



**FCC CFR47 PART 15 SUBPART C**

**C2PC CERTIFICATION TEST REPORT**

**FOR**

**GSM/WCDMA/LTE PHONE + BLUETOOTH, DTS b/g/n**

**MODEL NUMBER: LG-US550, LGUS550, US550**

**FCC ID: ZNFUS550**

**REPORT NUMBER: 15I19900-E3**

**ISSUE DATE: MARCH 12, 2015**

*Prepared for*

**LG ELECTRONICS MOBILECOMM U.S.A., INC  
1000 SYLVAN AVENUE  
ENGLEWOOD CLIFFS,  
NEW JERSEY, 07632, U.S.A**

*Prepared by*

**UL VERIFICATION SERVICES INC.  
47173 BENICIA STREET  
FREMONT, CA 94538, U.S.A.  
TEL: (510) 771-1000  
FAX: (510) 661-0888**



**NVLAP LAB CODE 200065-0**

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	03/12/15	Initial Issue	D. Corona

## TABLE OF CONTENTS

<b>1. ATTESTATION OF TEST RESULTS .....</b>	<b>4</b>
<b>2. TEST METHODOLOGY .....</b>	<b>5</b>
<b>3. FACILITIES AND ACCREDITATION .....</b>	<b>5</b>
<b>4. CALIBRATION AND UNCERTAINTY .....</b>	<b>5</b>
4.1. <i>MEASURING INSTRUMENT CALIBRATION .....</i>	<i>5</i>
4.2. <i>SAMPLE CALCULATION .....</i>	<i>5</i>
4.3. <i>MEASUREMENT UNCERTAINTY.....</i>	<i>6</i>
<b>5. EQUIPMENT UNDER TEST .....</b>	<b>7</b>
5.1. <i>DESCRIPTION OF EUT .....</i>	<i>7</i>
5.2. <i>MAXIMUM OUTPUT POWER.....</i>	<i>7</i>
5.3. <i>DESCRIPTION OF AVAILABLE ANTENNAS .....</i>	<i>7</i>
5.4. <i>WORST-CASE CONFIGURATION AND MODE.....</i>	<i>8</i>
5.5. <i>DESCRIPTION OF TEST SETUP.....</i>	<i>9</i>
<b>6. TEST AND MEASUREMENT EQUIPMENT .....</b>	<b>11</b>
<b>7. SUMMARY TABLE .....</b>	<b>12</b>
<b>8. RADIATED TEST RESULTS.....</b>	<b>13</b>
8.1. <i>LIMITS AND PROCEDURE.....</i>	<i>13</i>
8.2. <i>TRANSMITTER ABOVE 1 GHz.....</i>	<i>14</i>
8.3. <i>WORST-CASE BELOW 1 GHz.....</i>	<i>27</i>
<b>9. SETUP PHOTOS.....</b>	<b>30</b>

# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** LG ELECTRONICS MOBILECOMM U.S.A., INC  
**EUT DESCRIPTION:** GSM/WCDMA/LTE PHONE + BLUETOOTH, DTS b/g/n  
**MODEL:** LG-US550, LGUS550, US550  
**SERIAL NUMBER:** 80EFD1FD, 80049B33  
**DATE TESTED:** February 25, 2015

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

UL Verification Services Inc. 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 Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 Verification Services Inc. By:



DAN CORONIA  
CONSUMER TECHNOLOGY DIVISION  
WISE PROJECT LEAD  
UL VERIFICATION SERVICES INC

Tested By:



STEVEN TRAN  
CONSUMER TECHNOLOGY DIVISION  
WISE LAB ENGINEER  
UL VERIFICATION SERVICES INC

## 2. TEST METHODOLOGY

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

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
<input type="checkbox"/> Chamber A(IC: 2324B-1)	<input type="checkbox"/> Chamber D(IC: 2324B-4)
<input checked="" type="checkbox"/> Chamber B(IC: 2324B-2)	<input type="checkbox"/> Chamber E(IC: 2324B-5)
<input type="checkbox"/> Chamber C(IC: 2324B-3)	<input type="checkbox"/> Chamber F(IC: 2324B-6)
	<input type="checkbox"/> Chamber G(IC: 2324B-7)
	<input type="checkbox"/> Chamber H(IC: 2324B-8)

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.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

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable} \\ &\text{Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

### 4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 18000 MHz	4.94 dB

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

## **5. EQUIPMENT UNDER TEST**

### **5.1. DESCRIPTION OF EUT**

The EUT is a GSM/WCDMA/LTE PHONE + BLUETOOTH, DTS b/g/n

### **5.2. MAXIMUM OUTPUT POWER**

The transmitter has a maximum conducted output power as follows:  
See original report for details

### **5.3. DESCRIPTION OF AVAILABLE ANTENNAS**

The radio utilizes an FPCB antenna, with a maximum gain of -3.1dBi.

#### **5.4. WORST-CASE CONFIGURATION AND MODE**

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

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

## 5.5. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG	MCS-02WD	DA3Z0153451	N/A
Earphone	LG	LG-US550	N/A	N/A

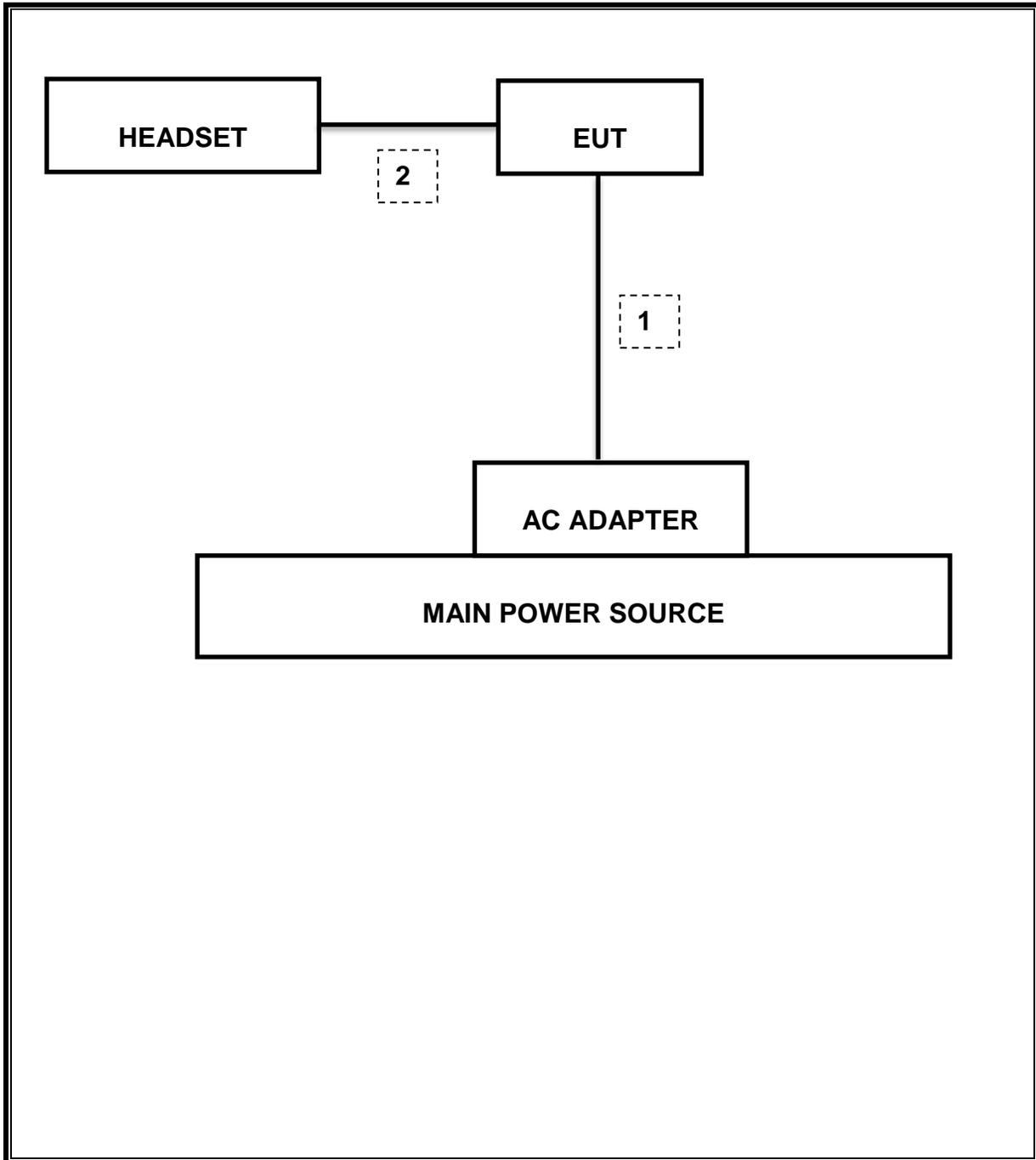
### I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Mini-USB	Shielded	1.2m	N/A
2	Audio	1	Mini-Jack	Unshielded	1m	N/A

### TEST SETUP

The EUT is continuously communicating to the Bluetooth tester during the tests. EUT was set in the Hidden menu mode to enable BLE communications.

**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 Equipment List				
Description	Manufacturer	Model	Asset	Cal Due
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	F00064	12/13/15
Antenna, Horn, 18GHz	EMCO	3115	C00783	10/25/15
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	11/14/15
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	04/28/15
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	10/22/15
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/15
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/15
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/15
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/16/16
Reject Filter, 2.4GHz	Micro-Tronics	BRM50702	N02684	CNR
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/15
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/15

Test Equipment List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Version 9.5, 07/22/14
Conducted Software	UL	UL EMC	Version 9.5, 05/17/14
CLT Software	UL	UL RF	Version 1.0, 02/02/15
Antenna Port Software	UL	UL RF	Version 2.1.1.1, 1/20/15

## 7. SUMMARY TABLE

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)(2)	RSS-210 A8.2(a)	Occupied Band width (6dB)	>500KHz	Conducted	Pass	See Original
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	See Original
15.247	RSS-210 A8.4	TX conducted output power	<30dBm		Pass	See Original
15.247	RSS-210 A8.2	PSD	<8dBm		Pass	See Original
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	See Original
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	45.65dBuV/m

## 8. RADIATED TEST RESULTS

### 8.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

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

#### TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4 - 2009. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor =  $10\log(1/x)$  for this sample B mode = 0dB (duty cycle >98%); G mode = 0.21dB; N mode = 0.24dB.

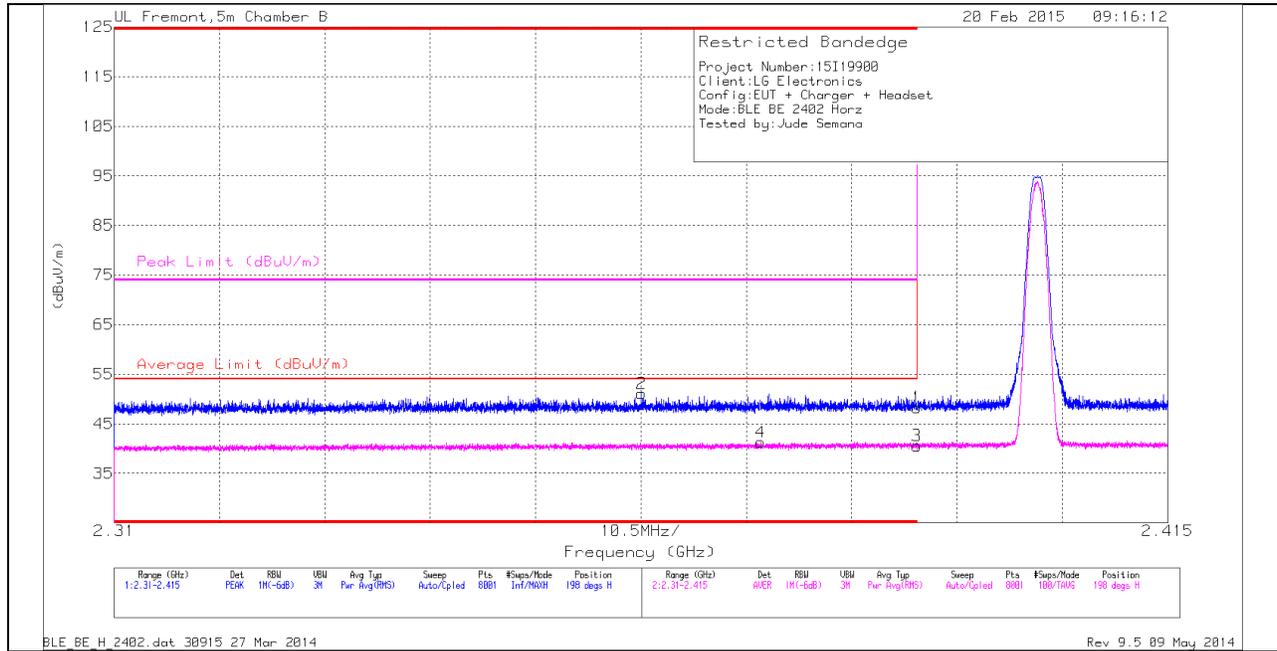
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

## 8.2. TRANSMITTER ABOVE 1 GHz RESTRICTED BANDEDGE (LOW CHANNEL)

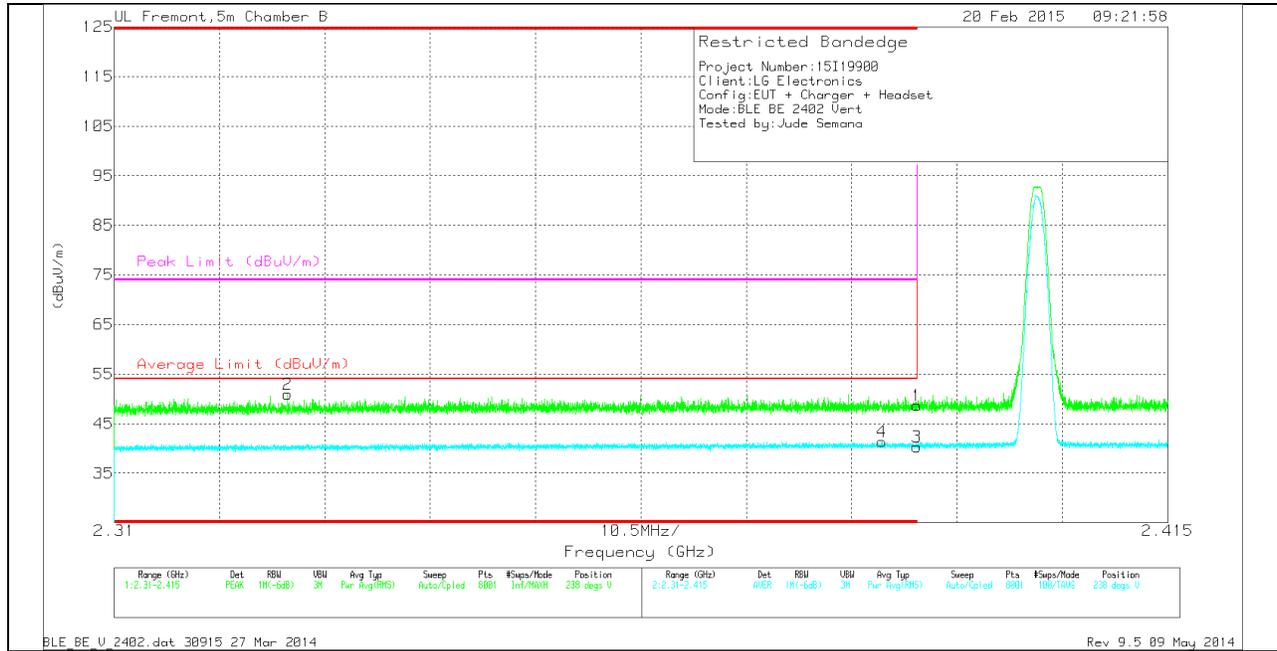
### HORIZONTAL PEAK AND AVERAGE PLOT



### HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/Filter/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.363	41.71	PK	32	-22.6	0	51.11	-	-	74	-22.89	198	232	H
4	* 2.374	29.82	RMS	32	-22.6	2.1	41.32	54	-12.68	-	-	198	232	H
1	* 2.39	38.79	PK	32.1	-22.6	0	48.29	-	-	74	-25.71	198	232	H
3	* 2.39	28.97	RMS	32.1	-22.6	2.1	40.57	54	-13.43	-	-	198	232	H

**VERTICAL PEAK AND AVERAGE PLOT**

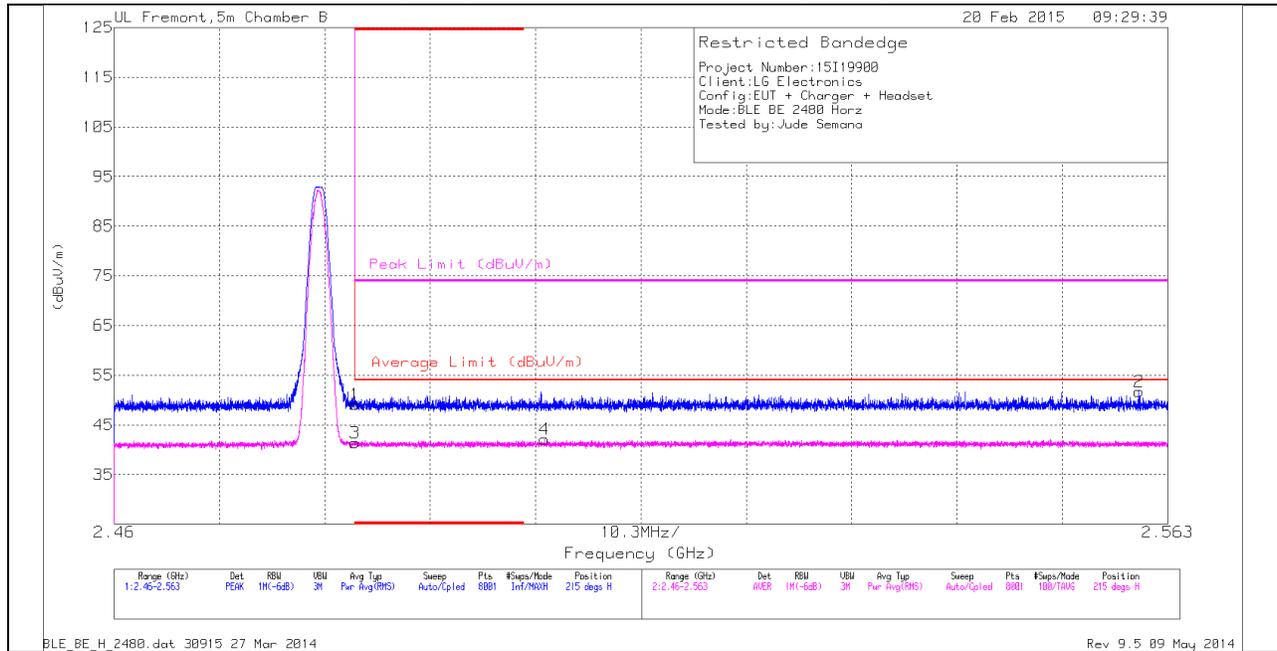


**VERTICAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/Fitter/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.327	41.85	PK	31.8	-22.7	0	50.95	-	-	74	-23.05	238	242	V
4	* 2.387	29.8	RMS	32.1	-22.6	2.1	41.4	54	-12.6	-	-	238	242	V
1	* 2.39	39.12	PK	32.1	-22.6	0	48.62	-	-	74	-25.38	238	242	V
3	* 2.39	28.77	RMS	32.1	-22.6	2.1	40.37	54	-13.63	-	-	238	242	V

**AUTHORIZED BANDEDGE (HIGH CHANNEL)**

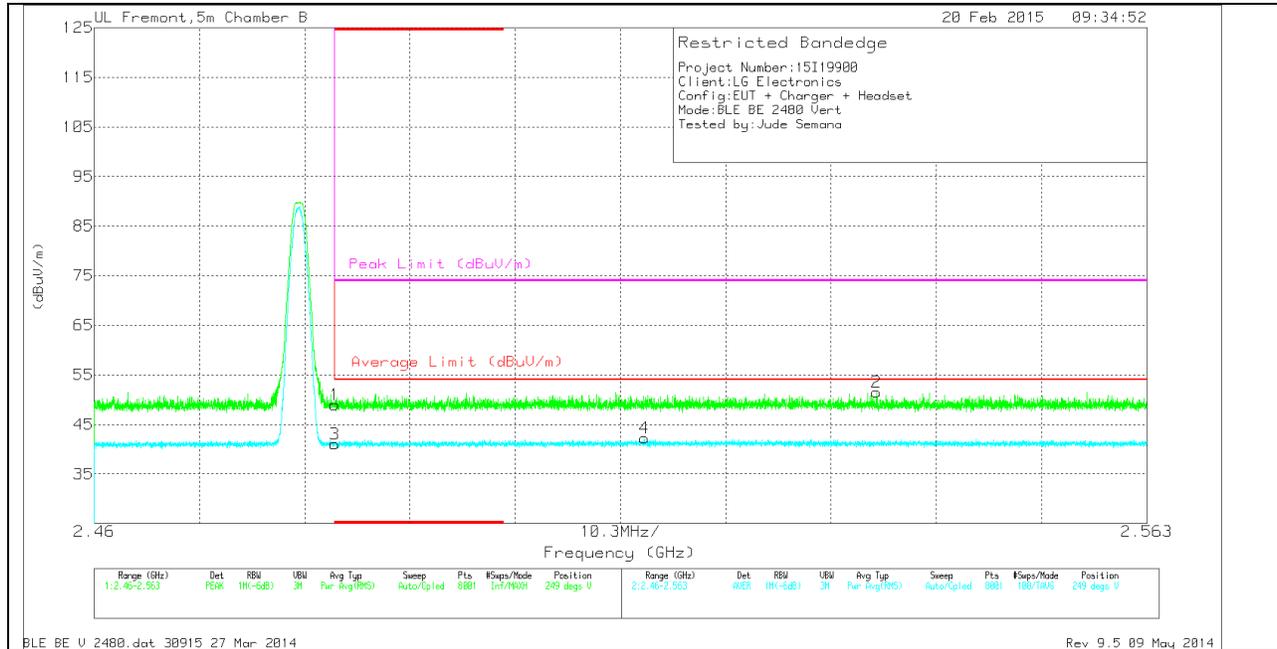
**HORIZONTAL PEAK AND AVERAGE PLOT**



**HORIZONTAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/Filter/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	39.09	PK	32.4	-22.4	0	49.09	-	-	74	-24.91	215	276	H
3	* 2.484	29.34	RMS	32.4	-22.4	2.1	41.44	54	-12.56	-	-	215	276	H
4	2.502	30.02	RMS	32.4	-22.4	2.1	42.12	54	-11.88	-	-	215	276	H
2	2.56	41.61	PK	32.5	-22.4	0	51.71	-	-	74	-22.29	215	276	H

**VERTICAL PEAK AND AVERAGE PLOT**

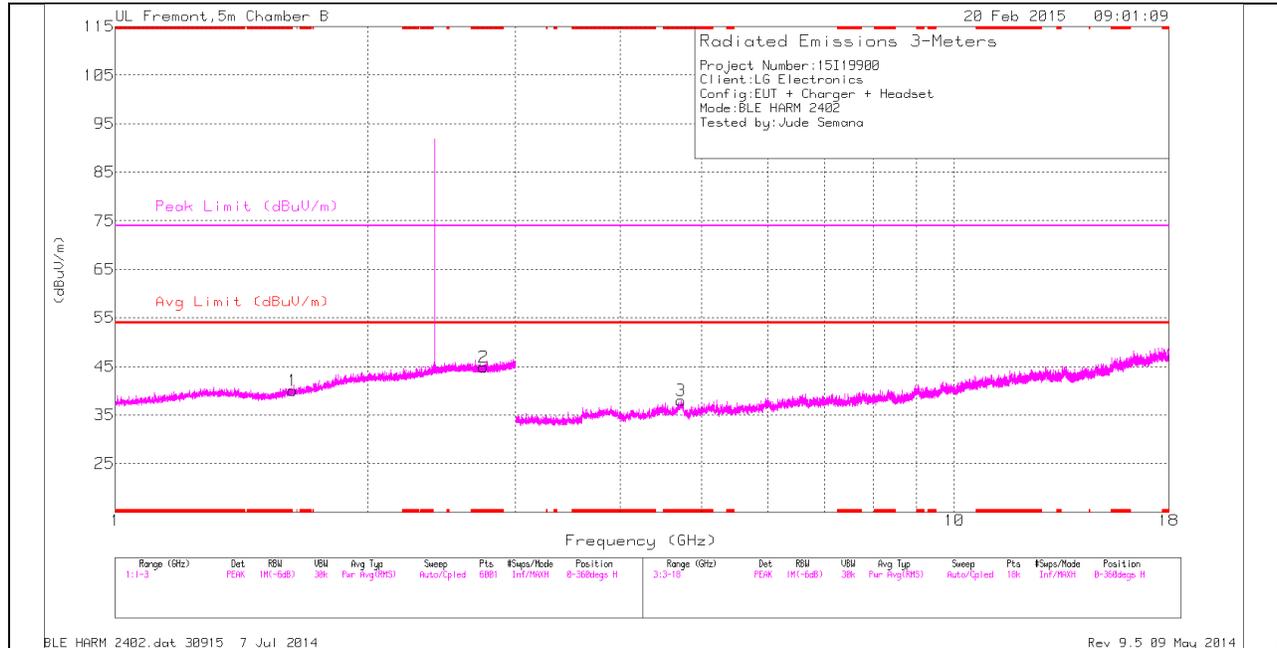


**VERTICAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/Fit r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	38.99	PK	32.4	-22.4	0	48.99	-	-	74	-25.01	249	284	V
3	* 2.484	28.95	RMS	32.4	-22.4	2.1	41.05	54	-12.95	-	-	249	284	V
4	2.514	30.06	RMS	32.5	-22.4	2.1	42.26	54	-11.74	-	-	249	284	V
2	2.537	41.31	PK	32.5	-22.3	0	51.51	-	-	74	-22.49	249	284	V

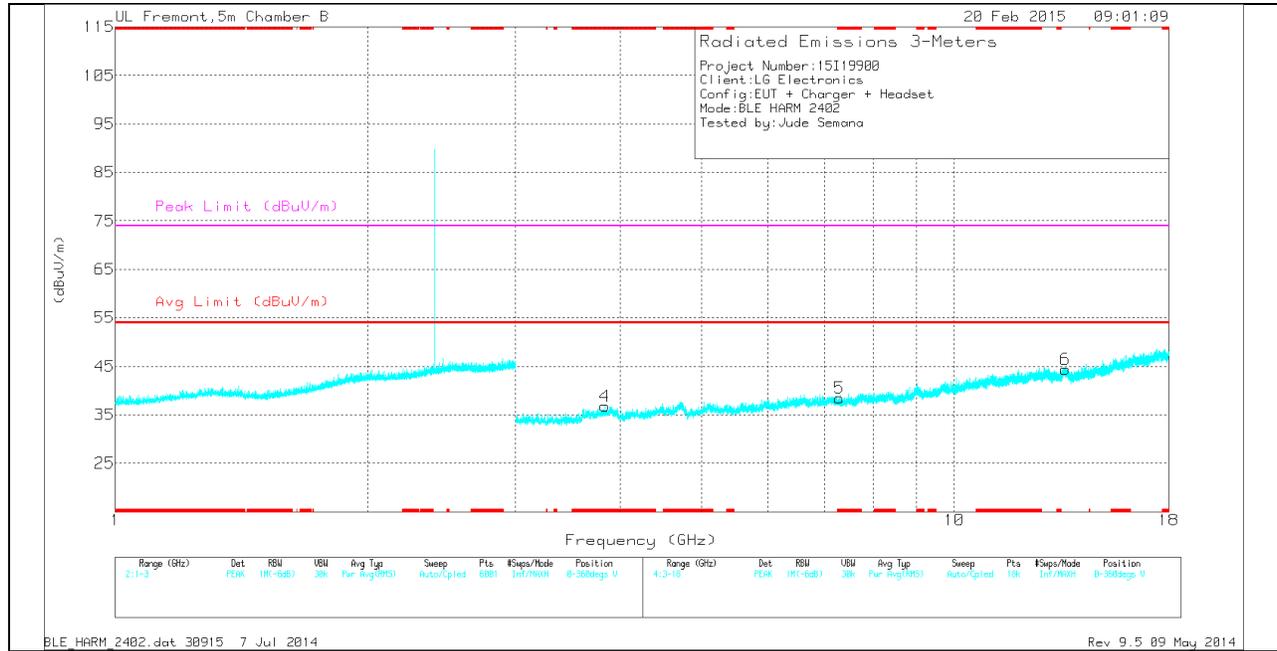
## HARMONICS AND SPURIOUS EMISSIONS

### LOW CHANNEL HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

**LOW CHANNEL VERTICAL**



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

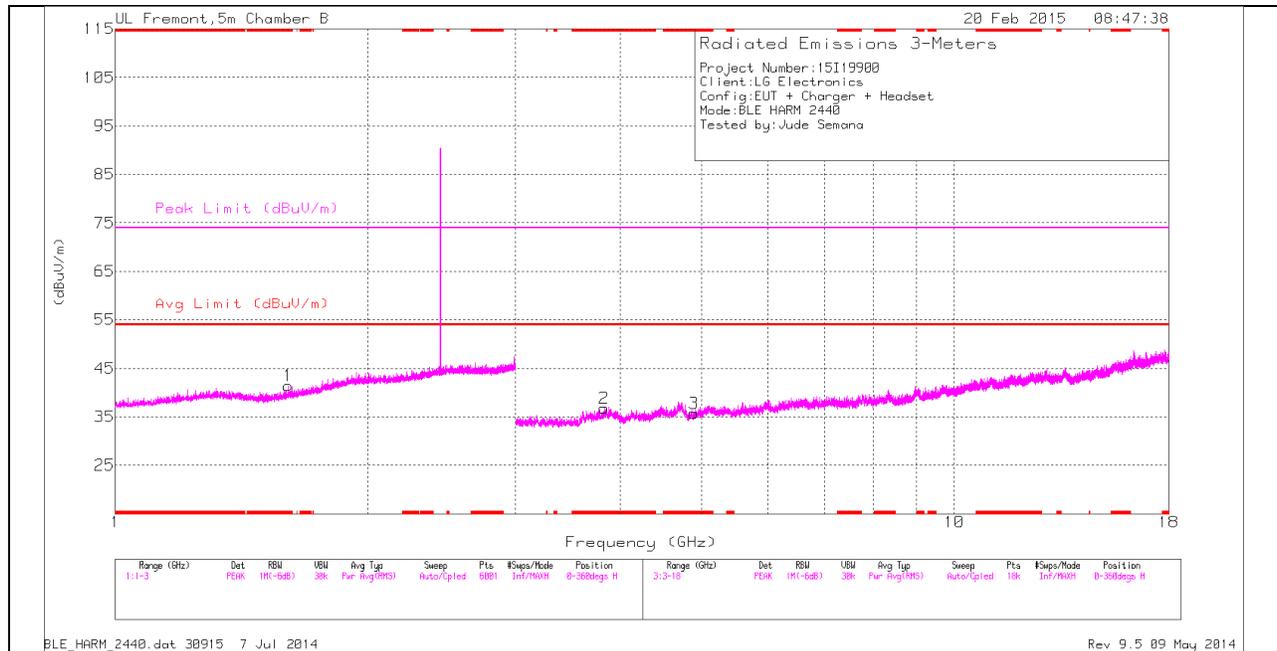
**LOW CHANNEL DATA**

*TRACE MARKERS*

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/Ftr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.626	35.04	PK	28.6	-23.6	0	40.04	-	-	74	-33.96	0-360	100	H
2	* 2.748	34.78	PK	32.3	-22.2	0	44.88	-	-	74	-29.12	0-360	100	H
4	* 3.834	33.32	PK	33.7	-30.2	0	36.82	-	-	74	-37.18	0-360	199	V
3	* 4.722	32.88	PK	34.2	-29.1	0	37.98	-	-	74	-36.02	0-360	199	H
5	* 7.288	30.86	PK	35.6	-28	0	38.46	-	-	74	-35.54	0-360	101	V
6	13.552	26.42	PK	38.9	-20.9	0	44.42	-	-	-	-	0-360	199	V

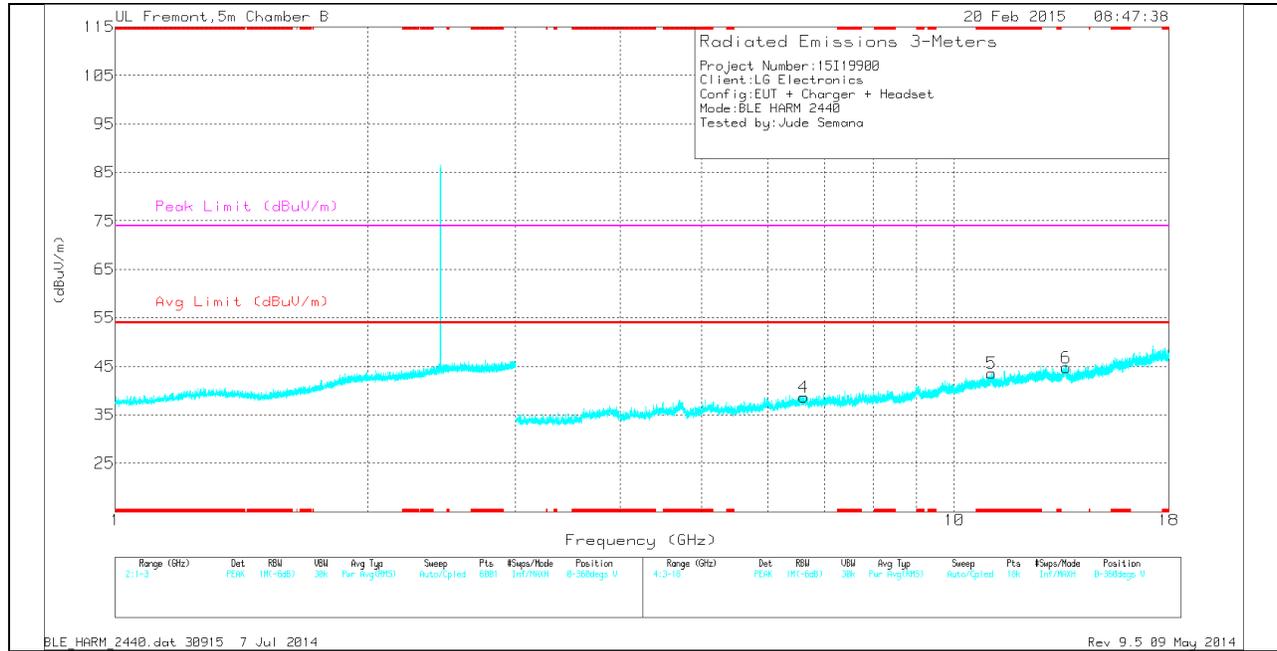
PK - Peak detector

MID CHANNEL HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

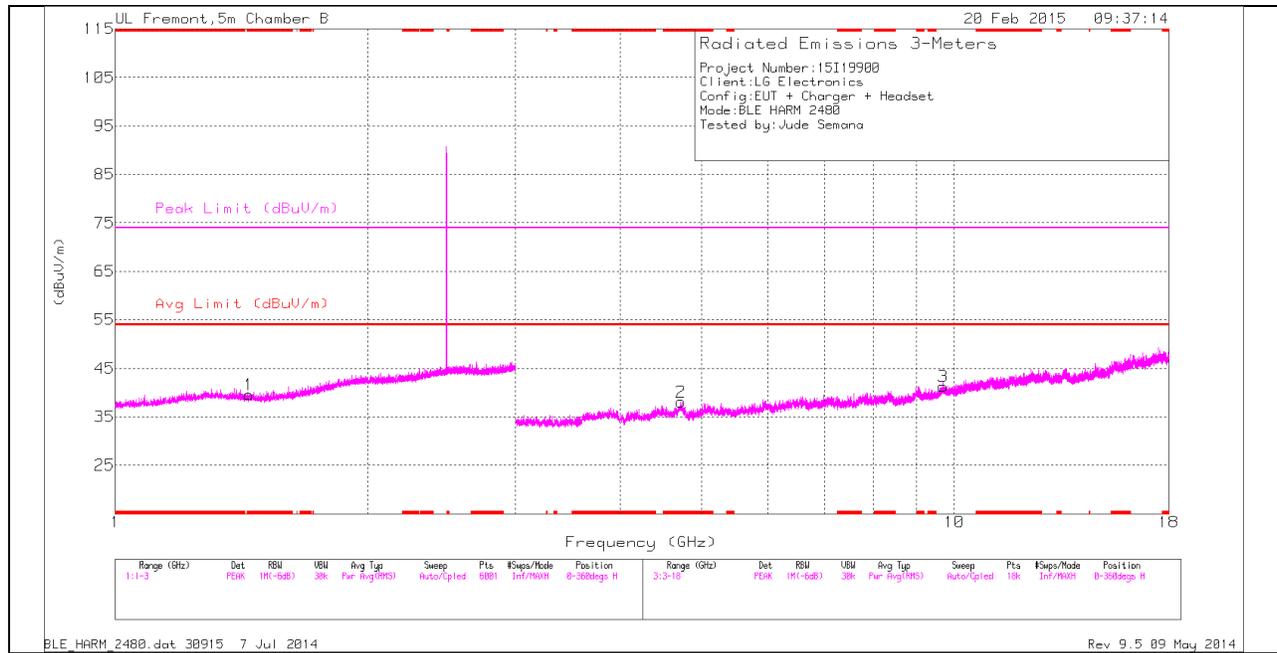
**MID CHANNEL DATA**

*TRACE MARKERS*

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/Ftr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.607	36.5	PK	28.5	-23.6	0	41.4	-	-	74	-32.6	0-360	99	H
2	* 3.826	33.41	PK	33.7	-30.3	0	36.81	-	-	74	-37.19	0-360	199	H
3	* 4.895	32.03	PK	34.2	-30.5	0	35.73	-	-	74	-38.27	0-360	101	H
5	* 11.078	27.76	PK	37.8	-22	0	43.56	-	-	74	-30.44	0-360	101	V
4	6.614	30.98	PK	35.7	-28	0	38.68	-	-	-	-	0-360	101	V
6	13.584	27.15	PK	38.8	-21.2	0	44.75	-	-	-	-	0-360	101	V

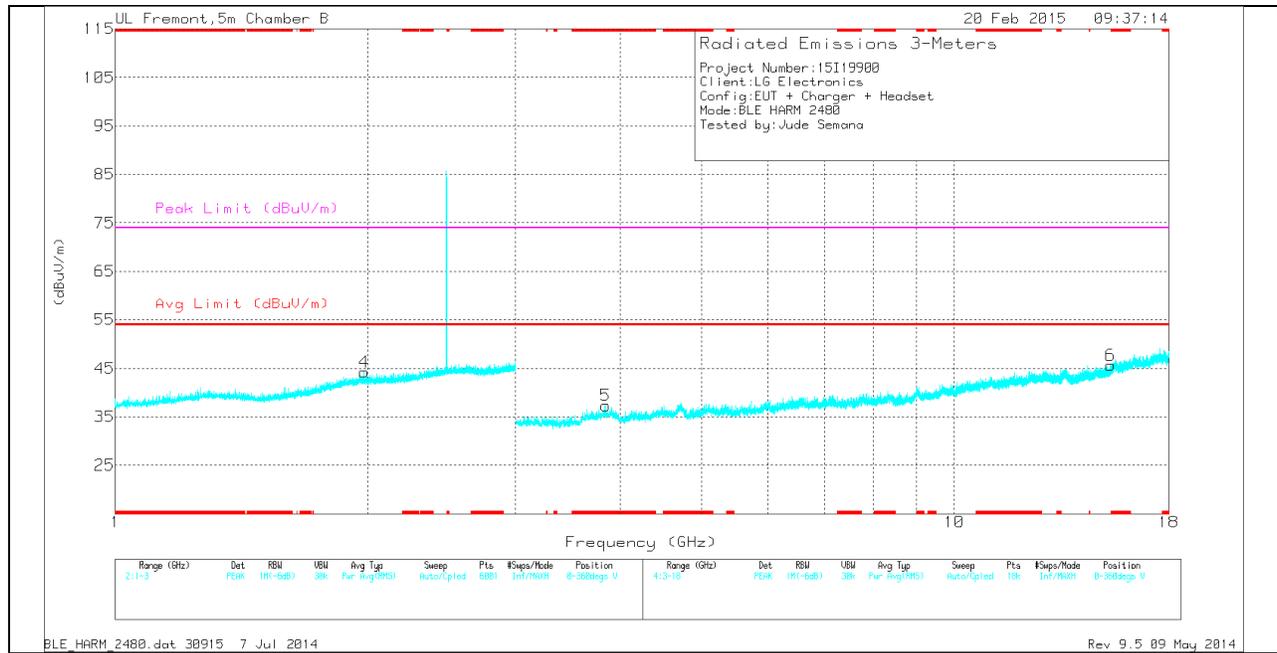
PK - Peak detector

**HIGH CHANNEL HORIZONTAL**



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

**HIGH CHANNEL VERTICAL**



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

**HIGH CHANNEL DATA**

*TRACE MARKERS*

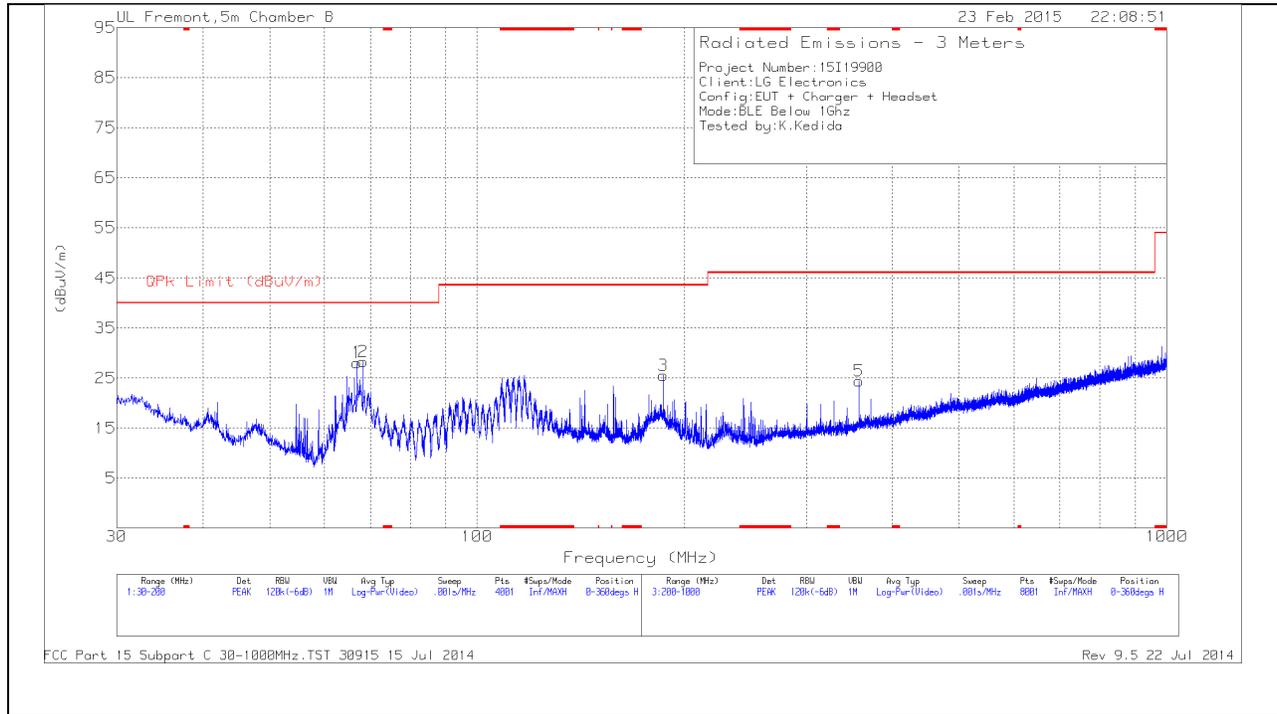
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/Ftr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.443	35.23	PK	28.3	-24	0	39.53	-	-	74	-34.47	0-360	101	H
5	* 3.841	33.73	PK	33.7	-30.1	0	37.33	-	-	74	-36.67	0-360	200	V
2	* 4.72	32.97	PK	34.2	-29.1	0	38.07	-	-	74	-35.93	0-360	101	H
4	1.979	36.14	PK	31.3	-23.2	0	44.24	-	-	-	-	0-360	199	V
6	15.345	26.85	PK	40.2	-21.4	0	45.65	-	-	-	-	0-360	200	V
3	9.693	27.94	PK	36.9	-23.6	0	41.24	-	-	-	-	0-360	101	H

PK - Peak detector

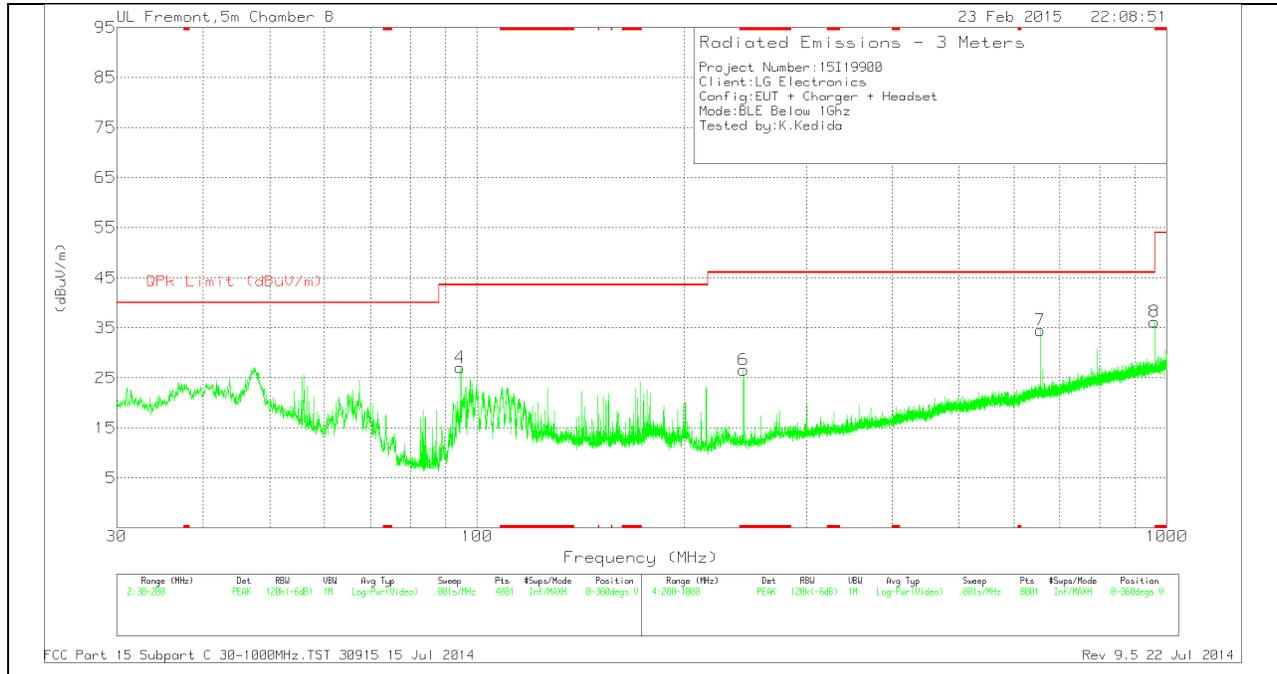
### 8.3. WORST-CASE BELOW 1 GHz

#### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)

##### HORIZONTAL PLOT



**VERTICAL PLOT**



**BELOW 1 GHz TABLE**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 243.4	41.5	PK	11.6	-26.5	26.6	46.02	-19.42	0-360	200	V
8	* 960	35.71	PK	22.9	-22.4	36.21	46.02	-9.81	0-360	200	V
1	66.89	48.47	PK	8	-28.4	28.07	40	-11.93	0-360	300	H
2	68.335	48.66	PK	8	-28.4	28.26	40	-11.74	0-360	300	H
4	94.4725	46.44	PK	8.7	-28.1	27.04	43.52	-16.48	0-360	101	V
3	186.145	41.3	PK	11.3	-27.1	25.5	43.52	-18.02	0-360	100	H
5	358	35.5	PK	14.8	-25.9	24.4	46.02	-21.62	0-360	200	H
7	656.1	39.58	PK	19.9	-25	34.48	46.02	-11.54	0-360	101	V

PK - Peak detector

FCC Part 15 Subpart C 30-1000MHz.TST 30915 9 Jul 2013 Rev 9.5 12 Jun 2013