

EMISSIONS TEST REPORT

FULL COMPLIANCE

Report Number: 102479488BOX-004

Project Number: G102479488

Report Issue Date: 07/06/2016

Model(s) Tested: DD15

Model(s) Partially Tested: None

Standards: CFR47 FCC Part 15 Subpart C (15.247): 02/2016,
CFR47 FCC Part 15 Subpart B: 02/2016,
RSS-247 Issue 1: 05/2015,
ICES-003 Issue 6: 01/2016,
RSS-Gen Issue 4: 11/2014,
RSS-102 Issue 5: 03/2015,
KDB 558074 D01 DTS Meas Guidance v03r04: 01/2016

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

Client:
Honeywell International
1985 Douglas Dr N
Golden Valley, MN 55422-3992
USA

Report prepared by



Naga Suryadevara/EMC Engineer

Report reviewed by



Kouma Sinn / EMC Staff Engineer

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1 Introduction and Conclusion

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

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Section	Test full name	Result
3	Client Information	--
4	Description of Equipment Under Test and Variant Models	--
5	System Setup and Method	--
6	Transmitter radiated emissions (CFR47 FCC Part 15 Subpart C(2016), Section 15.247 (d) RSS247 Issue1: 05/2015)	Pass
7	6 dB Bandwidth and Occupied Bandwidth (CFR47 FCC Part 15 Subpart C (2016), Section 15.247 (a)(2) RSS-247 Issue1: 05/2015)	Pass
8	Maximum Peak Output Power and Human RF exposure (CFR47 FCC Part 15 Subpart C (2016), Section 15.247 (b)(3) RSS-247 Issue1: 05/2015 RSS-102 Issue 5: 03/2015)	Pass
9	Maximum Power Spectral Density (CFR47 FCC Part 15 Subpart C (2016), Section 15.247 (e) RSS-247 Issue1: 05/2015)	Pass
10	Band Edge Compliance (CFR47 FCC Part 15 Subpart C (2016), Section 15.247 (d) RSS-247 Issue1: 05/2015)	Pass
11	Digital Devices Radiated Spurious Emissions (FCC 47CFR Part 15 Subpart B (2016), ICES-003 Issue 6 January 2016)	Pass
12	AC Mains Conducted Emissions (FCC 47CFR Part 15 Subpart B (2016), ICES-003 Issue 6 January 2016)	Pass
13	Revision History	--

3 Client Information

This EUT was tested at the request of:

Client: Honeywell International
1985 Douglas Dr N
Golden Valley, MN 55422-3992
USA

Contact: Divya Venkat
Telephone: 763-954-4816
Fax: None
Email: divya.venkat@honeywell.com

4 Description of Equipment Under Test and Variant Models

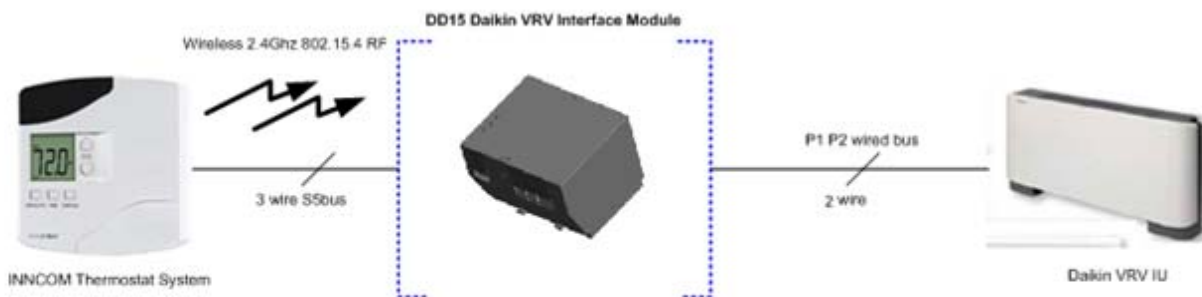
Manufacturer: Honeywell International
1985 Douglas Dr N
Golden Valley, MN 55422-3992
USA

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Interface Module	Honeywell International	DD15	BOX1602161428BOX-003*

Receive Date:	02/16/2016
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)

The DD15 unit will consist of a simple housing designed to mount inside the Daikin VRV unit. This product will contain 1 PWBA. This PWBA will contain the STM32F303 32-bit host micro to manage the INNCOM CBL32 firmware, S5bus wired communications and Deep Mesh RF wireless communications using the CC2520 2.4Ghz radio and CC2591 front-end amplifier for wireless 802.15.4 communication. The PWB will contain the Mitsumi 1192 programmed IC with HBS protocol for proprietary communication on the P1/P2 system bus towards the Daikin VRV.



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

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Transmit mode
2	Receive mode

Software used by the EUT:

No.	Descriptions of EUT Exercising
1	IMS Terminal

Radio/Receiver Characteristics	
Frequency Band(s)	2405-2480 MHz
Modulation Type(s)	DTS
Maximum Output Power	12.43 dBm
Test Channels	Channel – 11, 19, 26
Occupied Bandwidth	2.3646 MHz
Frequency Hopper: Number of Hopping Channels	NA
Frequency Hopper: Channel Dwell Time	NA
Frequency Hopper: Max interval between two instances of use of the same channel	NA
MIMO Information (# of Transmit and Receive antenna ports)	NA
Equipment Type	Standalone
ETSI LBT/Adaptivity	NA
ETSI Adaptivity Type	NA
ETSI Temperature Category (I, II, III)	NA
ETSI Receiver Category (1, 2, 3)	NA
Antenna Type and Gain	Integral

Variant Models:

The following variant models were not tested as part of this evaluation, but have been identified by the manufacturer as being electrically identical models, depopulated models, or with reasonable similarity to the model(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

None

5 System Setup and Method

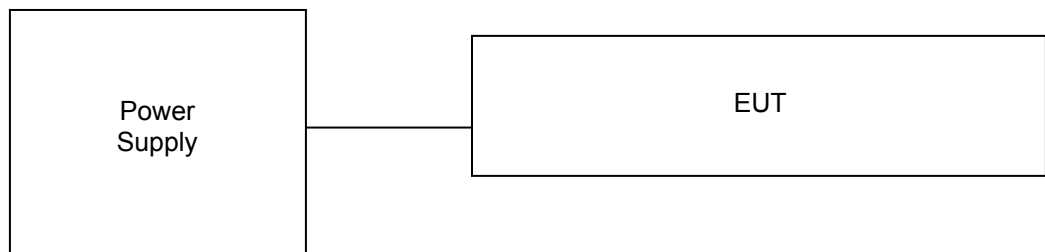
Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
1	Power Supply Cable	2	None	None	AC Mains
2	DC Cable	>3	None	None	Power supply

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
AD/DC Power Converter	Mean Well	DR-30-12	EB5239322

5.1 Method:

Configuration as required by CFR47 FCC Part 15 Subpart C (15.247): 02/2016, CFR47 FCC Part 15 Subpart B: 02/2016, RSS-247 Issue 1: 05/2015, ICES-003 Issue 6: 01/2016, RSS-Gen Issue 4: 11/2014 RSS-102 Issue 5: 03/2015, ANSI C63.4: 2014, ANSI C63.10:2013, and KDB 558074 D01 DTS Meas Guidance v03r04: 01/2016.

5.2 EUT Block Diagram:



6 Transmitter Radiated Spurious Emissions

6.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C (15.247), ANSI C63.4, ANSI C63.10, KDB558074, and RSS-247.

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 Db	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

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

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

Where

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

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

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

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

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

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

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

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

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

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

Example:

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

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

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:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004'	Weather Station	Davis Instruments	7400	PE80529A61A	10/23/2015	10/23/2017
145128'	EMI Receiver (20 Hz - 40 GHz)	Rohde & Schwarz	ESIB 40	839283/001	03/14/2015	03/14/2016
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	10/08/2015	10/08/2016
145013'	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2944A07027	10/12/2015	10/12/2016
145106'	Bilog Antenna (30MHz - 5GHz)	Sunol Sciences	JB5	A111003	11/10/2015	11/10/2016
145-410'	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	09/01/2015	09/01/2016
ETS002'	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	04/10/2015	04/10/2016
EMC04'	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	04/07/2015	04/07/2016
CBLHF2012 -2M-1'	2m 9kHz-40GHz Coaxial Cable - SET1	Huber & Suhner	SF102	252675001	02/09/2016	02/09/2017
CBLHF2012 -5M-1'	5m 9kHz-40GHz Coaxial Cable - SET 1	Huber & Suhner	SF102	252676001	02/09/2016	02/09/2017
145014'	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	05/13/2015	05/13/2016

Software Utilized:

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

6.3 Results:

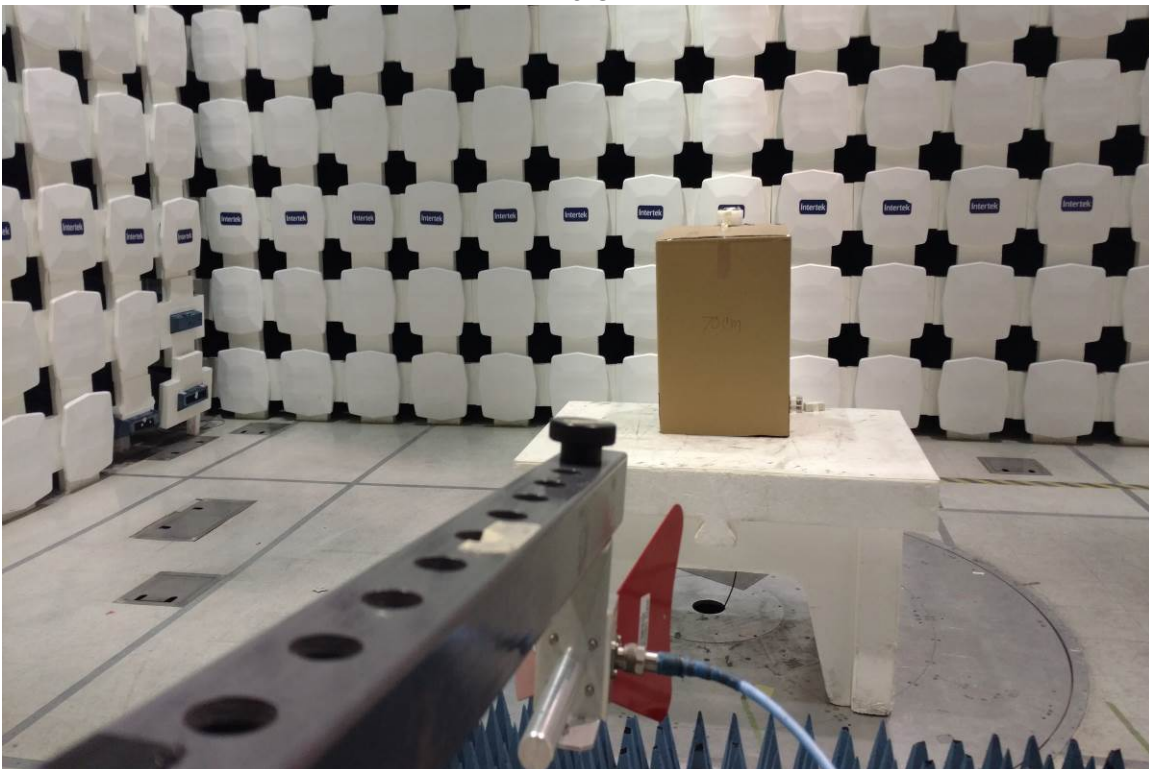
The sample tested was found to Comply.

6.4 Setup Photographs:

30 MHz – 1 GHz



1 – 18 GHz



18 – 25 GHz



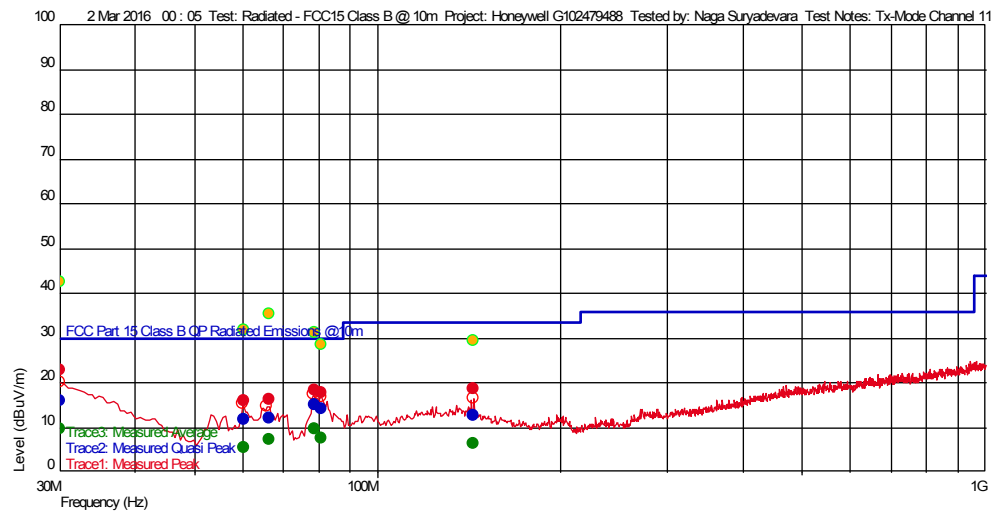
6.5 Plots/Data:

Transmit mode Channel-11, 30 MHz – 1 GHz

Test Information

Test Details	User Entry
Test:	Radiated - FCC15 Class B @ 10m
Project:	Honeywell G102479488
Test Notes:	Tx-Mode Channel 11
Temperature:	20 C
Humidity:	17% 999 mbars
Tested by:	Naga Suryadevara
Test Started:	2 Mar 2016 00 : 05

Prescan Emission Graph



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

Emissions Test Data

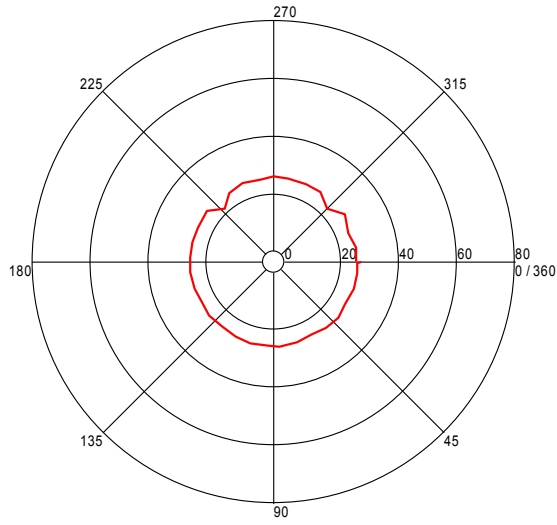
Trace2: Measured Quasi Peak

Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)
144.043086359 M	12.60	13.196	-26.092	33.520	-20.92		276	3.30	120 k
60.314629737 M	11.88	7.531	-27.392	30.000	-18.12		244	3.59	120 k
66.578356866 M	12.23	8.100	-27.236	30.000	-17.77		358	4.00	120 k
80.958917727 M	14.23	7.604	-26.876	30.000	-15.77		17	1.24	120 k
78.909017647 M	15.21	7.709	-26.927	30.000	-14.79		154	2.90	120 k
30.042084168 M	16.02	21.471	-28.059	30.000	-13.98		52	3.90	120 k

Azimuth Plots

Turntable Plot (30.042084168 MHz)

Level (dBuV/m)

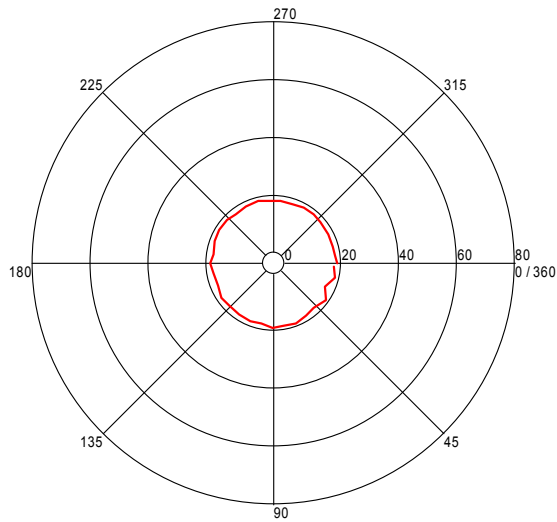


All Polarities

Azimuth (Degrees)

Turntable Plot (60.314629737 MHz)

Level (dBuV/m)

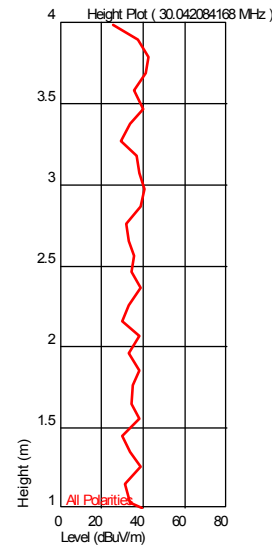


All Polarities

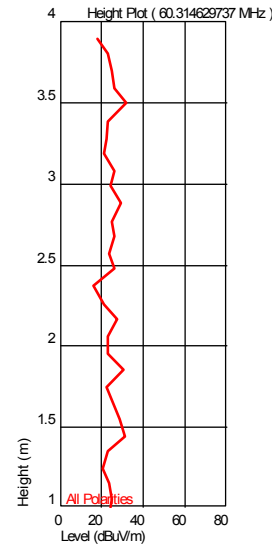
Azimuth (Degrees)

Turntable Plots

Height Plot (30.042084168 MHz)

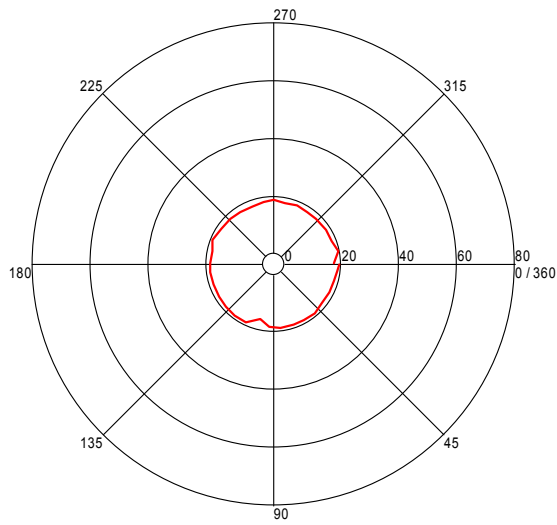


Height Plot (60.314629737 MHz)



Turntable Plot (66.578356866 MHz)

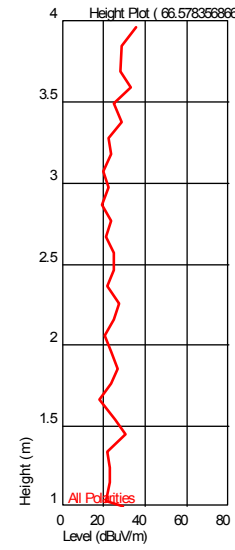
Level (dBuV/m)



All Polarities

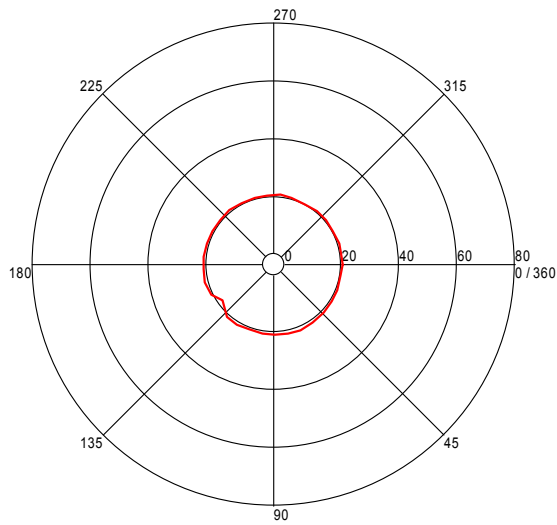
Azimuth (Degrees)

Height Plot (66.578356866 MHz)



Turntable Plot (78.909017647 MHz)

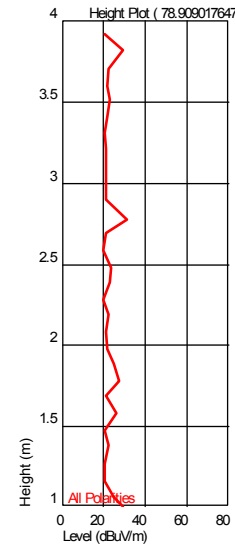
Level (dBuV/m)



All Polarities

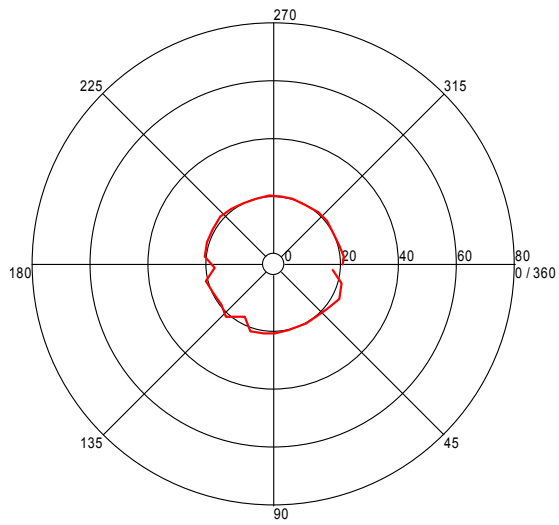
Azimuth (Degrees)

Height Plot (78.909017647 MHz)



Turntable Plot (80.958917727 MHz)

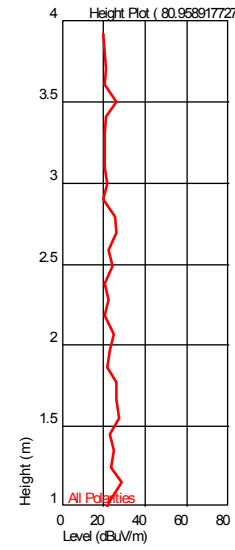
Level (dBuV/m)



All Polarities

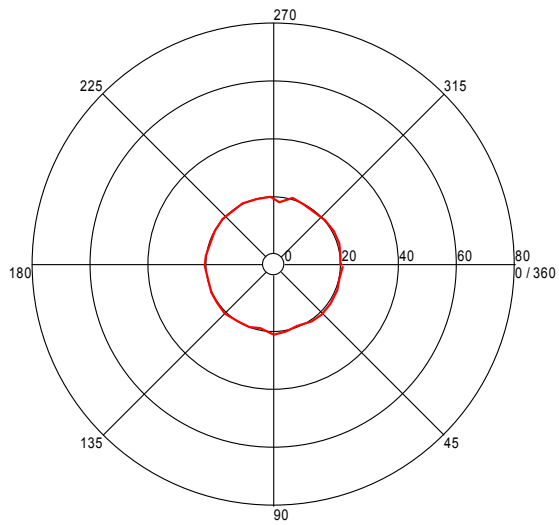
Azimuth (Degrees)

Height Plot (80.958917727 MHz)



Turntable Plot (144.043086359 MHz)

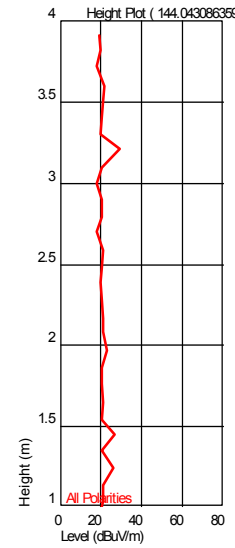
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (144.043086359 MHz)

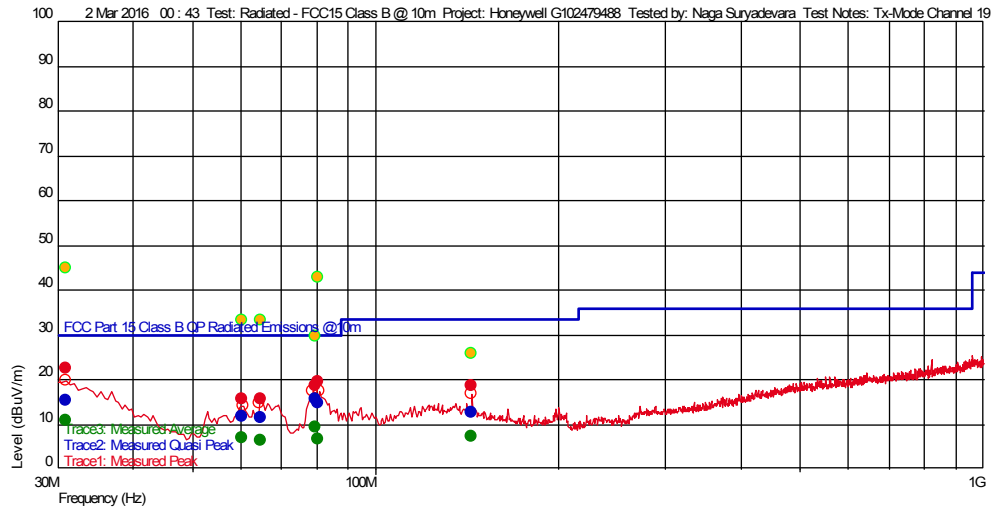


Transmit mode Channel-19, 30 MHz – 1 GHz

Test Information

Test Details	User Entry
Test:	Radiated - FCC15 Class B @ 10m
Project:	Honeywell G102479488
Test Notes:	Tx-Mode Channel 19
Temperature:	20 C
Humidity:	17% 999 mbars
Tested by:	Naga Suryadevara
Test Started:	2 Mar 2016 00 : 43

Prescan Emission Graph



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

Emissions Test Data

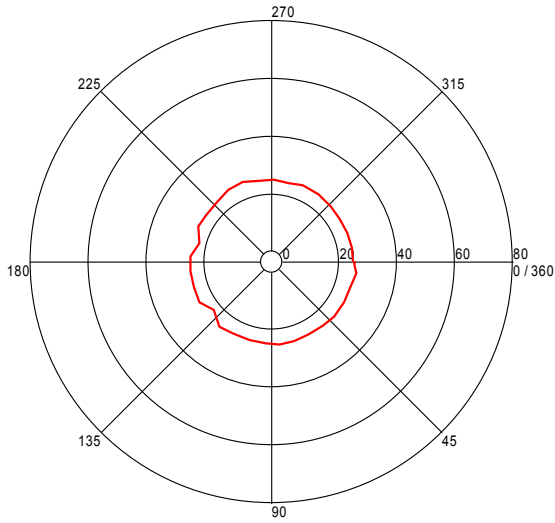
Trace2: Measured Quasi Peak

Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)
143.999799786 M	12.76	13.200	-26.092	33.520	-20.76		341	3.70	120 k
64.912024032 M	11.47	7.991	-27.277	30.000	-18.53		228	4.00	120 k
60.44629212 M	11.83	7.545	-27.389	30.000	-18.17		41	3.18	120 k
80.41462915 M	14.86	7.659	-26.890	30.000	-15.14		177	4.00	120 k
30.973547206 M	15.49	20.819	-28.040	30.000	-14.51		19	3.80	120 k
79.564929527 M	15.67	7.700	-26.911	30.000	-14.33		359	2.90	120 k

Azimuth Plots

Turntable Plot (30.973547206 MHz)

Level (dBuV/m)

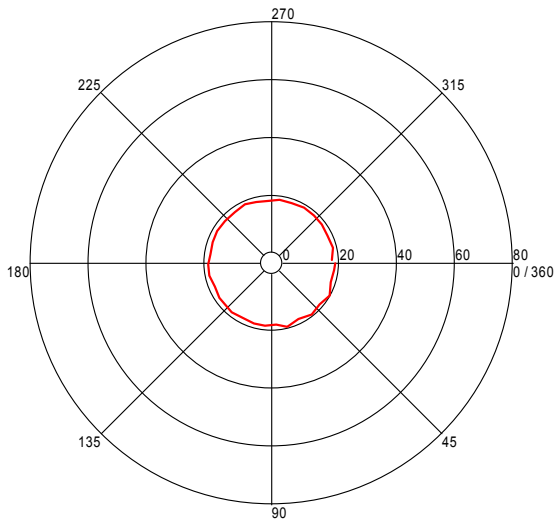


All Polarities

Azimuth (Degrees)

Turntable Plot (60.44629212 MHz)

Level (dBuV/m)

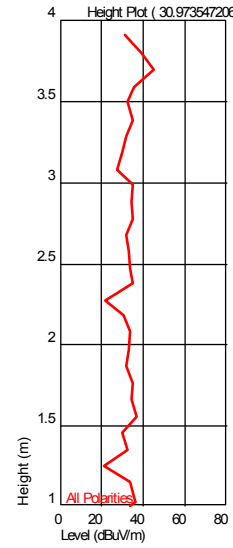


All Polarities

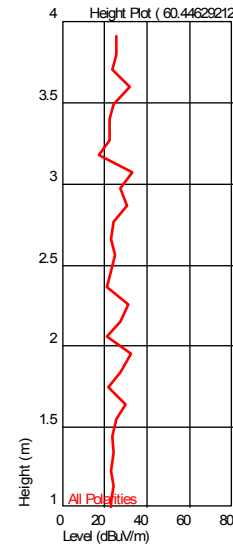
Azimuth (Degrees)

Turntable Plots

Height Plot (30.973547206 MHz)

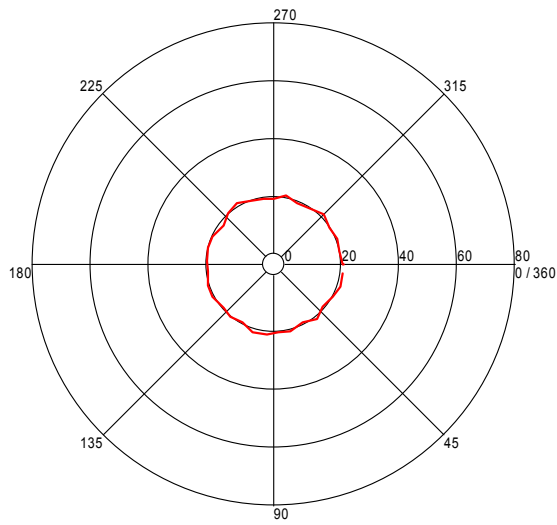


Height Plot (60.44629212 MHz)



Turntable Plot (64.912024032 MHz)

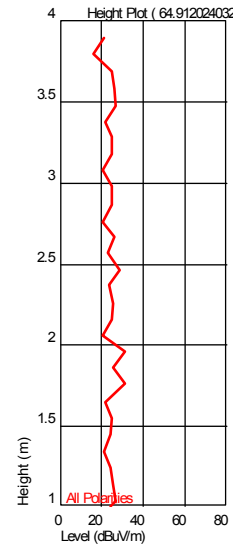
Level (dBuV/m)



All Polarities

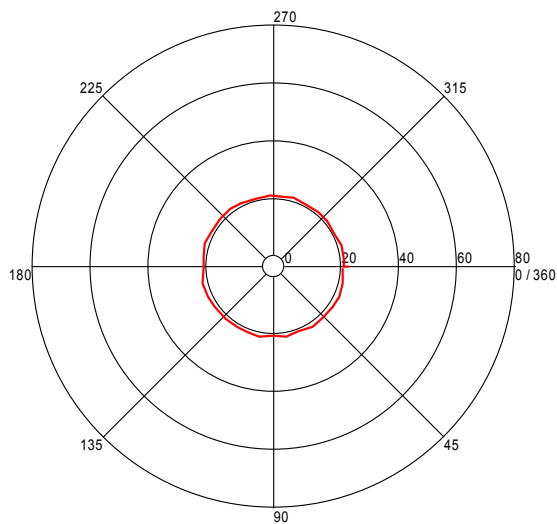
Azimuth (Degrees)

Height Plot (64.912024032 MHz)



Turntable Plot (79.564929527 MHz)

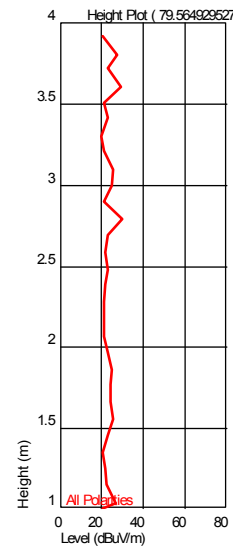
Level (dBuV/m)



All Polarities

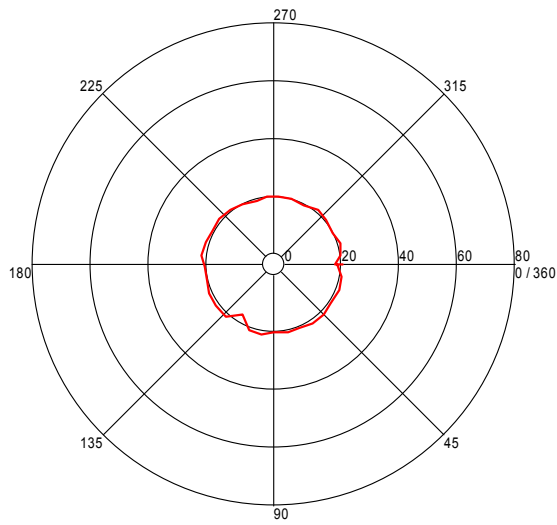
Azimuth (Degrees)

Height Plot (79.564929527 MHz)



Turntable Plot (80.41462915 MHz)

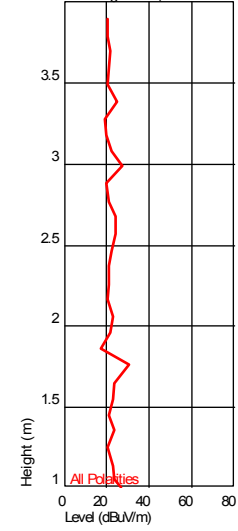
Level (dBuV/m)



All Polarities

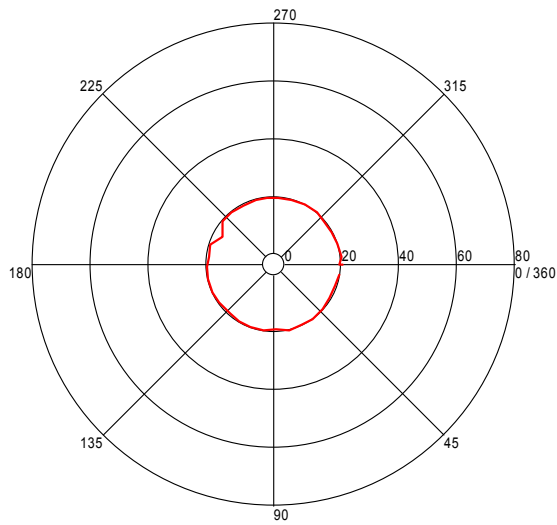
Azimuth (Degrees)

Height Plot (80.41462915 MHz)



Turntable Plot (143.999799786 MHz)

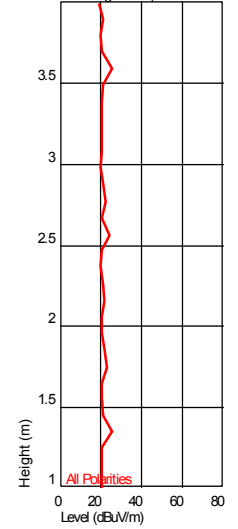
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (143.999799786 MHz)

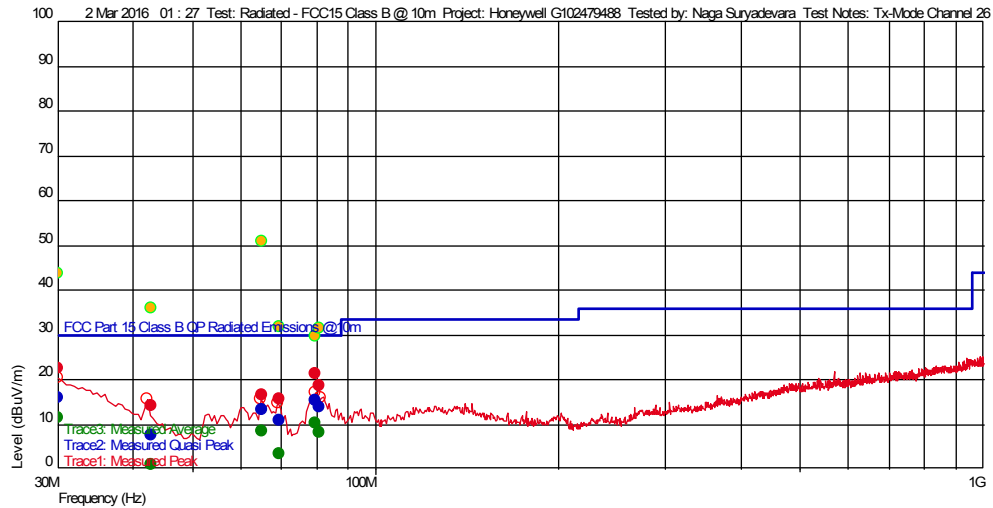


Transmit mode Channel-26, 30 MHz – 1 GHz

Test Information

Test Details	User Entry
Test:	Radiated - FCC15 Class B @ 10m
Project:	Honeywell G102479488
Test Notes:	Tx-Mode Channel 26
Temperature:	20 C
Humidity:	17% 999 mbars
Tested by:	Naga Suryadevara
Test Started:	2 Mar 2016 01 : 27

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

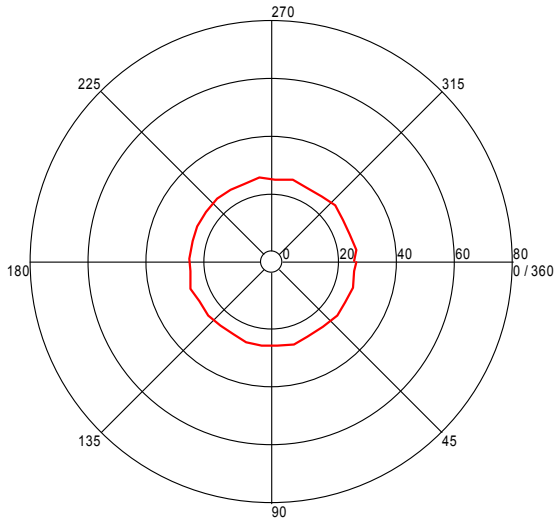
Trace2: Measured Quasi Peak

Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)
42.736072547 M	7.61	12.385	-27.799	30.000	-22.39		113	3.81	120 k
69.493586719 M	11.00	8.200	-27.163	30.000	-19.00		73	3.59	120 k
65.175951944 M	13.18	8.018	-27.271	30.000	-16.82		299	2.18	120 k
81.00801598 M	14.01	7.600	-26.875	30.000	-15.99		316	3.61	120 k
79.771142008 M	15.44	7.700	-26.906	30.000	-14.56		84	1.04	120 k
30.079759519 M	15.99	21.444	-28.058	30.000	-14.01		273	1.93	120 k

Azimuth Plots

Turntable Plot (30.079759519 MHz)

Level (dBuV/m)

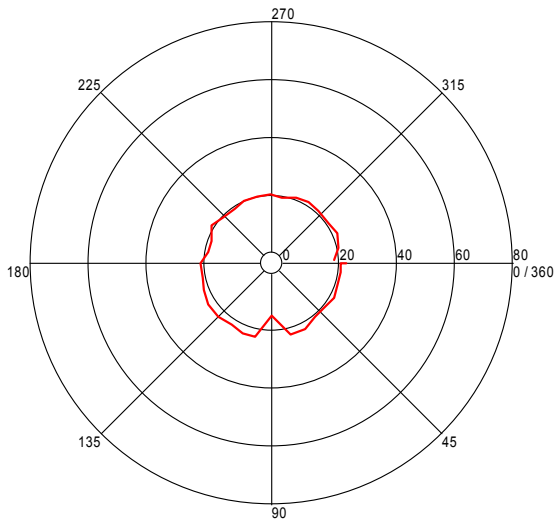


All Polarities

Azimuth (Degrees)

Turntable Plot (42.736072547 MHz)

Level (dBuV/m)

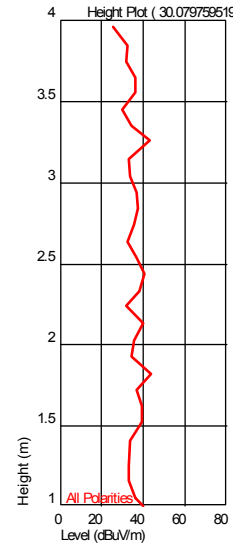


All Polarities

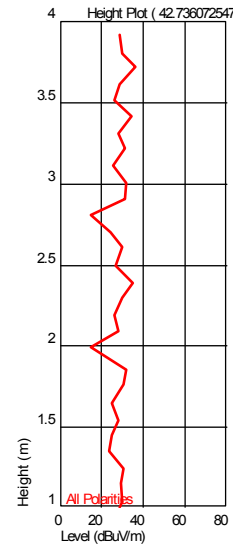
Azimuth (Degrees)

Turntable Plots

Height Plot (30.079759519 MHz)

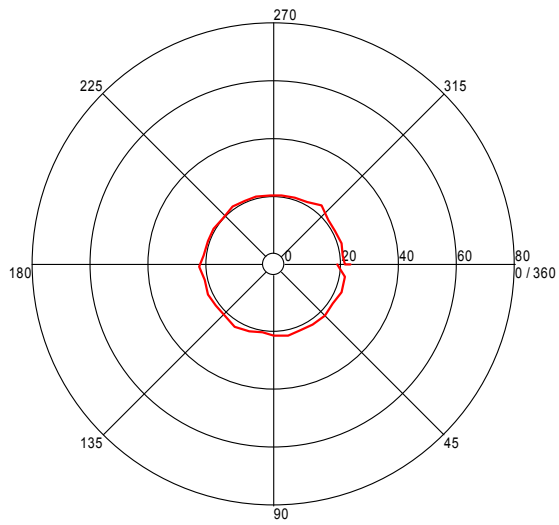


Height Plot (42.736072547 MHz)



Turntable Plot (65.175951944 MHz)

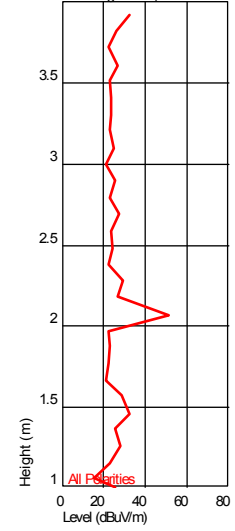
Level (dBuV/m)



All Polarities

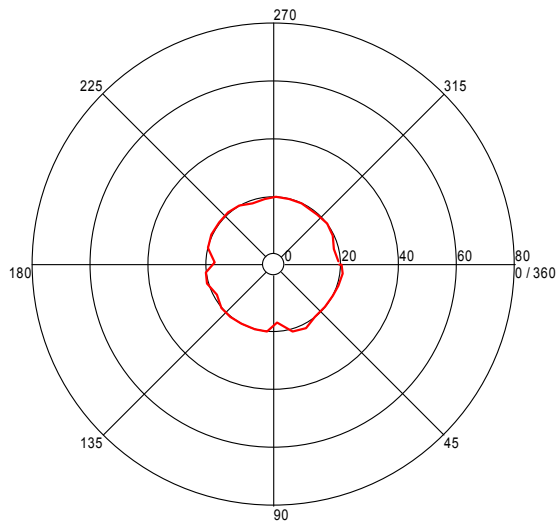
Azimuth (Degrees)

Height Plot (65.175951944 MHz)



Turntable Plot (69.493586719 MHz)

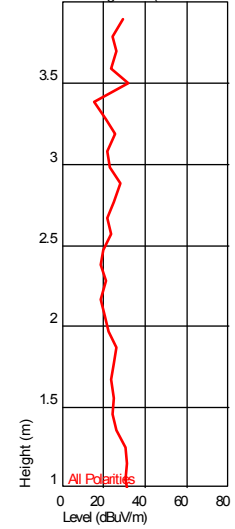
Level (dBuV/m)



All Polarities

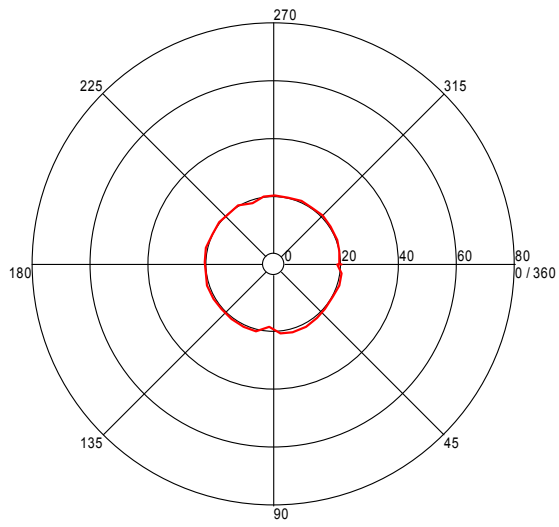
Azimuth (Degrees)

Height Plot (69.493586719 MHz)



Turntable Plot (79.771142008 MHz)

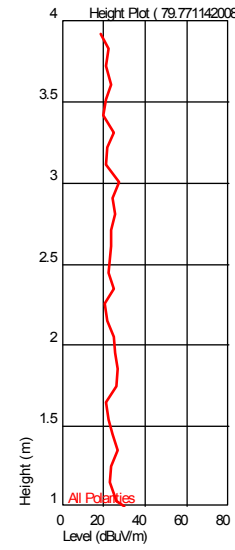
Level (dBuV/m)



All Polarities

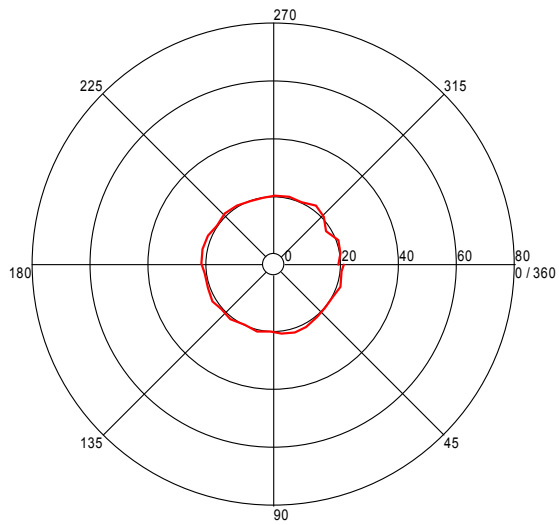
Azimuth (Degrees)

Height Plot (79.771142008 MHz)



Turntable Plot (81.00801598 MHz)

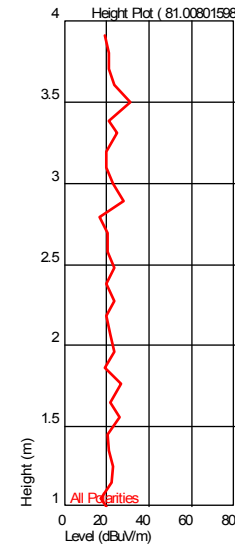
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (81.00801598 MHz)

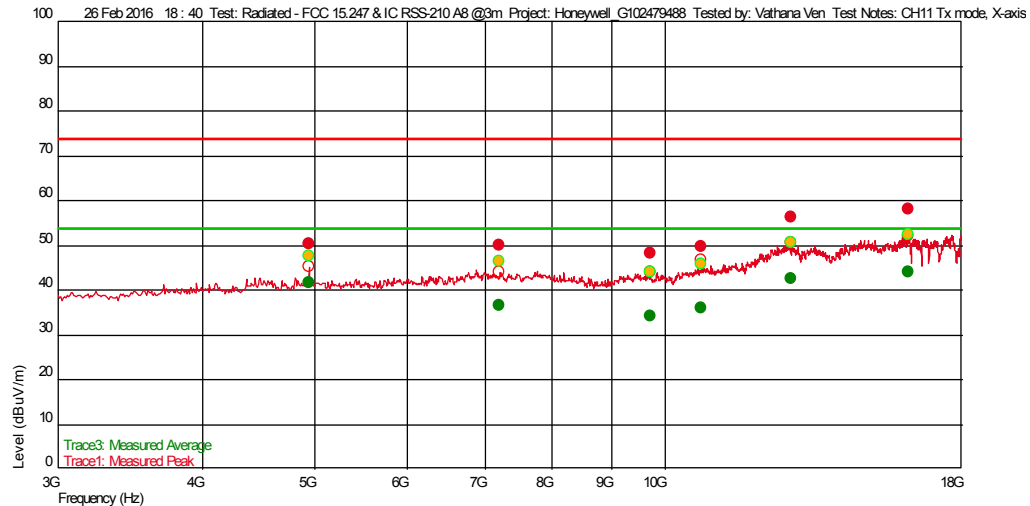


Transmit mode Channel-11, X-axis, 1 – 18 GHz

Test Information

Test Details	User Entry
Test:	Radiated - FCC 15.247 & IC RSS-247 @3m
Project:	Honeywell_G102479488
Test Notes:	CH11 Tx mode, X-axis
Temperature:	20 deg C
Humidity:	17%, 1001 mB
Tested by:	Vathana Ven
Test Started:	26 Feb 2016 18 : 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)
9.715758183 G	48.18	36.826	-30.968	74.000	-25.82		172	2.06	1 M
10.754662659 G	49.59	37.799	-29.568	74.000	-24.41	--	331	2.09	1 M
7.213366734 G	49.94	35.640	-29.565	74.000	-24.06		139	1.71	1 M
4.93989312 G	50.25	34.036	-29.726	74.000	-23.75	--	341	1.09	1 M
12.848236473 G	56.26	39.173	-25.346	74.000	-17.74	--	19	1.67	1 M
16.202244489 G	58.04	40.801	-25.330	74.000	-15.96		356	4.01	1 M

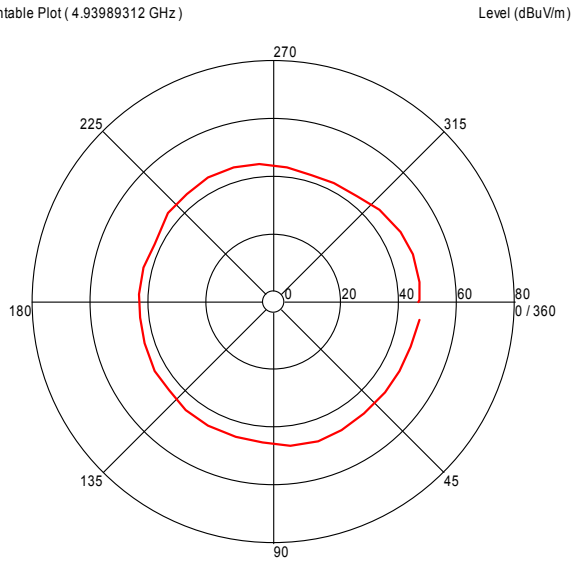
Trace3: Measured Average

Frequency (Hz)	Level (dBuV/m)	AF	PA+CL	Limit (dBuV/m)	Margin (dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)
9.715758183 G	34.27	36.826	-30.968	54.000	-19.73		172	2.06	1 M
10.754662659 G	36.11	37.799	-29.568	54.000	-17.89	--	331	2.09	1 M
7.213366734 G	36.50	35.640	-29.565	54.000	-17.50		139	1.71	1 M
4.93989312 G	41.67	34.036	-29.726	54.000	-12.33	--	341	1.09	1 M
12.848236473 G	42.58	39.173	-25.346	54.000	-11.42	--	19	1.67	1 M
16.202244489 G	43.89	40.801	-25.330	54.000	-10.11		356	4.01	1 M

Note: Manual scan was done from 1-3 GHz. No emissions were detected above the measuring noise floor.

Azimuth Plots

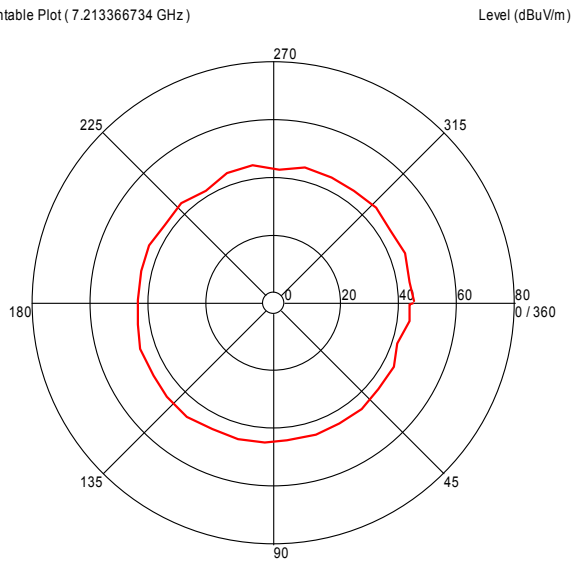
Turntable Plot (4.93989312 GHz)



All Polarities

Azimuth (Degrees)

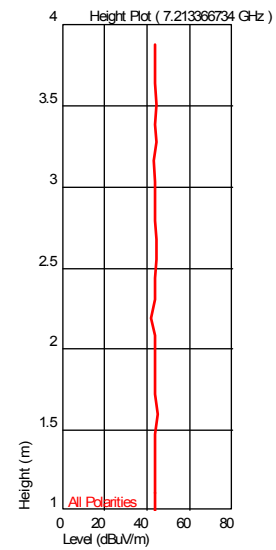
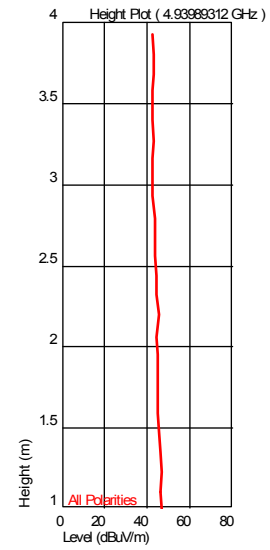
Turntable Plot (7.213366734 GHz)



All Polarities

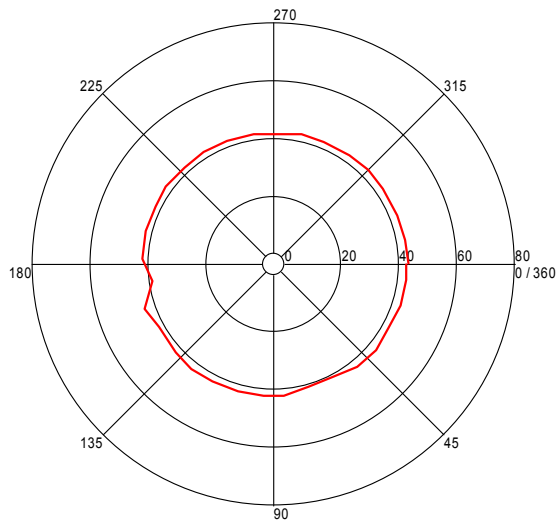
Azimuth (Degrees)

Turntable Plots



Turntable Plot (9.715758183 GHz)

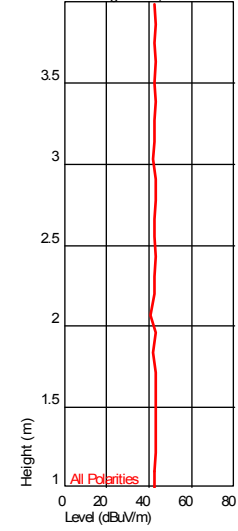
Level (dBuV/m)



All Polarities

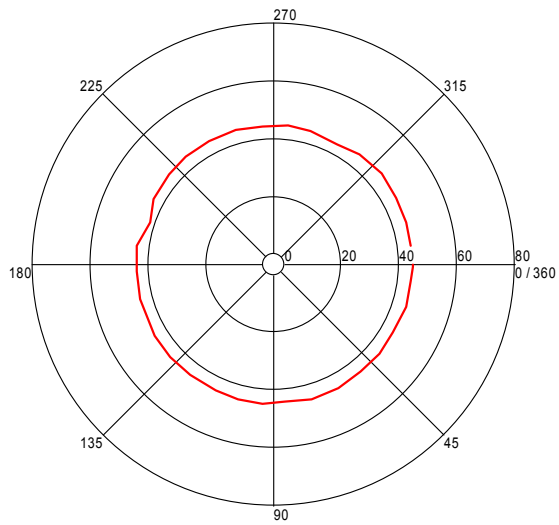
Azimuth (Degrees)

Height Plot (9.715758183 GHz)



Turntable Plot (10.754662659 GHz)

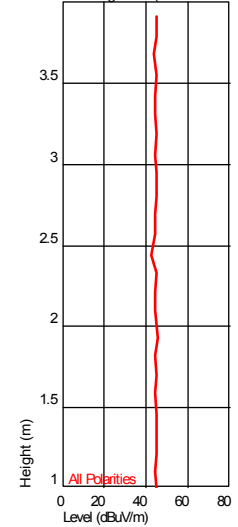
Level (dBuV/m)



All Polarities

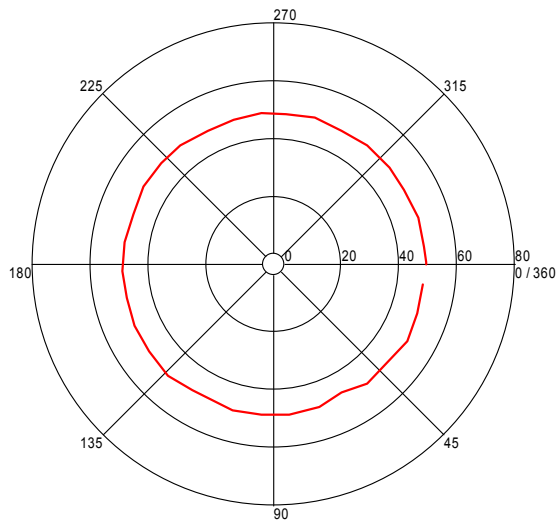
Azimuth (Degrees)

Height Plot (10.754662659 GHz)



Turntable Plot (12.848236473 GHz)

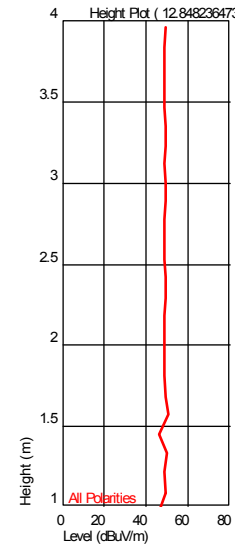
Level (dBuV/m)



All Polarities

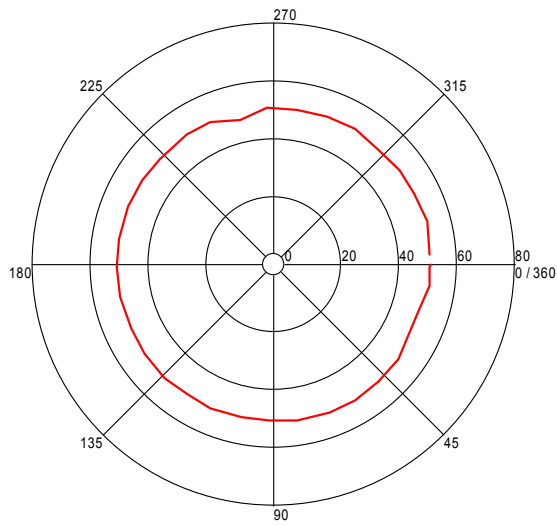
Azimuth (Degrees)

Height Plot (12.848236473 GHz)



Turntable Plot (16.202244489 GHz)

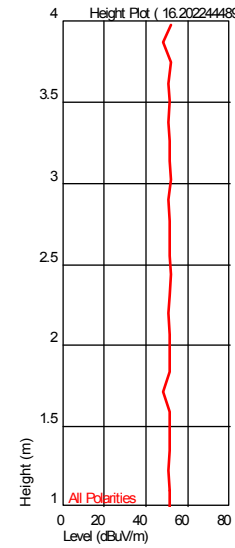
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (16.202244489 GHz)

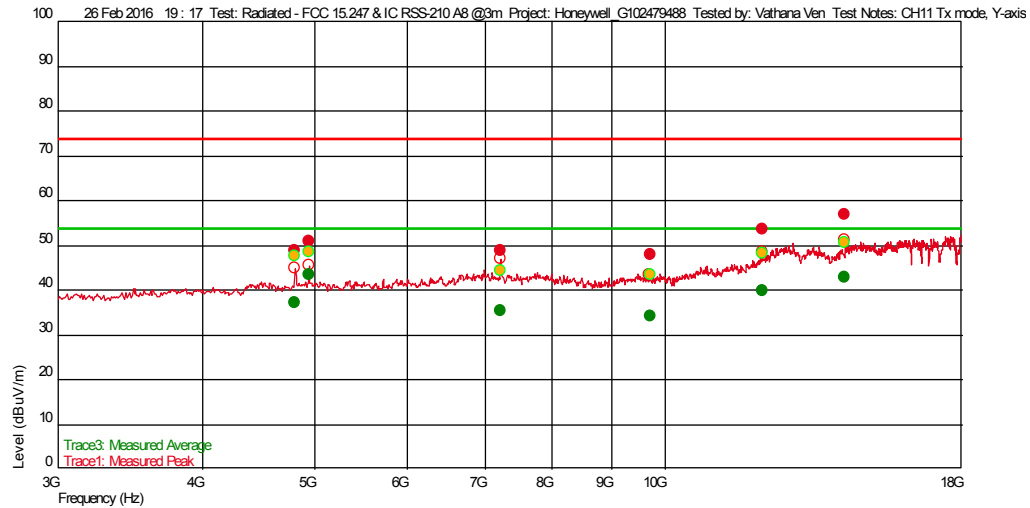


Transmit mode Channel-11, Y-axis, 1 – 18 GHz

Test Information

Test Details	User Entry	Additional Information
Test:	Radiated - FCC 15.247 & IC RSS-247 @3m	
Project:	Honeywell_G102479488	
Test Notes:	CH11 Tx mode, Y-axis	
Temperature:	20 deg C	
Humidity:	17%, 1001 mB	
Tested by:	Vathana Ven	
Test Started:	26 Feb 2016 19:17	

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)
9.714301937 G	48.04	36.825	-30.967	74.000	-25.96		50	2.32	1 M
4.809819639 G	48.80	34.015	-29.912	74.000	-25.20	—	360	3.27	1 M
7.224048096 G	48.90	35.639	-29.575	74.000	-25.10		276	2.99	1 M
4.940093521 G	51.04	34.036	-29.726	74.000	-22.96	—	320	1.08	1 M
12.132070808 G	53.70	38.880	-27.215	74.000	-20.30		264	2.70	1 M
14.298991315 G	56.80	38.968	-24.599	74.000	-17.20		50	1.94	1 M

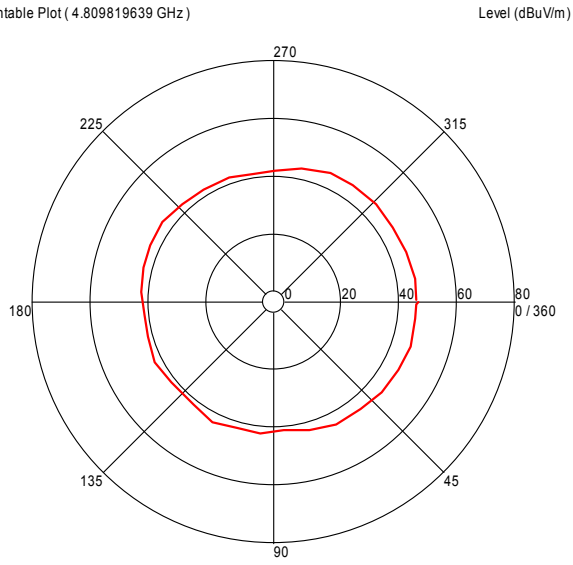
Trace3: Measured Average

Frequency (Hz)	Level (dBuV/m)	AF	PA+CL	Limit (dBuV/m)	Margin (dBuV/m)	Hor (—), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)
9.714301937 G	34.10	36.825	-30.967	54.000	-19.90		50	2.32	1 M
7.224048096 G	35.31	35.639	-29.575	54.000	-18.69		276	2.99	1 M
4.809819639 G	37.13	34.015	-29.912	54.000	-16.87	—	360	3.27	1 M
12.132070808 G	39.90	38.880	-27.215	54.000	-14.10		264	2.70	1 M
14.298991315 G	42.96	38.968	-24.599	54.000	-11.04		50	1.94	1 M
4.940093521 G	43.56	34.036	-29.726	54.000	-10.44	—	320	1.08	1 M

Note: Manual scan was done from 1-3 GHz. No emissions were detected above the measuring noise floor.

Azimuth Plots

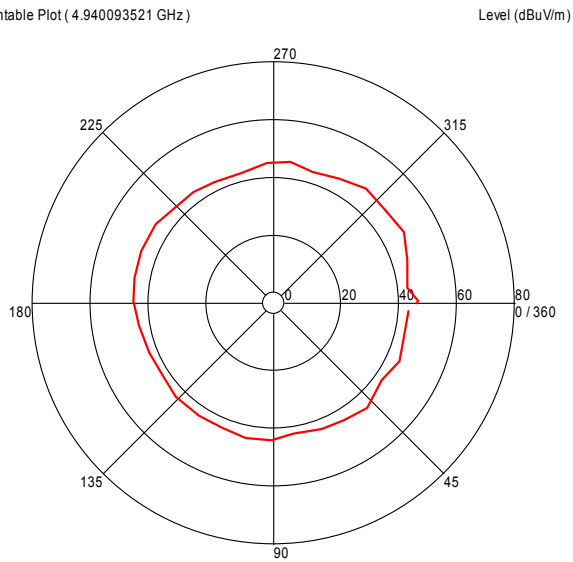
Turntable Plot (4.809819639 GHz)



All Polarities

Azimuth (Degrees)

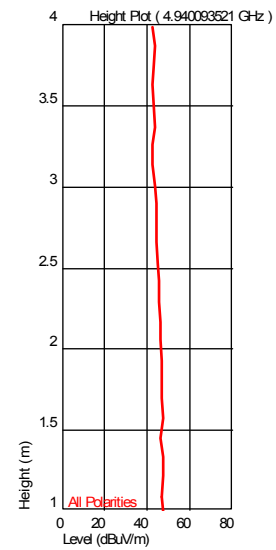
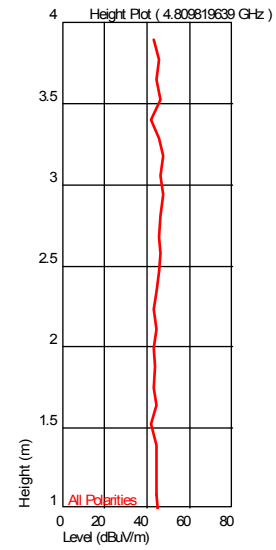
Turntable Plot (4.940093521 GHz)



All Polarities

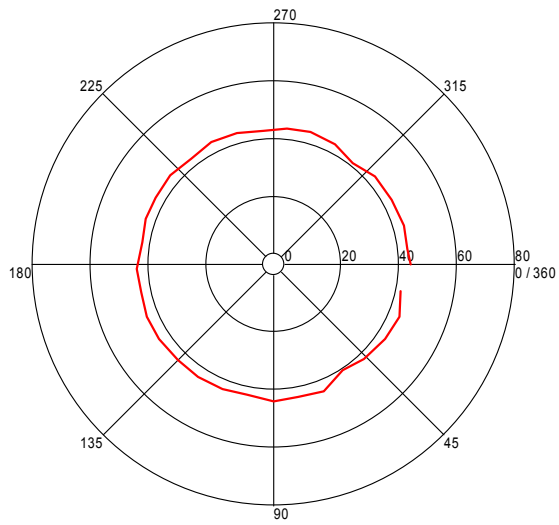
Azimuth (Degrees)

Turntable Plots



Turntable Plot (7.224048096 GHz)

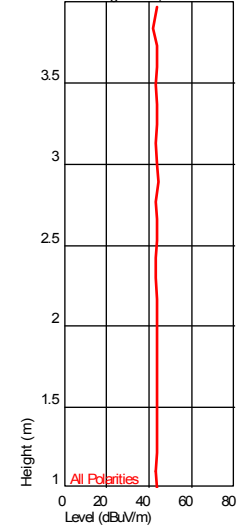
Level (dBuV/m)



All Polarities

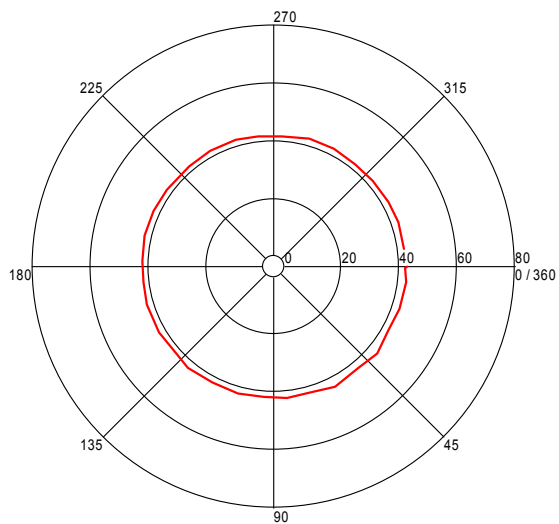
Azimuth (Degrees)

Height Plot (7.224048096 GHz)



Turntable Plot (9.714301937 GHz)

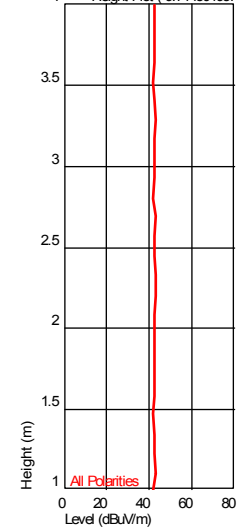
Level (dBuV/m)



All Polarities

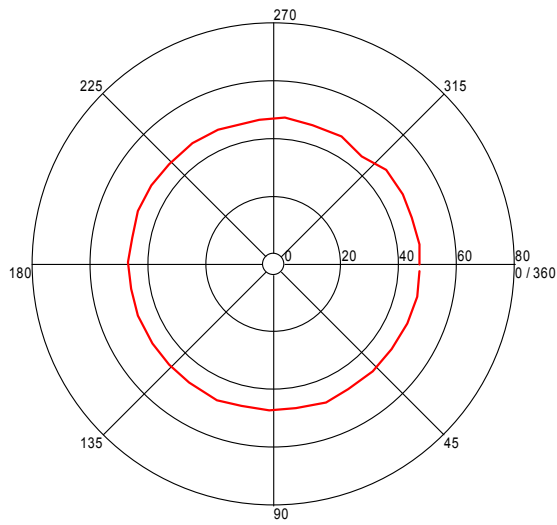
Azimuth (Degrees)

Height Plot (9.714301937 GHz)



Turntable Plot (12.132070808 GHz)

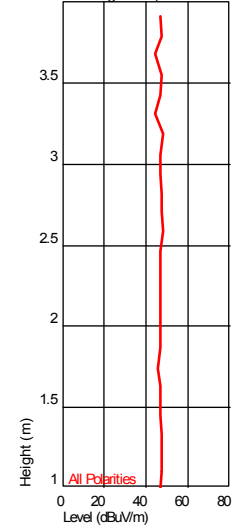
Level (dBuV/m)



All Polarities

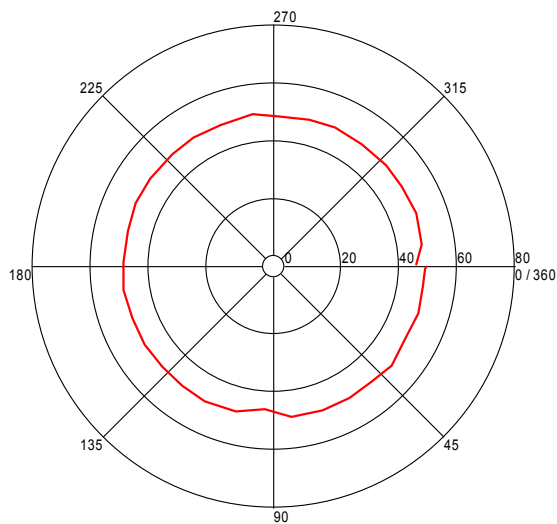
Azimuth (Degrees)

Height Plot (12.132070808 GHz)



Turntable Plot (14.298991315 GHz)

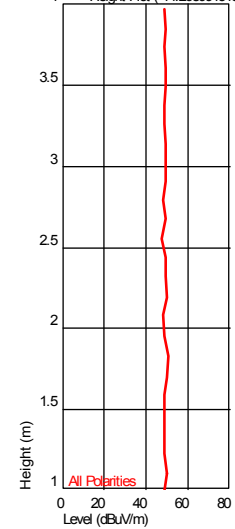
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (14.298991315 GHz)

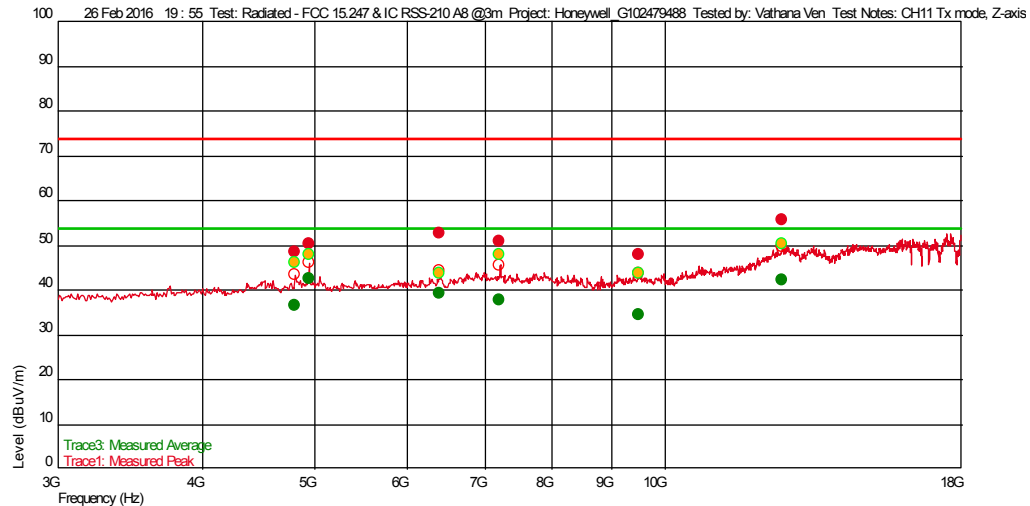


Transmit mode Channel-11, Z-axis, 1 – 18 GHz

Test Information

Test Details	User Entry
Test:	Radiated - FCC 15.247 & IC RSS-247 @3m
Project:	Honeywell_G102479488
Test Notes:	CH11 Tx mode, Z-axis
Temperature:	20 deg C
Humidity:	17%, 1001 mB
Tested by:	Vathana Ven
Test Started:	26 Feb 2016 19 : 55

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)
9.496138945 G	48.03	36.488	-30.889	74.000	-25.97		97	1.70	1 M
4.809953239 G	48.37	34.015	-29.912	74.000	-25.63		18	3.14	1 M
4.940227121 G	50.25	34.037	-29.725	74.000	-23.75	--	320	1.32	1 M
7.213446894 G	50.77	35.640	-29.565	74.000	-23.23	--	168	1.33	1 M
6.40254509 G	52.77	35.484	-30.113	74.000	-21.23	--	223	1.93	1 M
12.628089512 G	55.69	39.182	-25.921	74.000	-18.31		360	2.47	1 M

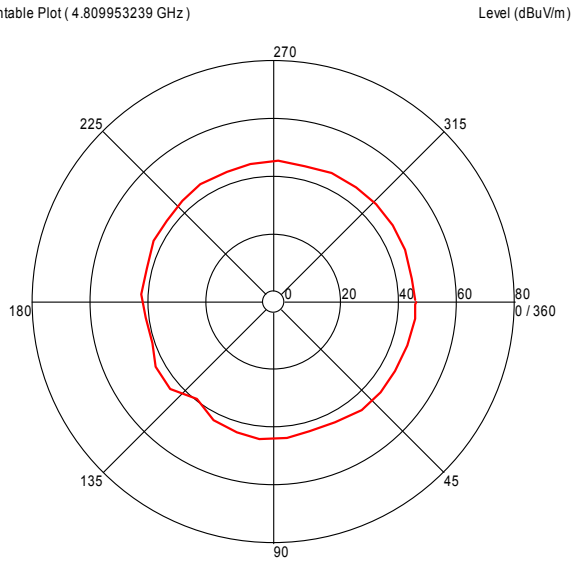
Trace3: Measured Average

Frequency (Hz)	Level (dBuV/m)	AF	PA+CL	Limit (dBuV/m)	Margin (dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)
9.496138945 G	34.35	36.488	-30.889	54.000	-19.65		97	1.70	1 M
4.809953239 G	36.60	34.015	-29.912	54.000	-17.40		18	3.14	1 M
7.213446894 G	37.66	35.640	-29.565	54.000	-16.34	--	168	1.33	1 M
6.40254509 G	39.27	35.484	-30.113	54.000	-14.73	--	223	1.93	1 M
12.628089512 G	42.18	39.182	-25.921	54.000	-11.82		360	2.47	1 M
4.940227121 G	42.66	34.037	-29.725	54.000	-11.34	--	320	1.32	1 M

Note: Manual scan was done from 1-3 GHz. No emissions were detected above the measuring noise floor.

Azimuth Plots

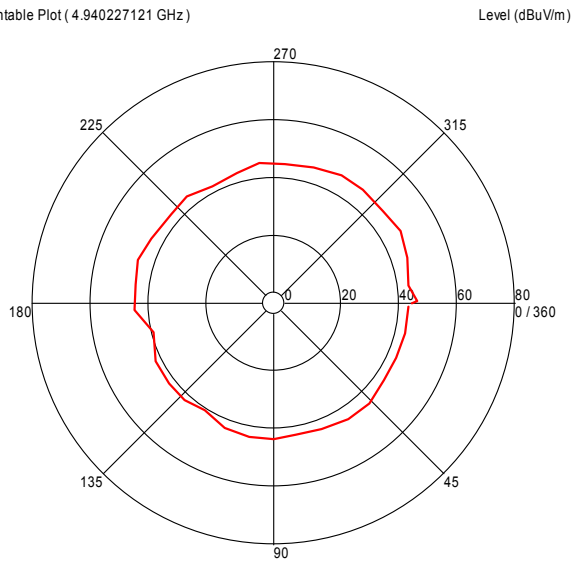
Turntable Plot (4.809953239 GHz)



All Polarities

Azimuth (Degrees)

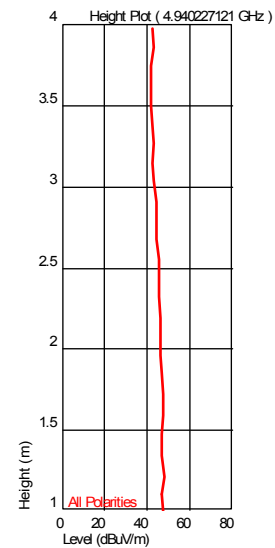
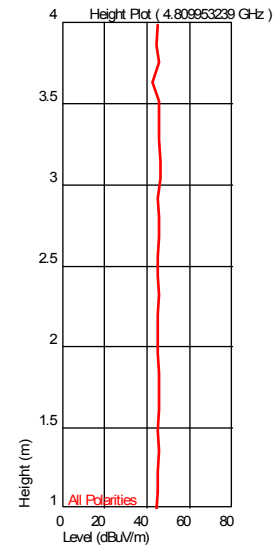
Turntable Plot (4.940227121 GHz)



All Polarities

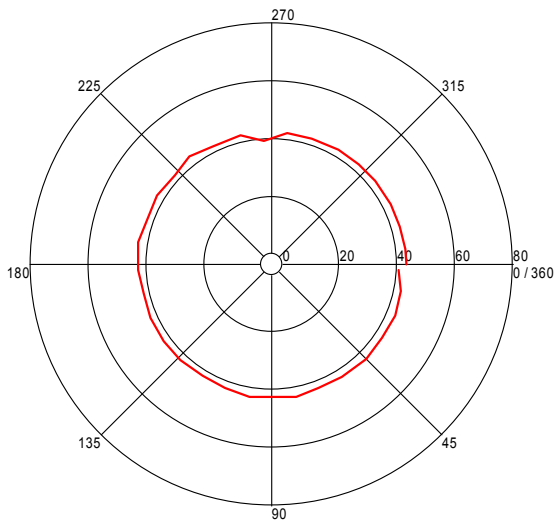
Azimuth (Degrees)

Turntable Plots



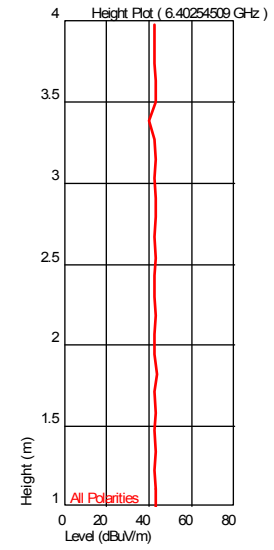
Turntable Plot (6.40254509 GHz)

Level (dBuV/m)



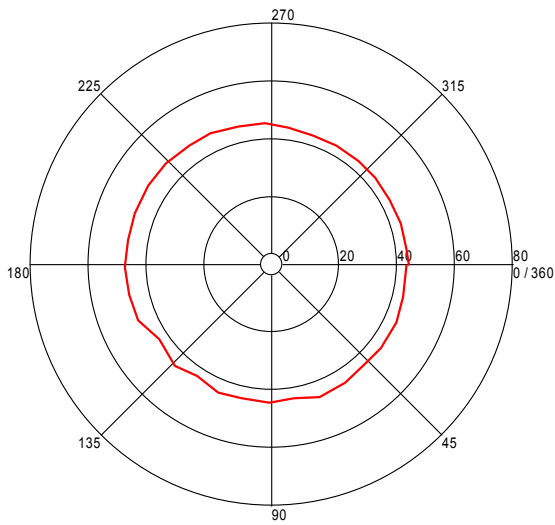
All Polarities

Azimuth (Degrees)



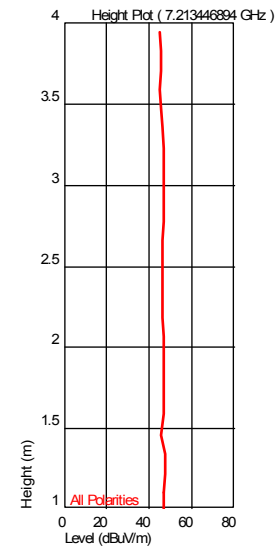
Turntable Plot (7.213446894 GHz)

Level (dBuV/m)



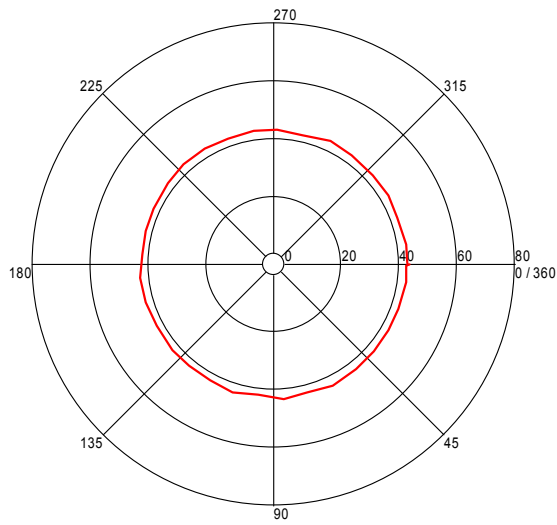
All Polarities

Azimuth (Degrees)



Turntable Plot (9.496138945 GHz)

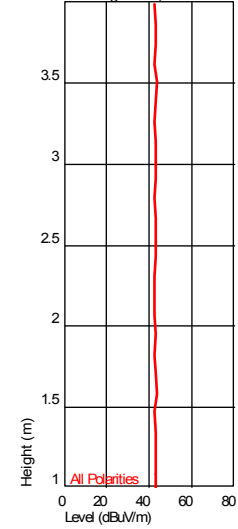
Level (dBuV/m)



All Polarities

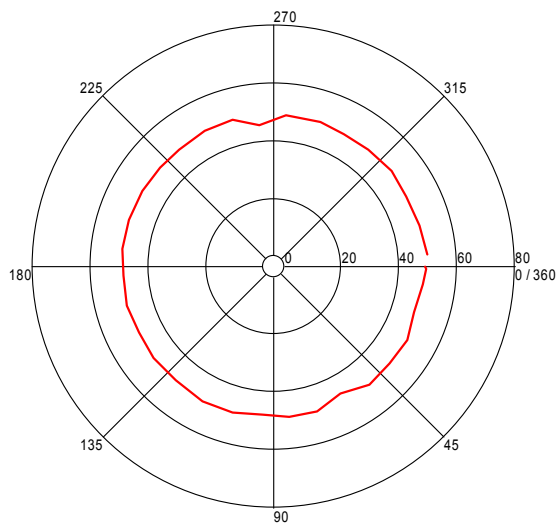
Azimuth (Degrees)

Height Plot (9.496138945 GHz)



Turntable Plot (12.628089512 GHz)

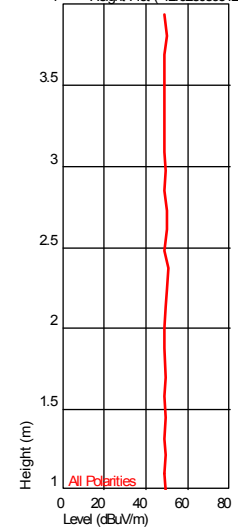
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (12.628089512 GHz)

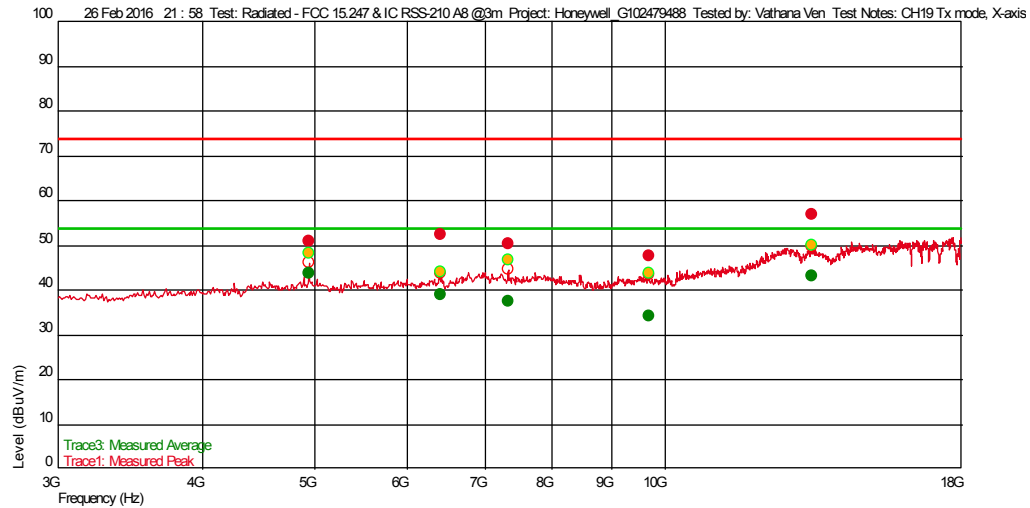


Transmit mode Channel-19, X-axis, 1 – 18 GHz

Test Information

Test Details	User Entry
Test:	Radiated - FCC 15.247 & IC RSS-247 @3m
Project:	Honeywell_G102479488
Test Notes:	CH19 Tx mode, X-axis
Temperature:	20 deg C
Humidity:	17%, 1001 mB
Tested by:	Vathana Ven
Test Started:	26 Feb 2016 21 : 58

Prescan Emission Graph



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

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)
9.698009353 G	47.64	36.815	-30.961	74.000	-26.36		143	2.70	1 M
7.333647295 G	50.37	35.646	-29.680	74.000	-23.63		149	2.92	1 M
4.940113561 G	50.92	34.036	-29.726	74.000	-23.08	--	319	1.58	1 M
6.420293921 G	52.53	35.499	-30.090	74.000	-21.47		74	3.50	1 M
13.404021376 G	56.79	39.163	-24.805	74.000	-17.21	--	238	4.01	1 M

Trace3: Measured Average

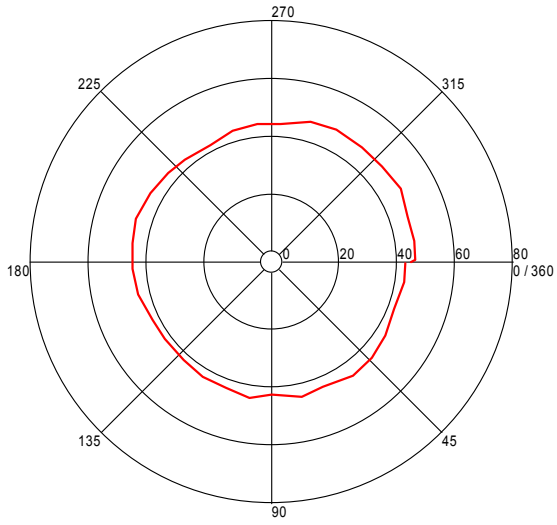
Frequency (Hz)	Level (dBuV/m)	AF	PA+CL	Limit (dBuV/m)	Margin (dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)
9.698009353 G	34.09	36.815	-30.961	54.000	-19.91		143	2.70	1 M
7.333647295 G	37.43	35.646	-29.680	54.000	-16.57		149	2.92	1 M
6.420293921 G	38.83	35.499	-30.090	54.000	-15.17		74	3.50	1 M
13.404021376 G	43.11	39.163	-24.805	54.000	-10.89	--	238	4.01	1 M
4.940113561 G	43.85	34.036	-29.726	54.000	-10.15	--	319	1.58	1 M

Note: Manual scan was done from 1-3 GHz. No emissions were detected above the measuring noise floor.

Azimuth Plots

Turntable Plot (4.940113561 GHz)

Level (dBuV/m)

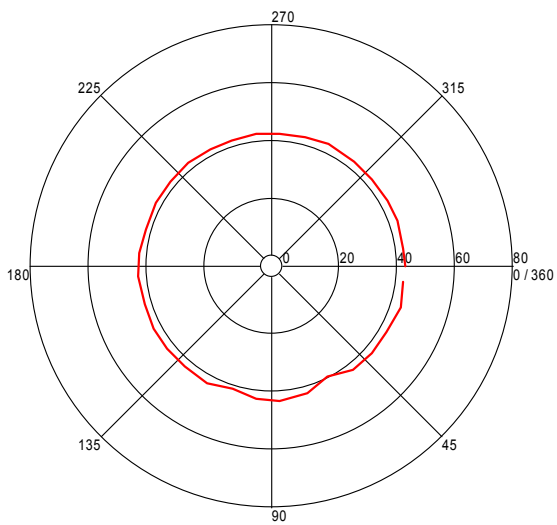


All Polarities

Azimuth (Degrees)

Turntable Plot (6.420293921 GHz)

Level (dBuV/m)

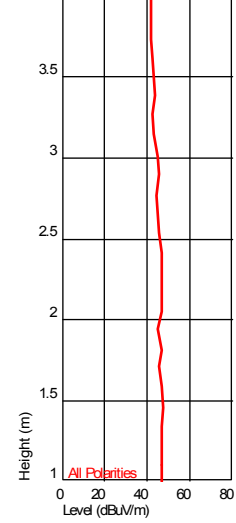


All Polarities

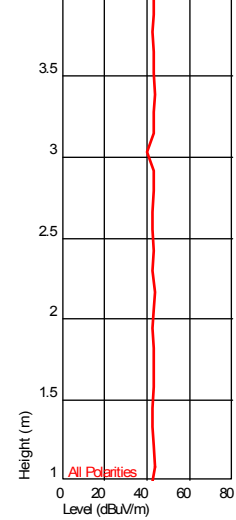
Azimuth (Degrees)

Turntable Plots

Height Plot (4.940113561 GHz)

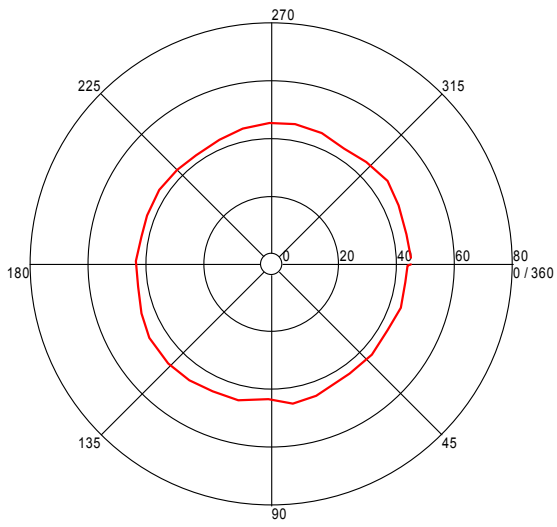


Height Plot (6.420293921 GHz)



Turntable Plot (7.333647295 GHz)

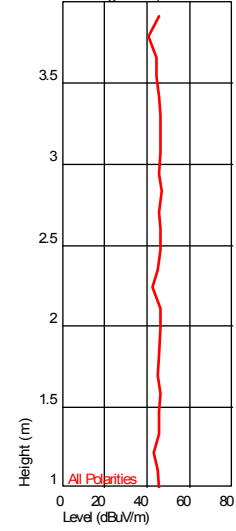
Level (dBuV/m)



All Polarities

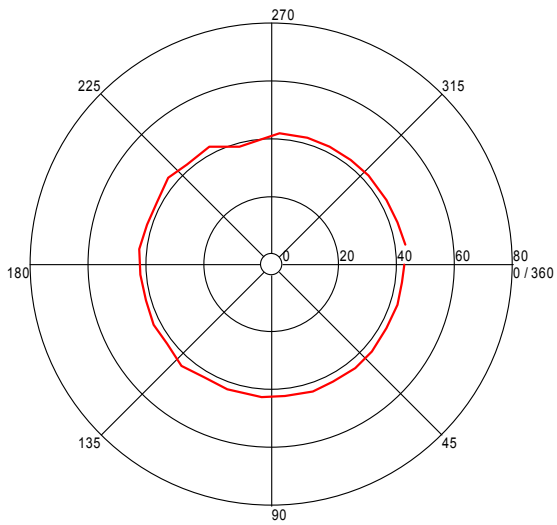
Azimuth (Degrees)

Height Plot (7.333647295 GHz)



Turntable Plot (9.698009353 GHz)

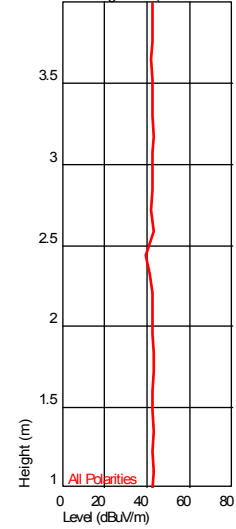
Level (dBuV/m)



All Polarities

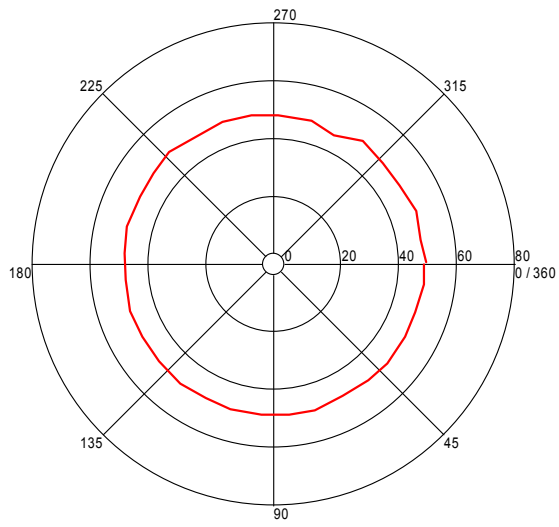
Azimuth (Degrees)

Height Plot (9.698009353 GHz)



Turntable Plot (13.404021376 GHz)

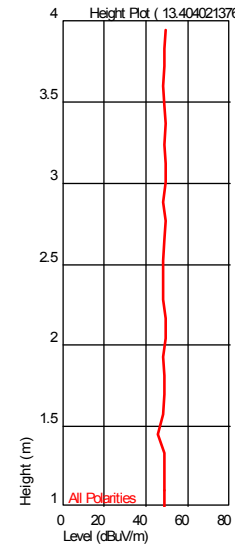
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (13.404021376 GHz)

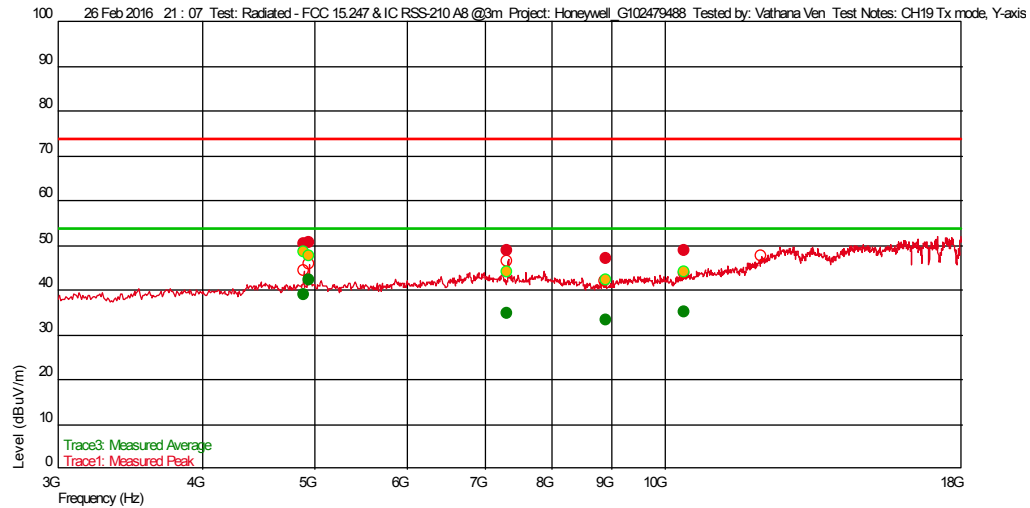


Transmit mode Channel-19, Y-axis, 1 – 18 GHz

Test Information

Test Details	User Entry
Test:	Radiated - FCC 15.247 & IC RSS-247 @3m
Project:	Honeywell_G102479488
Test Notes:	CH19 Tx mode, Y-axis
Temperature:	20 deg C
Humidity:	17%, 1001 mB
Tested by:	Vathana Ven
Test Started:	26 Feb 2016 21:07

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)
8.897842351 G	47.07	35.963	-30.670	74.000	-26.93	--	196	3.89	1 M
7.326613227 G	48.80	35.643	-29.674	74.000	-25.20		178	1.21	1 M
10.394308617 G	48.90	37.251	-30.285	74.000	-25.10		319	2.77	1 M
4.889779559 G	50.26	33.978	-29.798	74.000	-23.74	--	318	3.11	1 M
4.940140281 G	50.52	34.036	-29.726	74.000	-23.48	--	306	1.57	1 M

Trace3: Measured Average

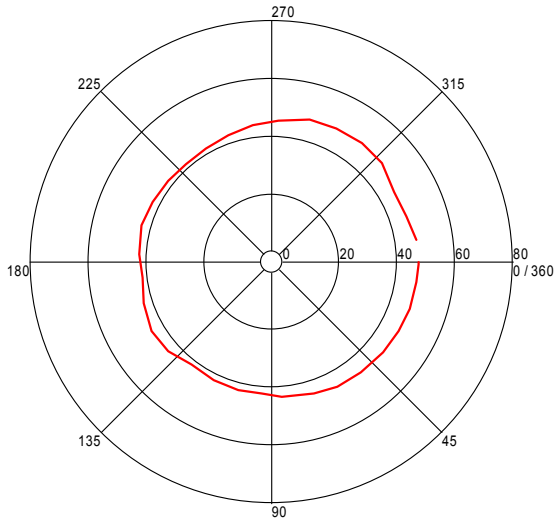
Frequency (Hz)	Level (dBuV/m)	AF	PA+CL	Limit (dBuV/m)	Margin (dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)
8.897842351 G	33.35	35.963	-30.670	54.000	-20.65	--	196	3.89	1 M
7.326613227 G	34.89	35.643	-29.674	54.000	-19.11		178	1.21	1 M
10.394308617 G	35.20	37.251	-30.285	54.000	-18.80		319	2.77	1 M
4.889779559 G	38.87	33.978	-29.798	54.000	-15.13	--	318	3.11	1 M
4.940140281 G	42.33	34.036	-29.726	54.000	-11.67	--	306	1.57	1 M

Note: Manual scan was done from 1-3 GHz. No emissions were detected above the measuring noise floor.

Azimuth Plots

Turntable Plot (4.889779559 GHz)

Level (dBuV/m)

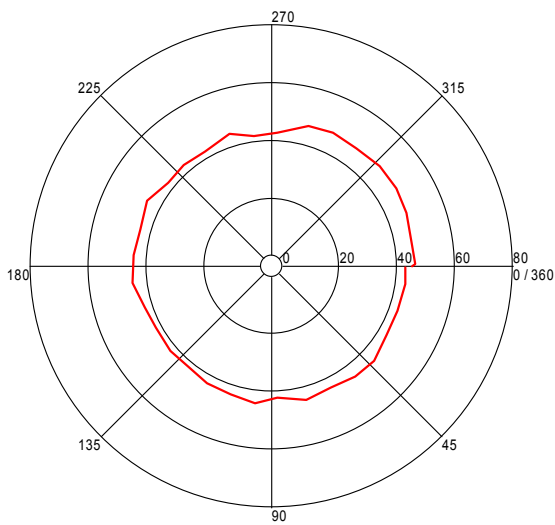


All Polarities

Azimuth (Degrees)

Turntable Plot (4.940140281 GHz)

Level (dBuV/m)

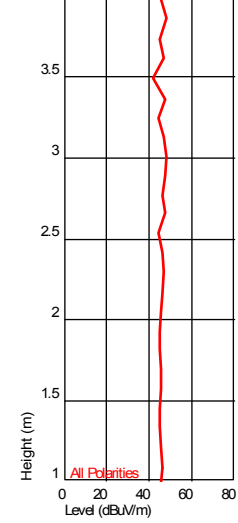


All Polarities

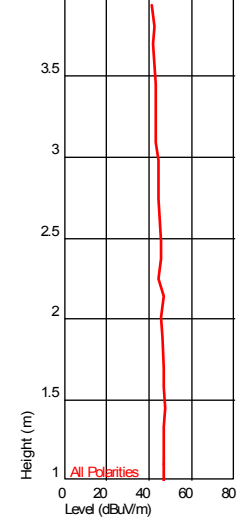
Azimuth (Degrees)

Turntable Plots

Height Plot (4.889779559 GHz)

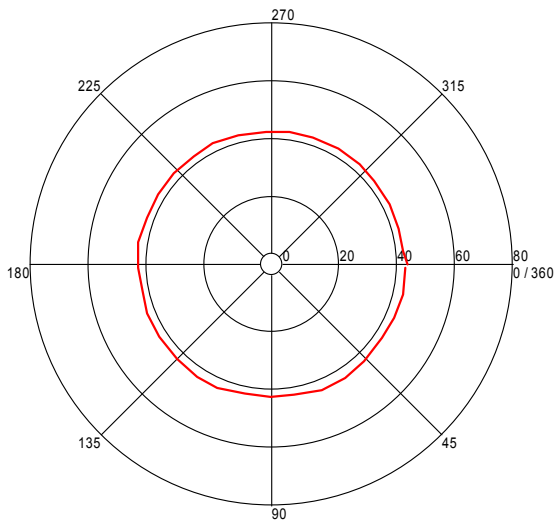


Height Plot (4.940140281 GHz)



Turntable Plot (7.326613227 GHz)

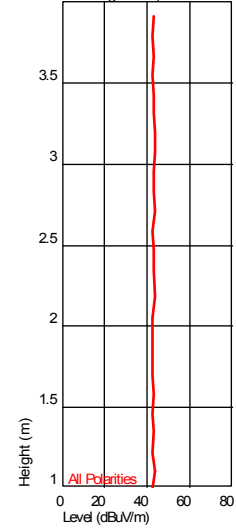
Level (dBuV/m)



All Polarities

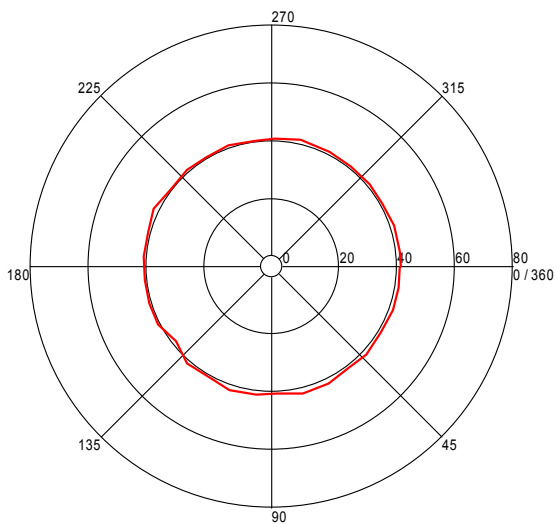
Azimuth (Degrees)

Height Plot (7.326613227 GHz)



Turntable Plot (8.897842351 GHz)

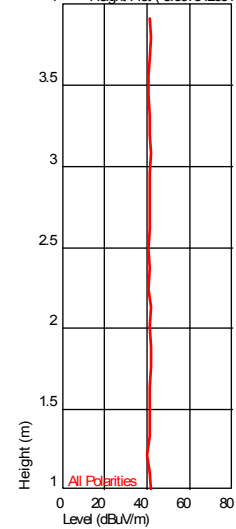
Level (dBuV/m)



All Polarities

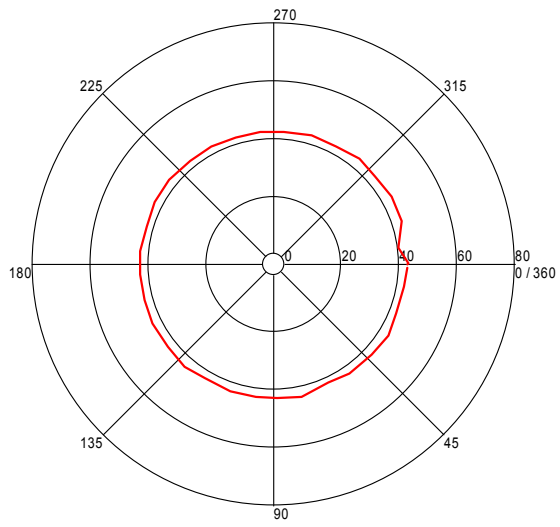
Azimuth (Degrees)

Height Plot (8.897842351 GHz)



Turntable Plot (10.394308617 GHz)

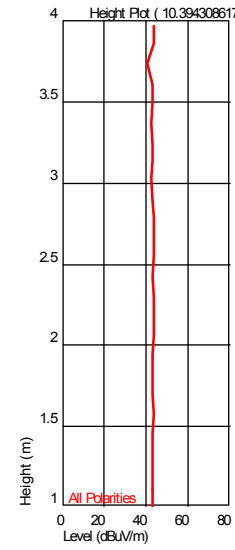
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (10.394308617 GHz)

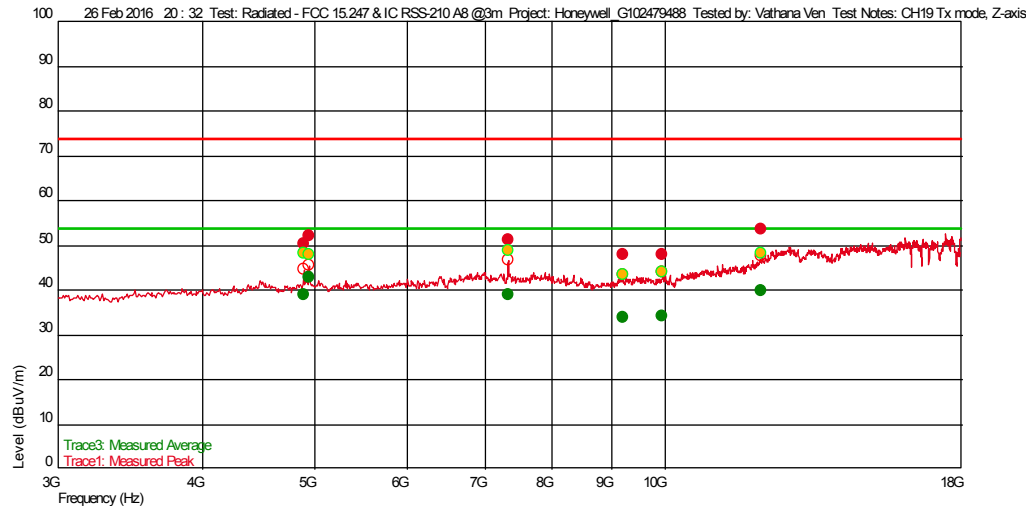


Transmit mode Channel-19, Z-axis, 1 – 18 GHz

Test Information

Test Details	User Entry
Test:	Radiated - FCC 15.247 & IC RSS-247 @3m
Project:	Honeywell_G102479488
Test Notes:	CH19 Tx mode, Z-axis
Temperature:	20 deg C
Humidity:	17%, 1001 mB
Tested by:	Vathana Ven
Test Started:	26 Feb 2016 20 : 32

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)
9.200794924 G	47.84	36.295	-30.782	74.000	-26.16	--	287	1.14	1 M
9.95730795 G	47.85	36.973	-31.055	74.000	-26.15	--	336	1.93	1 M
4.888871075 G	50.26	33.978	-29.799	74.000	-23.74		0	2.90	1 M
7.336566467 G	51.20	35.647	-29.683	74.000	-22.80	--	175	1.70	1 M
4.9398998 G	51.98	34.036	-29.726	74.000	-22.02	--	320	1.09	1 M
12.099338678 G	53.49	38.863	-27.301	74.000	-20.51		29	2.03	1 M

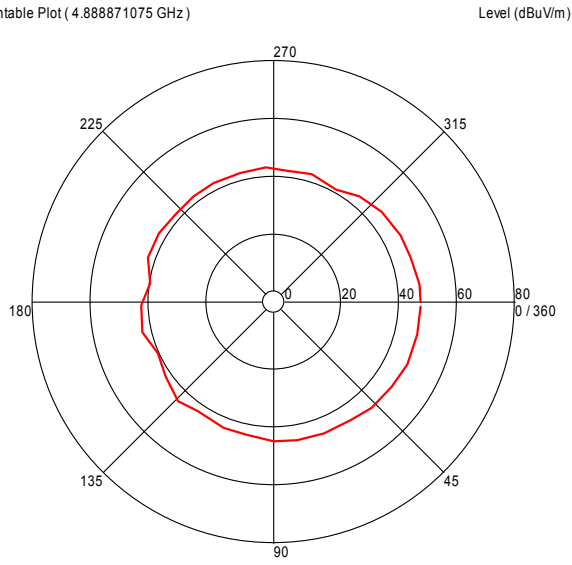
Trace3: Measured Average

Frequency (Hz)	Level (dBuV/m)	AF	PA+CL	Limit (dBuV/m)	Margin (dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)
9.200794924 G	33.75	36.295	-30.782	54.000	-20.25	--	287	1.14	1 M
9.95730795 G	34.16	36.973	-31.055	54.000	-19.84	--	336	1.93	1 M
7.336566467 G	38.88	35.647	-29.683	54.000	-15.12	--	175	1.70	1 M
4.888871075 G	39.04	33.978	-29.799	54.000	-14.96		0	2.90	1 M
12.099338678 G	39.80	38.863	-27.301	54.000	-14.20		29	2.03	1 M
4.9398998 G	42.83	34.036	-29.726	54.000	-11.17	--	320	1.09	1 M

Note: Manual scan was done from 1-3 GHz. No emissions were detected above the measuring noise floor.

Azimuth Plots

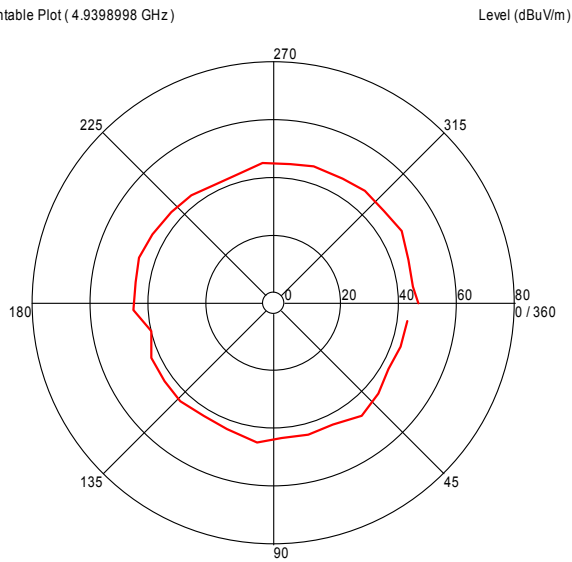
Turntable Plot (4.888871075 GHz)



All Polarities

Azimuth (Degrees)

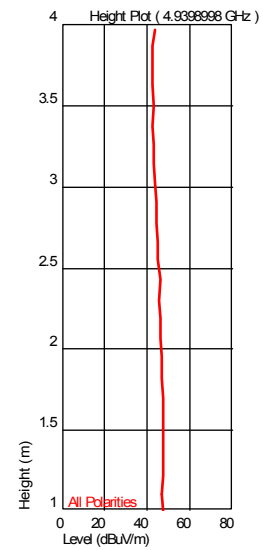
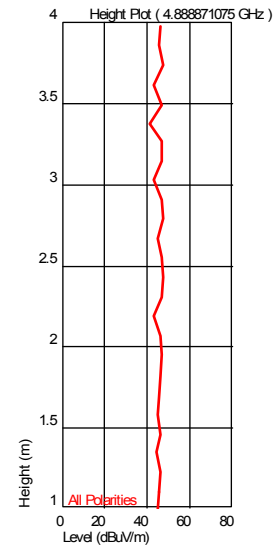
Turntable Plot (4.9398998 GHz)



All Polarities

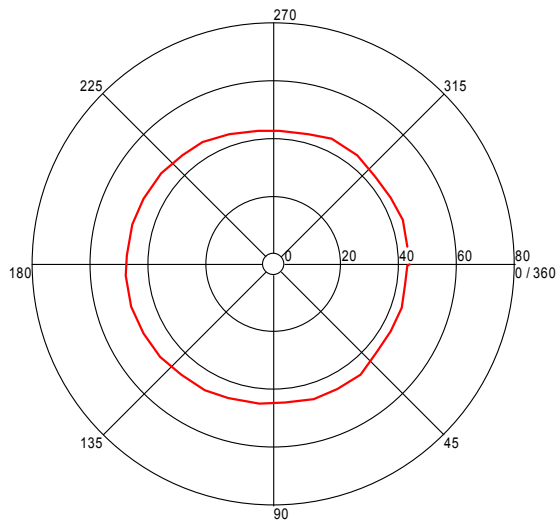
Azimuth (Degrees)

Turntable Plots



Turntable Plot (7.336566467 GHz)

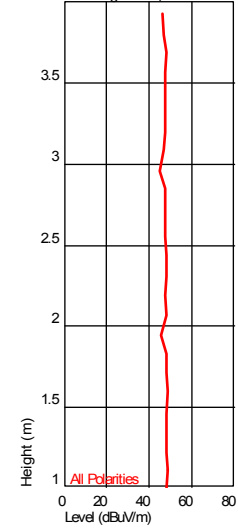
Level (dBuV/m)



All Polarities

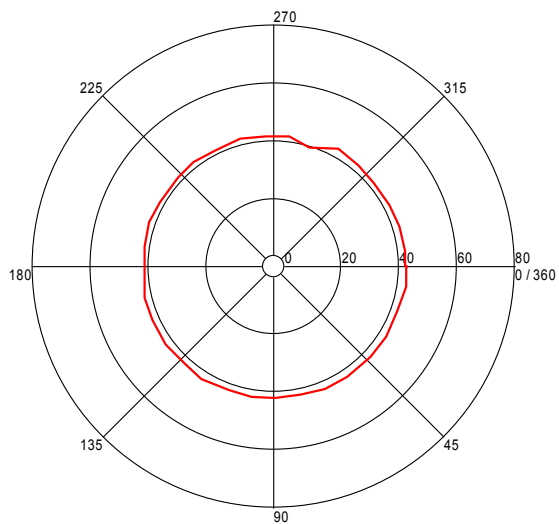
Azimuth (Degrees)

Height Plot (7.336566467 GHz)



Turntable Plot (9.200794924 GHz)

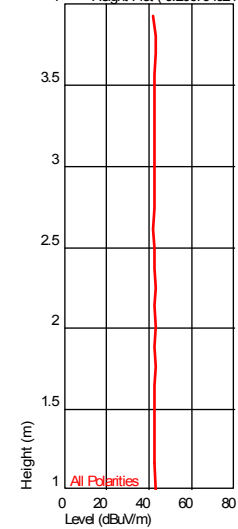
Level (dBuV/m)



All Polarities

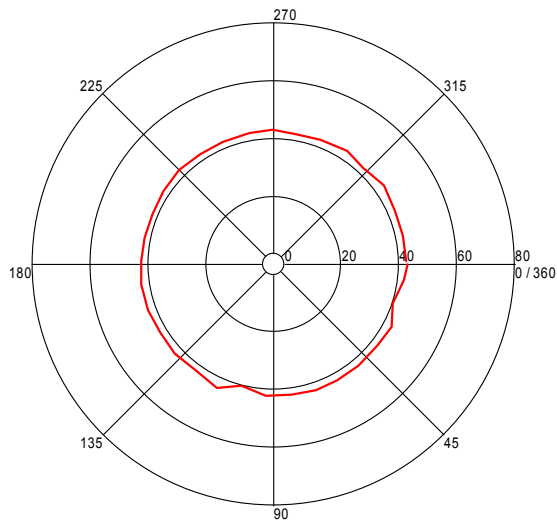
Azimuth (Degrees)

Height Plot (9.200794924 GHz)



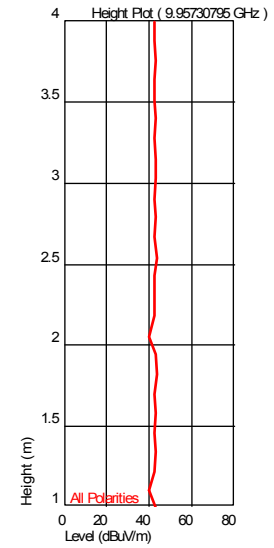
Turntable Plot (9.95730795 GHz)

Level (dBuV/m)



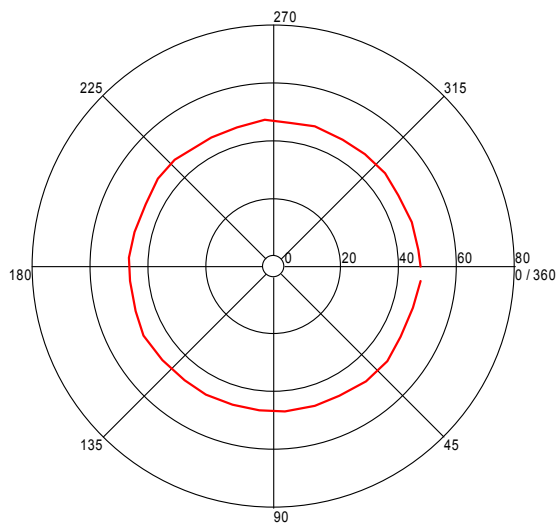
All Polarities

Azimuth (Degrees)



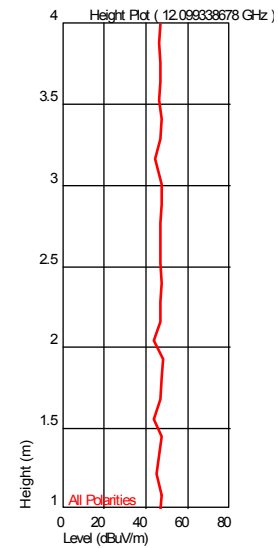
Turntable Plot (12.099338678 GHz)

Level (dBuV/m)



All Polarities

Azimuth (Degrees)

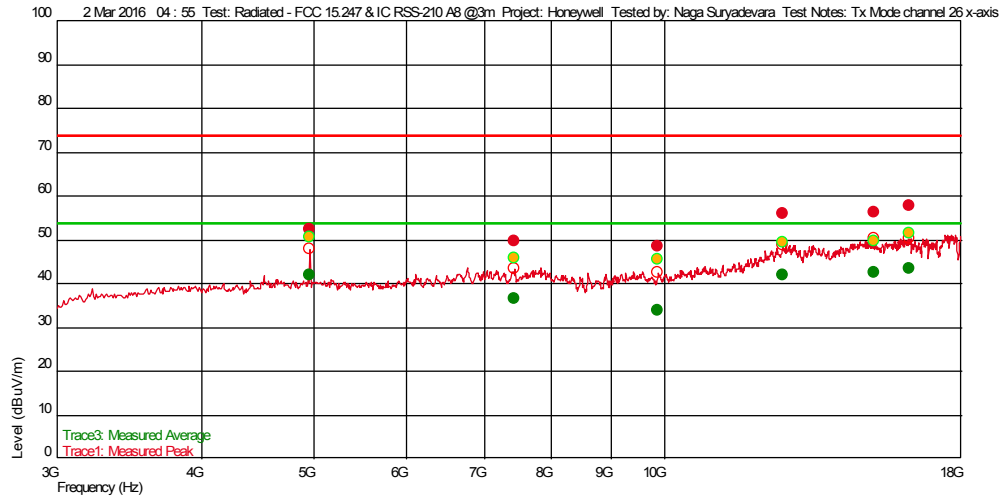


Transmit mode Channel-26, X-axis, 1 – 18 GHz

Test Information

Test Details: User Entry
 Test: Radiated - FCC 15.247 & IC RSS-210 A8 @3m
 Project: Honeywell
 Test Notes: Tx Mode channel 26 x-axis
 Temperature: 20 C
 Humidity: 14% 999 mbars
 Tested by: Naga Suryadevara
 Test Started: 2 Mar 2016 04 : 55

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)
9.878289913 G	48.47	36.962	-31.026	74.000	-25.53	--	47	1.20	1 M
7.438430193 G	49.72	35.666	-29.781	74.000	-24.28		160	1.09	1 M
4.958957916 G	52.30	34.066	-29.699	74.000	-21.70	--	86	1.09	1 M
12.638744155 G	55.96	39.186	-25.893	74.000	-18.04		242	2.46	1 M
15.157702071 G	56.29	39.667	-24.700	74.000	-17.71		84	2.17	1 M
16.253607214 G	57.90	40.851	-25.381	74.000	-16.10		321	1.94	1 M

Trace3: Measured Average

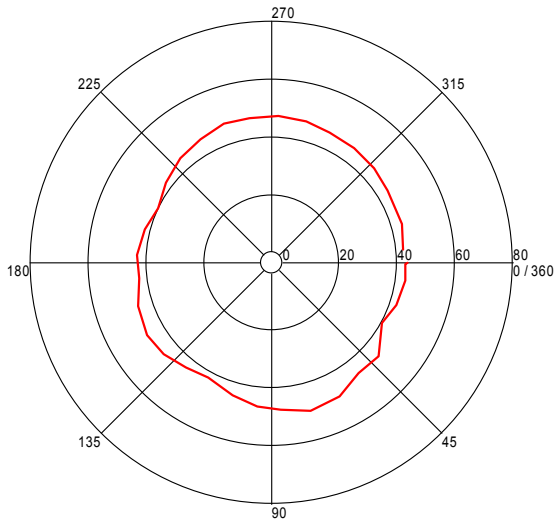
Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)
9.878289913 G	33.81	36.962	-31.026	54.000	-20.19	--	47	1.20	1 M
7.438430193 G	36.58	35.666	-29.781	54.000	-17.42		160	1.09	1 M
12.638744155 G	41.88	39.186	-25.893	54.000	-12.12		242	2.46	1 M
4.958957916 G	42.03	34.066	-29.699	54.000	-11.97	--	86	1.09	1 M
15.157702071 G	42.47	39.667	-24.700	54.000	-11.53		84	2.17	1 M
16.253607214 G	43.53	40.851	-25.381	54.000	-10.47		321	1.94	1 M

Note: Manual scan was done from 1-3 GHz. No emissions were detected above the measuring noise floor.

Azimuth Plots

Turntable Plot (4.958957916 GHz)

Level (dBuV/m)

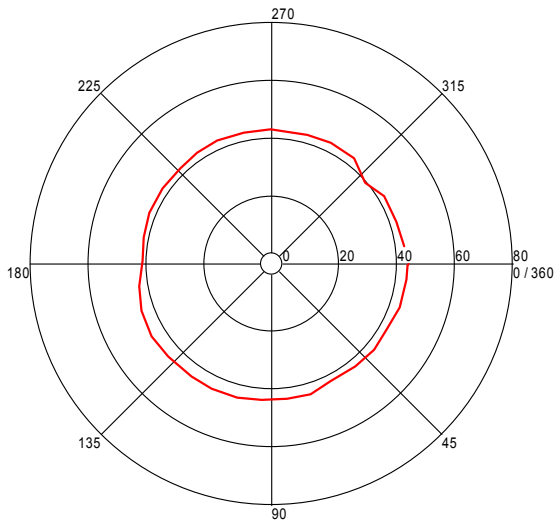


All Polarities

Azimuth (Degrees)

Turntable Plot (7.438430193 GHz)

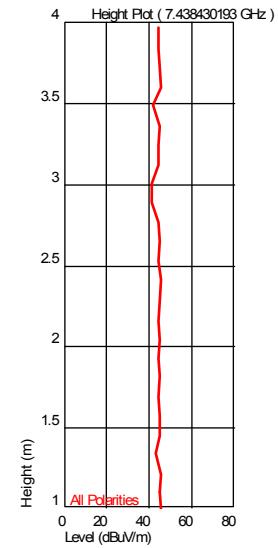
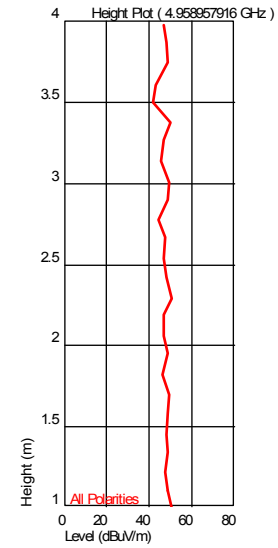
Level (dBuV/m)



All Polarities

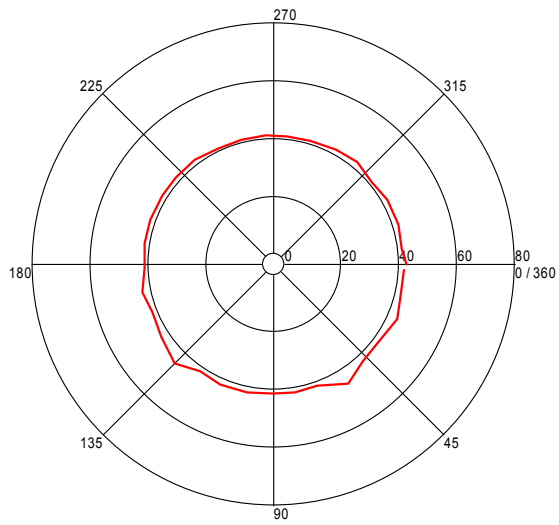
Azimuth (Degrees)

Turntable Plots



Turntable Plot (9.878289913 GHz)

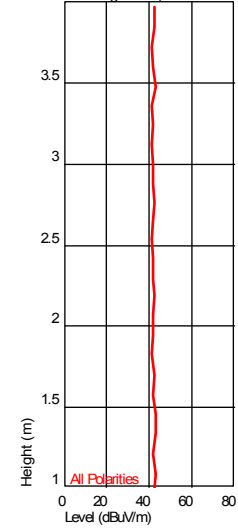
Level (dBuV/m)



All Polarities

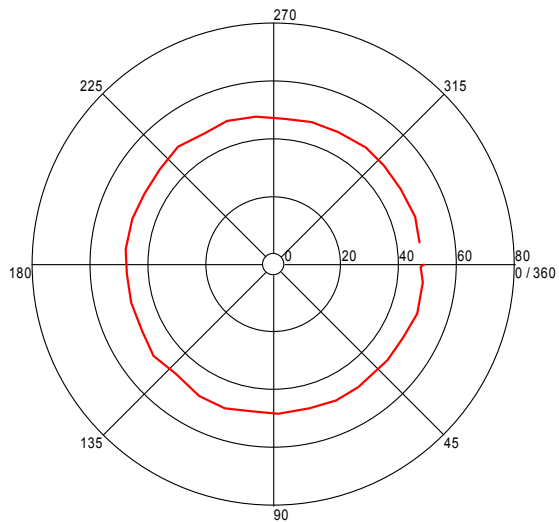
Azimuth (Degrees)

Height Plot (9.878289913 GHz)



Turntable Plot (12.638744155 GHz)

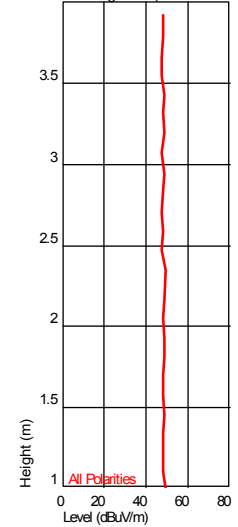
Level (dBuV/m)



All Polarities

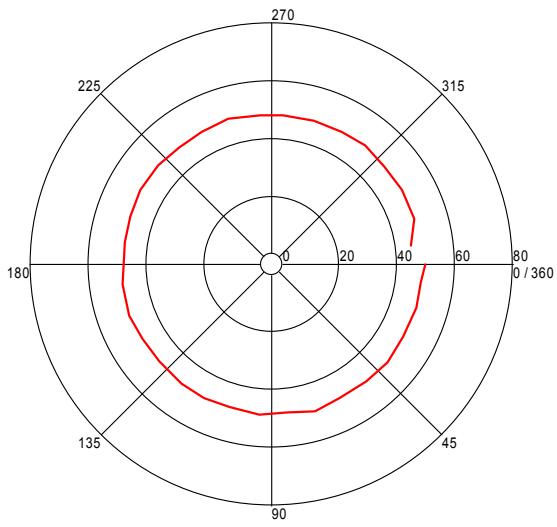
Azimuth (Degrees)

Height Plot (12.638744155 GHz)



Turntable Plot (15.157702071 GHz)

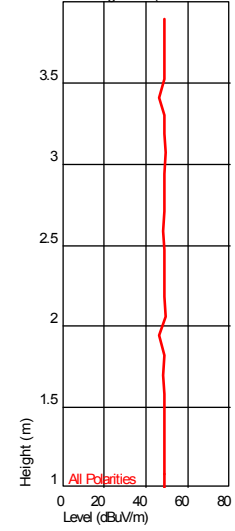
Level (dBuV/m)



All Polarities

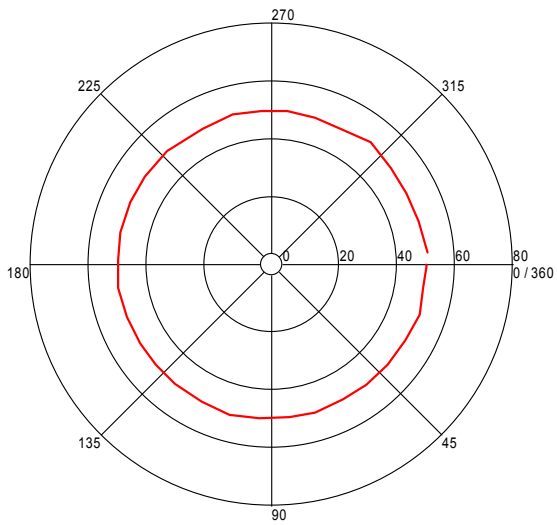
Azimuth (Degrees)

Height Plot (15.157702071 GHz)



Turntable Plot (16.253607214 GHz)

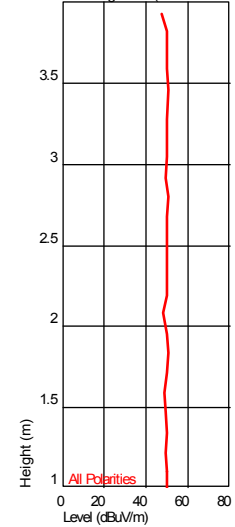
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (16.253607214 GHz)

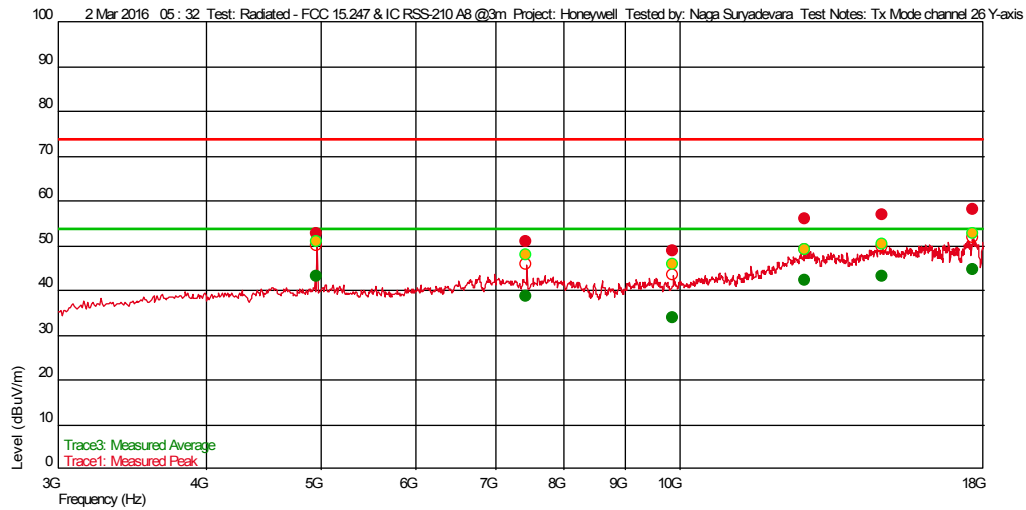


Transmit mode Channel-26, Y-axis, 1 – 18 GHz

Test Information

Test Details	User Entry
Test:	Radiated - FCC 15.247 & IC RSS-210 A8 @3m
Project:	Honeywell
Test Notes:	Tx Mode channel 26 Y-axis
Temperature:	20 C
Humidity:	14% 999 mbars
Tested by:	Naga Suryadevara
Test Started:	2 Mar 2016 05 : 32

Prescan Emission Graph



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

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)
9.878289913 G	48.47	36.962	-31.026	74.000	-25.53	--	47	1.20	1 M
7.438430193 G	49.72	35.666	-29.781	74.000	-24.28		160	1.09	1 M
4.958957916 G	52.30	34.066	-29.699	74.000	-21.70	--	86	1.09	1 M
12.638744155 G	55.96	39.186	-25.893	74.000	-18.04		242	2.46	1 M
15.157702071 G	56.29	39.667	-24.700	74.000	-17.71		84	2.17	1 M
16.253607214 G	57.90	40.851	-25.381	74.000	-16.10		321	1.94	1 M

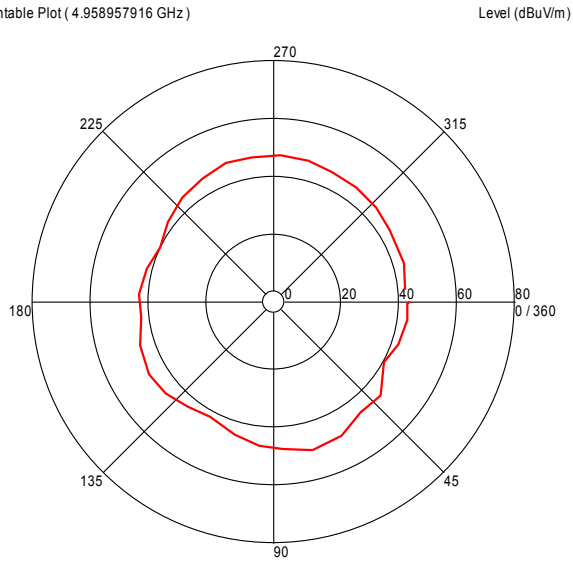
Trace3: Measured Average

Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)
9.878289913 G	33.81	36.962	-31.026	54.000	-20.19	--	47	1.20	1 M
7.438430193 G	36.58	35.666	-29.781	54.000	-17.42		160	1.09	1 M
12.638744155 G	41.88	39.186	-25.893	54.000	-12.12		242	2.46	1 M
4.958957916 G	42.03	34.066	-29.699	54.000	-11.97	--	86	1.09	1 M
15.157702071 G	42.47	39.667	-24.700	54.000	-11.53		84	2.17	1 M
16.253607214 G	43.53	40.851	-25.381	54.000	-10.47		321	1.94	1 M

Note: Manual scan was done from 1-3 GHz. No emissions were detected above the measuring noise floor.

Azimuth Plots

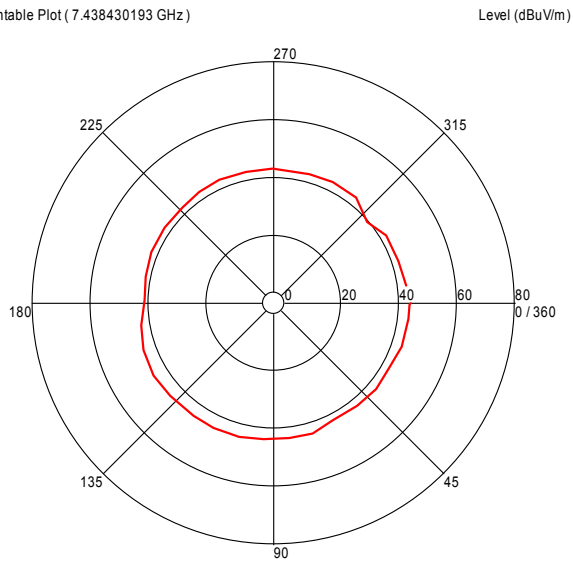
Turntable Plot (4.958957916 GHz)



All Polarities

Azimuth (Degrees)

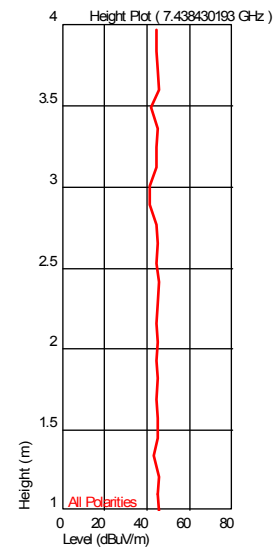
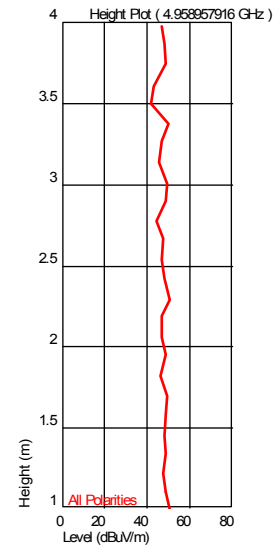
Turntable Plot (7.438430193 GHz)



All Polarities

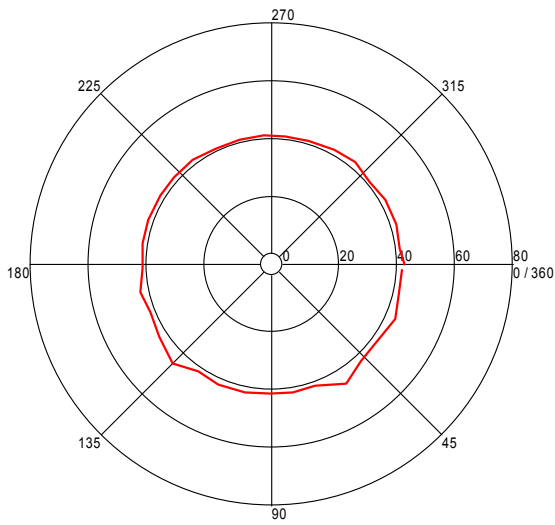
Azimuth (Degrees)

Turntable Plots



Turntable Plot (9.878289913 GHz)

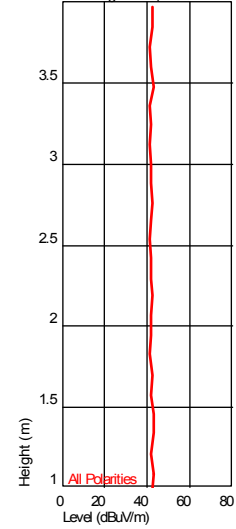
Level (dBuV/m)



All Polarities

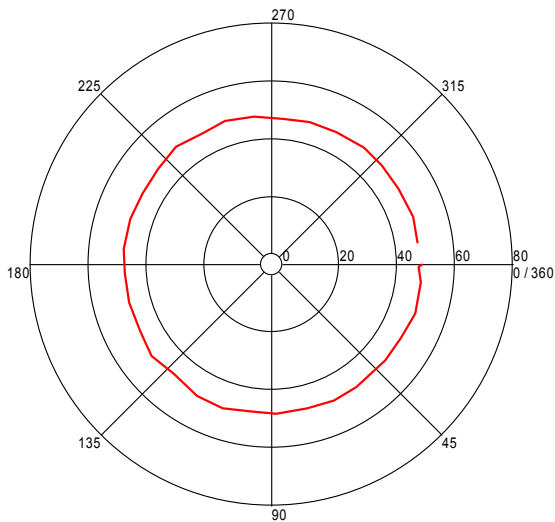
Azimuth (Degrees)

Height Plot (9.878289913 GHz)



Turntable Plot (12.638744155 GHz)

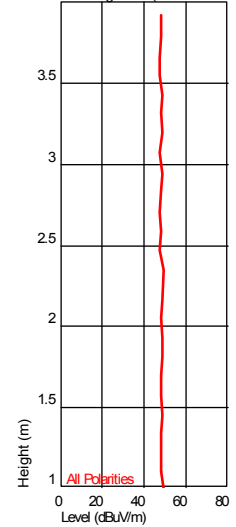
Level (dBuV/m)



All Polarities

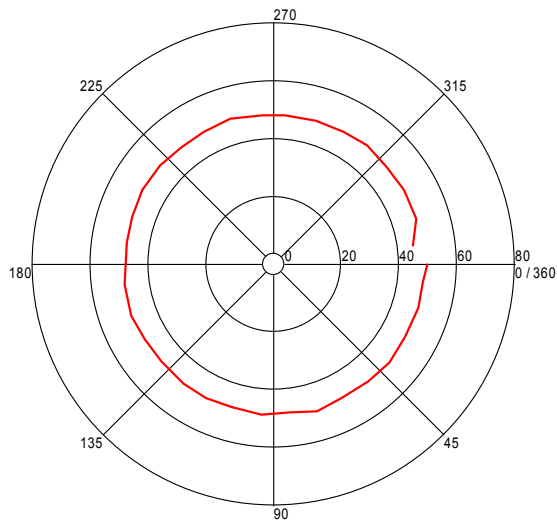
Azimuth (Degrees)

Height Plot (12.638744155 GHz)



Turntable Plot (15.157702071 GHz)

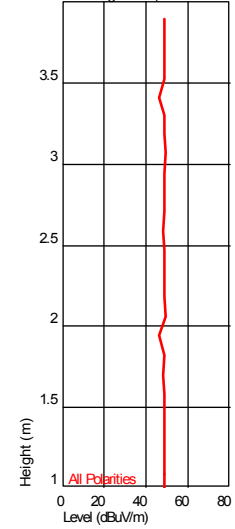
Level (dBuV/m)



All Polarities

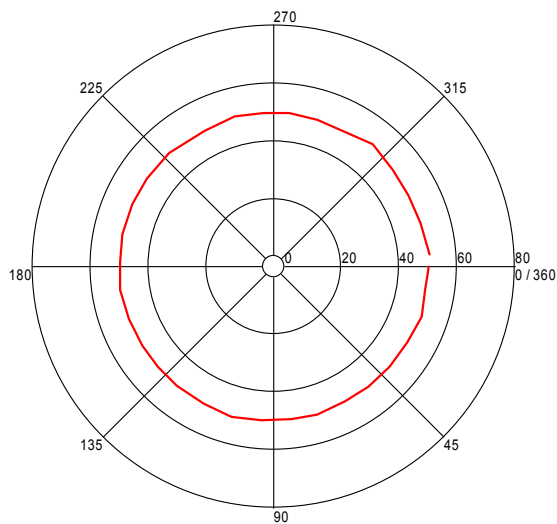
Azimuth (Degrees)

Height Plot (15.157702071 GHz)



Turntable Plot (16.253607214 GHz)

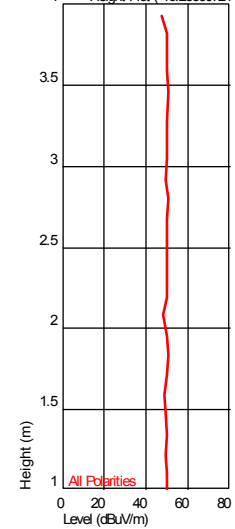
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (16.253607214 GHz)

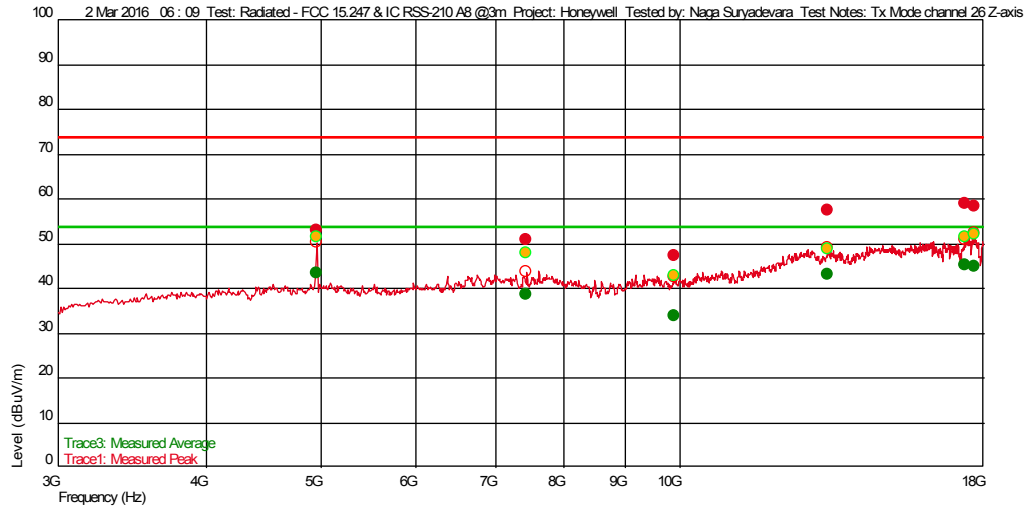


Transmit mode Channel-26, Z-axis, 1 – 18 GHz

Test Information

Test Details	User Entry
Test:	Radiated - FCC 15.247 & IC RSS-210 A8 @3m
Project:	Honeywell
Test Notes:	Tx Mode channel 26 Z-axis
Temperature:	20 C
Humidity:	14% 999 mbars
Tested by:	Naga Suryadevara
Test Started:	2 Mar 2016 06 : 09

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)
9.896045424 G	47.27	36.983	-31.033	74.000	-26.73		320	2.48	1 M
7.438643954 G	50.82	35.666	-29.781	74.000	-23.18	--	11	2.76	1 M
4.959018036 G	52.97	34.066	-29.699	74.000	-21.03	--	1	1.57	1 M
13.309498998 G	57.42	39.199	-24.839	74.000	-16.58		132	3.61	1 M
17.681903807 G	58.31	41.352	-24.368	74.000	-15.69		13	2.41	1 M
17.393052772 G	59.02	41.459	-25.110	74.000	-14.98		165	3.29	1 M

Trace3: Measured Average

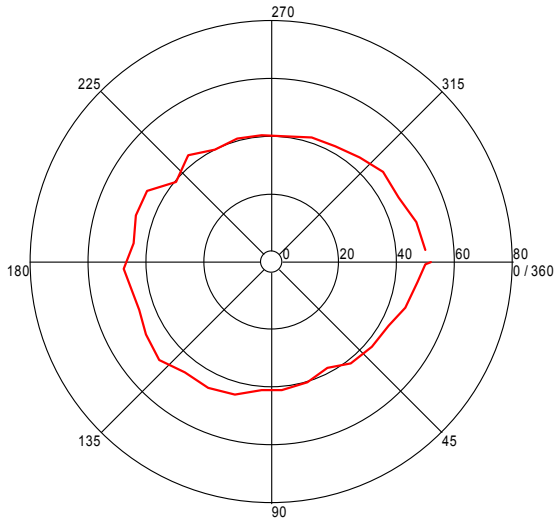
Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)
9.896045424 G	33.83	36.983	-31.033	54.000	-20.17		320	2.48	1 M
7.438643954 G	38.70	35.666	-29.781	54.000	-15.30	--	11	2.76	1 M
13.309498998 G	43.12	39.199	-24.839	54.000	-10.88		132	3.61	1 M
4.959018036 G	43.51	34.066	-29.699	54.000	-10.49	--	1	1.57	1 M
17.681903807 G	44.86	41.352	-24.368	54.000	-9.14		13	2.41	1 M
17.393052772 G	45.10	41.459	-25.110	54.000	-8.90		165	3.29	1 M

Note: Manual scan was done from 1-3 GHz. No emissions were detected above the measuring noise floor.

Azimuth Plots

Turntable Plot (4.959018036 GHz)

Level (dBuV/m)

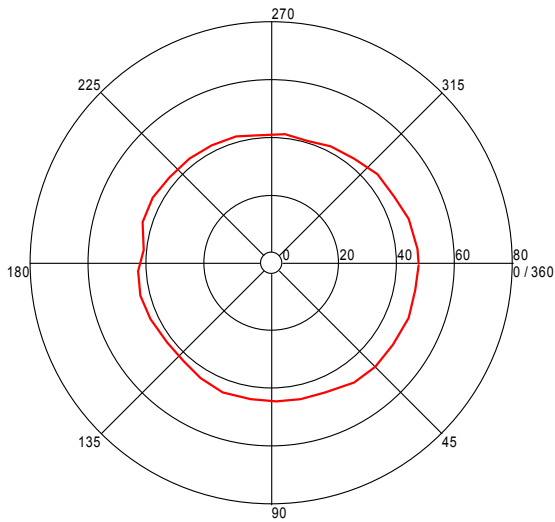


All Polarities

Azimuth (Degrees)

Turntable Plot (7.438643954 GHz)

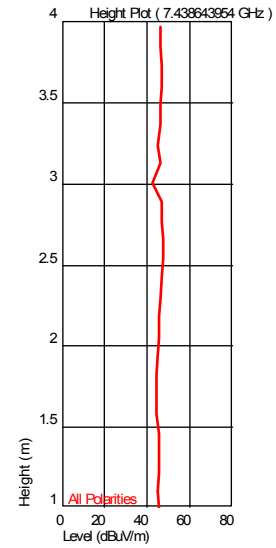
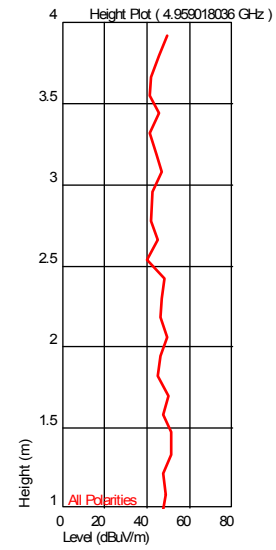
Level (dBuV/m)



All Polarities

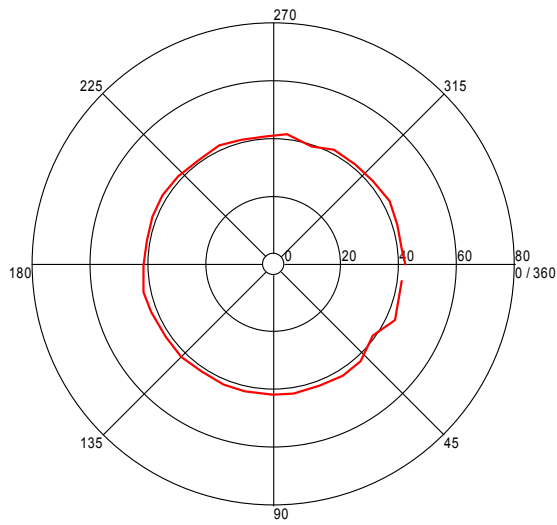
Azimuth (Degrees)

Turntable Plots



Turntable Plot (9.896045424 GHz)

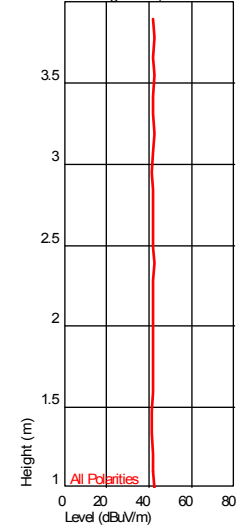
Level (dBuV/m)



All Polarities

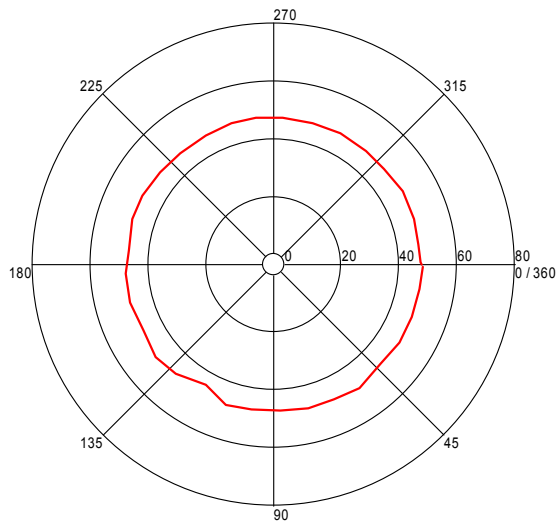
Azimuth (Degrees)

Height Plot (9.896045424 GHz)



Turntable Plot (13.309498998 GHz)

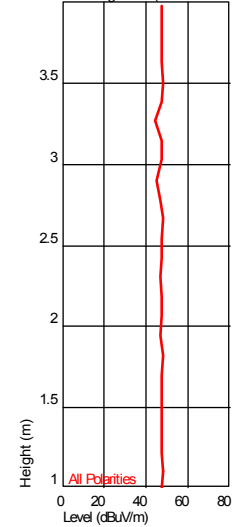
Level (dBuV/m)



All Polarities

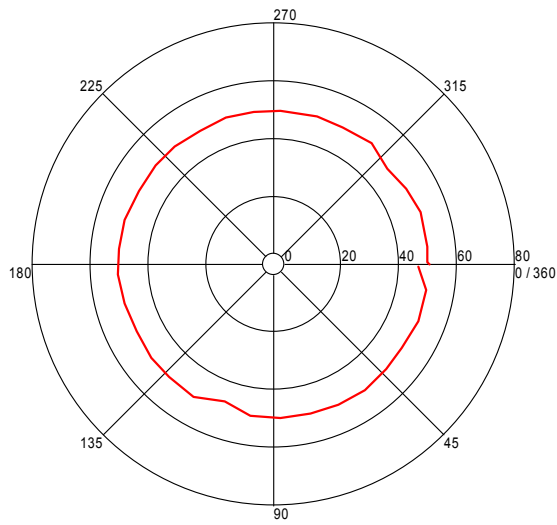
Azimuth (Degrees)

Height Plot (13.309498998 GHz)



Turntable Plot (17.393052772 GHz)

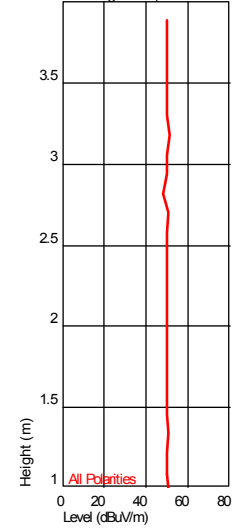
Level (dBuV/m)



All Polarities

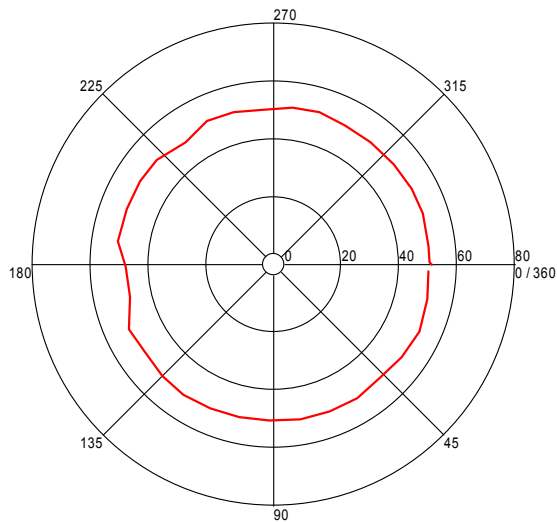
Azimuth (Degrees)

Height Plot (17.393052772 GHz)



Turntable Plot (17.681903807 GHz)

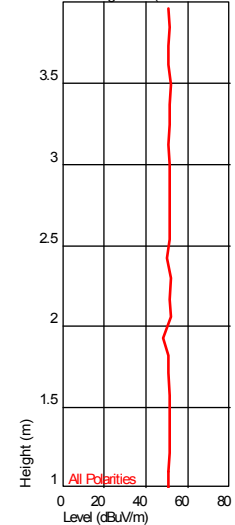
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (17.681903807 GHz)



Note: Manual scan was done from 18-25 GHz. No emissions were detected above the measuring noise floor.

Test Personnel:	<u>Naga Suryadevara NS</u>	Test Date:	<u>02/26/2016</u>
	<u>Vathana Ven VSV</u>		<u>03/02/2016</u>
Supervising/Reviewing Engineer:			
(Where Applicable)	<u>N/A</u>		
Product Standard:	<u>FCC 15.247 and RSS-247</u>	Limit Applied:	<u>Below specified limit</u>
	<u>DC Powered – P/S powered</u>		
Input Voltage:	<u>from 120 VAC 60 Hz</u>		
Pretest Verification w/ Ambient Signals or BB Source:	<u>Yes</u>	Ambient Temperature:	<u>20, 20 °C</u>
		Relative Humidity:	<u>17, 17 %</u>
		Atmospheric Pressure:	<u>999, 1001 mbars</u>

Deviations, Additions, or Exclusions: None

7 6 dB and Occupied Bandwidth

7.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C (15.247), ANSI C63.4, ANSI C63.10, KDB558074, and RSS-247.

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 dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

7.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004'	Weather Station	Davis Instruments	7400	PE80529A61A	10/23/2015	10/23/2017
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/14/2015	03/14/2016
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	Multiple	10/08/2015	10/08/2016
ETS002'	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	04/10/2015	04/10/2016

Software Utilized:

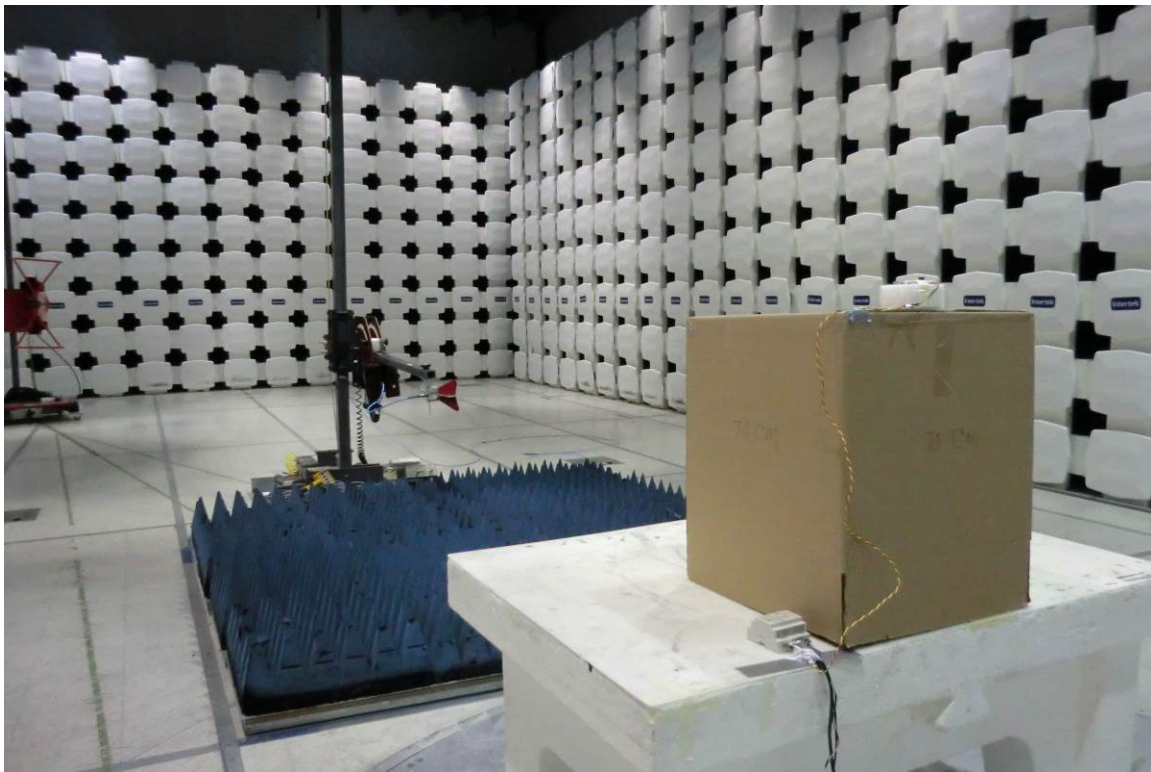
Name	Manufacturer	Version
None		

7.3 Results:

The sample tested was found to Comply.

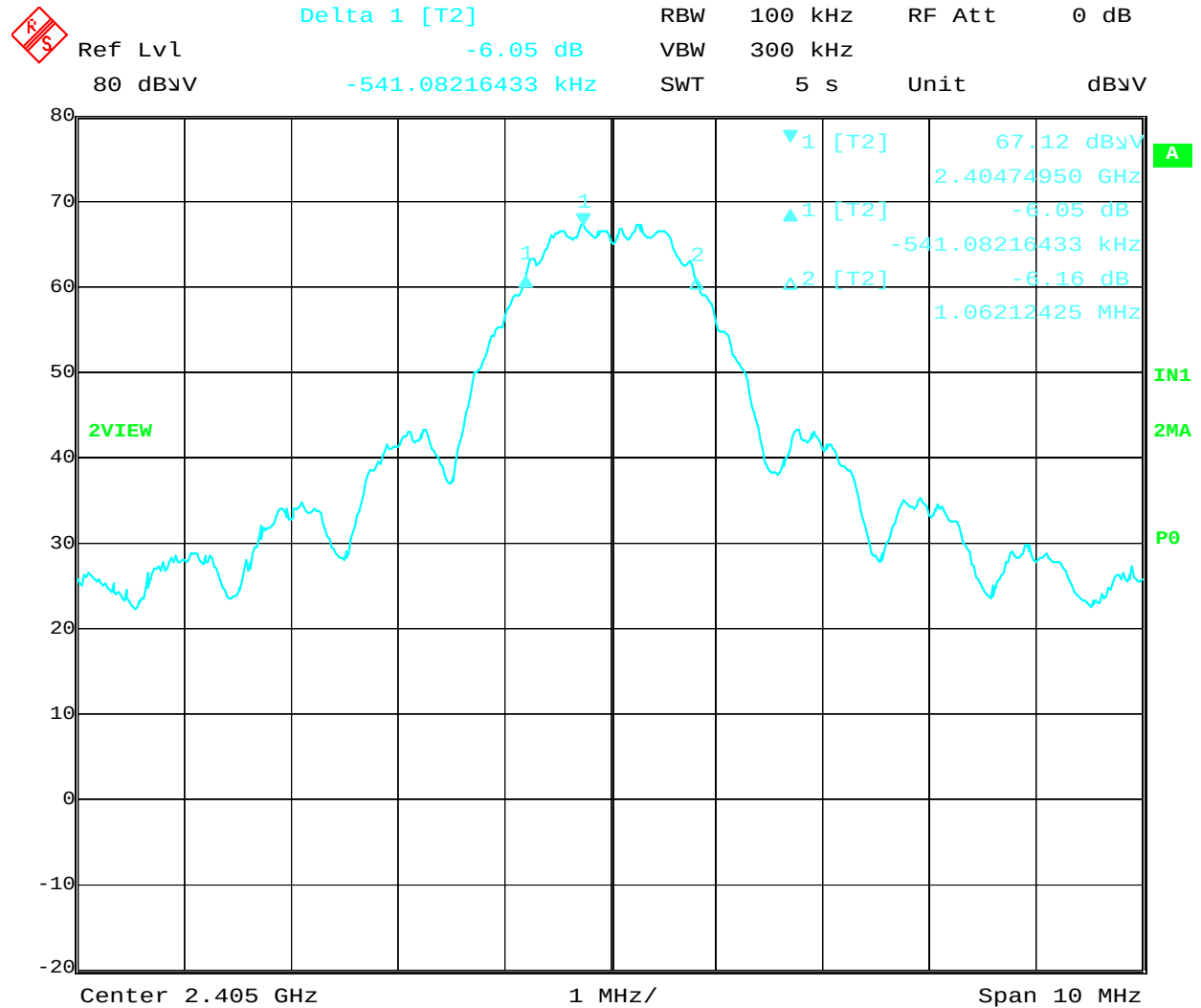
The sample tested was found to Comply. The 99% power bandwidth, or 6 dB bandwidth, must not be less than 500 kHz.

7.4 Setup Photograph:



7.5 Plots/Data:

Low Channel 2405 MHz, 6 dB bandwidth – 1603.2064 kHz



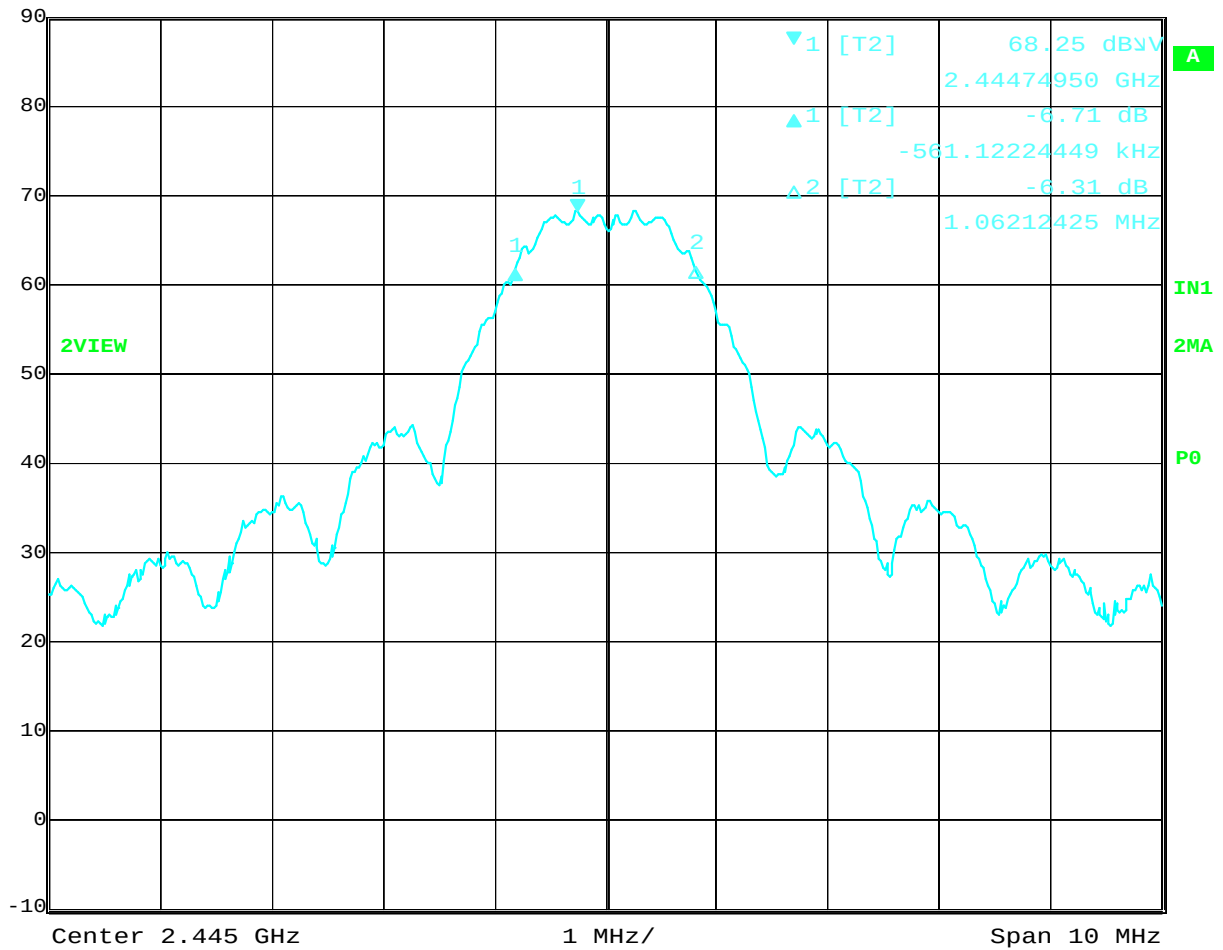
Date: 25.FEB.2016 20:42:34

Note: The unit shown in the above plot is dBuV.

Mid Channel 2445 MHz, 6 dB bandwidth – 1623.246 kHz



Ref Lvl	Delta 1 [T2]	RBW	100 kHz	RF Att	0 dB
90 dBμV	-6.71 dB	VBW	300 kHz		
	-561.12224449 kHz	SWT	2 s	Unit	dBμV



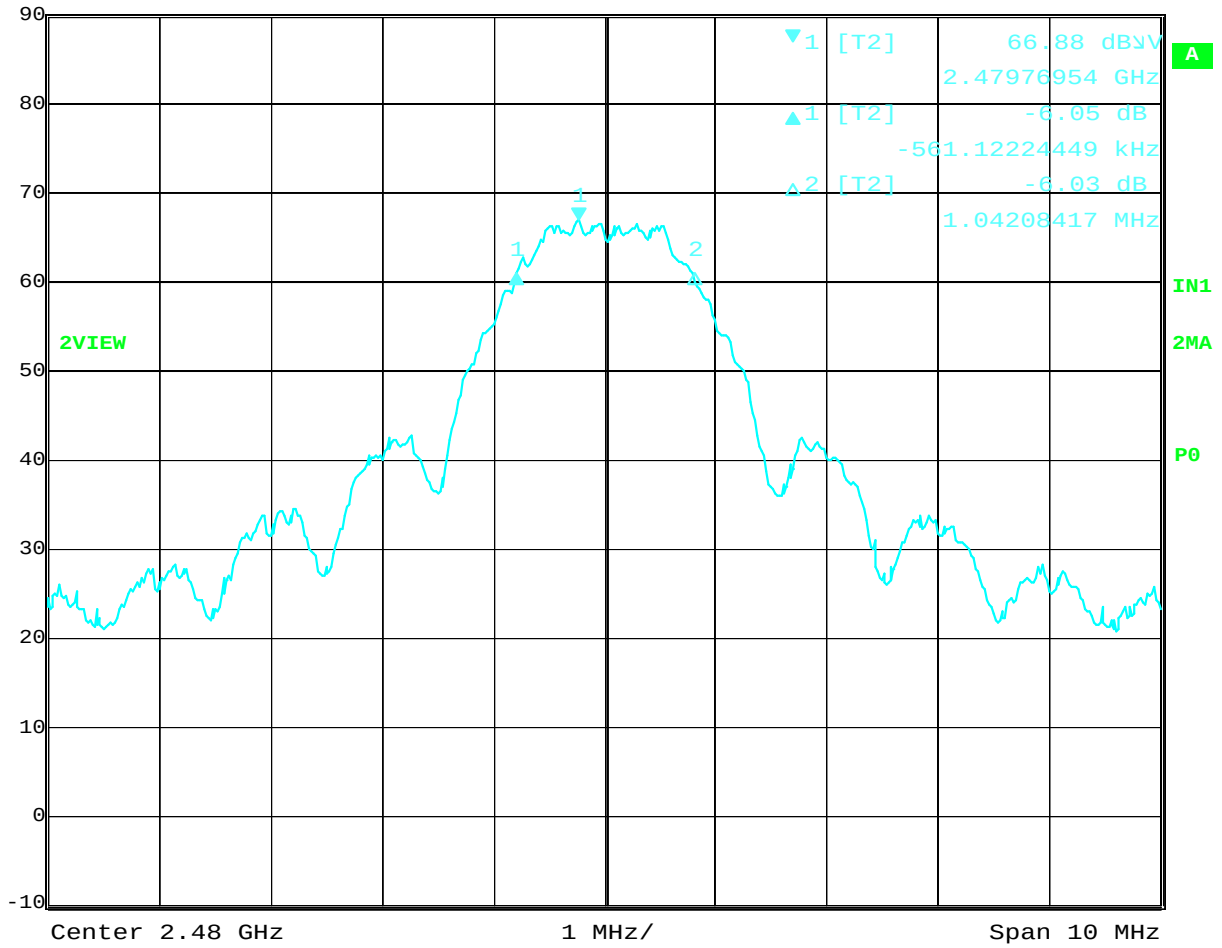
Date: 25.FEB.2016 22:03:11

Note: The unit shown in the above plot is dBuV.

Hi Channel 2480 MHz, 6 dB bandwidth – 1603.206 kHz



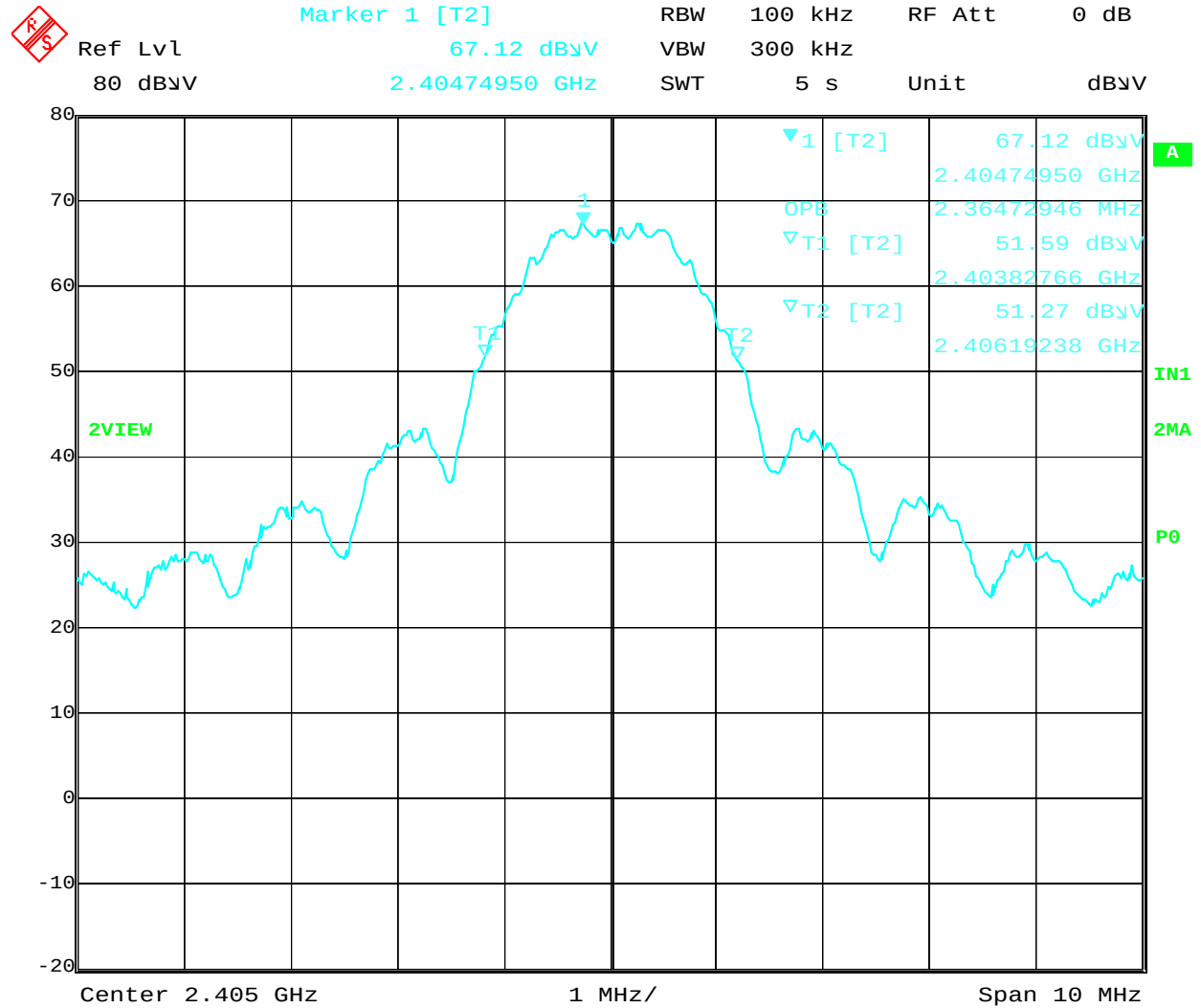
Ref Lvl	Delta 1 [T2]	RBW	100 kHz	RF Att	0 dB
90 dBμV	-6.05 dB	VBW	300 kHz		
	-561.12224449 kHz	SWT	5 ms	Unit	dBμV



Date: 25.FEB.2016 23:38:57

Note: The unit shown in the above plot is dBuV.

Occupied Bandwidth, Low Channel – 2.3647 MHz



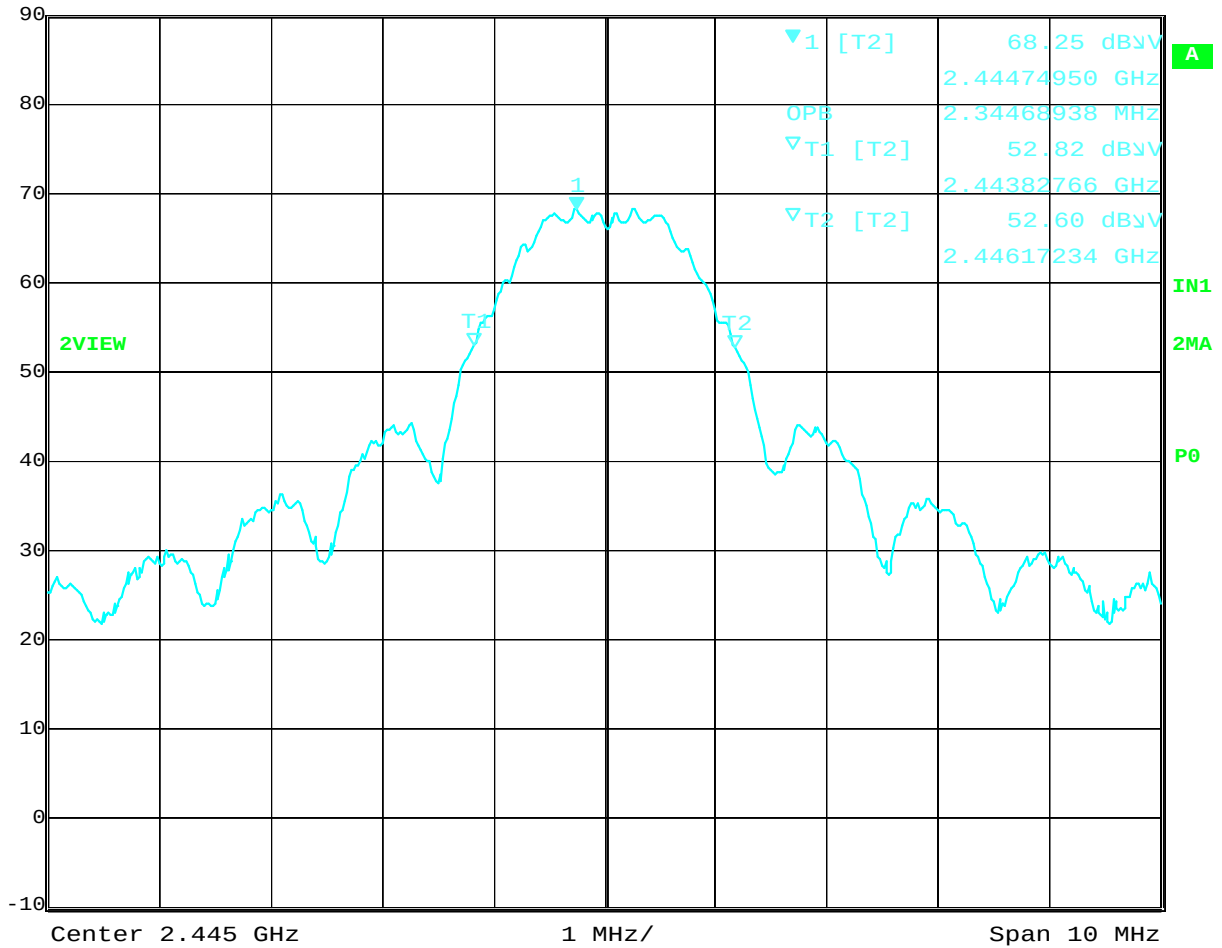
Date: 25.FEB.2016 20:46:39

Note: The unit shown in the above plot is dBuV.

Occupied Bandwidth, Mid Channel – 2.3446 MHz



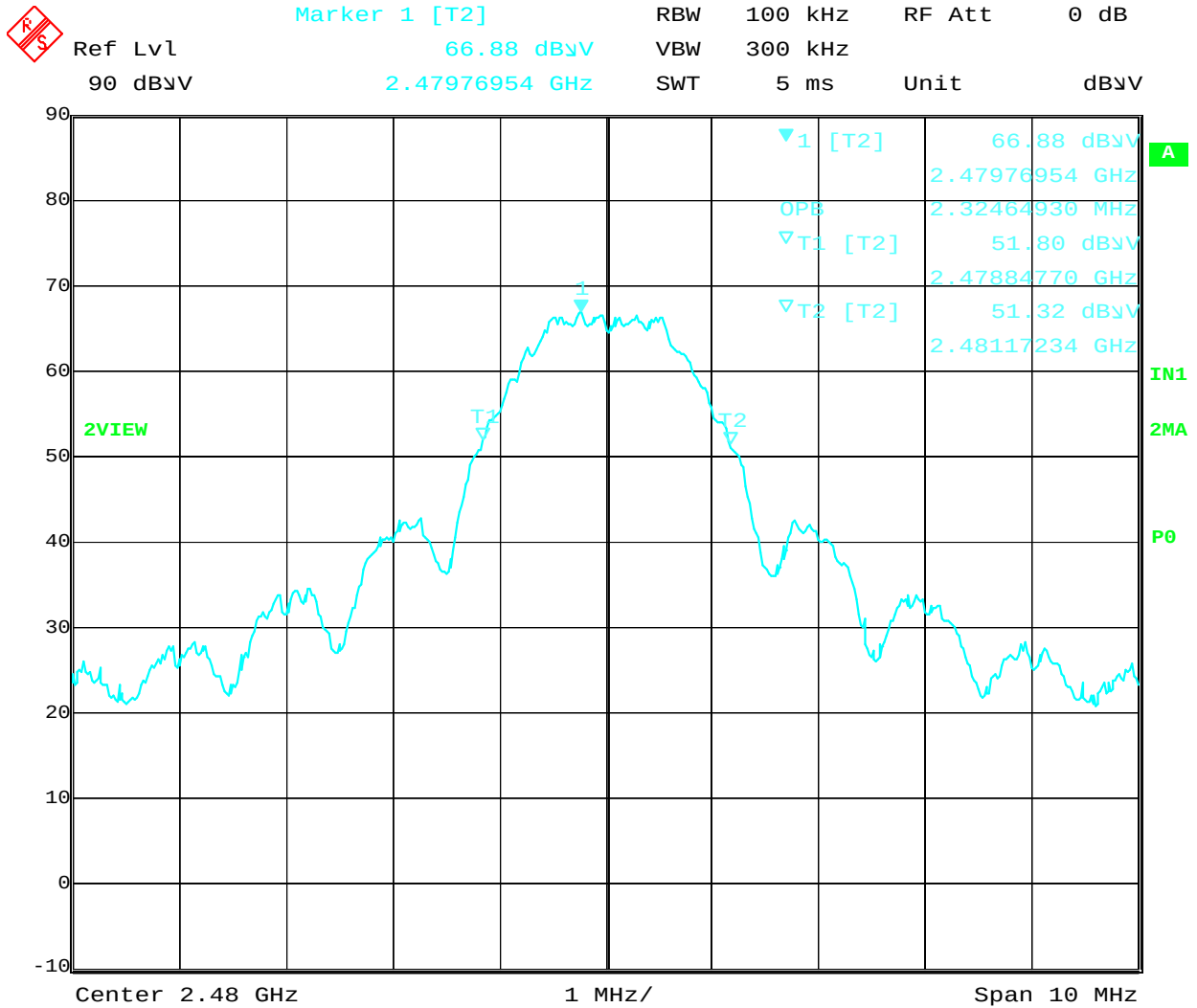
Ref Lvl	Marker 1 [T2]	RBW	100 kHz	RF Att	0 dB
90 dBμV	68.25 dBμV	VBW	300 kHz		
	2.44474950 GHz	SWT	2 s	Unit	dBμV



Date: 25.FEB.2016 22:04:37

Note: The unit shown in the above plot is dBuV.

Occupied Bandwidth, High Channel – 2.3246 MHz



Date: 25.FEB.2016 23:40:14

Note: The unit shown in the above plot is dBuV.

Test Personnel: Vathana Ven
 Supervising/Reviewing Engineer: N/A
 (Where Applicable)
 Product Standard: FCC Part 15 Subpart C and RSS-247
 Input Voltage: DC Powered – P/S powered from 120 VAC 60 Hz
 Pretest Verification: Yes

Test Date: 02/25/2016

Limit Applied: Below specified limit

Ambient Temperature: 20 °C
 Relative Humidity: 18 %
 Atmospheric Pressure: 1003 mbars

Deviations, Additions, or Exclusions: None

8 Maximum Peak Output Power and Human RF exposure

8.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C (15.247), ANSI C63.4, ANSI C63.10, KDB558074, and RSS-247.

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 dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

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

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

Where

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

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

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

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

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

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

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

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

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

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

Example:

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

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

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.

8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004'	Weather Station	Davis Instruments	7400	PE80529A61A	10/23/2015	10/23/2017
145128'	EMI Receiver (20 Hz - 40 GHz)	Rohde & Schwarz	ESIB 40	839283/001	03/14/2015	03/14/2016
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	Multiple	10/08/2015	10/08/2016
ETS002'	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	04/10/2015	04/10/2016
EMC04'	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	04/07/2015	04/07/2016
145014'	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	05/13/2015	05/13/2016

Software Utilized:

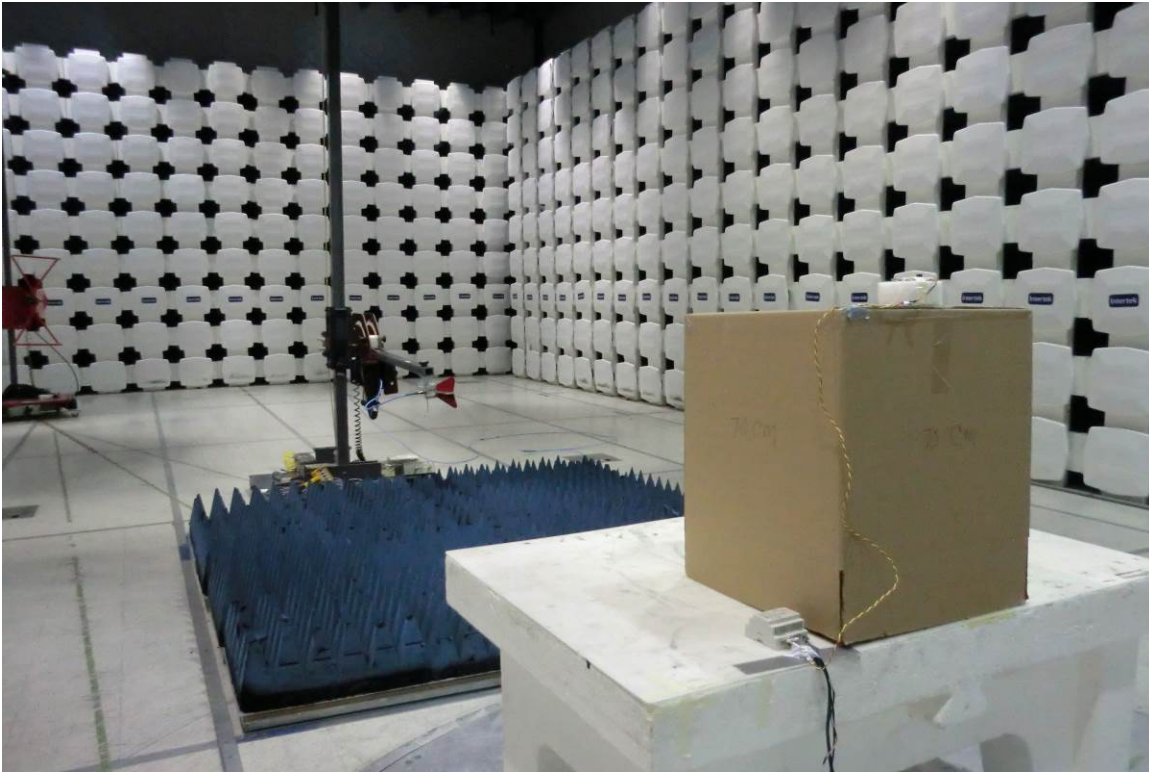
Name	Manufacturer	Version
EMI Boxborough.xls	Intertek	08/27/10

8.3 Results:

The sample tested was found to Comply. The EIRP must not exceed 30 dBm. The Human RF Exposure limit is 1 mW/cm².

8.4 Setup Photographs:

1-18 GHz



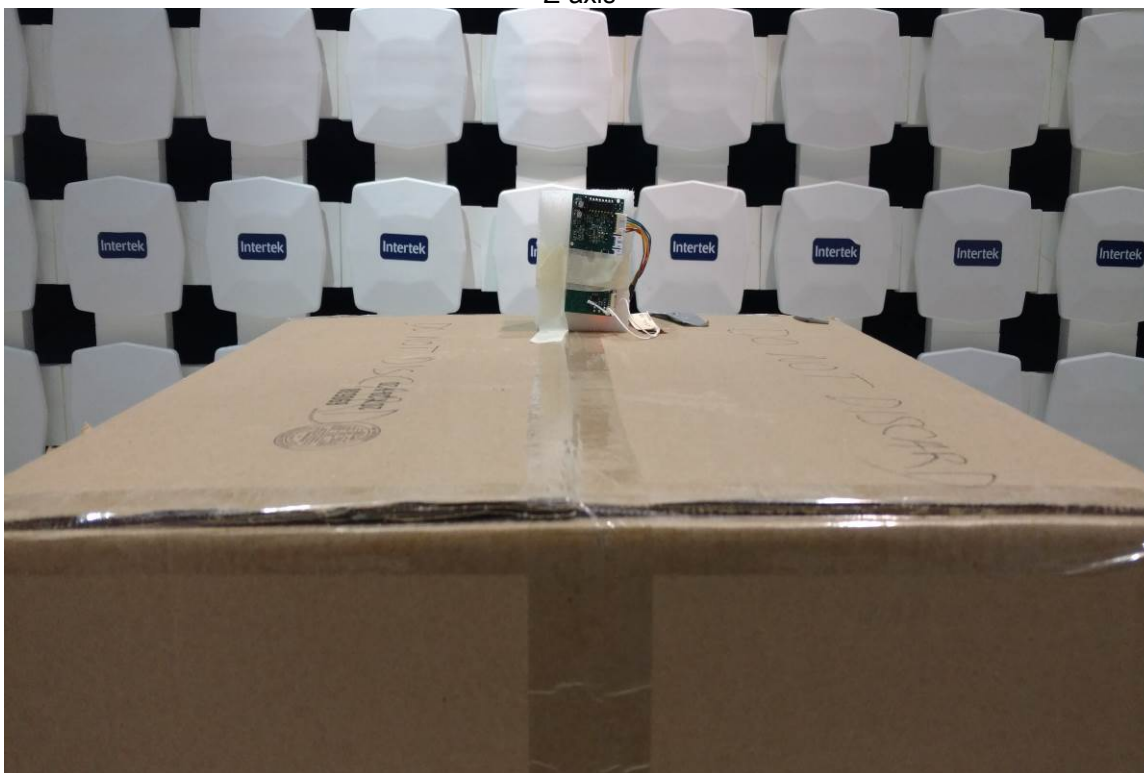
X-axis



Y-axis



Z-axis



8.5 Test Data:

Intertek

Output Power

Company: Honeywell International

Model #: DD15

Serial #: UUT#1

Engineers: Vathana Ven

Project #: G102479488

Standard: FCC Part 15 Subpart B Class B

Receiver: R&S ESI (145-128) 03-14-2016

PreAmp: 145-003 10-11-15.txt

PreAmp Used? (Y or N): N

Date(s): 02/25/16

Limit Distance (m): 3

Test Distance (m): 3

Voltage/Frequency:

Antenna & Cables: HF Bands: N, LF, HF, SHF

Antenna: ETS002 04-10-16.txt ETS002 04-10-16.txt

Cable(s): 145-416 1-18 GHz 10-08-16.txt NONE.

Barometer: DAV004

Filter: NONE

Temp/Humidity/Pressure: 20c

25%

1006mB

Frequency Range: Frequencies Shown

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, Channel 11, X-axis (Unit on its back)											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2405.000	63.60	31.98	3.68	0.00	0.00	4.04	30.00	-25.96	5/10 MHz
PK	H	2405.000	70.88	31.98	3.68	0.00	0.00	11.32	30.00	-18.68	5/10 MHz
Note: RF Output Power, Channel 11, Y-axis (Unit on its long side)											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2405.000	70.29	31.98	3.68	0.00	0.00	10.73	30.00	-19.27	5/10 MHz
PK	H	2405.000	65.77	31.98	3.68	0.00	0.00	6.21	30.00	-23.79	5/10 MHz
Note: RF Output Power, Channel 11, Z-axis (Unit on its short side)											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2405.000	67.42	31.98	3.68	0.00	0.00	7.86	30.00	-22.14	5/10 MHz
PK	H	2405.000	69.65	31.98	3.68	0.00	0.00	10.09	30.00	-19.91	5/10 MHz
Note: RF Output Power, Channel 19, X-axis (Unit on its back)											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2445.000	65.77	32.09	3.73	0.00	0.00	6.38	30.00	-23.62	5/10 MHz
PK	H	2445.000	69.78	32.09	3.73	0.00	0.00	10.39	30.00	-19.61	5/10 MHz
Note: RF Output Power, Channel 19, Y-axis (Unit on its long side)											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2445.000	70.55	32.09	3.73	0.00	0.00	11.16	30.00	-18.84	5/10 MHz
PK	H	2445.000	66.28	32.09	3.73	0.00	0.00	6.89	30.00	-23.11	5/10 MHz
Note: RF Output Power, Channel 19, Z-axis (Unit on its short side)											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2445.000	71.82	32.09	3.73	0.00	0.00	12.43	30.00	-17.57	5/10 MHz
PK	H	2445.000	71.19	32.09	3.73	0.00	0.00	11.80	30.00	-18.20	5/10 MHz
Note: RF Output Power, Channel 26, X-axis (Unit on its back)											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2480.000	66.79	32.19	3.78	0.00	0.00	7.54	30.00	-22.46	5/10 MHz
PK	H	2480.000	68.17	32.19	3.78	0.00	0.00	8.92	30.00	-21.08	5/10 MHz
Note: RF Output Power, Channel 26, Y-axis (Unit on its long side)											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2480.000	69.15	32.19	3.78	0.00	0.00	9.90	30.00	-20.10	5/10 MHz
PK	H	2480.000	69.03	32.19	3.78	0.00	0.00	9.78	30.00	-20.22	5/10 MHz
Note: RF Output Power, Channel 26, Z-axis (Unit on its short side)											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2480.000	67.67	32.19	3.78	0.00	0.00	8.42	30.00	-21.58	5/10 MHz
PK	H	2480.000	70.51	32.19	3.78	0.00	0.00	11.26	30.00	-18.74	5/10 MHz

Human RF Exposure

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. .

§1.1310 The criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices shall be evaluated according to the provisions of §2.1093 of this chapter.

Part §1.1310 Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

(1) Occupational/controlled exposure limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when a person is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure. The phrase *fully aware* in the context of applying these exposure limits means that an exposed person has received written and/or verbal information fully explaining the potential for RF exposure resulting from his or her employment. With the exception of *transient* persons, this phrase also means that an exposed person has received appropriate training regarding work practices relating to controlling or mitigating his or her exposure. Such training is not required for *transient* persons, but they must receive written and/or verbal information and notification (for example, using signs) concerning their exposure potential and appropriate means available to mitigate their exposure. The phrase *exercise control* means that an exposed person is allowed to and knows how to reduce or avoid exposure by administrative or engineering controls and work practices, such as use of personal protective equipment or time averaging of exposure.

(2) General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

RSS-102 Issue 5 Exposure Limits:**Table 4: RF Field Strength Limits for Devices Used by the General Public
(Uncontrolled Environment)**

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ <i>f</i>	-	6**
1.1-10	87/ <i>f</i> ^{0.5}	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ <i>f</i> ^{0.25}	0.1540/ <i>f</i> ^{0.25}	8.944/ <i>f</i> ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 <i>f</i> ^{0.3417}	0.008335 <i>f</i> ^{0.3417}	0.02619 <i>f</i> ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> ^{1.2}
150000-300000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616000/ <i>f</i> ^{1.2}
Note: <i>f</i> is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

1.1 Test Procedure

An MPE evaluation was performed in order to show that the device was compliant with §2.1091. The maximum power density was calculated for each transmitter at a separation distance of 20 cm.

For each transmitter the maximum power RF exposure at a 20 cm distance using the formula:

$$\text{Conducted Power}_{\text{mW}} = 10^{\text{ConductedPower(dBm)}/10}$$

$$\text{Power Density} = [\text{Conducted Power}_{\text{mW}} \times \text{Ant.Gain}] / [4\pi \times (20_{\text{cm}})^2] \text{ or } [\text{EIRP}] / [4\pi \times (20_{\text{cm}})^2]$$

1.2 Results:

$$\text{Maximum Output Power} = 10^{(12.43/10)} \text{ or } 17.4985 \text{ mW}$$

$$\text{Power Density} = (17.4985) / 5025.6 \text{ or } 0.00348 \text{ mW/cm}^2$$

$$\text{Limit at 2.4 GHz} = 1 \text{ mW/cm}^2$$

$$\text{RSS-102 Issue 5 Exposure Limit at 2.4 GHz} = 5.35 \text{ W/m}^2$$

$$\text{Power Density} = 0.0348 \text{ W/m}^2$$

The calculated maximum power density at 20 cm distance is less than the limit for general population / uncontrolled exposure.

Test Personnel:	Vathana Ven <i>VSV</i>	Test Date:	02/25/2016
Supervising/Reviewing Engineer:			
(Where Applicable)	N/A		
Product Standard:	FCC Part 15 Subpart C and RSS-247	Limit Applied:	Below specified limit
Input Voltage:	DC Powered – P/S powered from 120 VAC 60 Hz		
Pretest Verification:	Yes	Ambient Temperature:	20 °C
		Relative Humidity:	25 %
		Atmospheric Pressure:	1006 mbars

Deviations, Additions, or Exclusions: None

9 Maximum Power Spectral Density

9.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C (15.247), ANSI C63.4, ANSI C63.10, KDB558074, and RSS-247.

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 dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

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

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

Where

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

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

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

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

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

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

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

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

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

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

Example:

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

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

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.

9.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004'	Weather Station	Davis Instruments	7400	PE80529A61A	10/23/2015	10/23/2017
145128'	EMI Receiver (20 Hz - 40 GHz)	Rohde & Schwarz	ESIB 40	839283/001	03/14/2015	03/14/2016
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	10/08/2015	10/08/2016
ETS002'	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	04/10/2015	04/10/2016
EMC04'	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	04/07/2015	04/07/2016
145014'	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	05/13/2015	05/13/2016

Software Utilized:

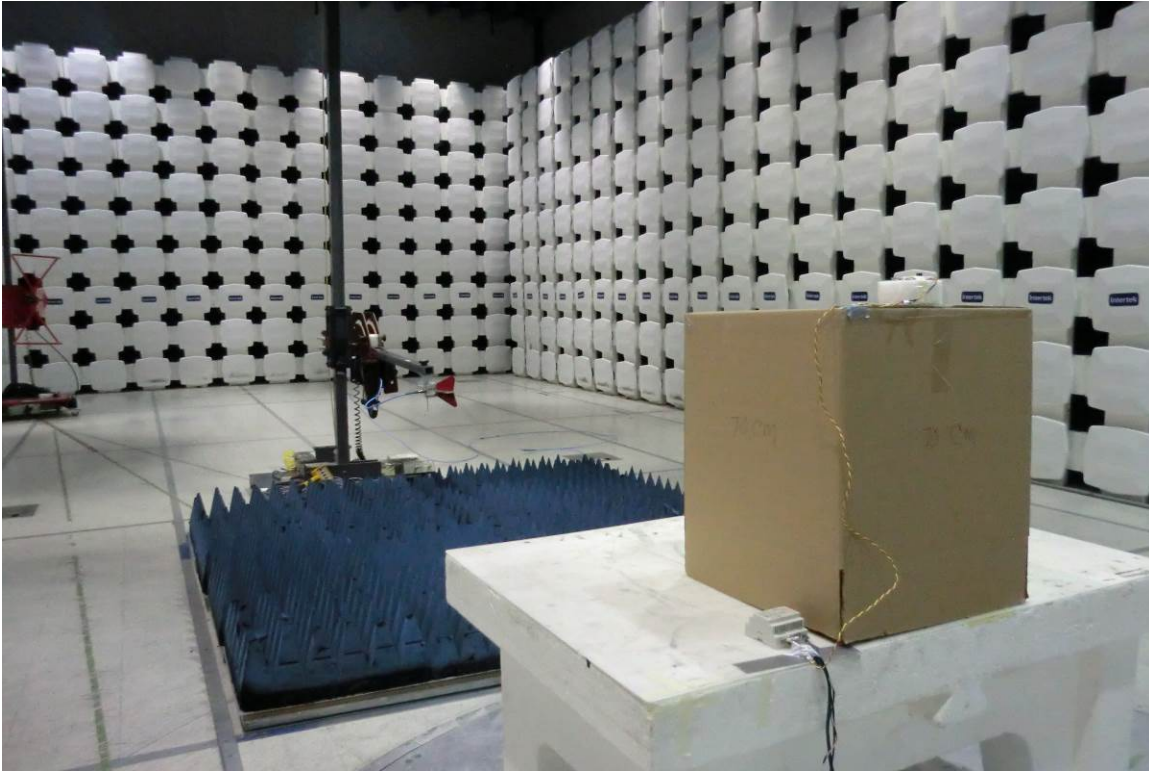
Name	Manufacturer	Version
EMI Boxborough.xls	Intertek	08/27/10

9.3 Results:

The sample tested was found to Comply. The peak power spectral density must not exceed 8 dBm in any 3 kHz bandwidth using the methods of ANSI C63.10:2009.

9.4 Setup Photographs:

1-18 GHz



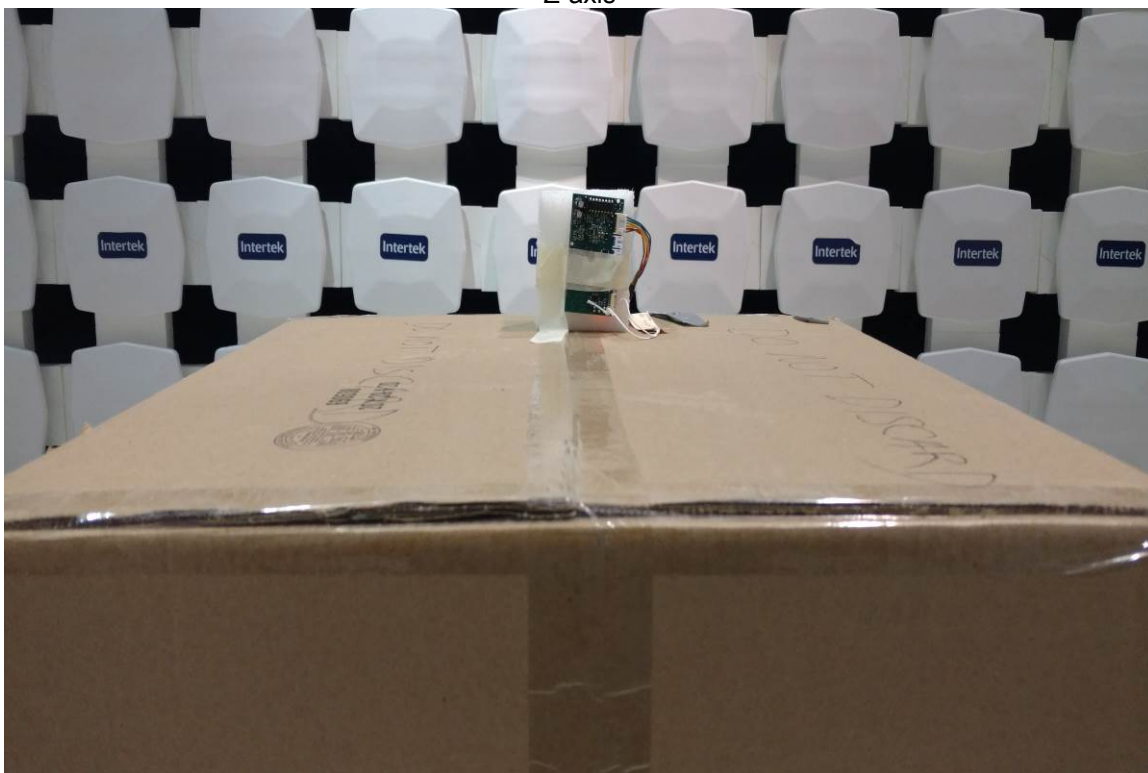
X-axis



Y-axis



Z-axis



9.5 Test Data:

Intertek

Power Spectral Density

Company: Honeywell International

Model #: DD15

Serial #: UUT#1

Engineers: Vathana Ven

Project #: G102479488

Standard: FCC Part 15 Subpart B Class B

Receiver: R&S ESI (145-128) 03-14-2016

PreAmp: 145-003 10-11-15.txt

PreAmp Used? (Y or N): N

Date(s): 02/25/16

Limit Distance (m): 3

Test Distance (m): 3

Voltage/Frequency:

Frequency Range: Frequencies Shown

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: Power Spectral Density, Channel 11, X-axis (Unit on its back)											
Peak Power Spectral Density, normalized from 100kHz to 3 kHz using Bandwidth Correction Factor 10LOG(3/100 kHz)=-15.2 dB											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2405.000	62.82	31.98	3.68	0.00	0.00	-11.94	8.00	-19.94	100/300 kHz
PK	H	2405.000	67.01	31.98	3.68	0.00	0.00	-7.75	8.00	-15.75	100/300 kHz
Note: Power Density measured in a 3 kHz RBW											
PK	V	2405.000	46.73	31.98	3.68	0.00	0.00	-12.83	8.00	-20.83	3/10 kHz
PK	H	2405.000	53.96	31.98	3.68	0.00	0.00	-5.60	8.00	-13.60	3/10 kHz
Note: Power Spectral Density, Channel 11, Y-axis (Unit on its long side)											
Peak Power Spectral Density, normalized from 100kHz to 3 kHz using Bandwidth Correction Factor 10LOG(3/100 kHz)=-15.2 dB											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2405.000	66.63	31.98	3.68	0.00	0.00	-8.13	8.00	-16.13	100/300 kHz
PK	H	2405.000	62.17	31.98	3.68	0.00	0.00	-12.59	8.00	-20.59	100/300 kHz
Note: Power Density measured in a 3 kHz RBW											
PK	V	2405.000	54.53	31.98	3.68	0.00	0.00	-5.03	8.00	-13.03	3/10 kHz
PK	H	2405.000	48.85	31.98	3.68	0.00	0.00	-10.71	8.00	-18.71	3/10 kHz
Note: Power Spectral Density, Channel 11, Z-axis (Unit on its short side)											
Peak Power Spectral Density, normalized from 100kHz to 3 kHz using Bandwidth Correction Factor 10LOG(3/100 kHz)=-15.2 dB											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2405.000	63.68	31.98	3.68	0.00	0.00	-11.08	8.00	-19.08	100/300 kHz
PK	H	2405.000	65.67	31.98	3.68	0.00	0.00	-9.09	8.00	-17.09	100/300 kHz
Note: Power Density measured in a 3 kHz RBW											
PK	V	2405.000	51.20	31.98	3.68	0.00	0.00	-8.36	8.00	-16.36	3/10 kHz
PK	H	2405.000	53.51	31.98	3.68	0.00	0.00	-6.05	8.00	-14.05	3/10 kHz
Note: Power Spectral Density, Channel 19, X-axis (Unit on its back)											
Peak Power Spectral Density, normalized from 100kHz to 3 kHz using Bandwidth Correction Factor 10LOG(3/100 kHz)=-15.2 dB											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2445.000	62.07	32.09	3.73	0.00	0.00	-12.52	8.00	-20.52	100/300 kHz
PK	H	2445.000	66.16	32.09	3.73	0.00	0.00	-8.43	8.00	-16.43	100/300 kHz
Note: Power Density measured in a 3 kHz RBW											
PK	V	2445.000	50.06	32.09	3.73	0.00	0.00	-9.33	8.00	-17.33	3/10 kHz
PK	H	2445.000	52.40	32.09	3.73	0.00	0.00	-6.99	8.00	-14.99	3/10 kHz

Note: Power Spectral Density, Channel 19, Y-axis (Unit on its long side)											
Peak Power Spectral Density, normalized from 100kHz to 3 kHz using Bandwidth Correction Factor 10LOG(3/100 kHz)=-15.2 dB											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2445.000	66.48	32.09	3.73	0.00	0.00	-8.11	8.00	-16.11	100/300 kHz
PK	H	2445.000	62.71	32.09	3.73	0.00	0.00	-11.88	8.00	-19.88	100/300 kHz
Note: Power Density measured in a 3 kHz RBW											
PK	V	2445.000	53.07	32.09	3.73	0.00	0.00	-6.32	8.00	-14.32	3/10 kHz
PK	H	2445.000	49.03	32.09	3.73	0.00	0.00	-10.36	8.00	-18.36	3/10 kHz
Note: Power Spectral Density, Channel 19, Z-axis (Unit on its short side)											
Peak Power Spectral Density, normalized from 100kHz to 3 kHz using Bandwidth Correction Factor 10LOG(3/100 kHz)=-15.2 dB											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2445.000	68.24	32.09	3.73	0.00	0.00	-6.35	8.00	-14.35	100/300 kHz
PK	H	2445.000	67.49	32.09	3.73	0.00	0.00	-7.10	8.00	-15.10	100/300 kHz
Note: Power Density measured in a 3 kHz RBW											
PK	V	2445.000	55.32	32.09	3.73	0.00	0.00	-4.07	8.00	-12.07	3/10 kHz
PK	H	2445.000	54.36	32.09	3.73	0.00	0.00	-5.03	8.00	-13.03	3/10 kHz
Note: Power Spectral Density, Channel 26, X-axis (Unit on its back)											
Peak Power Spectral Density, normalized from 100kHz to 3 kHz using Bandwidth Correction Factor 10LOG(3/100 kHz)=-15.2 dB											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2480.000	63.28	32.19	3.78	0.00	0.00	-11.17	8.00	-19.17	100/300 kHz
PK	H	2480.000	64.31	32.19	3.78	0.00	0.00	-10.14	8.00	-18.14	100/300 kHz
Note: Power Density measured in a 3 kHz RBW											
PK	V	2480.000	49.91	32.19	3.78	0.00	0.00	-9.34	8.00	-17.34	3/10 kHz
PK	H	2480.000	50.95	32.19	3.78	0.00	0.00	-8.30	8.00	-16.30	3/10 kHz
Note: Power Spectral Density, Channel 26, Y-axis (Unit on its long side)											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
Peak Power Spectral Density, normalized from 100kHz to 3 kHz using Bandwidth Correction Factor 10LOG(3/100 kHz)=-15.2 dB											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2480.000	65.59	32.19	3.78	0.00	0.00	-8.86	8.00	-16.86	100/300 kHz
PK	H	2480.000	65.19	32.19	3.78	0.00	0.00	-9.26	8.00	-17.26	100/300 kHz
Note: Power Density measured in a 3 kHz RBW											
PK	V	2480.000	51.91	32.19	3.78	0.00	0.00	-7.34	8.00	-15.34	3/10 kHz
PK	H	2480.000	53.43	32.19	3.78	0.00	0.00	-5.82	8.00	-13.82	3/10 kHz
Note: Power Spectral Density, Channel 26, Z-axis (Unit on its short side)											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
Peak Power Spectral Density, normalized from 100kHz to 3 kHz using Bandwidth Correction Factor 10LOG(3/100 kHz)=-15.2 dB											
Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP											
PK	V	2480.000	63.44	32.19	3.78	0.00	0.00	-11.01	8.00	-19.01	100/300 kHz
PK	H	2480.000	66.85	32.19	3.78	0.00	0.00	-7.60	8.00	-15.60	100/300 kHz
Note: Power Density measured in a 3 kHz RBW											
PK	V	2480.000	51.63	32.19	3.78	0.00	0.00	-7.62	8.00	-15.62	3/10 kHz
PK	H	2480.000	53.11	32.19	3.78	0.00	0.00	-6.14	8.00	-14.14	3/10 kHz

Test Personnel: Vathana Ven
 Supervising/Reviewing Engineer: N/A
 (Where Applicable) FCC Part 15 Subpart C and
 Product Standard: RSS-247
DC Powered - P/S powered
 Input Voltage: from 120 VAC 60 Hz
 Pretest Verification: Yes

Test Date: 02/25/2016

Limit Applied: Below specified limit

Ambient Temperature: 20 °C
 Relative Humidity: 25 %
 Atmospheric Pressure: 1006 mbars

Deviations, Additions, or Exclusions: None

10 Band Edge Compliance

10.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C (15.247), ANSI C63.4, ANSI C63.10, KDB558074, and RSS-247.

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 dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

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

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

Where

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

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

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

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

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

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

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

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

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

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

Example:

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

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

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.

10.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004'	Weather Station	Davis Instruments	7400	PE80529A61A	10/23/2015	10/23/2017
145128'	EMI Receiver (20 Hz - 40 GHz)	Rohde & Schwarz	ESIB 40	839283/001	03/14/2015	03/14/2016
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	10/08/2015	10/08/2016
ETS002'	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	04/10/2015	04/10/2016
EMC04'	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	04/07/2015	04/07/2016
145014'	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	05/13/2015	05/13/2016

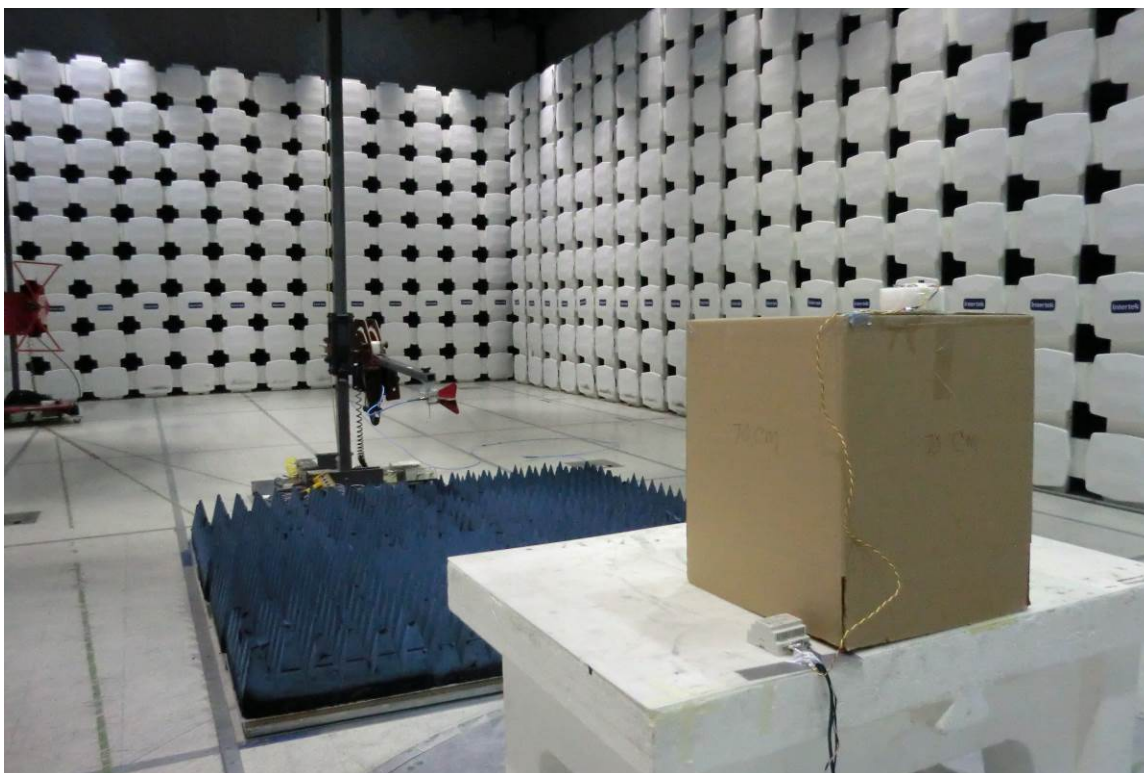
Software Utilized:

Name	Manufacturer	Version
EMI Boxborough.xls	Intertek	08/27/10

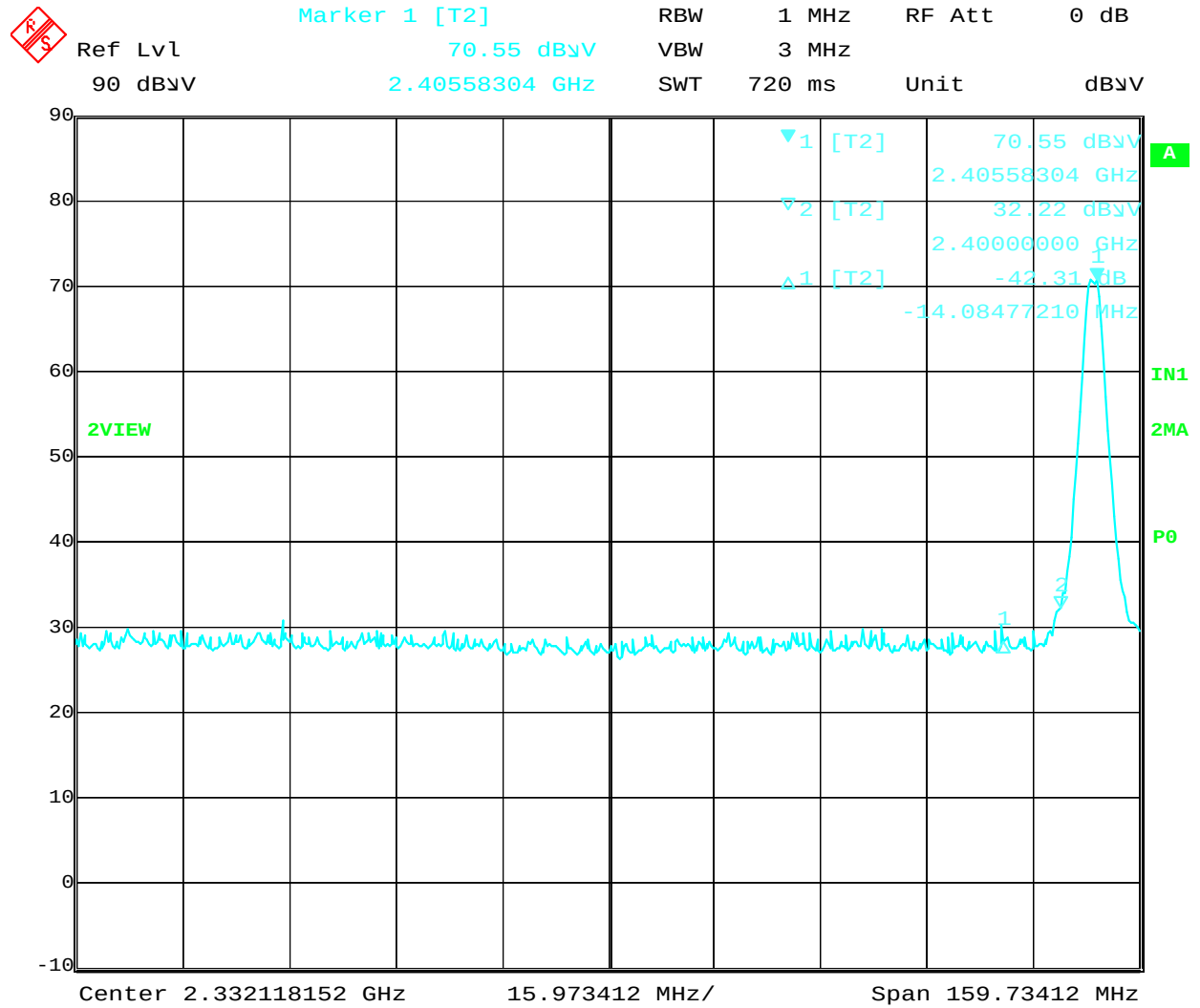
10.3 Results:

The sample tested was found to Comply.

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

10.4 Setup Photograph:

10.5 Plots/Data:

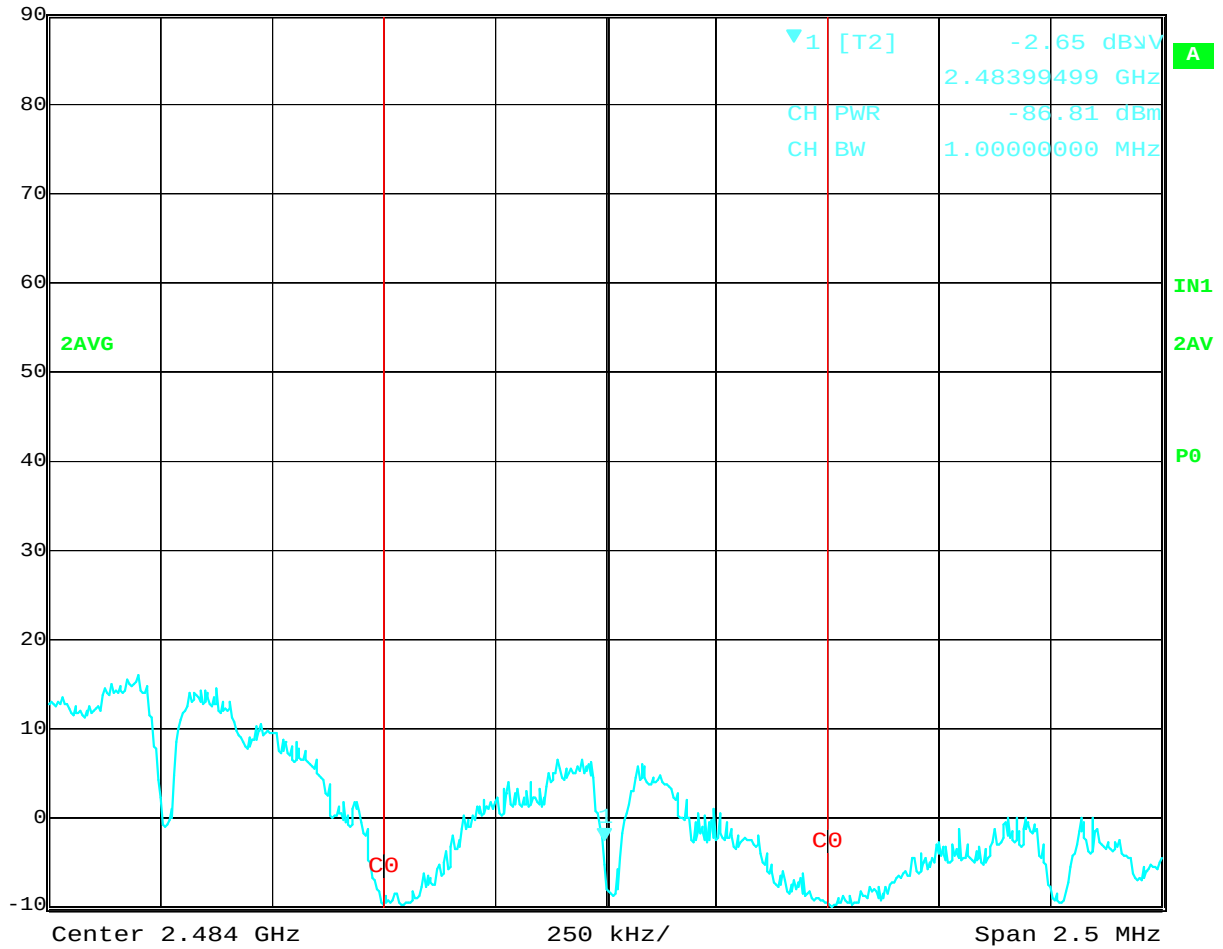


Date: 25.FEB.2016 21:12:51

Note: The unit shown in the above plot is dBuV.



Ref Lvl	Marker 1 [T2]	RBW	10 kHz	RF Att	0 dB
90 dBuV	-2.65 dBuV	VBW	30 kHz		
	2.48399499 GHz	SWT	100 ms	Unit	dBuV

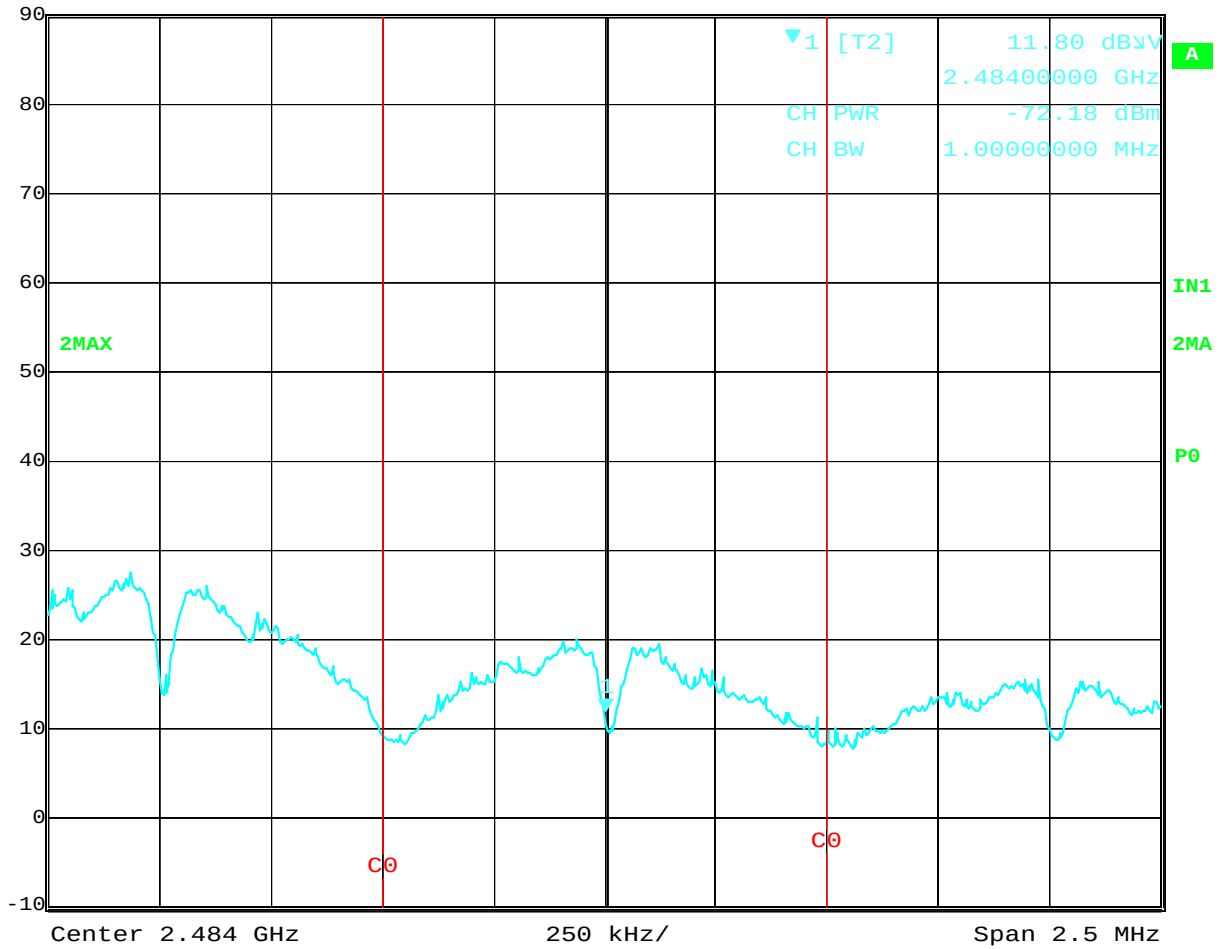


Date: 26.FEB.2016 00:02:49

Note: The unit shown in the above plot is dBuV



Marker 1 [T2] RBW 10 kHz RF Att 0 dB
 Ref Lvl 11.80 dBuV VBW 30 kHz
 90 dBuV 2.48400000 GHz SWT 2 s Unit dBuV



Date: 26.FEB.2016 00:00:13

Note: The unit shown in the above plot is dBuV.

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
Note: Upper Band Edge Compliance, Integrated to 1 MHz RBW Equivalent											
PK	V	2484.000	35.30	32.20	3.79	0.00	0.00	71.28	74.00	-2.72	10 kHz/30 kHz
AVG	V	2484.000	17.50	32.20	3.79	0.00	0.00	53.48	54.00	-0.52	10 kHz/30 kHz

Test Personnel:	Vathana Ven <i>VSV</i>	Test Date:	02/26/2016
Supervising/Reviewing Engineer:			
(Where Applicable)	N/A		
Product Standard:	FCC Part 15 Subpart C and RSS-247	Limit Applied:	Below specified limit
Input Voltage:	DC Powered – P/S powered from 120 VAC 60 Hz	Ambient Temperature:	20 °C
Pretest Verification:	Yes	Relative Humidity:	25 %
		Atmospheric Pressure:	1006 mbars

11 Digital Devices Radiated Spurious Emissions

11.1 Method

Tests are performed in accordance with Configuration as required by FCC 47CFR Part 15 Subpart B (2/2016), ICES-003 Issue 6 January 2016, ANSI C 63.4:2014, and RSS-Gen Issue 4 November 2014.

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	4.6dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

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

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

Where

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

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

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

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

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

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

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

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

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

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

Example:

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

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

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.

11.2 Test Equipment Used:

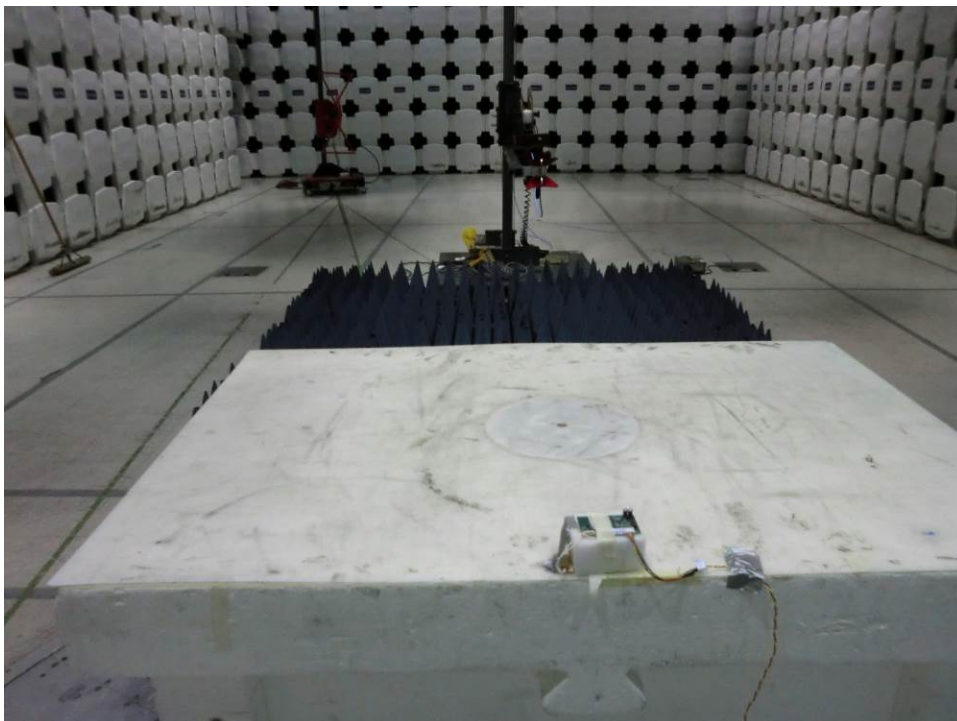
Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004'	Weather Station	Davis Instruments	7400	PE80529A61A	10/23/2015	10/23/2017
145128'	EMI Receiver (20 Hz - 40 GHz)	Rohde & Schwarz	ESIB 40	839283/001	03/14/2015	03/14/2016
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	10/08/2015	10/08/2016
ETS002'	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	04/10/2015	04/10/2016
145013'	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2944A07027	10/12/2015	10/12/2016
145106'	Bilog Antenna (30MHz - 5GHz)	Sunol Sciences	JB5	A111003	11/10/2015	11/10/2016
145-410'	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	09/01/2015	09/01/2016
145014'	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	05/13/2015	05/13/2016

Software Utilized:

Name	Manufacturer	Version
Compliance5	Teseq	5.26.46.46

11.3 Results:

The sample tested was found to Comply.

11.4 Setup Photographs:

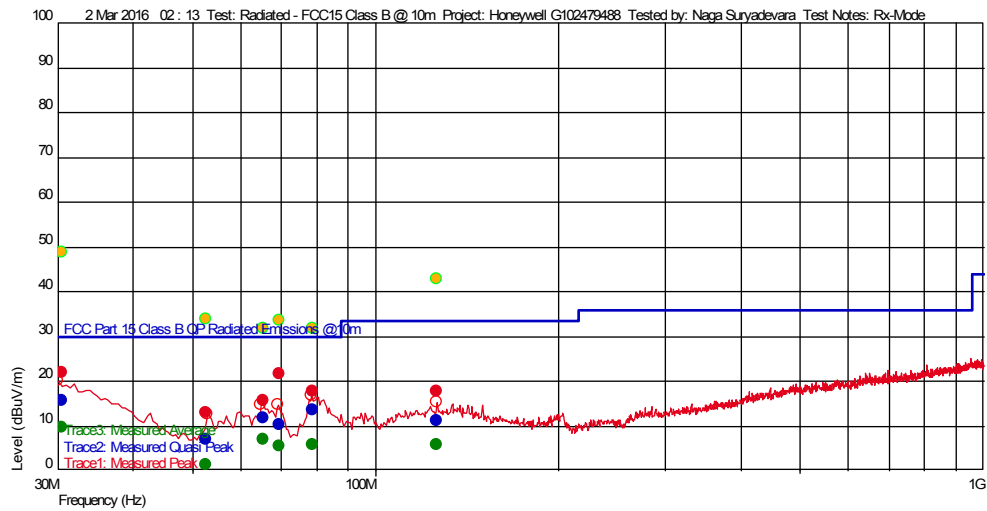
11.5 Plots/Data:

Power Supply @ 120 VAC 60 Hz, 30 MHz – 1 GHz, Rx Mode

Test Information

Test Details	User Entry
Test:	Radiated - FCC15 Class B @ 10m
Project:	Honeywell G102479488
Test Notes:	Rx-Mode
Temperature:	20 C
Humidity:	17% 999 mbars
Tested by:	Naga Suryadevara
Test Started:	2 Mar 2016 02 : 13

Prescan Emission Graph



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

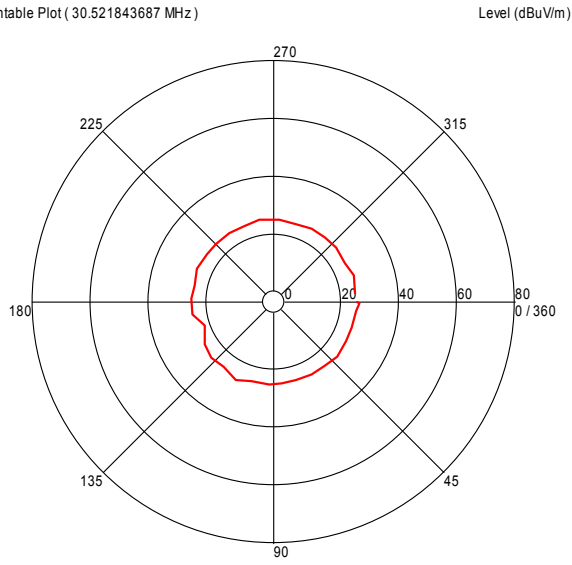
Emissions Test Data

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)
52.620240118 M	7.15	7.376	-27.584	30.000	-22.85		354	1.66	120 k
126.593587285 M	11.11	14.200	-26.214	33.520	-22.41	--	237	4.00	120 k
69.547294134 M	10.28	8.200	-27.161	30.000	-19.72		21	1.04	120 k
65.606412866 M	11.84	8.061	-27.260	30.000	-18.16		94	4.00	120 k
78.857715042 M	13.72	7.714	-26.929	30.000	-16.28		172	3.98	120 k
30.521843687 M	15.69	21.135	-28.049	30.000	-14.31	--	127	3.20	120 k

Azimuth Plots

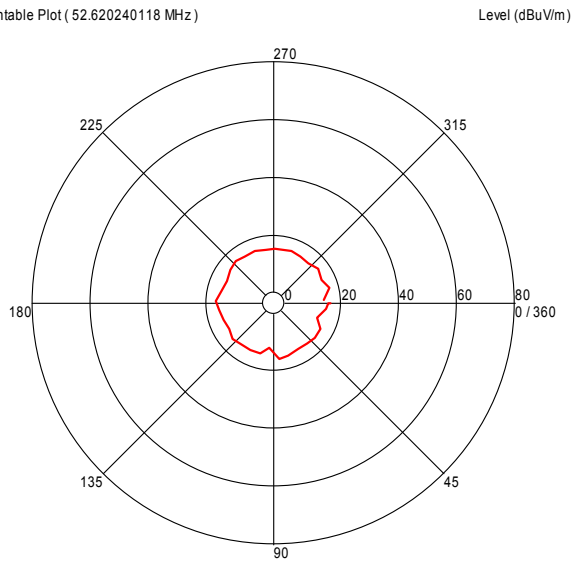
Turntable Plot (30.521843687 MHz)



All Polarities

Azimuth (Degrees)

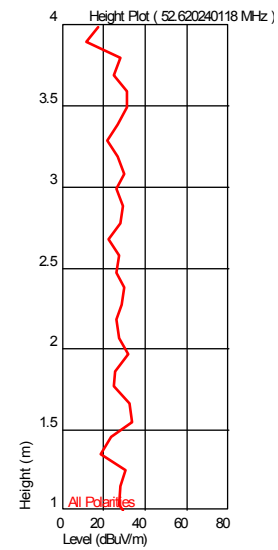
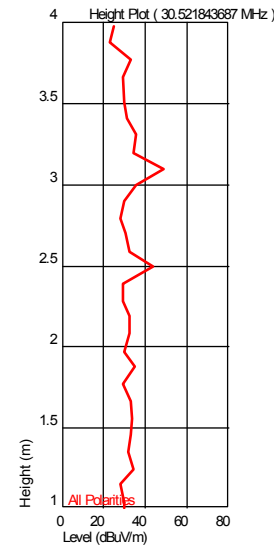
Turntable Plot (52.620240118 MHz)



All Polarities

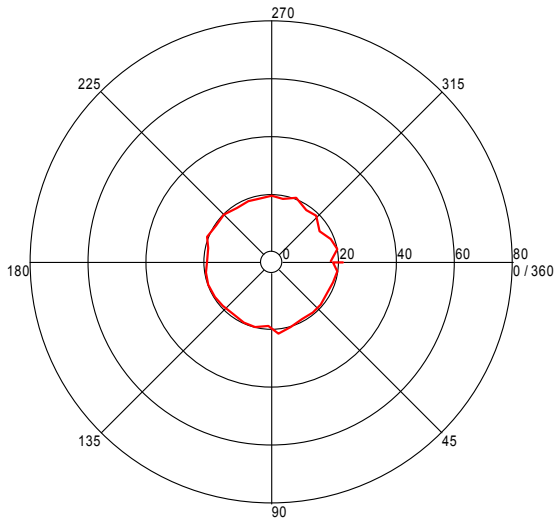
Azimuth (Degrees)

Turntable Plots



Turntable Plot (65.606412866 MHz)

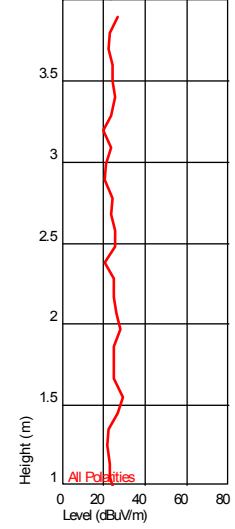
Level (dBuV/m)



All Polarities

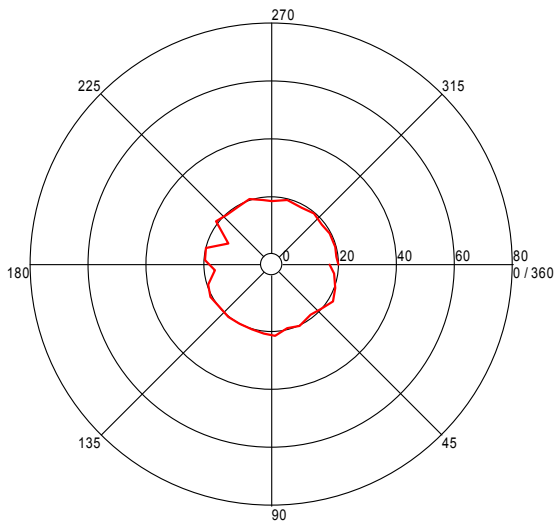
Azimuth (Degrees)

Height Plot (65.606412866 MHz)



Turntable Plot (69.547294134 MHz)

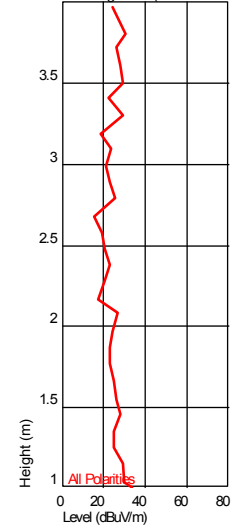
Level (dBuV/m)



All Polarities

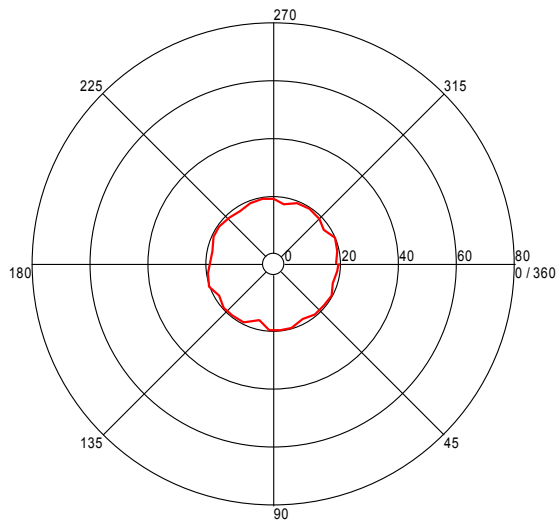
Azimuth (Degrees)

Height Plot (69.547294134 MHz)



Turntable Plot (78.857715042 MHz)

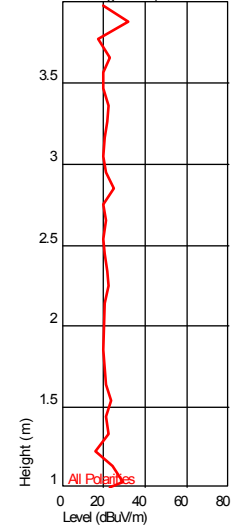
Level (dBuV/m)



All Polarities

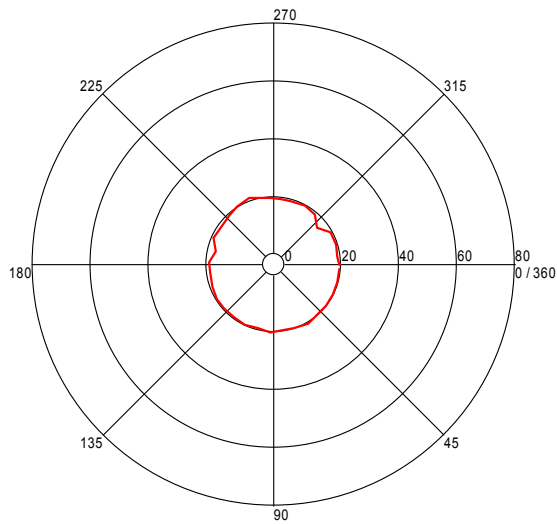
Azimuth (Degrees)

Height Plot (78.857715042 MHz)



Turntable Plot (126.593587285 MHz)

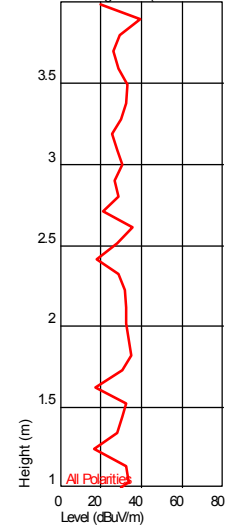
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (126.593587285 MHz)

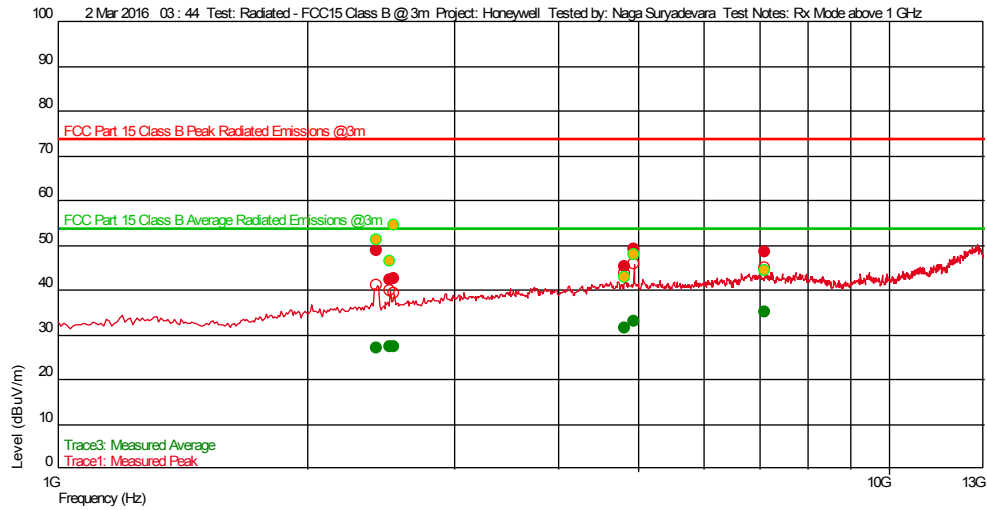


Power Supply @ 120 VAC 60 Hz, 1-13 GHz, Rx Mode

Test Information

Test Details	User Entry
Test:	Radiated - FCC15 Class B @ 3m
Project:	Honeywell
Test Notes:	Rx Mode above 1 GHz
Temperature:	20 C
Humidity:	14% 999 mbars
Tested by:	Naga Suryadevara
Test Started:	2 Mar 2016 03 : 44

Prescan Emission Graph



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

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)
2.514609218 G	42.35	32.250	-33.988	74.000	-31.65	--	68	2.04	1 M
2.545938543 G	42.57	32.269	-33.930	74.000	-31.43		105	1.51	1 M
4.820808284 G	45.32	34.010	-29.896	74.000	-28.68	--	18	1.92	1 M
7.10243821 G	48.50	35.671	-29.458	74.000	-25.50	--	169	2.40	1 M
2.423787575 G	48.81	32.031	-34.156	74.000	-25.19	--	99	1.45	1 M
4.940861724 G	49.25	34.038	-29.725	74.000	-24.75	--	7	1.68	1 M

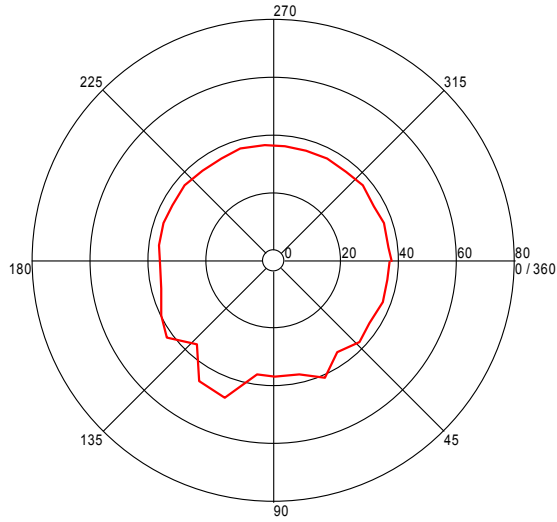
Trace3: Measured Average

Frequency(Hz)	Level (dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)
2.423787575 G	26.96	32.031	-34.156	54.000	-27.04	--	99	1.45	1 M
2.514609218 G	27.18	32.250	-33.988	54.000	-26.82	--	68	2.04	1 M
2.545938543 G	27.42	32.269	-33.930	54.000	-26.58		105	1.51	1 M
4.820808284 G	31.61	34.010	-29.896	54.000	-22.39	--	18	1.92	1 M
4.940861724 G	33.07	34.038	-29.725	54.000	-20.93	--	7	1.68	1 M
7.10243821 G	35.13	35.671	-29.458	54.000	-18.87	--	169	2.40	1 M

Azimuth Plots

Turntable Plot (2.423787575 GHz)

Level (dBuV/m)

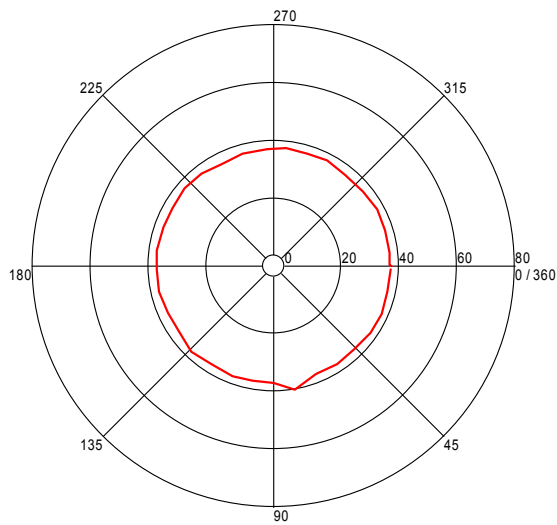


All Polarities

Azimuth (Degrees)

Turntable Plot (2.514609218 GHz)

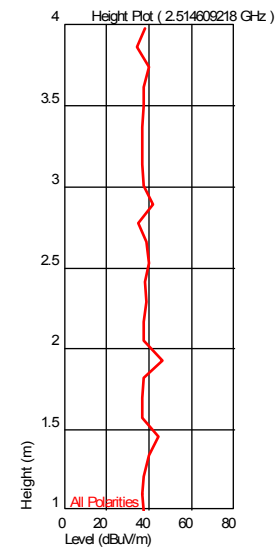
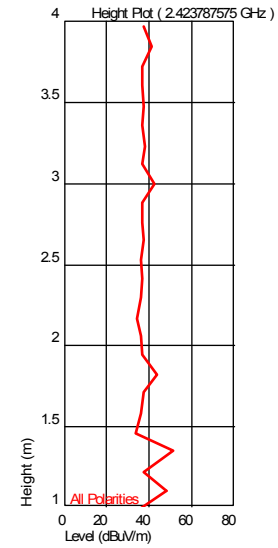
Level (dBuV/m)



All Polarities

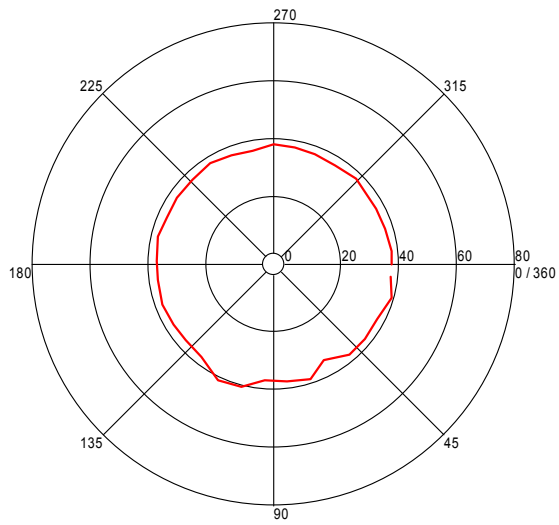
Azimuth (Degrees)

Turntable Plots



Turntable Plot (2.545938543 GHz)

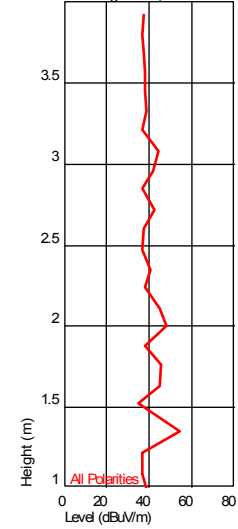
Level (dBuV/m)



All Polarities

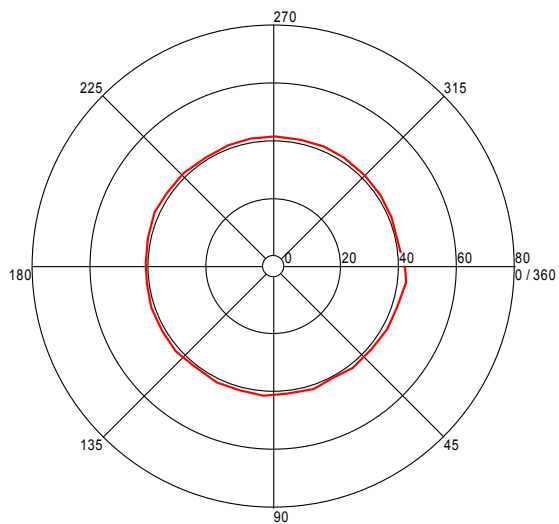
Azimuth (Degrees)

Height Plot (2.545938543 GHz)



Turntable Plot (4.820808284 GHz)

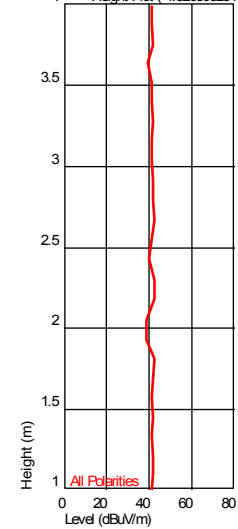
Level (dBuV/m)



All Polarities

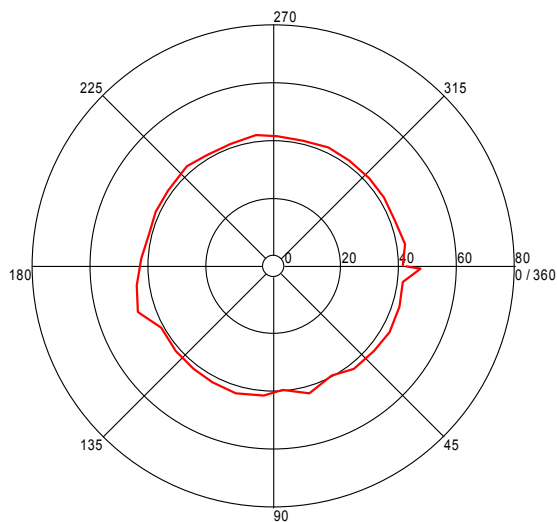
Azimuth (Degrees)

Height Plot (4.820808284 GHz)



Turntable Plot (4.940861724 GHz)

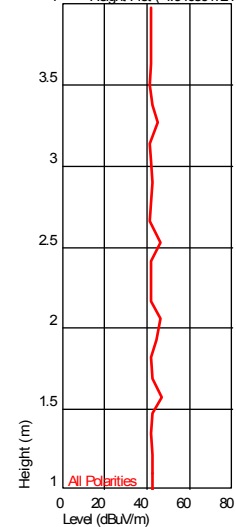
Level (dBuV/m)



All Polarities

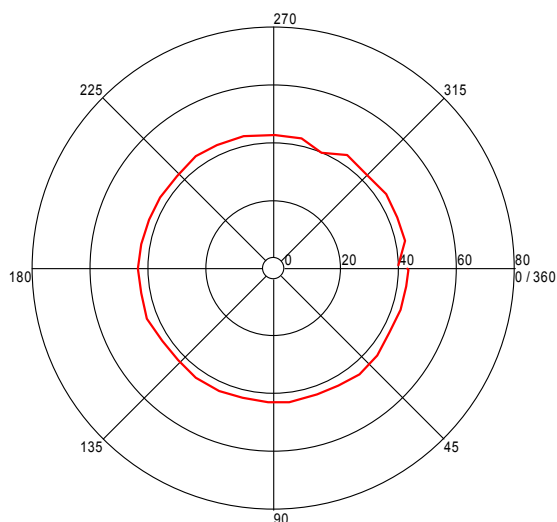
Azimuth (Degrees)

Height Plot (4.940861724 GHz)



Turntable Plot (7.10243821 GHz)

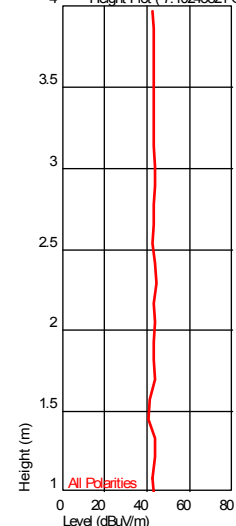
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (7.10243821 GHz)



Test Personnel: Naga Suryadevara NS
Supervising/Reviewing Engineer:
(Where Applicable) N/A

Test Date: 03/02/2016

Product Standard: FCC Part15 Subpart B
DC Powered – P/S powered
from 120 VAC 60 Hz

Limit Applied: Class B

Input Voltage:
Pretest Verification w/
Ambient Signals or
BB Source: Yes

Ambient Temperature: 20 °C

Relative Humidity: 14%
Atmospheric Pressure: 999 mbars

Deviations, Additions, or Exclusions: None

12 AC Mains Conducted Emissions

12.1 Method

Tests are performed in accordance with Configuration as required CFR Part 15 Subpart B (2/2016), ICES-003 Issue 5 August 2012, ANSI C 63.4:2014, and RSS-Gen Issue 4 November 2014.

TEST SITE: EMC Lab

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

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucisp
AC Line Conducted Emissions	150 kHz - 30 MHz	2.8dB	3.4dB
Telco Port Emissions	150 kHz - 30 MHz	3.2dB	5.0dB

As shown in the table above our conducted emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculations

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

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

Where NF = Net Reading in dB μ V

RF = Reading from receiver in dB μ V

LF = LISN 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:

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

$$NF = \text{Net Reading in dB}\mu\text{V}$$

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.

12.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV001'	Weather Station	Davis Instruments	7400	PE80519A61	10/23/2015	10/23/2017
ROS002'	9kHz to 3GHz EMI Test Receiver	Rohde & Schwartz	ESCI 1166.5950K03	100067	07/23/2015	07/23/2016
MET1'	Digital Multimeter	Meterman	15XP	050407785	05/08/2015	05/08/2016
LISN30'	LISN - CISPR16 Compliant 9kHz-30MHz	Com-Power	LI-215A	191961	03/18/2015	03/18/2016
DS22'	Attenuator, 20dB	Mini Circuits	20dB, 50 ohm	DS22	07/31/2015	07/31/2016
CBL2014-1'	RG58C/U, BNC (M)	Pomona	2249-C-180	CBL2014-1	04/02/2015	04/02/2016
DS23A'	Attenuator, 20dB	Mini Circuits	20dB, 50 ohm	DS23A	10/15/2015	10/15/2016

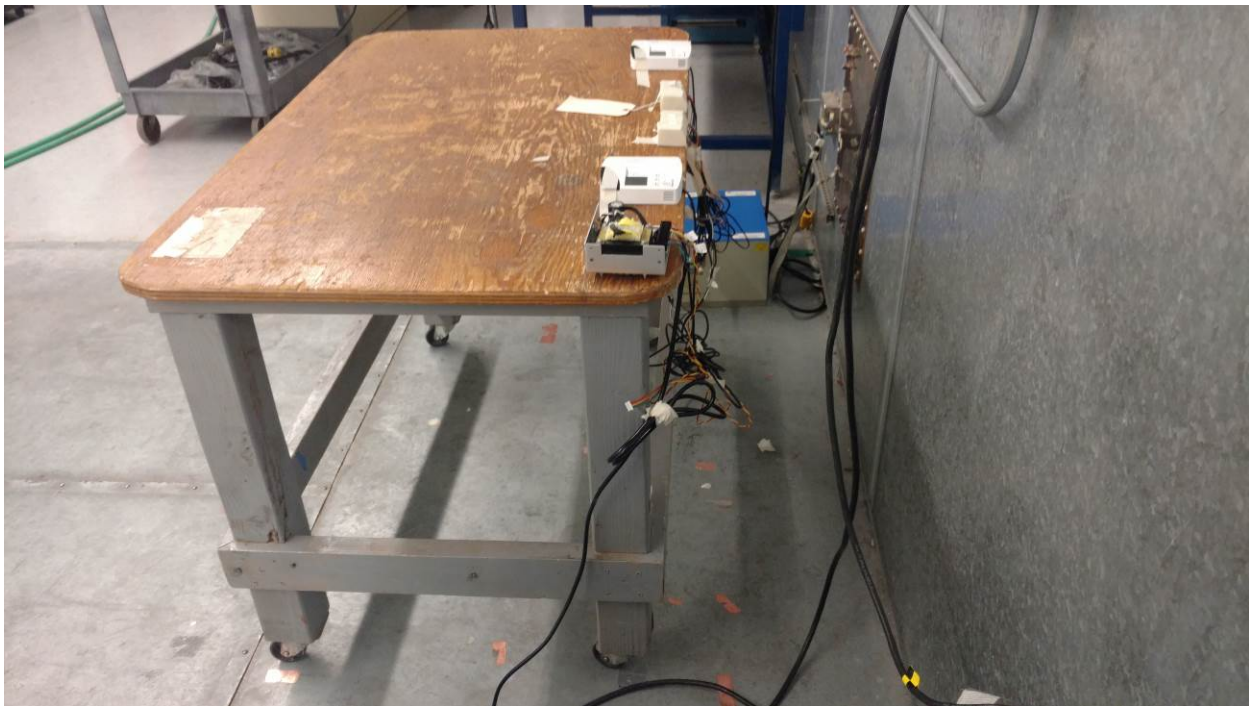
Software Utilized:

Name	Manufacturer	Version
Compliance5	Teseq	5.26.46.46

12.3 Results:

The sample tested was found to Comply.

12.4 Setup Photographs:



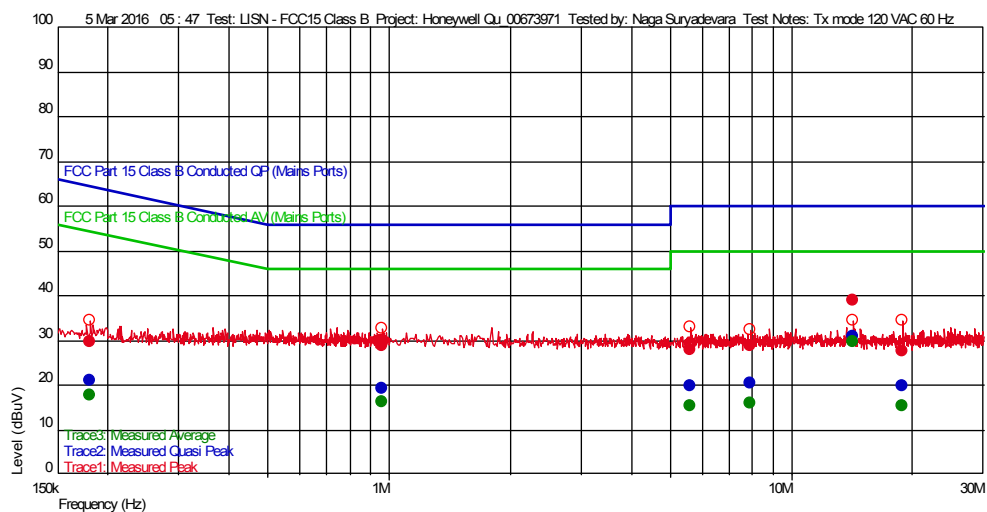
12.5 Plots/Data:

Power Supply @ 120 VAC 60 Hz, Tx-mode, Mid Channel

Test Information

Test Details	User Entry
Test:	LISN - FCC15 Class B
Project:	Honeywell Qu_00673971
Test Notes:	Tx mode 120 VAC 60 Hz
Temperature:	20 C
Humidity:	18%
Tested by:	Naga Suryadevara
Test Started:	5 Mar 2016 05 : 47

Prescan Emission Graph



Emissions Test Data

Trace2: Measured Quasi Peak

Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	LINE
181.45 k	21.11	0.090	20.022	64.419	-43.31	9 k	L1
18.92 M	19.89	0.010	20.310	60.000	-40.11	9 k	N
5.635 M	19.96	0.060	20.156	60.000	-40.04	9 k	L1
7.921 M	20.53	0.052	20.199	60.000	-39.47	9 k	L1
961.75 k	19.38	0.060	20.067	56.000	-36.62	9 k	L1
14.28 M	30.97	0.027	20.272	60.000	-29.03	9 k	N

Trace3: Measured Average

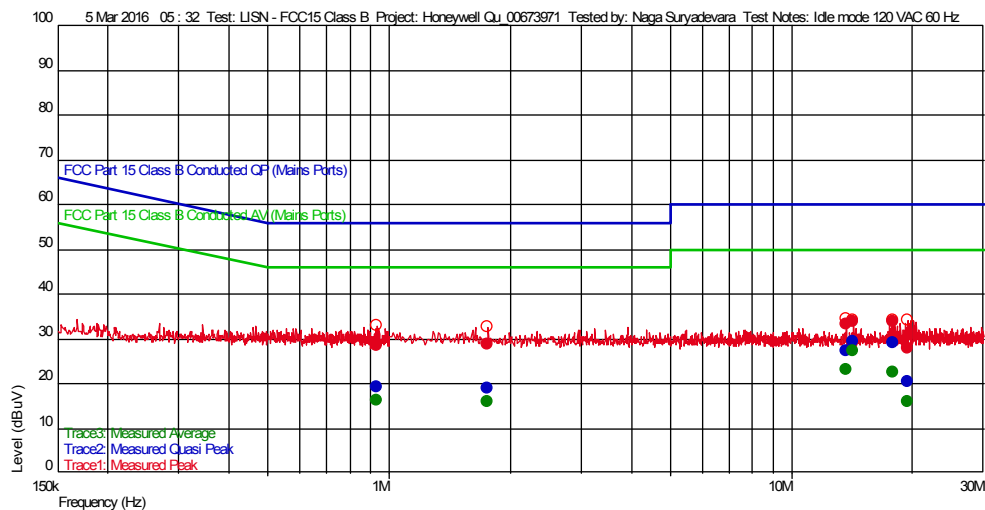
Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	LINE
181.45 k	17.71	0.090	20.022	54.419	-36.71	9 k	L1
18.92 M	15.33	0.010	20.310	50.000	-34.67	9 k	N
5.635 M	15.41	0.060	20.156	50.000	-34.59	9 k	L1
7.921 M	15.83	0.052	20.199	50.000	-34.17	9 k	L1
961.75 k	16.26	0.060	20.067	46.000	-29.74	9 k	L1
14.28 M	29.75	0.027	20.272	50.000	-20.25	9 k	N

Power Supply @ 120 VAC 60 Hz, Rx-mode, Mid Channel

Test Information

Test Details	User Entry
Test:	LISN - FCC15 Class B
Project:	Honeywell Qu_00673971
Test Notes:	Idle mode 120 VAC 60 Hz
Temperature:	20 C
Humidity:	18%
Tested by:	Naga Suryadevara
Test Started:	5 Mar 2016 05 : 32

Prescan Emission Graph



Emissions Test Data

Trace2: Measured Quasi Peak

Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	LINE
19.48 M	20.53	0.010	20.315	60.000	-39.47	9 k	L1
1.765 M	19.07	0.060	20.085	56.000	-36.93	9 k	N
935.4 k	19.38	0.060	20.064	56.000	-36.62	9 k	L1
13.68 M	27.18	0.030	20.267	60.000	-32.82	9 k	L1
17.98 M	29.01	0.010	20.302	60.000	-30.99	9 k	N
14.28 M	29.33	0.027	20.272	60.000	-30.67	9 k	N

Trace3: Measured Average

Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	LINE
19.48 M	15.96	0.010	20.315	50.000	-34.04	9 k	L1
1.765 M	16.11	0.060	20.085	46.000	-29.89	9 k	N
935.4 k	16.21	0.060	20.064	46.000	-29.79	9 k	L1
17.98 M	22.51	0.010	20.302	50.000	-27.49	9 k	N
13.68 M	23.14	0.030	20.267	50.000	-26.86	9 k	L1
14.28 M	27.45	0.027	20.272	50.000	-22.55	9 k	N

Test Personnel: Naga Suryadevara N5
 Supervising/Reviewing Engineer:
 (Where Applicable) N/A
 Product Standard: EN 55022, FCC Part15
Subpart B
DC Powered – P/S powered
from 120 VAC 60 Hz
 Pretest Verification w/
 Ambient Signals or
 BB Source: Yes

Test Date: 03/05/2016
 Limit Applied: Class B
 Ambient Temperature: 20 °C
 Relative Humidity: 18 %
 Atmospheric Pressure: 1003 mbars

Deviations, Additions, or Exclusions: Compliance to Class B limits was achieved with SLS-12-017T power supply.

13 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	03/14/2016	102479488BOX-004	NS	KPS <i>KPS</i>	Original Issue
1	03/20/2016	102479488BOX-004	NS	KPS <i>KPS</i>	Updated software used, radio receiver characteristics and Human RF Exposure
2	07/06/2016	102479488BOX-004	NS		Updated Page 3 – Test summary, Updated table on page -74, Updated Page 92 – Section 11.1, added note on page 89, 90