

FCC CFR47 PART 15 SUBPART C

BLUETOOTH LOW ENERGY

CERTIFICATION TEST REPORT

FOR

CDMA/LTE PHONE WITH BT & DTS WLAN b/g/n

MODEL NUMBER: LG-US375, LGUS375, US375, LG-AS375, LGAS375, AS375

FCC ID: ZNFUS375

REPORT NUMBER: 16I22599-E3V2

ISSUE DATE: 1/27/2016

Prepared for

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	1/22/2016	Initial issue	D. CORONIA
V2	1/27/2016	Updated Section 9 & 8.4.1	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 WITH BT & DTS WLAN b/g/n

MODEL: LG-US375, LGUS375, US375, LG-AS375, LGAS375, AS375

SERIAL NUMBER: 511CYZP000605, 510CYYQ000090

DATE TESTED: JANUARY 6-25, 2016

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 revision 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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REPORT NO: 16l22599-E3V2 FCC ID: ZNFUS375

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013 for FCC, FCC CFR 47 Part 2, and FCC CFR 47 Part 15.

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 D
☐ Chamber B	☐ Chamber E
	☐ Chamber F
	☐ Chamber G
	☐ Chamber H

The above test sites and facilities are covered under FCC Test Firm Registration # 208313.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0.

Chambers A through H are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-8, respectively.

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

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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, 9KHz to 30 MHz	2.14 dB
Radiated Disturbance, 30 to 1000 MHz	4.98 dB
Radiated Disturbance,1000 to 6000 MHz	3.86 dB
Radiated Disturbance,6000 to 18000 MHz	4.23 dB
Radiated Disturbance,18000 to 26000 MHz	5.30 dB
Radiated Disturbance,26000 to 40000 MHz	5.23 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 WITH BT + DTS WLAN b/g/n

5.2. MAXIMUM OUTPUT POWER

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

Frequency	Mode	Output Power	Output Power
Range		(dBm)	(mW)
(MHz)			
2402-2480	BLE	2.08	1.61

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of 1.25 dBi.

5.4. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit on the channel with higher 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.

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DESCRIPTION OF TEST SETUP 5.5.

SUPPORT EQUIPMENT

	Suppo	rt Equipment List		
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG	MCS-02WRE	N/A	N/A
Earphone	LG	N/A	N/A	N/A

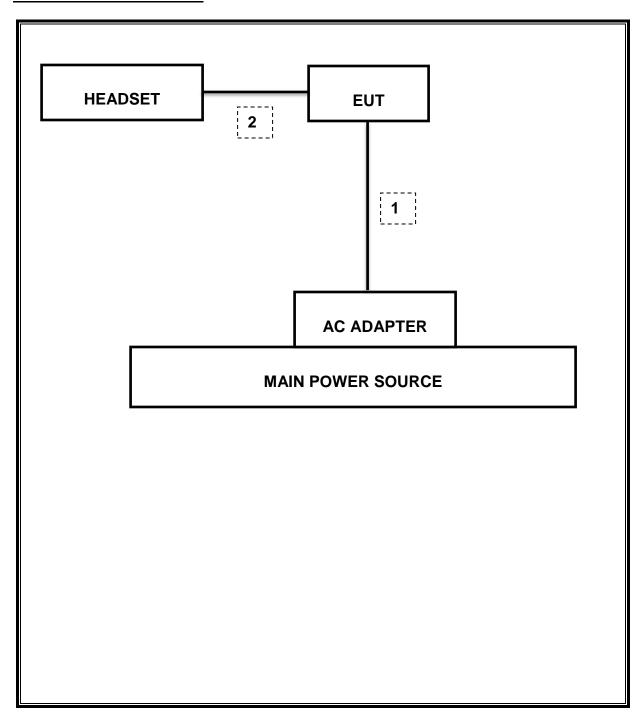
I/O CABLES

			1/0 (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

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 Li	st		
Description	Manufacturer	Model	T Number	Cal Due
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	185	02/18/16
Antenna, Horn, 18GHz	ETS Lindgren	3117	119	01/15/16
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	447	05/12/16
RF Preamplifier, 1GHz - 18GHz	Miteq	NSP4000-SP2	88	04/07/16
RF Preamplifier, 1GHz - 26.5GHz	HP	8449B	404	06/29/16
Amplifier, 10KHz to 1 GHz	Keysight	8447D	15	08/14/16
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	123	10/22/16
Spectrum Analyzer, PXA, 3 Hz to 44 GHz	Keysight	N9030A	908	03/03/16
EMI Test Receiver, 9 KHz to 7 GHz	Rohde & Schwarz	ECSI7	284	09/10/16
Peak Power Meter	Agilent / HP	E4416A	84	01/26/16
Peak / Average Power Sensor	Keysight	E9327A	117	03/09/16
LISN for Conducted Emission	FCC	50/250-25-2-01	1310	09/16/16
Reject Filter, 2.4GHz	Micro-Tronics	BRM50702	160	CNR
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	417	05/04/16
High Pass Filter 6GHz	Micro-Tronics	HPS17542	893	04/25/16
High Pass Filter 3GHz	Micro-Tronics	HPS17543	898	04/25/16

	Test Software L	ist	
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Ver 9.5, June 24, 2015
Conducted Software	UL	UL EMC	Ver 9.5, May 26, 2015
Antenna Port Software	UL	UL RF	Ver 3.9.1, Dec 28, 2015

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7. SUMMARY TABLE

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result
15.247 (a)(2)	RSS-247 5.2.1	Occupied Bandwidth (6dB)	>500KHz		Pass
2.1051, 15.247 (d)	RSS-247 5.5	Band Edge / Conducted Spurious Emission	-20dBc	Conducted	Pass
15.247	RSS-247 5.4.4	TX conducted output power	<30dBm	Conducted	Pass
15.247	RSS-247 5.2.2	PSD	<8dBm		Pass
15.207 (a)	RSS-GEN 8.8	AC Power Line conducted emissions	Section 10	Radiated	Pass
15.205, 15.209	RSS-GEN 8.9/7	Radiated Spurious Emission	< 54dBuV/m	Nauialeu	Pass

8. ANTENNA PORT TEST RESULTS

ON TIME, DUTY CYCLE 8.1.

LIMITS

None; for reporting purposes only

PROCEDURE

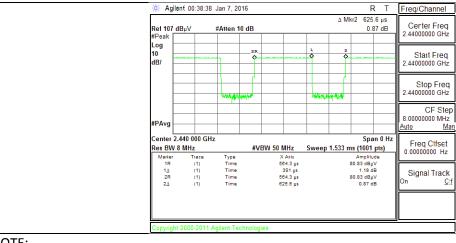
KDB 558074 Zero-Span Spectrum Analyzer Method

RESULTS

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time	Period	Duty Cycle	Duty	Duty Cycle	1/T
	В		х	Cycle	Correction Factor	Minimum VBW
	(msec)	(msec)	(linear)	(%)	(dB)	(kHz)
BLE	0.391	0.626	0.625	62.50%	2.04	2.558

DUTY CYCLE PLOTS



8.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

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

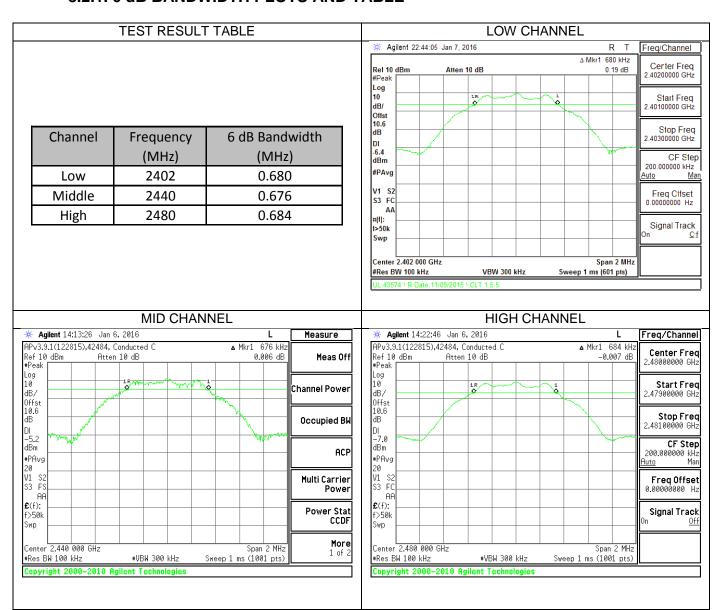
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

DATE: 1/27/2016

RESULTS

8.2.1. 6 dB BANDWIDTH PLOTS AND TABLE



8.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

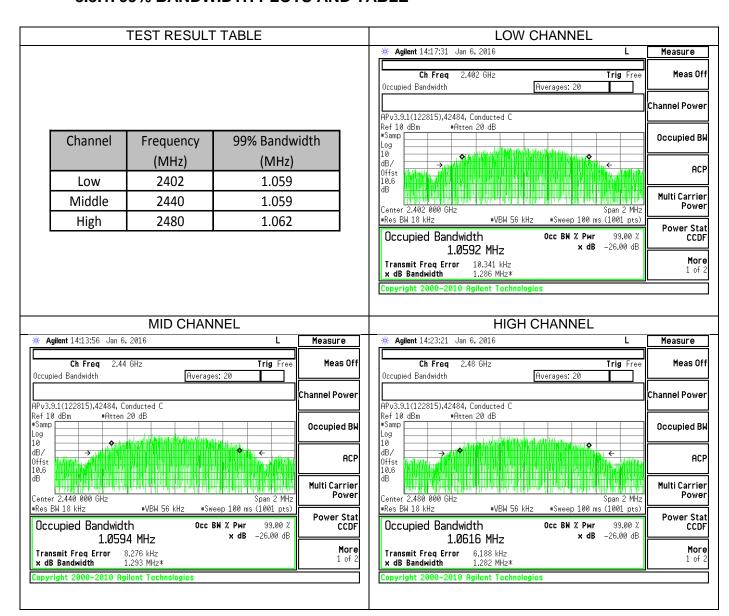
TEST PROCEDURE

Refer to KDB558074 D01 DTS Meas Guidance v03r04: The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

DATE: 1/27/2016

RESULTS

8.3.1. 99% BANDWIDTH PLOTS AND TABLE



8.4. OUTPUT POWER

LIMITS

FCC §15.247 (b)

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

TEST PROCEDURE

Peak power is measured using KDB558074 D01 DTS Meas Guidance v03r04 spectrum analyzer.

DATE: 1/27/2016

RESULTS

8.4.1. OUTPUT POWER PLOTS

	TEST	RESULT TABL	E			LO	W CHAN	INEL		
					# Agilent 16:30:53	3 Jan 25, 2016			R T	Freq/Channe
					Ref 10 dBm Peak	Atten 10 dB		Mkr1 2.401	1 955 GHz 0.36 dBm	Certer Free 2.40200000 GH
a	Frequency	Output	Limit	Margin	Log		1			
Channel	(MHz)	Power (dBm)	(dBm)	(dB)	dB/					Start Free 2.39750000 GH
Low	2402	-0.36	30	-30.36	10.6 dB					Stop Fre 2.40650000 GH
Middle	2440	2.08	30	-27.92						
High	2480	-0.01	30	-30.01	#PAvg					CF St 900.000000 kH <u>Auto</u>
					M1 S2 S3 FC					Freq Ctfse 0.00000000 H
					AA n(i): FTun Swp					Signal Trac
					Center 2.402 000 GH				Span 9 MHz	
					#Res BW 3 MHz	#VBW	8 MHz	Sweep 1 ms	(601 pts)	
					Copyright 2000-2010	Agilent Technologies				
₩ Agilent 16		ID CHANNEL	R T F	Freg/Channel		HIG	SH CHAN	NNEL	R T	Freg/Channe
Ref 10 dBm	32:22 Jan 25, 2016 Atten 10 dB	Mkr1 2.4:	39 925 GHz	Freq/Channel Certer Freq 2.4400000 GHz	* Agilent 16:33:07	HIG	GH CHAN	Mkr1 2.479		Freq/Channe Certer Free 2.48000000 GH
Ref 10 dBm Peak Log 10 dB/	:32:22 Jan 25, 2016		39 925 GHz 2.08 dBm	Certer Freq	# Agilent 16:33:07 Ref 10 dBm Peak Log 10 dB/	HIG 7 Jan 25, 2016	GH CHAN	Mkr1 2.479	9 820 GHz	Certer Fre
Ref 10 dBm Peak Log	:32:22 Jan 25, 2016	Mkr1 2.4	39 925 GHz 2.08 dBm	Certer Freq 2.44000000 GHz	* Agilent 16:33:07 Ref 10 dBm Peak Log 10	HIG 7 Jan 25, 2016	1	Mkr1 2.479	9 820 GHz	Certer Fre 2.48000000 GH Start Fre
Ref 10 dBm Peak Log 10 dB/ Offst 10.6	:32:22 Jan 25, 2016	Mkr1 2.4	39 925 GHz 2.08 dBm 2	Certer Freq 2.44000000 GHz Start Freq 2.43550000 GHz	# Agilent 16:33:07 Ref 10 dBm Peak Log 10 dB/ Offst 10.6	HIG 7 Jan 25, 2016	1	Mkr1 2.479	9 820 GHz	Certer Fre 2.48000000 GH Start Fre 2.47550000 GH
Rei 10 dBm Peak Log 10 dB/ Offist 10.6 dB #PAvg M1 S2 S3 FC AA	:32:22 Jan 25, 2016	Mkr1 2.4	39 925 GHz 2.08 dBm	Certer Freq 2.44000000 GHz Start Freq 2.43550000 GHz Stop Freq 2.44450000 GHz CF Step 900.000000 kHz	# Agilent 16:33:07 Ref 10 dBm Peak Log 10 dB/ Offst 10.6 dB #PAvg M1 S2 S3 FC AA	HIG 7 Jan 25, 2016	1	Mkr1 2.479	9 820 GHz	Certer Fre 2.4800000 GH Start Fre 2.47550000 GH Stop Fre 2.48450000 GH CF St 900.000000 kH
Rei 10 dBm Peak Log 10 dB/ Offst 10.6 dB	:32:22 Jan 25, 2016	Mkr1 2.4	39 925 GHz 2.08 dBm 2	Certer Freq 2.44000000 GHz Start Freq 2.43550000 GHz Stop Freq 2.44450000 GHz CF Step 900.000000 kHz uto Man	# Agilent 16:33:07 Ref 10 dBm Peak Log 10 dB/ Offist 10.6 dB #PAvg M1 S2 S3 FC	HIG 7 Jan 25, 2016	1	Mkr1 2.479	9 820 GHz	Certer Fre 2.48000000 GF Start Fre 2.47550000 GF Stop Fre 2.48450000 GF Stop Fre 2.48450000 GF Stop Freq Cifse Freq Cifse
Rei 10 dBm Peak Log 10 dB/ Offst 10.6 dB #PAvg M1 S2 S3 FC AA u(t): FTun	32:22 Jan 25, 2016 Atten 10 dB	Mkr1 2.4:	39 925 GHz 2.08 dBm 2	Certer Freq 2.44000000 GHz Start Freq 2.43550000 GHz Stop Freq 2.44450000 GHz CF Step 900.000000 kHz	# Agilent 16:33:07 Ref 10 dBm Peak Log 10 00 dB/ Offst 10.6 dB #PAvg M1 S2 S3 FC AA u(f): FTun	HIG 7 Jan 25, 2016 Atten 10 dB	1	Mkr1 2.479	9 820 GHz	Certer Fre 2.48000000 Gt Start Fre 2.47550000 Gt Stop Fre 2.48450000 Gt CF S' 900.000000 kt Auto Freq Cifse 0.0000000 F
Rel 10 dBm Peak Log 10 dB/ Offst 10.6 dB #PAvg M1 S2 S3 FC AA u(f): FT un Swp	32:22 Jan 25, 2016 Atten 10 dB	Mkr1 2.4:	39 925 GHz 2.08 dBm 2 2 2 3 4	Certer Freq 2.44000000 GHz Start Freq 2.43550000 GHz Stop Freq 2.44450000 GHz CF Step 900.000000 kHz	# Agilent 16:33:07 Ref 10 dBm Peak Log 10 dB/ Offst 10.6 dB #PAvg M1 S2 S3 FC AA u(I): FTun Swp	HIG 7 Jan 25, 2016 Atten 10 dB	1 O	Mkr1 2.479	9 820 GHz 0.17 dBm	Certer Fre 2.48000000 G Start Fre 2.47550000 G Stop Fre 2.48450000 G CFS 900.000000 kl Auto Freq Ctts 0.00000000 H
Rei 10 dBm Peak Log 10 dB/ Offst 10.6 dB #PAvg M1 S2 S3 FC AA u(1): FTun Swp Center 2.440 0 #Res BW 3 MH	32:22 Jan 25, 2016 Atten 10 dB	Mkr1 2.4:	39 925 GHz 2.08 dBm 2 2 2 3 4	Certer Freq 2.44000000 GHz Start Freq 2.43550000 GHz Stop Freq 2.44450000 GHz CF Step 900.000000 kHz	# Agilent 16:33:07 Ref 10 dBm Peak Log 10 dB/ Olist 10.6 dB #PAvg M1 S2 S3 FC AA n(I): FTun Swp Center 2.480 000 GH #Res BW 3 MHz	HIG 7 Jan 25, 2016 Atten 10 dB	1 O	Mkr1 2.479	9 820 GHz 0.17 dBm	Certer Fre 2.48000000 Gt Start Fre 2.47550000 Gt Stop Fre 2.48450000 Gt CF S' 900.000000 kt Auto Freq Cifse 0.0000000 F

8.5. **AVERAGE POWER**

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 10.6 dB (including 10 dB pad and 0.6 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	-1.39
Middle	2440	1.05
High	2480	-0.99

NOTE: --

8.6. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

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.

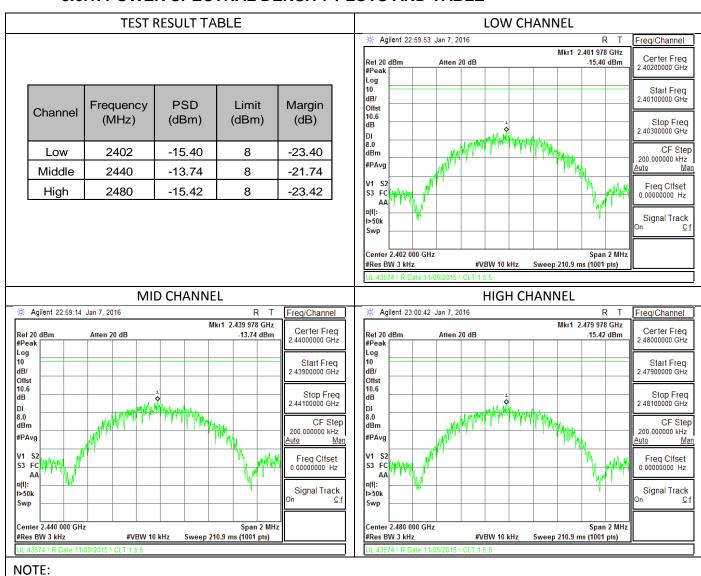
DATE: 1/27/2016

TEST PROCEDURE

Power Spectral Density was performed utilizing the "Method PKPSD (Peak PSD)" under KDB558074 D01 DTS Meas Guidance v03r04.

RESULTS

8.6.1. POWER SPECTRAL DENSITY PLOTS AND TABLE



8.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

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

DATE: 1/27/2016

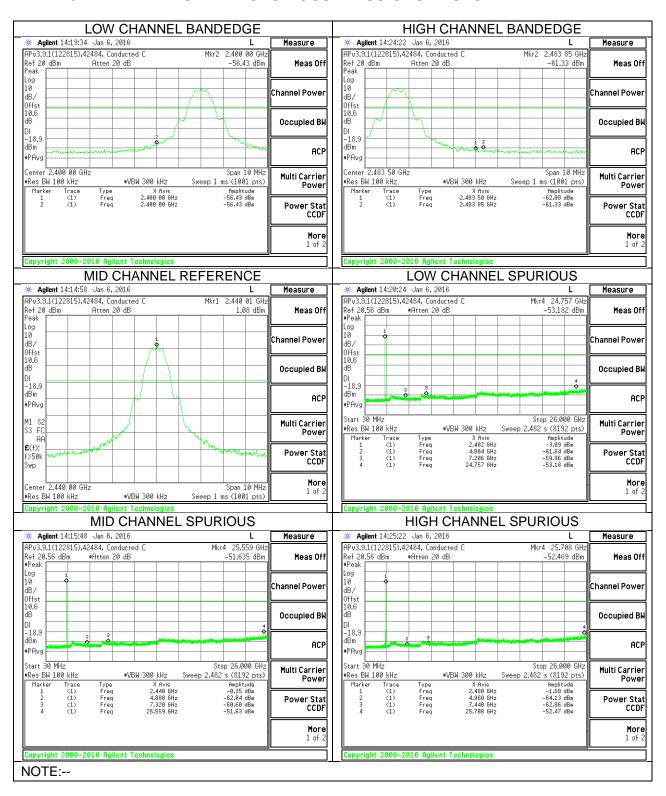
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

RESULTS

8.7.1. BANDEDGE AND SPURIOUS EMISSIONS PLOTS



DATE: 1/27/2016

9. RADIATED TEST RESULTS

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 for below 1GHz and 150cm for above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. 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 example: DCF = 10log (1/0.625)=2.04dB

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.

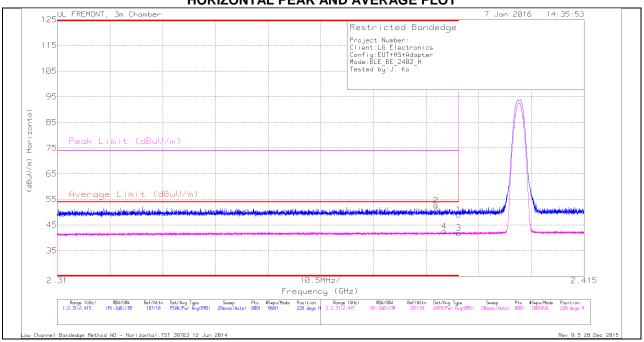
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

RESULTS

TRANSMITTER ABOVE 1 GHz 9.1.

RESTRICTED BANDEDGE (LOW CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

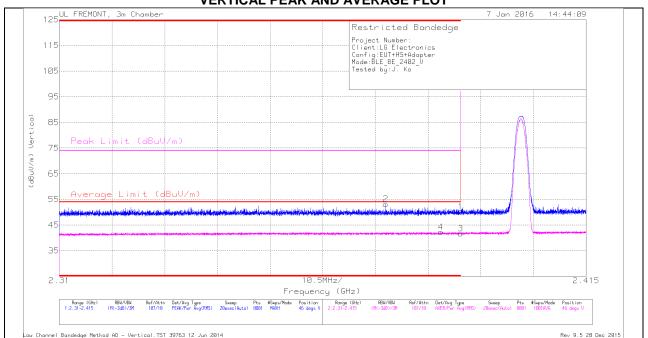
Marker	Frequency	Meter	Det	AF T119 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected	Average Limit (dBuV/m)	Margin	Peak Limit (dBuV/m)	PK Margin	Azimuth	Height	Polarity
	(GHz)	Reading					Reading		(dB)		(dB)	(Degs)	(cm)	
		(dBuV)					(dBuV/m)							
1	* 2.39	39.19	Pk	32	-22.2	0	48.99	-		74	-25.01	228	193	Н
2	* 2.385	42.77	Pk	32	-22.2	0	52.57	-		74	-21.43	228	193	Н
3	* 2.39	30.09	RMS	32	-22.2	2.04	41.93	54	-12.07	-		228	193	Н
4	* 2.387	30.69	RMS	32	-22.2	2.04	42.53	54	-11.47	-		228	193	Н

^{* -} indicates frequency in CFR15.205/IC 8.10 Restricted Band

Pk - Peak detector

RMS - RMS detection

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency	Meter	Det	AF T119 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected	Average Limit (dBuV/m)	Margin	Peak Limit (dBuV/m)	PK Margin	Azimuth	Height	Polarity
	(GHz)	Reading					Reading		(dB)		(dB)	(Degs)	(cm)	
		(dBuV)					(dBuV/m)							
1	* 2.39	40.45	Pk	32	-22.2	0	50.25	-	-	74	-23.75	46	188	V
2	* 2.375	43.43	Pk	31.9	-22.2	0	53.13	-	-	74	-20.87	46	188	V
3	* 2.39	29.82	RMS	32	-22.2	2.04	41.66	54	-12.34	-		46	188	V
4	* 2.386	30.43	RMS	32	-22.2	2.04	42.27	54	-11.73	-	-	46	188	V

^{* -} indicates frequency in CFR15.205/IC 8.10 Restricted Band

Pk - Peak detector

RMS - RMS detection

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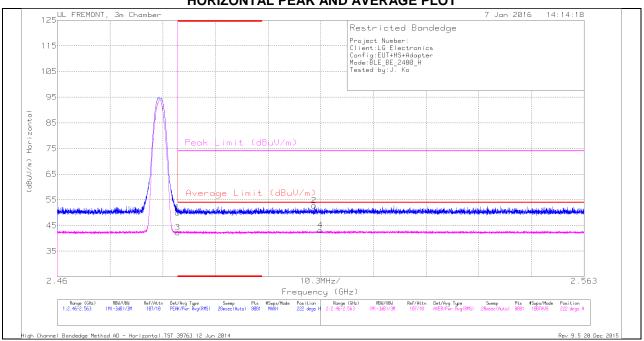
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AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

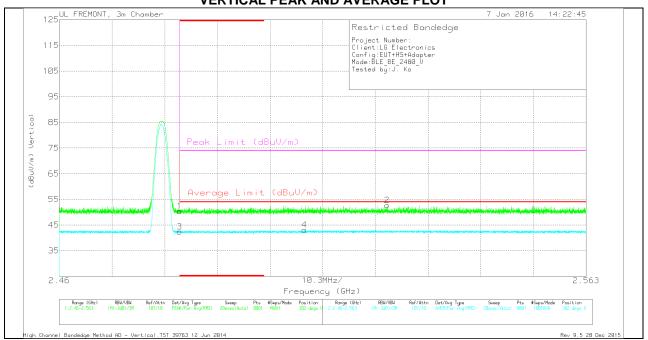
Marker	Frequency	Meter	Det	AF T119 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected	Average Limit (dBuV/m)	Margin	Peak Limit (dBuV/m)	PK Margin	Azimuth	Height	Polarity
	(GHz)	Reading					Reading		(dB)		(dB)	(Degs)	(cm)	
		(dBuV)					(dBuV/m)							
1	* 2.484	39.76	Pk	32.3	-22	0	50.06	-		74	-23.94	222	168	Н
3	* 2.484	29.96	RMS	32.3	-22	2.04	42.3	54	-11.7	-	-	222	168	Н
2	2.51	42.38	Pk	32.3	-21.9	0	52.78	-		74	-21.22	222	168	Н
4	2.511	30.7	RMS	32.3	-21.9	2.04	43.14	54	-10.86	-		222	168	Н

^{* -} indicates frequency in CFR15.205/IC 8.10 Restricted Band

Pk - Peak detector

RMS - RMS detection

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency	Meter	Det	AF T119 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected	Average Limit (dBuV/m)	Margin	Peak Limit (dBuV/m)	PK Margin	Azimuth	Height	Polarity
	(GHz)	Reading					Reading		(dB)		(dB)	(Degs)	(cm)	
		(dBuV)					(dBuV/m)							
1	* 2.484	40.16	Pk	32.3	-22	0	50.46	-		74	-23.54	302	142	V
3	* 2.484	30.03	RMS	32.3	-22	2.04	42.37	54	-11.63	-	-	302	142	V
4	2.508	30.7	RMS	32.3	-21.9	2.04	43.14	54	-10.86	-	-	302	142	V
2	2.524	42.23	Pk	32.4	-21.9	0	52.73	-		74	-21.27	302	142	V

^{* -} indicates frequency in CFR15.205/IC 8.10 Restricted Band

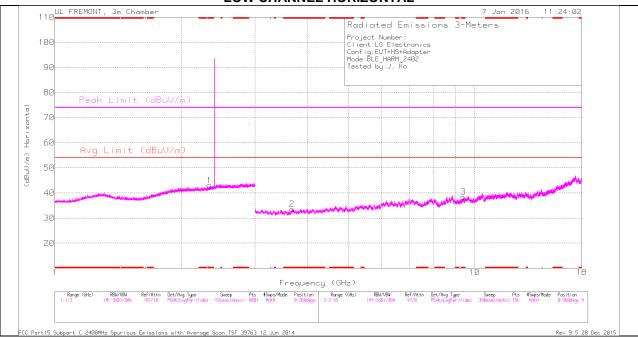
Pk - Peak detector

RMS - RMS detection

DATE: 1/27/2016

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.

REPORT NO: 16l22599-E3V2 DATE: 1/27/2016 FCC ID: ZNFUS375

LOW CHANNEL DATA

Trace Markers

Marker	Frequency	Meter	Det	AF T119 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected	Avg Limit (dBuV/m)	Margin	Peak Limit (dBuV/m)	PK Margin	Azimuth	Height	Polarity
	(GHz)	Reading					Reading		(dB)		(dB)	(Degs)	(cm)	
		(dBuV)					(dBuV/m)							
1	* 2.336	33.51	Avg	31.8	-22.3	0	43.01	54	-10.99			0-360	100	Н
4	* 2.384	33.89	Avg	32	-22.2	0	43.69	54	-10.31	-	-	0-360	100	V
2	* 3.674	30.3	Avg	33	-29.8	0	33.5	54	-20.5	-		0-360	100	Н
3	* 9.4	26.01	Avg	36.4	-24	0	38.41	54	-15.59			0-360	100	Н
5	* 8.355	26.88	Avg	35.8	-25.5	0	37.18	54	-16.82			0-360	100	V
6	* 4.948	30.5	Avg	34	-29.4	0	35.1	54	-18.9	-	-	0-360	100	V

^{* -} indicates frequency in CFR15.205/IC 8.10 Restricted Band

Avg - Video bandwidth < Resolution bandwidth

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
* 2.336	43.14	PK2	31.8	-22.3	0	52.64	-	-	74	-21.36	24	165	Н
* 2.337	30.67	MAv1	31.8	-22.3	2.04	42.21	54	-11.79	-	-	24	165	Н
* 2.383	42.71	PK2	32	-22.2	0	52.51	-	-	74	-21.49	212	121	V
* 2.383	30.65	MAv1	32	-22.2	2.04	42.49	54	-11.51	-	-	212	121	V
* 3.673	39.31	PK2	33	-29.9	0	42.41	-	-	74	-31.59	43	266	Н
* 3.673	27.15	MAv1	33	-29.9	2.04	32.29	54	-21.71	-	-	43	266	Н
* 9.399	35.13	PK2	36.4	-24	0	47.53	-	-	74	-26.47	222	111	Н
* 9.4	23.33	MAv1	36.4	-24	2.04	37.77	54	-16.23	-	-	222	111	Н
* 8.353	36.88	PK2	35.8	-25.5	0	47.18	-	-	74	-26.82	165	201	V
* 8.353	25.13	MAv1	35.8	-25.5	2.04	37.47	54	-16.53	-	-	165	201	V
* 4.948	40.12	PK2	34	-29.4	0	44.72	-	-	74	-29.28	356	115	V
* 4.946	28.29	MAv1	34	-29.4	2.04	34.93	54	-19.07	-	-	356	115	٧

^{* -} indicates frequency in CFR15.205/IC 8.10 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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.

REPORT NO: 16l22599-E3V2 DATE: 1/27/2016 FCC ID: ZNFUS375

MID CHANNEL DATA

Trace Markers

Marker	Frequency	Meter	Det	AF T119 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected	Avg Limit (dBuV/m)	Margin	Peak Limit (dBuV/m)	PK Margin	Azimuth	Height	Polarity
	(GHz)	Reading					Reading		(dB)		(dB)	(Degs)	(cm)	
		(dBuV)					(dBuV/m)							
3	* 11.238	24.81	Avg	38	-22.5	0	40.31	54	-13.69	-	-	0-360	200	Н
4	* 2.294	33.73	Avg	31.6	-22.3	0	43.03	54	-10.97	-	-	0-360	200	V
1	* 2.361	33.18	Avg	31.9	-22.3	0	42.78	54	-11.22			0-360	200	Н
2	* 3.681	30.84	Avg	33	-29.7	0	34.14	54	-19.86	-	-	0-360	200	Н
5	* 4.822	30.24	Avg	34	-29.1	0	35.14	54	-18.86	-	-	0-360	100	V
6	* 7.266	30.48	Avg	35.6	-27.7	0	38.38	54	-15.62		-	0-360	100	V

^{* -} indicates frequency in CFR15.205/IC 8.10 Restricted Band

Avg - Video bandwidth < Resolution bandwidth

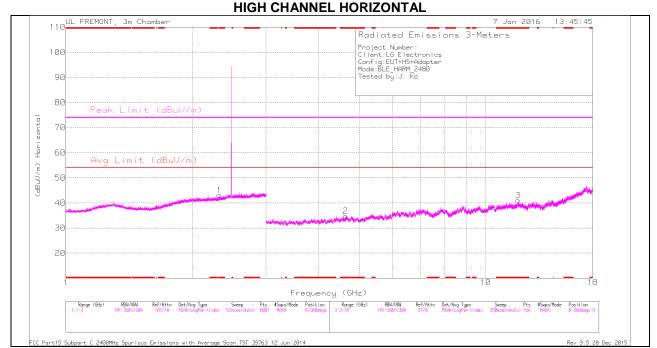
Radiated Emissions

Frequency (GHz)	Meter Reading	Det	AF T119 (dB/m)	Amp/Cbi/Fitr/ Pad (dB)	DC Corr (dB)	Corrected Reading	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
(GHZ)	(dBuV)		(ub/iii)	rau (ub)		(dBuV/m)	(ubuv/iii)	(ub)	(ubuv/iii)	(ub)	(Degs)	(ciii)	
* 2.362	42.12	PK2	31.9	-22.3	0	51.72	-	-	74	-22.28	333	254	Н
* 2.36	30.27	MAv1	31.9	-22.3	2.04	41.91	54	-12.09	-	-	333	254	Н
* 2.296	42.84	PK2	31.6	-22.3	0	52.14	-	-	74	-21.86	285	187	V
* 2.295	30.66	MAv1	31.6	-22.3	2.04	42	54	-12	-	-	285	187	V
* 3.681	39.58	PK2	33	-29.7	0	42.88	-	-	74	-31.12	102	265	Н
* 3.68	27.57	MAv1	33	-29.7	2.04	32.91	54	-21.09	-	-	102	265	Н
* 11.239	32.49	PK2	38	-22.6	0	47.89	-	-	74	-26.11	89	311	Н
* 11.24	20.71	MAv1	38	-22.6	2.04	38.15	54	-15.85	-	-	89	311	Н
* 4.822	40.02	PK2	34	-29.1	0	44.92	-	-	74	-29.08	222	116	V
* 4.823	27.77	MAv1	34	-29.1	2.04	34.71	54	-19.29	-	-	222	116	V
* 7.268	37.29	PK2	35.6	-27.7	0	45.19	-	-	74	-28.81	165	251	V
* 7.268	25.35	MAv1	35.6	-27.7	2.04	35.29	54	-18.71	-	-	165	251	V

^{* -} indicates frequency in CFR15.205/IC 8.10 Restricted Band

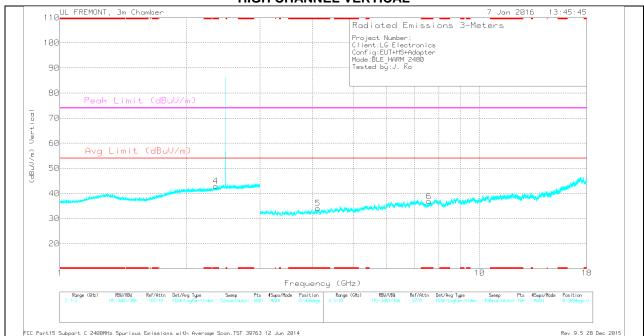
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average



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.

REPORT NO: 16l22599-E3V2 DATE: 1/27/2016 FCC ID: ZNFUS375

HIGH CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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	* 2.321	33.46	Avg	31.7	-22.2	0	42.96	54	-11.04		-	0-360	200	Н
4	* 2.351	33.41	Avg	31.8	-22.3	0	42.91	54	-11.09	-	-	0-360	100	V
2	* 4.639	30.54	Avg	33.9	-29.7	0	34.74	54	-19.26	-	-	0-360	100	Н
3	* 11.947	25.49	Avg	39.1	-23.6	0	40.99	54	-13.01	-	-	0-360	100	Н
5	* 4.116	30.69	Avg	33.3	-29.9	0	34.09	54	-19.91	-	-	0-360	200	V
6	* 7.575	27.73	Avg	35.7	-26.6	0	36.83	54	-17.17	-	-	0-360	100	V

^{* -} indicates frequency in CFR15.205/IC 8.10 Restricted Band

Avg - Video bandwidth < Resolution bandwidth

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
* 2.321	42.05	PK2	31.7	-22.2	0	51.55	-	-	74	-22.45	332	233	Н
* 2.319	30.5	MAv1	31.7	-22.2	2.04	42.04	54	-11.96	-	-	332	233	Н
* 2.349	43.28	PK2	31.8	-22.2	0	52.88	-	-	74	-21.12	212	147	V
* 2.35	30.65	MAv1	31.8	-22.2	2.04	42.29	54	-11.71	-	-	212	147	V
* 4.638	38.97	PK2	33.9	-29.7	0	43.17	-	-	74	-30.83	84	258	Н
* 4.638	26.87	MAv1	33.9	-29.7	2.04	33.11	54	-20.89	-	-	84	258	Н
* 11.948	32.59	PK2	39.1	-23.6	0	48.09	-	-	74	-25.91	173	269	Н
* 11.948	20.98	MAv1	39.1	-23.6	2.04	38.52	54	-15.48	-	-	173	269	Н
* 4.114	40.42	PK2	33.3	-29.9	0	43.82	-	-	74	-30.18	320	185	V
* 4.114	28.51	MAv1	33.3	-29.9	2.04	33.95	54	-20.05	-	-	320	185	V
* 7.576	37.36	PK2	35.7	-26.6	0	46.46	-	-	74	-27.54	231	159	V
* 7.573	25.92	MAv1	35.7	-26.6	2.04	37.06	54	-16.94	-	-	231	159	V

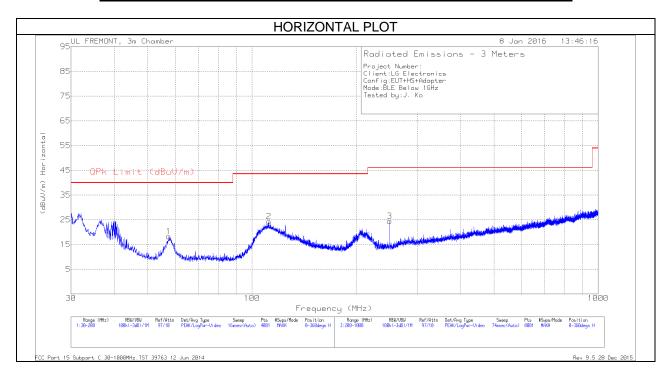
^{* -} indicates frequency in CFR15.205/IC 8.10 Restricted Band

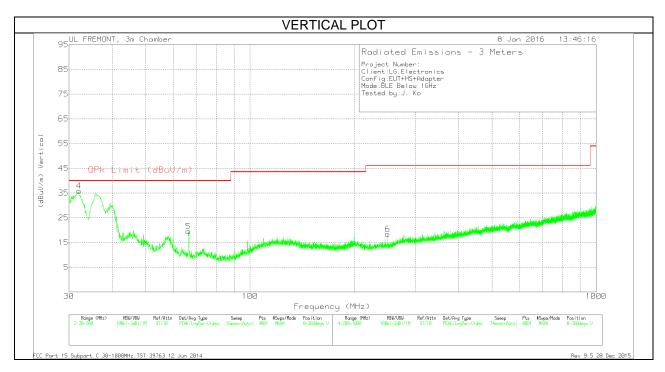
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

9.2. WORST-CASE BELOW 1 GHz

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





REPORT NO: 16l22599-E3V2 DATE: 1/27/2016 FCC ID: ZNFUS375

BELOW 1 GHz TABLE

Trace Markers

Marker	Frequency	Meter	Det	AF T185 (dB/m)	Amp/Cbl (dB)	Corrected	QPk Limit (dBuV/m)	Margin	Azimuth	Height	Polarity
	(MHz)	Reading				Reading		(dB)	(Degs)	(cm)	
		(dBuV)				(dBuV/m)					
4	32.04	42.64	Pk	20.4	-27.2	35.84	40	-4.16	0-360	100	V
1	57.4763	38	Pk	7.1	-26.9	18.2	40	-21.8	0-360	400	Н
5	66.4225	38.07	Pk	8.1	-26.7	19.47	40	-20.53	0-360	100	V
2	111.8975	37.83	Pk	12.7	-26.2	24.33	43.52	-19.19	0-360	200	Н
3	250	37.68	Pk	11.5	-24.7	24.48	46.02	-21.54	0-360	100	Н
6	250	31.57	Pk	11.5	-24.7	18.37	46.02	-27.65	0-360	100	V

^{* -} indicates frequency in CFR15.205/IC 8.10 Restricted Band

Pk - Peak detector

REPORT NO: 16l22599-E3V2 FCC ID: ZNFUS375

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

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			

DATE: 1/27/2016

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 C63.10.

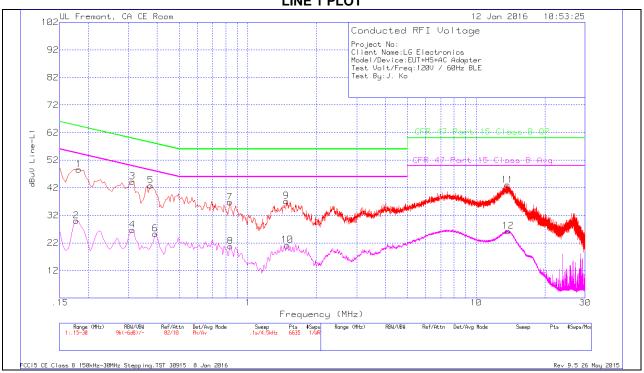
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

6 WORST EMISSIONS

LINE 1 PLOT



LINE 1 RESULT

Range 1: Line-L1 .15 - 30MHz

U										
Marker	Frequency	Meter	Det	T1310 IL	LC Cables	Corrected	CFR 47	Margin	CFR 47	Margin
	(MHz)	Reading		L1	1&3	Reading	Part 15	(dB)	Part 15	(dB)
		(dBuV)				dBuV	Class B QP		Class B	
									Avg	
1	.1815	48.63	Pk	0	0	48.63	64.42	-15.79		
2	.177	30.04	Av	0	0	30.04	-	-	54.63	-24.59
3	.312	44.23	Pk	0	0	44.23	59.92	-15.69		
4	.312	26.7	Av	0	0	26.7	-	-	49.92	-23.22
5	.375	42.78	Pk	0	0	42.78	58.39	-15.61		
6	.393	25.28	Av	0	0	25.28	-	-	48	-22.72
7	.834	36.81	Pk	0	0	36.81	56	-19.19		
8	.8385	20.79	Av	0	0	20.79	-	-	46	-25.21
9	1.473	37.05	Pk	0	.1	37.15	56	-18.85		
10	1.4865	21.08	Av	0	.1	21.18	-	-	46	-24.82
11	13.722	42.73	Pk	.1	.2	43.03	60	-16.97		
12	13.7895	26	Av	.1	.2	26.3	-	-	50	-23.7

Pk - Peak detector Av - Average detection

LINE 2 PLOT



LINE 2 RESULT

Range 2: Line-L2 .15 - 30MHz

U										
Marker	Frequency	Meter	Det	T1310 IL	LC Cables	Corrected	CFR 47	Margin	CFR 47	Margin
	(MHz)	Reading		L2	2&3	Reading	Part 15	(dB)	Part 15	(dB)
		(dBuV)				dBuV	Class B QP		Class B	
									Avg	
13	.177	42.92	Pk	0	0	42.92	64.63	-21.71		
14	.177	30.66	Av	0	0	30.66	-	-	54.63	-23.97
15	.366	40.99	Pk	0	0	40.99	58.59	-17.6		
16	.3525	33.32	Av	0	0	33.32	-	-	48.9	-15.58
17	.411	38.99	Pk	0	0	38.99	57.63	-18.64		
18	.402	22.73	Av	0	0	22.73	-	-	47.81	-25.08
19	.726	35.03	Pk	0	0	35.03	56	-20.97		
20	.7305	21.65	Av	0	0	21.65	-	-	46	-24.35
21	1.077	34.58	Pk	0	.1	34.68	56	-21.32		
22	1.068	20.69	Av	0	.1	20.79	-	-	46	-25.21
23	4.8615	36.25	Pk	0	.1	36.35	56	-19.65		
24	4.8615	21.76	Av	0	.1	21.86	-	-	46	-24.14

Pk - Peak detector

Av - Average detection