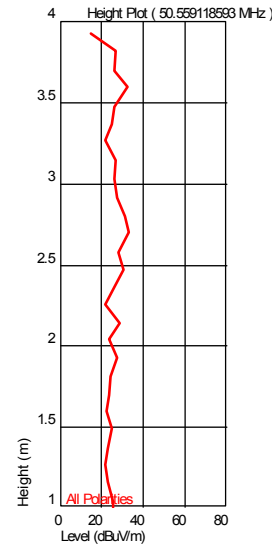
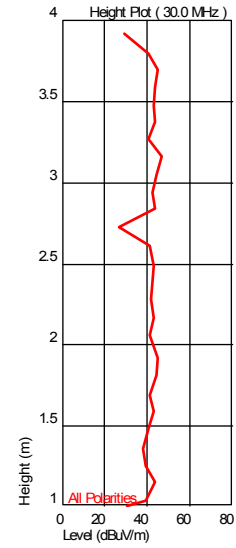
Turntable Plot (50.559118593 MHz)



All Polarities

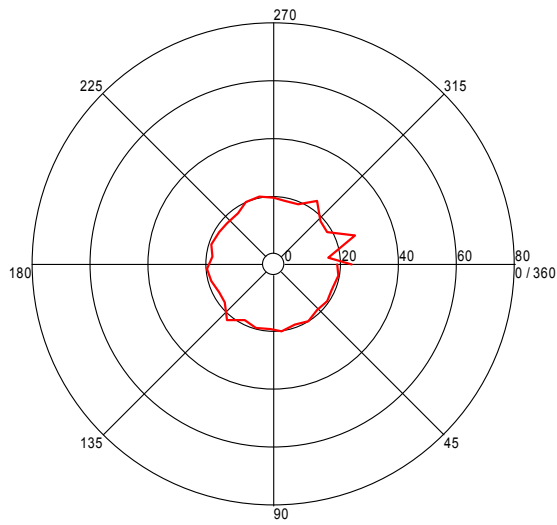
Azimuth (Degrees)

Turntable Plots



Turntable Plot (62.812825467 MHz)

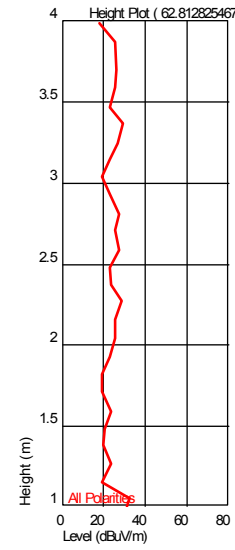
Level (dBuV/m)



All Polarities

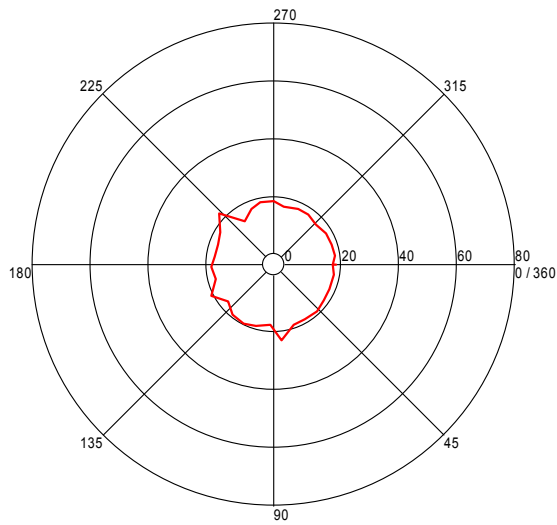
Azimuth (Degrees)

Height Plot (62.812825467 MHz)



Turntable Plot (99.337875832 MHz)

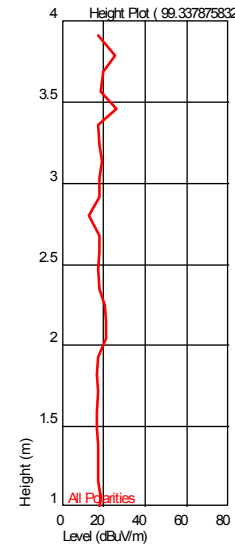
Level (dBuV/m)



All Polarities

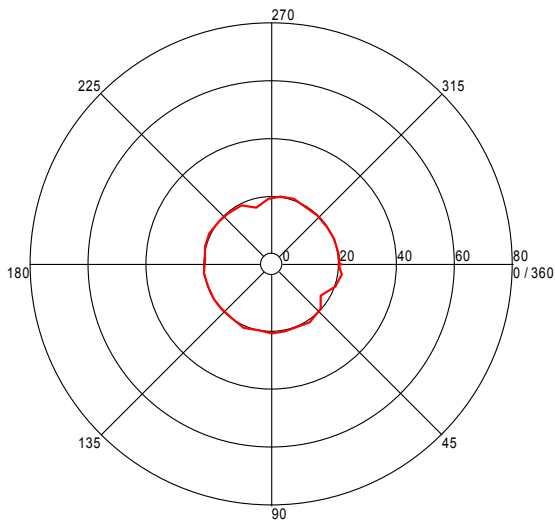
Azimuth (Degrees)

Height Plot (99.337875832 MHz)



Turntable Plot (137.906413226 MHz)

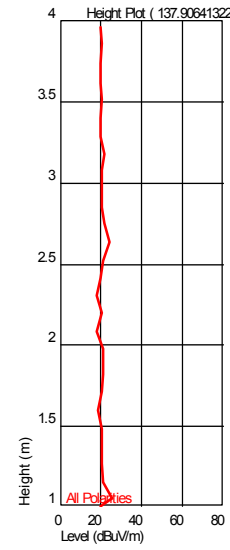
Level (dBuV/m)



All Polarities

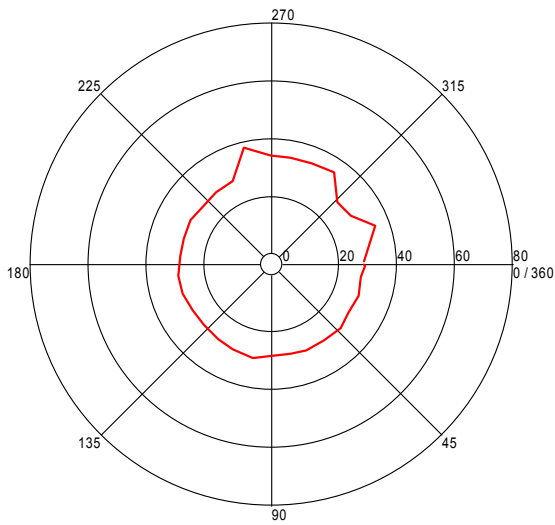
Azimuth (Degrees)

Height Plot (137.906413226 MHz)



Turntable Plot (713.166733361 MHz)

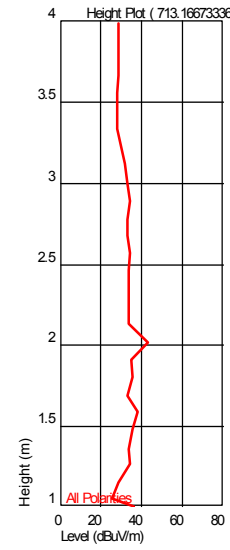
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (713.166733361 MHz)



Transmit Channel 5 (960MHz-1GHz)

Company: Red Point Positioning Antenna & Cables: N Bands: N, LF, HF, SHF
 Model #: RPP-ARN-V4B Antenna: 145154 11-18-15.txt 145154 11-18-15.txt
 Serial #: Sample # 1 Cable(s): CBLHF2012-2M-1 01-14-2015.txt CBLHF2012-2M-2 01-14-2015.txt
 Engineers: Kouma Sinn Location: 10M Chamber Barometer: DAV002 Filter: NONE
 Project #: G101902246 Date(s): 11/23/14
 Standard: FCC Part 15 Subpart F Temp/Humidity/Pressure: 20C 21% 1005mbar
 Receiver: ROS001 Limit Distance (m): 3
 PreAmp: 145-003 10-07-14.txt Test Distance (m): 3 53.9
 PreAmp Used? (Y or N): Y Voltage/Frequency: Internal Battery Frequency Range: 1-15 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
No emisisions were detected at a distance of 0.2 meter											

Transmit Channel 5 (1-15GHz)

Company: Red Point Positioning Antenna & Cables: N Bands: N, LF, HF, SHF
 Model #: RPP-ARN-V4B Antenna: ETS001 01-06-15.txt ETS001 01-06-15.txt
 Serial #: Sample # 1 & 2 Cable(s): 145-416 3mTrkB 10-04-2015.txt NONE.
 Engineers: Kouma Sinn Location: 10M Chamber Barometer: DAV002 Filter: NONE
 Project #: G101902246 Date(s): 11/23/14
 Standard: FCC Part 15 Subpart F Temp/Humidity/Pressure: 20C 21% 1005mbar
 Receiver: ROS001 Limit Distance (m): 3
 PreAmp: PRE145014 12-18-2014.txt Test Distance (m): 3
 PreAmp Used? (Y or N): Y Voltage/Frequency: Internal Battery Frequency Range: 1-15 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
The EIRP, in terms of dBm, can be converted to a field strength by adding 95.2. ResBW = 1MHz, RMS Detector											
FCC 15.519(c), 960-1610 MHz = -75.3 dBm or 19.90 dBuV/m. 1610-1990 MHz = -63.3 dBm or 31.9 dBuV/m											
1990-3100 MHz = -61.3 dBm or 33.90 dBuV/m, 3100-10600 MHz = -41.3 dBm or 53.90 dBuV/m,											
Above 10600 MHz = -61.3 dBm or 33.90 dBuV/m											
Limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency											
at which the highest radiated emission occurs, fM. That limit is 0 dBm EIRP.											
Used 3MHz ResBW instead of 50MHz, Limit = 95.2-20*LOG[(ResBW in MHz)/50MHz] = 95.2-24.437 = 70.763 dBuV/m											
The EIRP, in terms of dBm, can be converted to a field strength by adding 95.2. ResBW = 1kHz, Average Detector											
FCC 15.519(d), 1164-1240 MHz = -85.3 dBm or 9.90 dBuV/m, 1559-1610 MHz = -85.3 dBm or 9.9 dBuV/m.											
Changed Pulse Repetition Rate to 16 MHz.											
Channel 5 (6.4896 GHz). EUT on its long side. Receive Antenna fixed at 1 meter											
RMS	H	6489.600	38.03	35.65	11.01	32.80	0.00	51.89	53.90	-2.01	1/3MHz
PK	H	6489.600	56.75	35.65	11.01	32.80	0.00	70.61	70.76	-0.15	3/10MHz
RMS	V	6489.600	36.00	35.65	11.01	32.80	0.00	49.86	53.90	-4.04	1/3MHz
PK	V	6489.600	55.96	35.65	11.01	32.80	0.00	69.82	70.76	-0.94	3/10MHz
RMS	V	12979.200	27.24	39.38	14.93	30.92	0.00	50.63	53.90	-3.27	1/3MHz
RMS	V	1164.000	6.00	27.76	4.03	32.67	0.00	5.12	9.90	-4.78	1/3kHz
RMS	V	1200.000	6.54	28.13	4.09	32.64	0.00	6.12	9.90	-3.78	1/3kHz
RMS	V	1240.000	4.96	28.47	4.16	32.61	0.00	4.98	9.90	-4.92	1/3kHz
RMS	V	1559.000	3.20	28.43	4.68	32.45	0.00	3.86	9.90	-6.04	1/3kHz
RMS	V	1610.000	3.71	28.56	4.73	32.48	0.00	4.52	9.90	-5.38	1/3kHz
Channel 5 (6.4896 GHz). EUT on its short side. Receive Antenna fixed at 1 meter											
RMS	H	6489.600	30.62	35.65	11.01	32.80	0.00	44.48	53.90	-9.42	1/3MHz
PK	H	6489.600	51.26	35.65	11.01	32.80	0.00	65.12	70.76	-5.64	3/10MHz
RMS	V	6489.600	36.79	35.65	11.01	32.80	0.00	50.65	53.90	-3.25	1/3MHz
PK	V	6489.600	55.88	35.65	11.01	32.80	0.00	69.74	70.76	-1.02	3/10MHz
RMS	V	12979.200	27.24	39.38	14.93	30.92	0.00	50.63	53.90	-3.27	1/3MHz
RMS	V	1164.000	6.00	27.76	4.03	32.67	0.00	5.12	9.90	-4.78	1/3kHz
RMS	V	1200.000	6.54	28.13	4.09	32.64	0.00	6.12	9.90	-3.78	1/3kHz
RMS	V	1240.000	4.96	28.47	4.16	32.61	0.00	4.98	9.90	-4.92	1/3kHz
RMS	V	1559.000	3.20	28.43	4.68	32.45	0.00	3.86	9.90	-6.04	1/3kHz
RMS	V	1610.000	3.71	28.56	4.73	32.48	0.00	4.52	9.90	-5.38	1/3kHz
Channel 5 (6.4896 GHz). EUT on its back. Receive. Antenna fixed at 1 meter											
RMS	H	6489.600	36.07	35.65	11.01	32.80	0.00	49.93	53.90	-3.97	1/3MHz
PK	H	6489.600	55.03	35.65	11.01	32.80	0.00	68.89	70.76	-1.87	3/10MHz
RMS	V	6489.600	31.56	35.65	11.01	32.80	0.00	45.42	53.90	-8.48	1/3MHz
PK	V	6489.600	48.96	35.65	11.01	32.80	0.00	62.82	70.76	-7.94	3/10MHz
RMS	V	12979.200	27.24	39.38	14.93	30.92	0.00	50.63	53.90	-3.27	1/3MHz
RMS	V	1164.000	6.00	27.76	4.03	32.67	0.00	5.12	9.90	-4.78	1/3kHz
RMS	V	1200.000	6.54	28.13	4.09	32.64	0.00	6.12	9.90	-3.78	1/3kHz
RMS	V	1240.000	4.96	28.47	4.16	32.61	0.00	4.98	9.90	-4.92	1/3kHz
RMS	V	1559.000	3.20	28.43	4.68	32.45	0.00	3.86	9.90	-6.04	1/3kHz
RMS	V	1610.000	3.71	28.56	4.73	32.48	0.00	4.52	9.90	-5.38	1/3kHz

Notes: No emissions were detected from 15-40 GHz at a distance of 0.2 meter.

Charging Mode (30-960MHz)

Test Information

Test Details

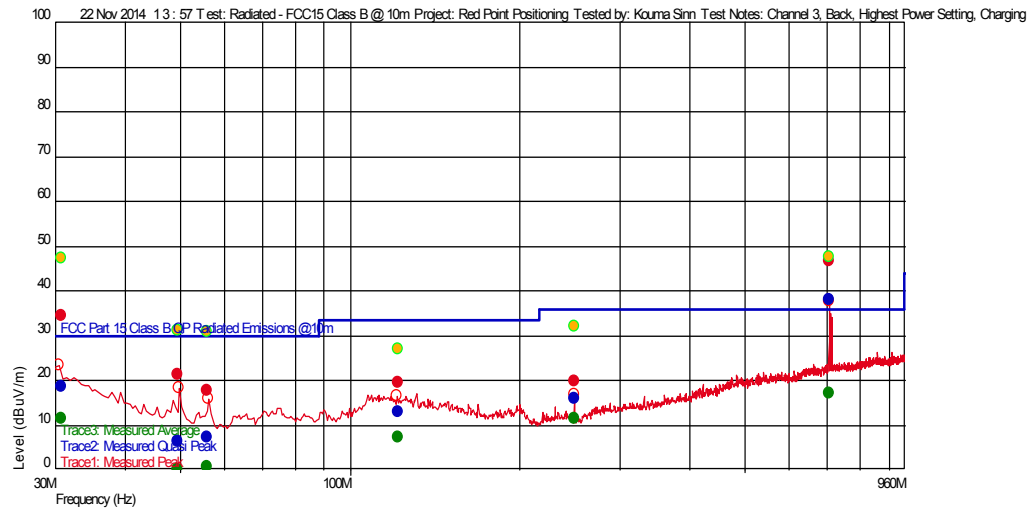
Test:
Project:
Test Notes:
Temperature:
Humidity:
Tested by:
Test Started:

User Entry

Radiated - FCC15 Class B @ 10m
Red Point Positioning
Channel 3, Back, Highest Power Setting, Charging
20C
15%, 1017mbar
Kouma Sinn
22 Nov 2014 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

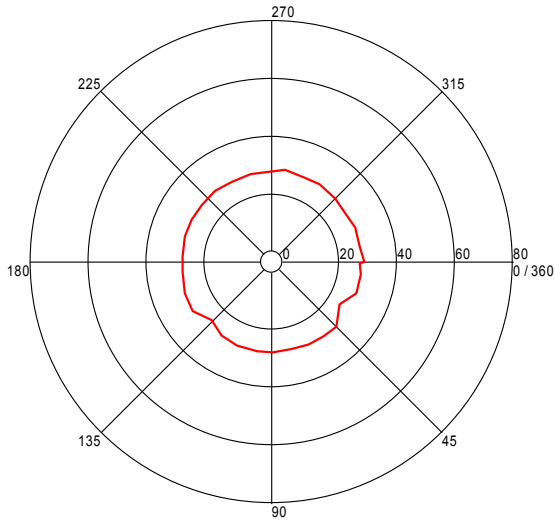
Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
49.475952204 M	6.52	8.110	-24.909	30.000	-23.48		329	2.95	120 k	
55.92745494 M	7.23	7.100	-24.726	30.000	-22.77		0	2.62	120 k	
121.864528607 M	13.00	14.100	-24.120	33.520	-20.52		360	1.04	120 k	
249.59679395 M	15.95	11.616	-23.734	36.020	-20.07		223	1.04	120 k	
30.825050156 M	18.56	20.722	-25.187	30.000	-11.44	--	291	3.15	120 k	
705.441482906 M	38.02	20.209	-21.460	--	---	--	268	3.60	120 k	

Notes: The emission at 705.4415 MHz is an ambient signal inside the chamber. Ambient scan was performed with no EUT in the chamber

Azimuth Plots

Turntable Plot (30.825050156 MHz)

Level (dBuV/m)

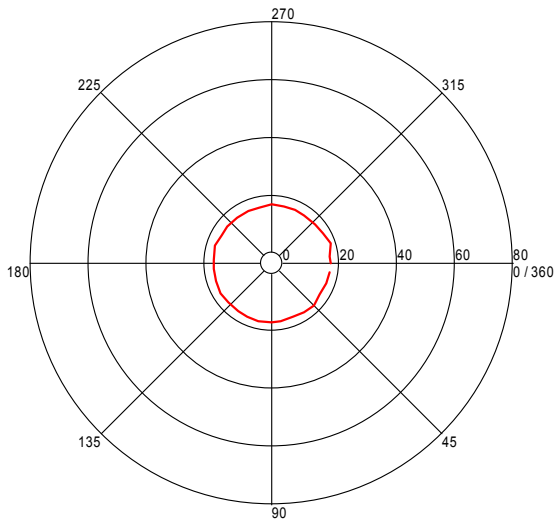


All Polarities

Azimuth (Degrees)

Turntable Plot (49.475952204 MHz)

Level (dBuV/m)

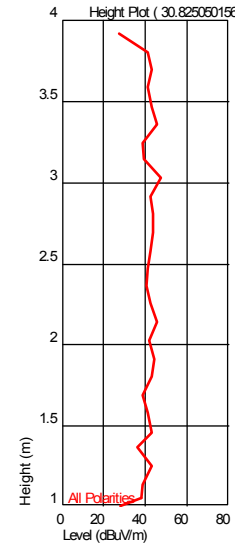


All Polarities

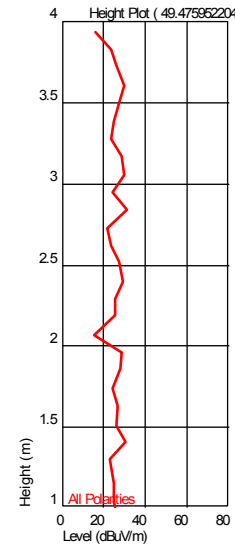
Azimuth (Degrees)

Turntable Plots

Height Plot (30.825050156 MHz)

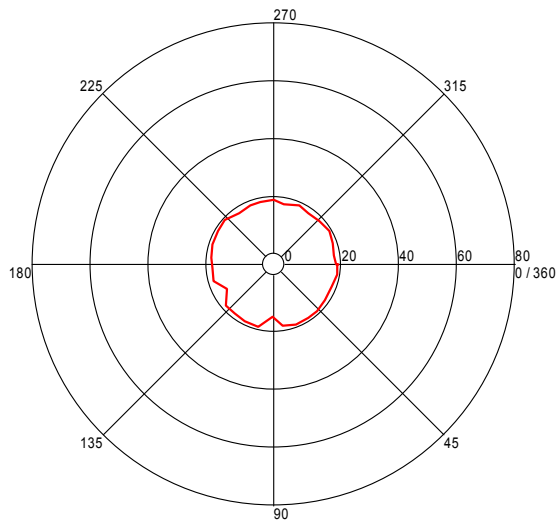


Height Plot (49.475952204 MHz)



Turntable Plot (55.92745494 MHz)

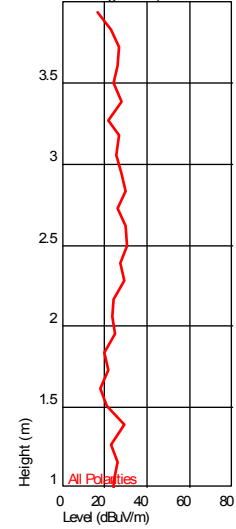
Level (dBuV/m)



All Polarities

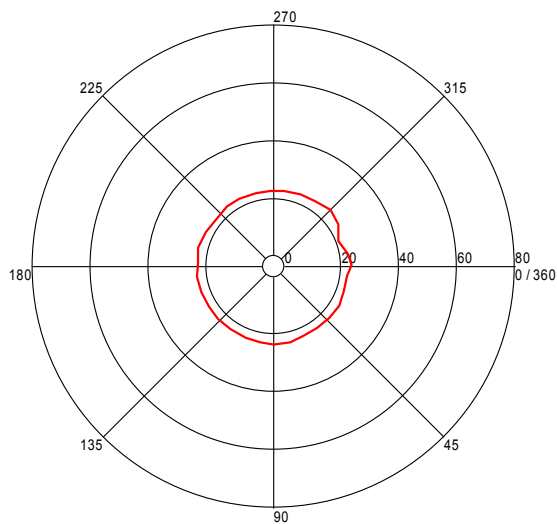
Azimuth (Degrees)

Height Plot (55.92745494 MHz)



Turntable Plot (121.864528607 MHz)

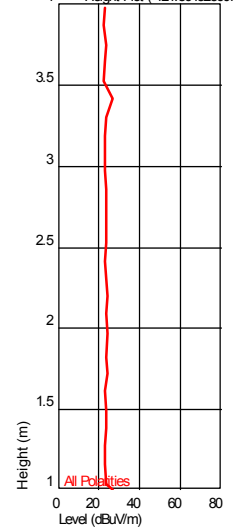
Level (dBuV/m)



All Polarities

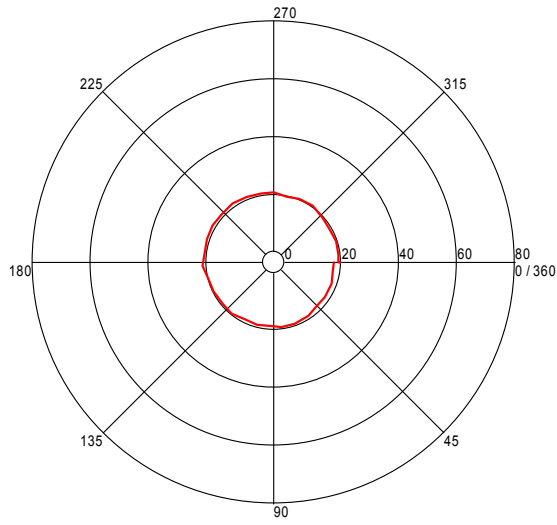
Azimuth (Degrees)

Height Plot (121.864528607 MHz)



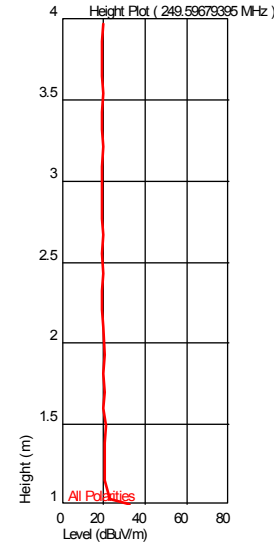
Turntable Plot (249.59679395 MHz)

Level (dBuV/m)



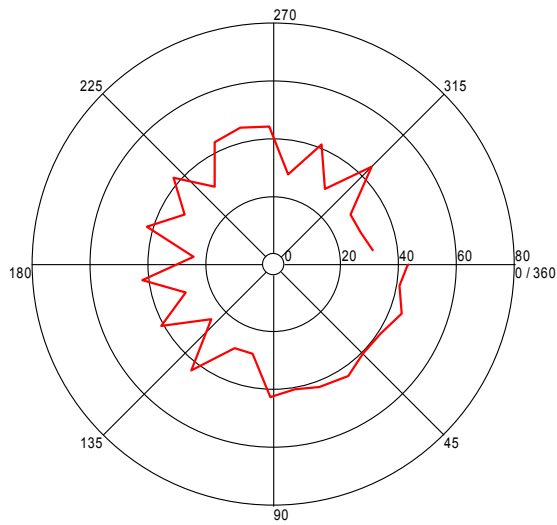
All Polarities

Azimuth (Degrees)



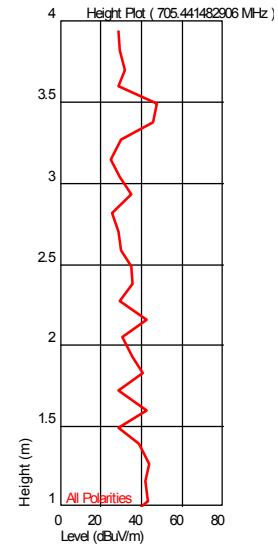
Turntable Plot (705.441482906 MHz)

Level (dBuV/m)



All Polarities

Azimuth (Degrees)



Charging Mode (960MHz-1000MHz)

Test Information

Test Details

Test:

Project:

Test Notes:

Temperature:

Humidity:

Tested by:

Test Started:

User Entry

Radiated - FCC15 Class B @ 10m

Red Point Positioning

Channel 3, Back, Highest Power Setting, Charging

20C

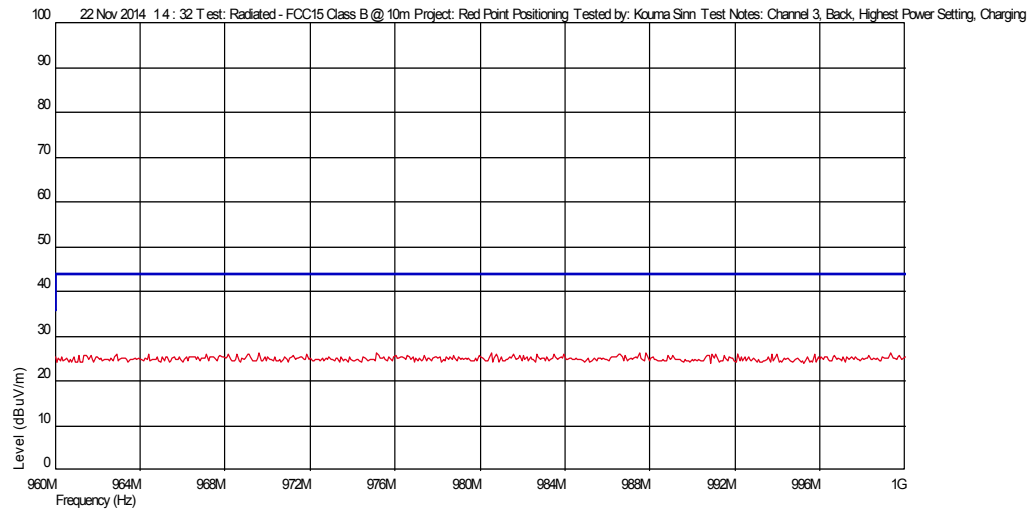
15%, 1017mbar

Kouma Sinn

22 Nov 2014 14 : 32

Additional Information

Prescan Emission Graph



Notes: No emissions were detected.

Test Personnel: Kouma Sinn *KPS*
Supervising/Reviewing
Engineer:
(Where Applicable) N/A
Product Standard: FCC Part 15 Subpart F & B
Input Voltage: RSS-220, ICES-003
Pretest Verification w/
Ambient Signals or
BB Source: Internal Battery Powered
BB Source/Ambient Signals

Test Date: 11/22/2014 & 11/23/2014

Limit Applied: Per standard

Ambient Temperature: 20, 20 °C

Relative Humidity: 15, 21 %

Atmospheric Pressure: 1017, 1005 mbars

Deviations, Additions, or Exclusions: None

7 Receiver Spurious Emissions

7.1 Method

Tests are performed in accordance with FCC Part 15 Subpart B, ICES-003, and ANSI C63.4:2009.

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

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucisp
Radiated Emissions, 10m	30-1000 MHz	4.6	6.3
Radiated Emissions, 3m	30-1000 MHz	5.3	6.3
Radiated Emissions, 3m	1-6 GHz	4.5	5.2
Radiated Emissions, 3m	6-15 GHz	5.2	5.5
Radiated Emissions, 3m	15-18 GHz	5.0	5.5
Radiated Emissions, 3m	18-40 GHz	5.0	5.5

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:

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

Alternately, when C5 Software is used, the "Level" includes all losses and gains and is compared directly in the "Margin" column to the "Limit". "AF" is the Antenna Factor; "PA+CL" are Preamp and Cable Loss. These are already accounted for in the "Level" column.

7.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV002	Weather Station	Davis Instruments	7400	PE80519A93	08/20/2013	08/20/2015
145145	Receiving Antenna	Sunol Sciences	JB3	A122313	01/07/2014	01/07/2015
145-410	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	10/04/2014	10/04/2015
145128	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/17/2014	03/17/2015
145003	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	10/11/2014	10/11/2015

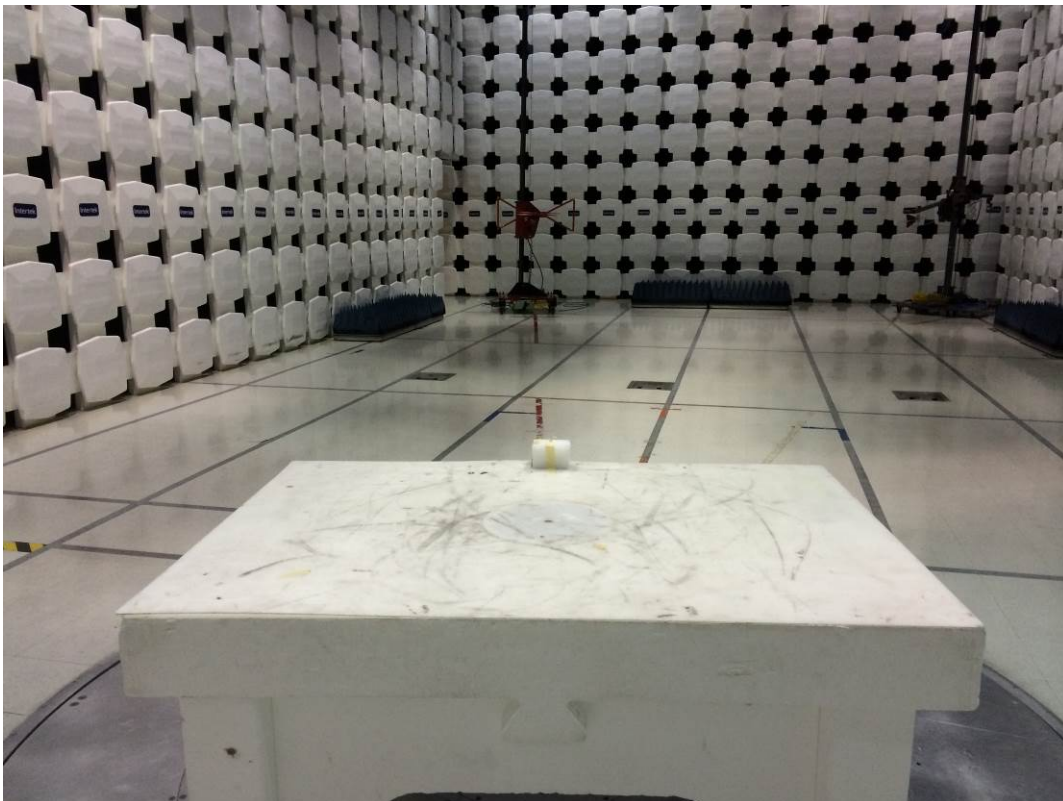
Software Utilized:

Name	Manufacturer	Version
C5 Emissions	TESEQ	5.26.46.46

7.3 Results:

The sample tested was found to Comply.

7.4 Setup Photographs:



7.5 Plots/Data:

Receive Mode, Internal Battery Powered

Test Information

Test Details

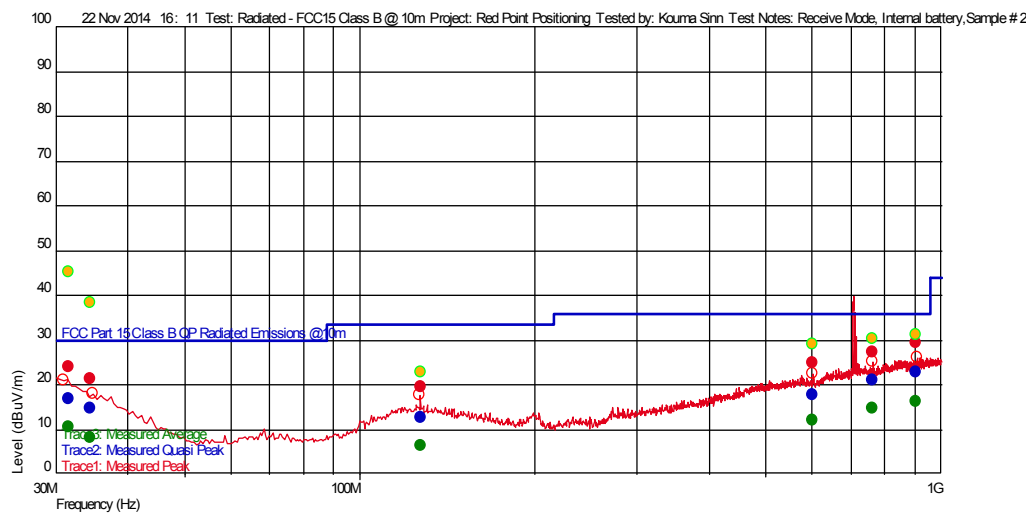
Test:
Project:
Test Notes:
Temperature:
Humidity:
Tested by:
Test Started:

User Entry

Radiated - FCC15 Class B @ 10m
Red Point Positioning
Receive Mode, Internal battery, Sample # 2
20C
15%, 1017mbar
Kouma Sinn
22 Nov 2014 16 : 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

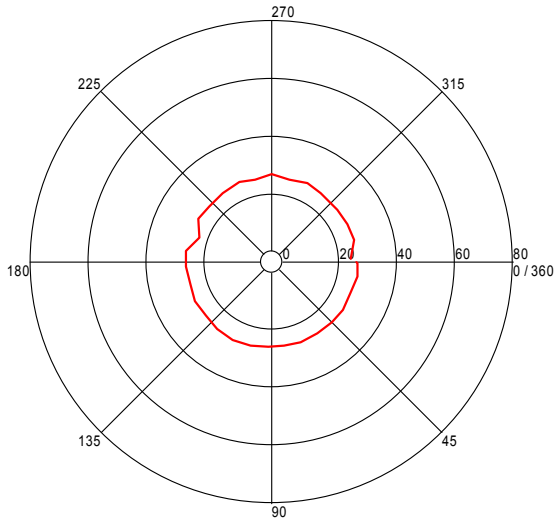
Trace2: Measured Quasi Peak

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
127.484569361 M	12.79	14.452	-24.046	33.520	-20.73		116	2.71	120 k	
601.598997928 M	17.86	18.632	-22.229	36.020	-18.16	--	268	1.04	120 k	
34.450099762 M	14.83	18.185	-25.171	30.000	-15.17		1	3.85	120 k	
764.11262498 M	21.06	20.700	-21.342	36.020	-14.96	--	56	2.94	120 k	
31.636473058 M	16.84	20.154	-25.254	30.000	-13.16	--	360	2.04	120 k	
908.237275 M	22.87	22.165	-21.117	36.020	-13.15	--	299	3.10	120 k	

Azimuth Plots

Turntable Plot (31.636473058 MHz)

Level (dBuV/m)

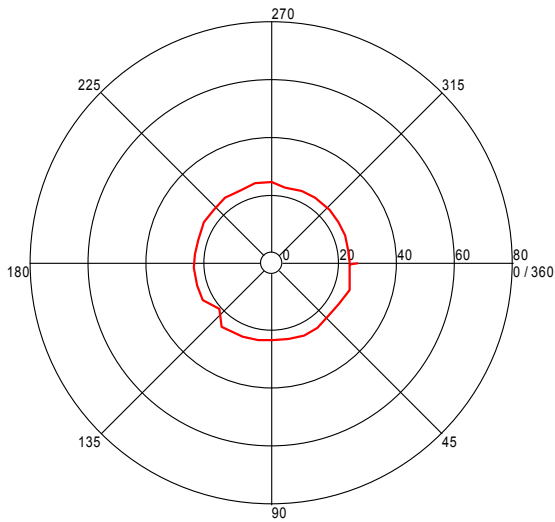


All Polarities

Azimuth (Degrees)

Turntable Plot (34.450099762 MHz)

Level (dBuV/m)

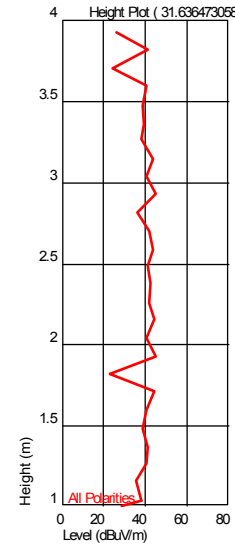


All Polarities

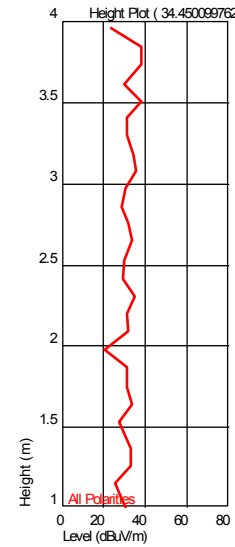
Azimuth (Degrees)

Turntable Plots

Height Plot (31.636473058 MHz)

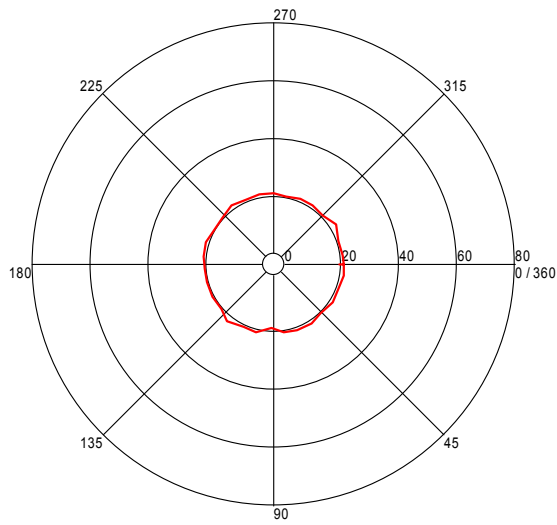


Height Plot (34.450099762 MHz)



Turntable Plot (127.484569361 MHz)

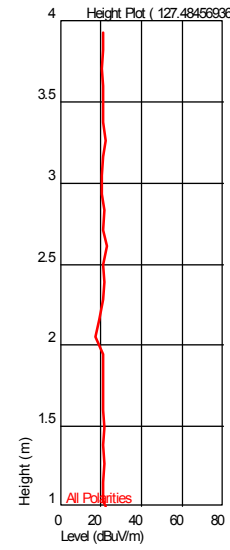
Level (dBuV/m)



All Polarities

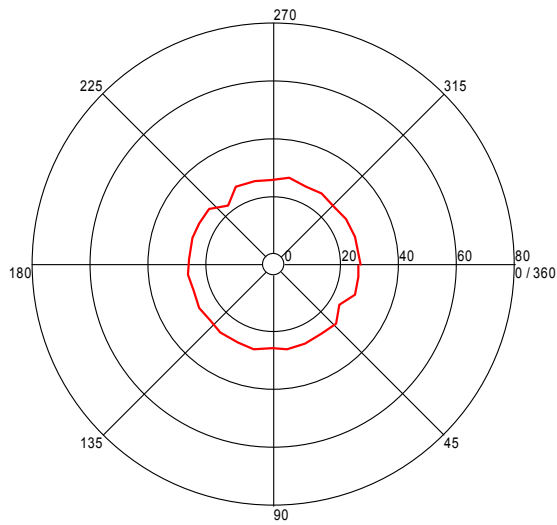
Azimuth (Degrees)

Height Plot (127.484569361 MHz)



Turntable Plot (601.598997928 MHz)

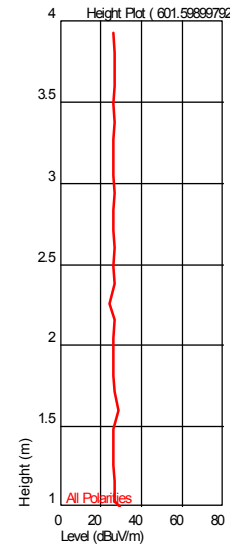
Level (dBuV/m)



All Polarities

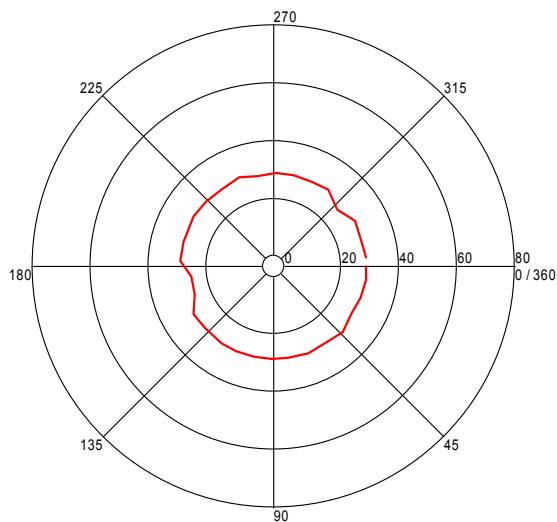
Azimuth (Degrees)

Height Plot (601.598997928 MHz)



Turntable Plot (764.11262498 MHz)

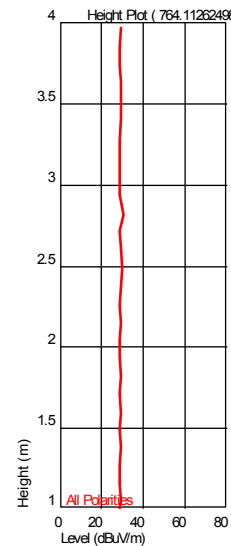
Level (dBuV/m)



All Polarities

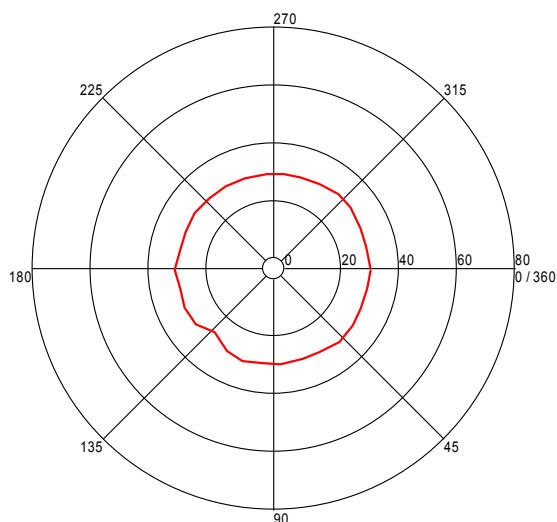
Azimuth (Degrees)

Height Plot (764.11262498 MHz)



Turntable Plot (908.237275 MHz)

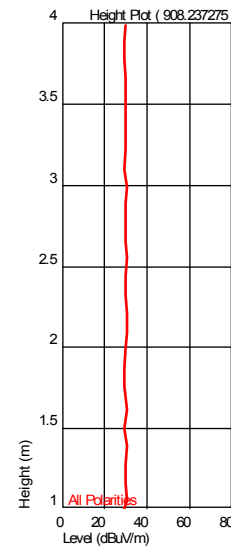
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (908.237275 MHz)



Test Personnel: Kouma Sinn *KPS*
Supervising/Reviewing Engineer:
(Where Applicable) N/A
Product Standard: FCC Part 15 Subpart B
Input Voltage: ICES-003
Pretest Verification w/ Ambient Signals or BB Source: Internal Battery Powered
BB Source: BB Source/Ambient Signals

Test Date: 11/22/2014Limit Applied: All Class BAmbient Temperature: 20 °CRelative Humidity: 15 %Atmospheric Pressure: 1017 mbars

Deviations, Additions, or Exclusions: None

8 AC Mains Conducted Emissions

8.1 Method

Tests are performed in accordance with FCC Part 15 Subpart B, ICES-003, and ANSI C63.4:2009.

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. A Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucisp
AC Line Conducted Emissions	150 kHz - 30 MHz	2.8	3.4
Telco Port Emissions	150 kHz - 30 MHz	3.2	5

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 or ISN 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:

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

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

Alternately, when C5 Software is used, the "Level" includes all losses and gains and is compared directly in the "Margin" column to the "Limit". "TF" is the Transducer Factor; in this case LISN or ISN loss.

8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DS27'	Attenuator, 20dB	Mini Circuits	20dB, 50 ohm	DS27	10/01/2014	10/01/2015
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/17/2014	03/17/2015
LISN32'	CISPR 16 LISN	Com-Power	LI-215A	191955	02/26/2014	02/26/2015
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	10/04/2014	10/04/2015
CBLBNC2012-5'	50 Ohm Coaxial Cable	Pomona	RG58C/U	CBLBNC2012-5	12/26/2013	12/26/2014
DAV002'	Weather Station	Davis Instruments	7400	PE80519A93	08/20/2013	08/20/2015

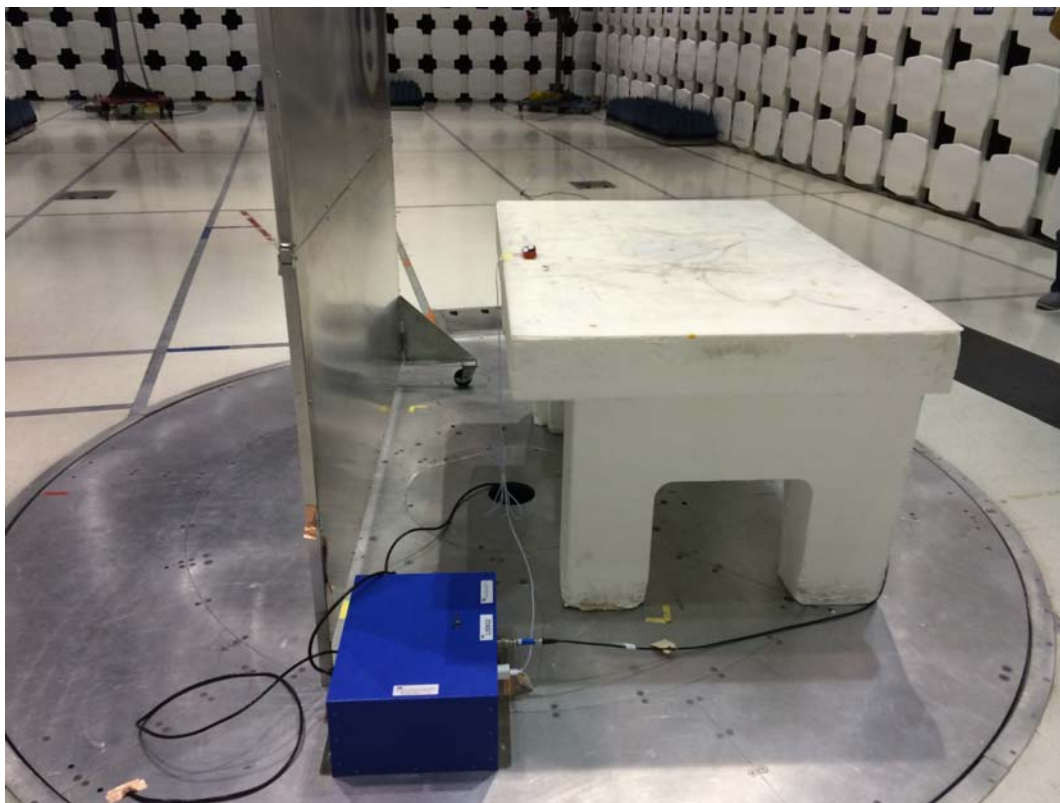
Software Utilized:

Name	Manufacturer	Version
C5 Emissions	TESEQ	5.26.46.46

8.3 Results:

The sample tested was found to Comply.

8.4 Setup Photographs:



8.5 Plots/Data:

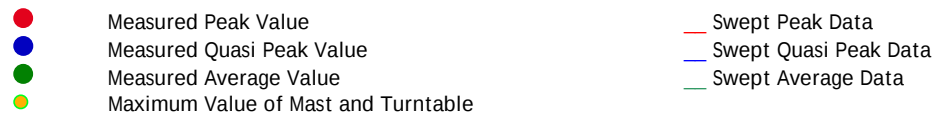
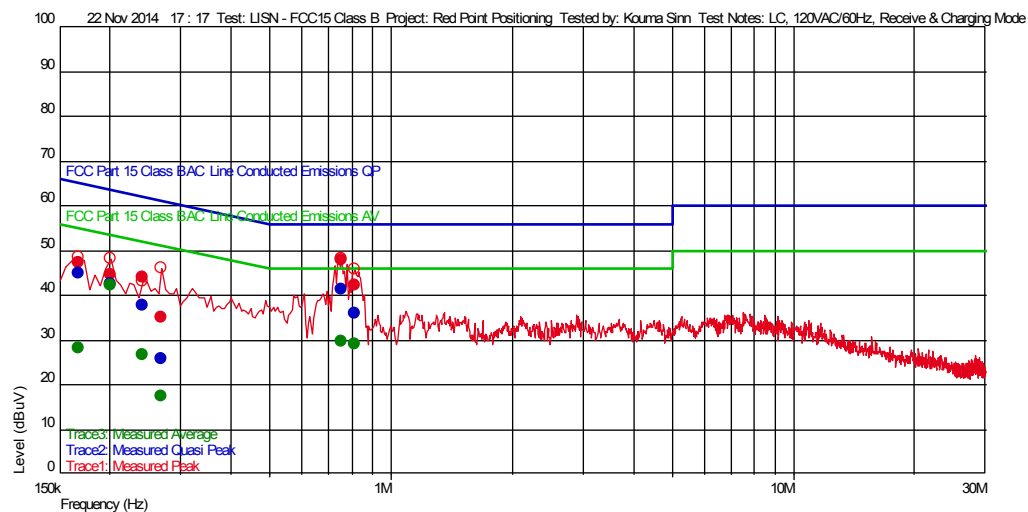
Receiving/Charging Mode, 120VAC/60Hz

Test Information

Test Details
 Test: LISN - FCC15 Class B
 Project: Red Point Positioning
 Test Notes: LC, 120VAC/60Hz, Receive & Charging Mode
 Temperature: 20C
 Humidity: 16%, 1009mbar
 Tested by: Kouma Sinn
 Test Started: 22 Nov 2014 17:17

Additional Information

Prescan Emission Graph



Emissions Test Data

Trace2: Measured Quasi Peak

Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
269.93987976 k	25.83	0.080	20.570	61.120	-35.29	9 k		L1
241.382765531 k	37.86	0.080	20.560	62.049	-24.18	9 k		L1
201.402805611 k	42.65	0.080	20.494	63.553	-20.90	9 k		L1
167.134268537 k	44.84	0.077	20.472	65.102	-20.26	9 k		L1
812.5250501 k	35.97	0.090	20.616	56.000	-20.03	9 k		L1
755.410821643 k	41.26	0.089	20.609	56.000	-14.74	9 k		N

Trace3: Measured Average

Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
269.93987976 k	17.55	0.080	20.570	51.120	-33.57	9 k		L1
167.134268537 k	28.21	0.077	20.472	55.102	-26.89	9 k		L1
241.382765531 k	26.59	0.080	20.560	52.049	-25.46	9 k		L1
812.5250501 k	29.00	0.090	20.616	46.000	-17.00	9 k		L1
755.410821643 k	29.59	0.089	20.609	46.000	-16.41	9 k		N
201.402805611 k	42.13	0.080	20.494	53.553	-11.42	9 k		L1

Notes: In normal operation the EUT is powered from internal battery but can be plugged into a 5VDC source for charging. So, line conducted emissions was performed on iPhone power adapter AC mains input.

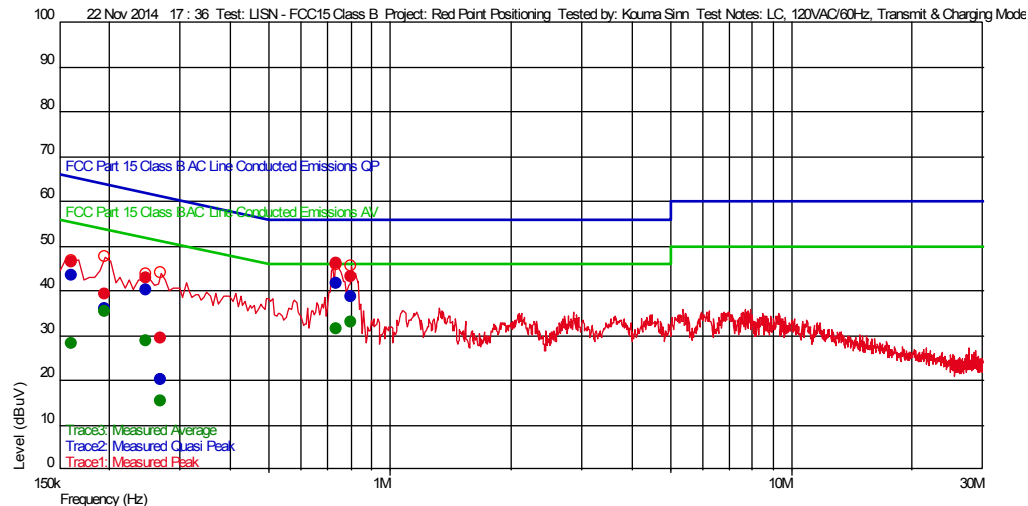
Transmitting/Charging Mode, 120VAC/60Hz

Test Information

Test Details
 Test: User Entry
 Project: LISN - FCC15 Class B
 Test Notes: Red Point Positioning
 Temperature: LC, 120VAC/60Hz, Transmit & Charging Mode
 Humidity: 20C
 Tested by: 16%, 1009mbar
 Test Started: Kouma Sinn
 22 Nov 2014 17 : 36

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
269.93987976 k	20.20	0.080	20.570	61.120	-40.92	9 k		N
195.691382766 k	36.12	0.080	20.500	63.791	-27.68	9 k		N
161.422845691 k	43.57	0.076	20.460	65.390	-21.82	9 k		N
247.094188377 k	40.07	0.080	20.560	61.854	-21.79	9 k		N
801.102204409 k	38.59	0.090	20.609	56.000	-17.41	9 k		N
738.276553106 k	41.49	0.085	20.609	56.000	-14.51	9 k		L1

Trace3: Measured Average

Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
269.93987976 k	15.45	0.080	20.570	51.120	-35.67	9 k		N
161.422845691 k	28.08	0.076	20.460	55.390	-27.31	9 k		N
247.094188377 k	28.71	0.080	20.560	51.854	-23.14	9 k		N
195.691382766 k	35.41	0.080	20.500	53.791	-18.38	9 k		N
738.276553106 k	31.36	0.085	20.609	46.000	-14.64	9 k		L1
801.102204409 k	32.99	0.090	20.609	46.000	-13.01	9 k		N

Notes: In normal operation the EUT is powered from internal battery but can be plugged into a 5VDC source for charging. So, line conducted emissions was performed on iPhone power adapter AC mains input.

Test Personnel: Kouma Sinn *KPS*
 Supervising/Reviewing Engineer:
 (Where Applicable) N/A
 Product Standard: FCC Part 15 Subpart B
 Input Voltage: ICES-003
 Pretest Verification w/ Ambient Signals or
 BB Source: 120VAC/60Hz
Ambient Signals

Test Date: 11/22/2014
 Limit Applied: All Class B
 Ambient Temperature: 20 °C
 Relative Humidity: 16 %
 Atmospheric Pressure: 1009 mbars

Deviations, Additions, or Exclusions: None

9 10dB Bandwidth

9.1 Method

Tests are performed in accordance with FCC Part 15 Subpart F §15.517:2014, §15.521:2014, §15.503:2014, and ANSI C63.4:2009.

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.

9.2 Test Equipment Used:

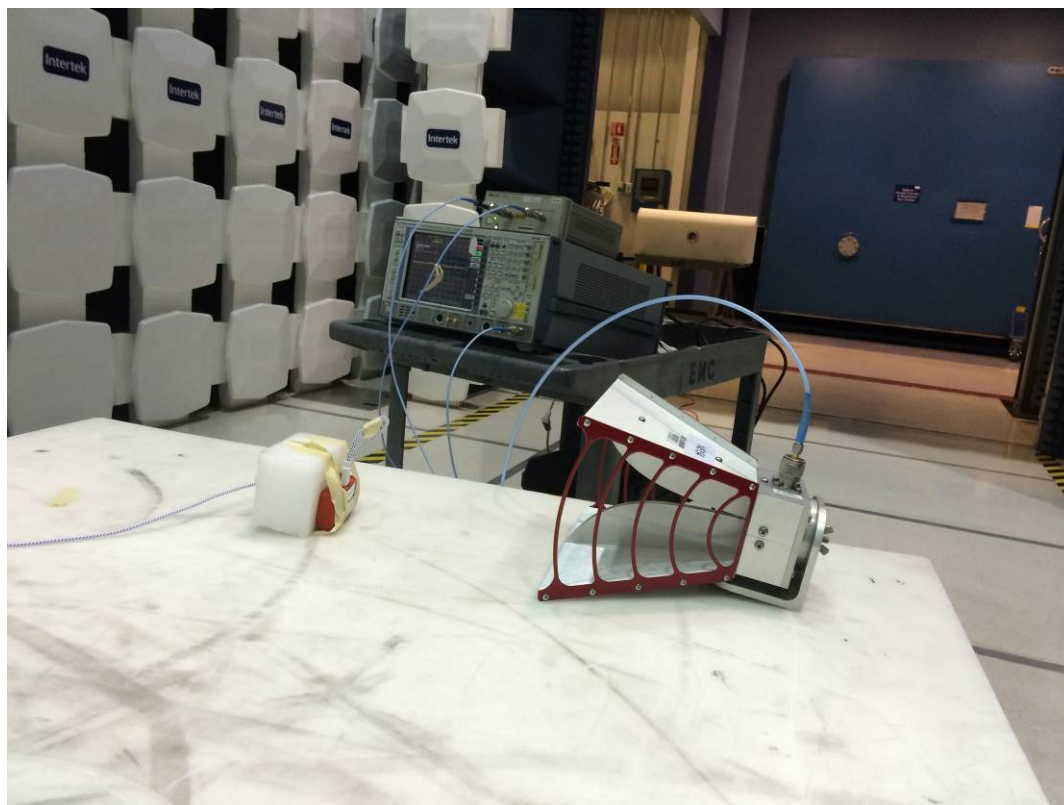
Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV002'	Weather Station	Davis Instruments	7400	PE80519A93	08/20/2013	08/20/2015
ROS001'	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	05/19/2014	05/19/2015
145-154'	ANTENNA, RIDGED GUIDE, 1-18 GHZ	EMCO	None	None	11/18/2014	11/18/2015
CBLHF2012-2M-1'	2m 40GHz Coaxial Cable	Huber & Suhner	SF102	252675001	01/14/2014	01/14/2015
CBLHF2012-2M-2'	2m 40GHz Coaxial Cable	Huber & Suhner	SF102	252675002	01/14/2014	01/14/2015
145003'	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	10/11/2014	10/11/2015

Software Utilized:

Name	Manufacturer	Version
None		

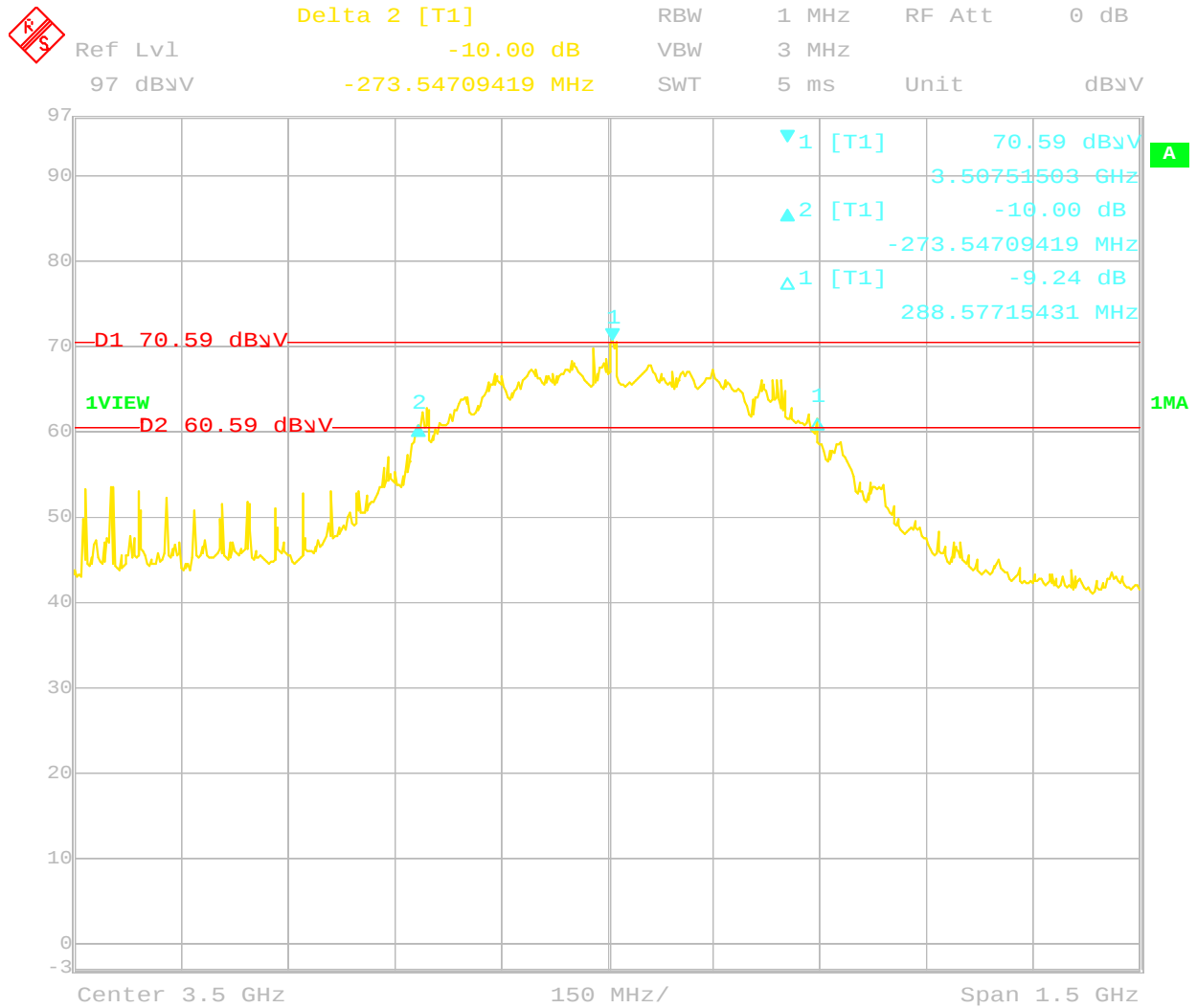
9.3 Results:

The sample tested was found to Comply.

9.4 Setup Photograph:

9.5 Plots/Data:

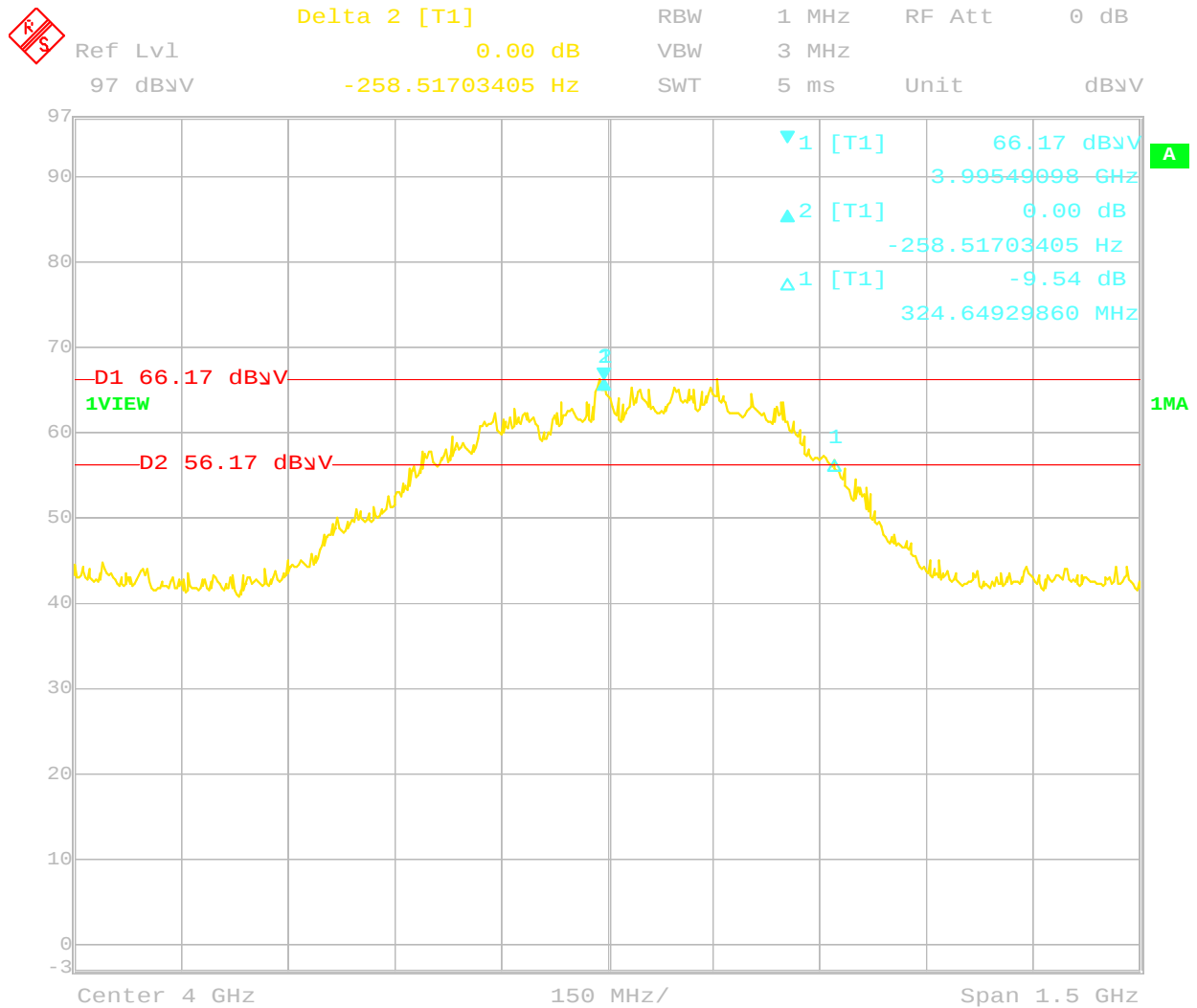
Channel 1



Date: 23.NOV.2014 20:10:06

Notes: The 10dB bandwidth measured is greater than 500MHz, therefore, the EUT met the Ultra-wideband (UWB) transmitter requirement.

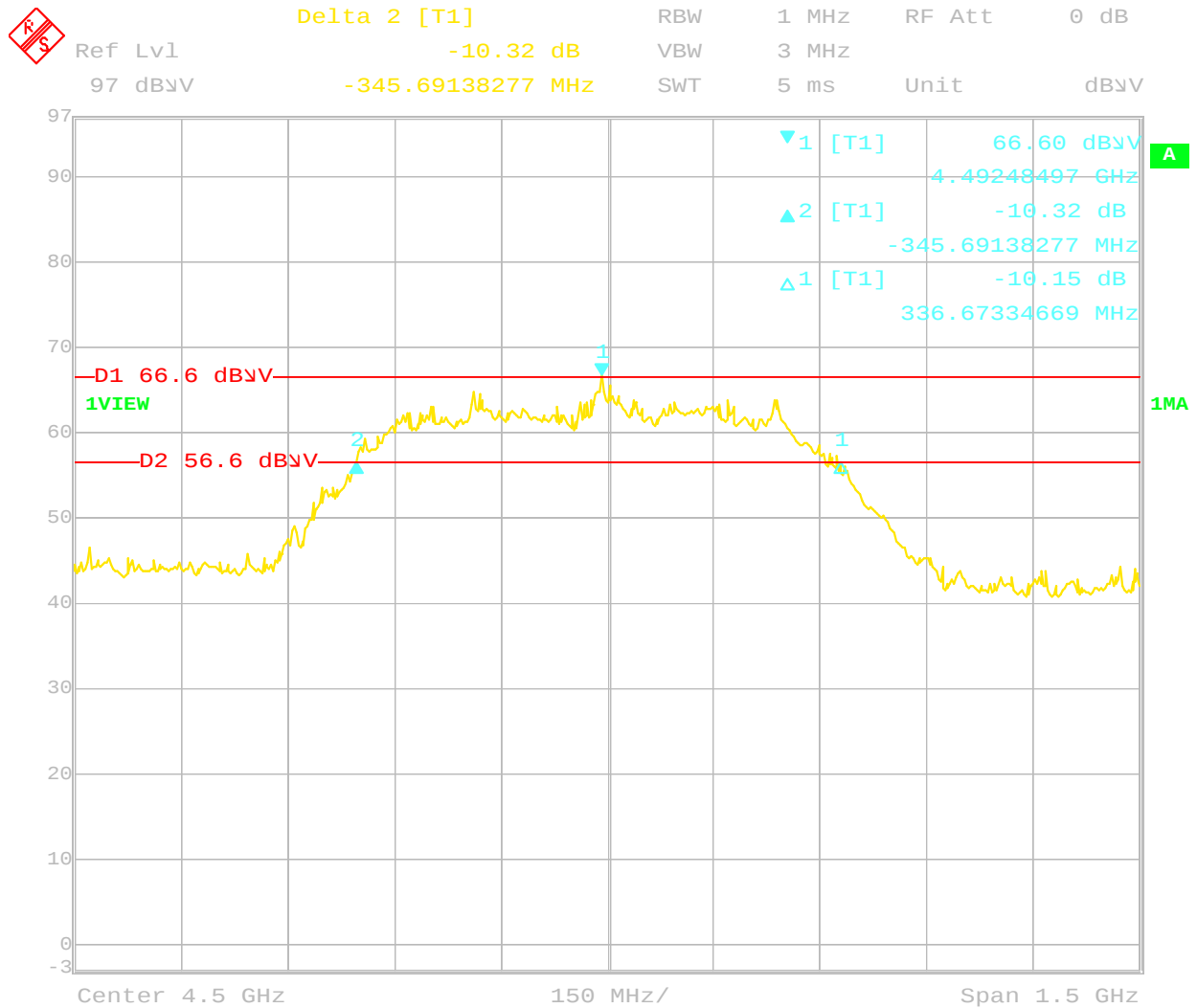
Channel 2



Date: 23.NOV.2014 20:06:18

Notes: The 10dB bandwidth measured is greater than 500MHz, therefore, the EUT met the Ultra-wideband (UWB) transmitter requirement.

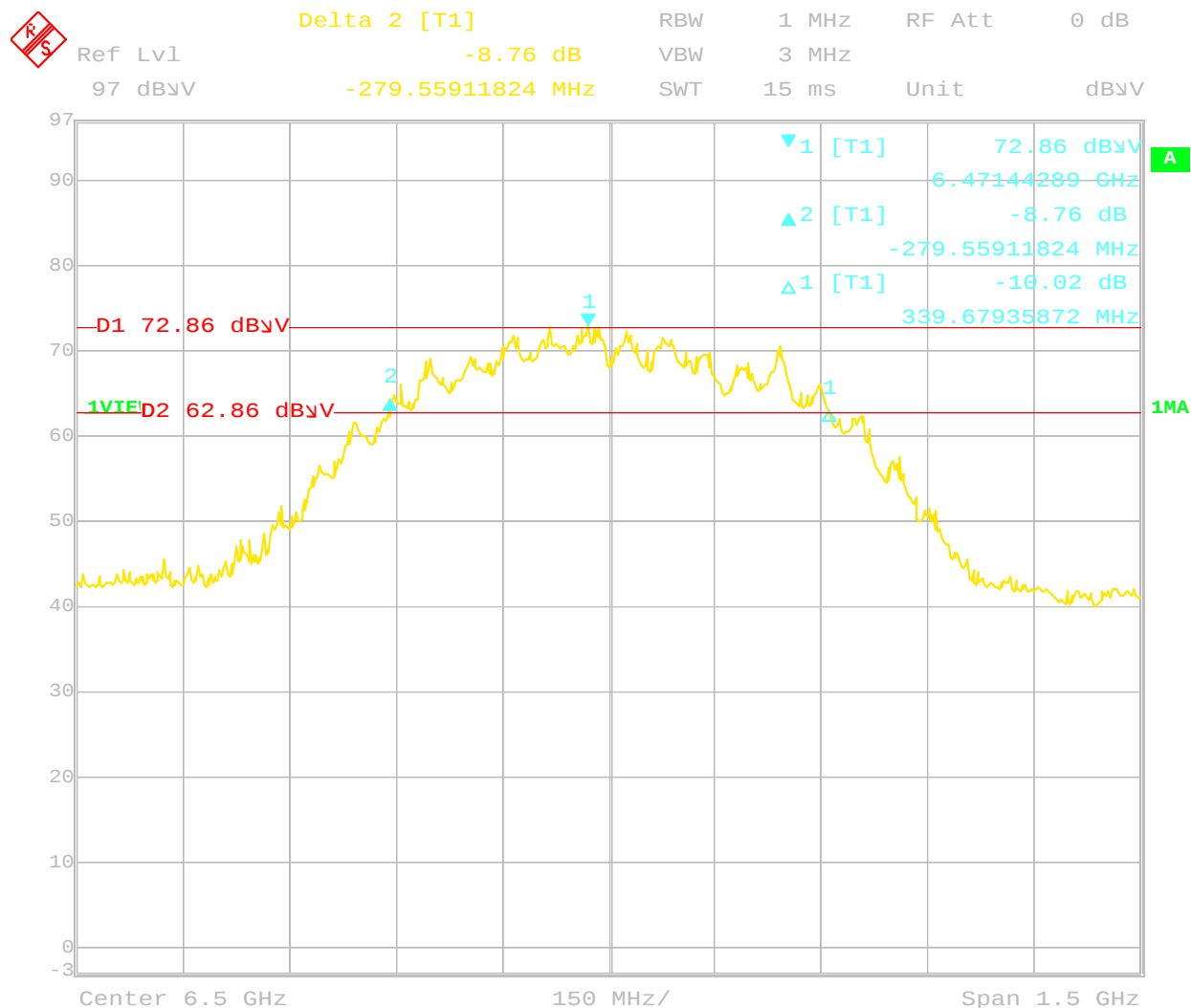
Channel 3



Date: 23.NOV.2014 20:16:23

Notes: The 10dB bandwidth measured is greater than 500MHz, therefore, the EUT met the Ultra-wideband (UWB) transmitter requirement.

Channel 5



Date: 23.NOV.2014 19:42:33

Notes: The 10dB bandwidth measured is greater than 500MHz, therefore, the EUT met the Ultra-wideband (UWB) transmitter requirement.

Test Personnel: Kouma Sinn *KPS*

Supervising/Reviewing Engineer: N/A

(Where Applicable) FCC Part 15 Subpart F

Product Standard: RSS-220

Input Voltage: Internal Battery Powered

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

Test Date: 11/23/2014

Limit Applied: FCC Part §15.503

Ambient Temperature: 20 °C

Relative Humidity: 21 %

Atmospheric Pressure: 1005 mbars

Deviations, Additions, or Exclusions: None

10 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	11/25/2014	101902246BOX-001	KPS <i>KPS</i>	VFV <i>VFV</i>	Original Issue