



FCC 47 CFR PART 15 SUBPART C

**BLUETOOTH LOW ENERGY
CERTIFICATION TEST REPORT**

FOR

TempuRing

MODEL NUMBER: PT-001

FCC ID: 2AE3ZPT-DS-5000

REPORT NUMBER: 10719529A

ISSUE DATE: July 15, 2015

Prepared for
PRIMA-TEMP
2820 WILDERNESS PLACE, SUITE C
BOULDER, CO 80301
USA

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Revision History

Rev.	Issue Date	Revisions	Revised By
--	July 15, 2015	Initial Issue	b.mucha

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: PRIMA-TEMP
2820 WILDERNESS PLACE, SUITE C
BOULDER, CO 80301, USA

EUT DESCRIPTION: TempuRing

MODEL: PT-001

SERIAL NUMBER: Non-serialized

DATE TESTED: April 2015 – June 2015

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL LLC based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL LLC By:



Michael Ferrer
EMC Engineer
UL LLC

Tested By:



Bart Mucha
EMC Engineer
UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15,

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 333 Pfingsten Road, Northbrook, IL 60062 USA.

UL NBK is accredited by NVLAP, Laboratory Code 100414-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/Standards/scopes/1004140.htm>

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Sample Calculations

Radiated Field Strength and Conducted Emissions data contained within this report is calculated on the following basis:

Field Strength (dBuV/m) = Meter Reading (dBuV) + AF (dB/m) - Gain (dB) + Cable Loss (dB)

Conducted Voltage (dBuV) = Meter Reading (dBuV) + Cable Loss (dB) + LISN IL (dB)

Conducted Current (dBuA) = Meter Reading (dBuV) + Cable Loss (dB) - Transducer Factor (dBohms)

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test	Range	Equipment	Uncertainty k=2
Radiated Emissions	30-200MHz	Bicon 10m Horz	4.27dB
Radiated Emissions	30-200MHz	Bicon 10m Vert	4.28dB
Radiated Emissions	200-1000MHz	LogP 10m Horz	3.33dB
Radiated Emissions	200-1000MHz	LogP 10m Vert	3.39dB
Radiated Emissions	1-6GHz	Horn	5.02dB
Radiated Emissions	6-18GHz	Horn	5.34dB
Radiated Emissions	18-26GHz	Horn	6.60dB
Conducted Ant Port	30MHz-26GHz	Spectrum Analyzer	2.94

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT (Equipment Under Test) is a Personal Fertility Temperature Sensor with BlueTooth LE transceiver.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE	4.26	2.67

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an integral folded dipole antenna, with a maximum gain of -6dBi.

5.4. SOFTWARE AND FIRMWARE

The EUT software installed during testing was STM8 ver. 1.3.

5.5. WORST-CASE CONFIGURATION AND MODE

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

The EUT operates only in single mode (BT LE).

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Description	Manufacturer	Model	Serial Number	FCC ID
EUT	PrimaTemp	PT-DS-5000	non-serialized	
Magnet	-	-	-	
Battery - used for testing only	-	-	-	

I/O CABLES

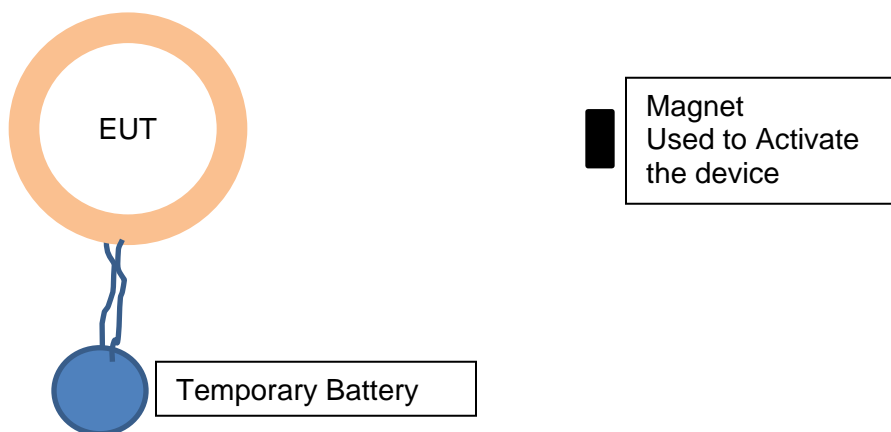
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
0	Enclosure	-	-	-	-	-
1	Power	0	0	2-wire	0.2	used as temporary to connect battery

TEST SETUP

The EUT is setup as stand-alone programmed to transmit continuously on specific channel.

For testing only an external battery and additional wires were connected to EUT.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Software					
Description	Manufacturer	Model	T No.	Cal Date	Cal Due
Radiated Software	UL	UL EMC		Ver 9.5, July 22, 2014	
Conducted Software	UL	UL EMC		Ver 9.5, May 17 2012	

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC4328	20141830	20151231
Bicon Antenna	Electro-Metrics	EM6912A	EMC4070	20141014	20151031
Log-P Antenna	Chase	UPA6109	EMC4313	20141119	20151130
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	20141216	20151231
Antenna Array	UL	BOMS	EMC4276	20141201	20151231
Spectrum Analyzer	Agilent	N9030A (PXA)	EMC4360	20141219	20151219

7. ANTENNA PORT TEST RESULTS

7.1. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

PROCEDURE

7.2. ON TIME AND DUTY CYCLE RESULTS

Please refer to operational description. Operational description states -6.7dB

7.3. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

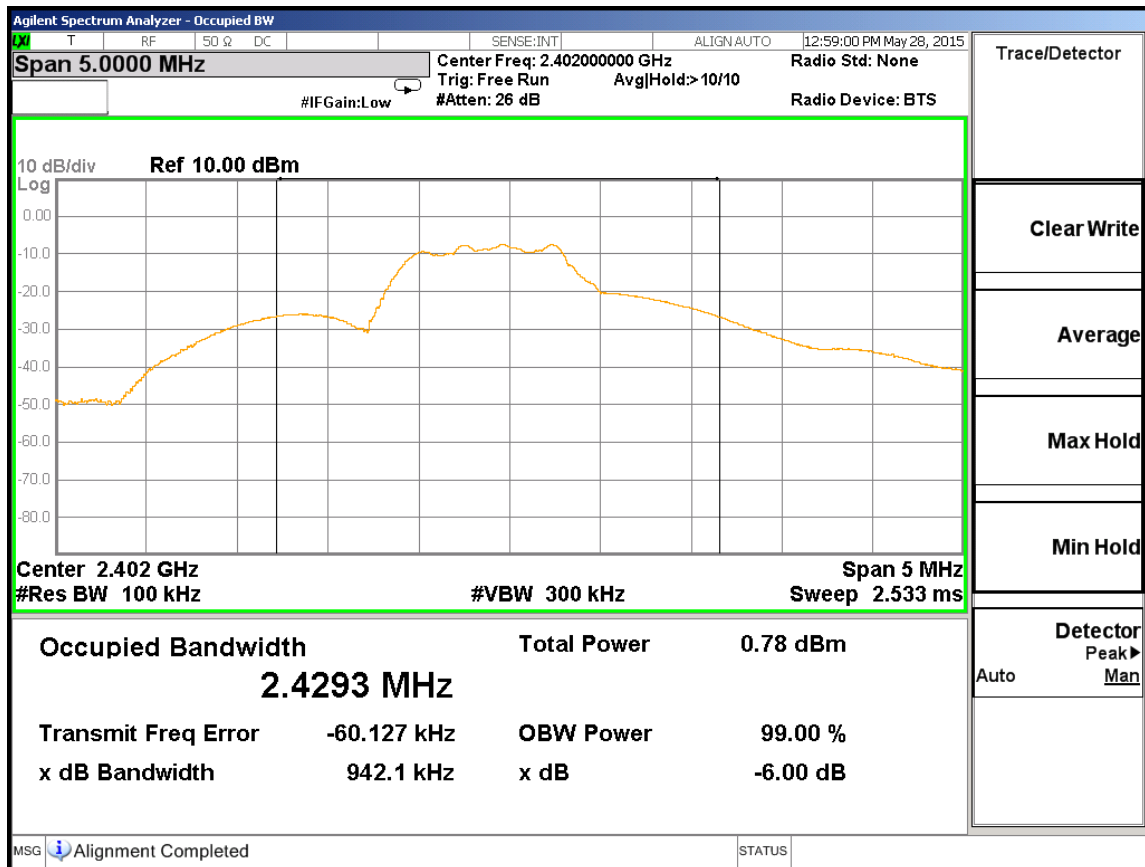
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.9421	0.5
Middle	2440	0.9329	0.5
High	2480	0.9307	0.5

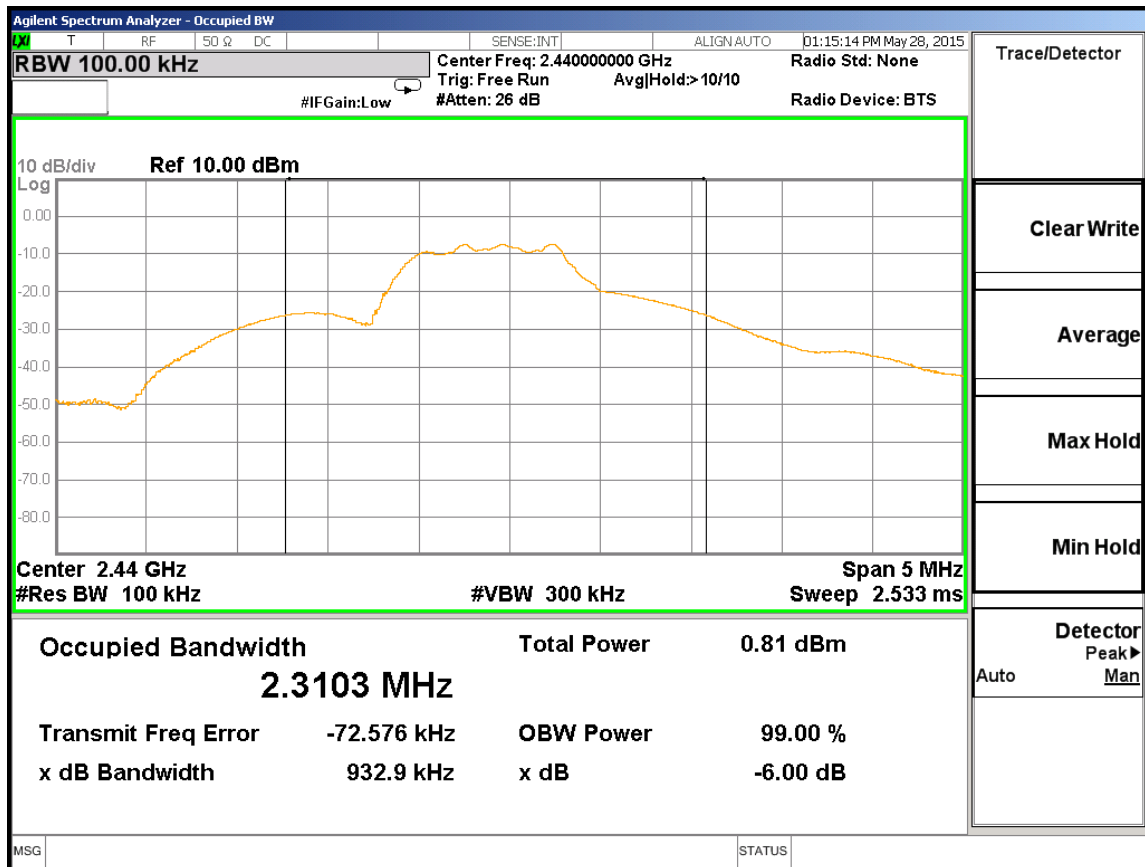
6 dB BANDWIDTH

Low Channel



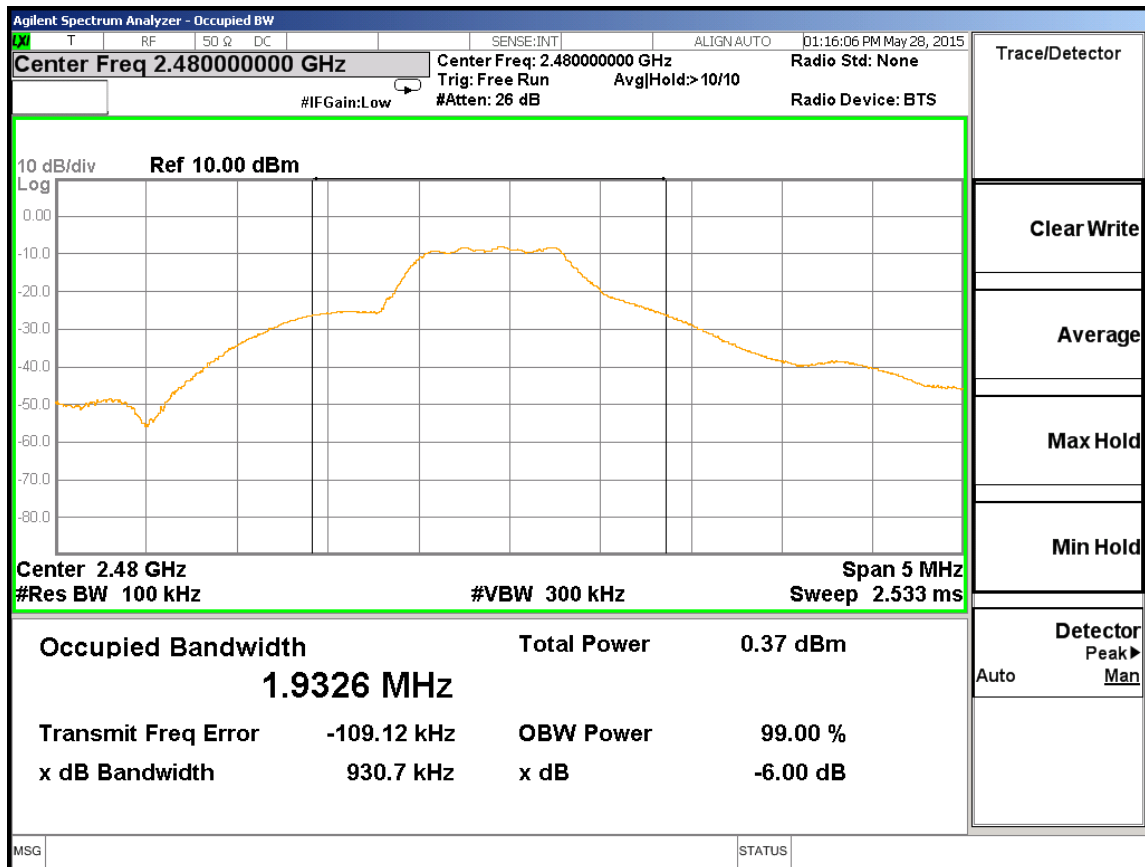
6 dB BANDWIDTH

Middle Channel



6 dB BANDWIDTH

High Channel



7.4. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

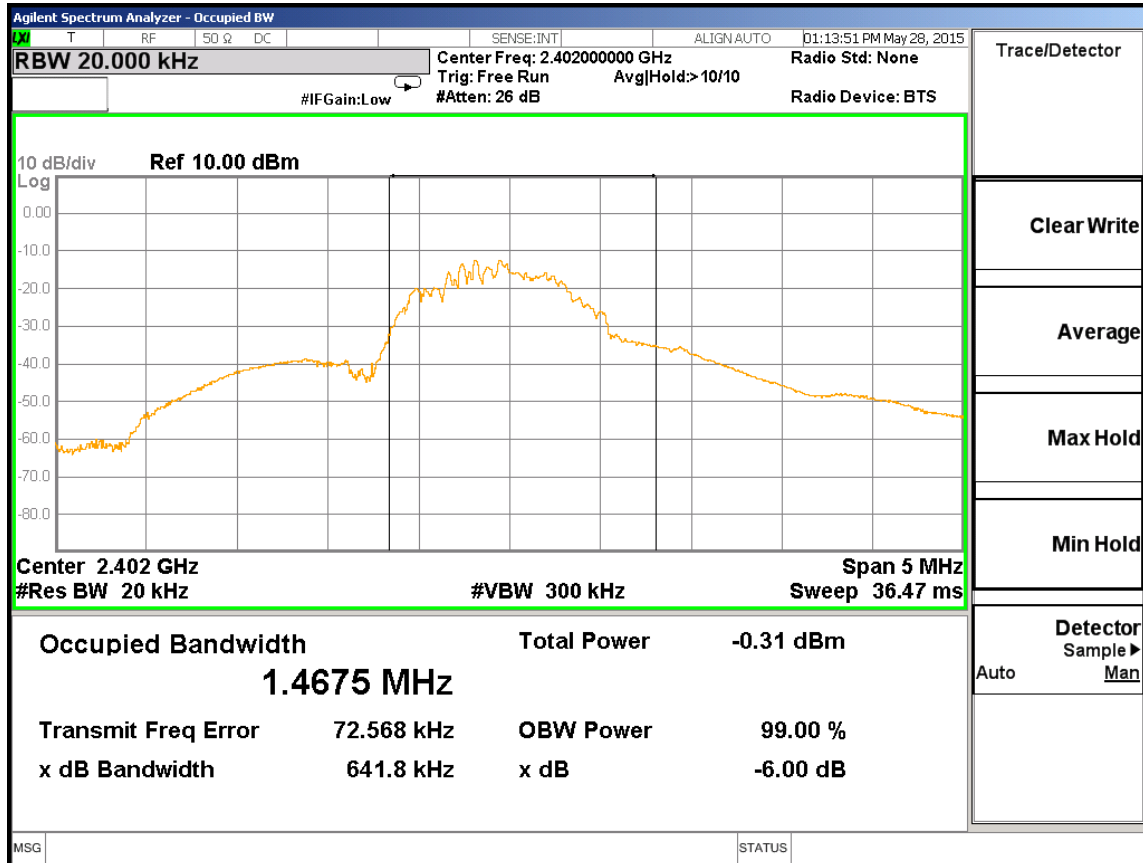
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.4675
Middle	2440	1.4176
High	2480	1.2354

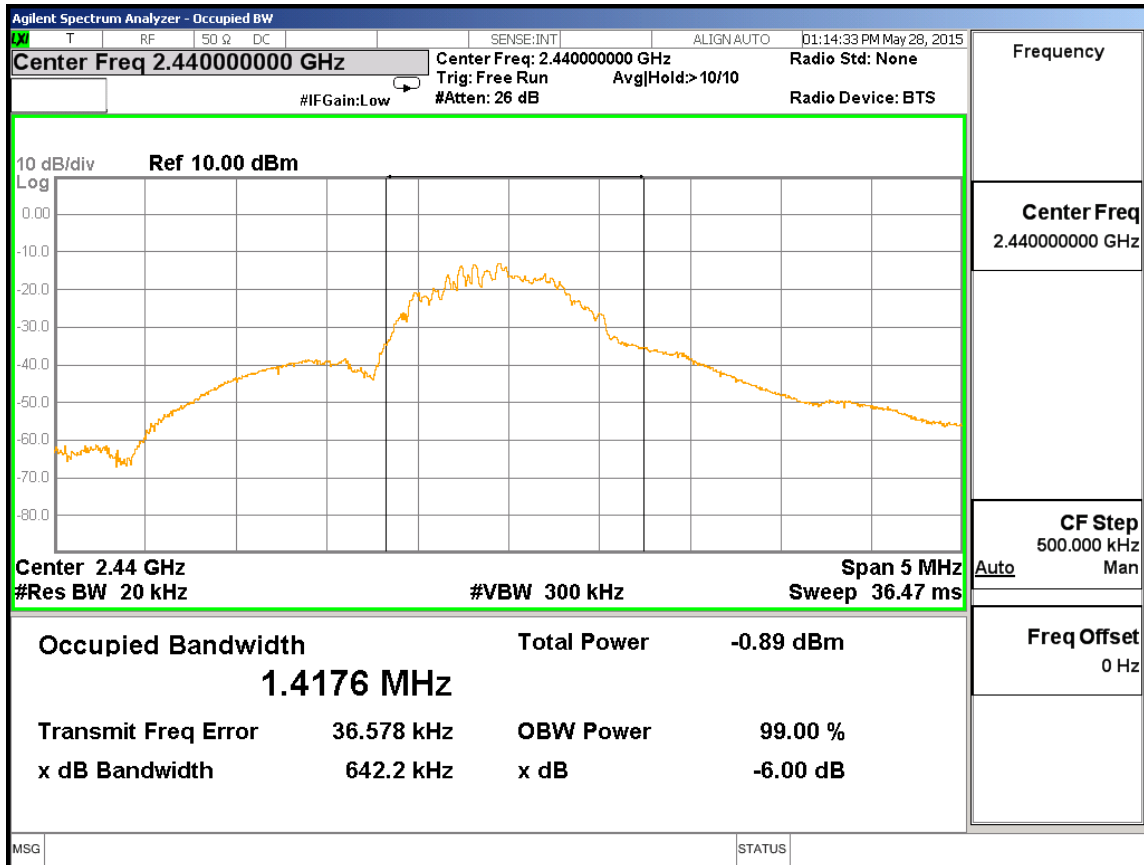
99% BANDWIDTH

Low Channel



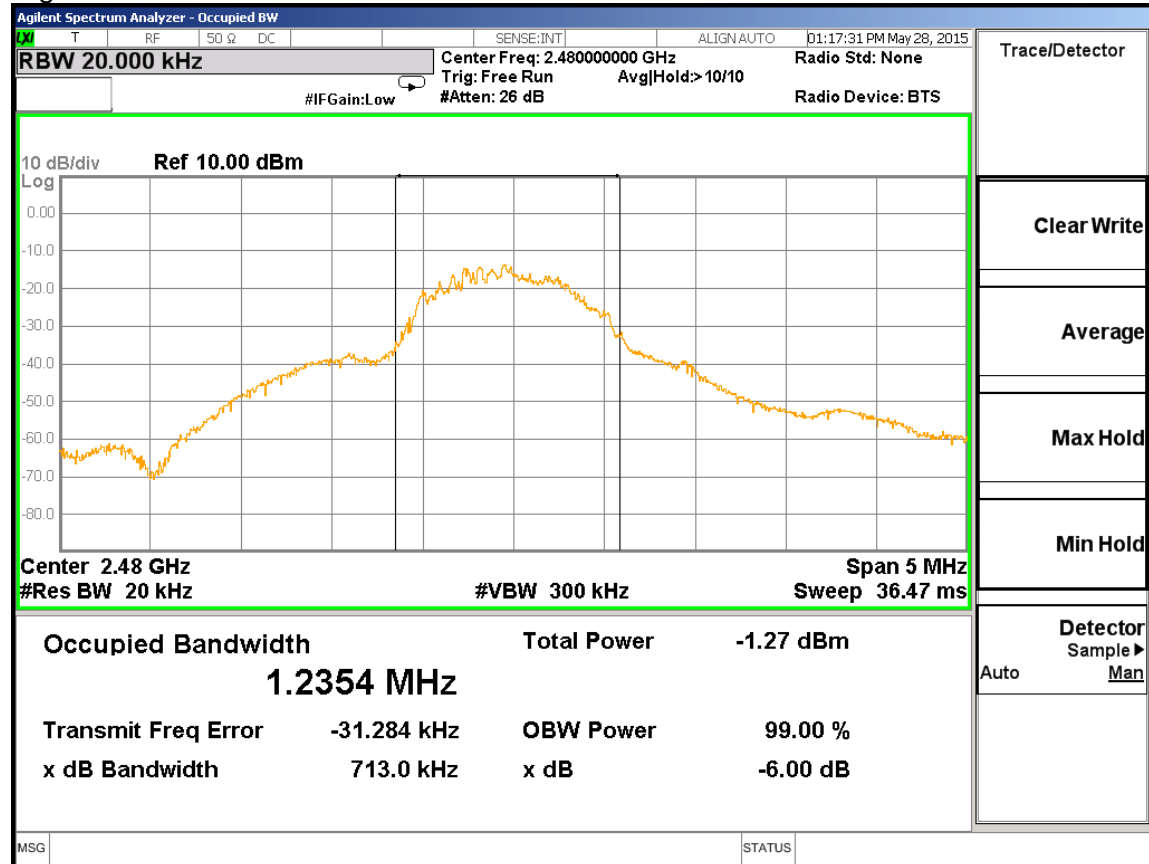
99% BANDWIDTH

Middle Channel



99% BANDWIDTH

High Channel



7.5. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

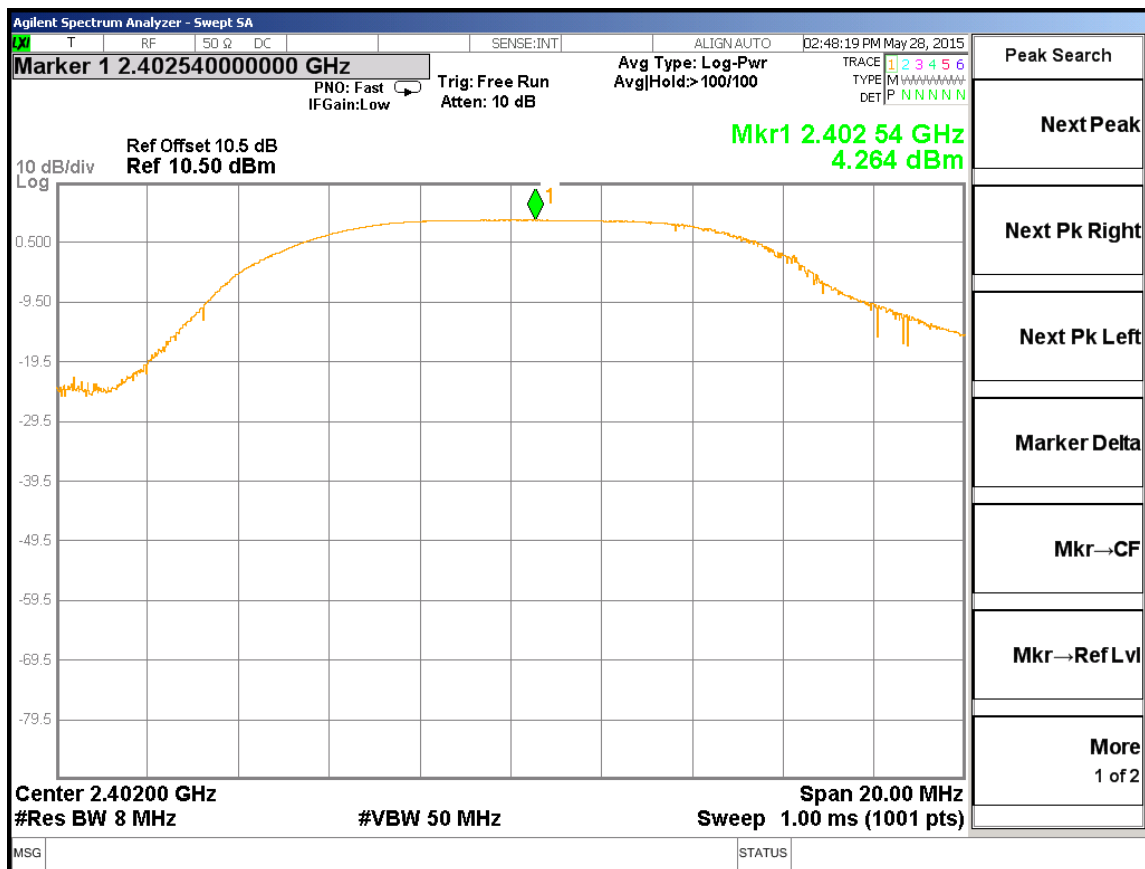
The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	4.260	30	-25.740
Middle	2440	4.166	30	-25.834
High	2480	4.076	30	-25.924

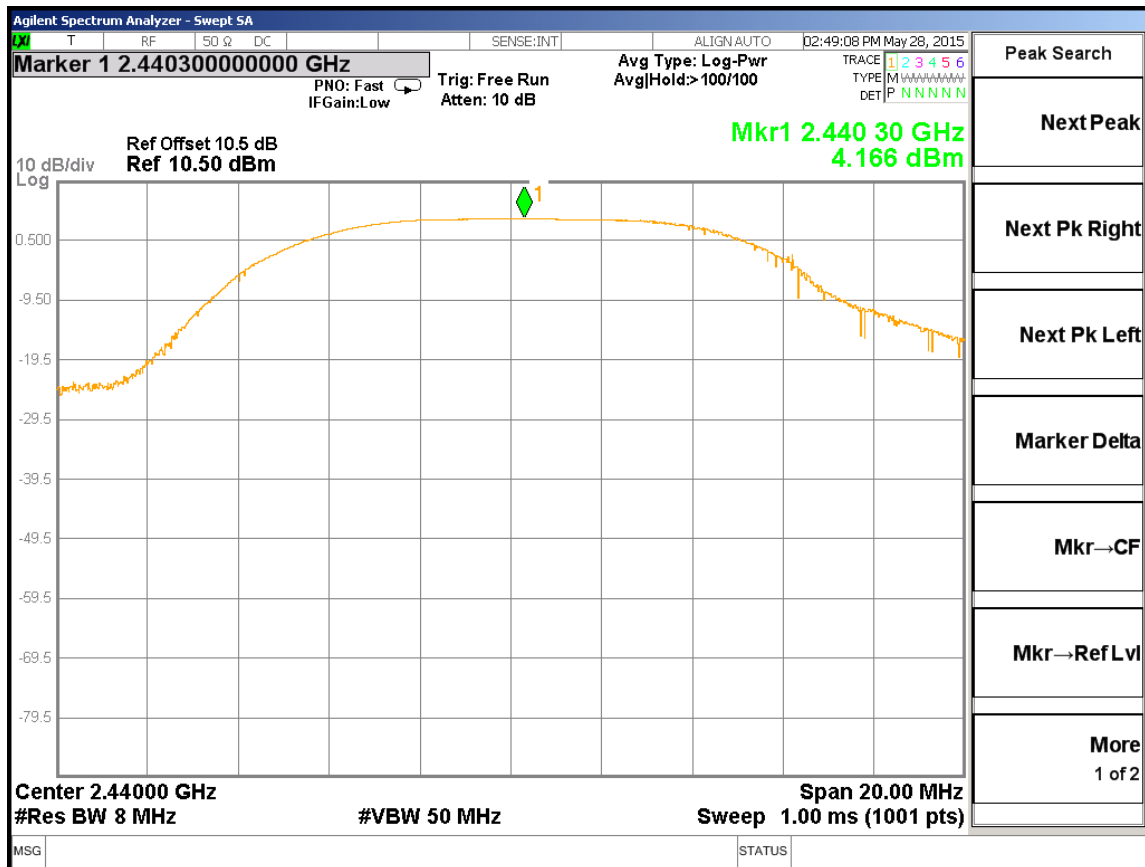
OUTPUT POWER

Low Channel



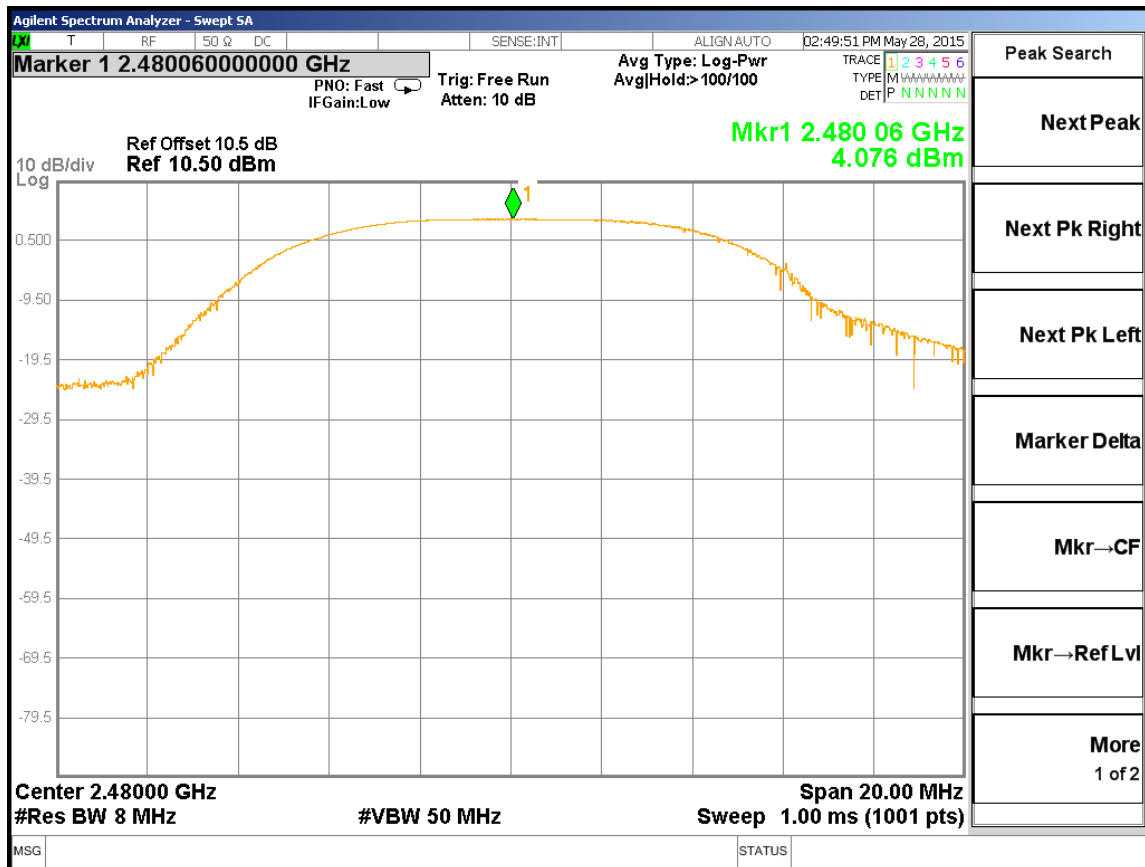
OUTPUT POWER

Middle Channel



OUTPUT POWER

High Channel



7.6. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

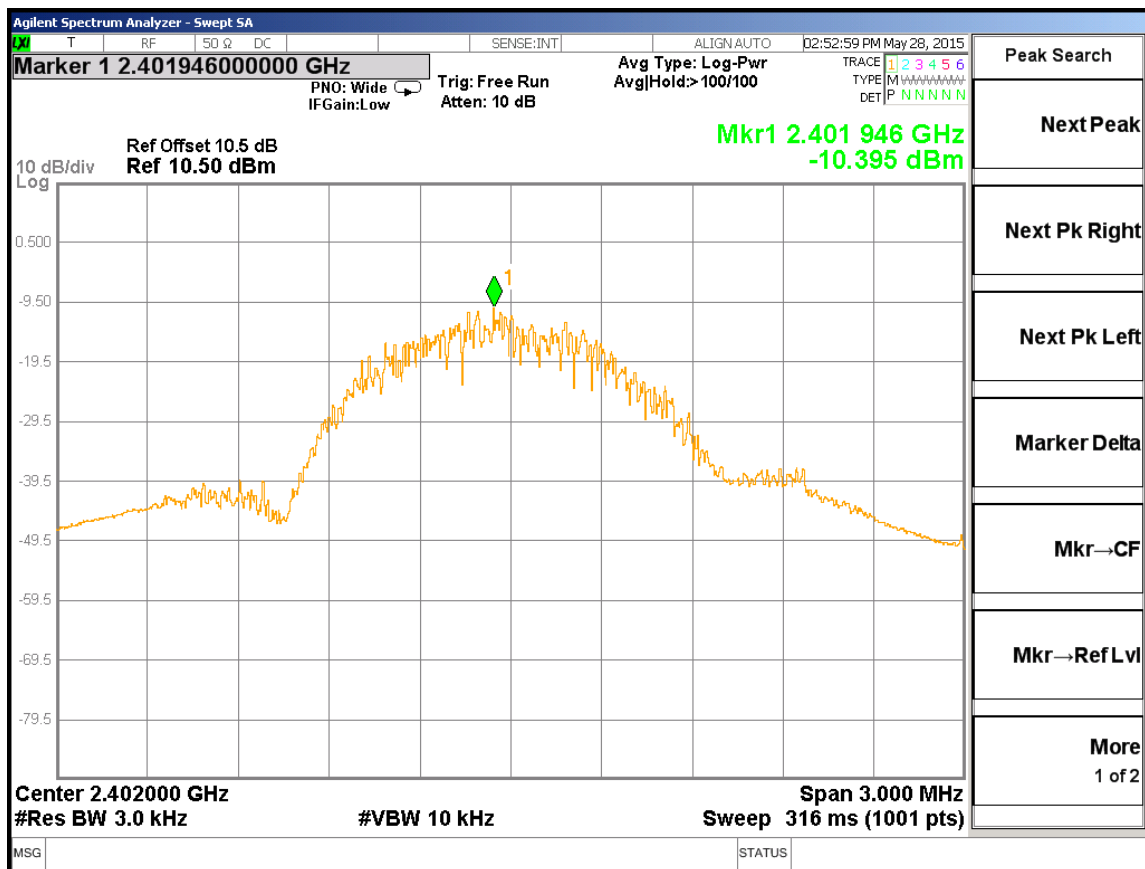
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-10.40	8	-18.40
Middle	2440	-10.67	8	-18.67
High	2480	-9.90	8	-17.90

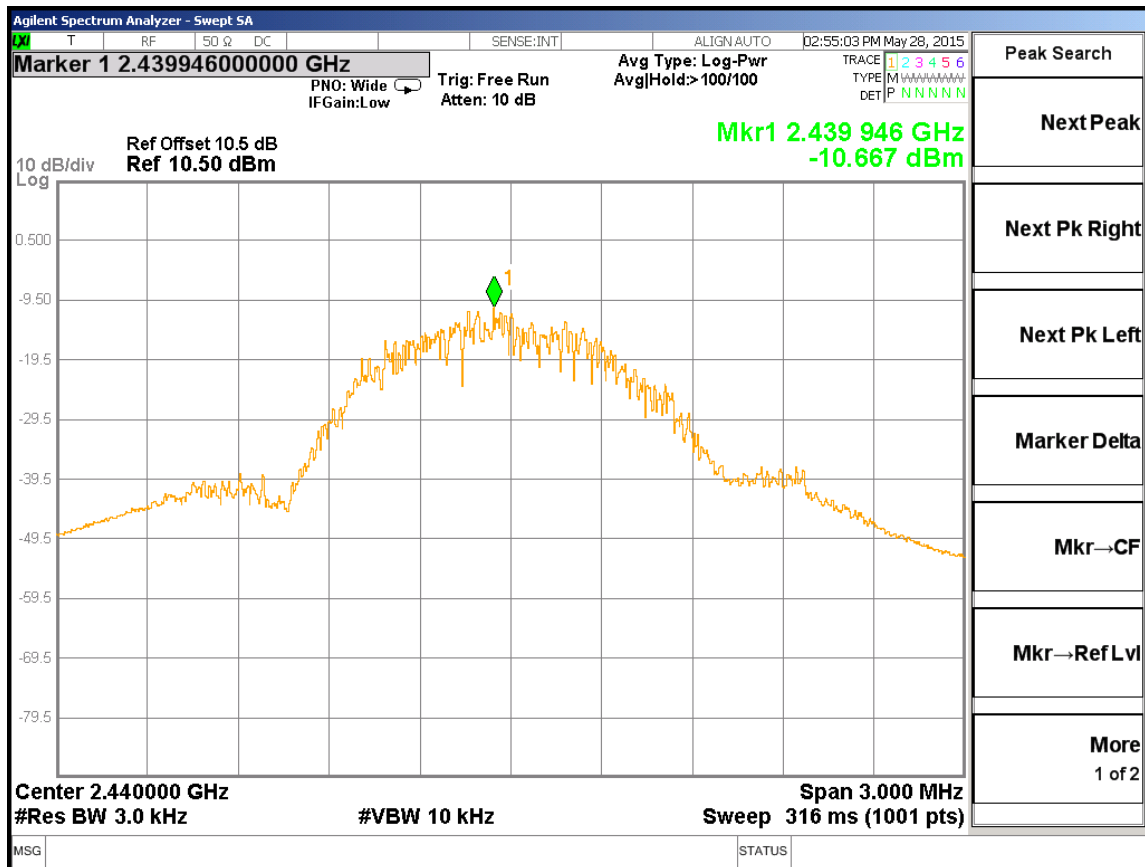
POWER SPECTRAL DENSITY

Low Channel



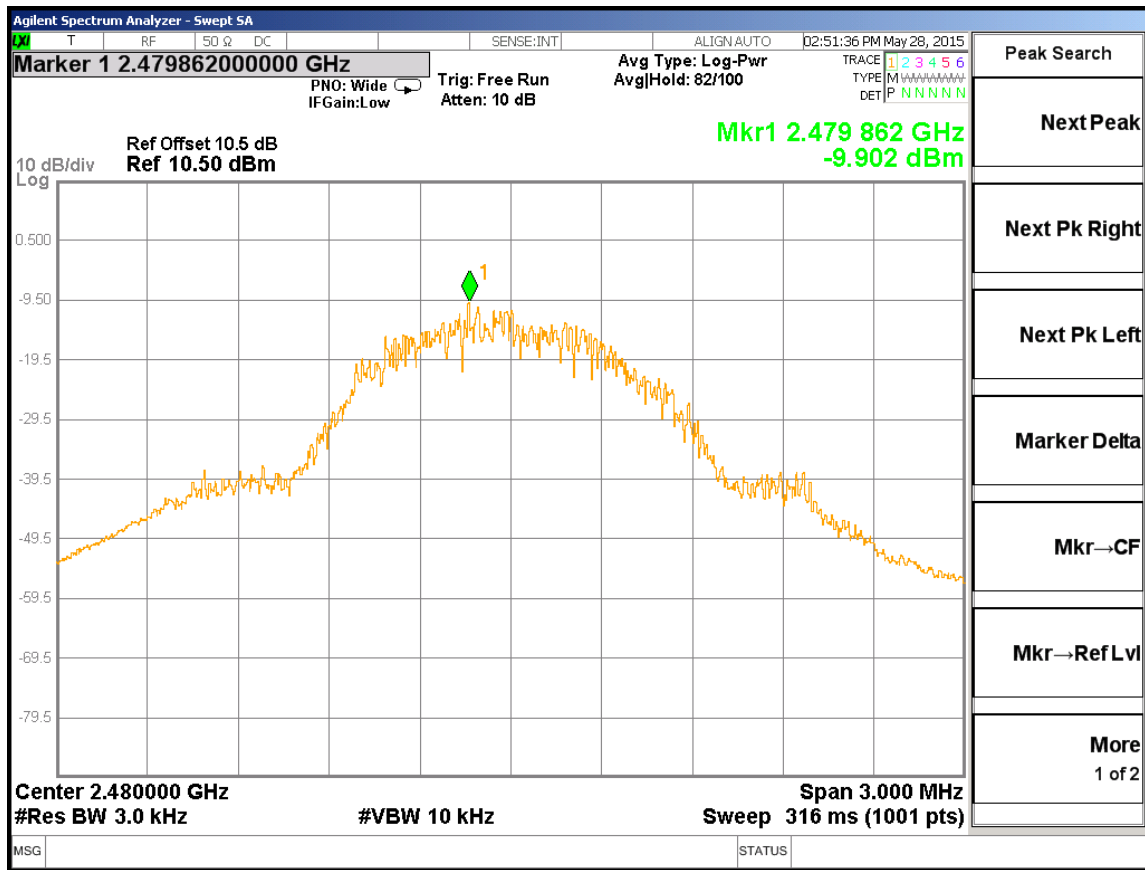
POWER SPECTRAL DENSITY

Middle Channel



POWER SPECTRAL DENSITY

High Channel



7.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

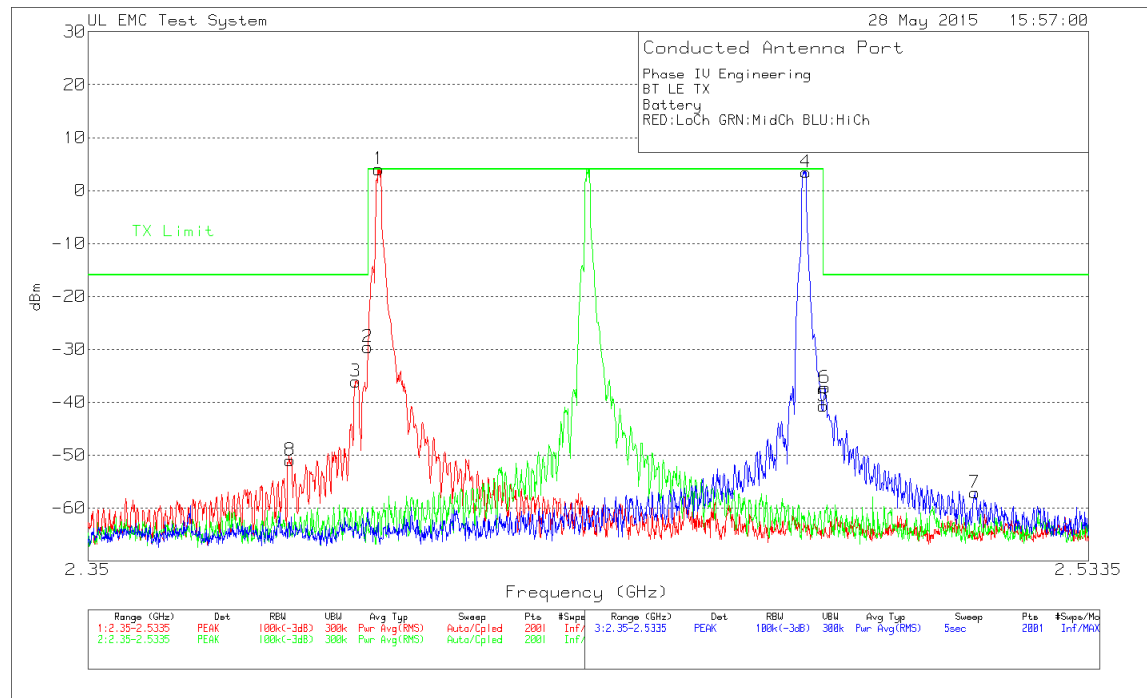
FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

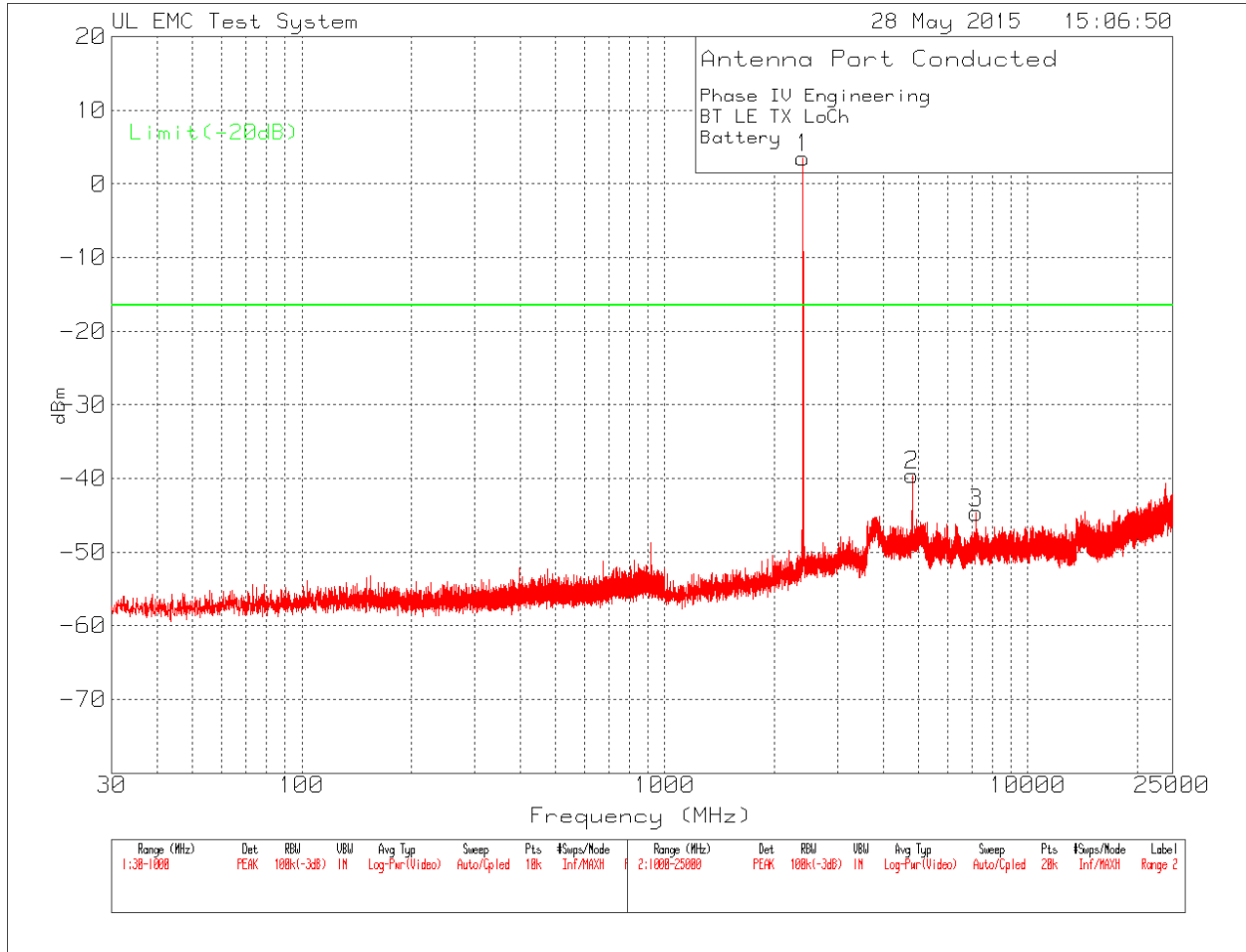
RESULTS

Bandedges – Low and High Channels



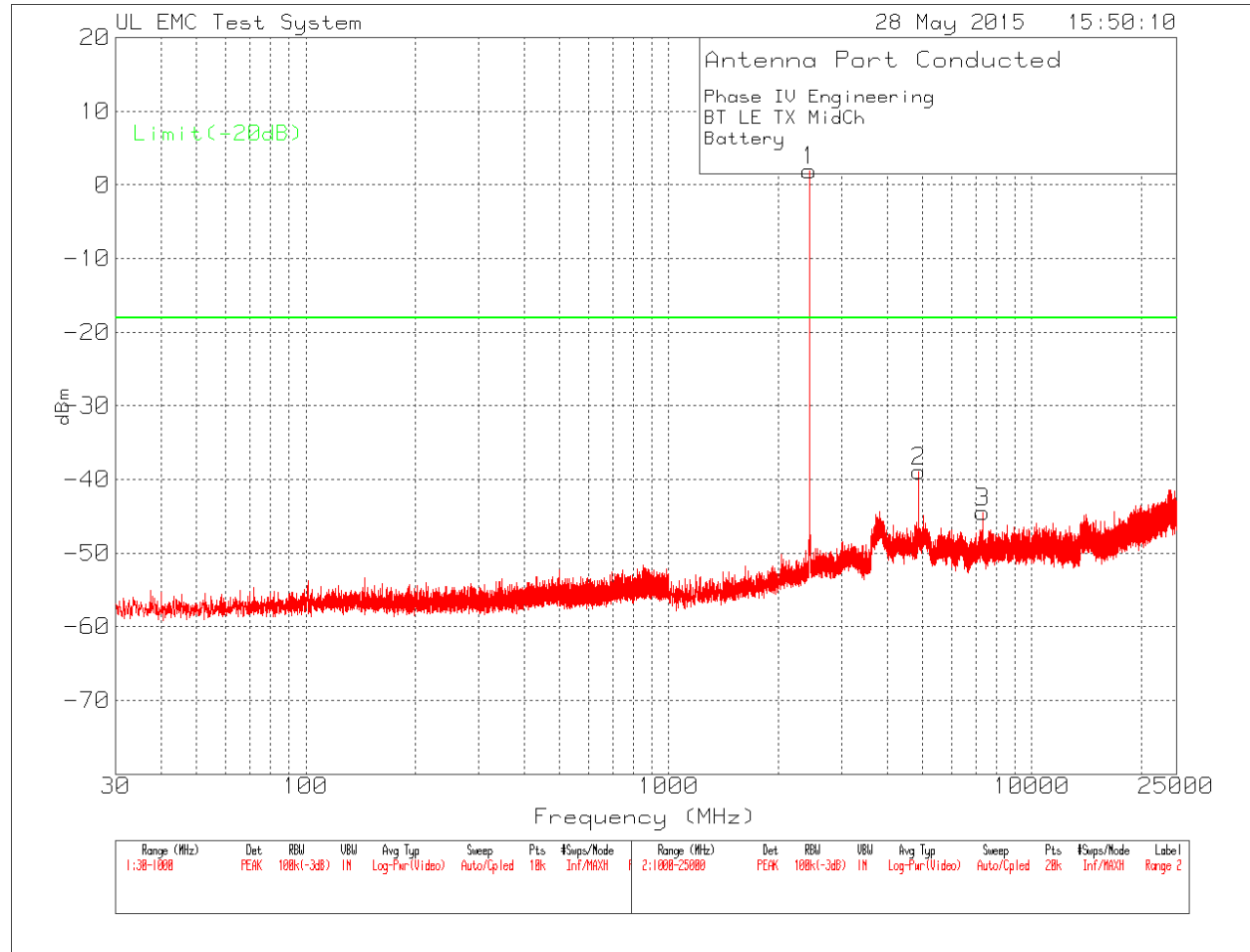
Phase IV Engineering									
BT LE TX									
Battery									
RED:LoCh GRN:MidCh BLU:HiCh									
Trace Markers									
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	dBuV to dBm	Cable Factor dB	Attenuator Factor dB	Corrected Reading dBm	Limit - 20dBc	Margin (dB)
Low Channel									
1	2.4019	100.05	PK	-107	1.1	9.9	4.05	-	-
2	2.4	66.4	PK	-107	1.1	9.9	-29.6	-15.95	-13.65
3	2.3978	59.9	PK	-107	1.1	9.9	-36.1	-15.95	-20.15
8	2.386	45.03	PK	-107	1.1	9.9	-50.97	-15.95	-35.02
High Channel									
4	2.4803	99.47	PK	-107	1.1	9.9	3.47	-	-
5	2.4835	55.31	PK	-107	1.1	9.9	-40.69	-16.53	-24.16
6	2.4838	58.78	PK	-107	1.1	9.9	-37.22	-16.53	-20.69
7	2.5119	38.93	PK	-107	1.1	9.9	-57.07	-16.53	-40.54
PK - Peak Detector									

Low Channel 30MHz – 25GHz



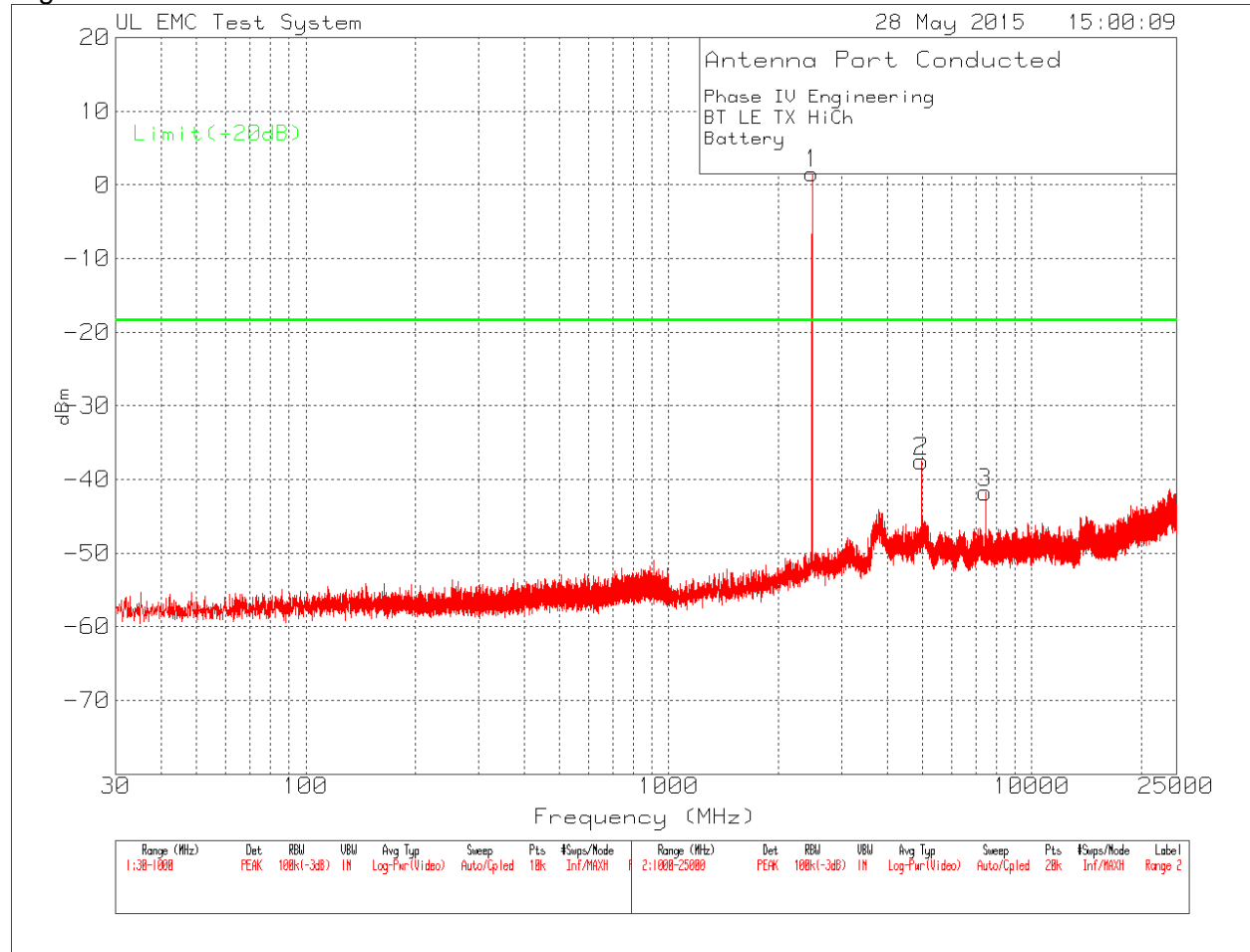
Phase IV Engineering							
BT LE TX LoCh							
Battery							
Marker No.	Test Frequency (MHz)	Meter Reading (dBm)	Detector	Path Factor dB	Peak Level dBm	Limit	Margin (dB)
1	2402.8	-6.98	PK	10.5	3.52	-	-
2	4804	-50.35	PK	10.8	-39.55	-16.48	-23.07
3	7206.4	-55.67	PK	11	-44.67	-16.48	-28.19
PK - Peak detector							

Middle Channel 30MHz – 25GHz



Phase IV Engineering							
BT LE TX MidCh							
Battery							
Marker No.	Test Frequency (MHz)	Meter Reading (dBm)	Detector	Path Factor dB	Peak Level dBm	Limit	Margin (dB)
1	2440	-8.57	PK	10.5	1.93	-	-
2	4880.8	-49.81	PK	10.9	-38.9	-18.1	-20.84
3	7319.2	-55.44	PK	11	-44.4	-18.1	-26.37
PK - Peak detector							

High Channel 30MHz – 25GHz



Phase IV Engineering							
BT LE TX HiCh							
Battery							
Marker No.	Test Frequency (MHz)	Meter Reading (dBm)	Detector	Path Factor dB	Peak Level dBm	Limit (dB)	Margin
1	2479.6	-8.94	PK	10.5	1.56	-	-
2	4960	-48.3	PK	10.8	-37.5	-18	-19.06
3	7440.4	-52.75	PK	11	-41.8	-18	-23.31
PK - Peak detector							

8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-GEN Clause 8.9 (Transmitter)

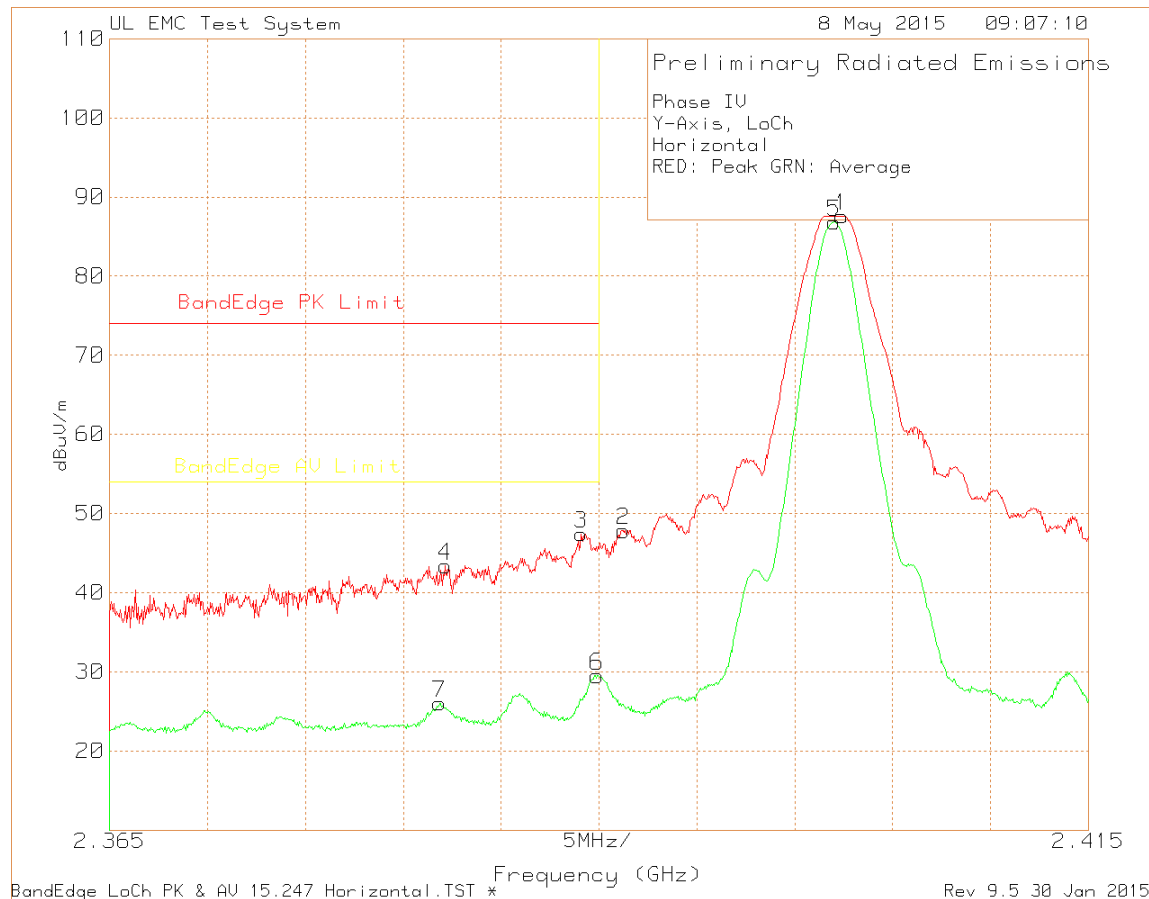
IC RSS-GEN Clause 7.1.2 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

* For all spurious emissions related to the trasmitt frequency average level was declared based on the use of peak level of the measurements and duty cycle correction. This was allowed per FCC KDB Inquiry # 409196

8.2. TRANSMITTER ABOVE 1 GHz

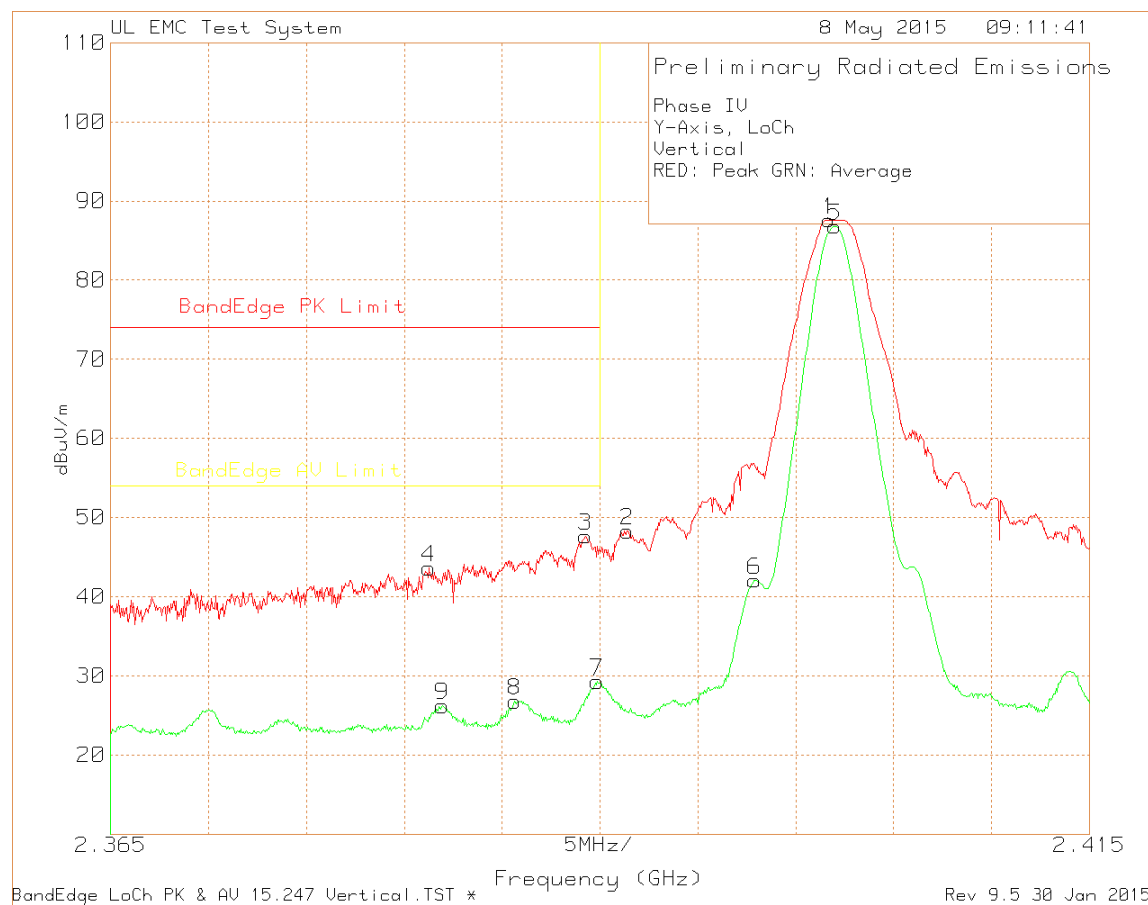
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



* Average scan (3kHz VBW) was conducted to show that there are no narrow band emissions hidden in the bandedge.

** All peak levels are under the average limits

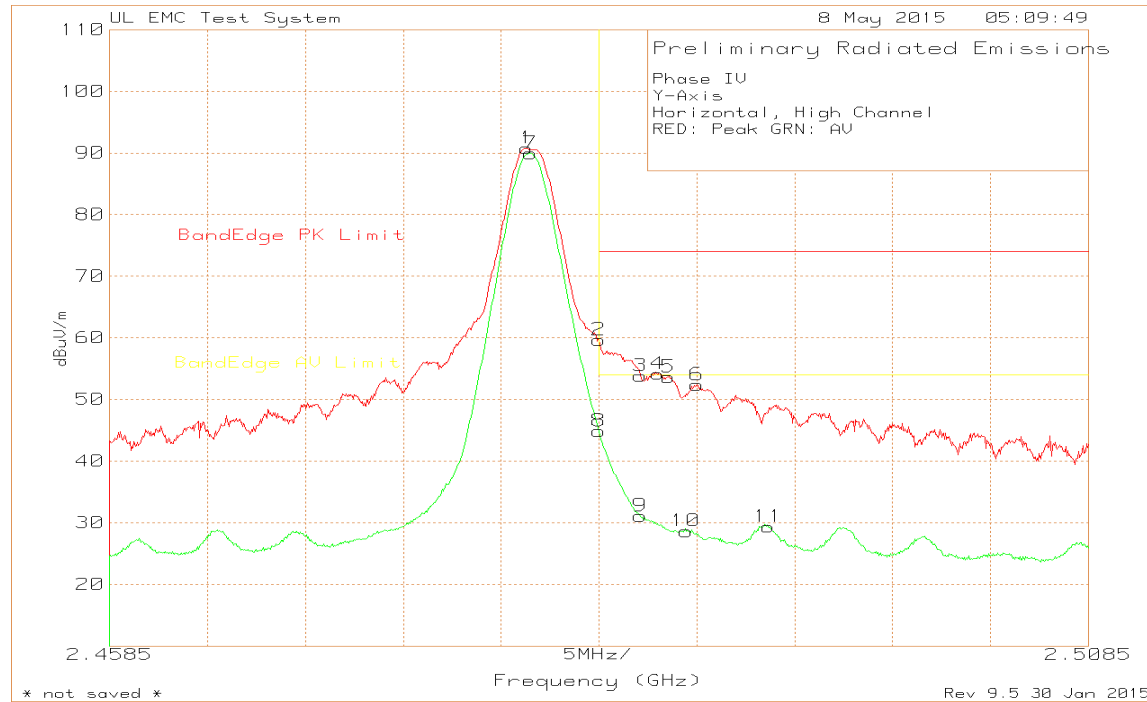
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



* Average scan (3kHz VBW) was conducted to show that there are no narrow band emissions hidden in the bandedge.

** All peak levels are under the average limits

RESTRICTED BANEDGE (HIGH CHANNEL, HORIZONTAL)

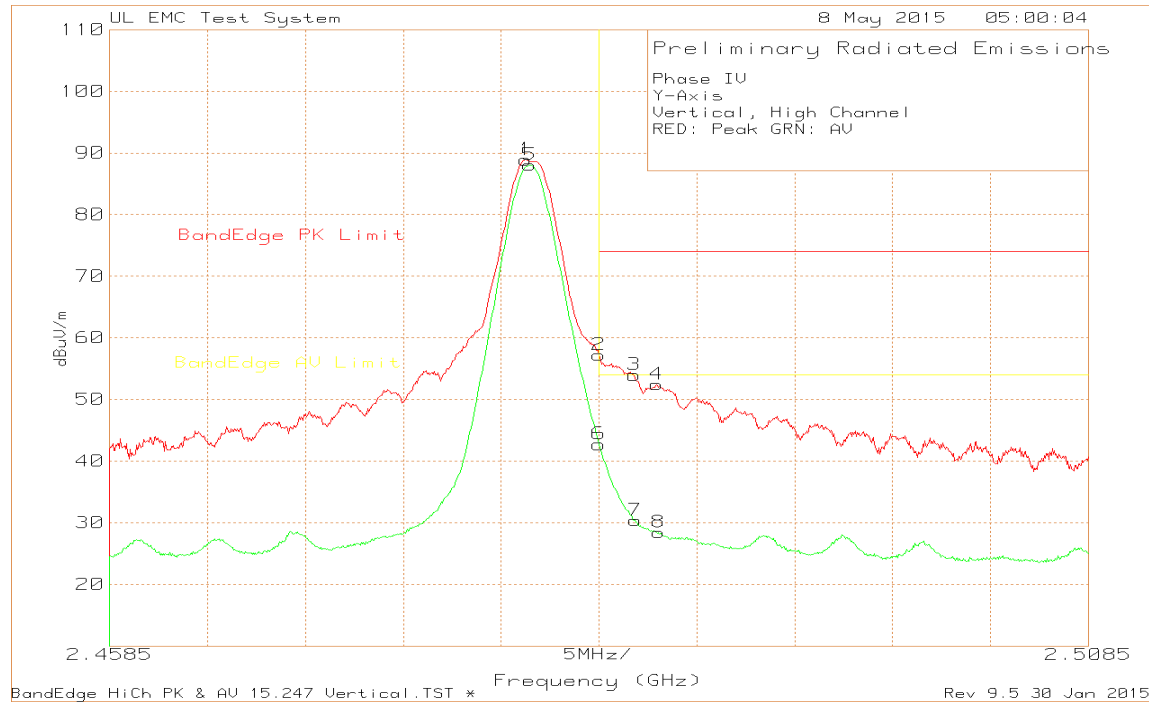


* Average scan (3kHz VBW) was conducted to show that there are no narrow band emissions hidden in the band edge.

** Compliance with Average Limits is shown in table below by applying the duty cycle to average measurement.

Phase IV															
Y-Axis															
Horizontal, High Channel															
RED: Peak GRN: AV															
Trace Markers															
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	Peak Level dBuV/m	Band Edge PK Limit dBuV/m	Margin (dB)	DC Factor dB	Average Level dB	Band Edge AV Limit dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.4798	120.44	Pk	22	-51.67	90.77	-	-	-	-	-	-	345	99	H
2	2.4835	89.27	Pk	22.1	-51.74	59.63	74	-14.37	-6.7	52.93	54	-1.07	345	99	H
3	2.4856	83.49	Pk	22.1	-51.77	53.82	74	-20.18	-6.7	47.12	54	-6.88	345	99	H
4	2.4865	83.84	Pk	22.1	-51.79	54.15	74	-19.85	-6.7	47.45	54	-6.55	345	99	H
5	2.4871	83.32	Pk	22.1	-51.8	53.62	74	-20.38	-6.7	46.92	54	-7.08	345	99	H
6	2.4885	82.09	Pk	22.1	-51.82	52.37	74	-21.63	-6.7	45.67	54	-8.33	345	99	H
7	2.48	119.62	Avg	22	-51.67	89.95	-	-	-	-	-	-	345	99	H
8	2.4835	74.49	Avg	22.1	-51.74	44.85	74	-29.15	-	-	54	-9.15	345	99	H
9	2.4856	60.75	Avg	22.1	-51.77	31.08	74	-42.92	-	-	54	-22.92	345	99	H
10	2.488	58.32	Avg	22.1	-51.81	28.61	74	-45.39	-	-	54	-25.39	345	99	H
11	2.4922	59.13	Avg	22.1	-51.88	29.35	74	-44.65	-	-	54	-24.65	345	99	H
Pk - Peak detector															
Avg - Video Averaging with 3kHz VBW															

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



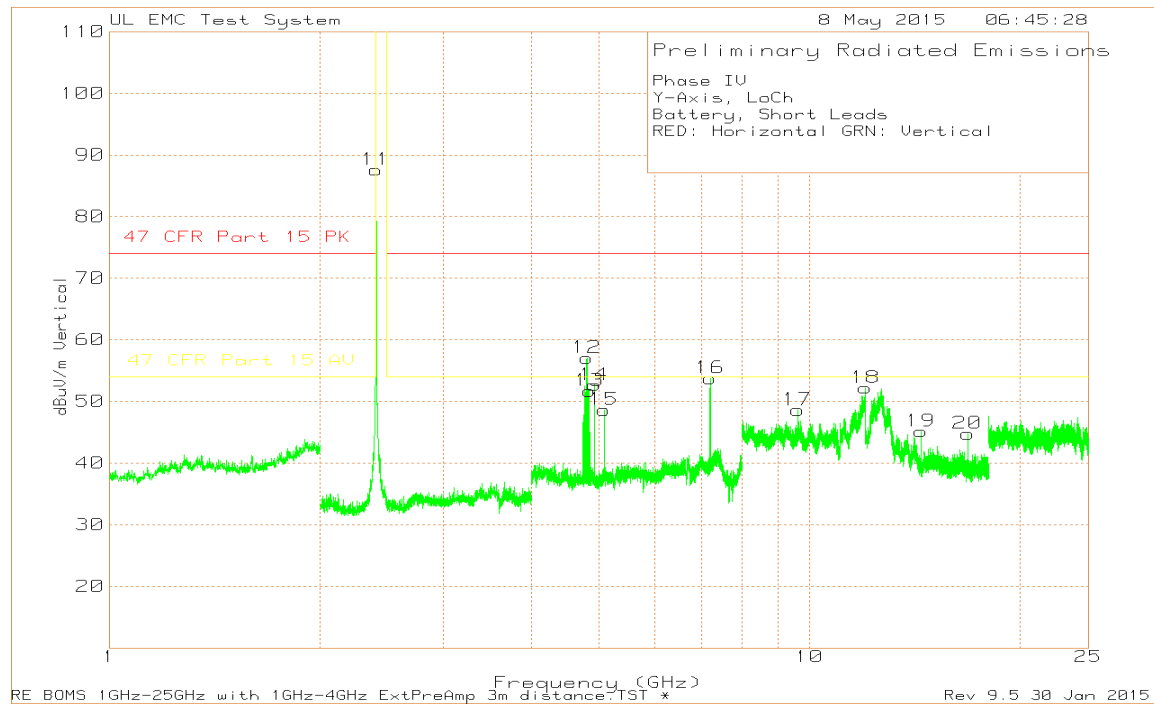
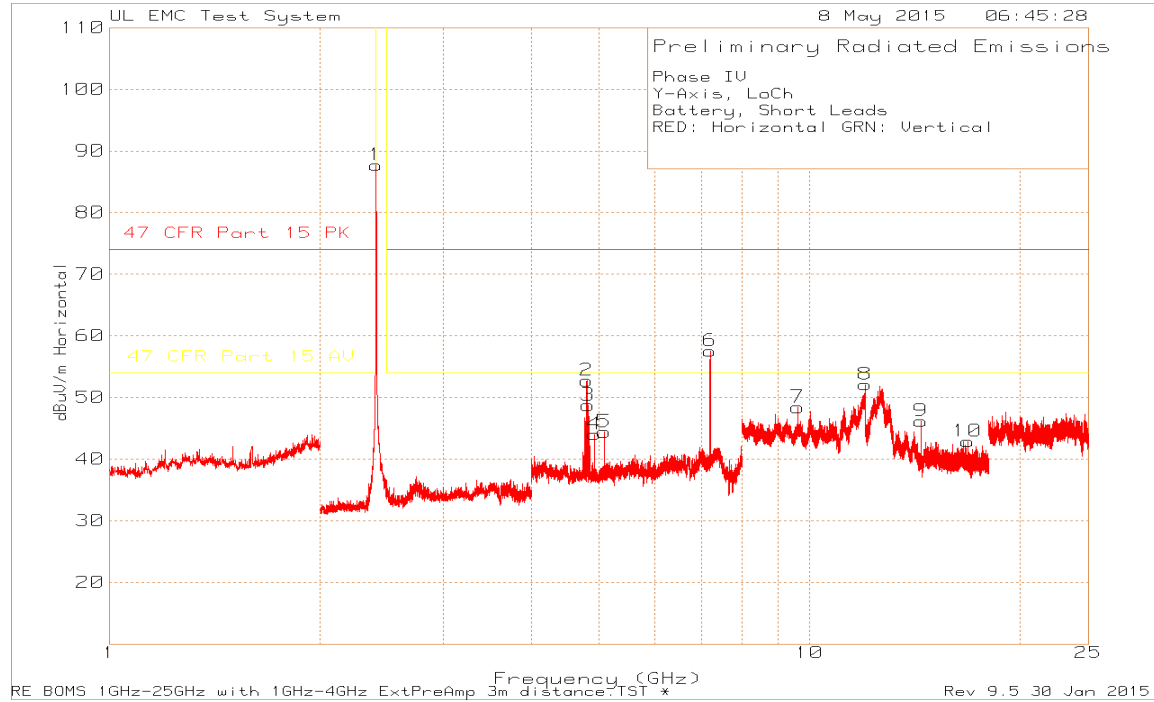
* Average scan (3kHz VBW) was conducted to show that there are no narrow band emissions hidden in the band edge.

** Compliance with Average Limits is shown in table below by applying the duty cycle to average measurement.

Phase IV															
Y-Axis															
Vertical, High Channel															
RED: Peak GRN: AV															
Trace Markers															
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	Peak Level dBuV/m	Band Edge PK Limit dBuV/m	Margin (dB)	DC Factor dB	Average Level dB	Band Edge AV Limit dBuV/m	Margin (dB)	Azimuth [Deps]	Height [cm]	Polarity
1	2.4798	118.55	Pk	22	-51.7	88.88	-	-	-	-	-	-	202	103	V
2	2.4835	86.85	Pk	22.1	-51.7	57.21	74	-16.79	-6.7	50.51	54	-3.49	202	103	V
3	2.4853	83.66	Pk	22.1	-51.8	53.99	74	-20.01	-6.7	47.29	54	-6.71	202	103	V
4	2.4865	82.13	Pk	22.1	-51.8	52.44	74	-21.56	-6.7	45.74	54	-8.26	202	103	V
5	2.48	117.71	Avg	22	-51.7	88.04	-	-	-	-	-	-	202	103	V
6	2.4835	72.38	Avg	22.1	-51.7	42.74	74	-31.26	-	-	54	-11.26	202	103	V
7	2.4854	60.05	Avg	22.1	-51.8	30.38	74	-43.62	-	-	54	-23.62	202	103	V
8	2.4866	58.11	Avg	22.1	-51.8	28.42	74	-45.58	-	-	54	-25.58	202	103	V
Pk - Peak detector															
Avg - Video Averaging with 3kHz VBW															

HARMONICS AND SPURIOUS EMISSIONS

Low Channel Scan Data

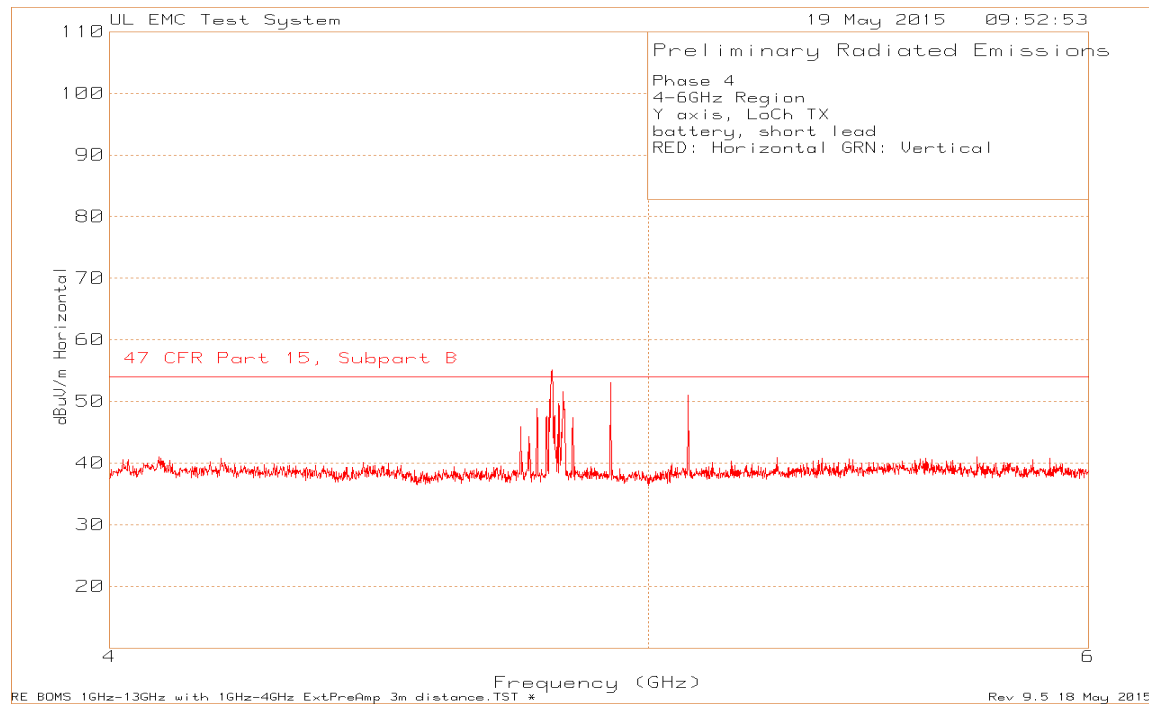
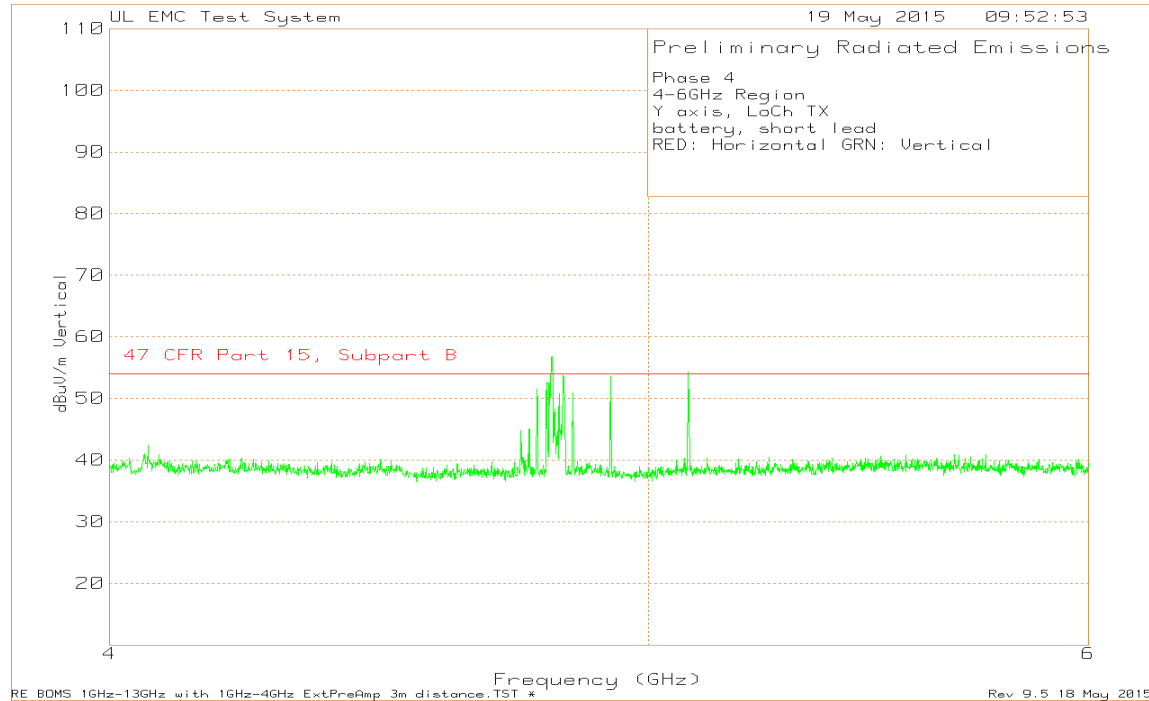


* Compliance with Average Limits in restricted bands is shown in table below by applying the duty cycle to average measurement.

Low Channel Tabular Data

Phase IV															
Y-Axis, LoCh															
Battery, Short Leads															
RED: Horizontal GRN: Vertical															
Trace Markers															
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	DC Factor dB	Average Level with DC dBuV/m	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.402	117.8	Pk	21.8	-51.91	87.69	-	-	-	-	-	-	0-360	100	H
2	* 4.804	75.7	Pk	27.7	-50.65	52.75	74	-21.25	-6.7	46.05	54	-7.95	0-360	149	H
3	* 4.827	71.44	Pk	27.7	-50.42	48.72	74	-25.28	-6.7	42.02	54	-11.98	0-360	100	H
4	* 4.922	66.87	Pk	27.8	-50.64	44.03	74	-29.97	-6.7	37.33	54	-16.67	0-360	100	H
5	* 5.084	65.97	Pk	28	-49.58	44.39	74	-29.61	-6.7	37.69	54	-16.31	0-360	149	H
6	7.207	74.39	Pk	29.8	-46.65	57.54	74	-16.46	-6.7	50.84	54	-3.16	0-360	149	H
7	9.609	60.4	Pk	36.4	-48.43	48.37	74	-25.63	-6.7	41.67	54	-12.33	0-360	150	H
8	* 12.008	53.37	Pk	39.4	-40.68	52.09	74	-21.91	-6.7	45.39	54	-8.61	0-360	150	H
9	14.41	47.68	Pk	39.8	-41.32	46.16	74	-27.84	-6.7	39.46	54	-14.54	0-360	150	H
10	16.812	43.14	Pk	40.1	-40.38	42.86	74	-31.14	-6.7	36.16	54	-17.84	0-360	100	H
11	2.401	117.7	Pk	21.8	-51.92	87.58	-	-	-	-	-	-	0-360	99	V
12	* 4.804	80.02	Pk	27.7	-50.65	57.07	74	-16.93	-6.7	50.37	54	-3.63	0-360	150	V
13	* 4.846	74.38	Pk	27.7	-50.35	51.73	74	-22.27	-6.7	45.03	54	-8.97	0-360	150	V
14	* 4.922	75.52	Pk	27.8	-50.64	52.68	74	-21.32	-6.7	45.98	54	-8.02	0-360	150	V
15	* 5.083	70.23	Pk	28	-49.58	48.65	74	-25.35	-6.7	41.95	54	-12.05	0-360	99	V
16	7.207	70.6	Pk	29.8	-46.65	53.75	74	-20.25	-6.7	47.05	54	-6.95	0-360	99	V
17	9.607	60.62	Pk	36.4	-48.42	48.6	74	-25.4	-6.7	41.9	54	-12.1	0-360	150	V
18	* 12.011	53.47	Pk	39.4	-40.67	52.2	74	-21.8	-6.7	45.5	54	-8.5	0-360	150	V
19	14.413	46.6	Pk	39.8	-41.24	45.16	74	-28.84	-6.7	38.46	54	-15.54	0-360	150	V
20	16.813	45.08	Pk	40.1	-40.39	44.79	74	-29.21	-6.7	38.09	54	-15.91	0-360	150	V
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band															
Pk - Peak detector															
Maximized Radiated Emission Data															
	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	DC Factor dB	Average Level with DC dBuV/m	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
	* 4.8034	76.42	Pk	27.7	-50.66	53.46	74	-20.54	-6.7	46.76	54	-7.24	28	100	H
	* 4.8034	81.09	Pk	27.7	-50.66	58.13	74	-15.87	-6.7	51.43	54	-2.57	315	156	V
	* 12.0089	56.13	Pk	39.4	-40.68	54.85	74	-19.15	-6.7	48.15	54	-5.85	360	149	H
	* 12.0087	52.6	Pk	39.4	-40.68	51.32	74	-22.68	-6.7	44.62	54	-9.38	99	159	V
Pk - Peak detector															
Av - Average detection															

Low Channel Scan Data around 5GHz

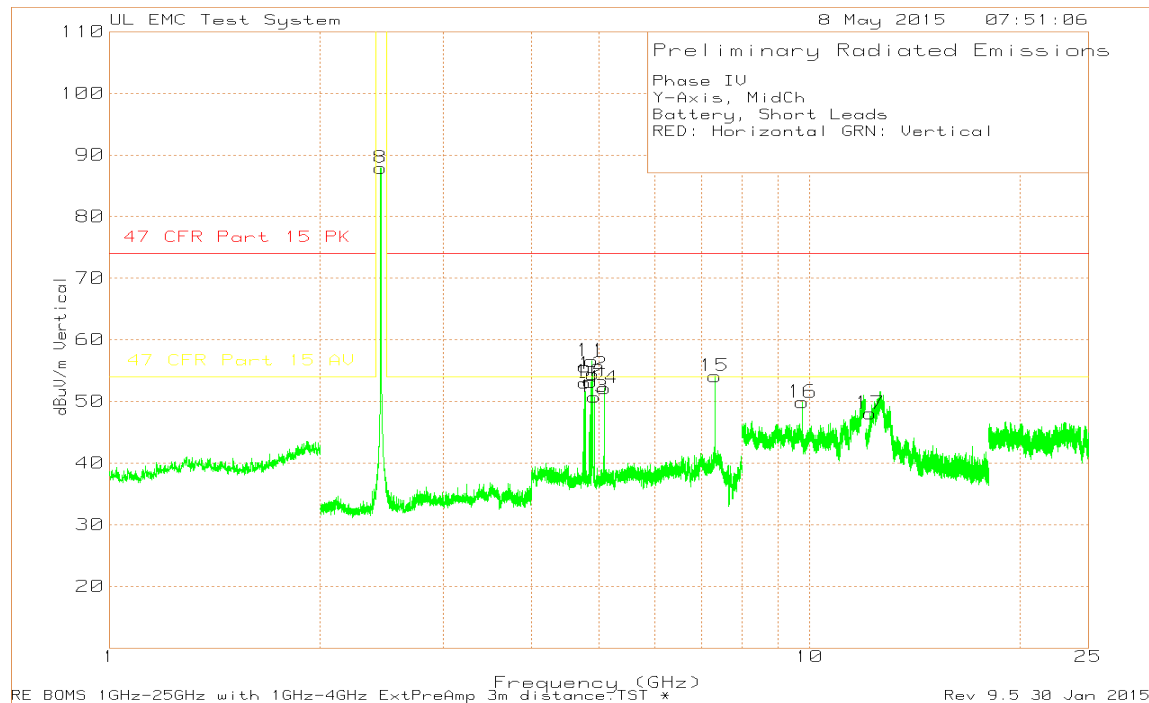
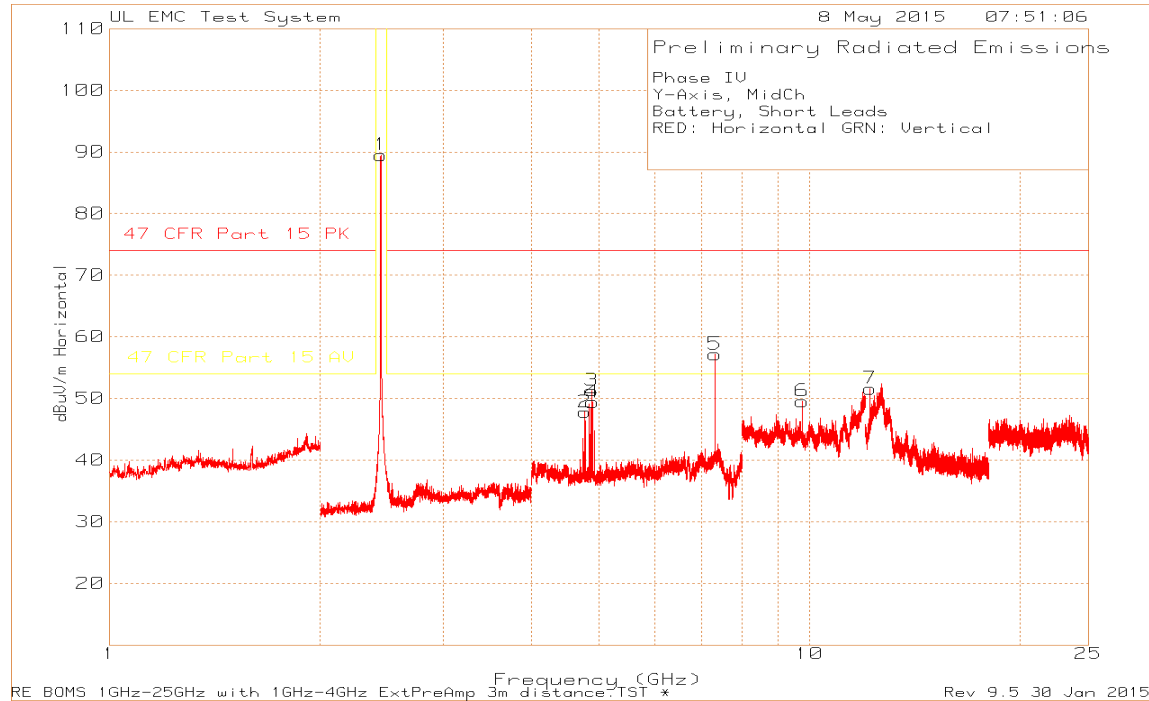


Low Channel Tabular Data around 5GHz

Phase 4														
4-6GHz Region														
Y axis, LoCh TX														
battery, short lead														
RED: Horizontal GRN: Vertical														
Radiated Emission Data														
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	DC Factor dB	Average Level with DC dBuV/m	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4.8044	81.17	Pk	27.7	-50.64	58.23	74	-15.77	-6.7	51.53	54	-2.47	294	187	V
4.7425	73.59	Pk	27.7	-51.23	50.06	74	-23.94	-6.7	43.36	54	-10.64	294	187	V
4.7593	74.77	Pk	27.7	-51.26	51.21	74	-22.79	-6.7	44.51	54	-9.49	294	187	V
4.775	77.37	Pk	27.7	-51.16	53.91	74	-20.09	-6.7	47.21	54	-6.79	294	187	V
4.7938	77.77	Pk	27.7	-50.87	54.6	74	-19.4	-6.7	47.9	54	-6.1	294	187	V
4.7983	77.55	Pk	27.7	-50.75	54.5	74	-19.5	-6.7	47.8	54	-6.2	294	187	V
4.8098	77.08	Pk	27.7	-50.55	54.23	74	-19.77	-6.7	47.53	54	-6.47	294	187	V
4.8187	77.16	Pk	27.7	-50.55	54.31	74	-19.69	-6.7	47.61	54	-6.39	294	187	V
4.8263	77.3	Pk	27.7	-50.44	54.56	74	-19.44	-6.7	47.86	54	-6.14	294	187	V
4.8461	77.52	Pk	27.7	-50.35	54.87	74	-19.13	-6.7	48.17	54	-5.83	294	187	V
4.9217	78.56	Pk	27.8	-50.63	55.73	74	-18.27	-6.7	49.03	54	-4.97	294	187	V
5.0835	76.82	Pk	28	-49.58	55.24	74	-18.76	-6.7	48.54	54	-5.46	294	187	V
4.8046	78.9	Pk	27.7	-50.64	55.96	74	-18.04	-6.7	49.26	54	-4.74	313	100	H
4.7425	72.55	Pk	27.7	-51.23	49.02	74	-24.98	-6.7	42.32	54	-11.68	313	100	H
4.7593	72.7	Pk	27.7	-51.26	49.14	74	-24.86	-6.7	42.44	54	-11.56	313	100	H
4.775	76.39	Pk	27.7	-51.16	52.93	74	-21.07	-6.7	46.23	54	-7.77	313	100	H
4.7938	76.42	Pk	27.7	-50.87	53.25	74	-20.75	-6.7	46.55	54	-7.45	313	100	H
4.7983	76	Pk	27.7	-50.75	52.95	74	-21.05	-6.7	46.25	54	-7.75	313	100	H
4.8097	75.51	Pk	27.7	-50.56	52.65	74	-21.35	-6.7	45.95	54	-8.05	313	100	H
4.8186	75.57	Pk	27.7	-50.55	52.72	74	-21.28	-6.7	46.02	54	-7.98	313	100	H
4.8263	76.12	Pk	27.7	-50.44	53.38	74	-20.62	-6.7	46.68	54	-7.32	313	100	H
4.8461	76.22	Pk	27.7	-50.35	53.57	74	-20.43	-6.7	46.87	54	-7.13	313	100	H
4.9218	76.88	Pk	27.8	-50.63	54.05	74	-19.95	-6.7	47.35	54	-6.65	313	100	H
5.0837	75.53	Pk	28	-49.58	53.95	74	-20.05	-6.7	47.25	54	-6.75	313	100	H
Pk - Peak detector														

* All the spurious emissions recorded are associated with the transmit frequency. While the period of those emissions is the same as for the fundamental frequency the burst durations are different. The shortest burst duration observed was at under 1uS and the longest burst duration was about 10uS. In all cases this this is significantly less then the duty cycle of the fundamental frequency. As worst case scenario the duty cycle correction for the fundamental was used.

Middle Channel Scan Data

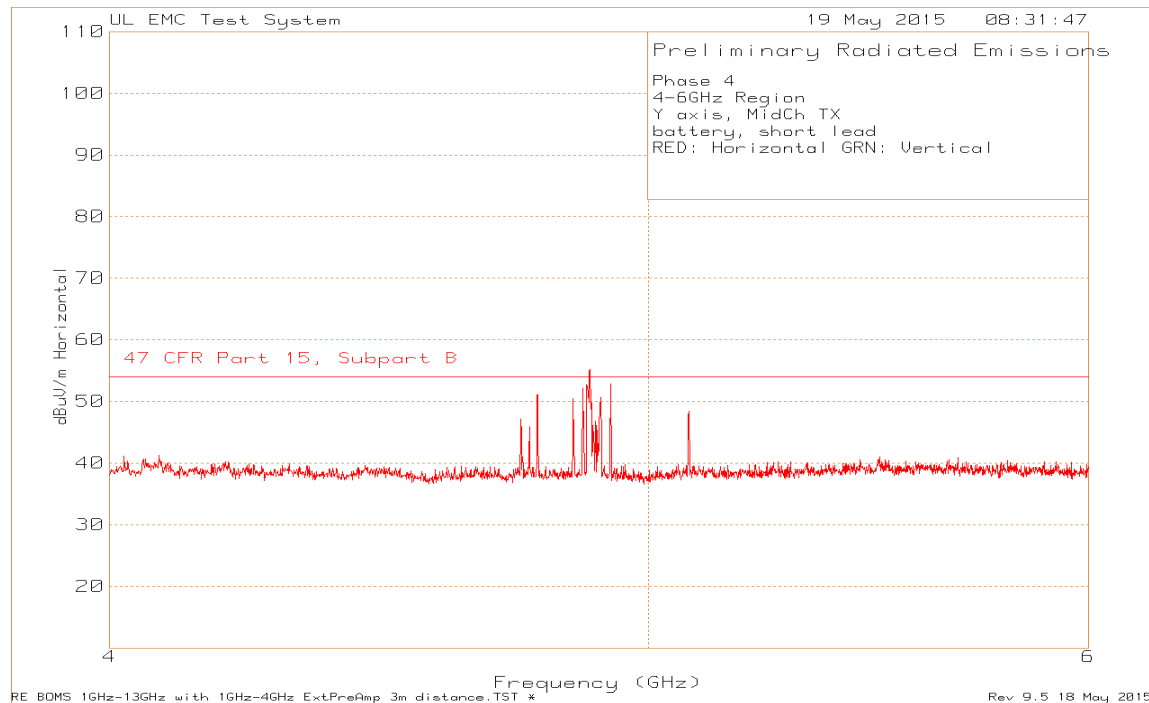
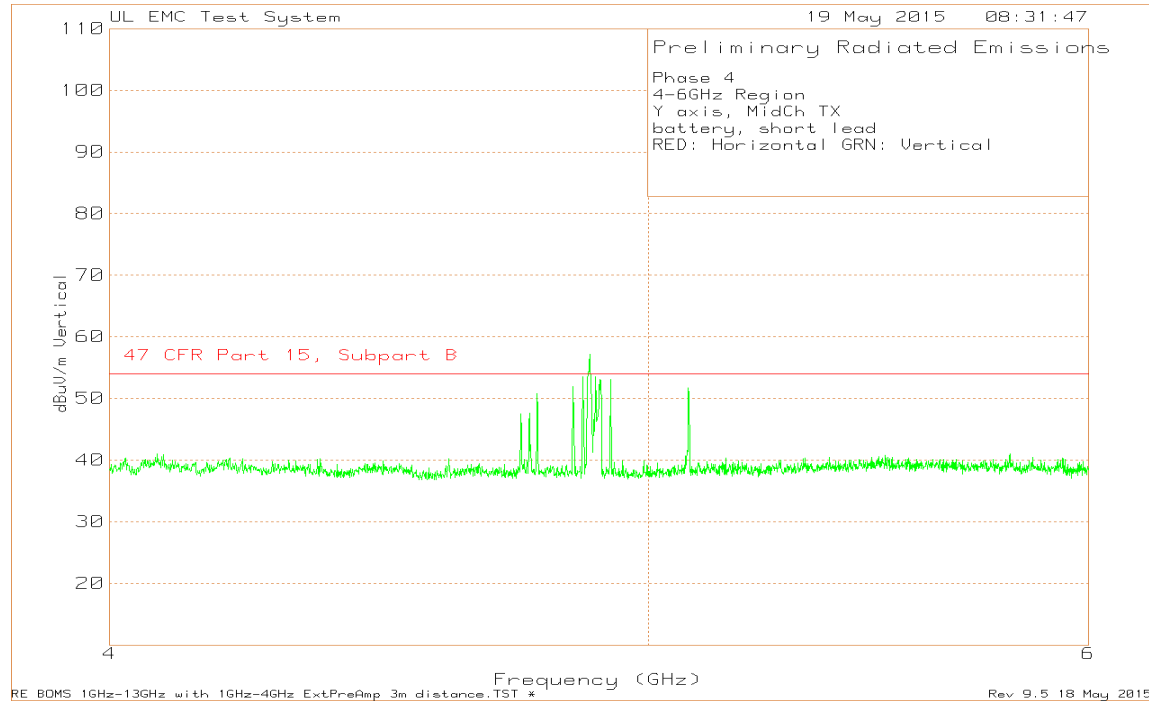


* Compliance with Average Limits in restricted bands is shown in table below by applying the duty cycle to average measurement.

Middle Channel Tabular Data

Phase IV															
Y-Axis, MidCh															
Battery , Short Leads															
RED: Horizontal GRN: Vertical															
Trace Markers															
							Limit 47 CFR				Limit 47 CFR				
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	Part 15 PK dBuV/m	Margin (dB)	DC Factor dB	Average Level with DC dBuV/m	Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.44	118.87	Pk	21.9	-51.29	89.48	-	-	-	-	-	-	0-360	100	H
2	* 4.775	71.25	Pk	27.7	-51.16	47.79	74	-26.21	-6.7	41.09	54	-12.91	0-360	101	H
3	* 4.88	73.93	Pk	27.7	-50.35	51.28	74	-22.72	-6.7	44.58	54	-9.42	0-360	101	H
4	* 4.899	72.16	Pk	27.7	-50.47	49.39	74	-24.61	-6.7	42.69	54	-11.31	0-360	101	H
5	* 7.322	72.48	Pk	30.6	-45.93	57.15	74	-16.85	-6.7	50.45	54	-3.55	0-360	149	H
6	9.761	61.89	Pk	36.4	-48.76	49.53	74	-24.47	-6.7	42.83	54	-11.17	0-360	100	H
7	* 12.198	52.37	Pk	39.4	-40.18	51.59	74	-22.41	-6.7	44.89	54	-9.11	0-360	150	H
8	2.439	117.3	Pk	21.9	-51.29	87.91	-	-	-	-	-	-	0-360	100	V
9	* 4.775	76.48	Pk	27.7	-51.16	53.02	74	-20.98	-6.7	46.32	54	-7.68	0-360	150	V
10	* 4.866	75.93	Pk	27.7	-50.46	53.17	74	-20.83	-6.7	46.47	54	-7.53	0-360	150	V
11	* 4.879	79.22	Pk	27.7	-50.34	56.58	74	-17.42	-6.7	49.88	54	-4.12	0-360	150	V
12	* 4.9	77.13	Pk	27.8	-50.48	54.45	74	-19.55	-6.7	47.75	54	-6.25	0-360	150	V
13	* 4.922	73.56	Pk	27.8	-50.64	50.72	74	-23.28	-6.7	44.02	54	-9.98	0-360	100	V
14	* 5.084	73.73	Pk	28	-49.58	52.15	74	-21.85	-6.7	45.45	54	-8.55	0-360	150	V
15	* 7.32	69.39	Pk	30.6	-45.89	54.1	74	-19.9	-6.7	47.4	54	-6.6	0-360	100	V
16	9.761	62.21	Pk	36.4	-48.76	49.85	74	-24.15	-6.7	43.15	54	-10.85	0-360	150	V
17	* 12.201	48.66	Pk	39.4	-40.03	48.03	74	-25.97	-6.7	41.33	54	-12.67	0-360	150	V
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band															
Pk - Peak detector															
Maximized Radiated Emission Data															
	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	DC Factor dB	Average Level with DC dBuV/m	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
	* 7.3192	70.29	Pk	30.6	-45.88	55.01	74	-18.99	-6.7	48.31	54	-5.69	103	100	V
	* 7.3191	72.92	Pk	30.6	-45.88	57.64	74	-16.36	-6.7	50.94	54	-3.06	201	146	H
	* 4.8805	80.02	Pk	27.7	-50.36	57.36	74	-16.64	-6.7	50.66	54	-3.34	302	163	V
	* 4.8794	74.97	Pk	27.7	-50.35	52.32	74	-21.68	-6.7	45.62	54	-8.38	25	100	H
Pk - Peak detector															
Av - Average detection															

Middle Channel Scan Data around 5GHz

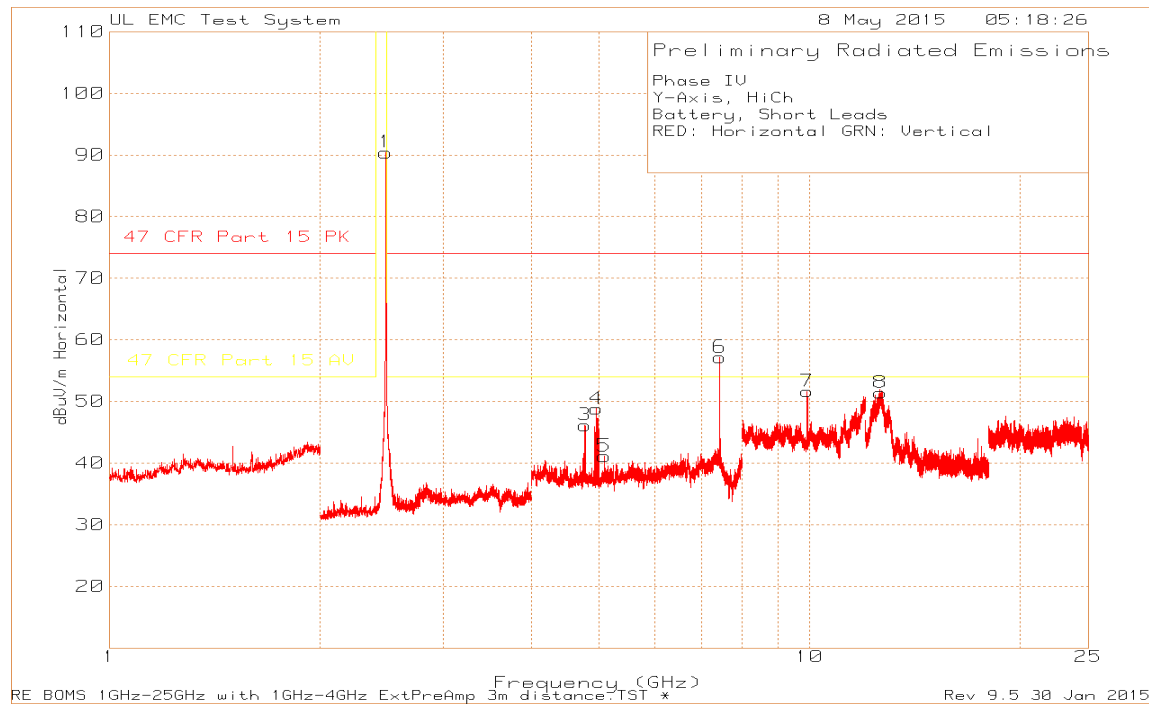
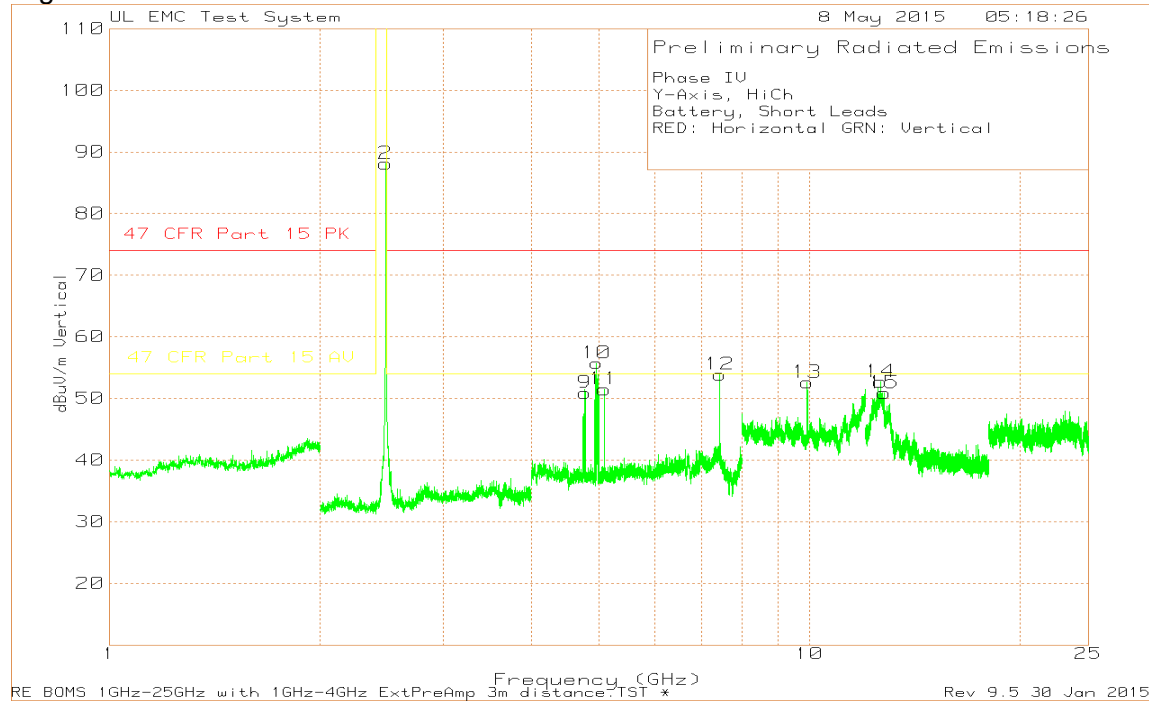


* All the spurious emissions recorded are associated with the transmit frequency. While the period of those emissions is the same as for the fundamental frequency the burst durations are different. The shortest burst duration observed was at under 1uS and the longest burst duration was about 10uS. In all cases this is significantly less than the duty cycle of the fundamental frequency. As worst case scenario the duty cycle correction for the fundamental was used.

Middle Channel Tabular Data around 5GHz

Phase 4														
4-6GHz Region														
Y axis, MidCh TX														
battery, short lead														
RED: Horizontal GRN: Vertical														
Trace Markers														
Radiated Emission Data														
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	DC Factor dB	Average Level with DC dBuV/m	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4.8794	78.48	Pk	27.7	-50.35	55.83	74	-18.17	-6.7	49.13	54	-4.87	316	100	H
4.8459	76.3	Pk	27.7	-50.35	53.65	74	-20.35	-6.7	46.95	54	-7.05	316	100	H
4.8661	76.5	Pk	27.7	-50.45	53.75	74	-20.25	-6.7	47.05	54	-6.95	316	100	H
4.8993	77.35	Pk	27.7	-50.47	54.58	74	-19.42	-6.7	47.88	54	-6.12	316	100	H
4.9217	77.1	Pk	27.8	-50.63	54.27	74	-19.73	-6.7	47.57	54	-6.43	316	100	H
4.8793	80.63	Pk	27.7	-50.35	57.98	74	-16.02	-6.7	51.28	54	-2.72	293	175	V
4.9218	78.26	Pk	27.8	-50.63	55.43	74	-18.57	-6.7	48.73	54	-5.27	293	175	V
4.9026	78.47	Pk	27.8	-50.51	55.76	74	-18.24	-6.7	49.06	54	-4.94	293	175	V
4.8915	78.39	Pk	27.7	-50.42	55.67	74	-18.33	-6.7	48.97	54	-5.03	293	175	V
4.8824	78.04	Pk	27.7	-50.38	55.36	74	-18.64	-6.7	48.66	54	-5.34	293	175	V
4.8744	78.3	Pk	27.7	-50.29	55.71	74	-18.29	-6.7	49.01	54	-4.99	293	175	V
4.8657	78.04	Pk	27.7	-50.46	55.28	74	-18.72	-6.7	48.58	54	-5.42	293	175	V
4.846	77.25	Pk	27.7	-50.35	54.6	74	-19.4	-6.7	47.9	54	-6.1	293	175	V
Pk - Peak detector														

High Channel Scan Data

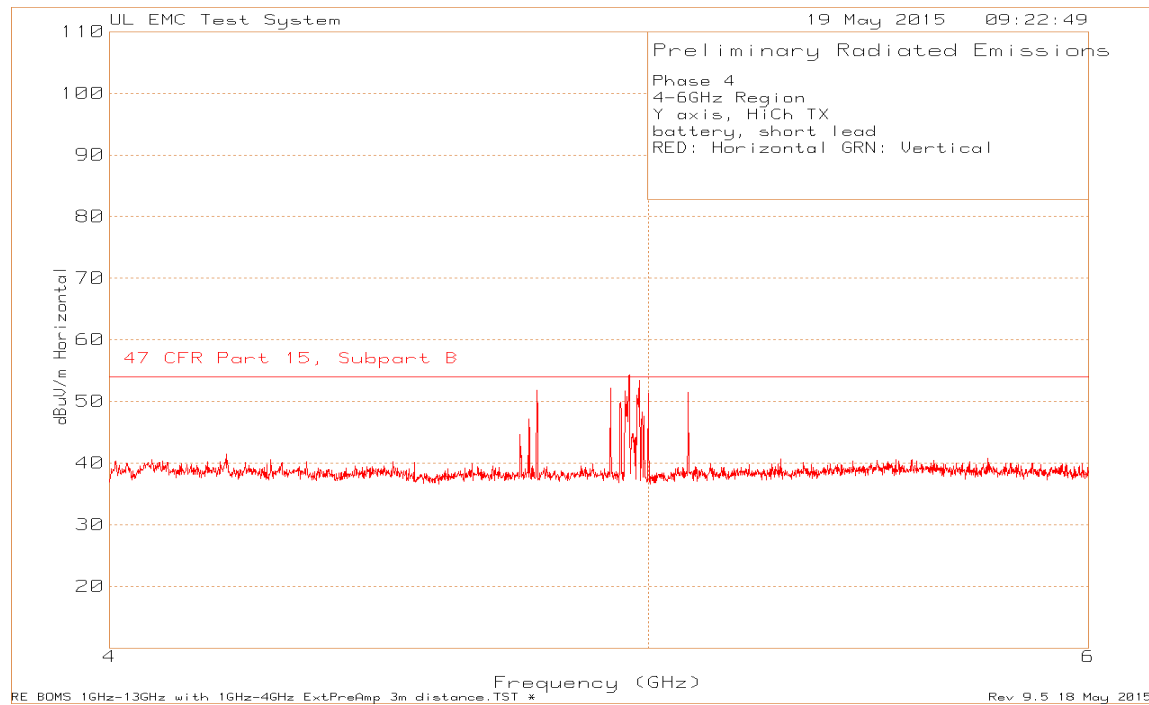
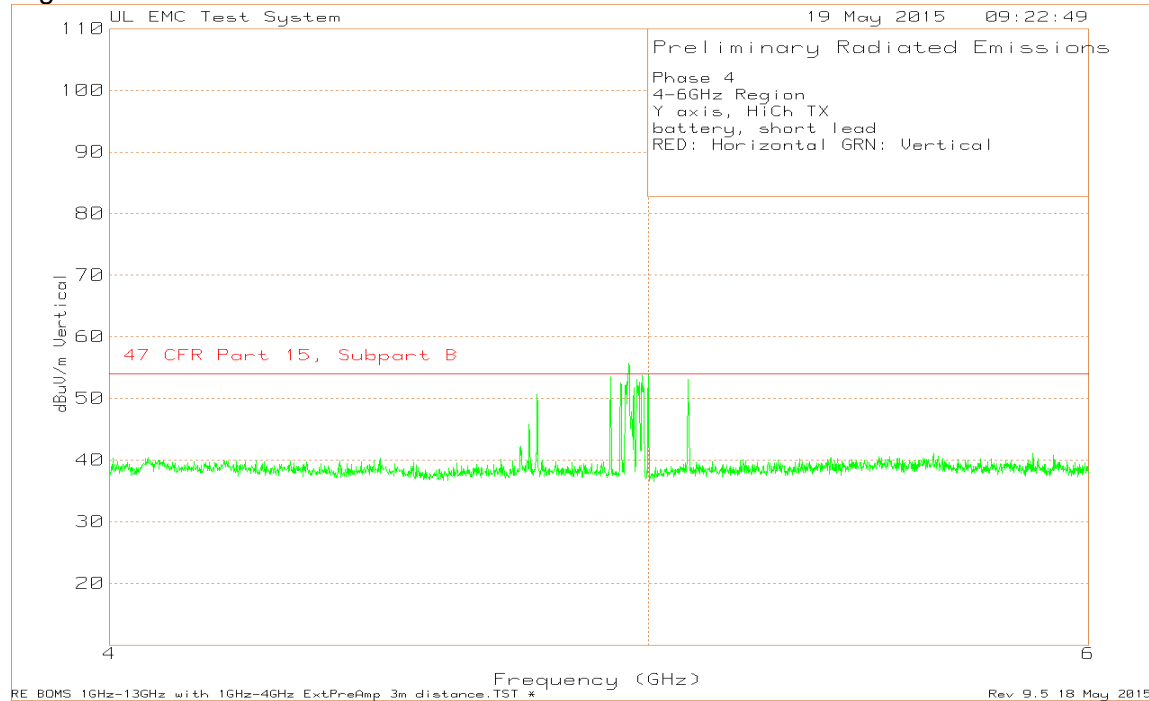


* Compliance with Average Limits in restricted bands is shown in table below by applying the duty cycle to average measurement.

High Channel Tabular Data

Phase IV															
Y-Axis, HiCh															
Battery, Short Leads															
RED: Horizontal GRN: Vertical															
Trace Markers															
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	DC Factor dB	Average Level with DC dBuV/m	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.479	120.05	Pk	22	-51.66	90.39	-	-	-	-	-	-	0-360	99	H
3	* 4.775	69.61	Pk	27.7	-51.16	46.15	74	-27.85	-6.7	39.45	54	-14.55	0-360	149	H
4	* 4.959	71.75	Pk	27.8	-50.74	48.81	74	-25.19	-6.7	42.11	54	-11.89	0-360	101	H
5	* 5.084	62.67	Pk	28	-49.58	41.09	74	-32.91	-6.7	34.39	54	-19.61	0-360	149	H
6	* 7.44	73.35	Pk	30.6	-46.81	57.14	74	-16.86	-6.7	50.44	54	-3.56	0-360	149	H
7	9.919	64.49	Pk	36.4	-49.25	51.64	74	-22.36	-6.7	44.94	54	-9.06	0-360	150	H
8	* 12.622	46.17	Pk	39.5	-34.26	51.41	74	-22.59	-6.7	44.71	54	-9.29	0-360	100	H
2	2.479	117.74	Pk	22	-51.66	88.08	-	-	-	-	-	-	0-360	100	V
9	* 4.776	74.39	Pk	27.7	-51.17	50.92	74	-23.08	-6.7	44.22	54	-9.78	0-360	150	V
10	* 4.961	78.68	Pk	27.8	-50.74	55.74	74	-18.26	-6.7	49.04	54	-4.96	0-360	150	V
11	* 5.084	73.08	Pk	28	-49.58	51.5	74	-22.5	-6.7	44.8	54	-9.2	0-360	99	V
12	* 7.441	70.21	Pk	30.5	-46.84	53.87	74	-20.13	-6.7	47.17	54	-6.83	0-360	150	V
13	9.919	65.45	Pk	36.4	-49.25	52.6	74	-21.4	-6.7	45.9	54	-8.1	0-360	151	V
14	* 12.625	47.44	Pk	39.5	-34.25	52.69	74	-21.31	-6.7	45.99	54	-8.01	0-360	150	V
15	12.777	49.11	Pk	39.6	-37.83	50.88	74	-23.12	-6.7	44.18	54	-9.82	0-360	150	V
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band															
Pk - Peak detector															
Radiated Emission Data															
	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	DC Factor dB	Average Level with DC dBuV/m	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
	* 7.4391	73.23	Pk	30.6	-46.79	57.04	74	-16.96	-6.7	50.34	54	-3.66	189	100	H
	* 7.4392	70.91	Pk	30.6	-46.79	54.72	74	-19.28	-6.7	48.02	54	-5.98	99	100	V
	* 4.9594	79.4	Pk	27.8	-50.74	56.46	74	-17.54	-6.7	49.76	54	-4.24	297	160	V
	* 4.9594	79.26	Pk	27.8	-50.74	56.32	74	-17.68	-6.7	49.62	54	-4.38	297	160	V
	* 4.9428	78.28	Pk	27.8	-50.73	55.35	74	-18.65	-6.7	48.65	54	-5.35	297	160	V
	* 4.9525	78.05	Pk	27.8	-50.76	55.09	74	-18.91	-6.7	48.39	54	-5.61	297	160	V
	* 4.9604	72.94	Pk	27.8	-50.74	50	74	-24	-6.7	43.3	54	-4	325	100	H
Pk - Peak detector															

High Channel Scan Data around 5GHz



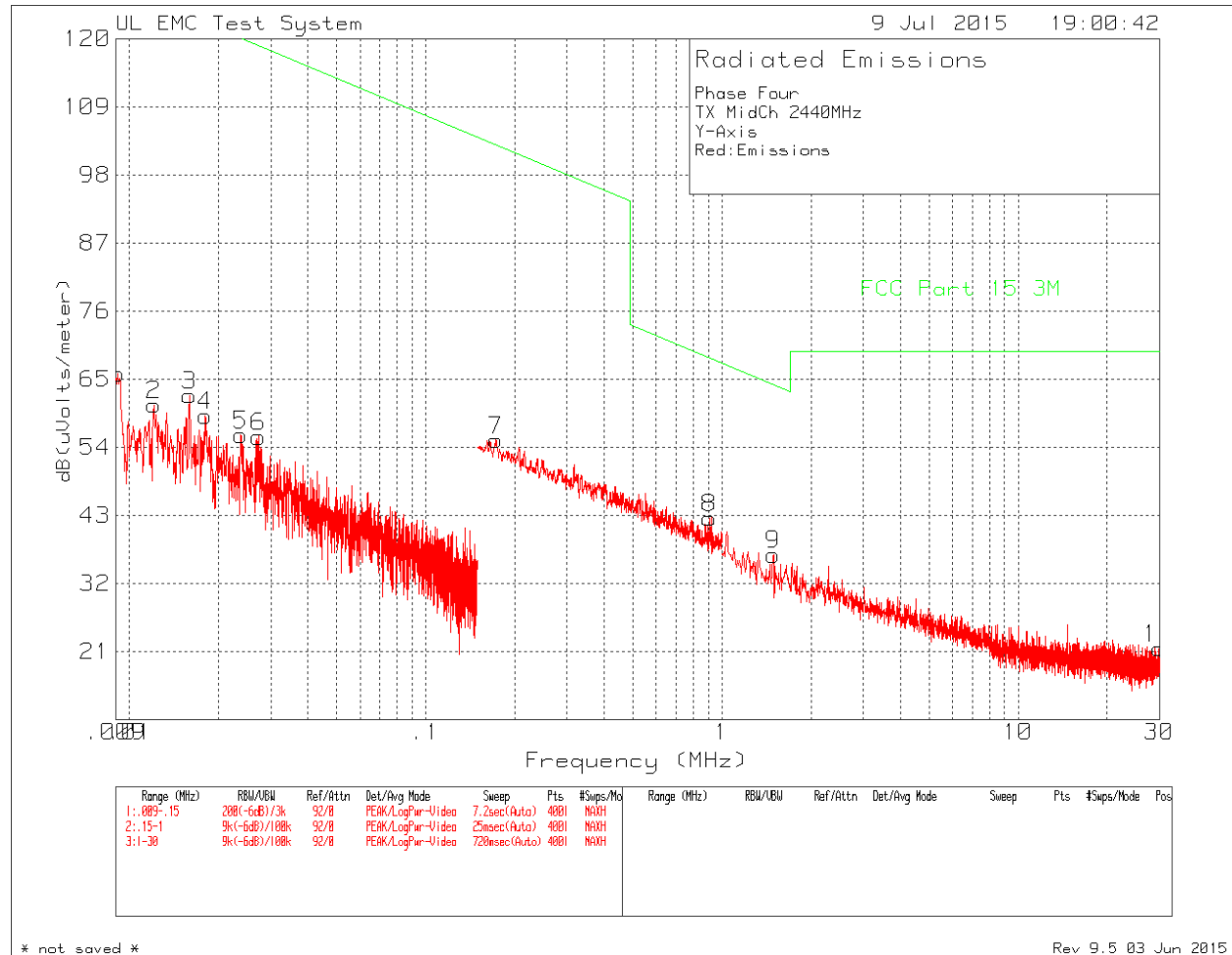
* All the spurious emissions recorded are associated with the transmit frequency. While the period of those emissions is the same as for the fundamental frequency the burst durations are different. The shortest burst duration observed was at under 1uS and the longest burst duration was about 10uS. In all cases this is significantly less than the duty cycle of the fundamental frequency. As worst case scenario the duty cycle correction for the fundamental was used.

High Channel Tabular Data around 5GHz

Phase 4														
4-6GHz Region														
Y axis, HiCh TX														
battery, short lead														
RED: Horizontal GRN: Vertical														
Radiated Emission Data														
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	Limit 47 CFR Part 15.209 PK dBuV/m	Margin (dB)	DC Factor dB	Average Level with DC dBuV/m	Limit 47 CFR Part 15.209 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4.9594	78.93	Pk	27.8	-50.74	55.99	74	-18.01	-6.7	49.29	54	-4.71	283	146	V
4.9218	57.21	Pk	27.8	-50.63	34.38	74	-39.62	-6.7	27.68	54	-26.32	283	146	V
4.9219	78.12	Pk	27.8	-50.64	55.28	74	-18.72	-6.7	48.58	54	-5.42	283	146	V
4.9427	78.49	Pk	27.8	-50.73	55.56	74	-18.44	-6.7	48.86	54	-5.14	283	146	V
4.9523	78.22	Pk	27.8	-50.76	55.26	74	-18.74	-6.7	48.56	54	-5.44	283	146	V
4.9695	78.23	Pk	27.8	-50.77	55.26	74	-18.74	-6.7	48.56	54	-5.44	283	146	V
4.9766	77.9	Pk	27.8	-50.76	54.94	74	-19.06	-6.7	48.24	54	-5.76	283	146	V
4.9809	77.94	Pk	27.8	-50.76	54.98	74	-19.02	-6.7	48.28	54	-5.72	283	146	V
4.9871	77.9	Pk	27.8	-50.8	54.9	74	-19.1	-6.7	48.2	54	-5.8	283	146	V
4.9901	77.73	Pk	27.8	-50.82	54.71	74	-19.29	-6.7	48.01	54	-5.99	283	146	V
4.9993	77.53	Pk	27.8	-50.81	54.52	74	-19.48	-6.7	47.82	54	-6.18	283	146	V
5.0837	76.44	Pk	28	-49.58	54.86	74	-19.14	-6.7	48.16	54	-5.84	283	146	V
4.9595	77.64	Pk	27.8	-50.74	54.7	74	-19.3	-6.7	48	54	-6	313	100	H
4.9216	77.02	Pk	27.8	-50.63	54.19	74	-19.81	-6.7	47.49	54	-6.51	313	100	H
4.9434	77.23	Pk	27.8	-50.73	54.3	74	-19.7	-6.7	47.6	54	-6.4	313	100	H
4.9528	77	Pk	27.8	-50.76	54.04	74	-19.96	-6.7	47.34	54	-6.66	313	100	H
4.9695	77.06	Pk	27.8	-50.77	54.09	74	-19.91	-6.7	47.39	54	-6.61	313	100	H
4.9767	77.17	Pk	27.8	-50.76	54.21	74	-19.79	-6.7	47.51	54	-6.49	313	100	H
4.9806	77.24	Pk	27.8	-50.76	54.28	74	-19.72	-6.7	47.58	54	-6.42	313	100	H
4.9868	77.1	Pk	27.8	-50.79	54.11	74	-19.89	-6.7	47.41	54	-6.59	313	100	H
4.9904	76.84	Pk	27.8	-50.82	53.82	74	-20.18	-6.7	47.12	54	-6.88	313	100	H
4.9994	76.87	Pk	27.8	-50.81	53.86	74	-20.14	-6.7	47.16	54	-6.84	313	100	H
5.0836	75.42	Pk	28	-49.58	53.84	74	-20.16	-6.7	47.14	54	-6.86	313	100	H
Pk - Peak detector														

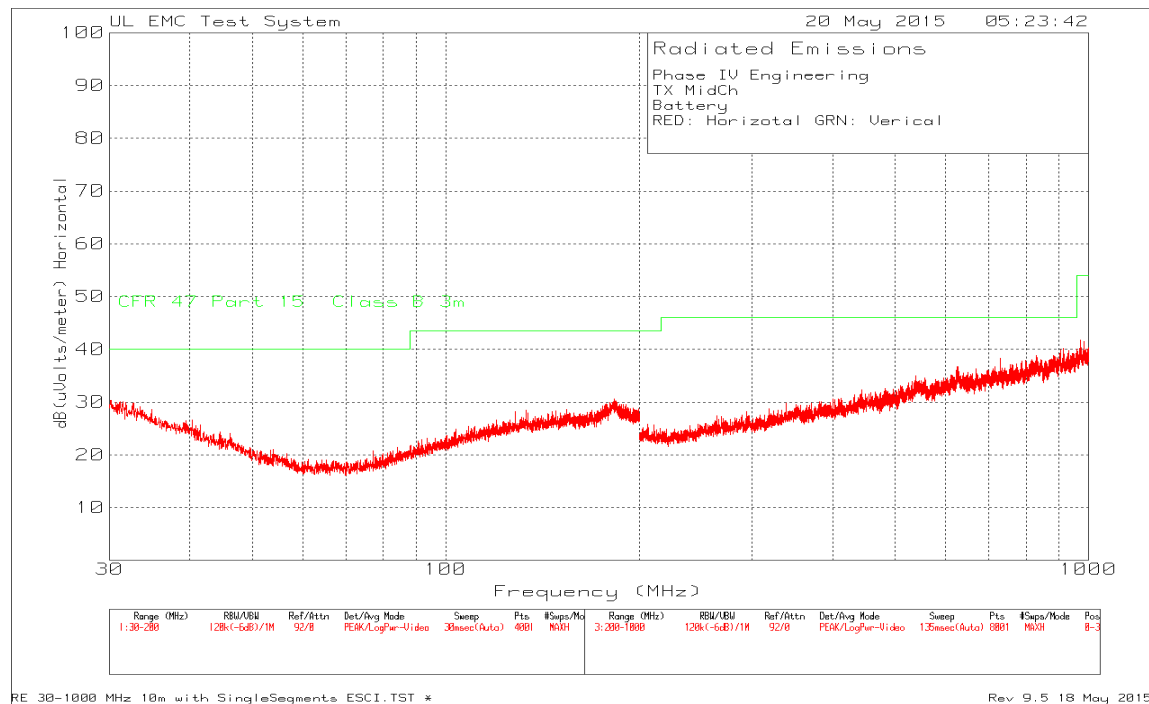
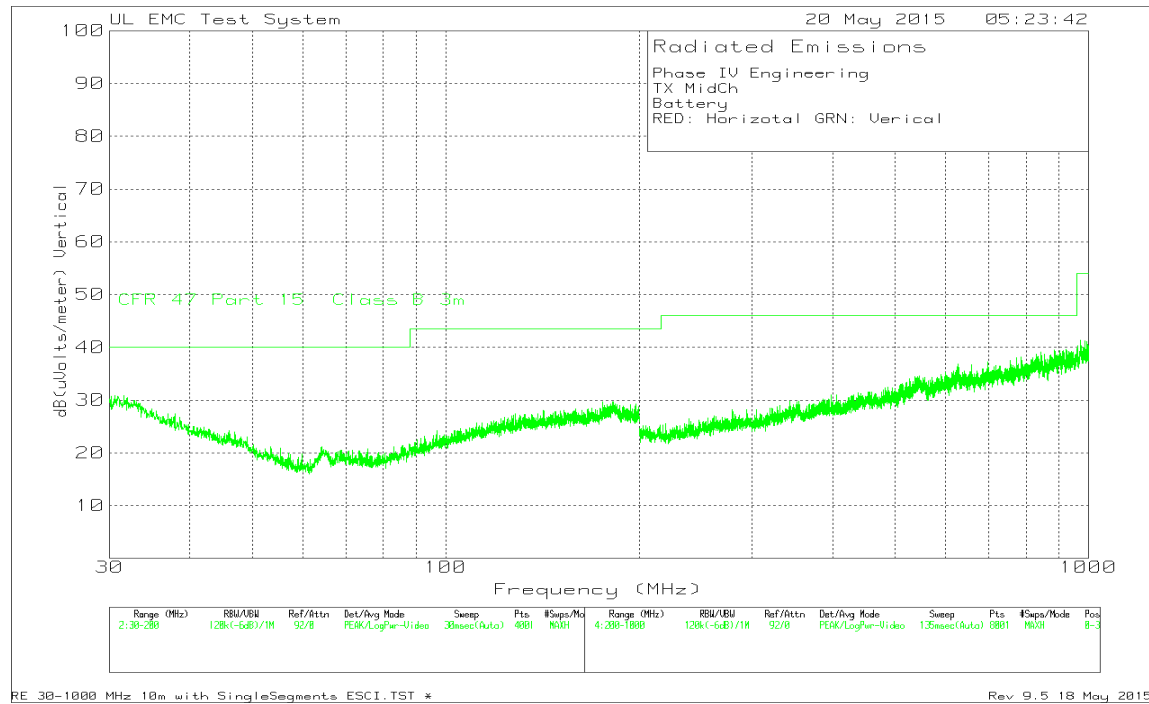
8.3. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 150kHz TO 30 MHz



*No emissions were recorded between 150kHz to 30MHz.

SPURIOUS EMISSIONS 30 TO 1000 MHZ



* No emissions recorded between 30MHz – 1GHz

END OF REPORT