



FCC 47 CFR PART 15 SUBPART C
BLUETOOTH LOW ENERGY
CERTIFICATION TEST REPORT
FOR
GSM/WCDMA/LTE PHONE + BLUETOOTH & 2.4GHz DTS b/g/n

MODEL NUMBER: LG-L33L, LGL33L, L33L

FCC ID: ZNFL33L

REPORT NUMBER: 14I19561-E3

ISSUE DATE: JANUARY 2, 2015

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

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



NVLAP LAB CODE 200065-0

Revision History

Rev.	Date	Revisions	Revised By
--	01/02/15	Initial Issue	D. Corona

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	4
2. TEST METHODOLOGY	5
3. FACILITIES AND ACCREDITATION	5
4. CALIBRATION AND UNCERTAINTY	5
4.1. <i>MEASURING INSTRUMENT CALIBRATION</i>	<i>5</i>
4.2. <i>SAMPLE CALCULATION</i>	<i>5</i>
4.3. <i>MEASUREMENT UNCERTAINTY.....</i>	<i>6</i>
5. EQUIPMENT UNDER TEST	7
5.1. <i>DESCRIPTION OF EUT</i>	<i>7</i>
5.2. <i>MAXIMUM OUTPUT POWER.....</i>	<i>7</i>
5.3. <i>DESCRIPTION OF AVAILABLE ANTENNAS</i>	<i>7</i>
5.4. <i>WORST-CASE CONFIGURATION AND MODE.....</i>	<i>8</i>
5.5. <i>DESCRIPTION OF TEST SETUP.....</i>	<i>9</i>
6. TEST AND MEASUREMENT EQUIPMENT	11
7. SUMMARY	12
8. ANTENNA PORT TEST RESULTS	13
8.1. <i>6 dB BANDWIDTH.....</i>	<i>13</i>
8.2. <i>99% BANDWIDTH.....</i>	<i>17</i>
8.3. <i>OUTPUT POWER.....</i>	<i>21</i>
8.4. <i>AVERAGE POWER.....</i>	<i>25</i>
8.5. <i>POWER SPECTRAL DENSITY</i>	<i>26</i>
8.6. <i>CONDUCTED SPURIOUS EMISSIONS.....</i>	<i>30</i>
9. RADIATED TEST RESULTS.....	37
9.1. <i>LIMITS AND PROCEDURE</i>	<i>37</i>
9.2. <i>TRANSMITTER ABOVE 1 GHz.....</i>	<i>38</i>
9.3. <i>WORST-CASE BELOW 1 GHz.....</i>	<i>51</i>
10. AC POWER LINE CONDUCTED EMISSIONS	53
11. SETUP PHOTOS	58

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LG ELECTRONICS MOBILECOMM U.S.A., INC
EUT DESCRIPTION: GSM/WCDMA/LTE PHONE + BLUETOOTH & 2.4GHz DTS b/g/n
MODEL: LG-L33L, LGL33L, L33L
SERIAL NUMBER: 1HRKA (CONDUCTED), 1HRK9 (RADIATED)
DATE TESTED: DECEMBER 12-31, 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.

Approved & Released For
UL Verification Services Inc. By:



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

Tested By:



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

2. TEST METHODOLOGY

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

3. FACILITIES AND ACCREDITATION

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

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE PHONE + BLUETOOTH & 2.4GHz DTS b/g/n

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402-2480	BLE	-0.42	0.91

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a FPCB antenna, with a maximum gain of 2.9dBi.

5.4. WORST-CASE CONFIGURATION AND MODE

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

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

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG	MCS-01WR	RD4X0891946	N/A
Earphone	LG	LG-L33L	N/A	N/A

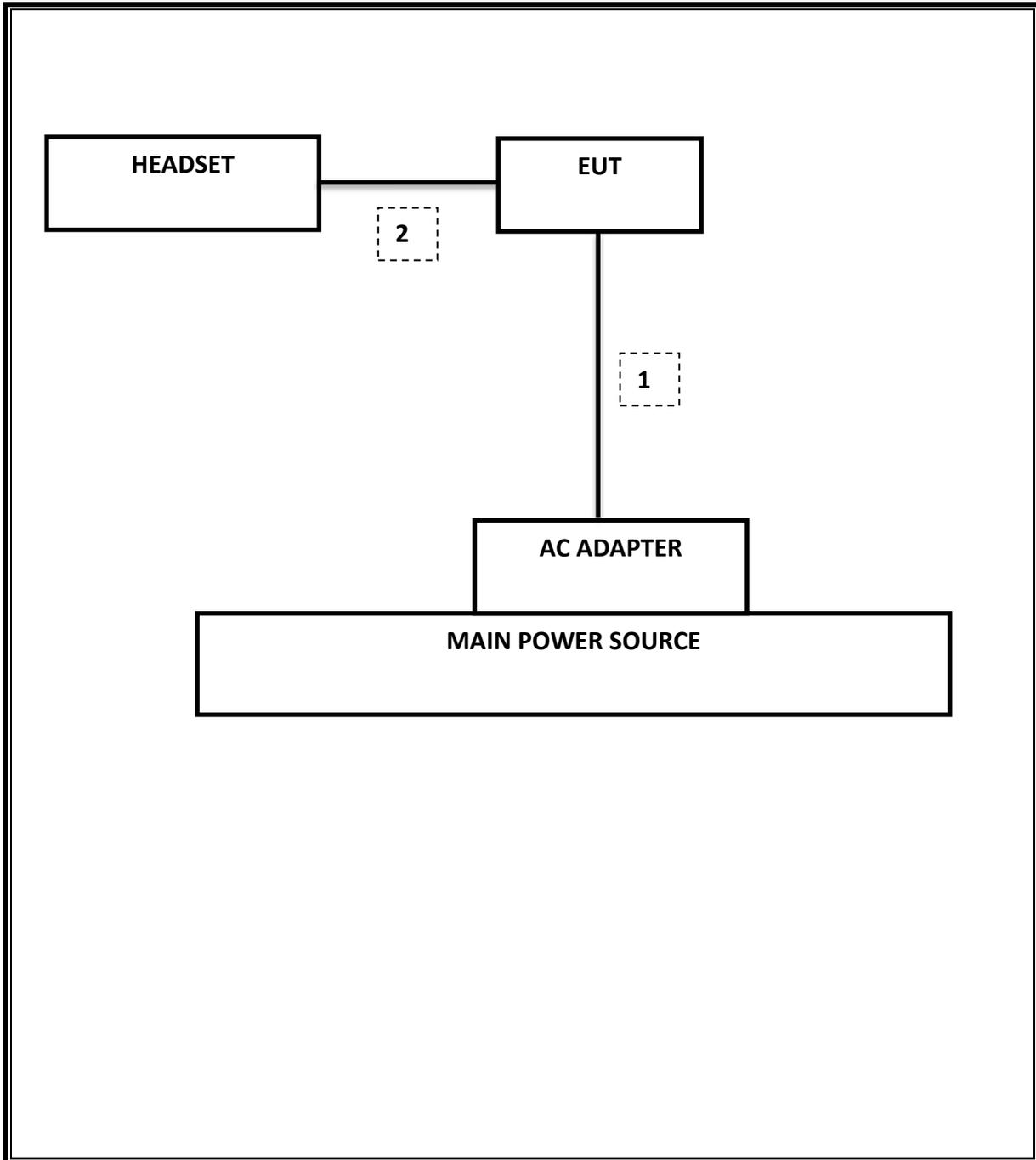
I/O CABLES

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

TEST SETUP

EUT was set in the Hidden menu mode to enable BLE communications.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	Manufacturer	Model	Asset	Cal Due
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	02/13/15
Antenna, Horn, 18GHz	EMCO	3115	C00783	10/25/15
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	11/14/15
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	01/28/15
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	10/22/15
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/15
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/15
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/15
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/15
Reject Filter, 2.4GHz	Micro-Tronics	BRM50702	N02684	CNR
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/15
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/15

7. SUMMARY

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	0.6645 MHz
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-55.01 dBm
15.247	RSS-210 A8.4	TX conducted output power	<30dBm		Pass	-0.423 dBm
15.247	RSS-210 A8.2	PSD	<8dBm		Pass	-15.866 dBm
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	50.62 dBuV(QP)
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	43.02 dBuV/m

8. ANTENNA PORT TEST RESULTS

8.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

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

TEST PROCEDURE

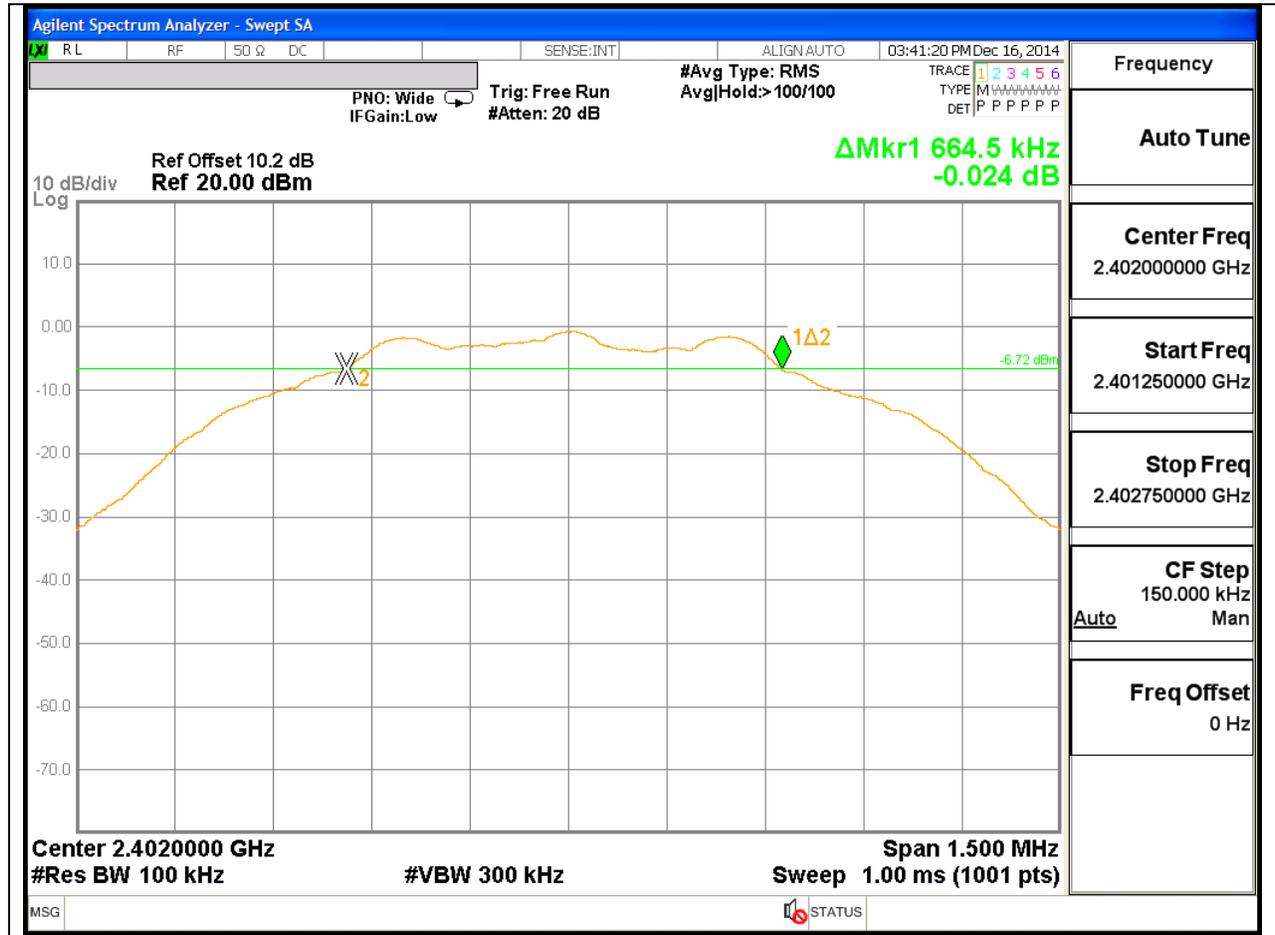
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

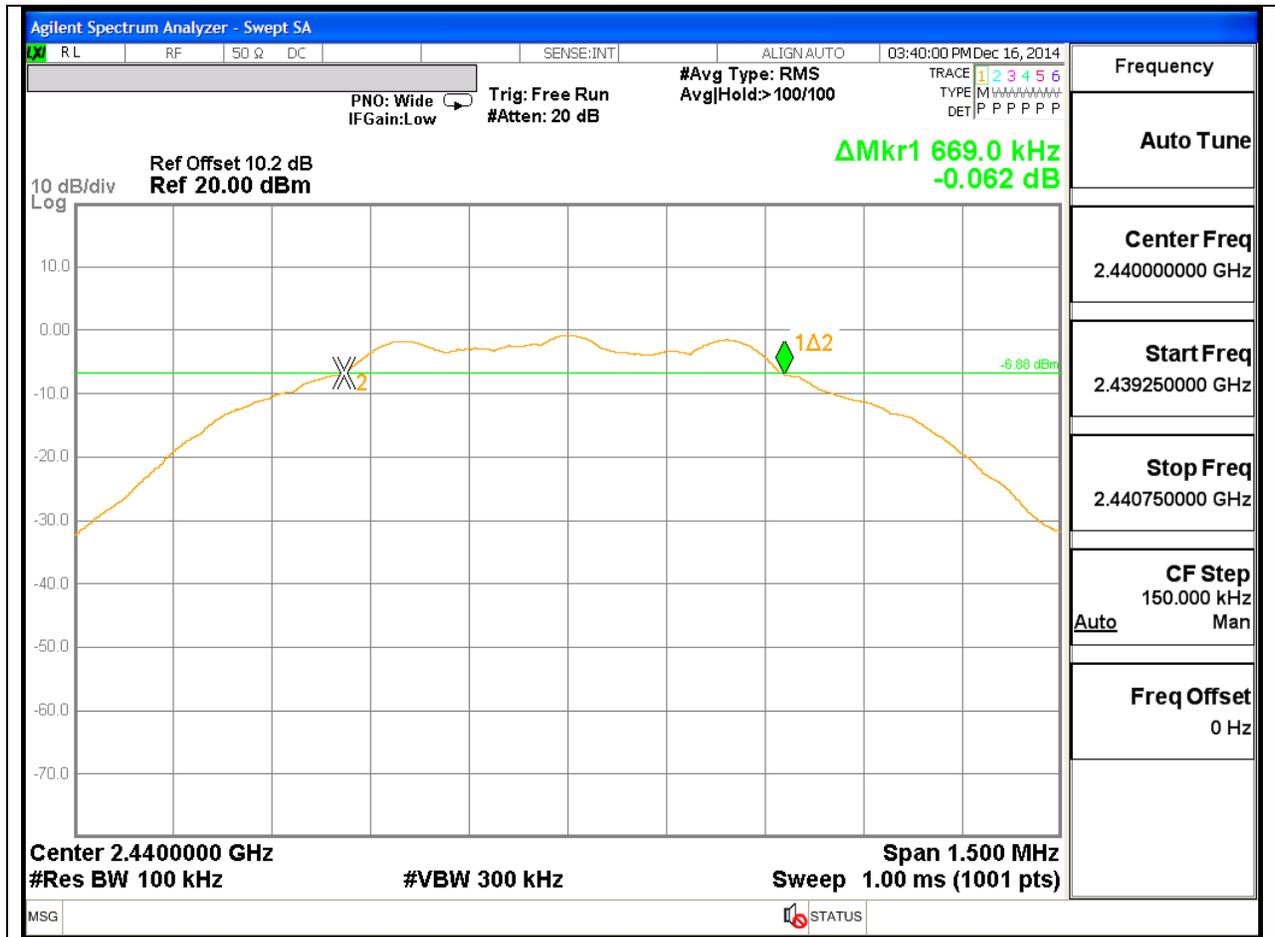
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.6645	0.5
Middle	2440	0.6690	0.5
High	2480	0.6705	0.5

6 dB BANDWIDTH PLOTS

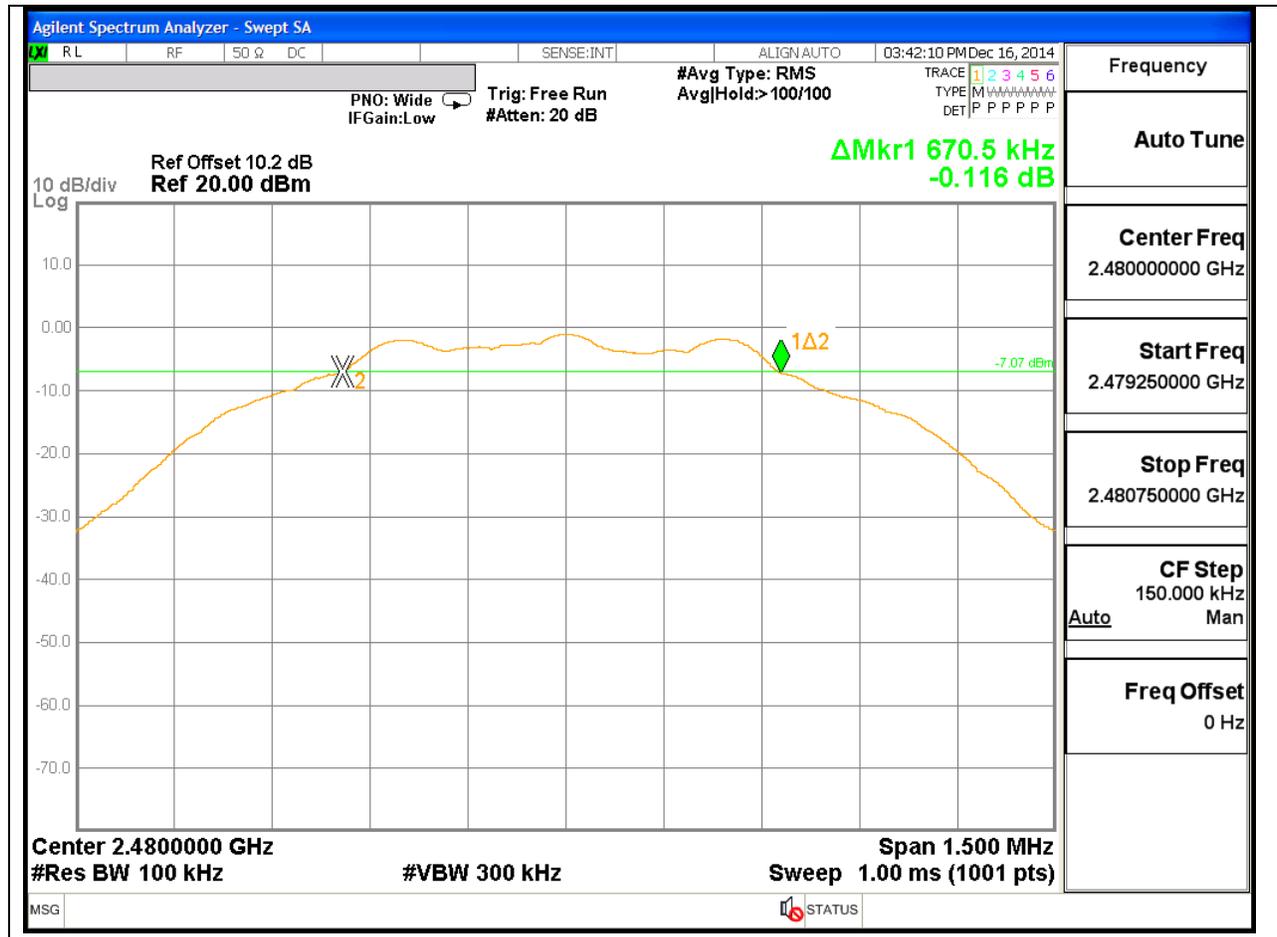
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

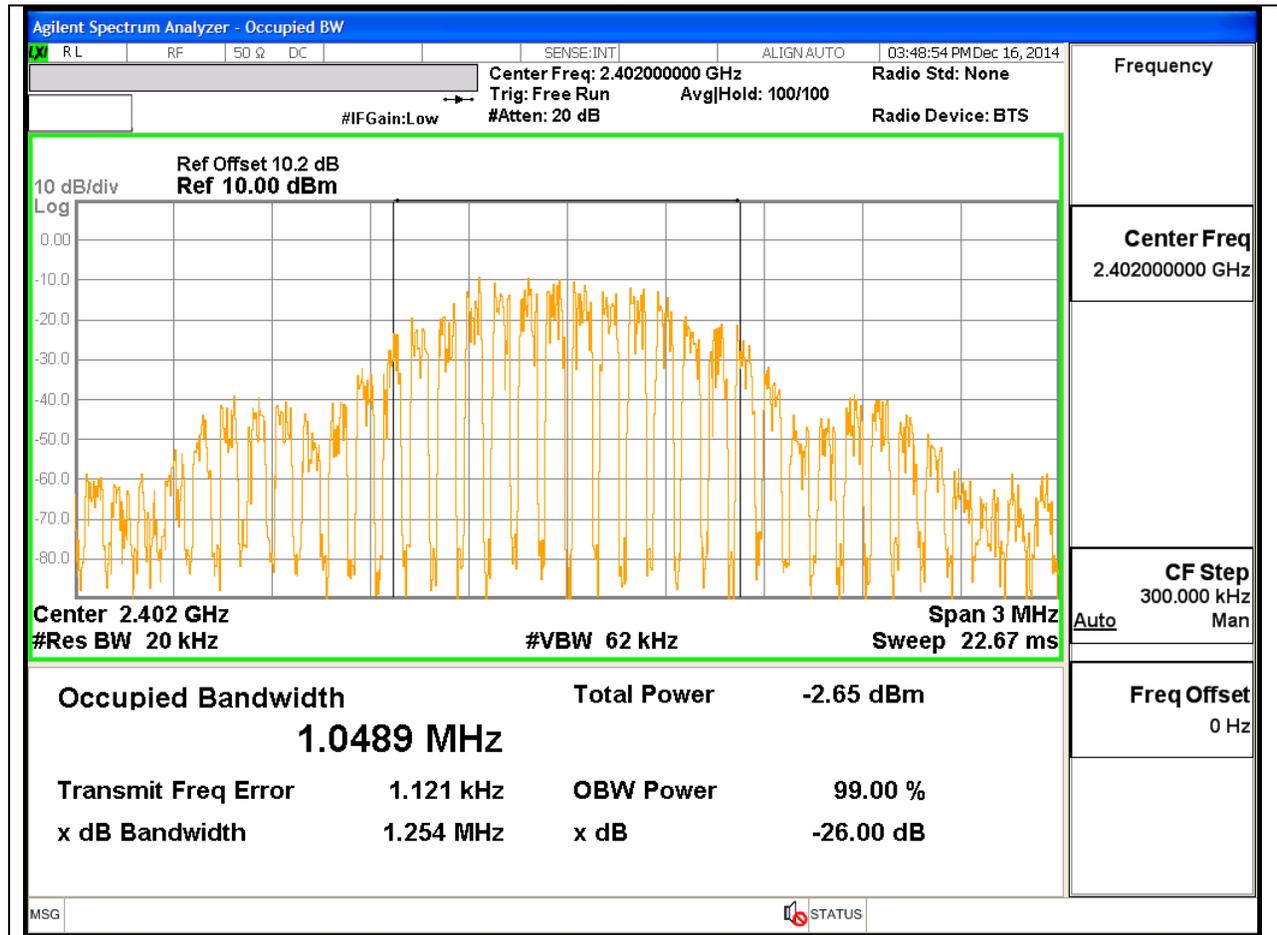
Reference to KDB558074 D01 DTS Meas Guidance v03r01: The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

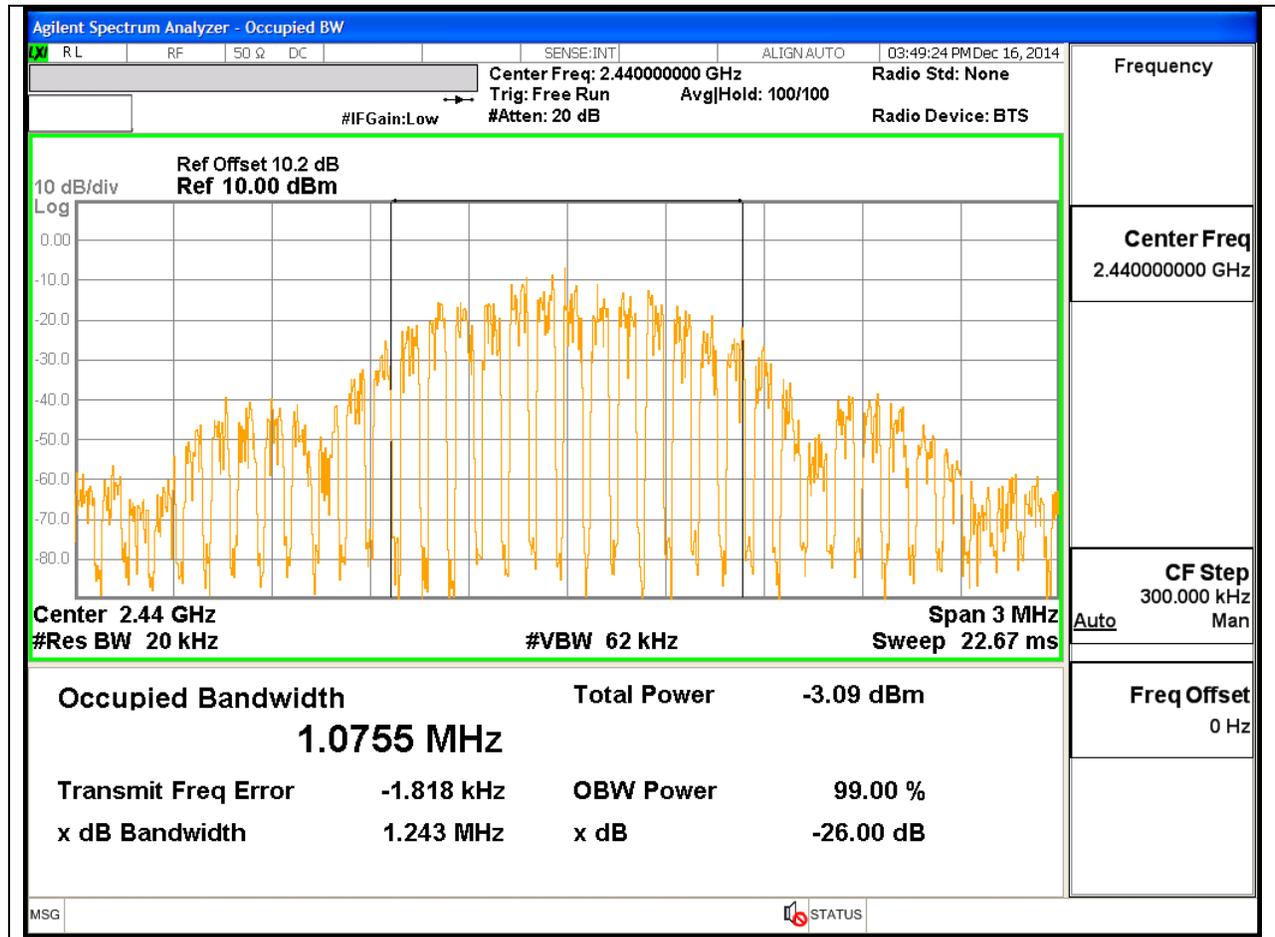
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0489
Middle	2440	1.0755
High	2480	1.0530

99% BANDWIDTH PLOTS

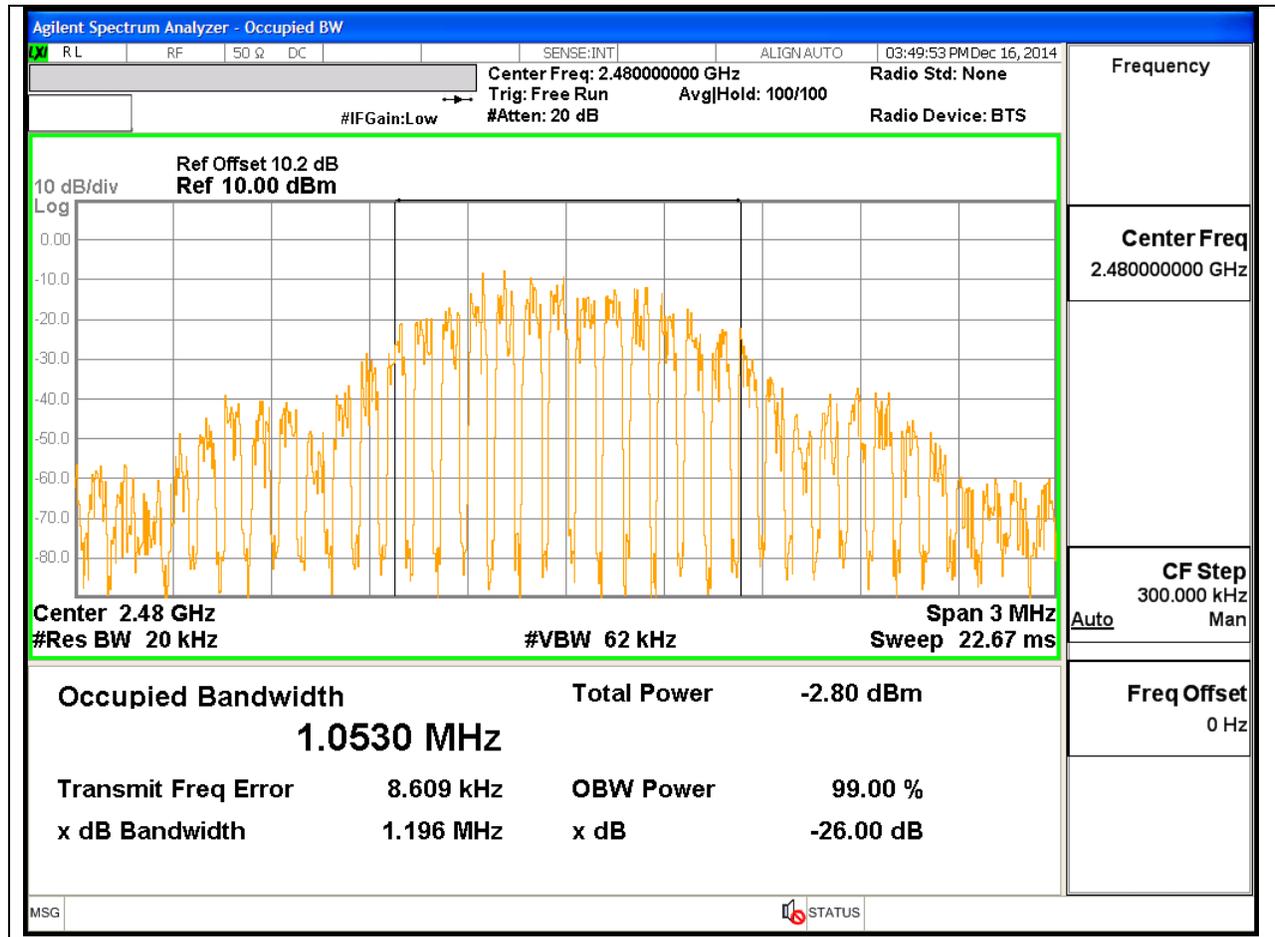
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8.3. 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

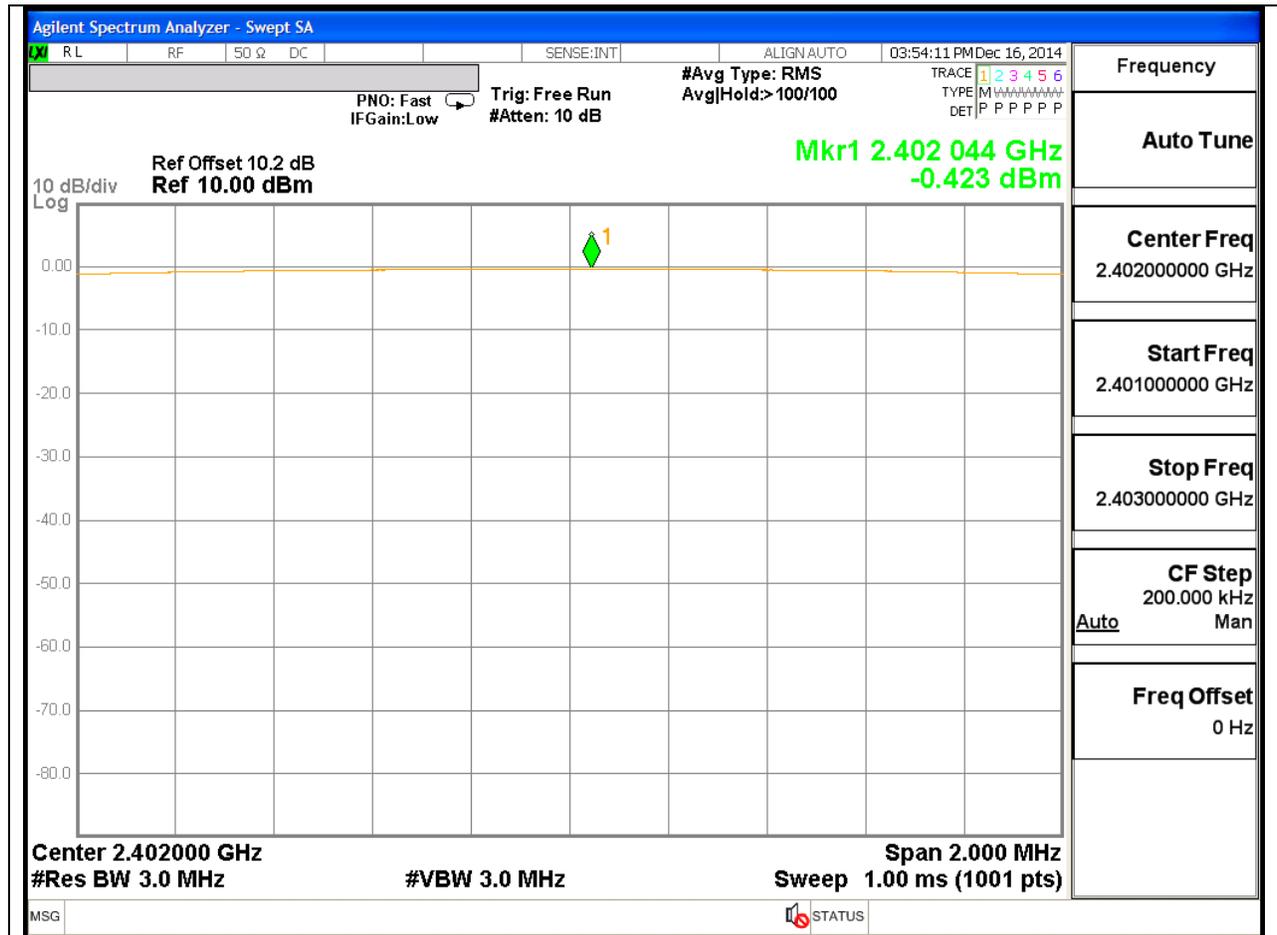
Peak power is measured using KDB558074 D01 DTS Meas Guidance v03r01 April 9, 2013 under section 9.1.1 utilizing spectrum analyzer.

RESULTS

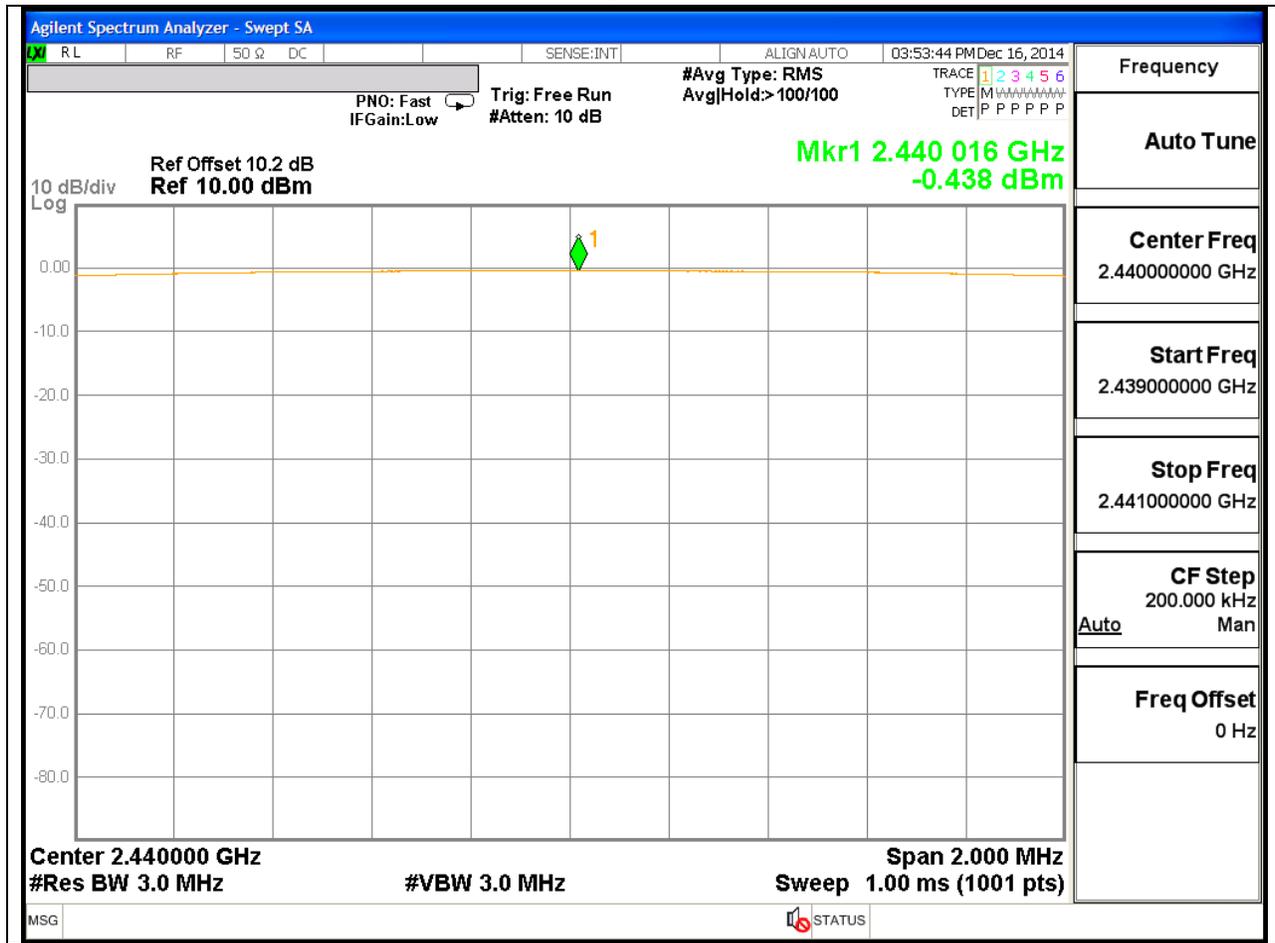
Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-0.423	30	-30.423
Middle	2440	-0.438	30	-30.438
High	2480	-0.620	30	-30.620

OUTPUT POWER PLOTS

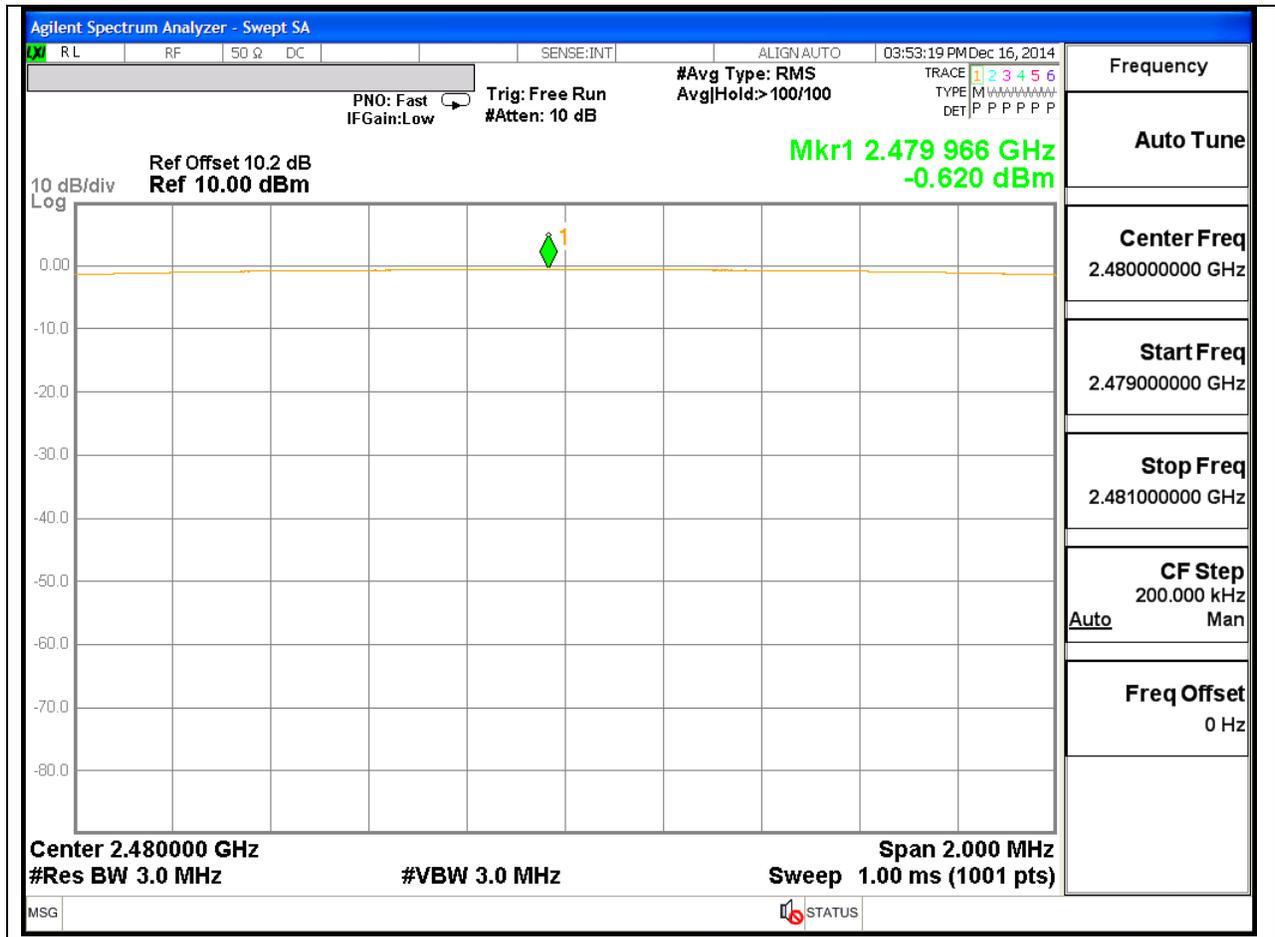
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8.4. 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 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	-0.96
Middle	2440	-0.94
High	2480	-0.94

8.5. 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.

TEST PROCEDURE

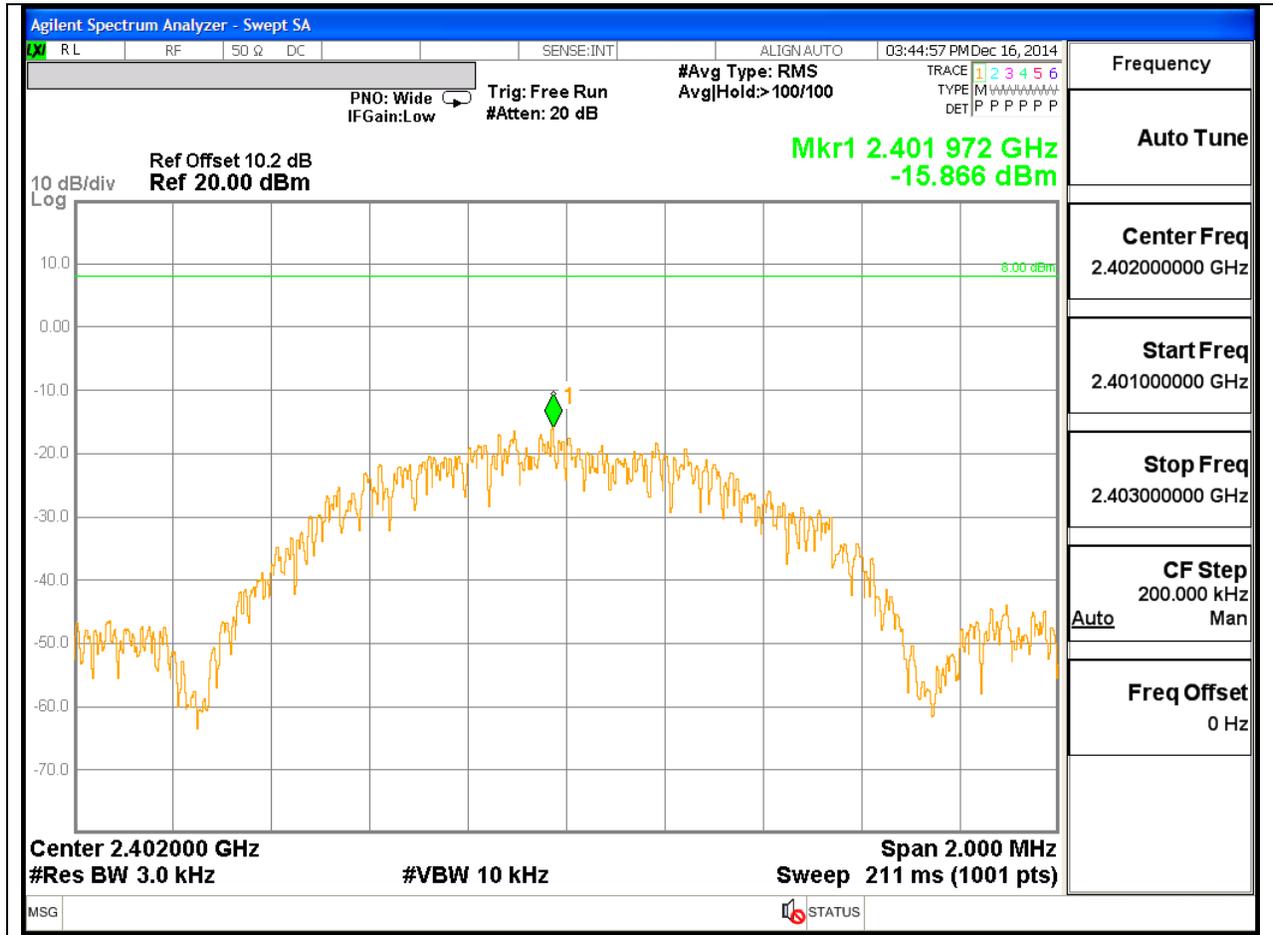
Power Spectral Density was performed utilizing the "Method PKPSD (Peak PSD)" under KDB558074 D01 DTS Meas Guidance v03r01, April 9, 2013

RESULTS

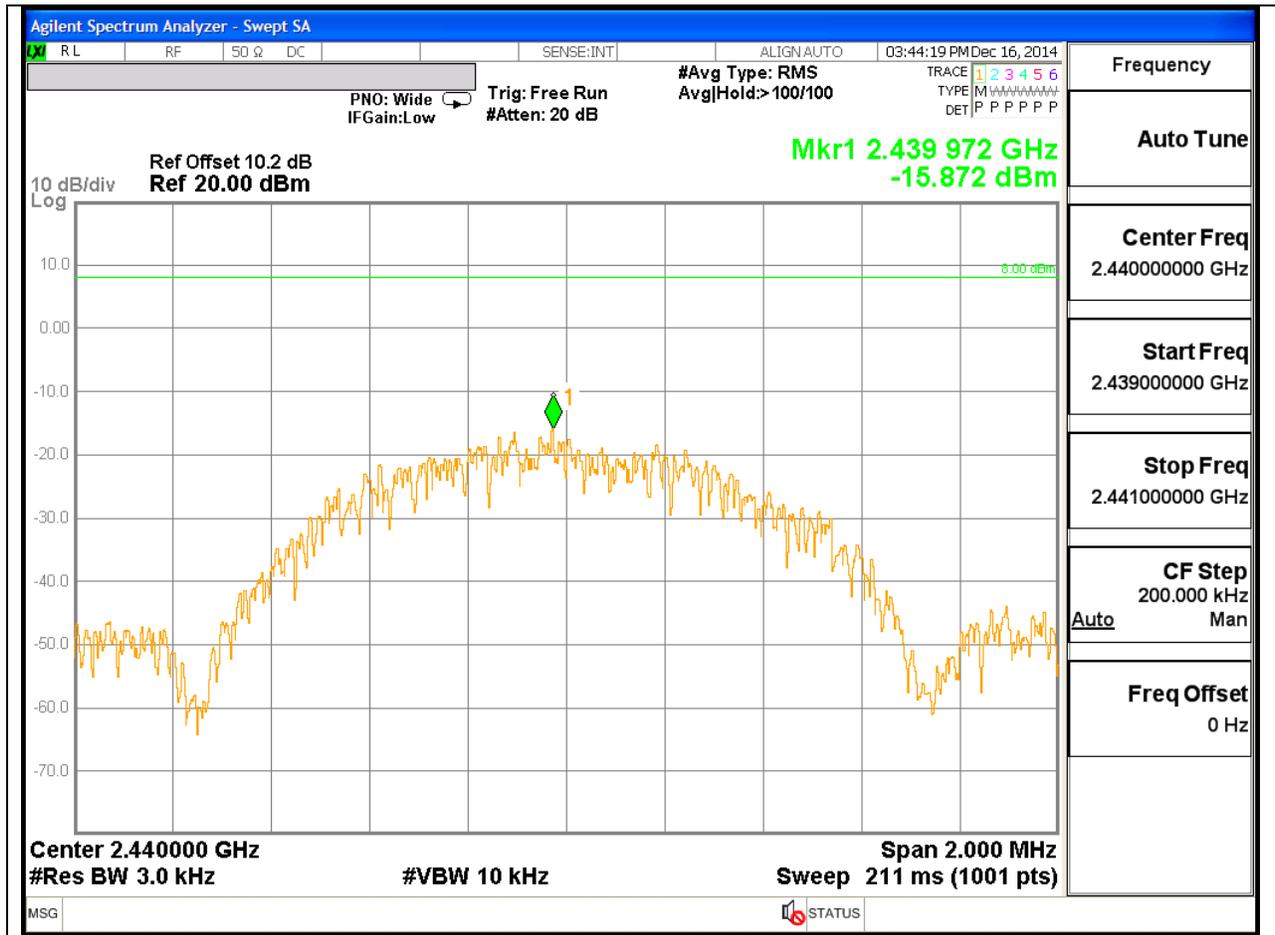
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-15.866	8	-23.87
Middle	2440	-15.872	8	-23.87
High	2480	-16.027	8	-24.03

POWER SPECTRAL DENSITY PLOTS

LOW CHANNEL



MID CHANNEL



8.6. 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 20dB.

TEST PROCEDURE

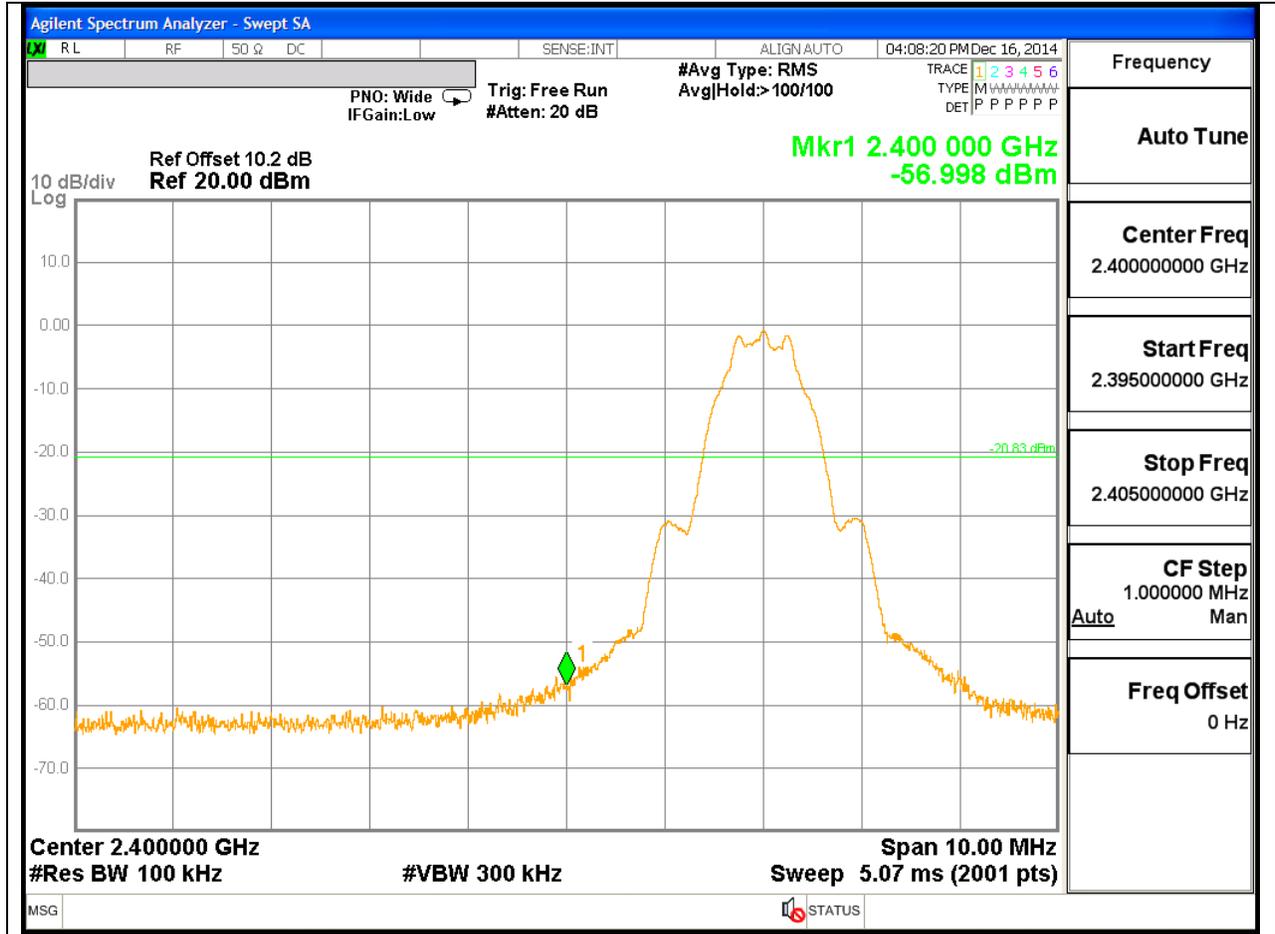
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

RESULTS

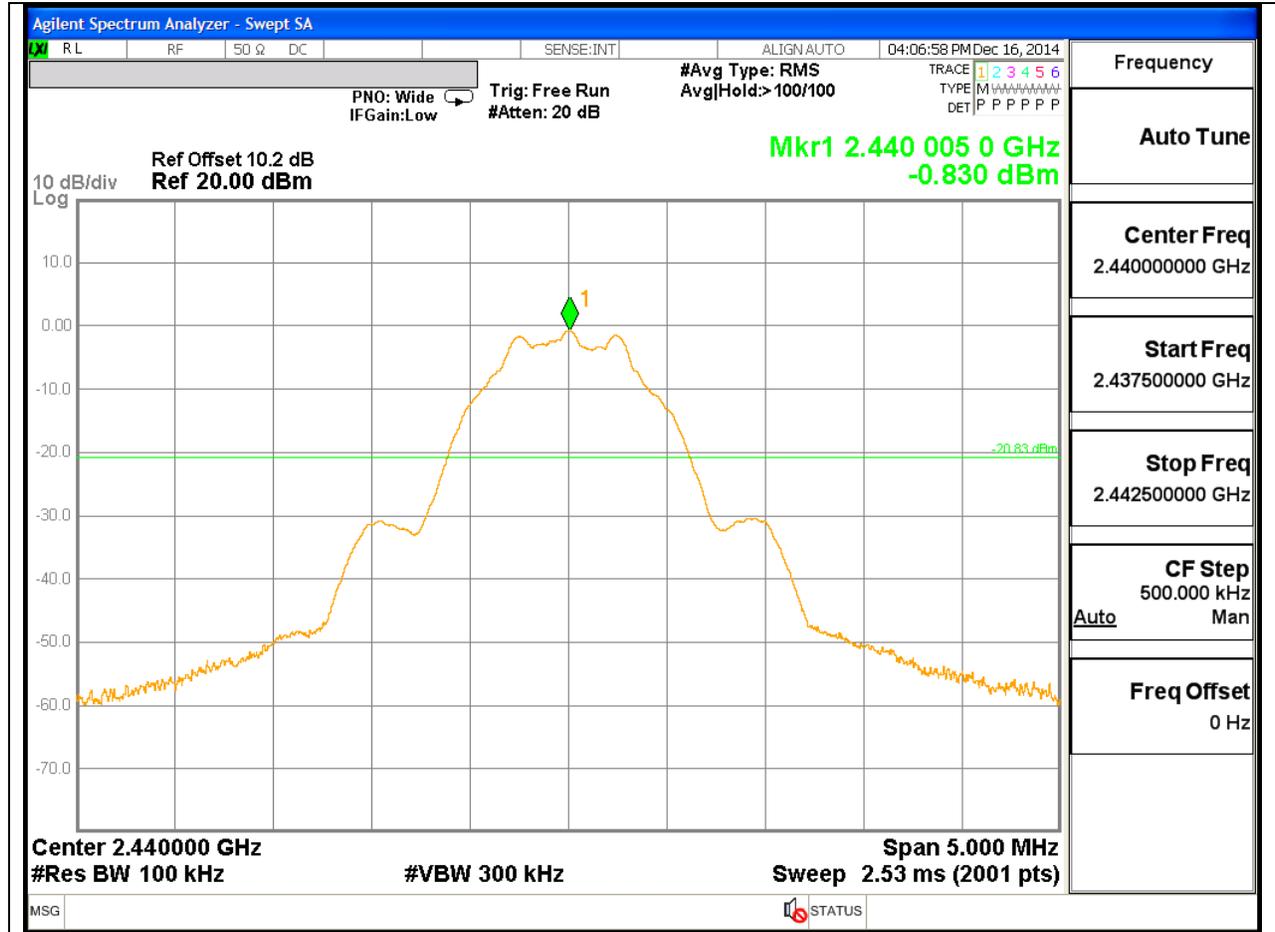
SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE



SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL REFERENCE



9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE LIMITS

FCC §15.205 and §15.209

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

TEST PROCEDURE

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

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

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor = $10 \log (1/x)$. For this sample: DCF = $10 \log (1/0.625) = 2.04 \text{ dB}$ (Spectrum Analyzer round it down to 2.04dB)

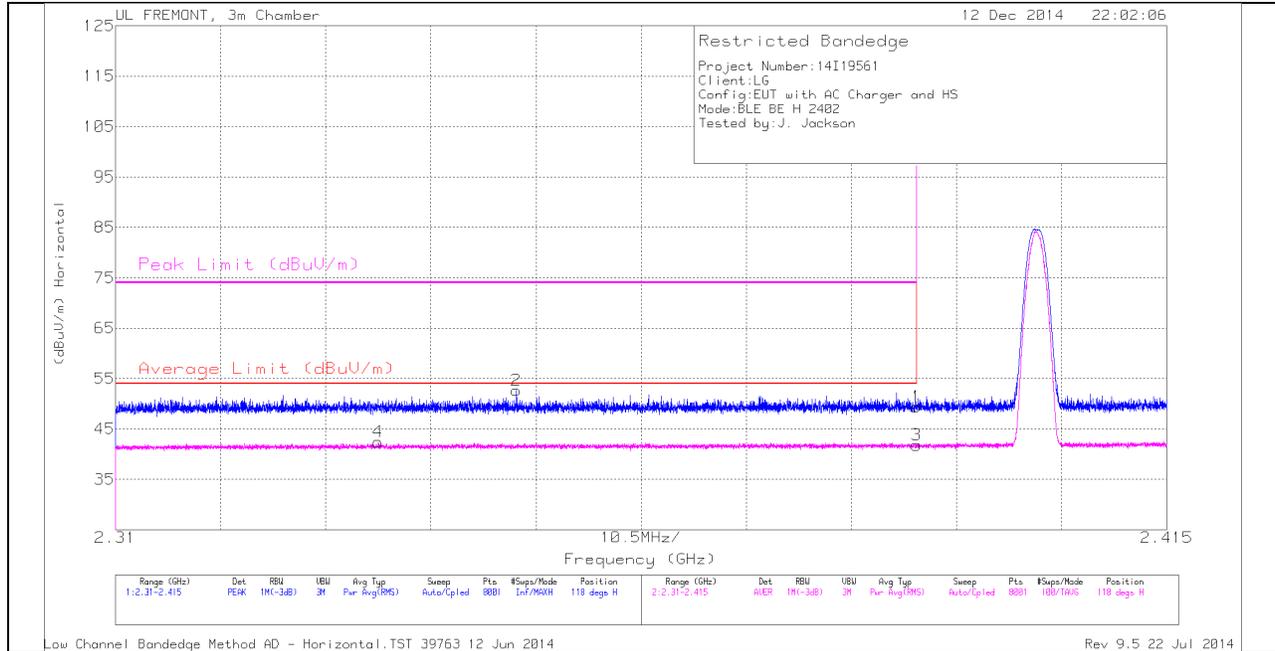
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The 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.

9.2. TRANSMITTER ABOVE 1 GHz RESTRICTED BANDEDGE (LOW CHANNEL)

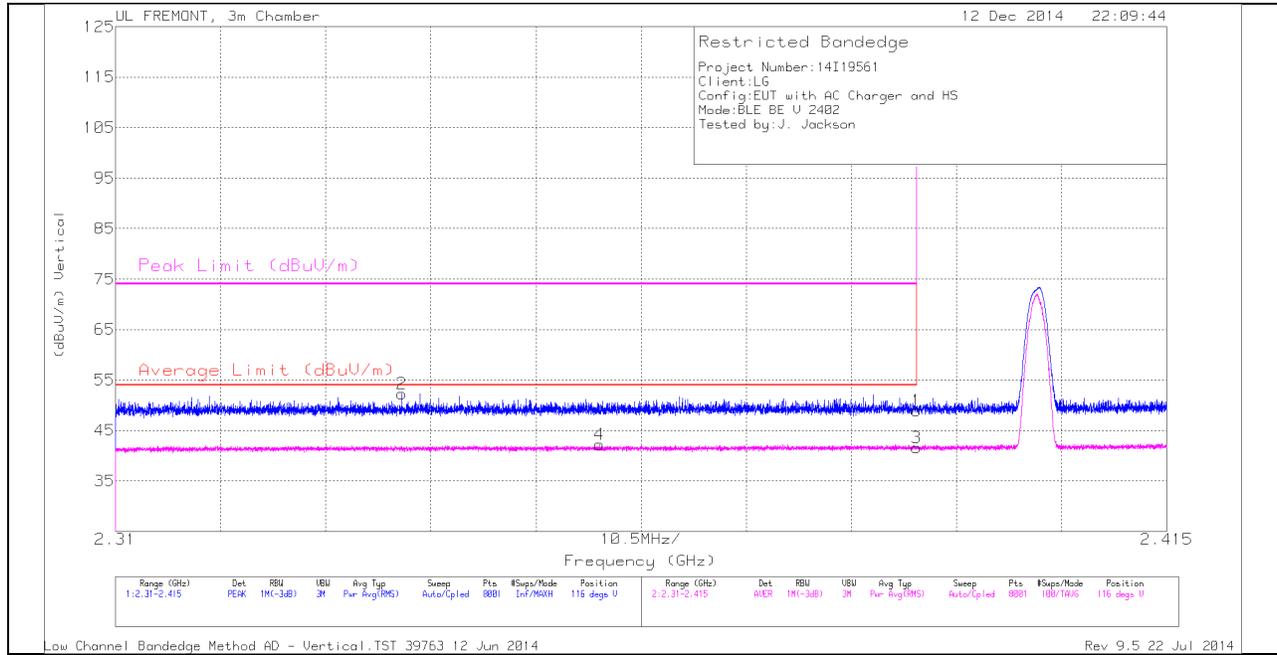
HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cb/Fitter/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	2.336	31.57	RMS	31.9	-23.1	2.04	42.41	54	-11.59	-	-	118	159	H
2	2.35	43.84	PK	32	-23.2	0	52.64	-	-	74	-21.36	118	159	H
1	2.39	40.47	PK	32.1	-23.1	0	49.47	-	-	74	-24.53	118	159	H
3	2.39	30.75	RMS	32.1	-23.1	2.04	41.79	54	-12.21	-	-	118	159	H

VERTICAL PEAK AND AVERAGE PLOT

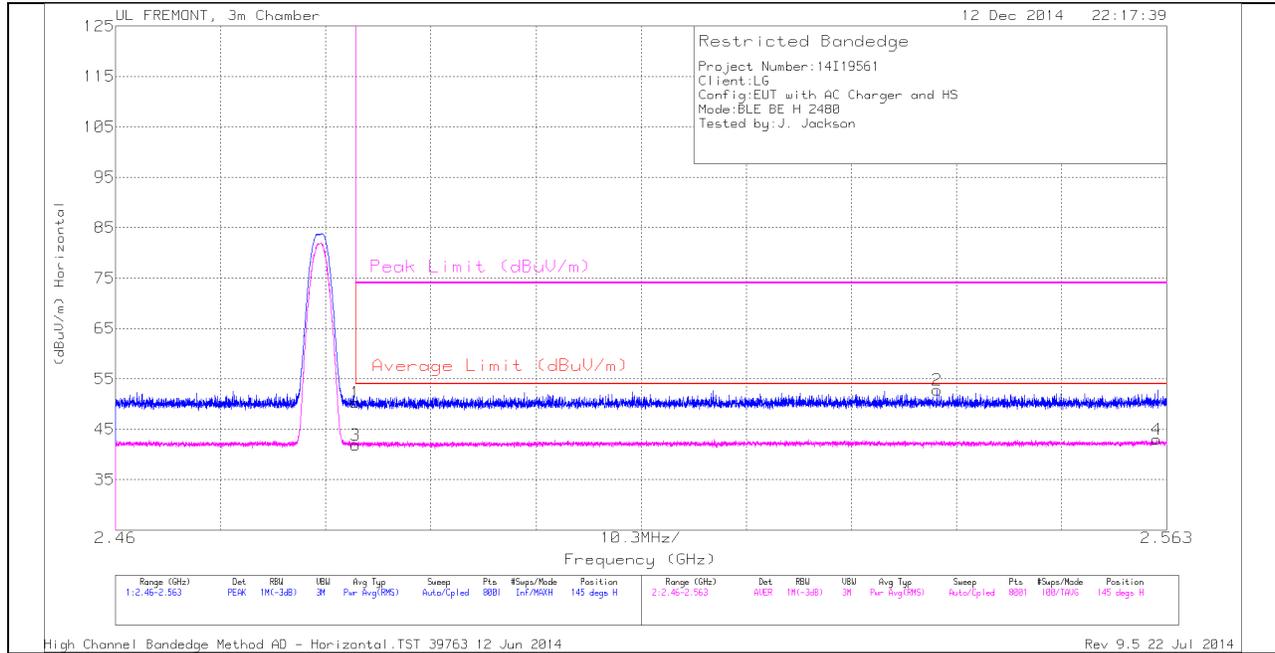


VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cb/Fitter/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.339	43.46	PK	31.9	-23.1	0	52.26	-	-	74	-21.74	116	120	V
4	2.358	31.28	RMS	32	-23.1	2.04	42.22	54	-11.78	-	-	116	120	V
1	2.39	39.89	PK	32.1	-23.1	0	48.89	-	-	74	-25.11	116	120	V
3	2.39	30.61	RMS	32.1	-23.1	2.04	41.65	54	-12.35	-	-	116	120	V

RESTRICTED BANDEDGE (HIGH CHANNEL)

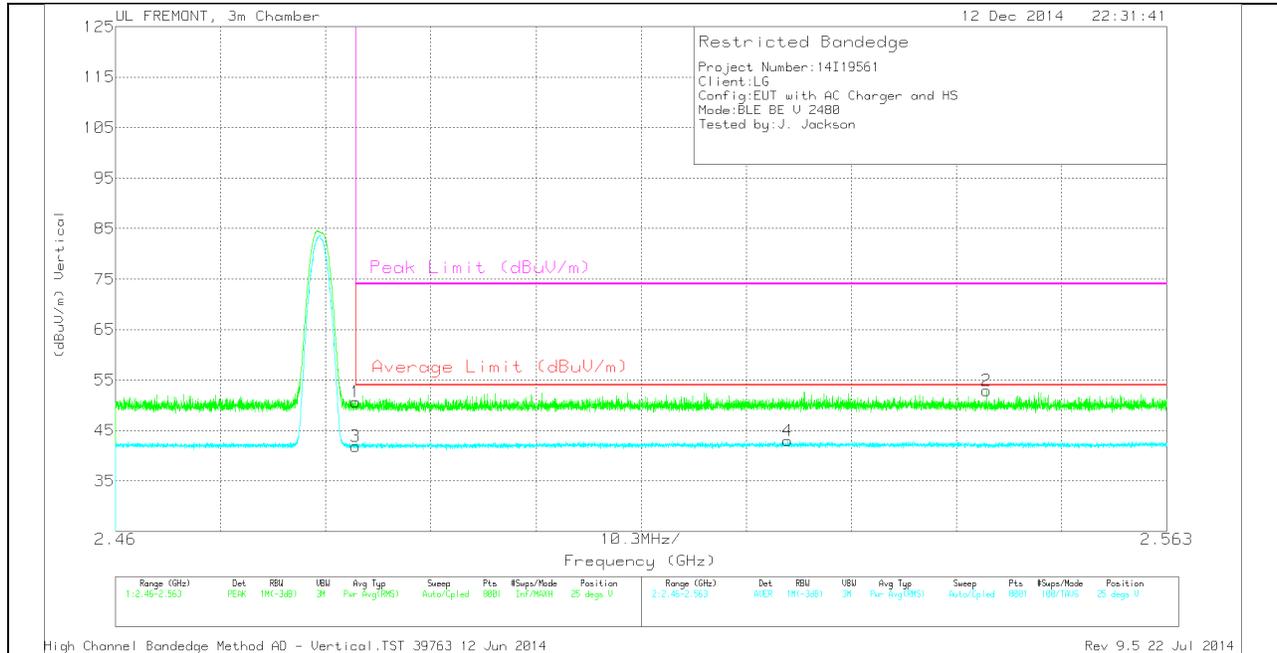
HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cb/Fitter/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.484	40.74	PK	32.3	-22.8	0	50.24	-	-	74	-23.76	145	195	H
3	2.484	30.3	RMS	32.3	-22.8	2.04	41.84	54	-12.16	-	-	145	195	H
2	2.541	42.92	PK	32.4	-22.6	0	52.72	-	-	74	-21.28	145	195	H
4	2.562	31.23	RMS	32.4	-22.7	2.04	42.97	54	-11.03	-	-	145	195	H

VERTICAL PEAK AND AVERAGE PLOT

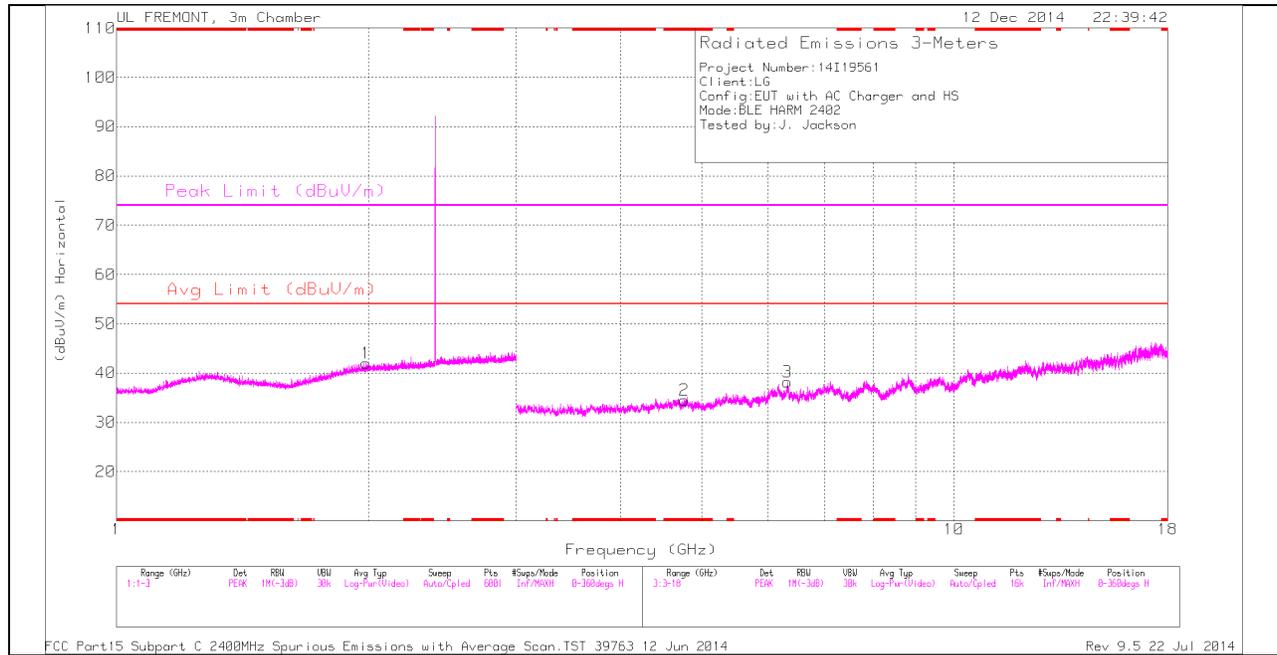


VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cb/Fit r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.484	41.14	PK	32.3	-22.8	0	50.64	-	-	74	-23.36	25	268	V
3	2.484	30.34	RMS	32.3	-22.8	2.04	41.88	54	-12.12	-	-	25	268	V
4	2.526	31.28	RMS	32.4	-22.7	2.04	43.02	54	-10.98	-	-	25	268	V
2	2.545	43.23	PK	32.4	-22.7	0	52.93	-	-	74	-21.07	25	268	V

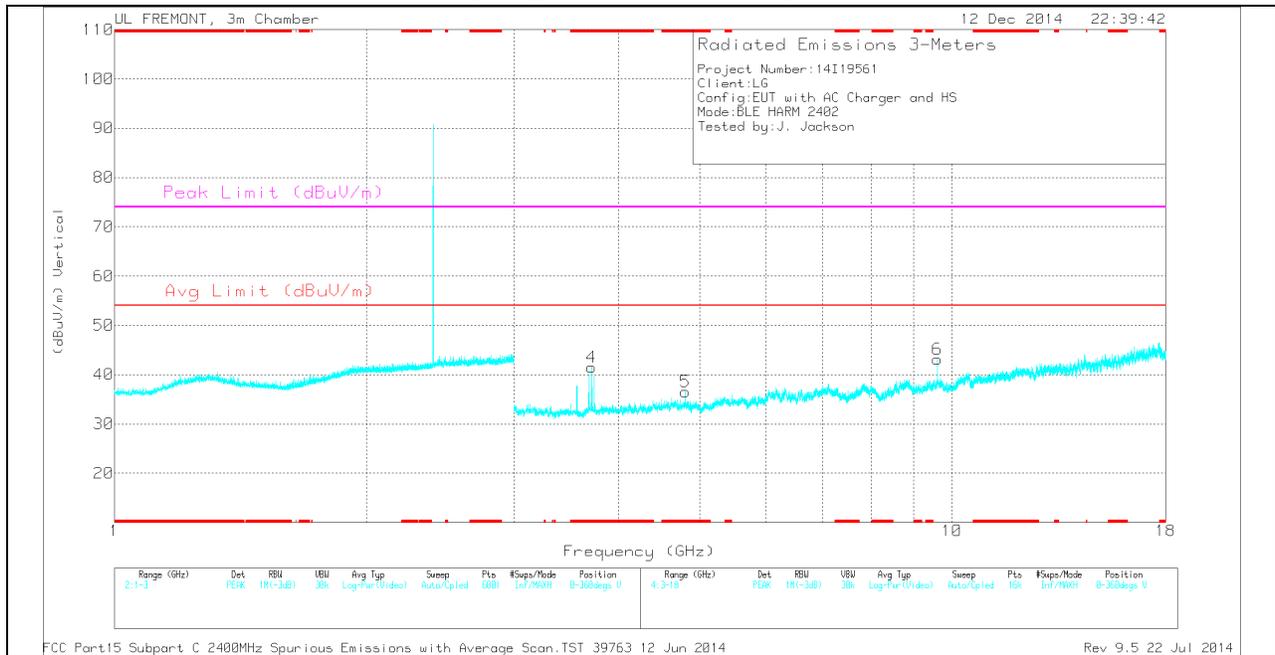
HARMONICS AND SPURIOUS EMISSIONS

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 T119 (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
2	* 4.764	31.44	PK	34.1	-31	0	34.54	-	-	74	-39.46	0-360	200	H
4	* 3.715	39.3	PK	33.2	-31	0	41.5	-	-	74	-32.5	0-360	100	V
5	* 4.804	32.75	PK	34.1	-30.3	0	36.55	-	-	74	-37.45	0-360	200	V
1	1.987	33.59	PK	31.6	-23.2	0	41.99	-	-	-	-	0-360	200	H
3	6.321	32.1	PK	35.4	-29.3	0	38.2	-	-	-	-	0-360	100	H
6	9.608	31.79	PK	36.7	-25.3	0	43.19	-	-	-	-	0-360	100	V

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

PK - Peak detector

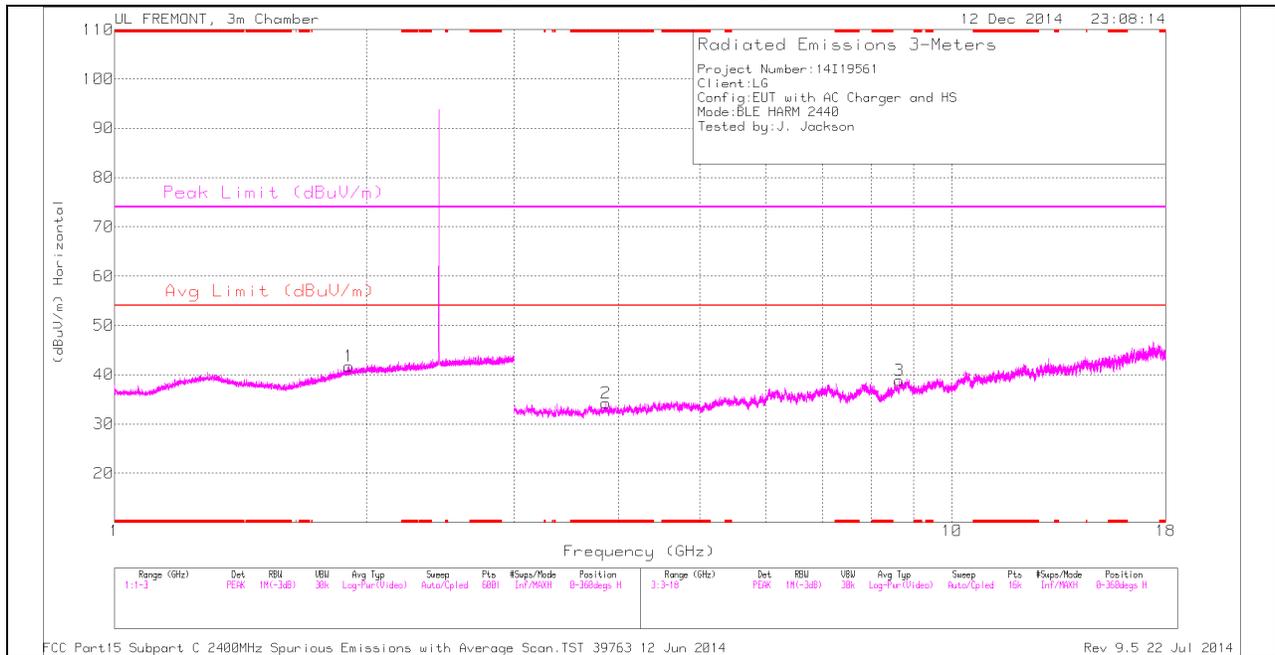
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
* 4.767	40.66	PK2	34.1	-30.9	0	43.86	-	-	74	-30.14	25	102	H
* 3.715	41	PK2	33.2	-31	0	43.2	-	-	74	-30.8	198	100	V
* 4.805	40.45	PK2	34.1	-30.4	0	44.15	-	-	74	-29.85	241	200	V

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

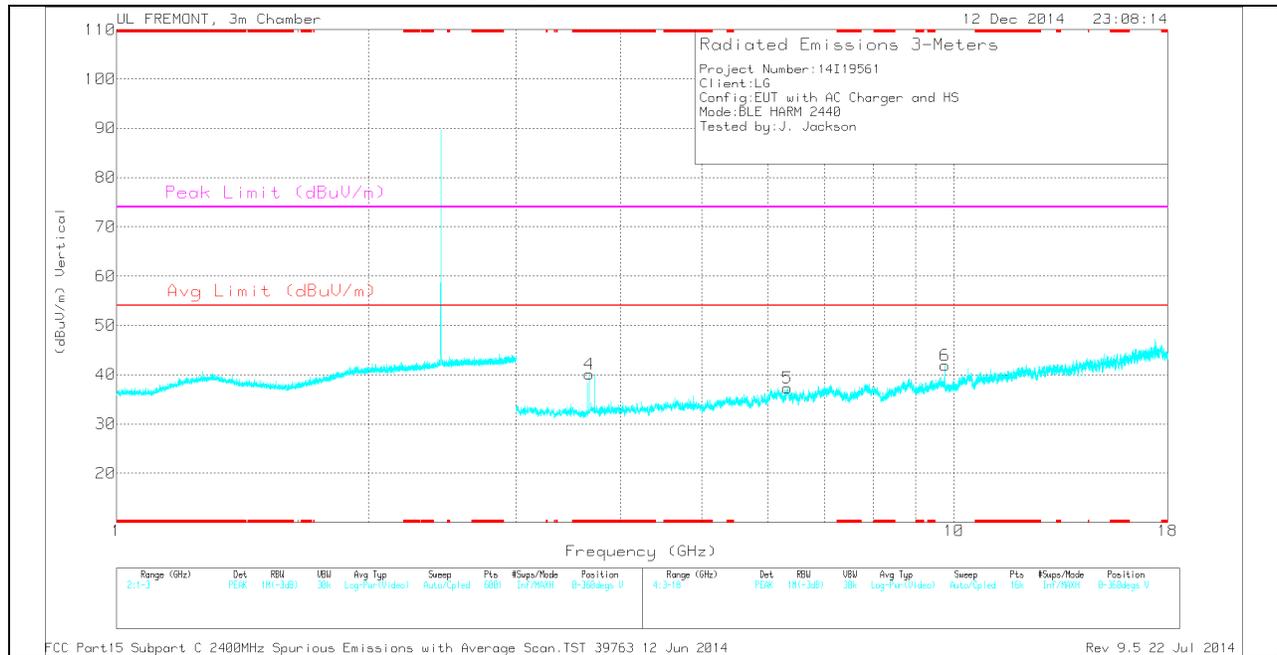
FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

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 T119 (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
2	* 3.865	32.37	PK	33.2	-31.3	0	34.27	-	-	74	-39.73	0-360	200	H
4	* 3.669	37.56	PK	33.2	-30.7	0	40.06	-	-	74	-33.94	0-360	200	V
1	1.907	33.66	PK	31.3	-23.2	0	41.76	-	-	-	-	0-360	200	H
5	6.324	31.07	PK	35.4	-29.2	0	37.27	-	-	-	-	0-360	100	V
3	8.65	30	PK	35.8	-27	0	38.8	-	-	-	-	0-360	100	H
6	9.76	30.87	PK	36.9	-25.9	0	41.87	-	-	-	-	0-360	200	V

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

PK - Peak detector

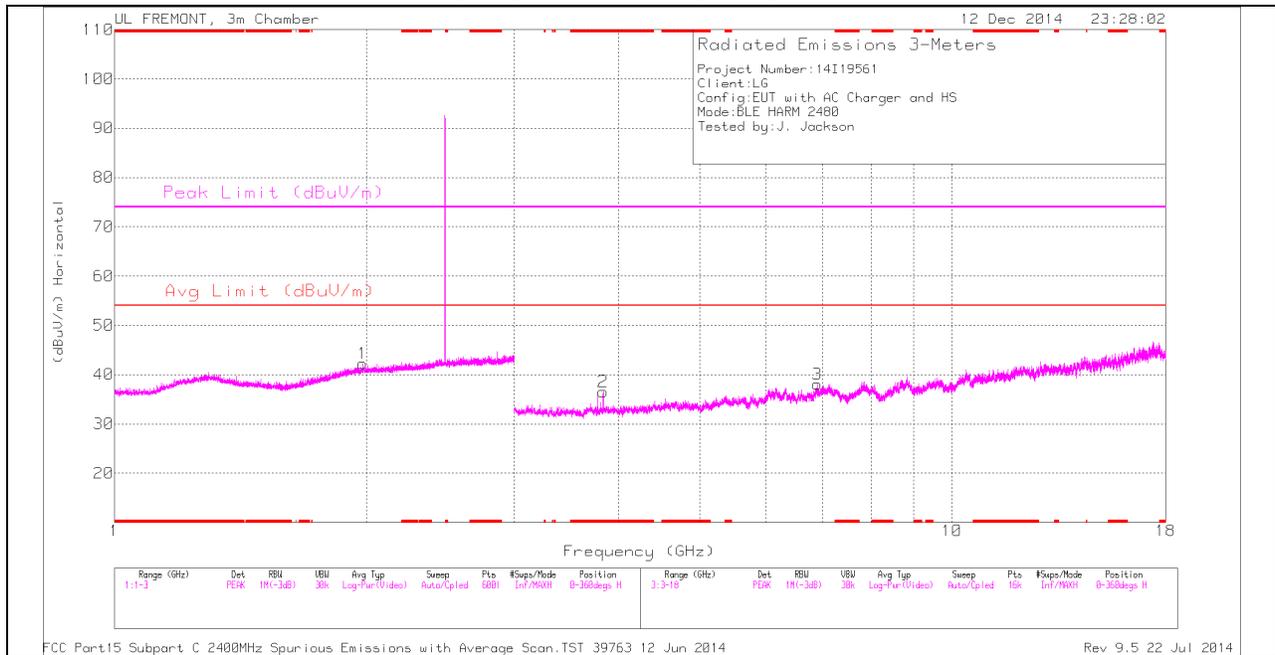
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
* 3.866	40.89	PK2	33.2	-31.3	0	42.79	-	-	74	-31.21	318	200	H
* 3.668	40.57	PK2	33.2	-30.7	0	43.07	-	-	74	-30.93	318	200	V

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

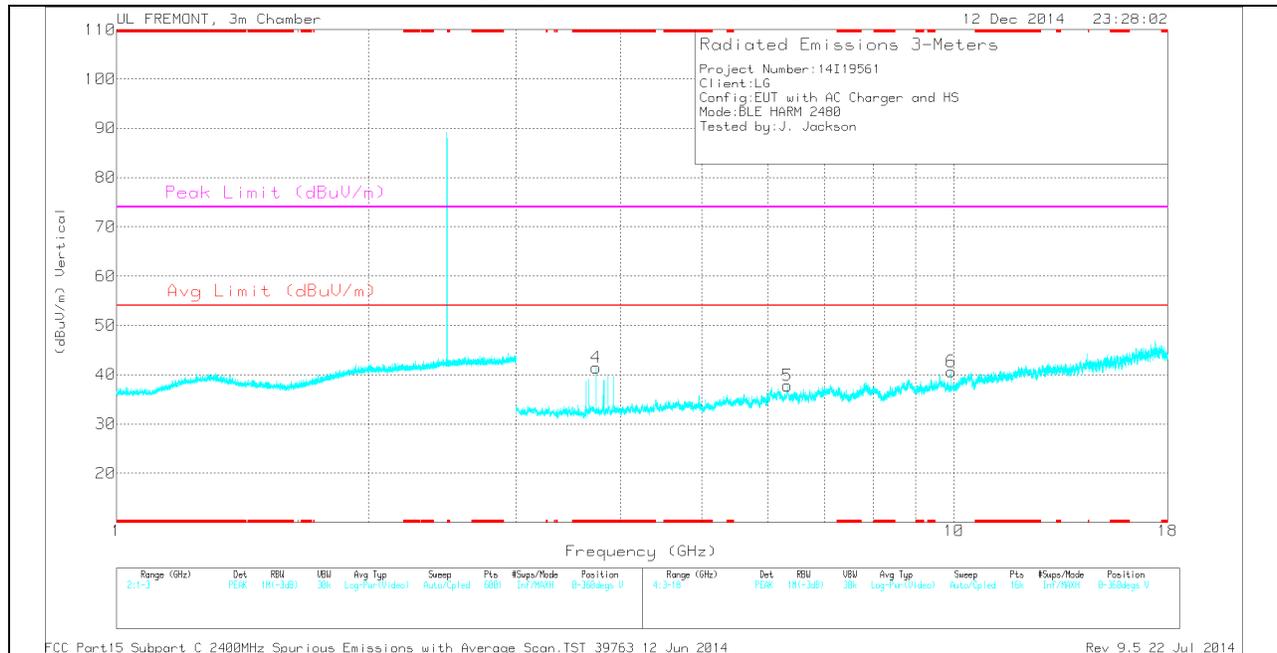
FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

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 T119 (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
2	* 3.832	34.56	PK	33.2	-31.2	0	36.56	-	-	74	-37.44	0-360	200	H
4	* 3.74	39.13	PK	33.2	-30.9	0	41.43	-	-	74	-32.57	0-360	100	V
1	1.978	34.02	PK	31.5	-23.3	0	42.22	-	-	-	-	0-360	100	H
5	6.325	31.55	PK	35.4	-29.2	0	37.75	-	-	-	-	0-360	200	V
3	6.902	30.91	PK	35.6	-28.5	0	38.01	-	-	-	-	0-360	100	H
6	9.919	29.36	PK	36.9	-25.6	0	40.66	-	-	-	-	0-360	200	V

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

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
* 3.832	40.43	PK2	33.2	-31.2	0	42.43	-	-	74	-31.57	299	200	H
* 3.741	40.77	PK2	33.2	-31	0	42.97	-	-	74	-31.03	232	100	V
* 3.832	40.43	PK2	33.2	-31.2	0	42.43	-	-	74	-31.57	299	200	H

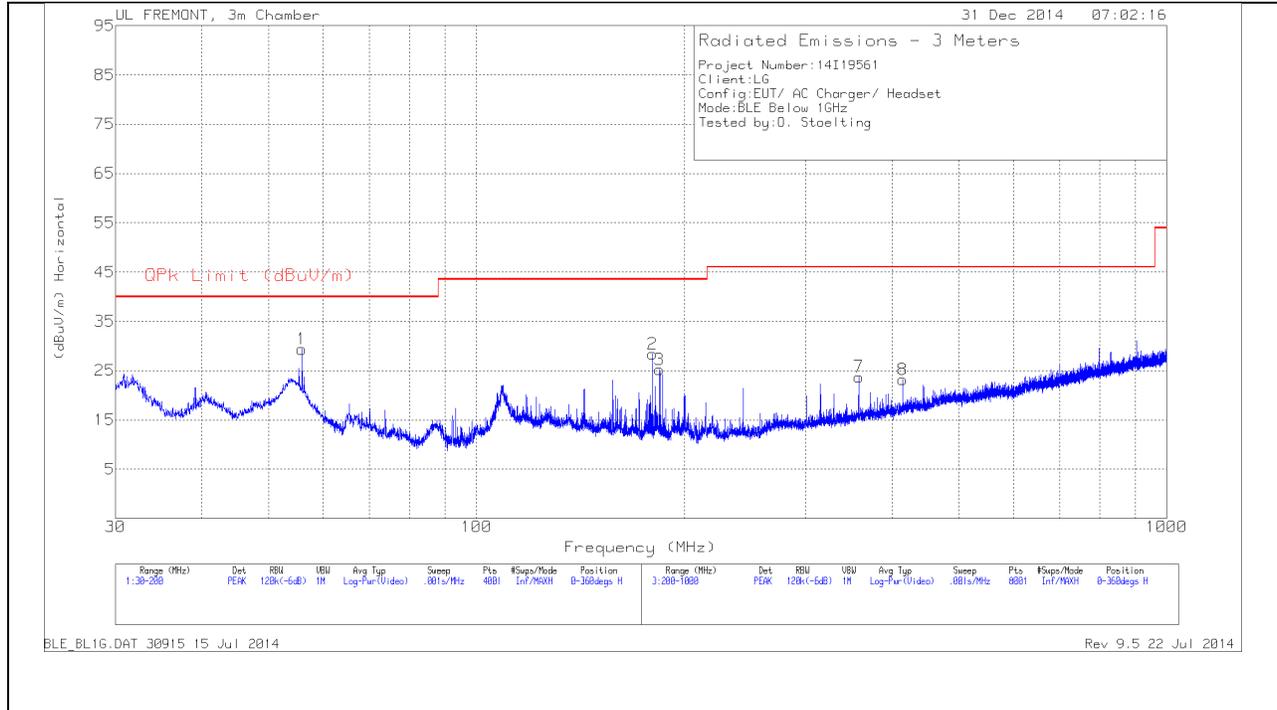
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

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

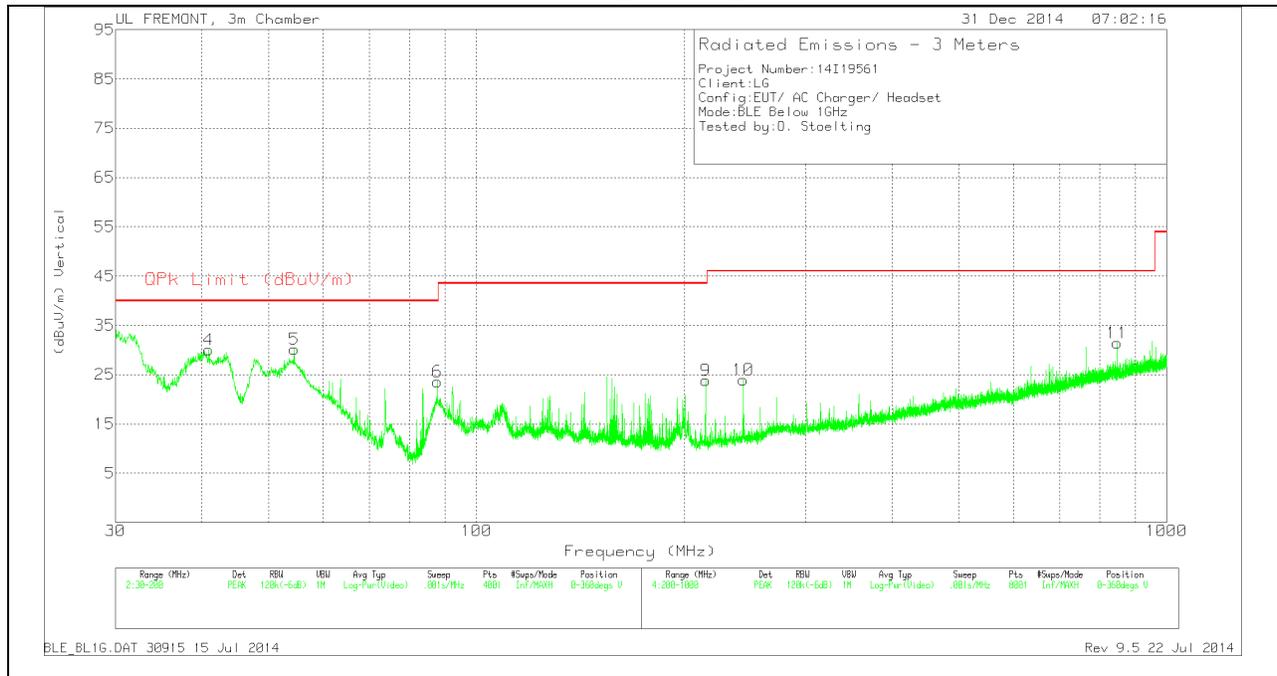
9.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



BELOW 1 GHz TABLE

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	40.965	45.29	PK	13.4	-28.6	30.09	40	-9.91	0-360	101	V
5	54.4375	51.39	PK	7.4	-28.6	30.19	40	-9.81	0-360	101	V
1	55.8613	50.55	PK	7.3	-28.5	29.35	40	-10.65	0-360	300	H
6	87.8425	44.16	PK	7.5	-28.1	23.56	40	-16.44	0-360	101	V
2	179.9825	44.32	PK	11.2	-27.1	28.42	43.52	-15.1	0-360	200	H
3	184.3175	41.08	PK	11.2	-27.1	25.18	43.52	-18.34	0-360	200	H
9	214.8	40.03	PK	10.6	-26.8	23.83	43.52	-19.69	0-360	200	V
10	243.4	38.76	PK	11.6	-26.4	23.96	46.02	-22.06	0-360	101	V
7	357.9	34.76	PK	14.8	-25.8	23.76	46.02	-22.26	0-360	200	H
8	414.7	33.07	PK	16	-25.9	23.17	46.02	-22.85	0-360	101	H
11	847.9	32.79	PK	22	-23.4	31.39	46.02	-14.63	0-360	101	V

PK - Peak detector

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

*Decreases with the logarithm of the frequency.

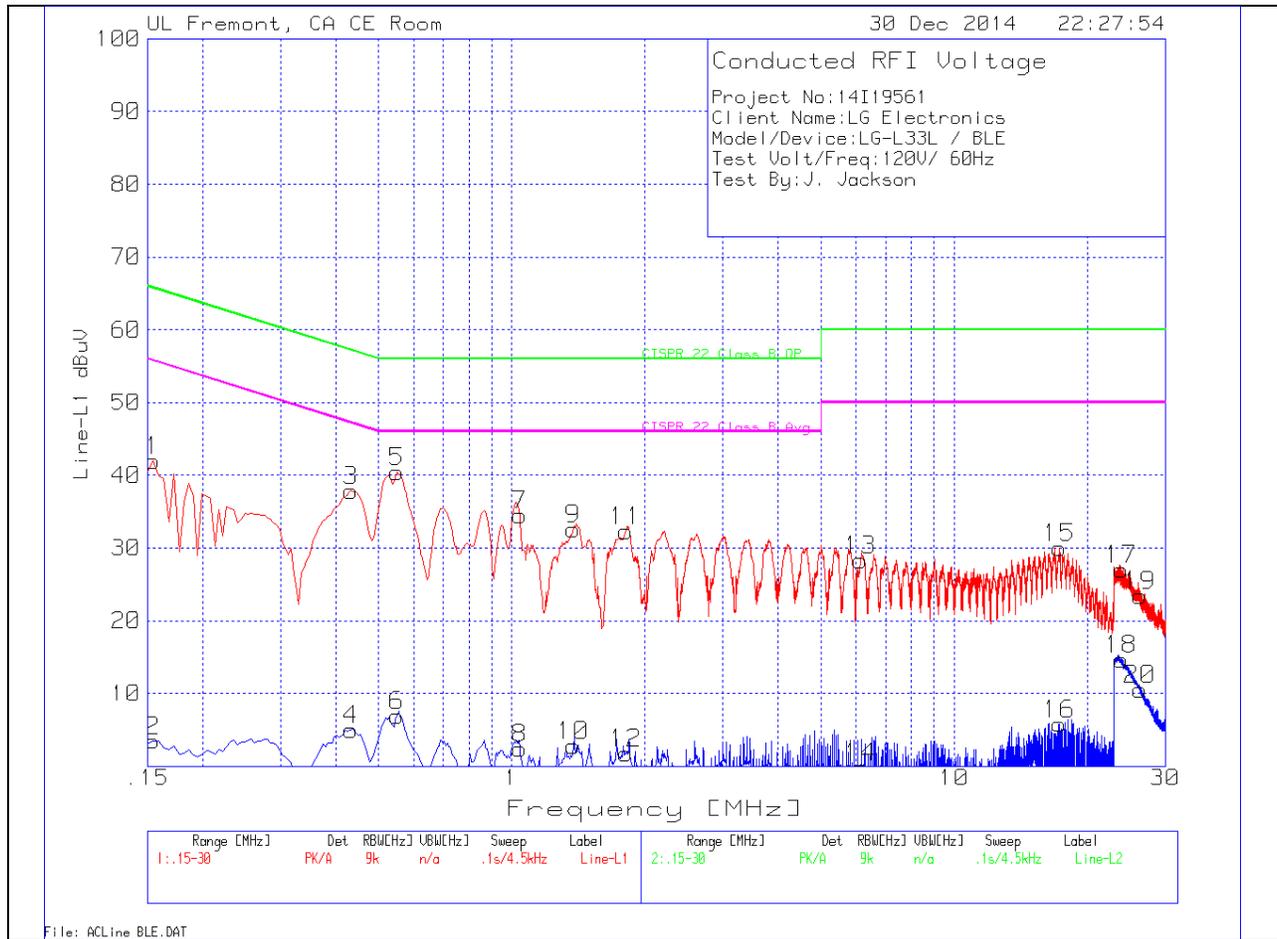
TEST PROCEDURE

ANSI C63.4 - 2009

RESULTS

6 WORST EMISSIONS

LINE 1 PLOT



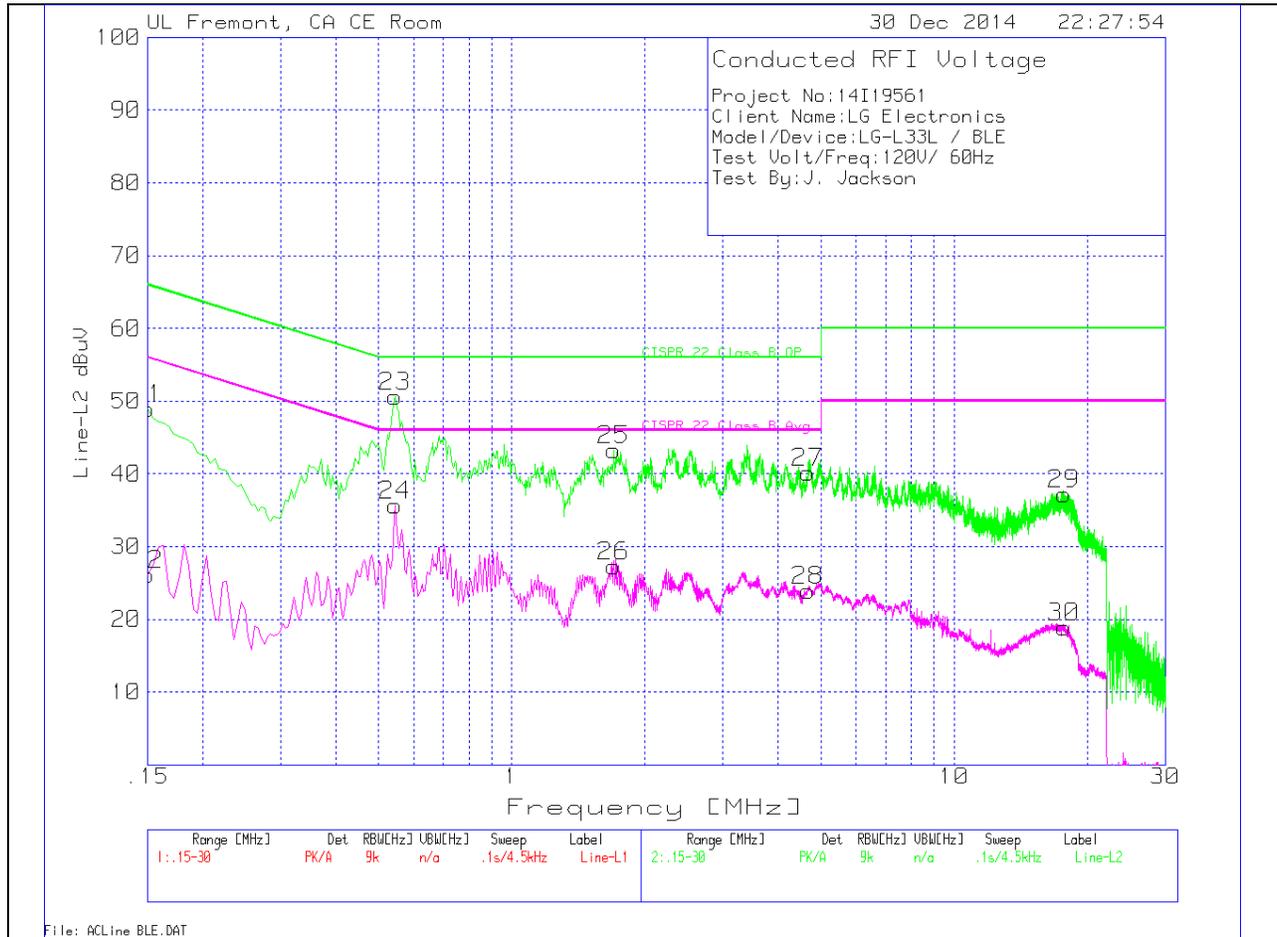
LINE 1 RESULTS

Line-L1 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.1545	40.7	PK	1.3	0	42	65.8	-23.8	-	-
2	.1545	2.2	Av	1.3	0	3.5	-	-	55.8	-52.3
3	.4335	37.43	PK	.4	0	37.83	57.2	-19.37	-	-
4	.4335	4.62	Av	.4	0	5.02	-	-	47.2	-42.18
5	.5505	40.19	PK	.3	0	40.49	56	-15.51	-	-
6	.5505	6.57	Av	.3	0	6.87	-	-	46	-39.13
7	1.041	34.27	PK	.2	0	34.47	56	-21.53	-	-
8	1.041	2.17	Av	.2	0	2.37	-	-	46	-43.63
9	1.3785	32.28	PK	.2	.1	32.58	56	-23.42	-	-
10	1.3785	2.49	Av	.2	.1	2.79	-	-	46	-43.21
11	1.8105	32.07	PK	.2	.1	32.37	56	-23.63	-	-
12	1.8105	1.51	Av	.2	.1	1.81	-	-	46	-44.19
13	6.144	28	PK	.2	.1	28.3	60	-31.7	-	-
14	6.144	-.49	Av	.2	.1	-.19	-	-	50	-50.19
15	17.2815	29.54	PK	.3	.2	30.04	60	-29.96	-	-
16	17.2815	5.32	Av	.3	.2	5.82	-	-	50	-44.18
17	23.8425	26.54	PK	.3	.2	27.04	60	-32.96	-	-
18	23.8425	14.12	Av	.3	.2	14.62	-	-	50	-35.38
19	26.2905	22.8	PK	.3	.3	23.4	60	-36.6	-	-
20	26.2905	9.98	Av	.3	.3	10.58	-	-	50	-39.42

LINE 2 PLOT



LINE 2 RESULTS

Line-L2 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
21	.15	47.48	PK	1.5	0	48.98	66	-17.02	-	-
22	.15	24.6	Av	1.5	0	26.1	-	-	56	-29.9
23	.546	50.32	PK	.3	0	50.62	56	-5.38	-	-
24	.546	35.39	Av	.3	0	35.69	-	-	46	-10.31
25	1.7025	42.95	PK	.2	.1	43.25	56	-12.75	-	-
26	1.7025	26.97	Av	.2	.1	27.27	-	-	46	-18.73
27	4.6635	39.85	PK	.2	.1	40.15	56	-15.85	-	-
28	4.6635	23.58	Av	.2	.1	23.88	-	-	46	-22.12
29	17.7225	36.77	PK	.3	.2	37.27	60	-22.73	-	-
30	17.7225	18.44	Av	.3	.2	18.94	-	-	50	-31.06

PK - Peak detector

Av - average detection