



**FCC CFR47 PART 15 SUBPART C  
C2PC CERTIFICATION TEST REPORT  
FOR**

**CDMA/ LTE Phone + Bluetooth, and DTS b/g/n  
MODEL NUMBER: LG-VS810PP, VS810PP, LGVS810PP**

**FCC ID: ZNFVS810PP**

**REPORT NUMBER: 14U18510-E4**

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Revision History

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** LG ELECTRONICS MOBILECOMM U.S.A., INC.  
**EUT DESCRIPTION:** CDMA/LTE Phone + Bluetooth, and DTS b/g/n  
**MODEL:** LG-VS810PP, VS810PP, LGVS810PP  
**SERIAL NUMBER:** 3535 Conducted, 3527 Radiated  
**DATE TESTED:** SEPTEMBER 20-23, 2014

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.

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## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.4-2009.

## 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 checked="" type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D
<input type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E
<input type="checkbox"/> Chamber C	<input type="checkbox"/> Chamber F
	<input checked="" type="checkbox"/> Chamber G
	<input type="checkbox"/> Chamber H

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:

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

### 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 CDMA/LTE Phone + Bluetooth, DTS b/g/n.

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

The transmitter has a maximum conducted output power as follows:

Please refer to project 14U18508 for details.

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

The radio utilizes an FPCB antenna, with a maximum gain of 0.12 dBi.

#### **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, and Z it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

Based on the baseline scan, the worst-case data rates were:

802.11b mode: 1 Mbps  
802.11g mode: 6 Mbps  
802.11n HT20mode: MCS0

## 5.5. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG	VS-810PP		N/A
Headset	LG	VS-810PP		N/A

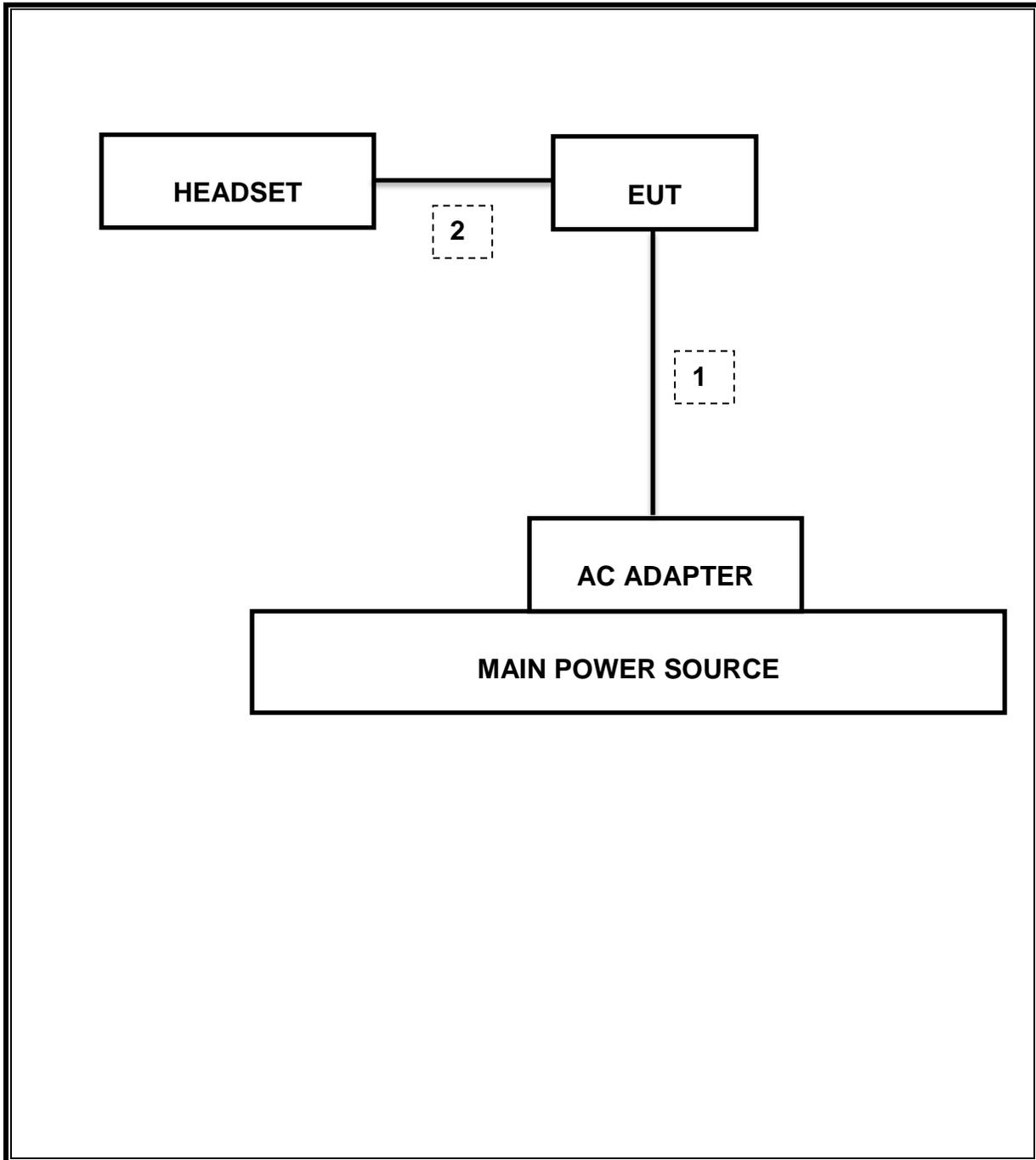
### I/O CABLES

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 a stand-alone unit during the tests. Test software exercised the radio module.

**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
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/14
Spectrum Analyzer,9KHz-40GHz	HP	8564E	C00986	04/01/15
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	1000741	08/04/15
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/08/15
Power Meter	Agilent / HP	N1911A	C00963	12/13/14
Wide band Power Sensor	Agilent / HP	N1921A	C00964	12/13/14
Antenna, Horn, 1-18 GHz	ETS	3117	C01022	02/21/15
Antenna, Horn,18- 26 GHz	ARA	MWH-1826/B	C00946	11/12/14
Antenna, Horn, 26-40 GHz	ARA	MWH-2640	F00194	05/14/15
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	T243	03/06/15
RF Preamplifier, 100KHz -> 1300MHz	HP	TBD	C00825	06/01/15
RF Preamplifier, 1GHz - 18GHz	Miteq	NSP4000-SP2	924343	03/23/15
RF Preamplifier, 1GHz - 26.5GHz	HP	8449B	F00167	03/25/15
AC Power Supply, 2,500VA 45-500Hz	Elgar-Ametek	CW2501M	F00013	CNR
RF Preamplifier, 1GHz - 40GHz	Miteq	NSP4000-SP2	C00990	08/20/14
Attenuator / Switch driver	HP	11713A	F00204	CNR
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	F00219	05/23/15
High Pass Filter 5GHz	Micro-Tronics	HPS17542	F00222	05/22/15
High Pass Filter 6GHz	Micro-Tronics	HPM17543	F00224	05/22/15

## 7. MEASUREMENT METHODS

KDB 558074 D01 DTS Meas Guidance v03r02: Measurement Procedure AVGPM-G is used for power and AVGPS-3 is used for power spectral density.

Unwanted emissions within Restricted Bands are measured using traditional radiated procedures.

Band edge emissions within Restricted Bands are measured using RMS with duty cycle factor offset method.

## 8. 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	45.20 dBuV/m

## 9. ANTENNA PORT TEST RESULTS

### 9.1. 6 dB BANDWIDTH

#### LIMITS

FCC §15.247 (a) (2)

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

#### TEST PROCEDURE

Reference to KDB 558074 D01 DTS Meas Guidance v03r01: The transmitter output is connected to a spectrum analyzer with the RBW set to 100KHz, the VBW  $\geq 3 \times$  RBW, peak detector and max hold.

#### RESULTS

Please refer to project 14U18508 for details.

## **9.2. 99% BANDWIDTH**

### **LIMITS**

None; for reporting purposes only.

### **RESULTS**

Please refer to project 14U18508 for details.

### **9.3. AVERAGE POWER**

#### **LIMITS**

None; for reporting purposes only.

#### **TEST PROCEDURE**

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.2 dB (including 10 dB pad and 0.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### **RESULTS**

Please refer to project 14U18508 for details.

## **9.4. OUTPUT POWER**

### **LIMITS**

FCC §15.247

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **DIRECTIONAL ANTENNA GAIN**

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

### **RESULTS**

Please refer to project 14U18508 for details.

## 9.5. PSD

### LIMITS

FCC §15.247

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

Please refer to project 14U18508 for details.

## 10. RADIATED TEST RESULTS

### 10.1. 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.

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; the video bandwidth is set to 3 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 = 0.22dB.

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.

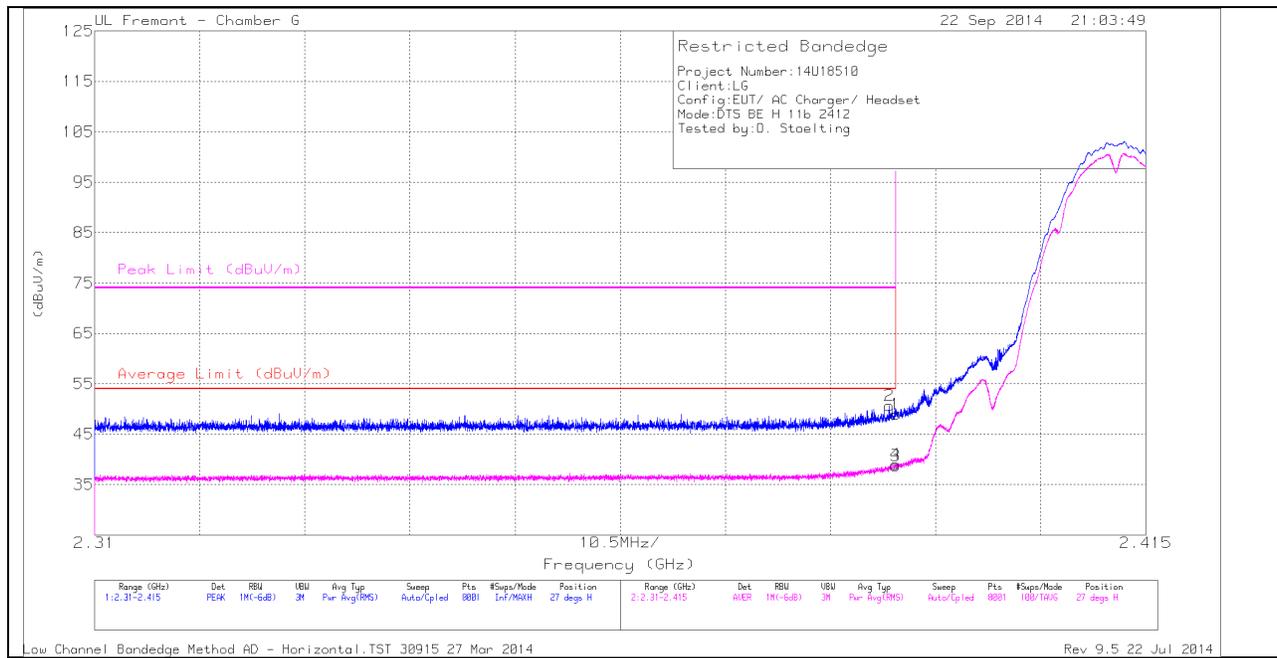
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

## 10.2. TRANSMITTER ABOVE 1 GHz

### 10.2.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND

#### RESTRICTED BANDEDGE (LOW CHANNEL)

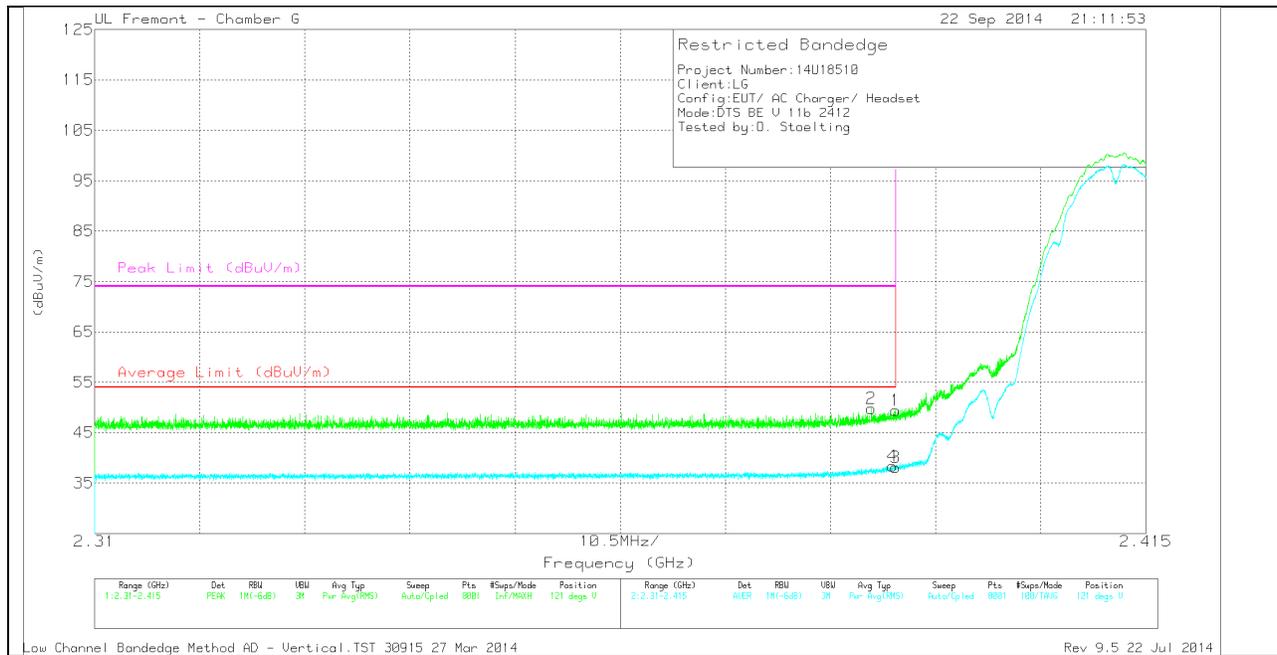
#### HORIZONTAL PEAK AND AVERAGE PLOT



#### HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.389	43.73	PK	31.8	-24.9	50.63	-	-	74	-23.37	27	280	H
1	* 2.39	42.03	PK	31.8	-24.9	48.93	-	-	74	-25.07	27	280	H
3	* 2.39	31.89	RMS	31.8	-24.9	38.79	54	-15.21	-	-	27	280	H
4	* 2.39	32.14	RMS	31.8	-24.9	39.04	54	-14.96	-	-	27	280	H

**VERTICAL PEAK AND AVERAGE PLOT**

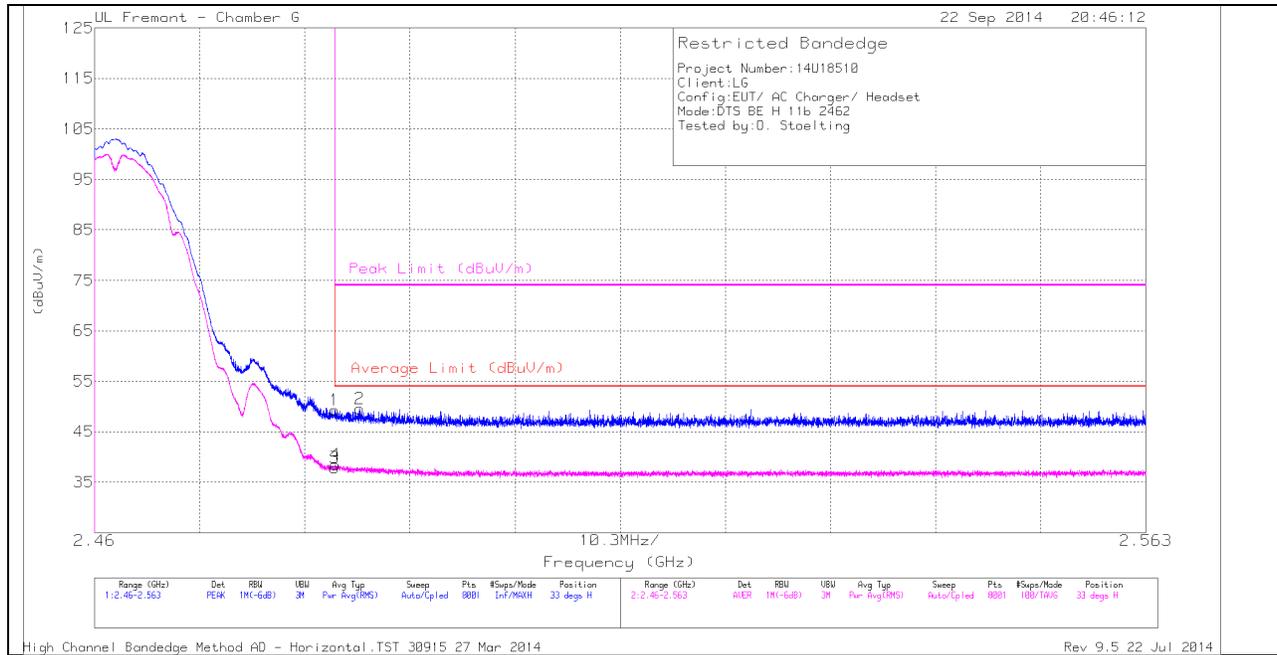


**VERTICAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.388	42.91	PK	31.8	-24.9	49.81	-	-	74	-24.19	121	291	V
1	* 2.39	42.47	PK	31.8	-24.9	49.37	-	-	74	-24.63	121	291	V
3	* 2.39	31.21	RMS	31.8	-24.9	38.11	54	-15.89	-	-	121	291	V
4	* 2.39	31.42	RMS	31.8	-24.9	38.32	54	-15.68	-	-	121	291	V

### AUTHORIZED BANDEDGE (HIGH CHANNEL)

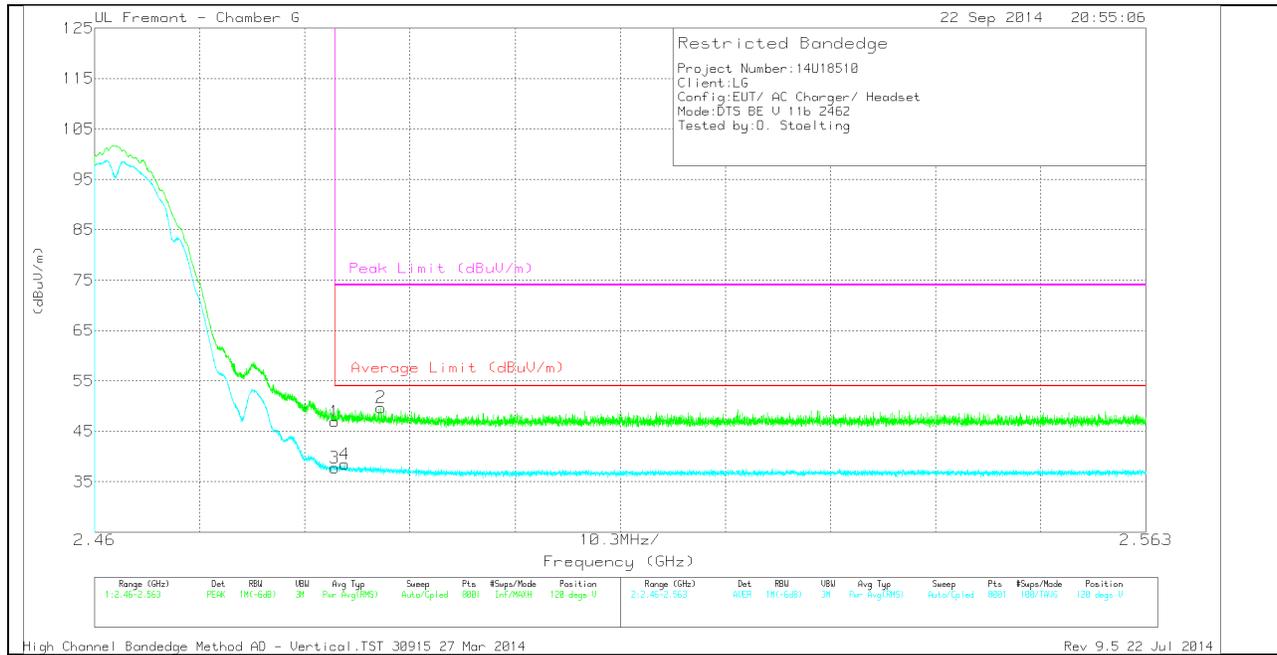
#### HORIZONTAL PEAK AND AVERAGE PLOT



#### HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/ Filtr/Pad (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	42.19	PK	32	-24.9	49.29	-	-	74	-24.71	33	270	H
3	* 2.484	30.82	RMS	32	-24.9	37.92	54	-16.08	-	-	33	270	H
4	* 2.484	31.45	RMS	32	-24.9	38.55	54	-15.45	-	-	33	270	H
2	* 2.486	42.41	PK	32	-24.9	49.51	-	-	74	-24.49	33	270	H

**VERTICAL PEAK AND AVERAGE PLOT**

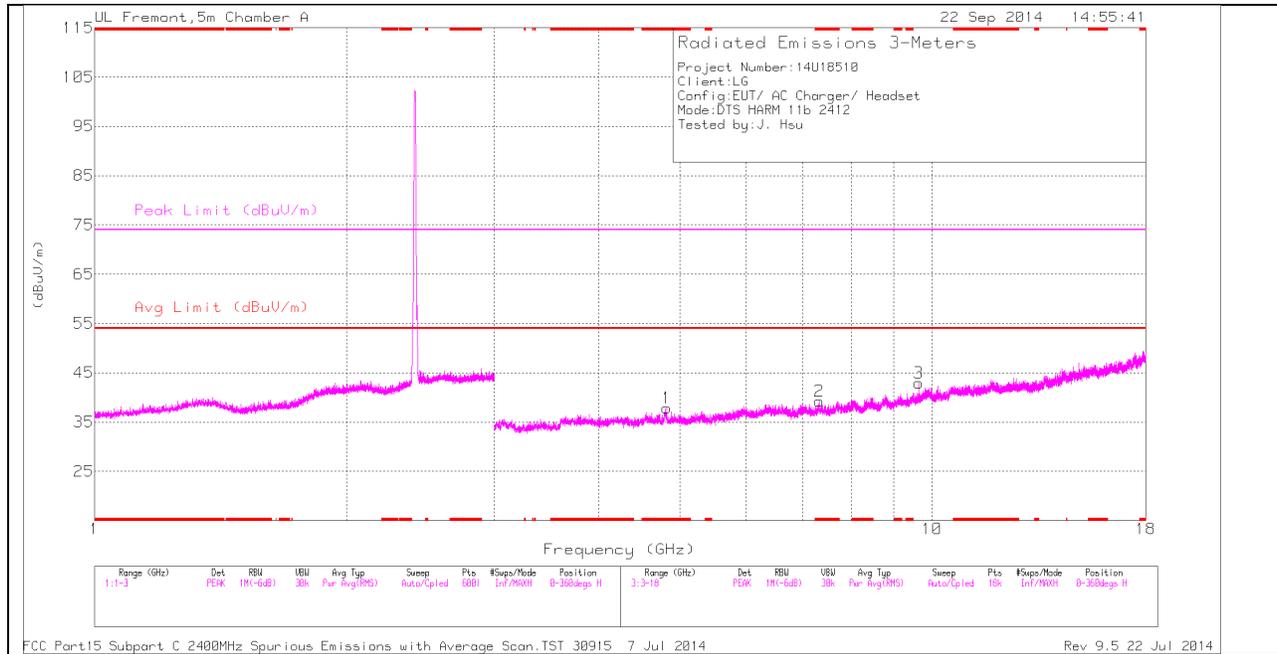


**VERTICAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/ Fitr/Pad (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	39.83	PK	32	-24.9	46.93	-	-	74	-27.07	120	273	V
3	* 2.484	30.63	RMS	32	-24.9	37.73	54	-16.27	-	-	120	273	V
4	* 2.484	31.34	RMS	32	-24.9	38.44	54	-15.56	-	-	120	273	V
2	* 2.488	42.63	PK	32	-24.9	49.73	-	-	74	-24.27	120	273	V

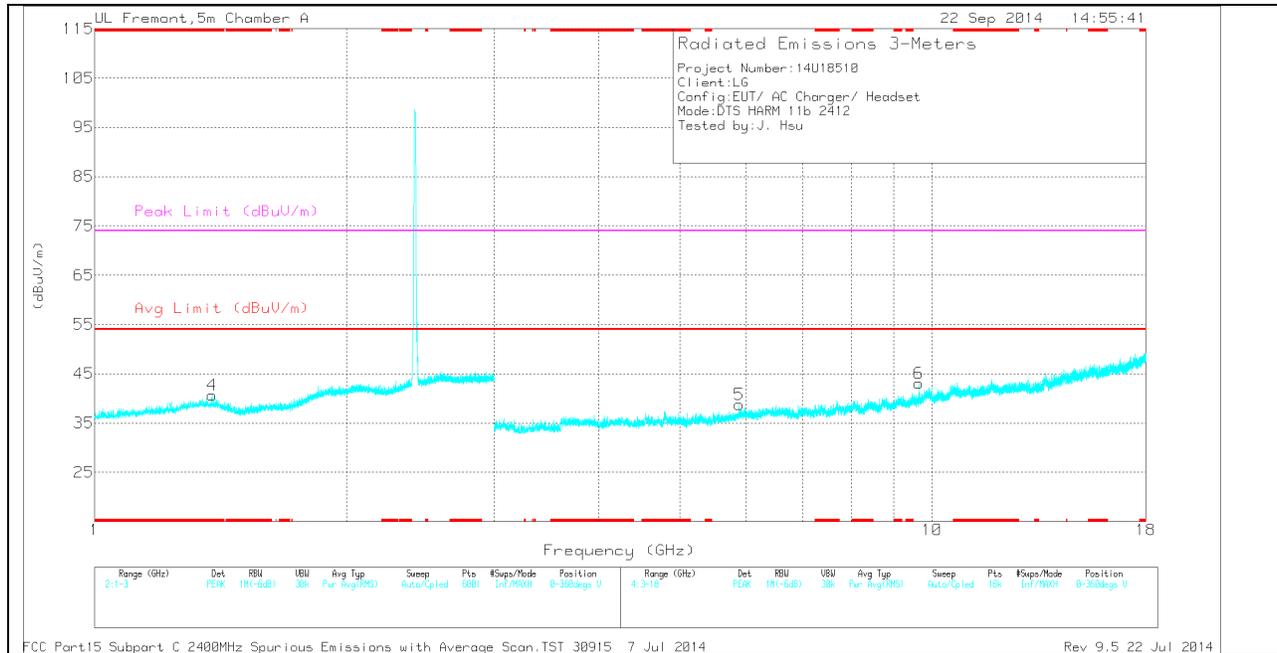
### HARMONICS AND SPURIOUS EMISSIONS

#### 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 T136 (dB/m)	Amp/Cbl/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
4	* 1.38	37.24	PK	29.9	-26.5	0	40.64	-	-	74	-33.36	0-360	201	V
1	* 4.824	33.02	PK	34	-29.2	0	37.82	-	-	74	-36.18	0-360	201	H
2	* 7.331	29.9	PK	35.2	-25.9	0	39.2	-	-	74	-34.8	0-360	100	H
5	5.882	31.3	PK	35	-27.6	0	38.7	-	-	-	-	0-360	100	V
3	9.647	30.22	PK	36.8	-24.1	0	42.92	-	-	-	-	0-360	201	H
6	9.647	30.36	PK	36.8	-24.1	0	43.06	-	-	-	-	0-360	201	V

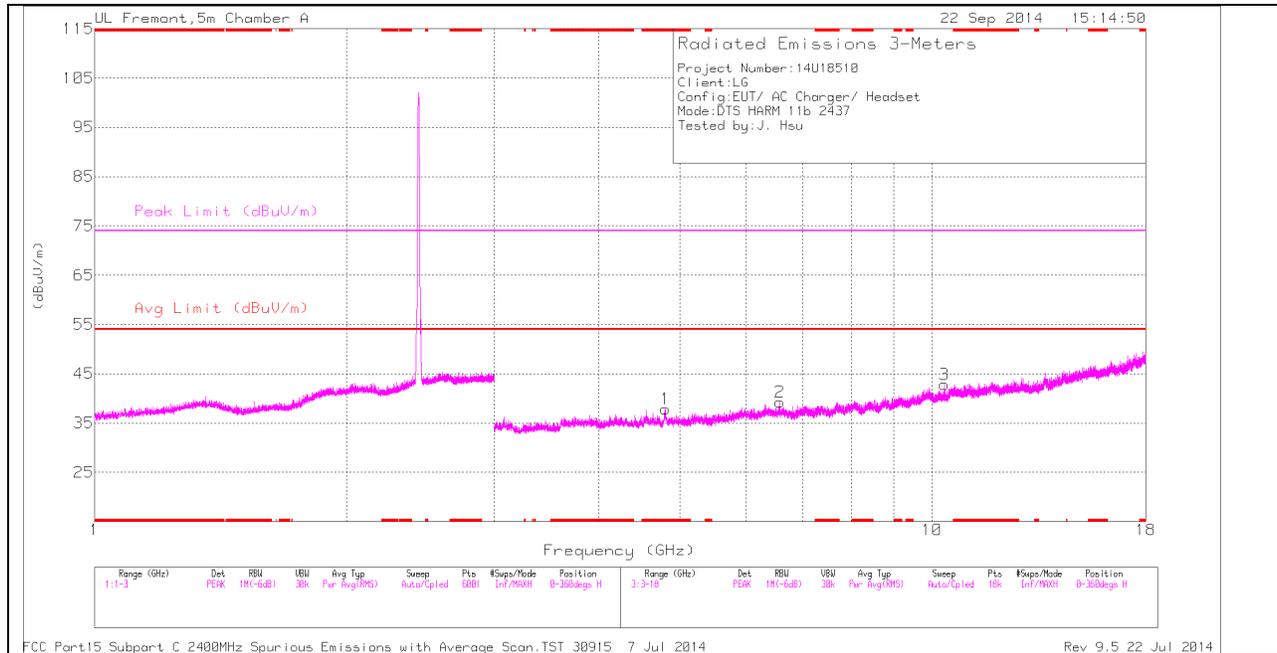
PK - Peak detector

*RADIATED EMISSIONS*

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/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
* 1.381	44.05	PK2	29.9	-26.5	0	47.45	-	-	74	-26.55	359	100	V
* 1.38	32.69	MAV1	29.9	-26.5	0	36.09	54	-17.91	-	-	359	100	V

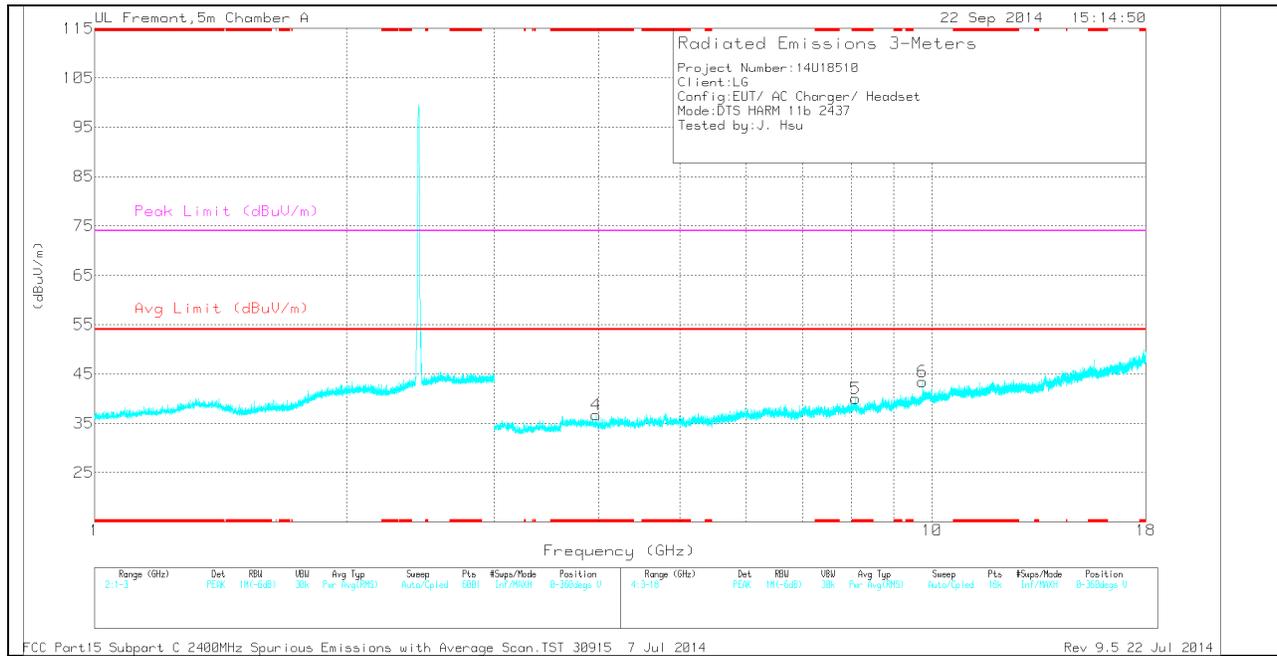
FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

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 T136 (dB/m)	Amp/Cbl/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	* 4.802	33.04	PK	34	-29.2	0	37.84	-	-	74	-36.16	0-360	100	H
4	* 3.968	33.57	PK	33.7	-30.5	0	36.77	-	-	74	-37.23	0-360	100	V
5	* 8.099	28.84	PK	35.5	-24.3	0	40.04	-	-	74	-33.96	0-360	201	V
2	6.584	30.58	PK	35.5	-26.8	0	39.28	-	-	-	-	0-360	201	H
6	9.747	30.09	PK	36.9	-23.5	0	43.49	-	-	-	-	0-360	201	V
3	10.343	28.27	PK	37.3	-22.8	0	42.77	-	-	-	-	0-360	100	H

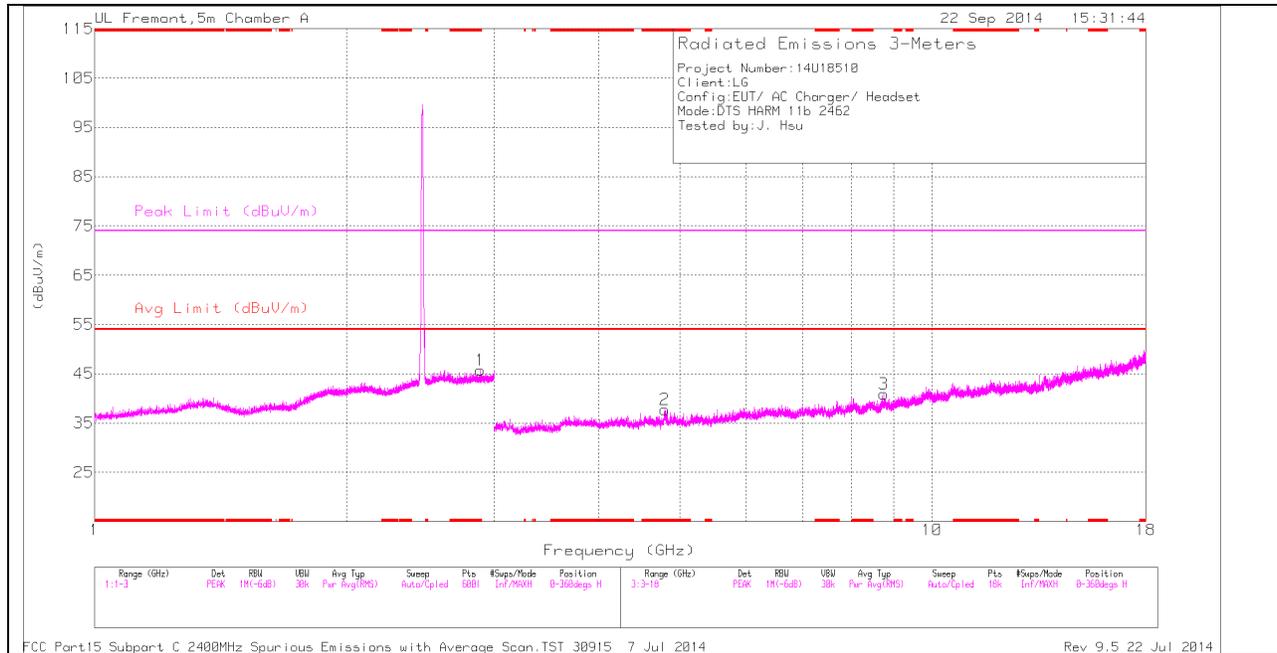
PK - Peak detector

*RADIATED EMISSIONS*

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/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
* 8.101	35.38	PK2	35.5	-24.4	0	46.48	-	-	74	-27.52	359	100	V
* 8.101	24.71	MAV1	35.5	-24.4	0	35.81	54	-18.19	-	-	359	100	V

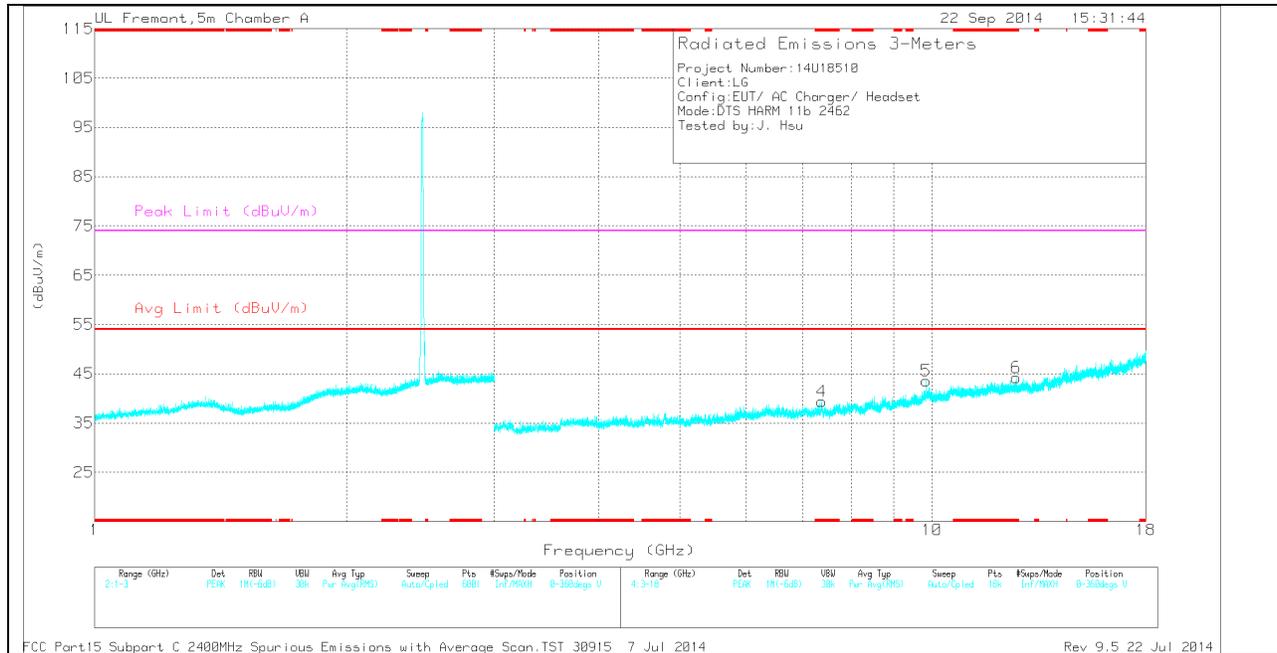
FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

**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 T136 (dB/m)	Amp/Cbl/Filtr/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	* 2.888	36.33	PK	32.6	-23.2	0	45.73	-	-	74	-28.27	0-360	201	H
2	* 4.796	33	PK	34	-29.3	0	37.7	-	-	74	-36.3	0-360	201	H
4	* 7.383	29.36	PK	35.3	-25.3	0	39.36	-	-	74	-34.64	0-360	201	V
6	* 12.6	27.49	PK	39	-22.3	0	44.19	-	-	74	-29.81	0-360	201	V
3	8.762	29.01	PK	35.8	-23.9	0	40.91	-	-	-	-	0-360	201	H
5	9.848	29.01	PK	37	-22.4	0	43.61	-	-	-	-	0-360	201	V

PK - Peak detector

*RADIATED EMISSIONS*

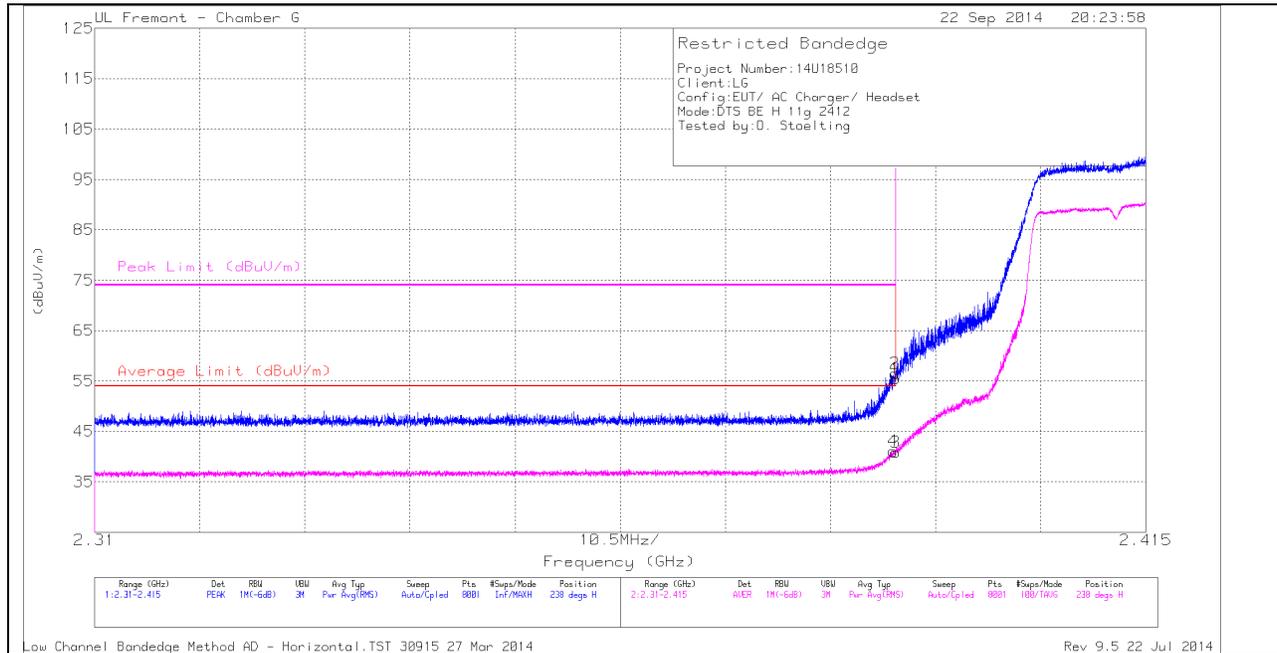
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.888	36.33	PK	32.6	-23.2	0	45.73	-	-	74	-28.27	0-360	201	H
2	* 4.796	33	PK	34	-29.3	0	37.7	-	-	74	-36.3	0-360	201	H
4	* 7.383	29.36	PK	35.3	-25.3	0	39.36	-	-	74	-34.64	0-360	201	V
6	* 12.6	27.49	PK	39	-22.3	0	44.19	-	-	74	-29.81	0-360	201	V
3	8.762	29.01	PK	35.8	-23.9	0	40.91	-	-	-	-	0-360	201	H
5	9.848	29.01	PK	37	-22.4	0	43.61	-	-	-	-	0-360	201	V

FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

**10.2.2. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND**

**RESTRICTED BANDEDGE (LOW CHANNEL)**

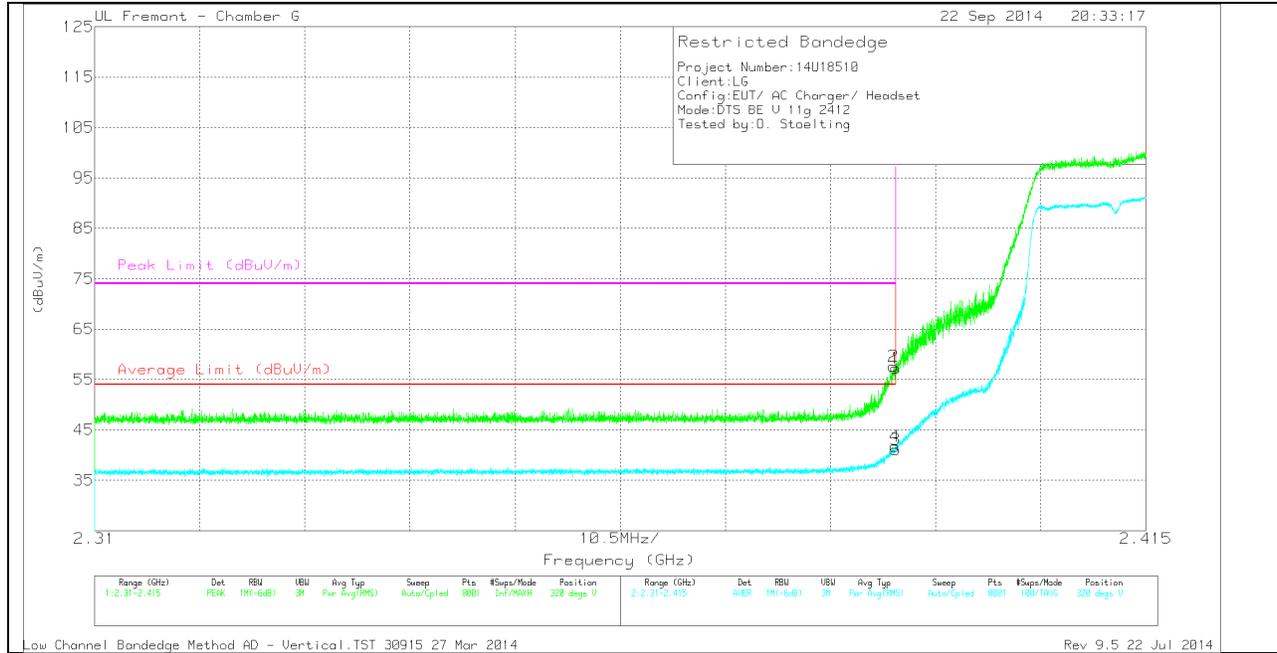
**HORIZONTAL PEAK AND AVERAGE PLOT**



**HORIZONTAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/FI tr/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	* 2.39	48.63	PK	31.8	-24.9	0	55.53	-	-	74	-18.47	238	343	H
2	* 2.39	49.56	PK	31.8	-24.9	0	56.46	-	-	74	-17.54	238	343	H
3	* 2.39	33.72	RMS	31.8	-24.9	.2	40.82	54	-13.18	-	-	238	343	H
4	* 2.39	33.98	RMS	31.8	-24.9	.2	41.08	54	-12.92	-	-	238	343	H

**VERTICAL PEAK AND AVERAGE PLOT**

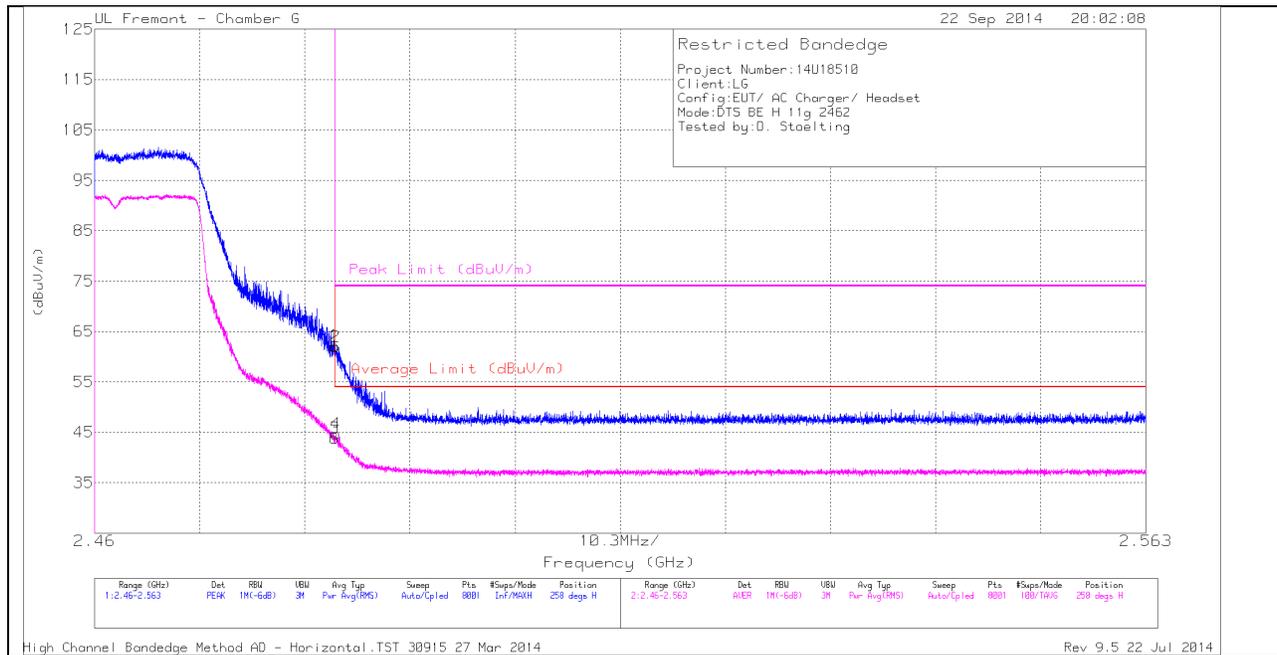


**VERTICAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/FI tr/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	* 2.39	50.31	PK	31.8	-24.9	0	57.21	-	-	74	-16.79	320	335	V
2	* 2.39	50.72	PK	31.8	-24.9	0	57.62	-	-	74	-16.38	320	335	V
3	* 2.39	33.95	RMS	31.8	-24.9	.2	41.05	54	-12.95	-	-	320	335	V
4	* 2.39	34.65	RMS	31.8	-24.9	.2	41.75	54	-12.25	-	-	320	335	V

**AUTHORIZED BANDEDGE (HIGH CHANNEL)**

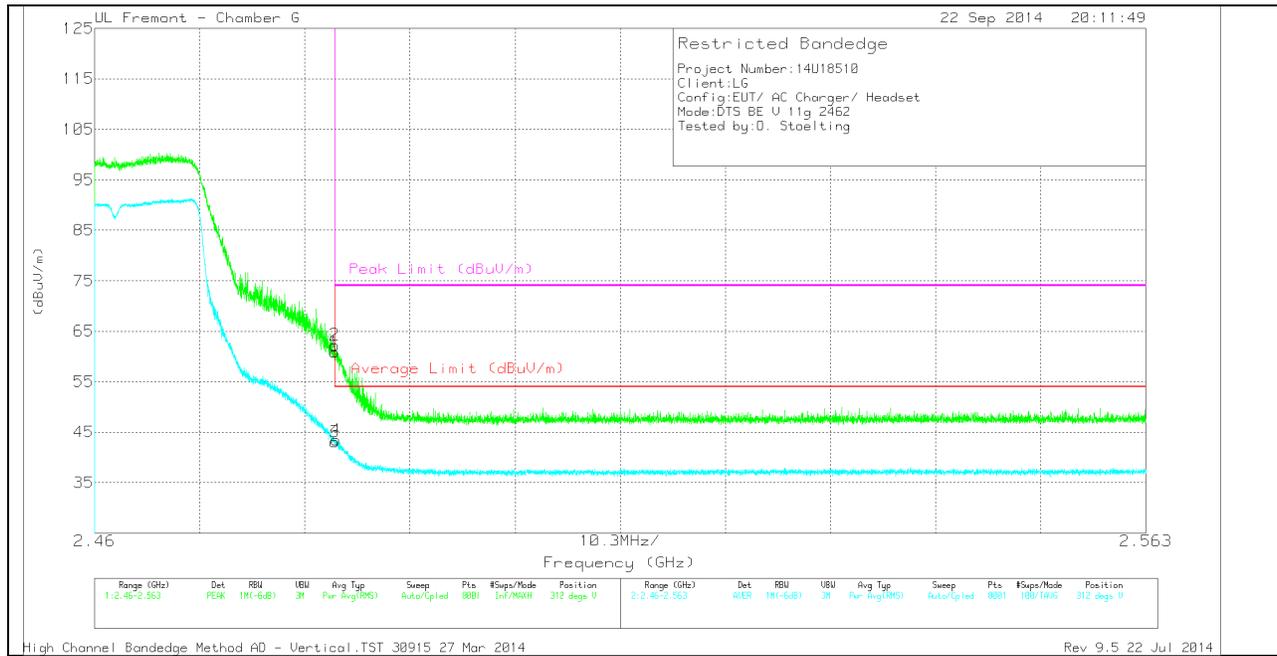
**HORIZONTAL PEAK AND AVERAGE PLOT**



**HORIZONTAL DATA**

Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/Fl tr/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	55.11	PK	32	-24.9	0	62.21	-	-	74	-11.79	258	106	H
2	* 2.484	54.89	PK	32	-24.9	0	61.99	-	-	74	-12.01	258	106	H
3	* 2.484	36.59	RMS	32	-24.9	.2	43.89	54	-10.11	-	-	258	106	H
4	* 2.484	37.41	RMS	32	-24.9	.2	44.71	54	-9.29	-	-	258	106	H

**VERTICAL PEAK AND AVERAGE PLOT**

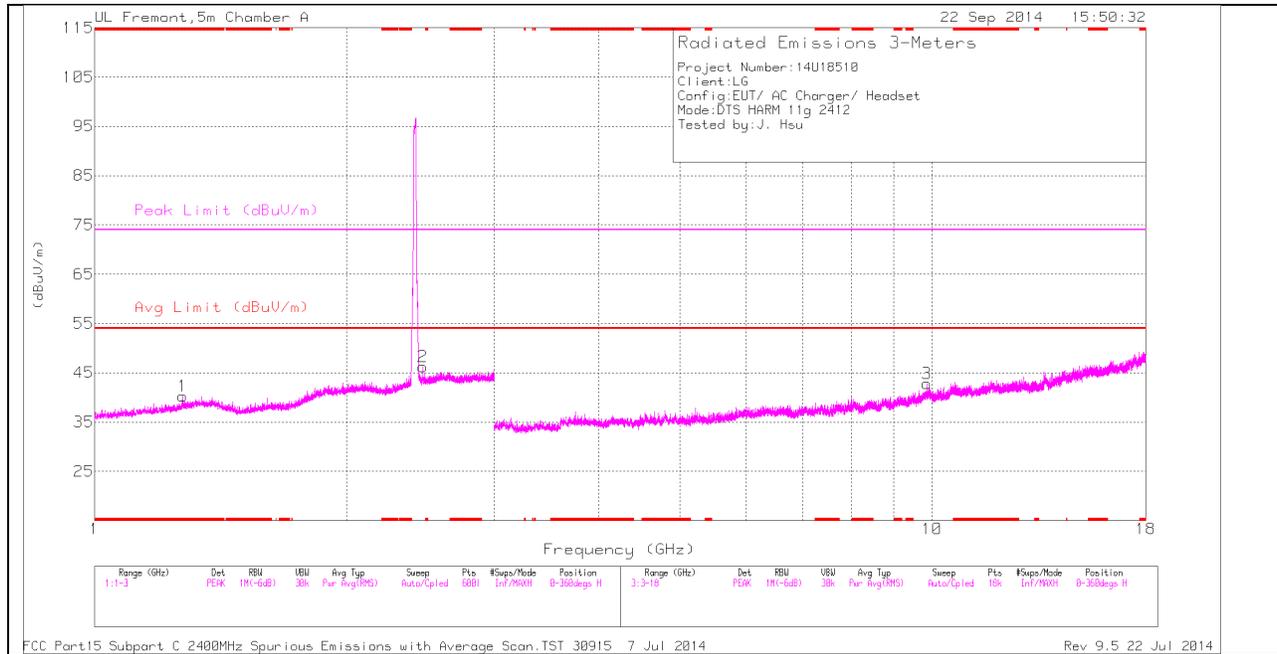


**VERTICAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/FI tr/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	53.75	PK	32	-24.9	0	60.85	-	-	74	-13.15	312	316	V
2	* 2.484	55.17	PK	32	-24.9	0	62.27	-	-	74	-11.73	312	316	V
3	* 2.484	35.74	RMS	32	-24.9	.2	43.04	54	-10.96	-	-	312	316	V
4	* 2.484	36.18	RMS	32	-24.9	.2	43.48	54	-10.52	-	-	312	316	V

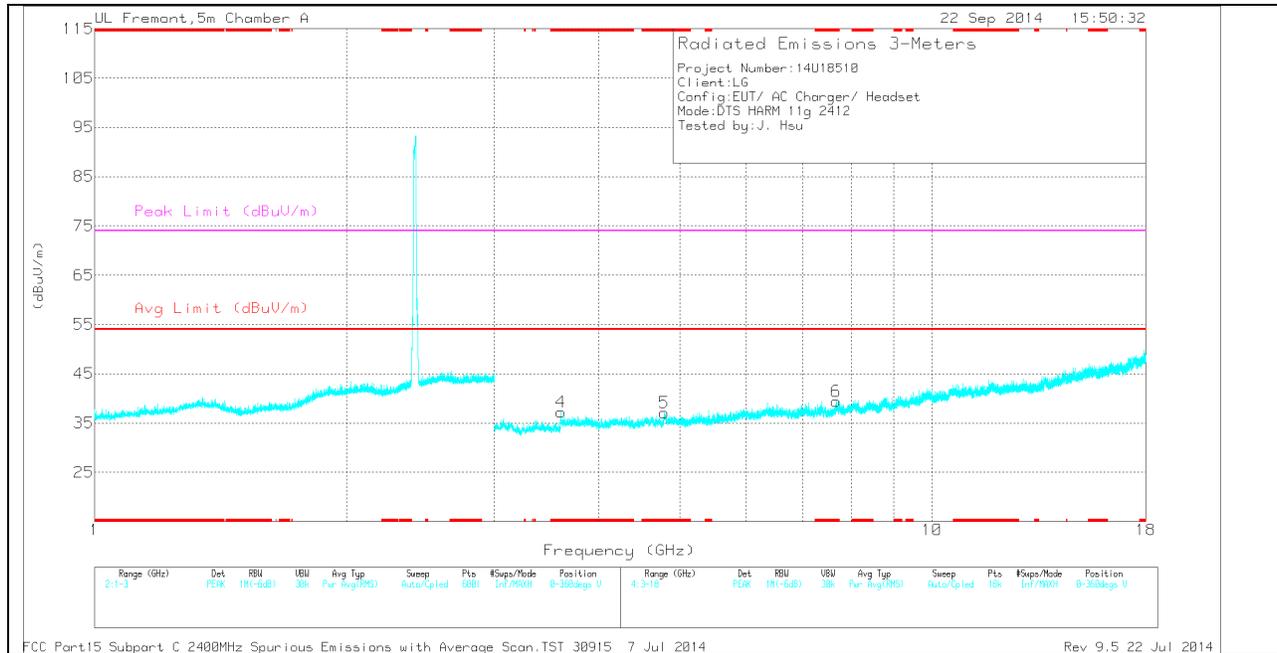
### HARMONICS AND SPURIOUS EMISSIONS

#### 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 T136 (dB/m)	Amp/Cbl/Filtr/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	* 1.274	37.51	PK	30	-27.2	0	40.31	-	-	74	-33.69	0-360	201	H
4	* 3.606	34.88	PK	33.2	-30.9	0	37.18	-	-	74	-36.82	0-360	201	V
5	* 4.787	32.7	PK	34	-29.6	0	37.1	-	-	74	-36.9	0-360	100	V
6	* 7.688	28.93	PK	35.4	-24.9	0	39.43	-	-	74	-34.57	0-360	100	V
2	2.464	37.82	PK	32.6	-24.2	0	46.22	-	-	-	-	0-360	201	H
3	9.856	28.11	PK	37	-22.3	0	42.81	-	-	-	-	0-360	201	H

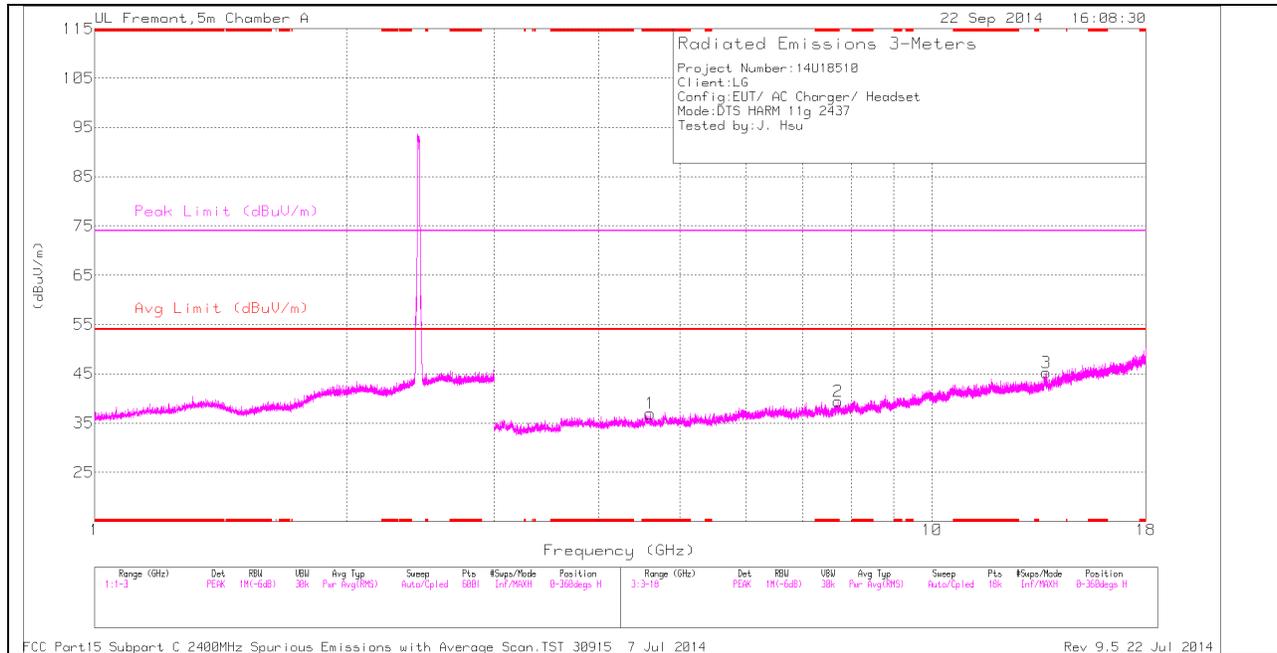
PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr/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
* 1.273	44.73	PK2	30	-27.2	0	47.53	-	-	74	-26.47	359	100	H
* 1.276	32.66	MAV1	30	-27.2	.2	35.66	54	-18.34	-	-	359	100	H
* 3.605	40.03	PK2	33.2	-30.9	0	42.33	-	-	74	-31.67	359	100	V
* 3.605	29.29	MAV1	33.2	-30.9	.2	31.79	54	-22.21	-	-	359	100	V

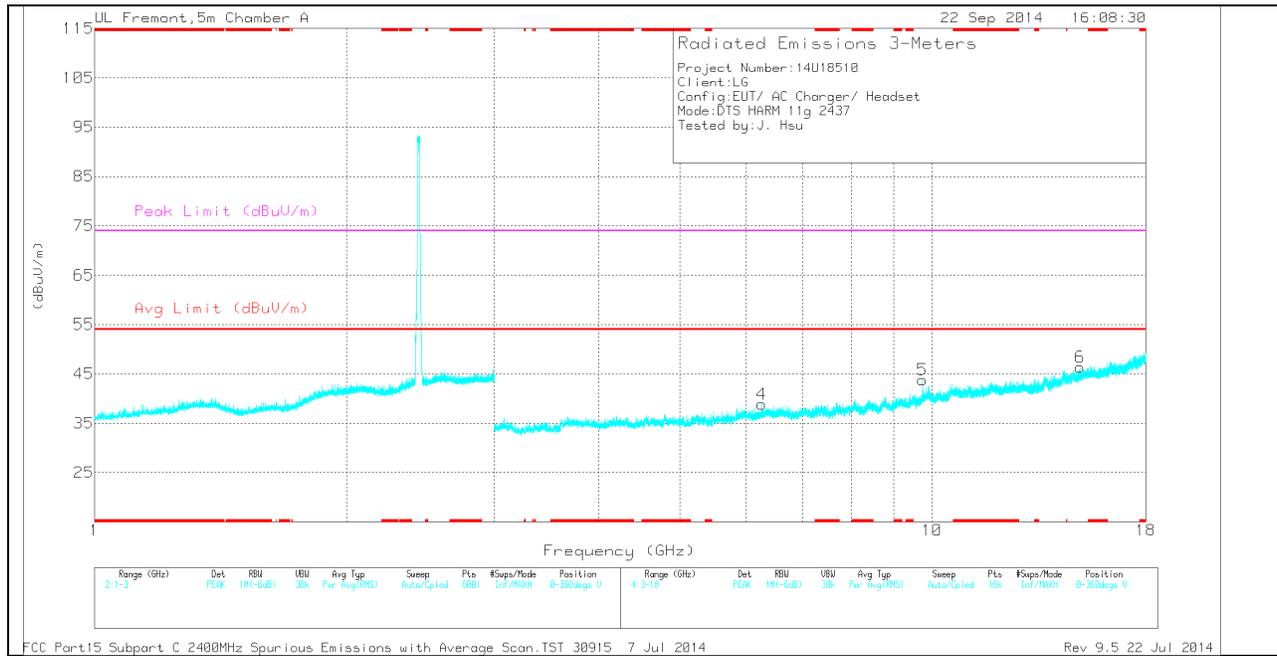
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MID CHANNEL HORIZONTAL



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	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fi tr/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.607	32.31	PK	34	-29.4	0	36.91	-	-	74	-37.09	0-360	100	H
2	* 7.72	29.21	PK	35.4	-25.2	0	39.41	-	-	74	-34.59	0-360	201	H
4	6.262	31.31	PK	35.4	-27.8	0	38.91	-	-	-	-	0-360	201	V
5	9.748	30.42	PK	36.9	-23.5	0	43.82	-	-	-	-	0-360	201	V
3	13.679	28.37	PK	38.8	-21.9	0	45.27	-	-	-	-	0-360	100	H
6	15.015	27.41	PK	40.2	-21.3	0	46.31	-	-	-	-	0-360	100	V

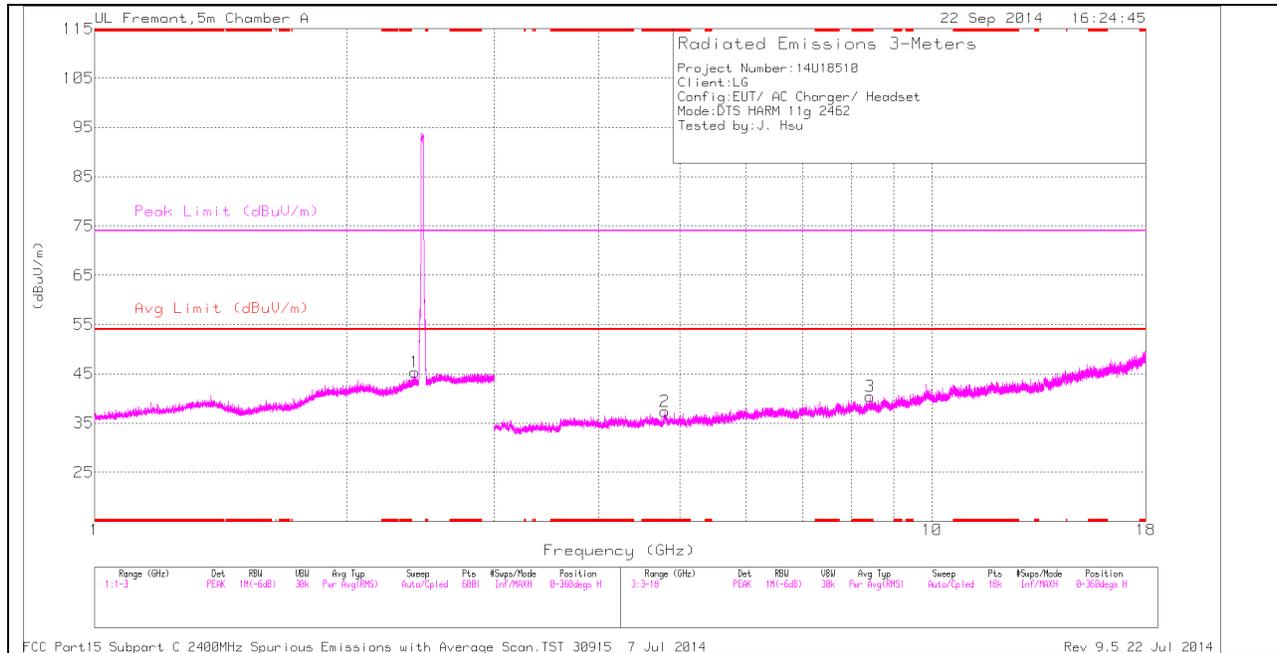
PK - Peak detector

*RADIATED EMISSIONS*

Frequen cy (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl /Fitr/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m )	Avg Limit (dBuV/m )	Margin (dB)	Peak Limit (dBuV/m )	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
9.746	36.1	PK2	36.9	-23.6	0	49.4	-	-	-	-	359	100	V
9.748	24.55	MAV1	36.9	-23.5	.2	38.15	-	-	-	-	359	100	V

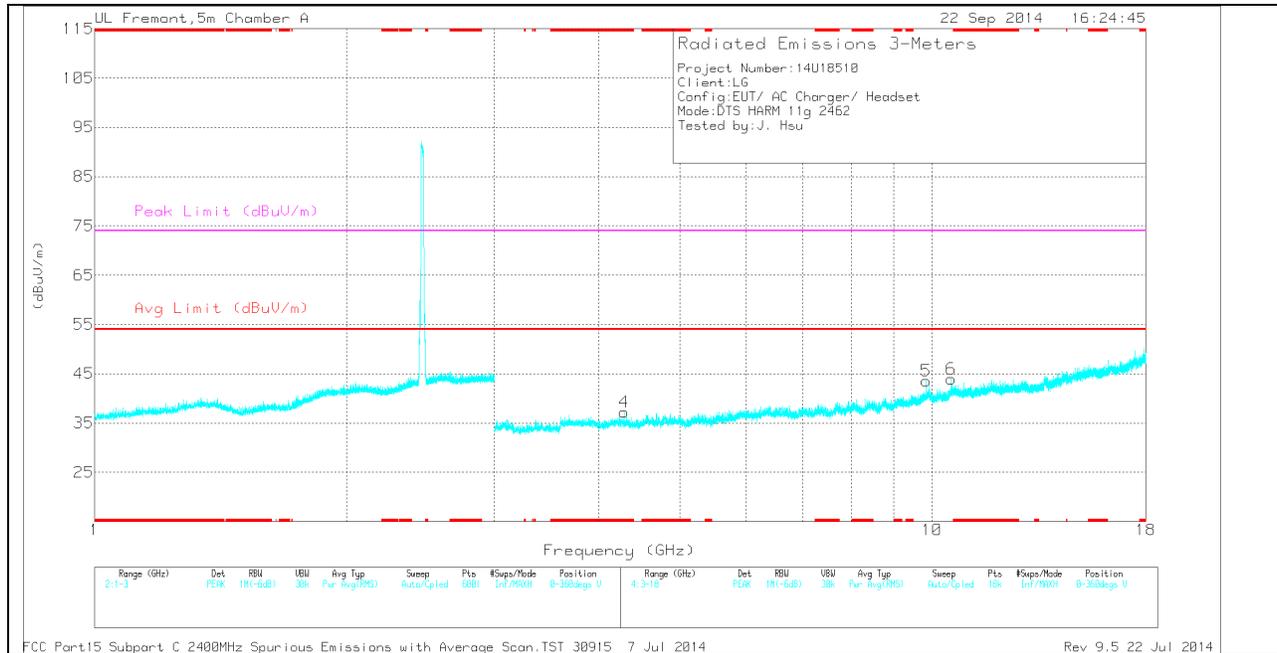
FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

**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	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fi tr/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4.799	32.55	PK	34	-29.2	0	37.35	-	-	74	-36.65	0-360	100	H
3	* 8.424	29.23	PK	35.7	-24.5	0	40.43	-	-	74	-33.57	0-360	100	H
4	* 4.289	33.22	PK	34	-30	0	37.22	-	-	74	-36.78	0-360	201	V
1	2.41	37.04	PK	32.4	-24.1	0	45.34	-	-	-	-	0-360	201	H
5	9.848	28.94	PK	37	-22.4	0	43.54	-	-	-	-	0-360	201	V
6	10.55	27.96	PK	37.6	-21.6	0	43.96	-	-	-	-	0-360	201	V

PK - Peak detector

*RADIATED EMISSIONS*

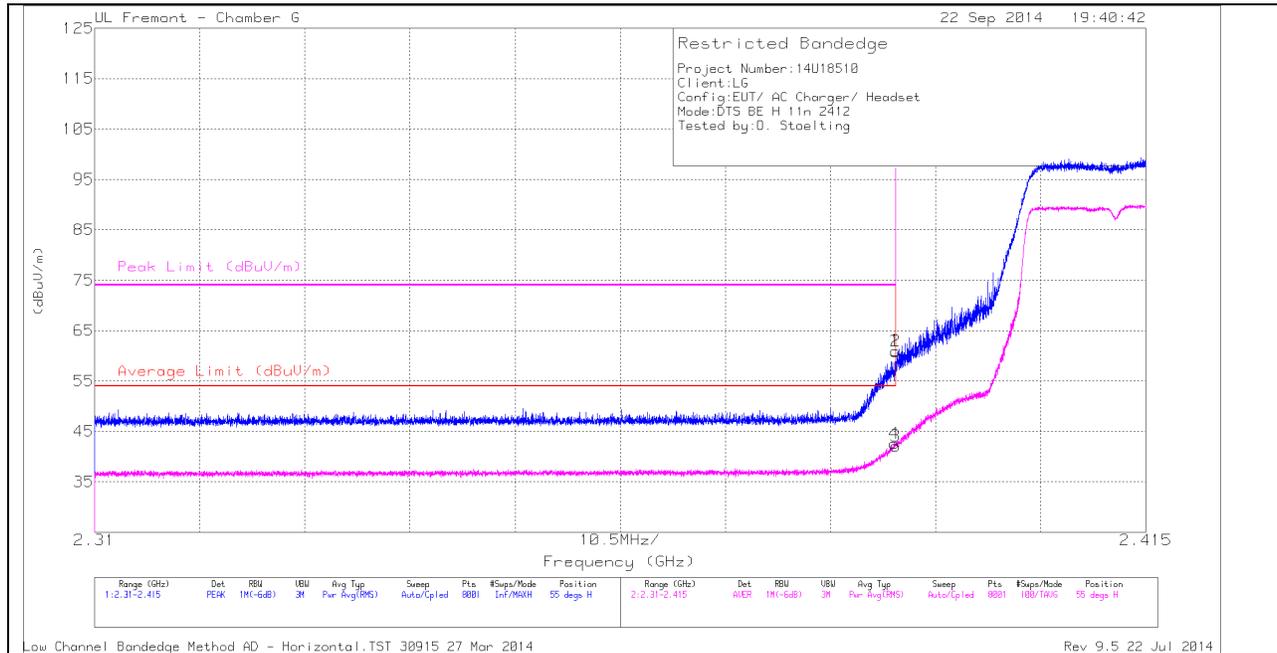
Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Fitr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 8.422	36.18	PK2	35.7	-24.4	0	47.48	-	-	74	-26.52	359	100	H
* 8.425	24.83	MAv1	35.7	-24.5	.2	36.23	54	-17.77	-	-	359	100	H

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**10.2.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND**

**RESTRICTED BANDEDGE (LOW CHANNEL)**

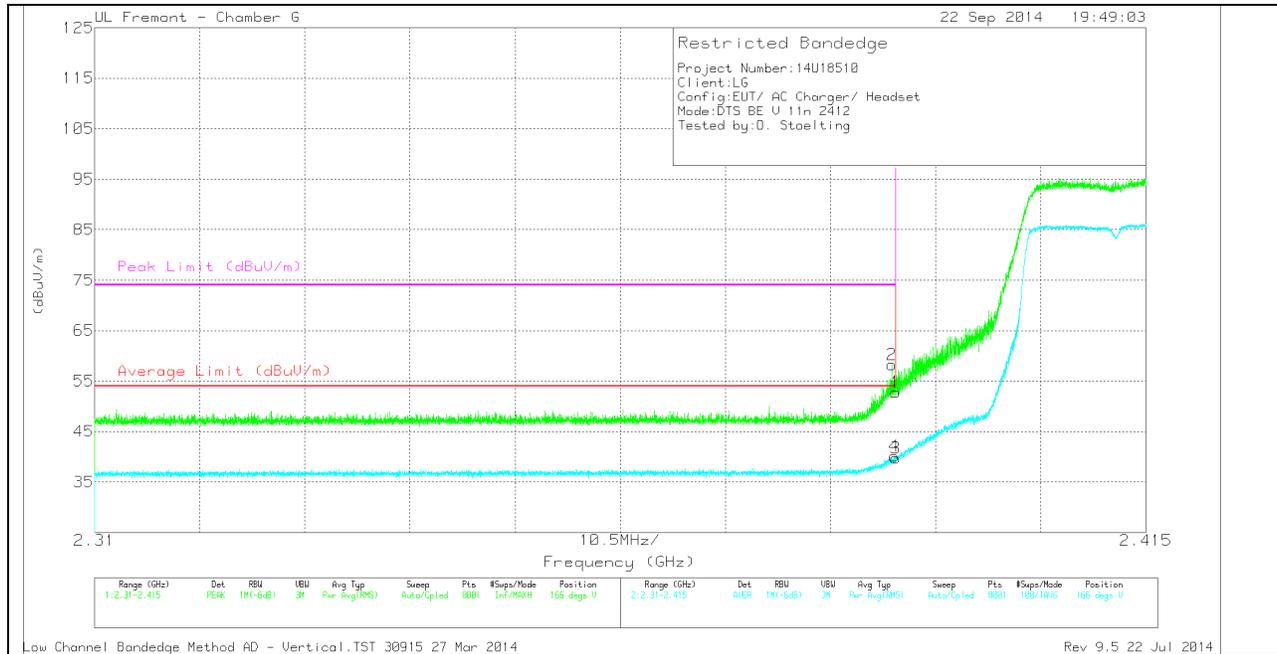
**HORIZONTAL PEAK AND AVERAGE PLOT**



**HORIZONTAL DATA**

Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/FI tr/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	54.13	PK	31.8	-24.9	0	61.03	-	-	74	-12.97	55	117	H
2	* 2.39	54.01	PK	31.8	-24.9	0	60.91	-	-	74	-13.09	55	117	H
3	* 2.39	34.98	RMS	31.8	-24.9	.23	42.11	54	-11.89	-	-	55	117	H
4	* 2.39	35.47	RMS	31.8	-24.9	.23	42.6	54	-11.4	-	-	55	117	H

**VERTICAL PEAK AND AVERAGE PLOT**

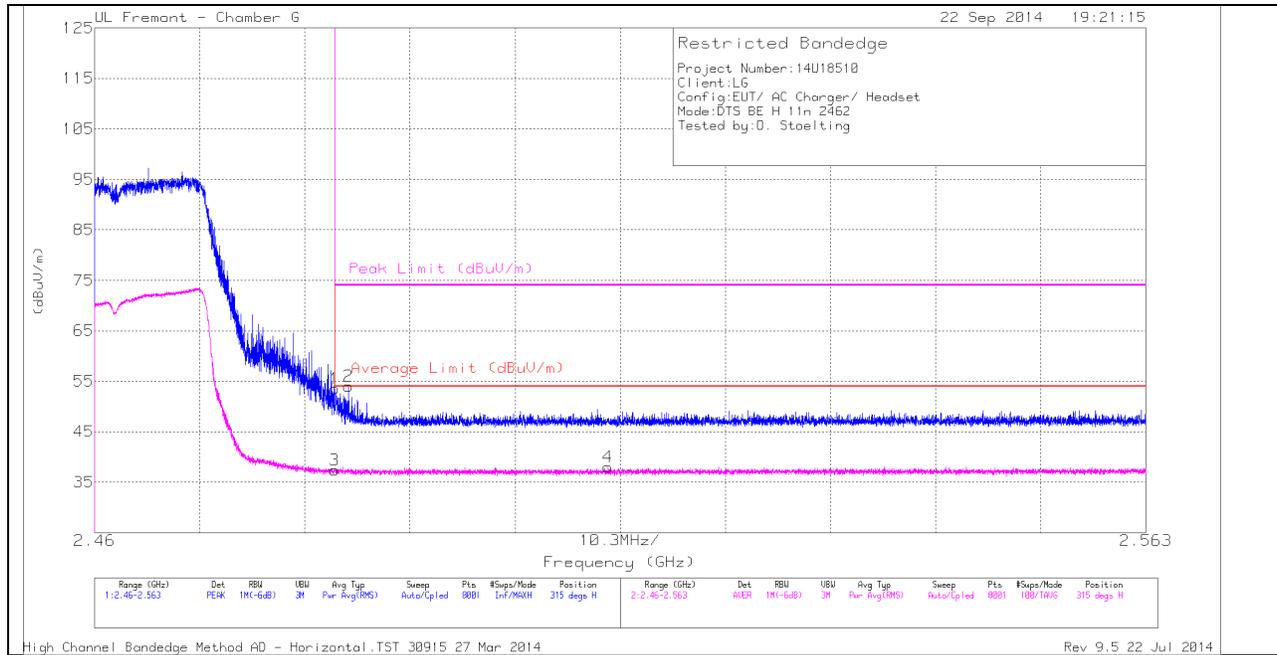


**VERTICAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/FI tr/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	* 2.39	45.86	PK	31.8	-24.9	0	52.76	-	-	74	-21.24	166	116	V
2	* 2.39	51.38	PK	31.8	-24.9	0	58.28	-	-	74	-15.72	166	116	V
3	* 2.39	32.66	RMS	31.8	-24.9	.23	39.79	54	-14.21	-	-	166	116	V
4	* 2.39	33.01	RMS	31.8	-24.9	.23	40.14	54	-13.86	-	-	166	116	V

**AUTHORIZED BANDEDGE (HIGH CHANNEL)**

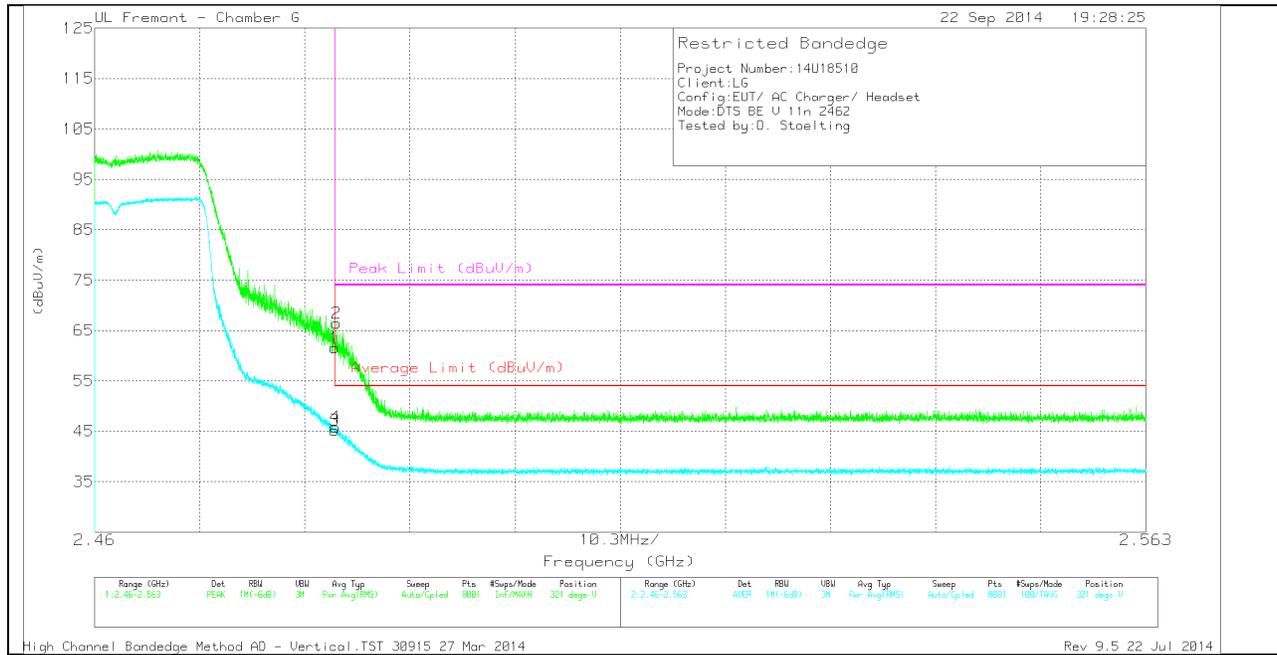
**HORIZONTAL PEAK AND AVERAGE PLOT**



**HORIZONTAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/FI tr/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	46.45	PK	32	-24.9	0	53.55	-	-	74	-20.45	315	313	H
2	* 2.485	46.95	PK	32	-24.9	0	54.05	-	-	74	-19.95	315	313	H
3	* 2.484	30.06	RMS	32	-24.9	.23	37.39	54	-16.61	-	-	315	313	H
4	2.51	30.72	RMS	32	-24.9	.23	38.05	54	-15.95	-	-	315	313	H

**VERTICAL PEAK AND AVERAGE PLOT**

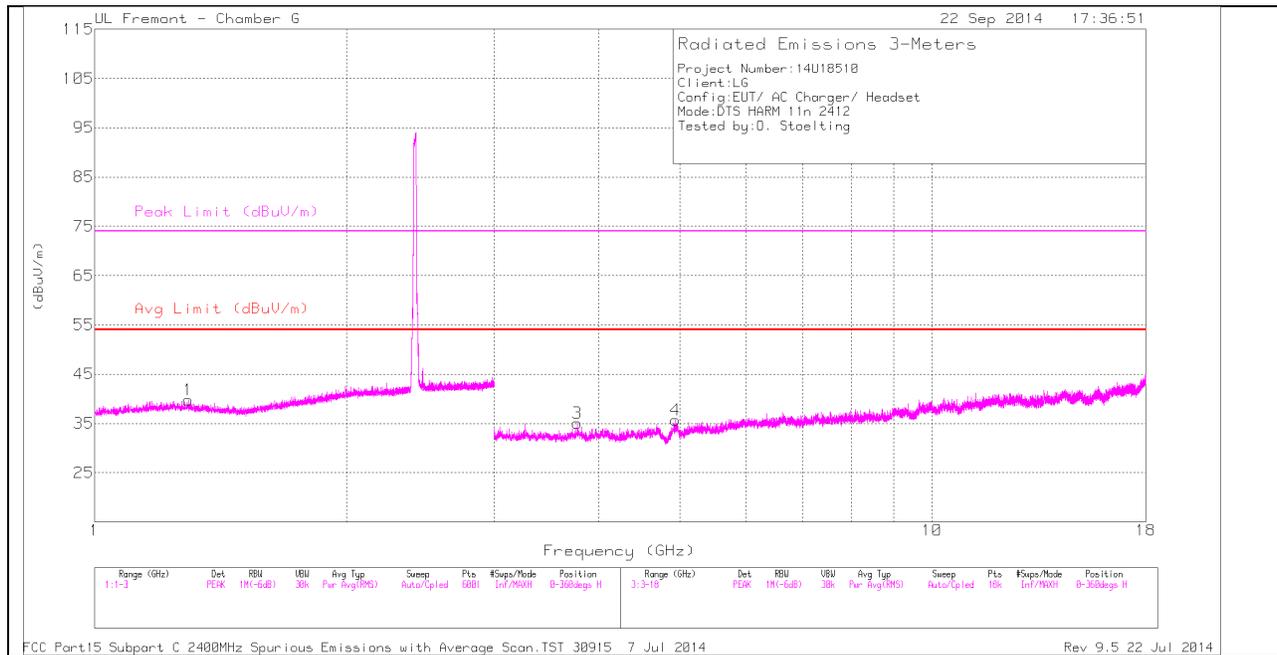


**VERTICAL DATA**

Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/FI tr/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	54.48	PK	32	-24.9	0	61.58	-	-	74	-12.42	321	307	V
2	* 2.484	59.33	PK	32	-24.9	0	66.43	-	-	74	-7.57	321	307	V
3	* 2.484	37.87	RMS	32	-24.9	.23	45.2	54	-8.8	-	-	321	307	V
4	* 2.484	38.45	RMS	32	-24.9	.23	45.78	54	-8.22	-	-	321	307	V

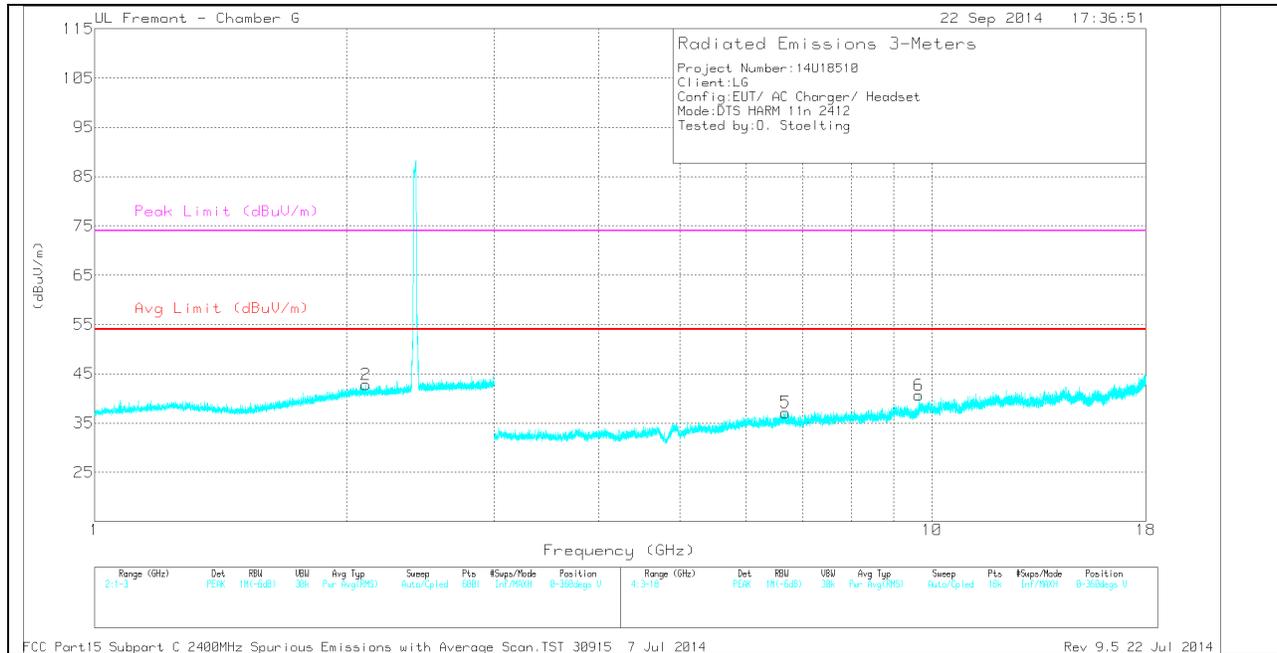
## HARMONICS AND SPURIOUS EMISSIONS

### 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 T862 (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	* 1.294	36.75	PK	29	-26	0	39.75	-	-	74	-34.25	0-360	201	H
3	* 3.771	34.8	PK	32.9	-32.6	0	35.1	-	-	74	-38.9	0-360	101	H
4	* 4.936	34.7	PK	34.1	-33.1	0	35.7	-	-	74	-38.3	0-360	201	H
2	2.109	36.47	PK	31.4	-25.1	0	42.77	-	-	-	-	0-360	201	V
5	6.681	33.26	PK	35.6	-31.7	0	37.16	-	-	-	-	0-360	201	V
6	9.648	31.66	PK	36.9	-27.9	0	40.66	-	-	-	-	0-360	201	V

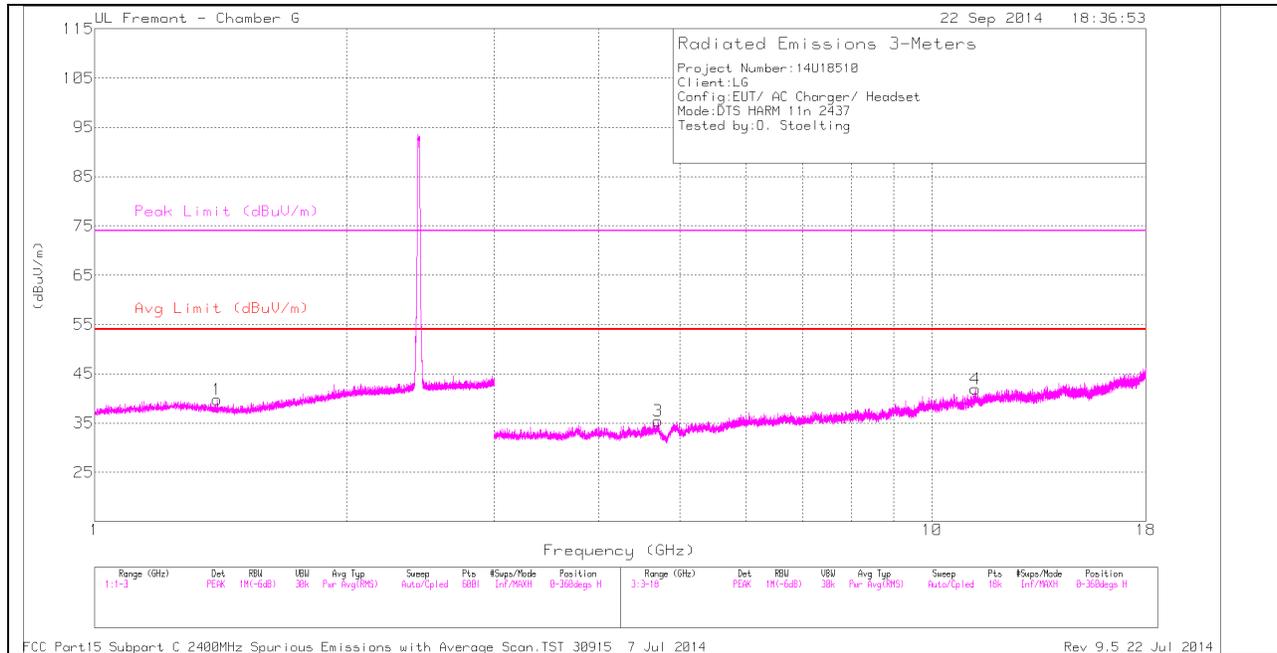
PK - Peak detector

*RADIATED EMISSIONS*

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (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
9.648	39.51	PK2	36.9	-27.9	0	48.51	-	-	-	-	138	213	V
9.648	31.83	MAV1	36.9	-27.9	.23	41.06	-	-	-	-	138	213	V

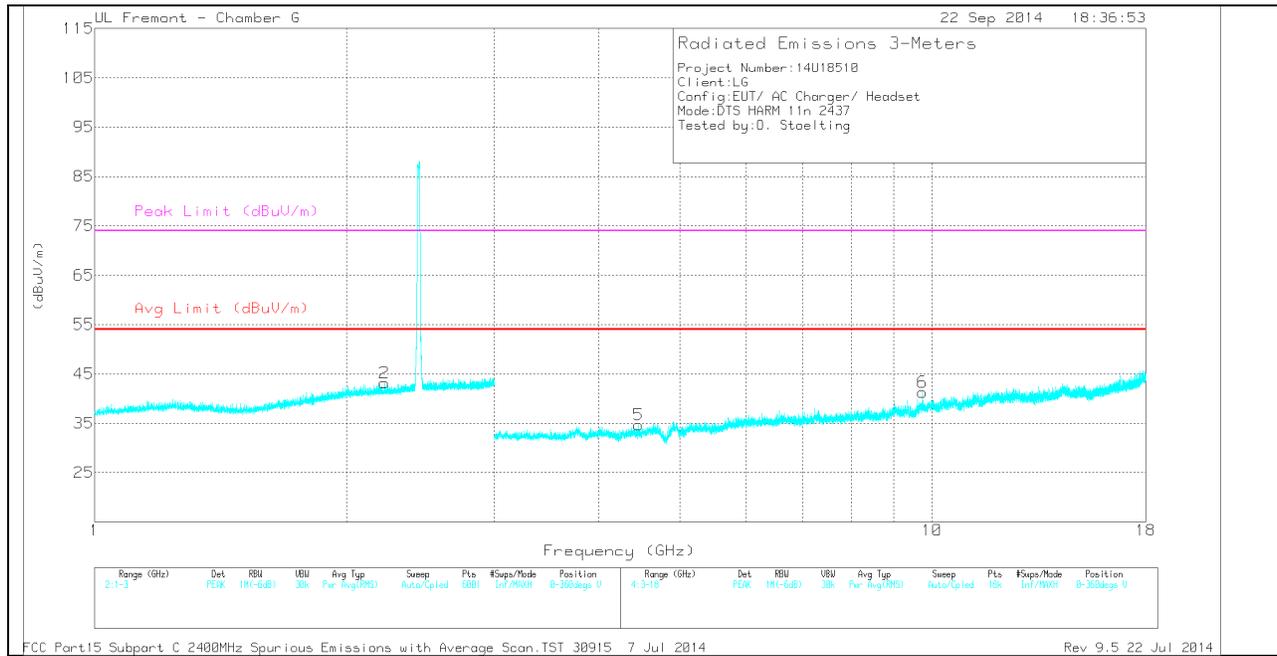
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**MID CHANNEL HORIZONTAL**



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 T862 (dB/m)	Amp/Cbl/Fitr/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	* 1.401	37.2	PK	28.4	-25.8	0	39.8	-	-	74	-34.2	0-360	101	H
2	* 2.218	36.78	PK	31.5	-25.1	0	43.18	-	-	74	-30.82	0-360	101	V
3	* 4.705	34.46	PK	34	-33	0	35.46	-	-	74	-38.54	0-360	201	H
4	* 11.264	29.7	PK	38	-25.8	0	41.9	-	-	74	-32.1	0-360	101	H
5	4.46	34.34	PK	33.7	-33.4	0	34.64	-	-	-	-	0-360	101	V
6	9.748	32.09	PK	37	-27.8	0	41.29	-	-	-	-	0-360	201	V

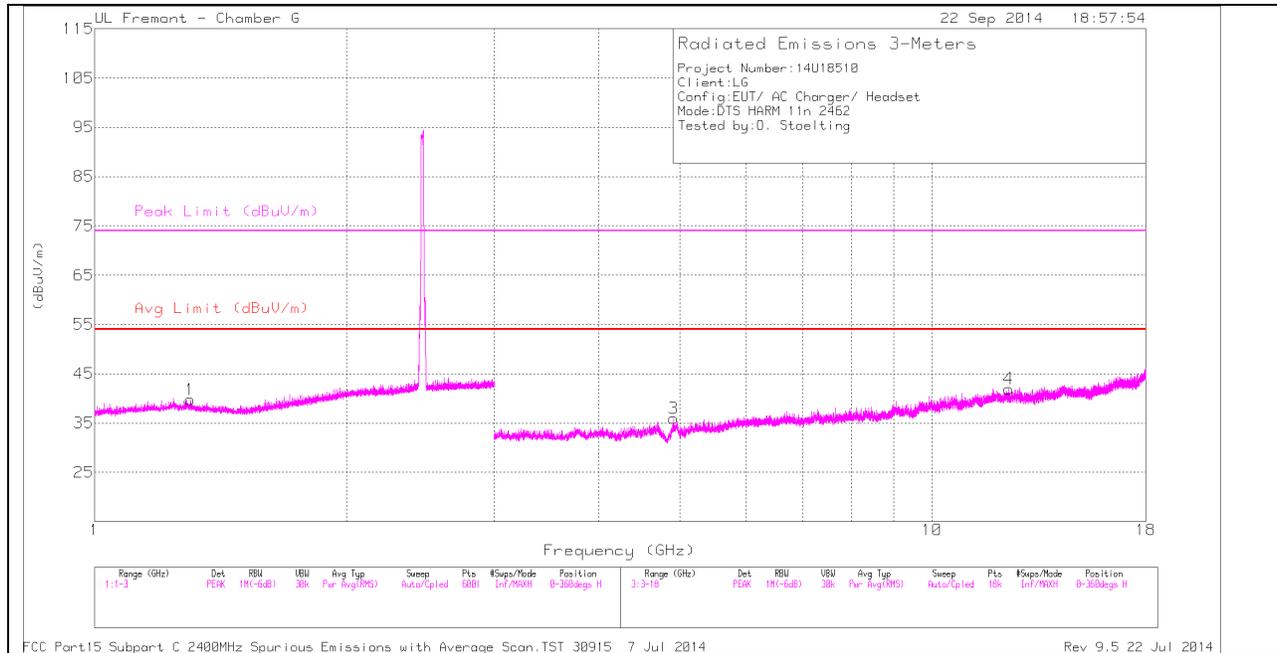
PK - Peak detector

*RADIATED EMISSIONS*

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fitr/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
9.748	39.13	PK2	37	-27.8	0	48.33	-	-	-	-	231	161	V
9.748	30.5	MAV1	37	-27.8	.23	39.93	-	-	-	-	231	161	V

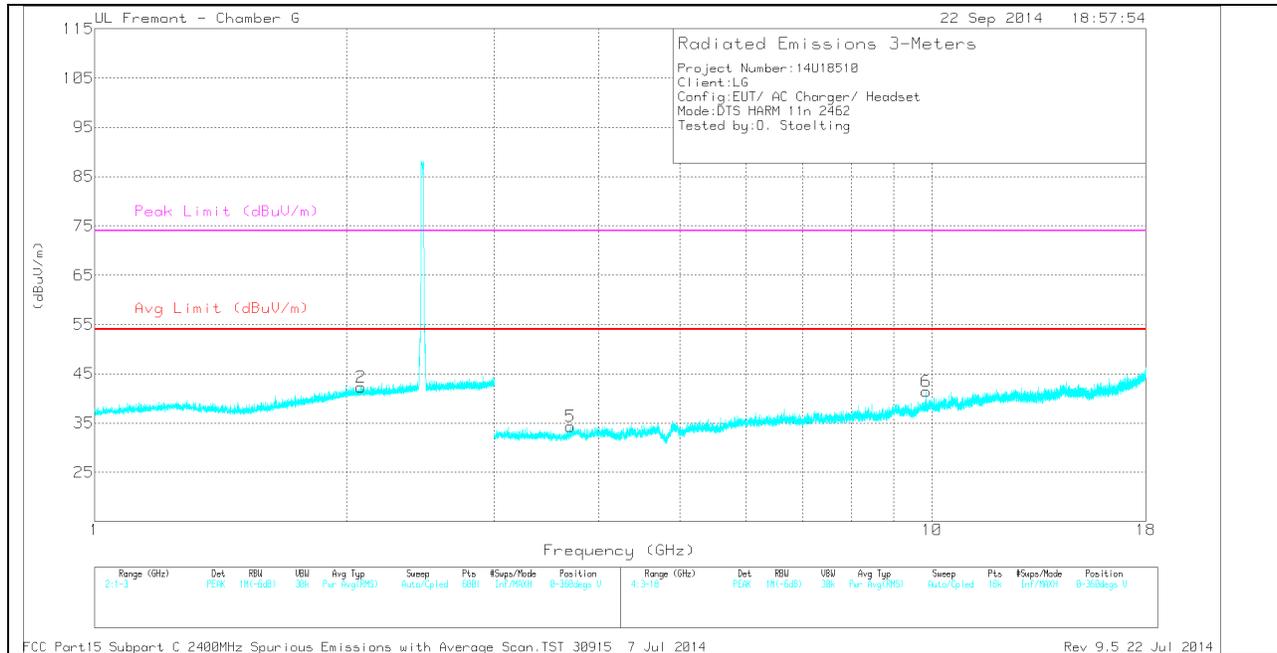
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**HIGH CHANNEL HORIZONTAL**



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 T862 (dB/m)	Amp/Cbl/Filtr/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	* 1.302	36.9	PK	28.9	-26	0	39.8	-	-	74	-34.2	0-360	201	H
3	* 4.917	35.02	PK	34.1	-33.2	0	35.92	-	-	74	-38.08	0-360	101	H
4	* 12.354	30.18	PK	38.9	-27.1	0	41.98	-	-	74	-32.02	0-360	101	H
5	* 3.698	33.26	PK	32.9	-31.8	0	34.36	-	-	74	-39.64	0-360	101	V
2	2.079	36.12	PK	31.4	-25.2	0	42.32	-	-	-	-	0-360	201	V
6	9.848	33.01	PK	37.2	-28.8	0	41.41	-	-	-	-	0-360	201	V

PK - Peak detector

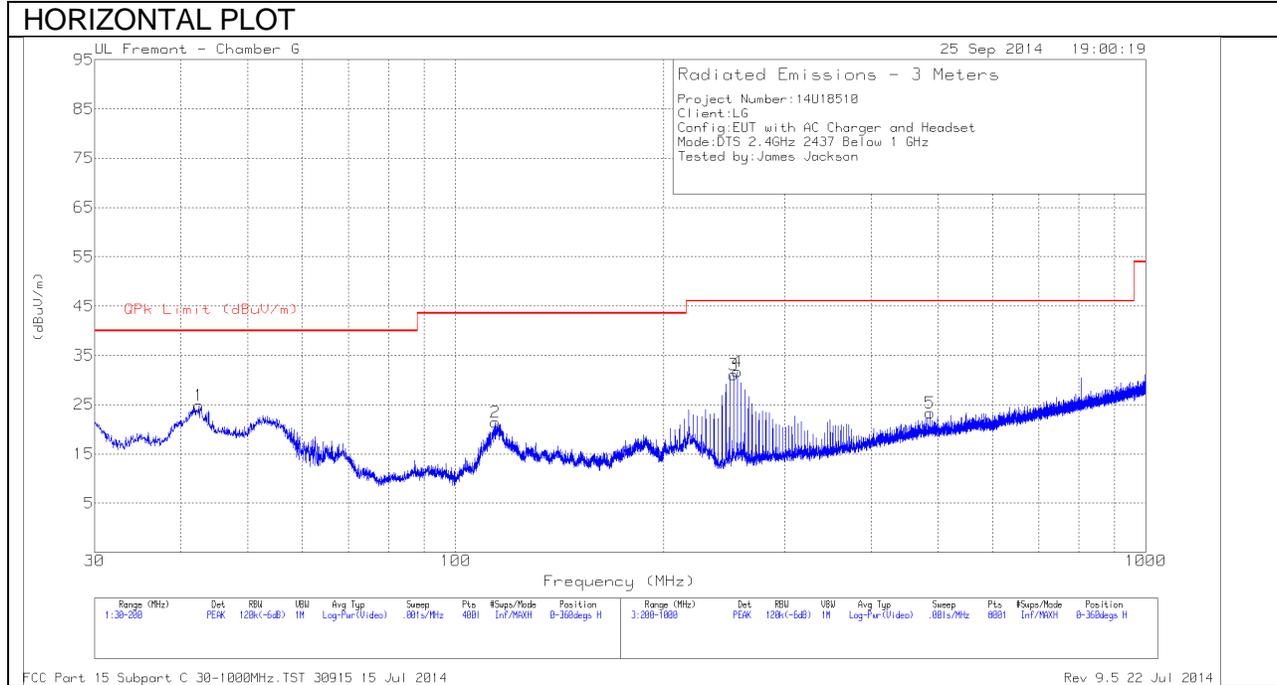
*RADIATED EMISSIONS*

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/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
9.848	31.32	MAv1	37.2	-28.8	.23	39.95	-	-	-	-	225	163	V
9.849	39.6	PK2	37.2	-28.8	0	48	-	-	-	-	225	163	V

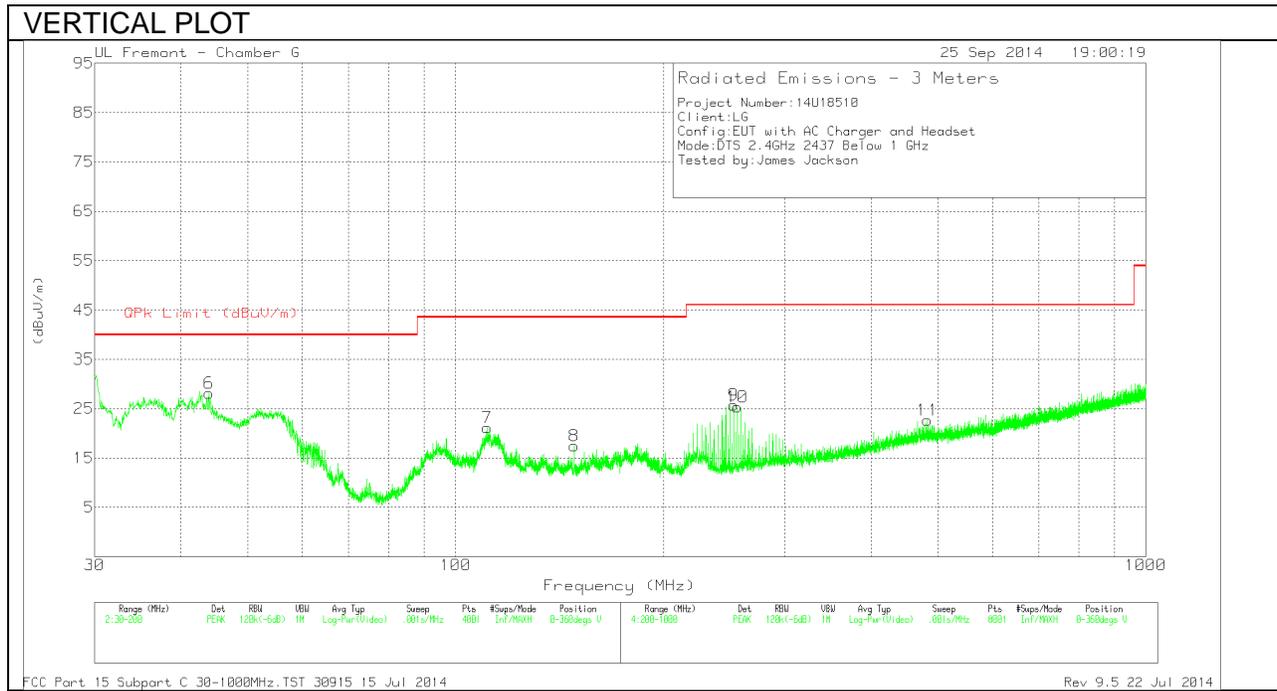
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### 10.3. WORST-CASE BELOW 1 GHz

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



**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)**



**Below 1G Data**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Hybrid	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 114.32	35.36	PK	16	-30	21.36	43.52	-22.16	0-360	201	H
7	* 111.26	35.52	PK	15.6	-30	21.12	43.52	-22.4	0-360	100	V
3	* 252.8	44.86	PK	15	-28.8	31.06	46.02	-14.96	0-360	100	H
4	* 256	45.4	PK	15.1	-28.8	31.7	46.02	-14.32	0-360	100	H
9	* 252.8	39.49	PK	15	-28.8	25.69	46.02	-20.33	0-360	201	V
10	* 256	39.09	PK	15.1	-28.8	25.39	46.02	-20.63	0-360	201	V
1	42.4525	40.28	PK	15.4	-30.8	24.88	40	-15.12	0-360	401	H
6	43.8975	44.5	PK	14.3	-30.7	28.1	40	-11.9	0-360	100	V
8	148.49	31.27	PK	15.8	-29.6	17.47	43.52	-26.05	0-360	100	V
11	483.2	29.76	PK	20.5	-27.6	22.66	46.02	-23.36	0-360	100	V
5	486.4	30.37	PK	20.5	-27.6	23.27	46.02	-22.75	0-360	201	H

\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

## 11. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

### TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4 2009.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

### RESULTS

Please refer to project 14U18508 for details.