

FCC CFR47 PART 15 SUBPART C

C2PC CERTIFICATION TEST REPORT

FOR

CDMA/ LTE Phone + Bluetooth, and DTS b/g/n

MODEL NUMBER: LG-LS660, LGLS660, LS660, LG-LS660P, LGLS660P and LS660P

FCC ID: ZNFLS660

REPORT NUMBER: 14U18507-E4 REVISION B

ISSUE DATE: SEPTEMBER 05, 2014

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

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NVLAP LAB CODE 200065-0

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Rev.	lssue Date	Revisions	Revised By
	08/20/14	Initial Issue	D. Coronia
A	09/02/14	Page 10, update Horn Antenna calibration date	D. Coronia
В	09/05/14	Page 6, update antenna gain information	D. Coronia

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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-LS660, LGLS660, LS660, LG-LS660P, LGLS660P and LS660P
SERIAL NUMBER:	780 (Conducted), 781 (Radiated)
DATE TESTED:	AUGUST 8 - 12, 2014

DS
TEST RESULTS
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:

Tested By:

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DANIEL SOPER CONSUMER TECHNOLOGY DIVISION LAB ENGINEER UL Verification Services Inc.

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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				
🖂 Chamber A	Chamber E				
Chamber B	Chamber F				
Chamber C	Chamber G				
Chamber D	Chamber H				

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

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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB) 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

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%.

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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 14U18147 for details.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -2.60 dBi.

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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.

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

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5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List									
Description	Manufacturer	Model	Serial Number	FCC ID					
AC Adapter	LG	STA-U34WRI	N/A	N/A					
AC Adapter	LG	MCS-02WR	N/A	N/A					
AC Adapter	LG	MCS-02WD	N/A	N/A					
Earphone	LG	N/A	N/A	N/A					

I/O CABLES

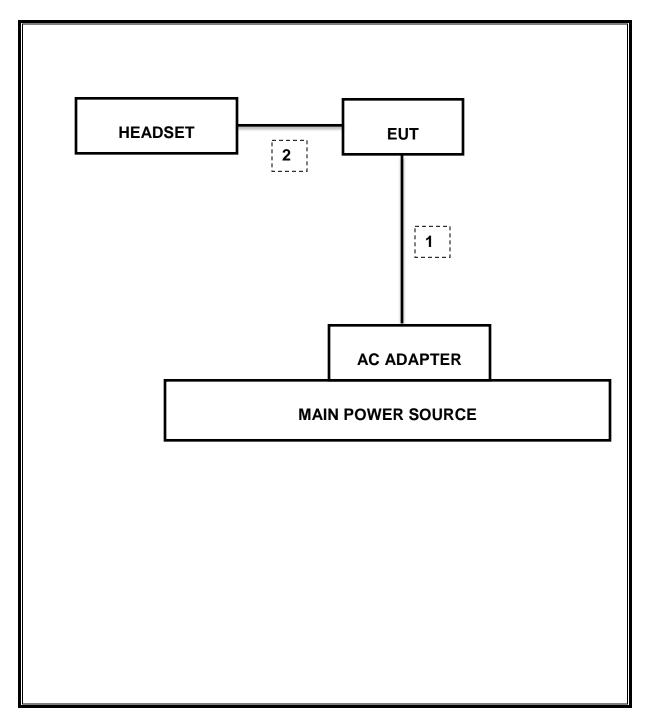
	I/O Cable List									
Cable No		# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks				
1	DC Power	1	Mini-USB	Shielded	1.2m	N/A				
2	Audio	1	Mini-Jack	Unshielded	1m	N/A				

TEST SETUP

The EUT is a stand-alone unit during the tests. Test software exercised the radio card.

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SETUP DIAGRAM FOR TESTS



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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	08/13/14				
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/18/14				
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	C00891	07/15/15				
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	F00165	08/24/14				
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				

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7. MEASUREMENT METHODS

KDB 558074 D01 DTS Meas Guidance v03r02: Measurement Procedure PKPM1 is used for power and PKPSD 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.

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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		Pass	see original
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc	Conducted	Pass	see original
15.247	RSS-210 A8.4	TX conducted output power	<30dBm	Conducted	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		Pass	see original
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m	Radiated	Pass	49.19dBuV/m

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9. ANTENNA PORT TEST RESULTS

9.1. 6 dB BANDWIDTH

<u>LIMITS</u>

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 to100KHz, the VBW $>= 3 \times RBW$, peak detector and max hold.

RESULTS

Please refer to project 14U18147 for details.

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9.2. 99% **BANDWIDTH**

LIMITS

None; for reporting purposes only.

RESULTS

Please refer to project 14U18147 for details.

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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 14U18147 for details.

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9.4. OUTPUT POWER

<u>LIMITS</u>

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 14U18147 for details.

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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 14U18147 for details.

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9.6. OUT-OF-BAND EMISSIONS

<u>LIMITS</u>

FCC §15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the inband reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

RESULTS

Please refer to project 14U18147 for details.

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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 = 0.2dB; N mode = 0.32dB.

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.

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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 125 UL Fremont - Chamber G 8 Aug 2014 02:09:05 Restricted Bandedge Project Number:14U18587 Client:LG Config:EUT w/Headset & Ac adapter Mode:DTS 2.4 11b BE 2412 Tested by:L. Lara 115 105 95 85 (dBuU/m) Peak Lim t (dBuU/r 75 65 imit (dBuU/m) Avenage 5 2 4 4 38 2.31 10.5MHz/ 2.415 Frequency (GHz)
 Sweep
 Pts
 #Swps/Mode
 Position
 Range (Pts)

 Auto/Cpied
 8801
 Enf/MAXH
 292 degs 275
 2:2:31-2:415
Det RBU UBU Avg Typ AVER IM(-668) 3M Pvr Avg(RMS) Sweep Pts #Swps/Mode Auto/Cpled 8881 188/TAV6 Ronge (GHz) 1:2.31-2.415 Position Det RBU PEAK 1M(-6:B) UBLI Avg Tup 31 Pwr Avg (RMS) ow Channel Bandedge Method AD - Horizontal.TST 30915 27 Mar 2014 Rev 9.5 22 Jul 2014

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/ Fltr/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	* 2.39	40.44	PK	31.8	-24.9	47.34	-	-	74	-26.66	292	278	Н
2	* 2.388	42.6	PK	31.8	-24.9	49.5	-	-	74	-24.5	292	278	Н
3	* 2.39	30.77	RMS	31.8	-24.9	37.67	54	-16.33	-	-	292	278	Н
4	* 2.389	31.49	RMS	31.8	-24.9	38.39	54	-15.61	-	-	292	278	Н

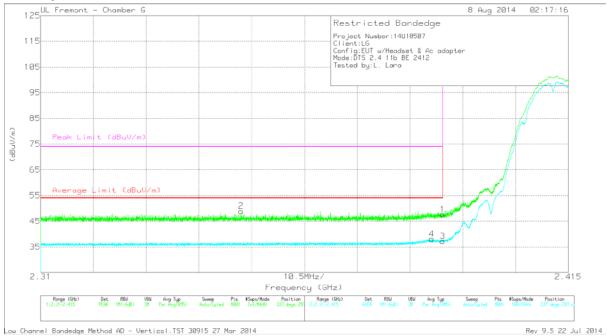
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

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VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/ Fltr/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	* 2.35	42.21	PK	31.7	-25	48.91	-	-	74	-25.09	337	287	V
4	* 2.388	31.17	RMS	31.8	-24.9	38.07	54	-15.93	-	-	337	287	V
1	* 2.39	40.71	PK	31.8	-24.9	47.61	-	-	74	-26.39	337	287	V
3	* 2.39	30.32	RMS	31.8	-24.9	37.22	54	-16.78	-	-	337	287	V

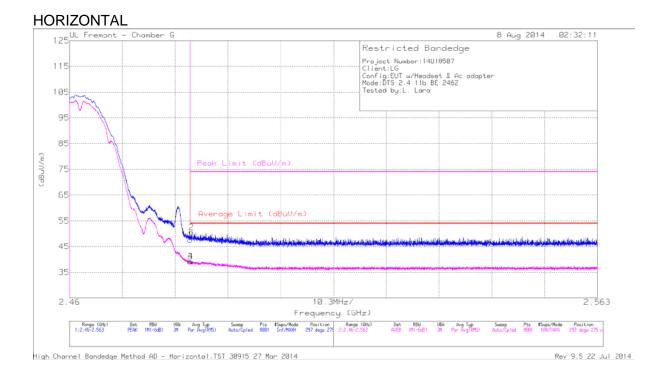
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

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AUTHORIZED BANDEDGE (HIGH CHANNEL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/ Fltr/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	40.53	PK	32	-24.9	47.63	-	-	74	-26.37	297	275	Н
2	* 2.484	43.38	PK	32	-24.9	50.48	-	-	74	-23.52	297	275	Н
3	* 2.484	32.05	RMS	32	-24.9	39.15	54	-14.85	-	-	297	275	Н
4	* 2.484	32.21	RMS	32	-24.9	39.31	54	-14.69	-	-	297	275	Н

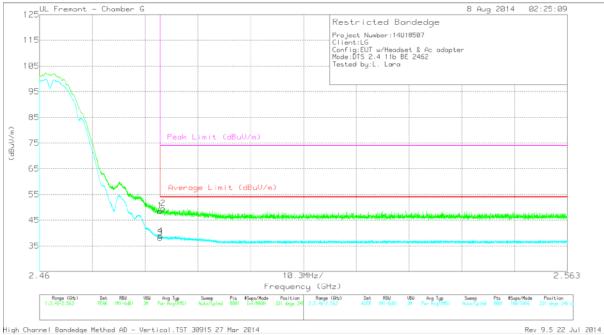
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

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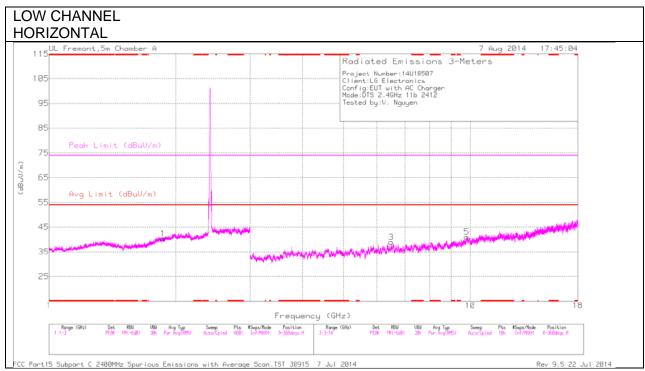
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/ m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	41.56	PK	32	-24.9	48.66	-	-	74	-25.34	331	346	V
2	* 2.484	42.54	PK	32	-24.9	49.64	-	-	74	-24.36	331	346	V
3	* 2.484	31.07	RMS	32	-24.9	38.17	54	-15.83	-	-	331	346	V
4	* 2.484	31.8	RMS	32	-24.9	38.9	54	-15.1	-	-	331	346	V

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

PK - Peak detector

RMS - RMS detection

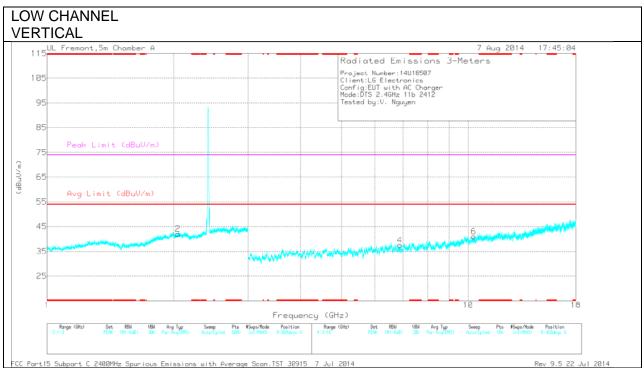
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HARMONICS AND SPURIOUS EMISSIONS

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

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REPORT NO: 14U18507-E4-B FCC ID: ZNFLS660

LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fl tr/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	1.862	34.33	PK	31.2	-25.2	0	40.33	-	-	-	-	0-360	100	Н
2	2.044	35.09	PK	31.9	-24.9	0	42.09	-	-	-	-	0-360	100	V
3	6.496	31.37	PK	35.5	-28	0	38.87	-	-	-	-	0-360	100	Н
4	6.878	29.92	PK	35.3	-27.7	0	37.52	-	-	-	-	0-360	201	V
5	9.815	26.42	PK	36.9	-22.3	0	41.02	-	-	-	-	0-360	100	Н
6	10.315	26.83	PK	37.2	-23	0	41.03	-	-	-	-	0-360	201	V

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

PK - Peak detector

Radiated Emissions

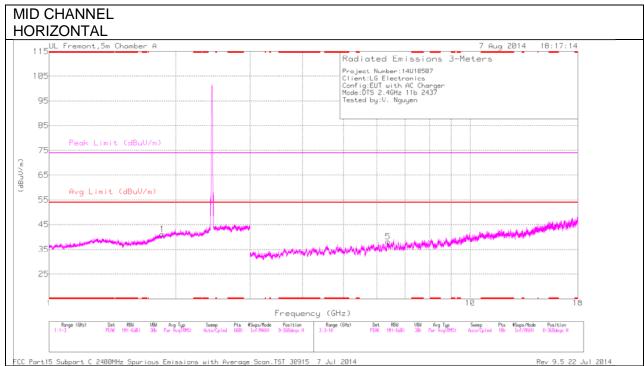
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Marg in (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
9.813	22.66	MAv1	36.9	-22.4	0	37.16	-	-	-	-	147	297	н
9.816	34.14	PK2	36.9	-22.3	0	48.74	-	-	-	-	147	297	н

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

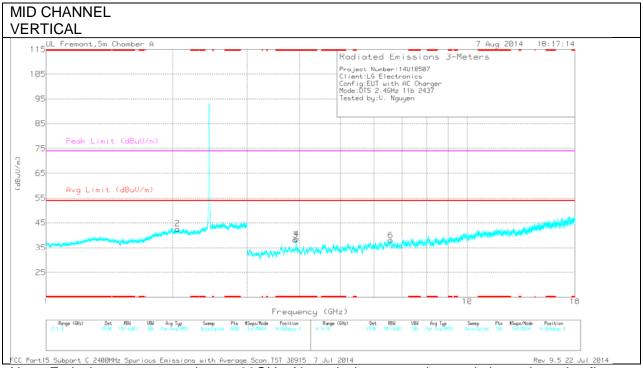
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fl tr/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
3	* 3.9	34.89	PK	33.8	-30.6	0	38.09	-	-	74	-35.91	0-360	100	V
4	* 3.935	34.96	PK	33.8	-30.3	0	38.46	-	-	74	-35.54	0-360	100	V
1	1.856	35.19	PK	31.2	-25.2	0	41.19	-	-	-	-	0-360	201	Н
2	2.051	35.12	PK	31.9	-24.4	0	42.62	-	-	-	-	0-360	201	V
5	6.386	30.69	PK	35.5	-28.1	0	38.09	-	-	-	-	0-360	100	Н
6	6.586	29.35	PK	35.5	-26.9	0	37.95	-	-	-	-	0-360	201	V

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

PK - Peak detector

Radiated Emissions

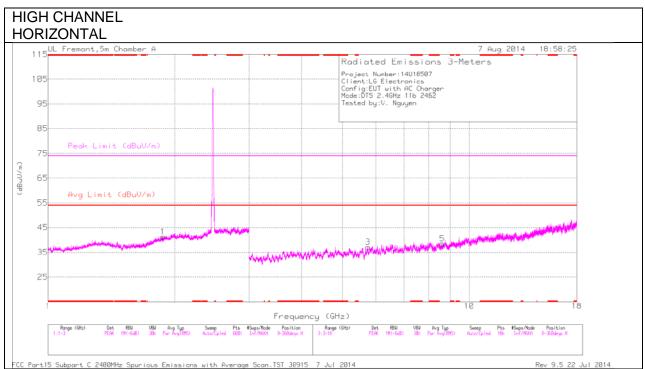
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.901	39.73	PK2	33.8	-30.5	0	43.03	-	-	74	-30.97	222	145	V
* 3.902	28.52	MAv1	33.8	-30.5	0	31.82	54	-22.18	-	-	222	145	V
* 3.937	39.52	PK2	33.8	-30.2	0	43.12	-	-	74	-30.88	249	213	V
* 3.935	28.21	MAv1	33.8	-30.3	0	31.71	54	-22.29	-	-	249	213	V

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

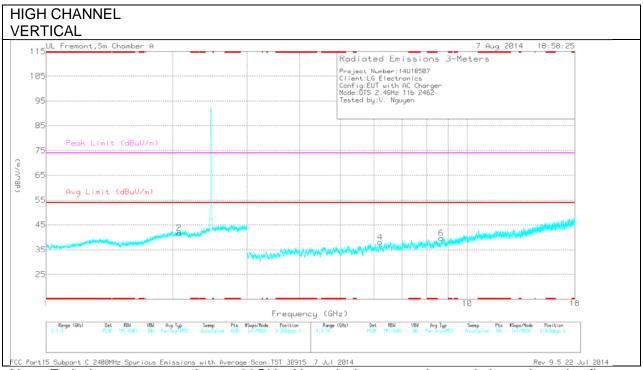
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fl tr/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	1.873	35.7	PK	31.3	-25.7	0	41.3	-	-	-	-	0-360	201	Н
2	2.069	34.38	PK	31.9	-24.6	0	41.68	-	-	-	-	0-360	201	V
3	5.75	32.15	PK	34.6	-29.7	0	37.05	-	-	-	-	0-360	201	Н
4	6.209	30.17	PK	35.4	-27.6	0	37.97	-	-	-	-	0-360	201	V
5	8.636	29.11	PK	35.7	-26.3	0	38.51	-	-	-	-	0-360	100	Н
6	8.676	29.01	PK	35.8	-25.2	0	39.61	-	-	-	-	0-360	100	V

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

PK - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl /Fltr/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
8.674	24.23	MAv1	35.8	-25.2	0	34.83	-	-	-	-	121	273	V
8.676	35.93	PK2	35.8	-25.2	0	46.53	-	-	-	-	121	273	V

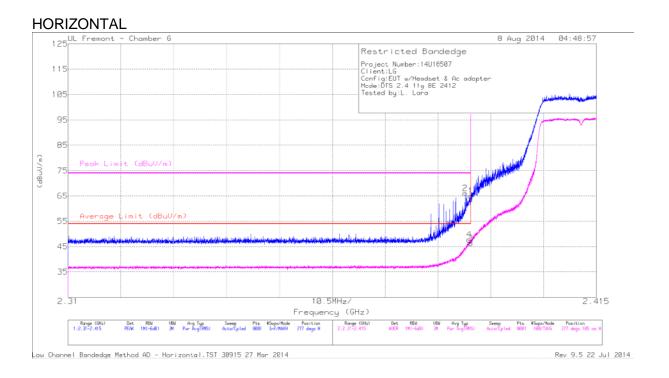
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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10.2.2. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fl 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	58.12	PK	31.8	-24.9	0	65.02	-	-	74	-8.98	277	105	Н
2	* 2.389	59.11	PK	31.8	-24.9	0	66.01	-		74	-7.99	277	105	Н
3	* 2.39	39.19	RMS	31.8	-24.9	.21	46.3	54	-7.7	-	-	277	105	Н
4	* 2.39	40.64	RMS	31.8	-24.9	.21	47.75	54	-6.25	-	-	277	105	Н

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

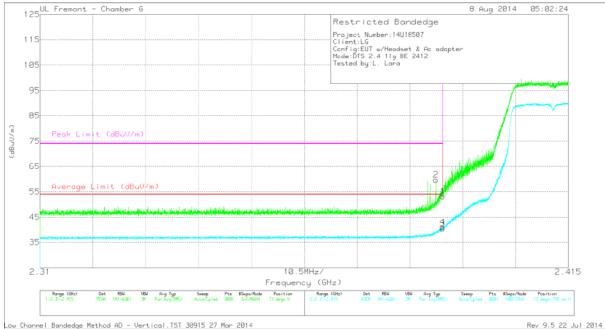
PK - Peak detector

RMS - RMS detection

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VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fl 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
2	* 2.389	52.88	PK	31.8	-24.9	0	59.78	-	-	74	-14.22	73	158	V
1	* 2.39	46.28	PK	31.8	-24.9	0	53.18	-	-	74	-20.82	73	158	V
3	* 2.39	33.41	RMS	31.8	-24.9	.21	40.52	54	-13.48	-	-	73	158	V
4	* 2.39	33.98	RMS	31.8	-24.9	.21	41.09	54	-12.91	-	-	73	158	V

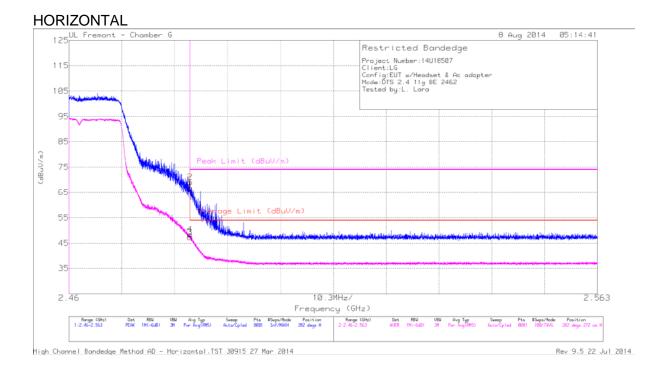
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

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AUTHORIZED BANDEDGE (HIGH CHANNEL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fl 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	59.69	PK	32	-24.9	0	66.79	-	-	74	-7.21	282	272	Н
2	* 2.484	61.94	PK	32	-24.9	0	69.04	-	-	74	-4.96	282	272	Н
3	* 2.484	40.22	RMS	32	-24.9	0	47.32	54	-6.68	-	-	282	272	Н
4	* 2.484	41.32	RMS	32	-24.9	0	48.42	54	-5.58	-	-	282	272	Н

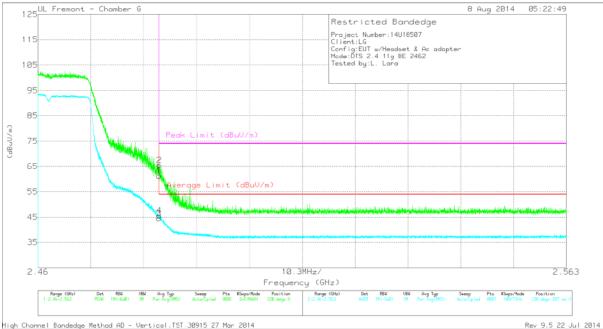
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

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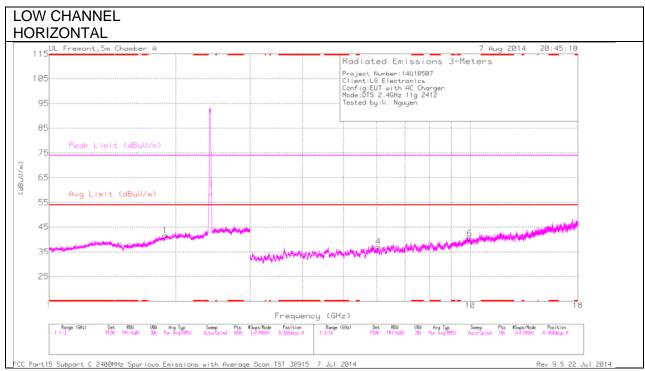
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fl tr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	54.23	PK	32	-24.9	0	61.33	-	-	74	-12.67	330	287	V
2	* 2.484	58.34	PK	32	-24.9	0	65.44	-	-	74	-8.56	330	287	V
3	* 2.484	37.32	RMS	32	-24.9	.21	44.63	54	-9.37	-	-	330	287	V
4	* 2.484	38.44	RMS	32	-24.9	.21	45.75	54	-8.25	-	-	330	287	V

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

PK - Peak detector

RMS - RMS detection

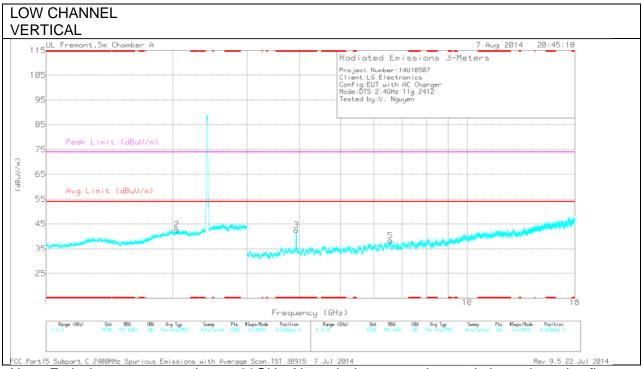
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HARMONICS AND SPURIOUS EMISSIONS

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

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REPORT NO: 14U18507-E4-B FCC ID: ZNFLS660

LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fl tr/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
3	* 3.93	39.4	PK	33.8	-30.6	0	42.6	-	-	74	-31.4	0-360	201	V
1	1.886	35.42	PK	31.5	-25.2	0	41.72	-	-	-	-	0-360	201	Н
2	2.044	35.67	PK	31.9	-24.9	0	42.67	-	-	-	-	0-360	100	V
4	6.046	29.84	PK	35.3	-28.1	0	37.04	-	-	-	-	0-360	100	Н
5	6.575	29.35	PK	35.5	-26.6	0	38.25	-	-	•	-	0-360	201	V
6	9.967	26.1	PK	37.1	-22.8	0	40.4	-	-	-	-	0-360	100	Н

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

PK - Peak detector

Radiated Emissions

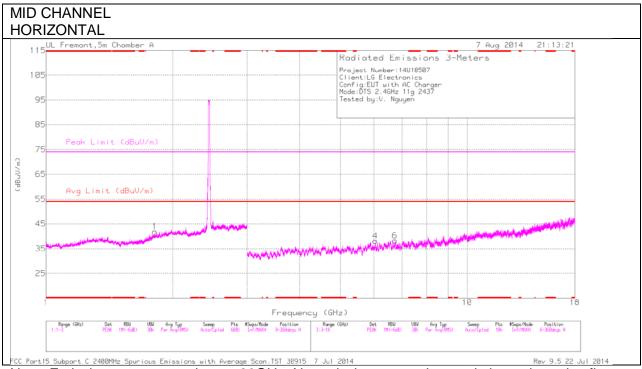
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.929	39.89	PK2	33.8	-30.6	0	43.09	-	-	74	-30.91	279	282	V
* 3.93	28.3	MAv1	33.8	-30.6	.21	31.71	54	-22.29	-	-	279	282	V

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

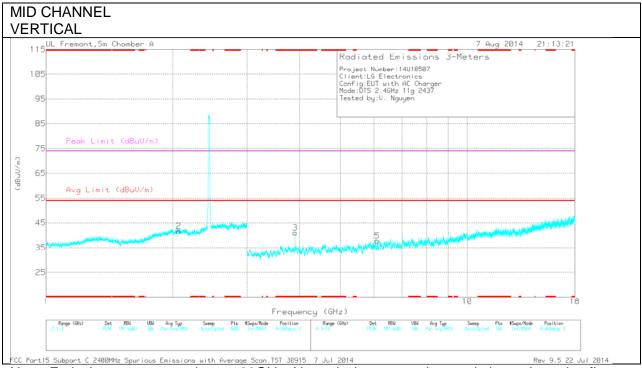
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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MID CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fl tr/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
3	* 3.9	37.79	PK	33.8	-30.6	0	40.99	-	-	74	-33.01	0-360	201	V
1	1.813	36.36	PK	30.7	-25.2	0	41.86	-	-	-	-	0-360	100	Н
2	2.064	34.5	PK	31.9	-24.7	0	41.7	-	-	-	-	0-360	201	V
4	6.046	30.87	PK	35.3	-28.1	0	38.07	-	-	-	-	0-360	201	Н
5	6.117	31.35	PK	35.4	-29	0	37.75	-	-	-	-	0-360	100	V
6	6.736	29.6	PK	35.4	-26.8	0	38.2	-	-	-		0-360	201	Н

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

PK - Peak detector

Radiated Emissions

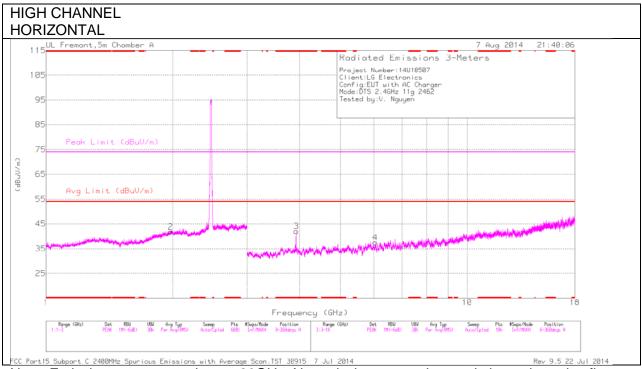
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.899	39.76	PK2	33.8	-30.6	0	42.96	-	-	74	-31.04	272	364	V
* 3.901	28.68	MAv1	33.8	-30.6	.21	32.09	54	-21.91	-	-	272	364	V

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

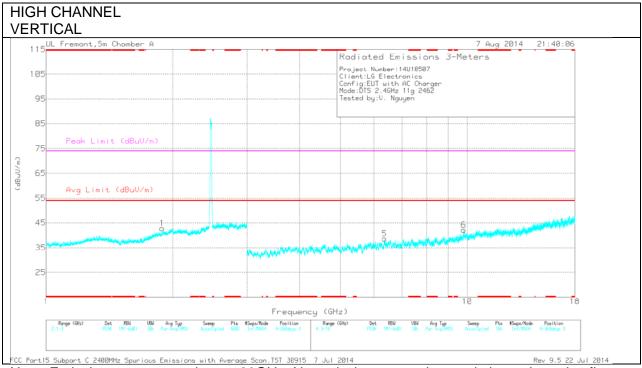
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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REPORT NO: 14U18507-E4-B FCC ID: ZNFLS660

HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fl tr/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
3	* 3.929	38.8	PK	33.8	-30.6	0	42	-	-	74	-32	0-360	100	Н
1	1.886	36.49	PK	31.5	-25.2	0	42.79	-	-	-	-	0-360	100	V
2	1.975	34.59	PK	32	-24.8	0	41.79	-	-	-	-	0-360	201	Н
4	6.046	30.22	PK	35.3	-28	0	37.52	-	-	-	-	0-360	201	Н
5	6.363	31.05	PK	35.5	-27.9	0	38.65	-	-	-	-	0-360	201	V
6	9.81	27.72	PK	36.9	-22.5	0	42.12	-	-	-	-	0-360	100	V

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

PK - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Fltr/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
* 3.93	39.6	PK2	33.8	-30.6	0	42.8	-	-	74	-31.2	76	264	Н
* 3.929	28.21	MAv1	33.8	-30.6	.21	31.62	54	-22.38	-	-	76	264	Н

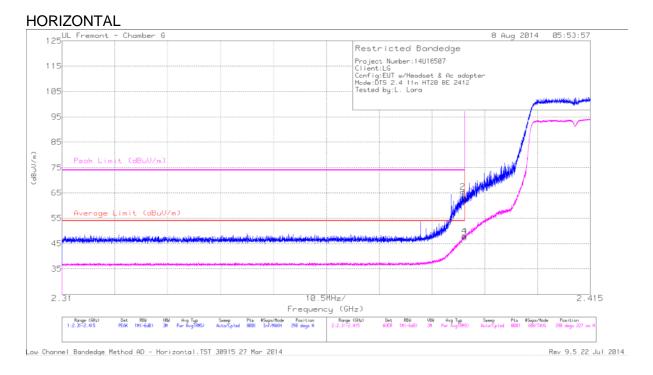
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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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)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fl 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	56.03	PK	31.8	-24.9	0	62.93	-	-	74	-11.07	298	227	Н
2	* 2.39	58.51	PK	31.8	-24.9	0	65.41	-	-	74	-8.59	298	227	Н
3	* 2.39	40.29	RMS	31.8	-24.9	.22	47.41	54	-6.59	-	-	298	227	Н
4	* 2.39	40.81	RMS	31.8	-24.9	.22	47.93	54	-6.07	-	-	298	227	Н

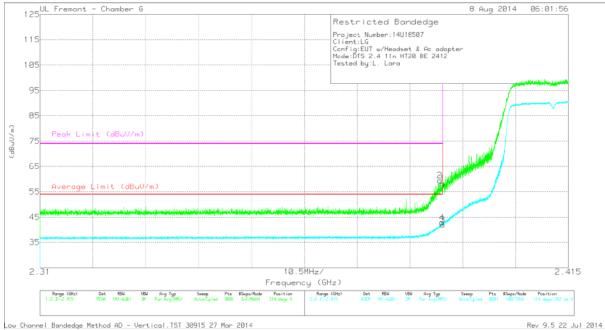
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

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VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fl 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
2	* 2.389	52.6	PK	31.8	-24.9	0	59.5	-	-	74	-14.5	314	292	V
1	* 2.39	51.4	PK	31.8	-24.9	0	58.3	-	-	74	-15.7	314	292	V
3	* 2.39	34.87	RMS	31.8	-24.9	.22	41.99	54	-12.01	-	-	314	292	V
4	* 2.39	35.77	RMS	31.8	-24.9	.22	42.89	54	-11.11	-	-	314	292	V

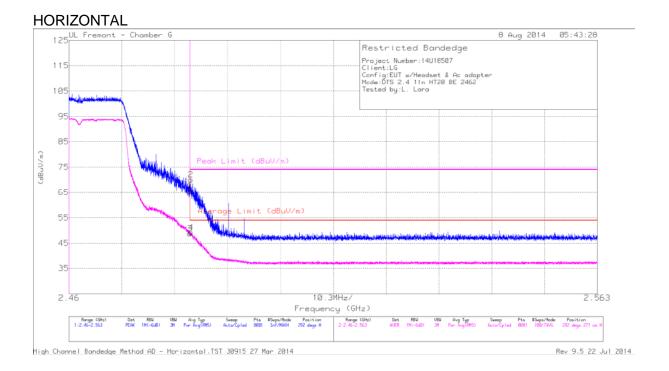
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

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AUTHORIZED BANDEDGE (HIGH CHANNEL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fl 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	58.45	PK	32	-24.9	0	65.55	-	-	74	-8.45	292	271	Н
2	* 2.484	62.97	PK	32	-24.9	0	70.07	-	-	74	-3.93	292	271	Н
3	* 2.484	41.5	RMS	32	-24.9	.22	48.82	54	-5.18	-	-	292	271	Н
4	* 2.484	41.87	RMS	32	-24.9	.22	49.19	54	-4.81	-	-	292	271	Н

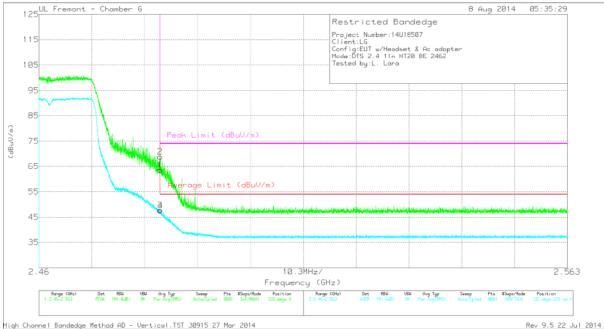
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

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VERTICAL



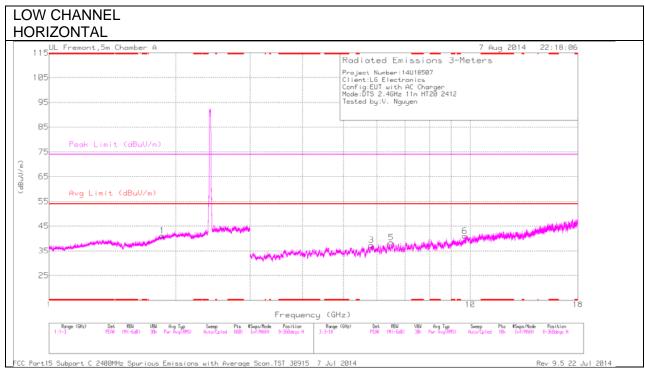
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fl tr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	56.52	PK	32	-24.9	0	63.62	-	-	74	-10.38	332	278	V
2	* 2.484	61.68	PK	32	-24.9	0	68.78	-	-	74	-5.22	332	278	V
3	* 2.484	40.53	RMS	32	-24.9	.22	47.85	54	-6.15	-	-	332	278	V
4	* 2.484	40.24	RMS	32	-24.9	.22	47.56	54	-6.44	-	-	332	278	V

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

PK - Peak detector

RMS - RMS detection

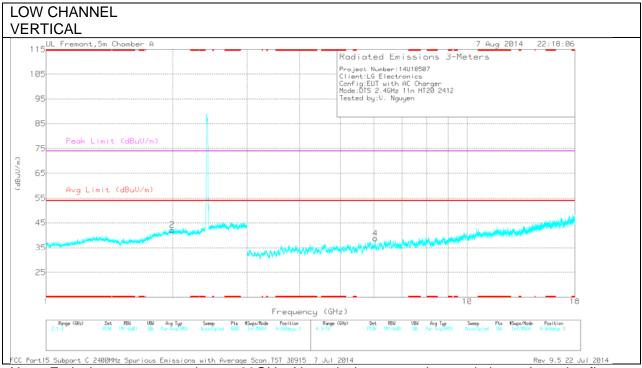
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HARMONICS AND SPURIOUS EMISSIONS

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

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REPORT NO: 14U18507-E4-B FCC ID: ZNFLS660

LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fl tr/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	1.856	35.16	PK	31.2	-25.2	0	41.16	-	-	-	-	0-360	201	Н
2	1.993	34.78	PK	32	-24.6	0	42.18	-	-	-	-	0-360	201	V
3	5.829	31.03	PK	34.8	-28.5	0	37.33	-	-	-	-	0-360	201	Н
4	6.046	31.45	PK	35.3	-28	0	38.75	-	-	-	-	0-360	100	V
5	6.487	31.08	PK	35.5	-28.2	0	38.38	-	-	•	-	0-360	100	Н
6	9.714	28.18	PK	36.8	-24	0	40.98	-	-	-	-	0-360	100	Н

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

PK - Peak detector

Radiated Emissions

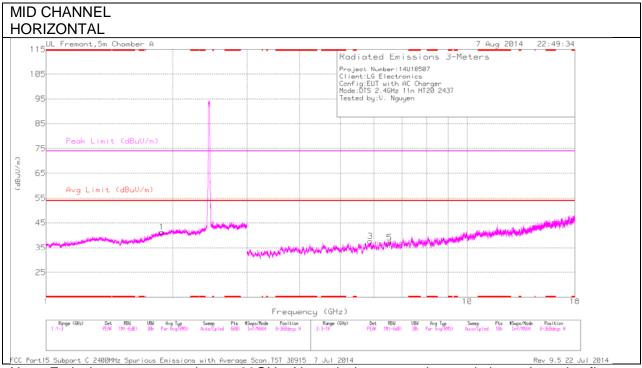
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/C bl/Fltr/P ad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1.993	30.86	MAv1	32.1	-24.6	.22	38.58	-	-	-	-	268	222	V
1.995	42.53	PK2	32.1	-24.8	0	49.83	-	-	-	-	268	222	V

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

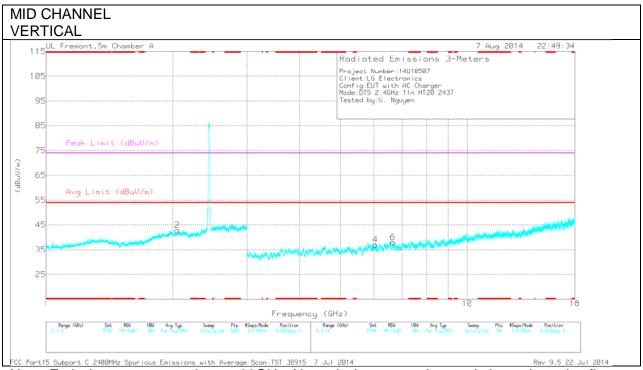
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fl tr/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	1.884	35.18	PK	31.5	-25.4	0	41.28	-	-	-	-	0-360	100	Н
2	2.05	35.39	PK	31.9	-24.5	0	42.79	-	-	-	-	0-360	201	V
3	5.888	30.75	PK	35	-28.1	0	37.65	-	-	-	-	0-360	201	Н
4	6.048	29.83	PK	35.4	-28.2	0	37.03	-	-	-	-	0-360	100	V
5	6.537	27.96	PK	35.5	-26.5	0	36.96	-	-	-	-	0-360	100	H
6	6.664	29.25	PK	35.4	-26.7	0	37.95	-	-	-	-	0-360	201	V

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

PK - Peak detector

Radiated Emissions

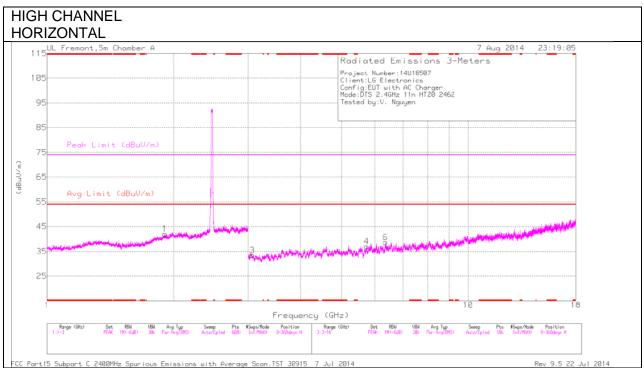
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/ m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2.048	31	MAv1	31.9	-24.7	.22	38.42	-	-	-	-	297	131	V
2.051	42.77	PK2	31.9	-24.4	0	50.27	-	-	-	-	297	131	V

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

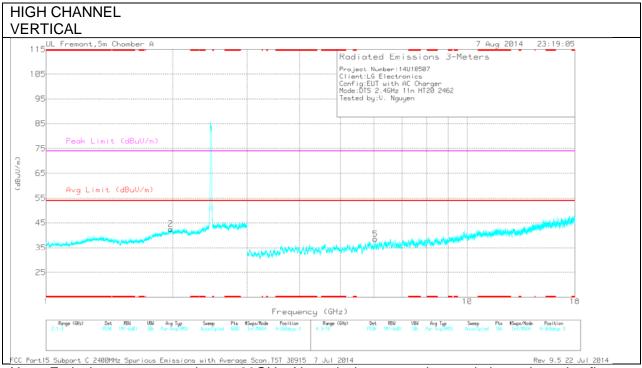
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fl tr/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	1.901	35.59	PK	31.7	-25.2	0	42.09	-	-	-	-	0-360	201	н
2	1.976	35.41	PK	32	-24.8	0	42.61	-	-	-	-	0-360	201	V
3	3.068	31.41	PK	32.8	-30.8	0	33.41	-	-	-	-	0-360	100	Н
4	5.734	31.72	PK	34.6	-29.4	0	36.92	-	-	-	-	0-360	201	Н
5	6.047	31.05	PK	35.4	-28	0	38.45	-	-	-	-	0-360	201	V
6	6.358	31.2	PK	35.5	-28.1	0	38.6	-	-	-		0-360	100	Н

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

PK - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl /Fltr/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
1.974	42.61	PK2	32	-24.8	0	49.81	-	-	-	-	224	144	V
1.974	30.92	MAv1	32	-24.8	.22	38.34	-	-	-	-	224	144	V

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

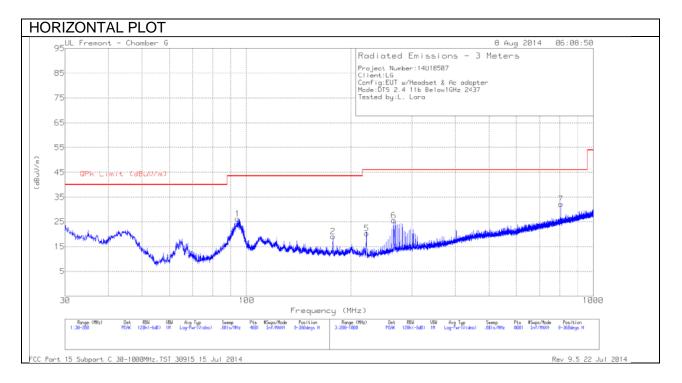
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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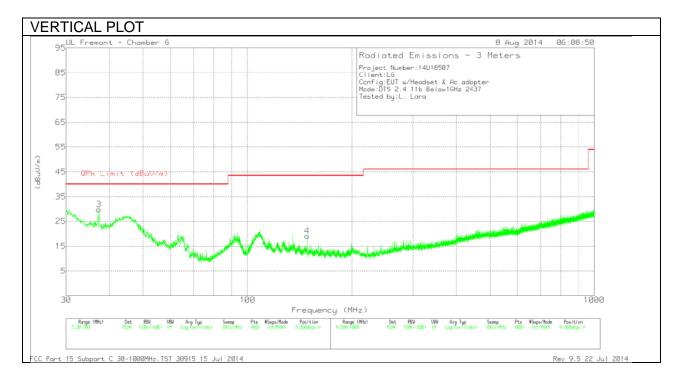
10.3. WORST-CASE BELOW 1 GHz

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



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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
6	* 265.6	38.71	PK	15.6	-28.7	25.61	46.02	-20.41	0-360	100	Н
3	37.2675	41.56	PK	19.1	-30.9	29.76	40	-10.24	0-360	100	V
1	94.26	44.9	PK	11.5	-30.2	26.2	43.52	-17.32	0-360	201	Н
4	148.49	32.9	PK	15.8	-29.6	19.1	43.52	-24.42	0-360	100	V
2	177.6875	33.93	PK	14.6	-29.4	19.13	43.52	-24.39	0-360	103	Н
5	222.2	35.77	PK	13.6	-29	20.37	46.02	-25.65	0-360	100	Н
7	806.1	34.05	PK	24.4	-26.2	32.25	46.02	-13.77	0-360	100	Н

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

PK - Peak detector

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11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted I	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 14U18147 for details.

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