



FCC CFR47 PART 15 SUBPART C

**BLUETOOTH LOW ENERGY
CERTIFICATION TEST REPORT**

FOR

GSM/WCDMA/LTE PHONE WITH BT & DTS WLAN b/g/n

MODEL NUMBER: LG-L61AL, L61AL, LGL61AL

FCC ID: ZNFL61AL

REPORT NUMBER: 15I22343-E3V2

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NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	12/21/2015	Initial Issue	D. CORONIA
V2	12/28/2015	Updated Section 8.2, 8.3 and 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: GSM/WCDMA/LTE PHONE WITH BT & DTS WLAN b/g/n
MODEL: LG-L61AL, L61AL, LGL61AL
SERIAL NUMBER: 510KPFX00155, 510KPJP00156, 510KPBF00157
DATE TESTED: NOVEMBER 24 - DECEMBER 5, 2015

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

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013 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
<input type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D
<input checked="" type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E
<input type="checkbox"/> Chamber C	<input type="checkbox"/> Chamber F
	<input type="checkbox"/> Chamber G
	<input type="checkbox"/> 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:

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/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 Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402-2480	BLE	0.48	1.12

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of 0.24 dBi.

5.4. WORST-CASE CONFIGURATION AND MODE

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

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

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

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

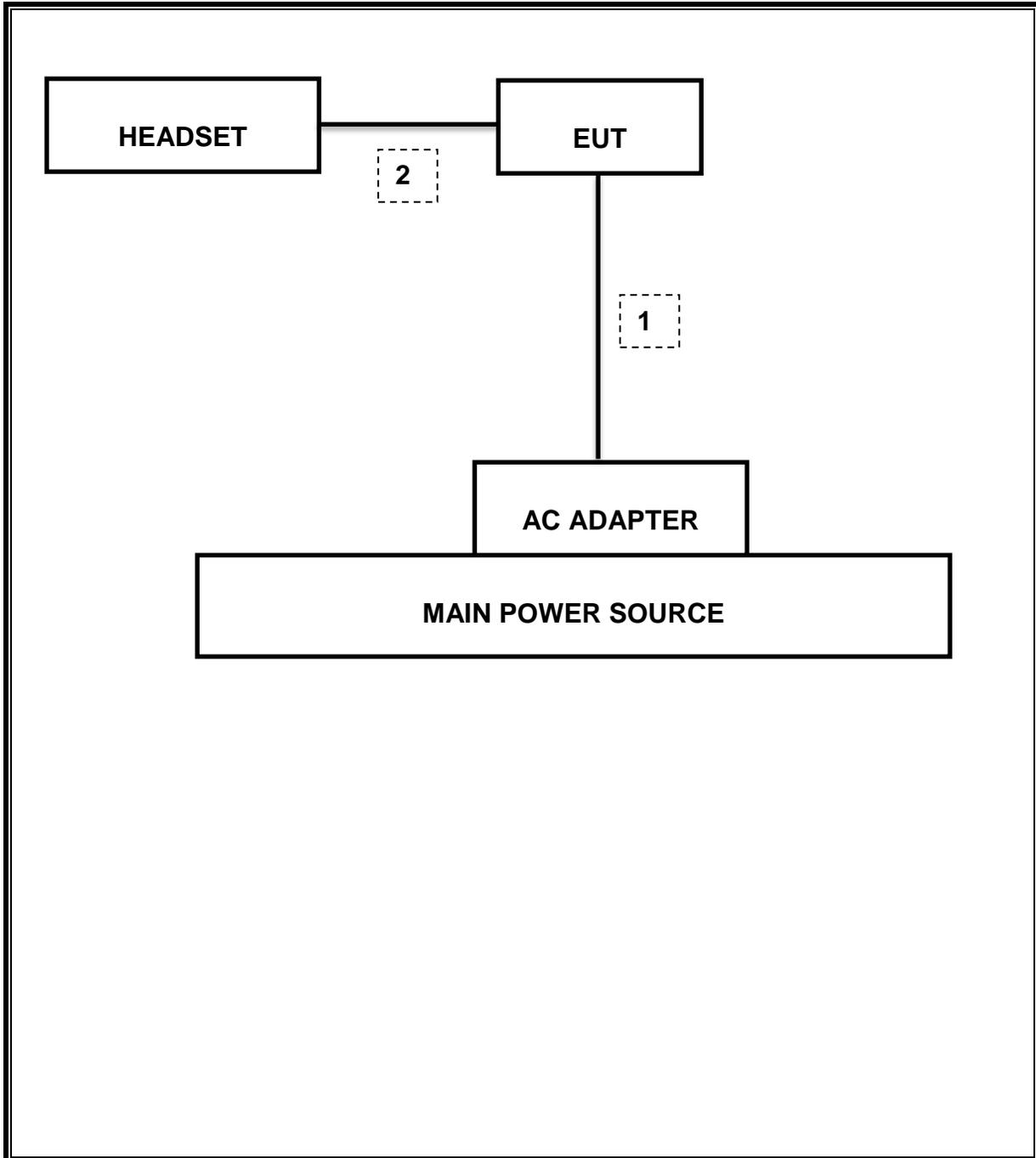
I/O CABLES

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	T Number	Cal Due
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	130	09/01/16
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	477	06/10/16
Antenna, Horn, 18GHz	EMCO	3115	59	11/18/16
Antenna, Horn, 18GHz	ETS Lindgren	3117	345	03/03/16
Antenna, Horn, 18GHz	ETS Lindgren	3117	136	03/03/16
Antenna, Horn, 18GHz	ETS Lindgren	3117	863	04/10/16
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	447	05/12/16
RF Pre-amplifier, 1GHz - 18GHz	Miteq	NSP4000-SP2	88	04/07/16
RF Pre-amplifier, 1GHz - 26.5GHz	HP	8449B	404	06/29/16
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
Spectrum Analyzer, PXA, 3 Hz to 44 GHz	Keysight	N9030A	907	01/07/16
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, 30 MHz	FCC	50/250-25-2	24	01/16/16
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 List			
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
CLT Software	UL	UL RF	Ver 1.0, Feb 2, 2015
Antenna Port Software	UL	UL RF	Ver 3.7, Nov 12, 2015

7. SUMMARY

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)(2)	RSS-247 5.2.1	Occupied Band width (6dB)	>500KHz	Conducted	Pass	0.645 MHz
2.1051, 15.247 (d)	RSS-247 5.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-50.73 dBm
15.247	RSS-247 5.4.4	TX conducted output power	<30dBm		Pass	0.48 dBm
15.247	RSS-247 5.2.2	PSD	<8dBm		Pass	-31.62 dBm
15.207 (a)	RSS-GEN 8.8	AC Power Line conducted emissions	Section 10	Radiated	Pass	60.16 dBuV
15.205, 15.209	RSS-GEN 8.9/7	Radiated Spurious Emission	< 54dBuV/m		Pass	38.35 dBuV/m*

*Indicates restricted band worst case

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

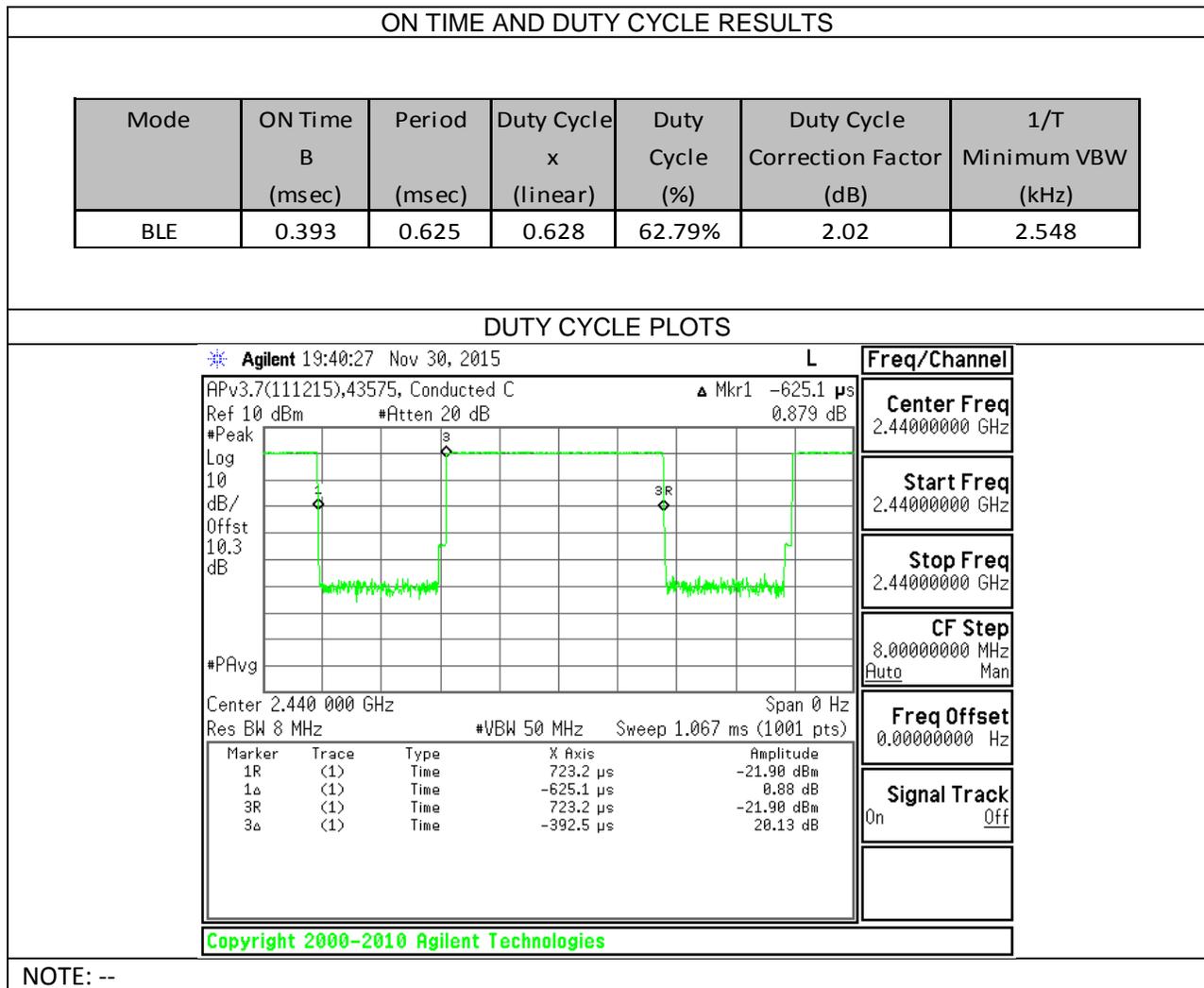
LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

RESULTS



8.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

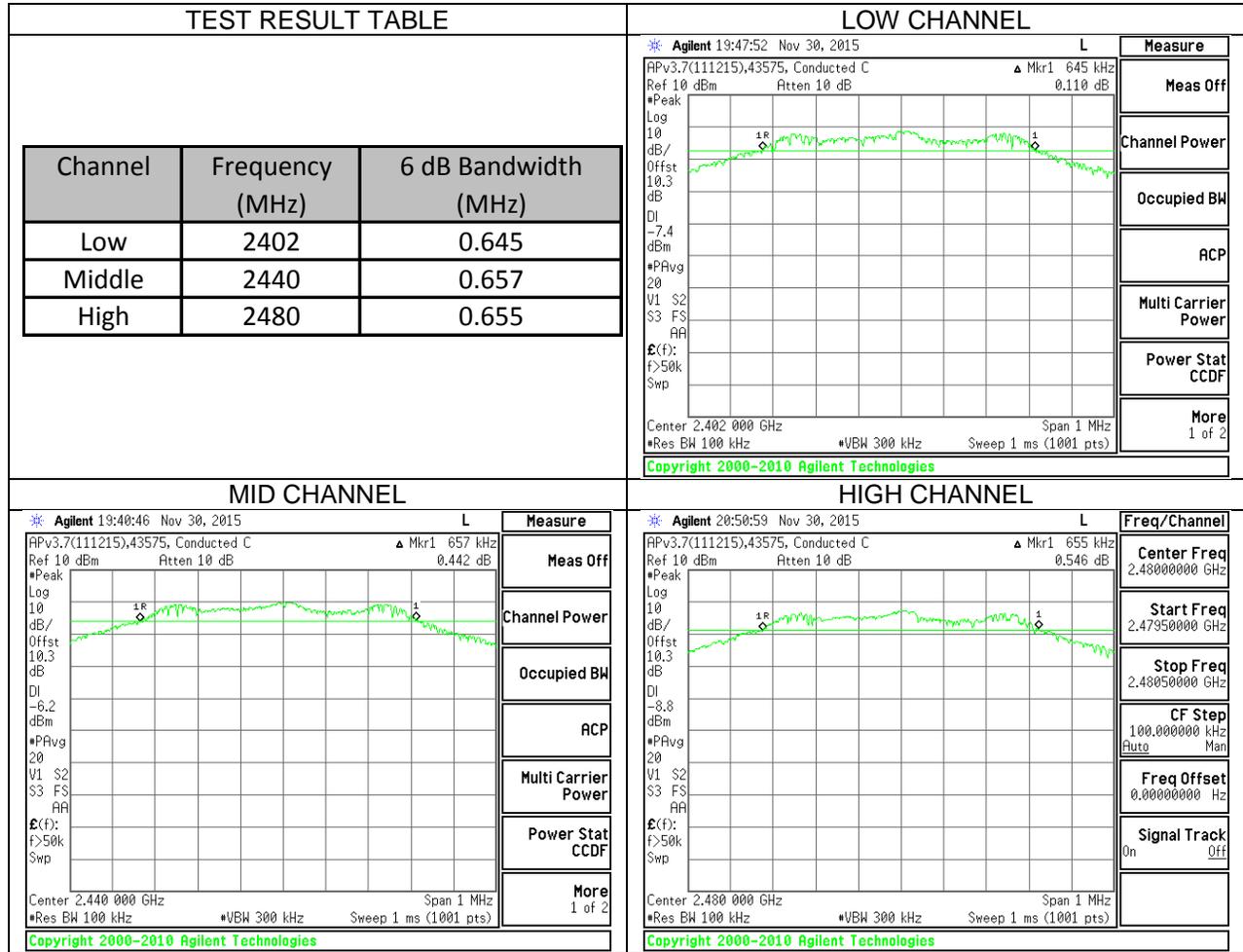
The minimum 6 dB bandwidth shall be at least 500 kHz.

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.

RESULTS

6 dB BANDWIDTH PLOTS AND TABLE



8.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

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

99% BANDWIDTH PLOTS AND TABLE

TEST RESULT TABLE			LOW CHANNEL													
				<table border="1"> <tr><td>Measure</td></tr> <tr><td>Meas Off</td></tr> <tr><td>Channel Power</td></tr> <tr><td>Occupied BW</td></tr> <tr><td>ACP</td></tr> <tr><td>Multi Carrier Power</td></tr> <tr><td>Power Stat CCDF</td></tr> <tr><td>More 1 of 2</td></tr> </table>	Measure	Meas Off	Channel Power	Occupied BW	ACP	Multi Carrier Power	Power Stat CCDF	More 1 of 2				
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<table border="1"> <thead> <tr> <th>Channel</th> <th>Frequency (MHz)</th> <th>99% Bandwidth (MHz)</th> </tr> </thead> <tbody> <tr> <td>Low</td> <td>2402</td> <td>1.054</td> </tr> <tr> <td>Middle</td> <td>2440</td> <td>1.051</td> </tr> <tr> <td>High</td> <td>2480</td> <td>1.045</td> </tr> </tbody> </table>	Channel	Frequency (MHz)	99% Bandwidth (MHz)	Low	2402	1.054	Middle	2440	1.051	High	2480	1.045				
Channel	Frequency (MHz)	99% Bandwidth (MHz)														
Low	2402	1.054														
Middle	2440	1.051														
High	2480	1.045														

8.4. OUTPUT POWER

LIMITS

FCC §15.247 (b)

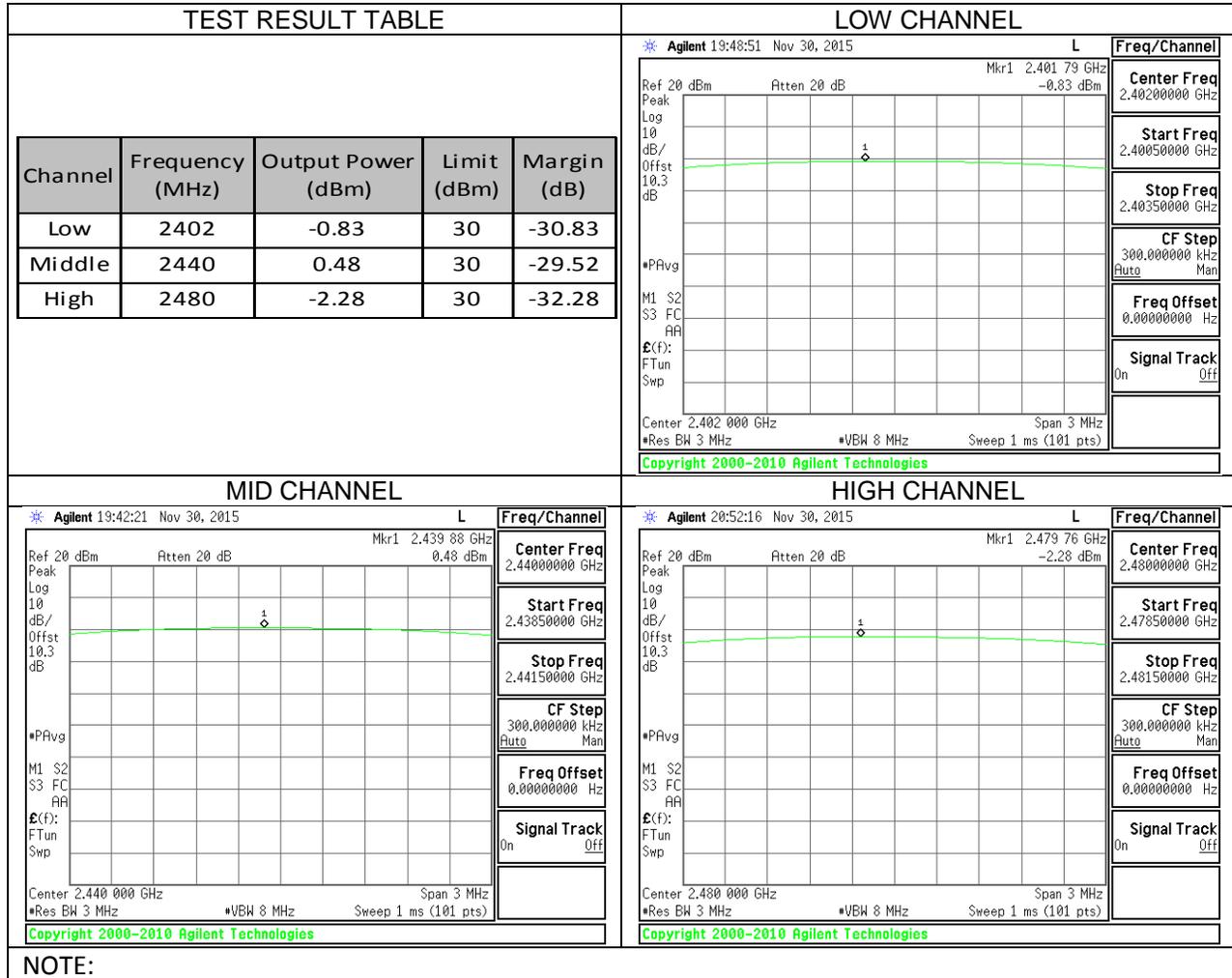
The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

Peak power is measured using KDB558074 D01 DTS Meas Guidance v03r03 spectrum analyzer.

RESULTS

8.4.1. OUTPUT POWER PLOTS



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 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	-1.2
Middle	2440	-0.27
High	2480	-2.61

8.6. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

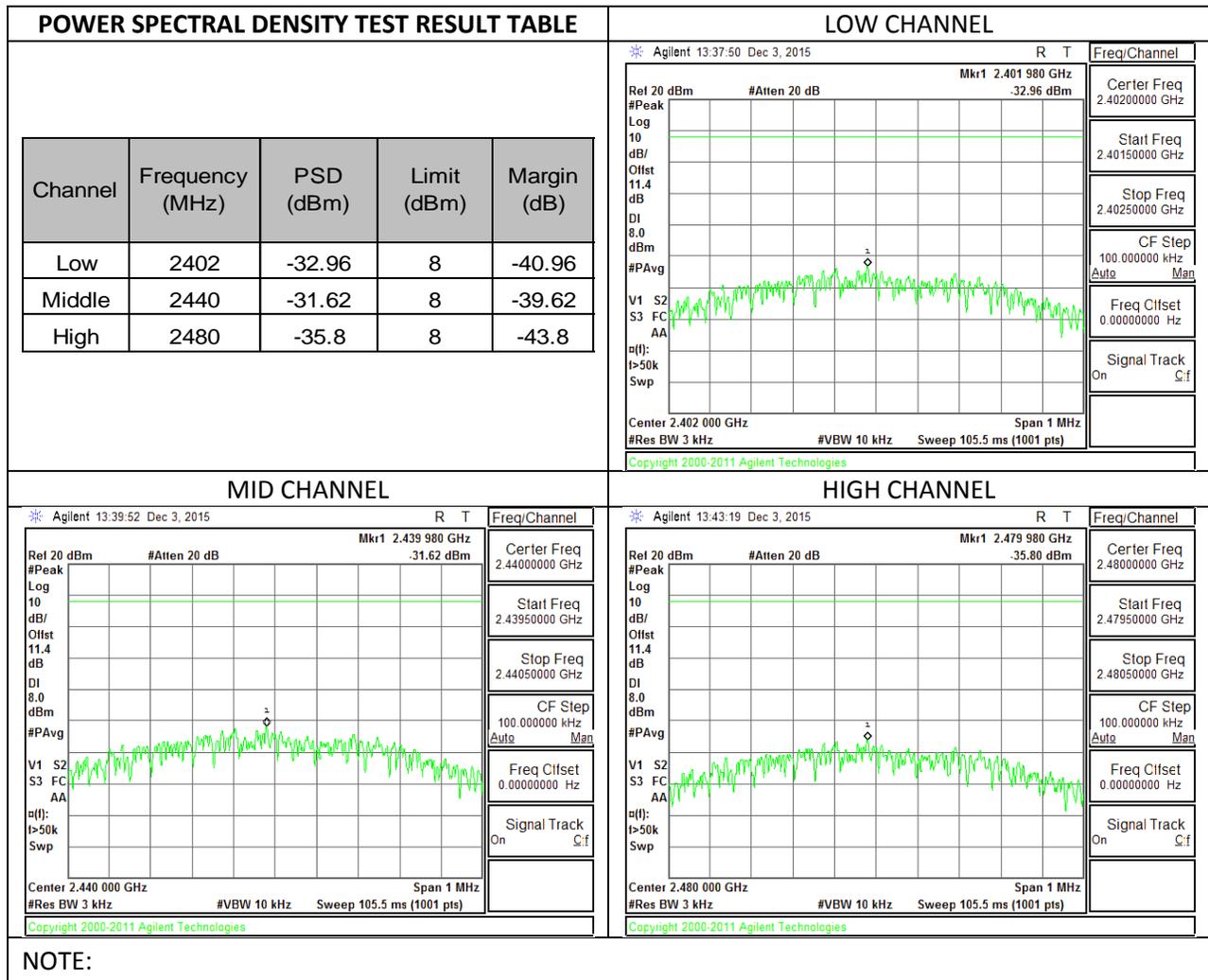
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

Power Spectral Density was performed utilizing the "Method PKPSD (Peak PSD)" under KDB558074 D01 DTS Meas Guidance v03r03.

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.

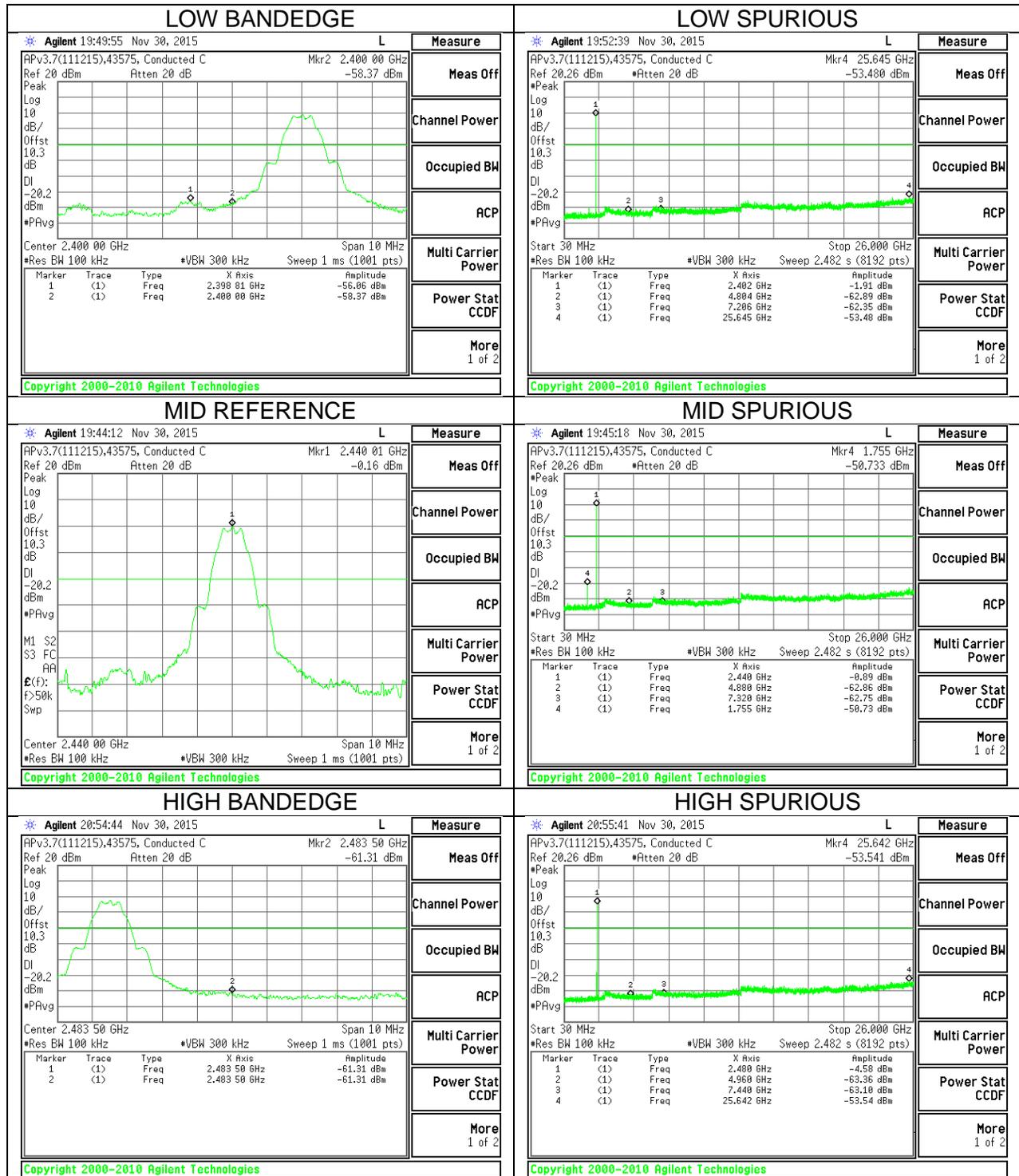
TEST PROCEDURE

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



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 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.

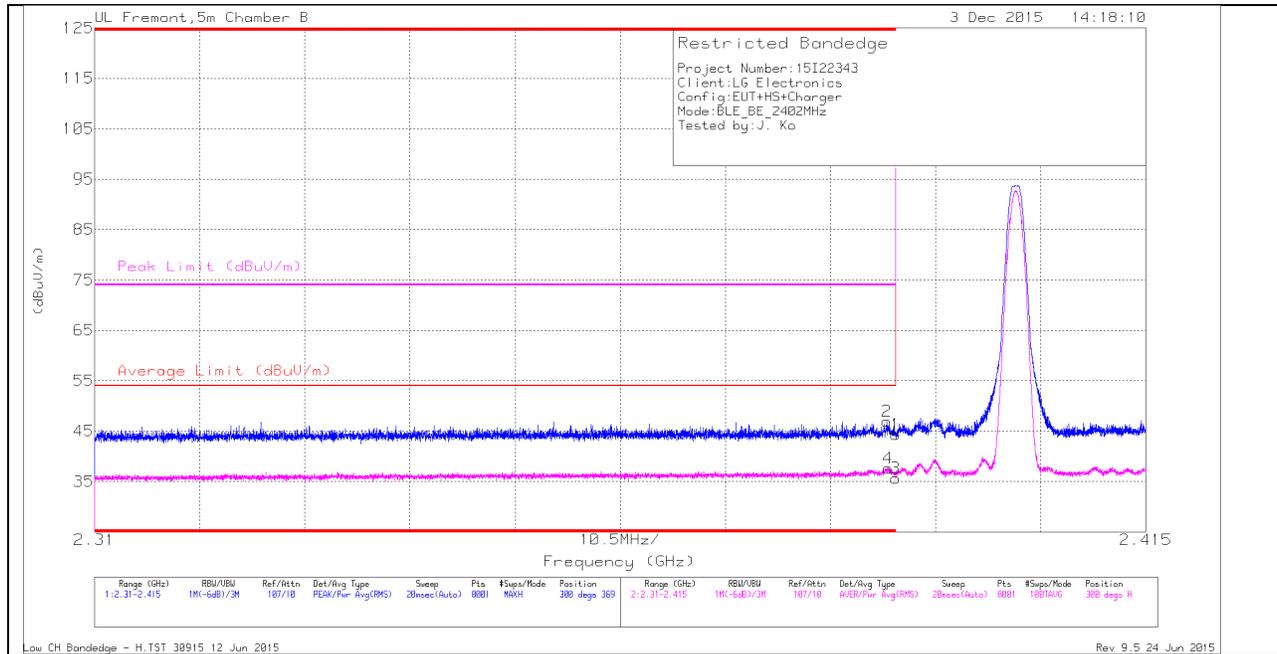
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor = $10 \log (1/x)$. For example: DCF = $10 \log (1/0.626)=2.03\text{dB}$ (Spectrum Analyzer round it up to 2 dB)

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.

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

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

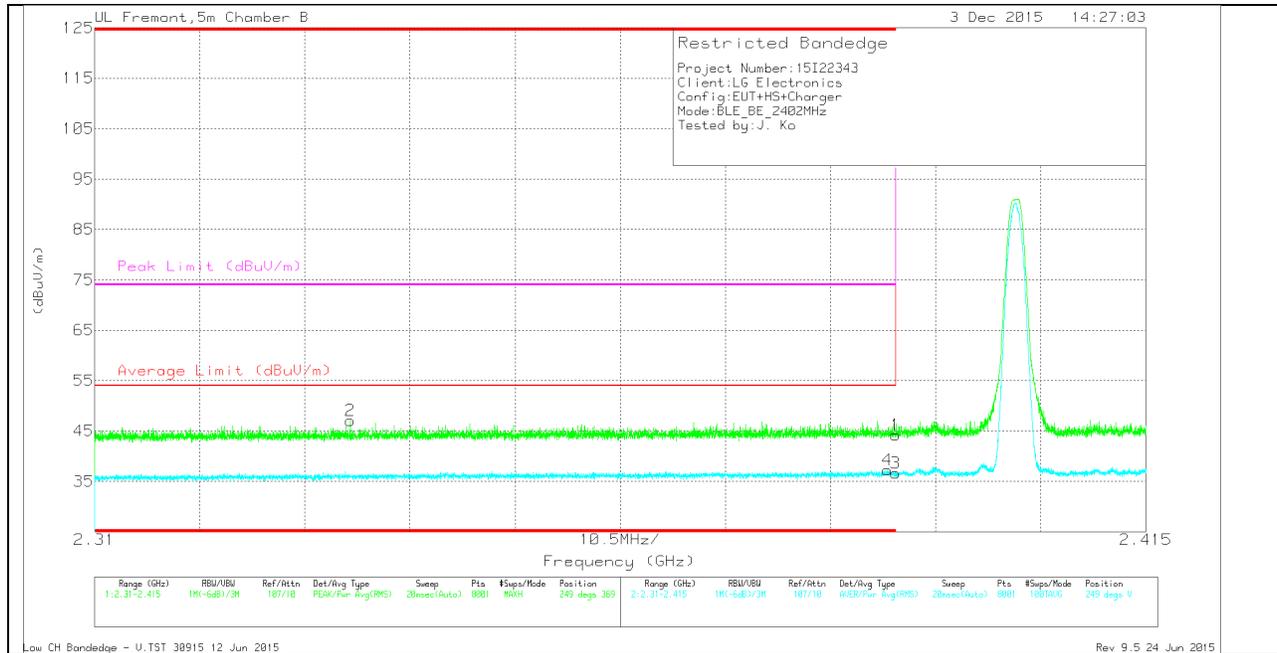
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/Fitter/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	34.2	Pk	32	-21.9	0	44.3	-	-	74	-29.7	300	369	H
2	* 2.389	36.8	Pk	32	-21.9	0	46.9	-	-	74	-27.1	300	369	H
3	* 2.39	23.5	RMS	32	-21.9	2.02	35.62	54	-18.38	-	-	300	369	H
4	* 2.389	25.56	RMS	32	-21.9	2.02	37.68	54	-16.32	-	-	300	369	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/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	* 2.39	34.12	Pk	32	-21.9	0	44.22	-	-	74	-29.78	249	369	V
2	* 2.336	37.24	Pk	31.7	-21.9	0	47.04	-	-	74	-26.96	249	369	V
3	* 2.39	24.52	RMS	32	-21.9	2.02	36.64	54	-17.36	-	-	249	369	V
4	* 2.389	25.08	RMS	32	-21.9	2.02	37.2	54	-16.8	-	-	249	369	V

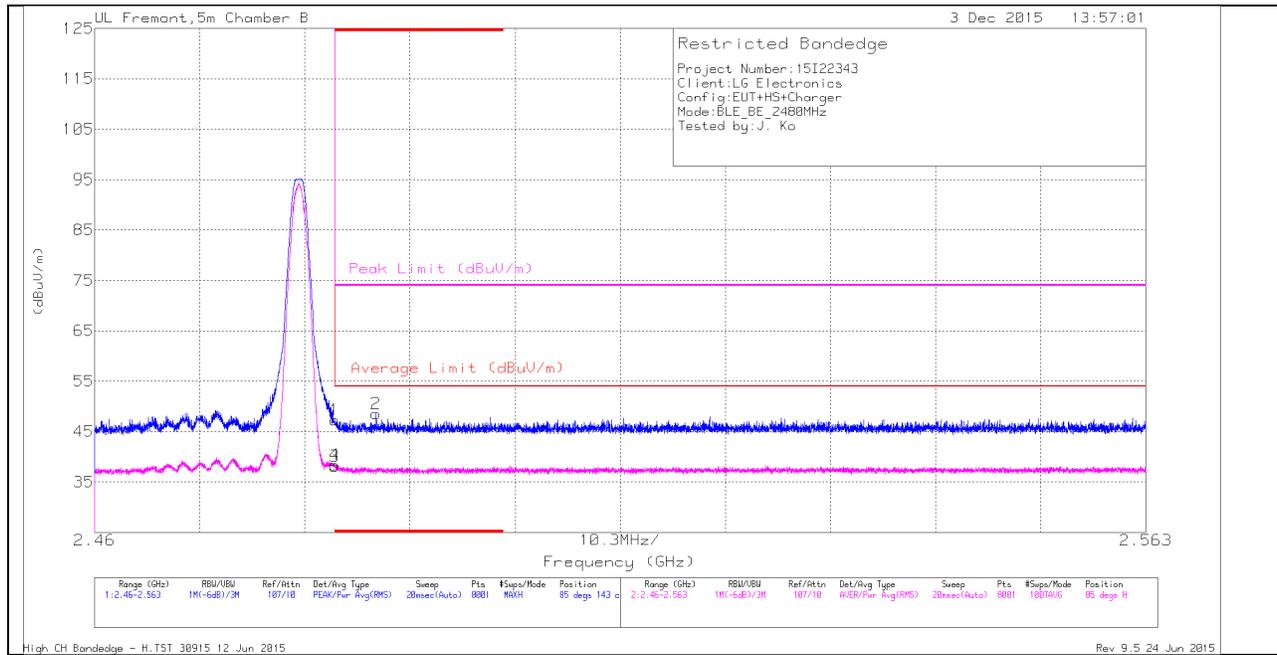
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

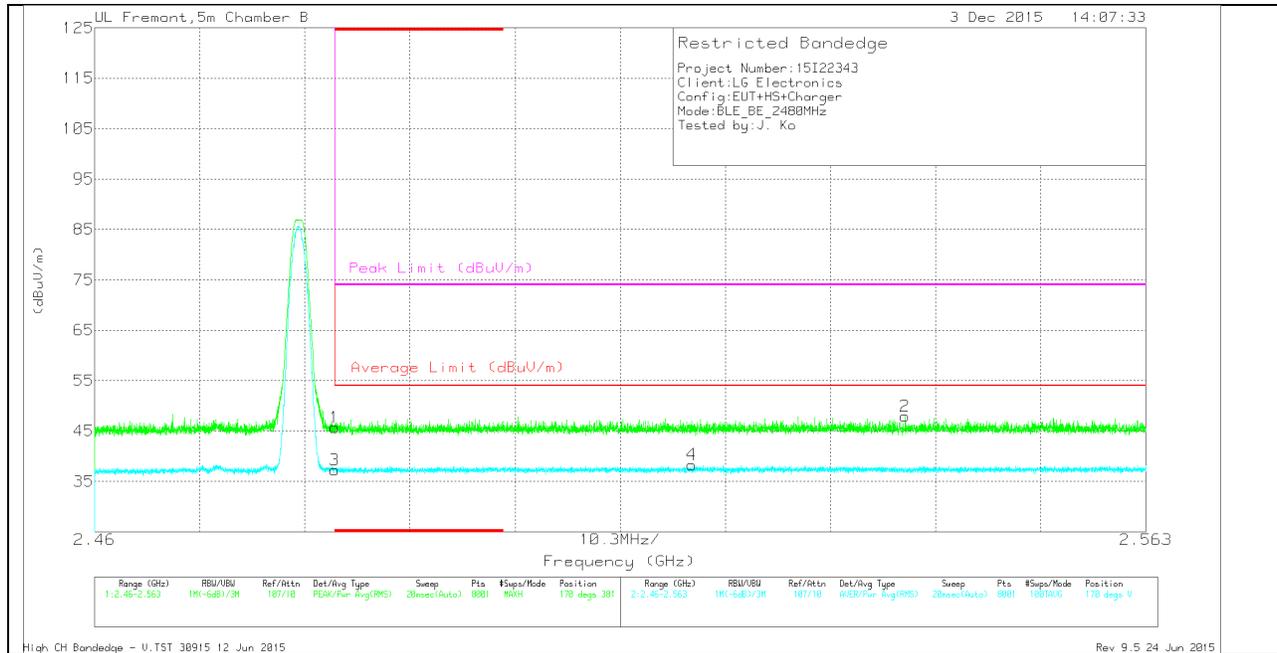
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/Filter/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	36.57	Pk	32.5	-21.8	0	47.27	-	-	74	-26.73	85	143	H
2	* 2.488	37.96	Pk	32.5	-21.9	0	48.56	-	-	74	-25.44	85	143	H
3	* 2.484	25.37	RMS	32.5	-21.8	2.02	38.09	54	-15.91	-	-	85	143	H
4	* 2.484	25.63	RMS	32.5	-21.8	2.02	38.35	54	-15.65	-	-	85	143	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/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	34.95	Pk	32.5	-21.8	0	45.65	-	-	74	-28.35	170	381	V
3	* 2.484	24.52	RMS	32.5	-21.8	2.02	37.24	54	-16.76	-	-	170	381	V
4	2.519	25.59	RMS	32.6	-21.9	2.02	38.31	54	-15.69	-	-	170	381	V
2	2.539	37.28	Pk	32.6	-21.9	0	47.98	-	-	74	-26.02	170	381	V

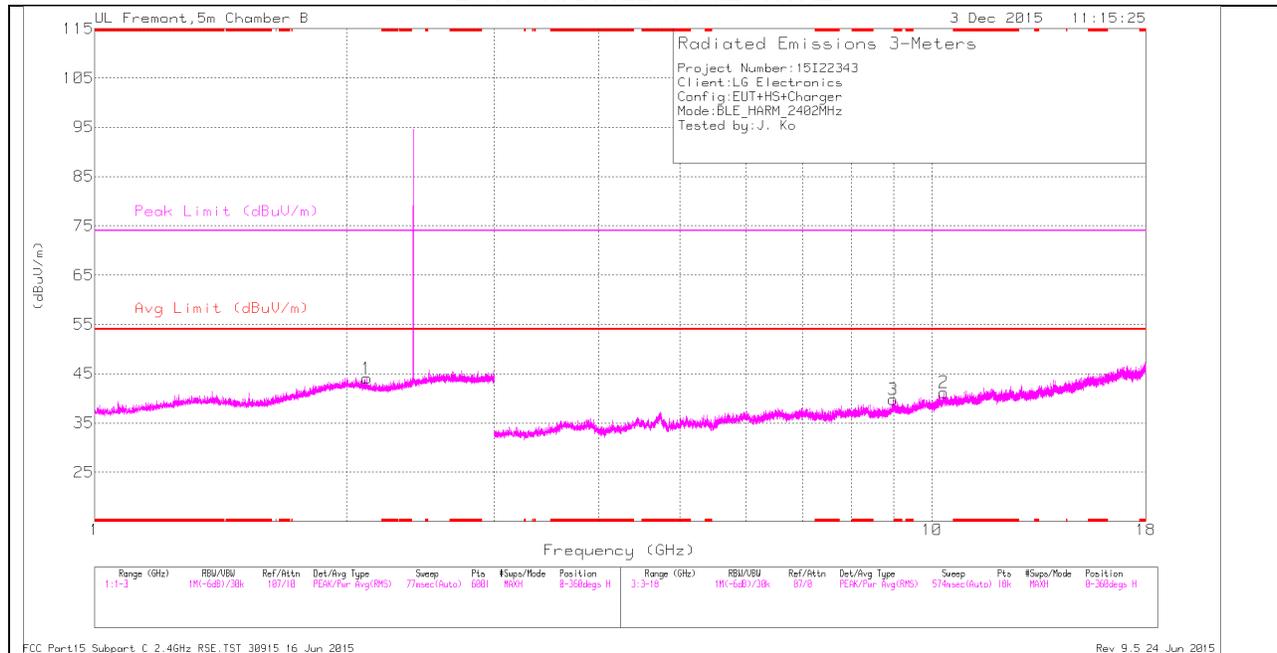
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection

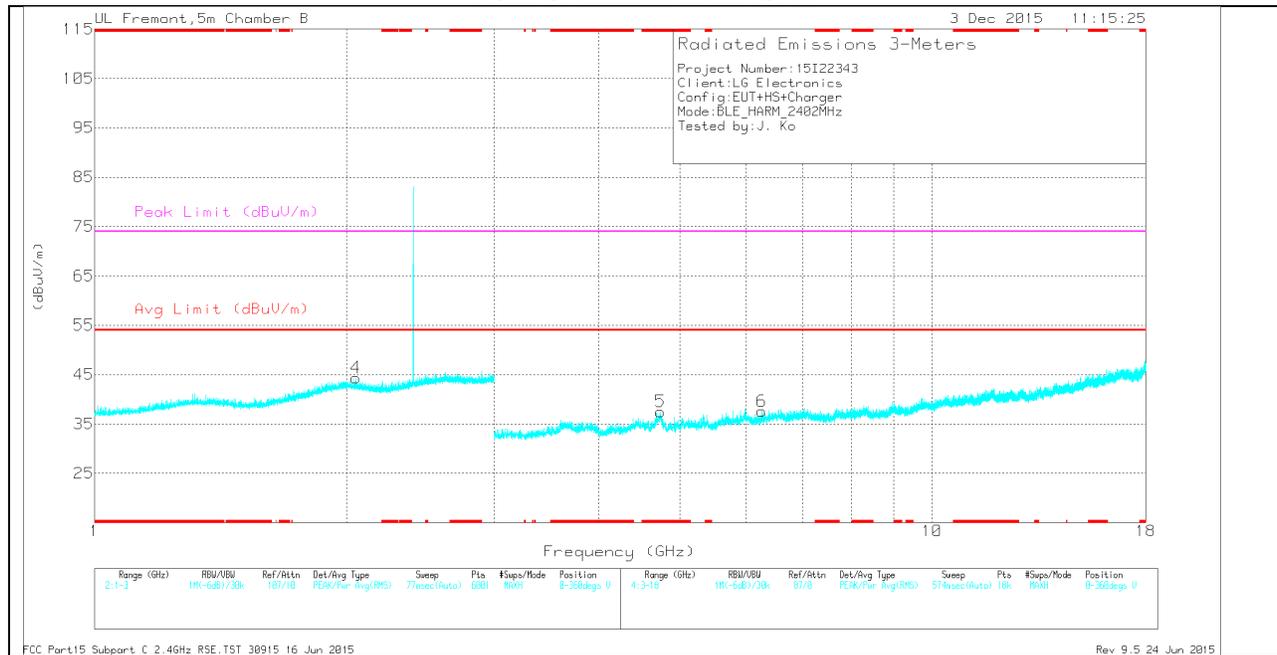
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



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

LOW CHANNEL VERTICAL



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

LOW CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Filtr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 4.737	33.94	Pk	34.3	-30.7	0	37.54	-	-	74	-36.46	0-360	101	V
4	2.051	36.69	Pk	32.1	-24.4	0	44.39	-	-	-	-	0-360	101	V
1	2.114	36.77	Pk	31.7	-24.4	0	44.07	-	-	-	-	0-360	102	H
6	6.26	33.32	Pk	35.5	-31.2	0	37.62	-	-	-	-	0-360	101	V
3	8.978	30.62	Pk	36	-26.8	0	39.82	-	-	-	-	0-360	199	H
2	10.319	29.22	Pk	37.4	-25.4	0	41.22	-	-	-	-	0-360	101	H

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

Pk - Peak detector

RADIATED EMISSIONS

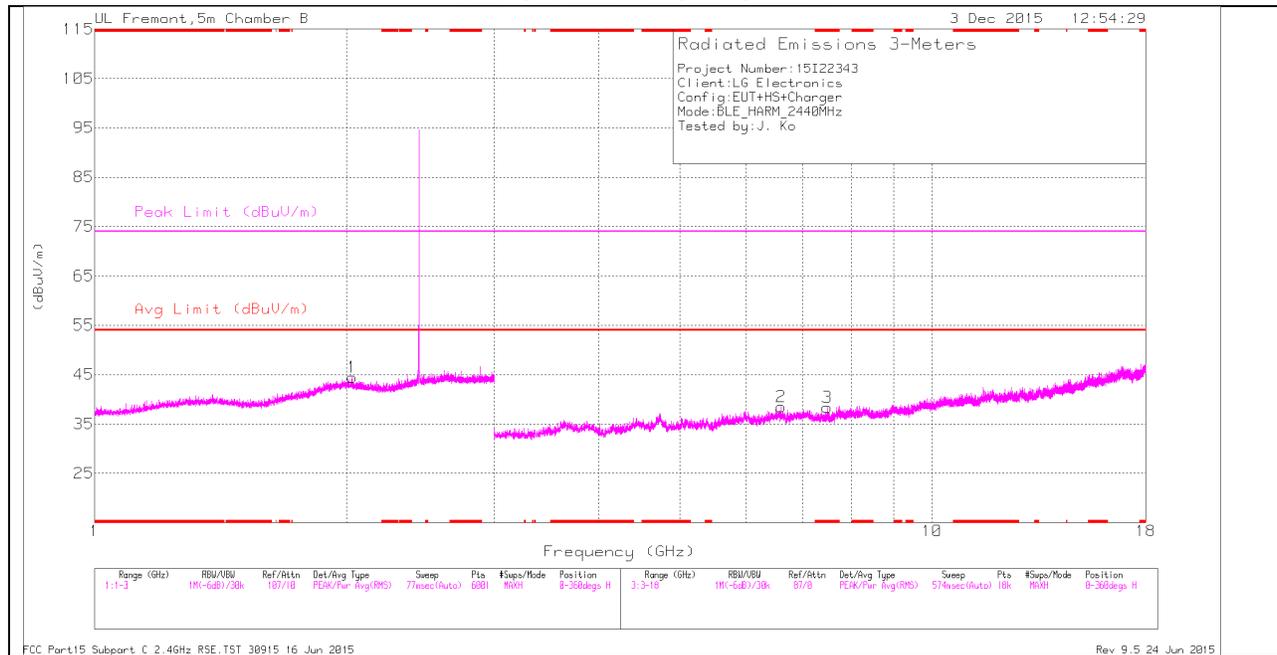
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Filtr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.739	42.12	PK2	34.3	-30.7	0	45.72	-	-	74	-28.28	332	258	V
* 4.738	29.9	MAv1	34.3	-30.7	2.02	35.52	54	-18.48	-	-	332	258	V
2.05	43.72	PK2	32.1	-24.4	0	51.42	-	-	74	-22.58	360	101	V
2.051	31.99	MAv1	32.1	-24.4	2.02	41.71	54	-12.29	-	-	360	101	V
2.113	44.59	PK2	31.7	-24.4	0	51.89	-	-	74	-22.11	360	101	H
2.113	32.12	MAv1	31.7	-24.4	2.02	41.44	54	-12.56	-	-	360	101	H
6.26	41.49	PK2	35.5	-31.2	0	45.79	-	-	74	-28.21	332	102	V
6.26	29.48	MAv1	35.5	-31.2	2.02	35.8	54	-18.2	-	-	332	102	V
8.977	37.57	PK2	36	-26.8	0	46.77	-	-	74	-27.23	360	199	H
8.98	26.15	MAv1	36	-26.9	2.02	37.27	54	-16.73	-	-	360	199	H
10.318	25.18	MAv1	37.4	-25.4	2.02	39.2	54	-14.8	-	-	360	101	H
10.32	36.56	PK2	37.4	-25.3	0	48.66	-	-	74	-25.34	360	101	H

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

PK2 - KDB558074 Method: Maximum Peak

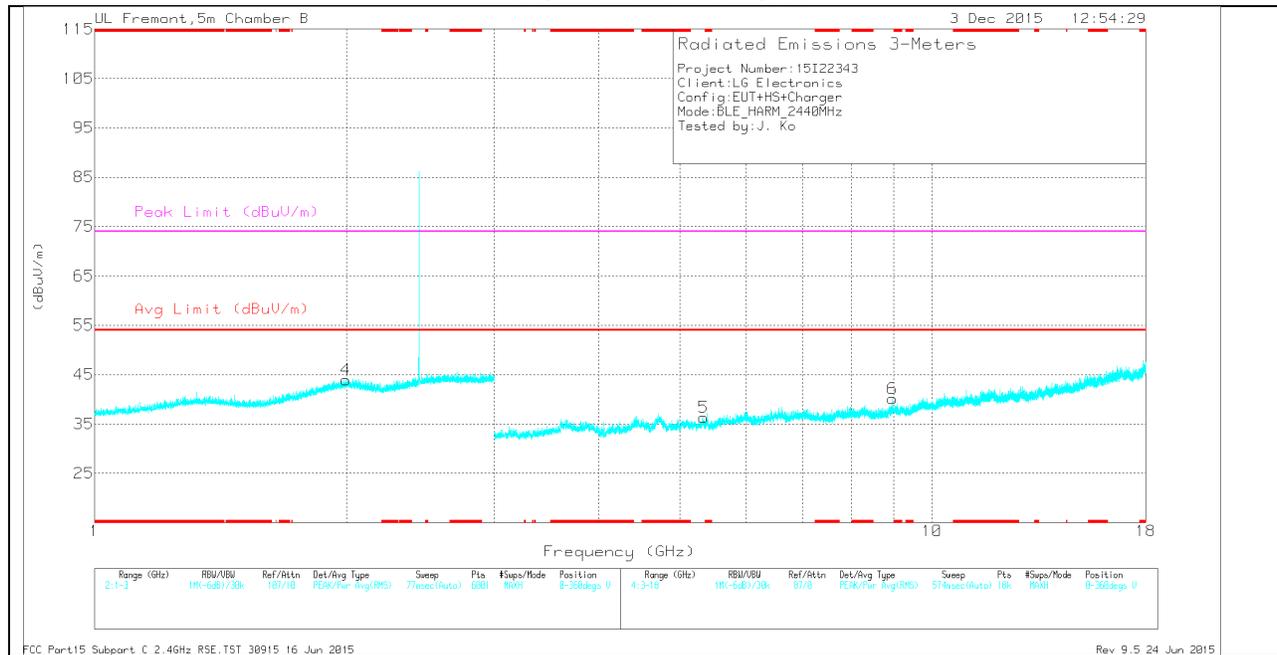
MAv1 - KDB558074 Option 1 Maximum RMS Average

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.

MID CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/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
3	* 7.494	32.35	Pk	35.3	-29.3	0	38.35	-	-	74	-35.65	0-360	199	H
4	1.997	36.1	Pk	32.3	-24.5	0	43.9	-	-	-	-	0-360	199	V
1	2.032	36.8	Pk	32.2	-24.5	0	44.5	-	-	-	-	0-360	102	H
5	5.337	32.71	Pk	34.4	-30.8	0	36.31	-	-	-	-	0-360	199	V
2	6.604	33.24	Pk	36	-30.8	0	38.44	-	-	-	-	0-360	199	H
6	8.971	30.85	Pk	36	-26.7	0	40.15	-	-	-	-	0-360	199	V

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

Pk - Peak detector

RADIATED EMISSIONS

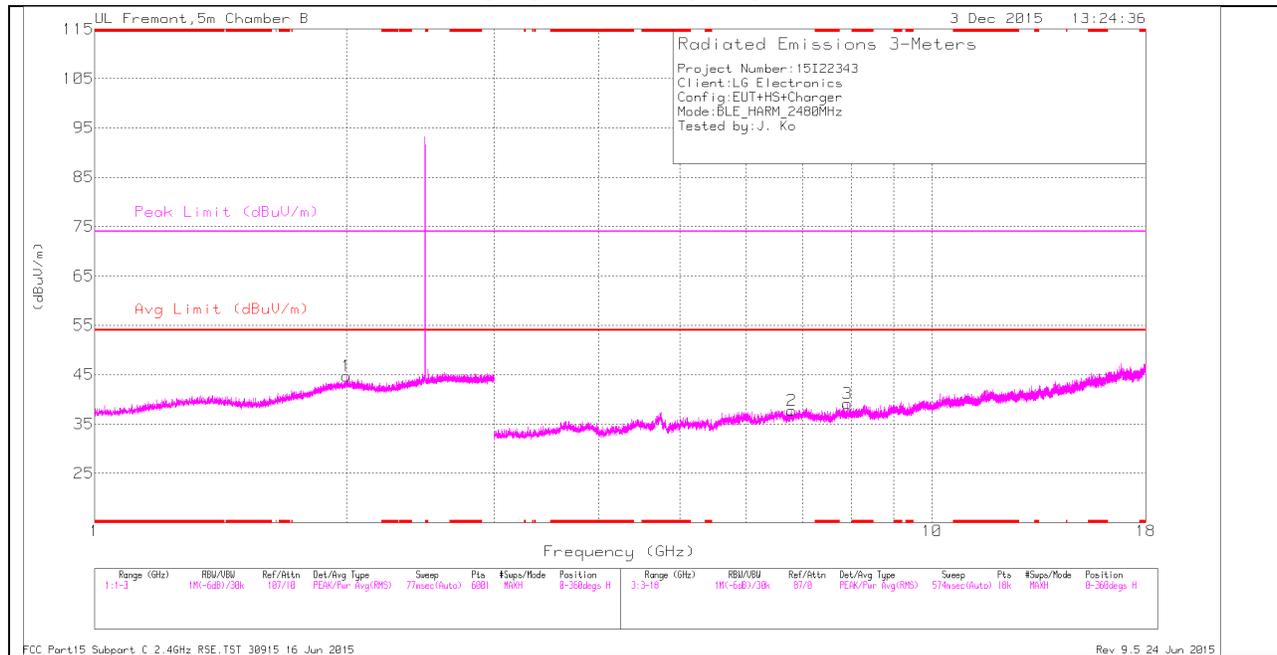
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/ Fitr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.494	39.08	PK2	35.3	-29.3	0	45.08	-	-	74	-28.92	36	129	H
* 7.496	27.42	MAv1	35.3	-29.3	2.02	35.44	54	-18.56	-	-	36	129	H
1.996	32.1	MAv1	32.3	-24.5	2.02	41.92	54	-12.08	-	-	359	198	V
1.998	43.83	PK2	32.3	-24.5	0	51.63	-	-	74	-22.37	359	198	V
2.031	32.08	MAv1	32.2	-24.5	2.02	41.8	54	-12.2	-	-	359	101	H
2.032	43.72	PK2	32.2	-24.5	0	51.42	-	-	74	-22.58	359	101	H
5.336	40.41	PK2	34.4	-30.8	0	44.01	-	-	74	-29.99	36	198	V
5.336	29.18	MAv1	34.4	-30.8	2.02	34.8	54	-19.2	-	-	36	198	V
6.604	29.41	MAv1	36	-30.8	2.02	36.63	54	-17.37	-	-	359	198	H
6.606	40.41	PK2	36	-30.8	0	45.61	-	-	74	-28.39	359	198	H
8.97	37.76	PK2	36	-26.7	0	47.06	-	-	74	-26.94	36	198	V
8.972	26.32	MAv1	36	-26.8	2.02	37.54	54	-16.46	-	-	36	198	V

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

PK2 - KDB558074 Method: Maximum Peak

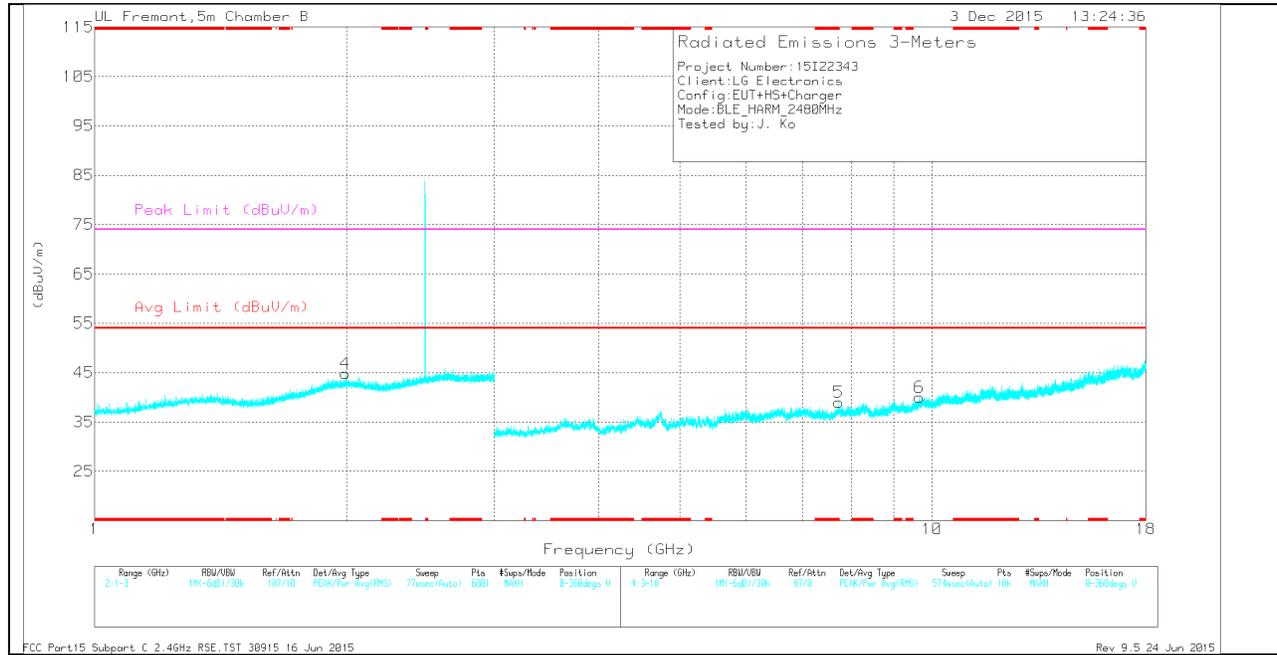
MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL HORIZONTAL



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

HIGH CHANNEL VERTICAL



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

HIGH CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Filtr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 7.731	31.63	Pk	35.5	-28.1	0	39.03	-	-	74	-34.97	0-360	101	V
4	1.994	37.03	Pk	32.3	-24.5	0	44.83	-	-	-	-	0-360	101	V
1	2	36.91	Pk	32.3	-24.5	0	44.71	-	-	-	-	0-360	101	H
2	6.805	31.83	Pk	35.9	-30	0	37.73	-	-	-	-	0-360	101	H
3	7.921	32.66	Pk	35.6	-29.1	0	39.16	-	-	-	-	0-360	101	H
6	9.659	29.75	Pk	36.7	-26.4	0	40.05	-	-	-	-	0-360	199	V

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

Pk - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Filtr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.729	38.88	PK2	35.5	-28.2	0	46.18	-	-	74	-27.82	164	384	V
* 7.73	27.08	MAv1	35.5	-28.1	2.02	36.5	54	-17.5	-	-	164	384	V
1.992	32.21	MAv1	32.3	-24.5	2.02	42.03	54	-11.97	-	-	360	101	V
1.996	44.4	PK2	32.3	-24.5	0	52.2	-	-	74	-21.8	360	101	V
1.998	43.49	PK2	32.3	-24.5	0	51.29	-	-	74	-22.71	360	101	H
1.998	32.24	MAv1	32.3	-24.5	2.02	42.06	54	-11.94	-	-	360	101	H
6.804	28.23	MAv1	35.9	-30	2.02	36.15	54	-17.85	-	-	360	101	H
6.805	39.69	PK2	35.9	-30	0	45.59	-	-	74	-28.41	360	101	H
7.92	28.28	MAv1	35.6	-29.1	2.02	36.8	54	-17.2	-	-	360	101	H
7.922	39.63	PK2	35.6	-29.1	0	46.13	-	-	74	-27.87	360	101	H
9.659	26.14	MAv1	36.7	-26.4	2.02	38.46	54	-15.54	-	-	164	200	V
9.66	36.93	PK2	36.7	-26.4	0	47.23	-	-	74	-26.77	164	200	V

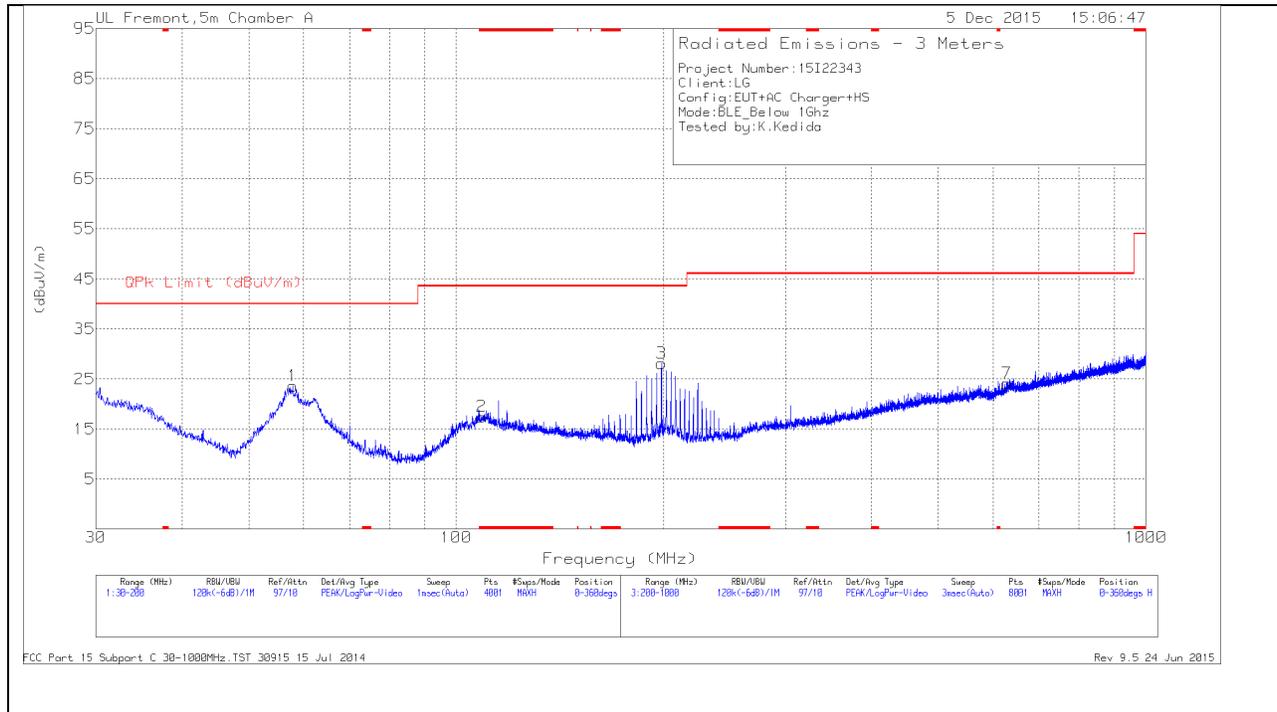
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

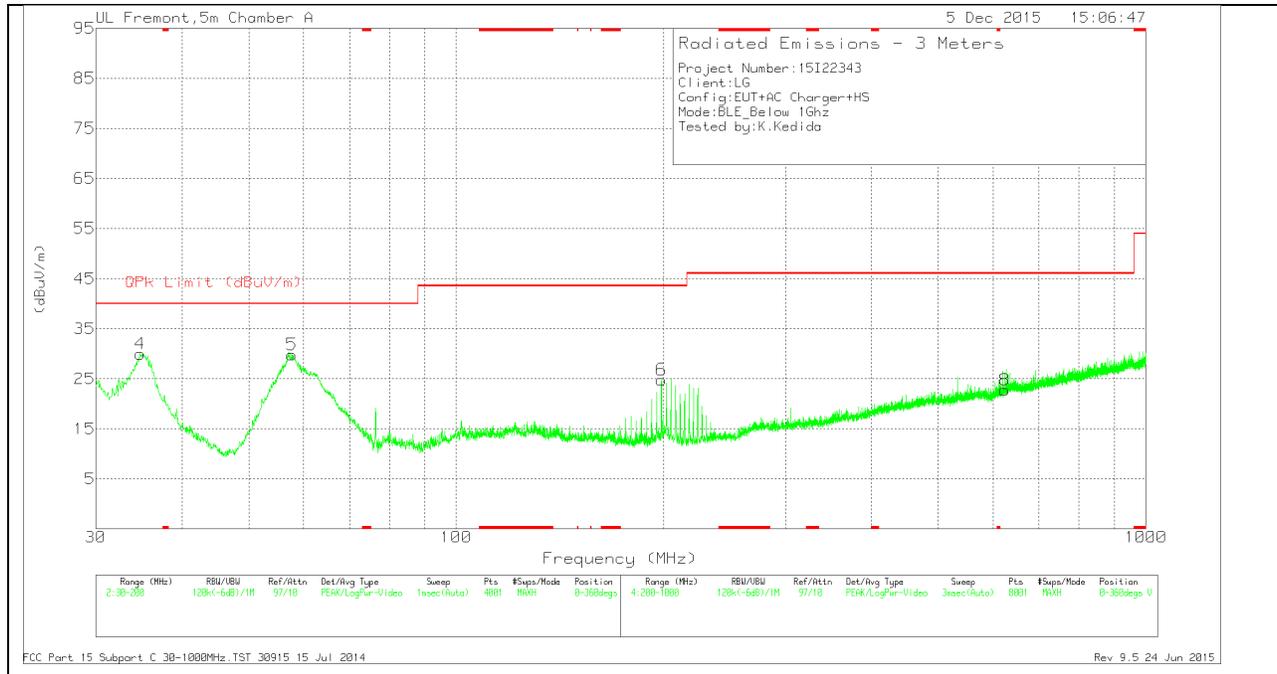
MAv1 - KDB558074 Option 1 Maximum RMS Average

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	AFT477 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 108.8163	31.57	Pk	16.4	-30.5	17.47	43.52	-26.05	0-360	399	H
4	34.8025	39.48	Pk	21.7	-31.2	29.98	40	-10.02	0-360	101	V
5	57.7525	49.62	Pk	11.1	-30.9	29.82	40	-10.18	0-360	101	V
1	57.9225	43.51	Pk	11.1	-31	23.61	40	-16.39	0-360	299	H
3	198.385	41.81	Pk	16.3	-30	28.11	43.52	-15.41	0-360	100	H
6	198.385	38.5	Pk	16.3	-30	24.8	43.52	-18.72	0-360	101	V
8	624.4	27.87	Pk	23.3	-28.4	22.77	46.02	-23.25	0-360	199	V
7	629.4	29.11	Pk	23.5	-28.5	24.11	46.02	-21.91	0-360	299	H

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

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

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.

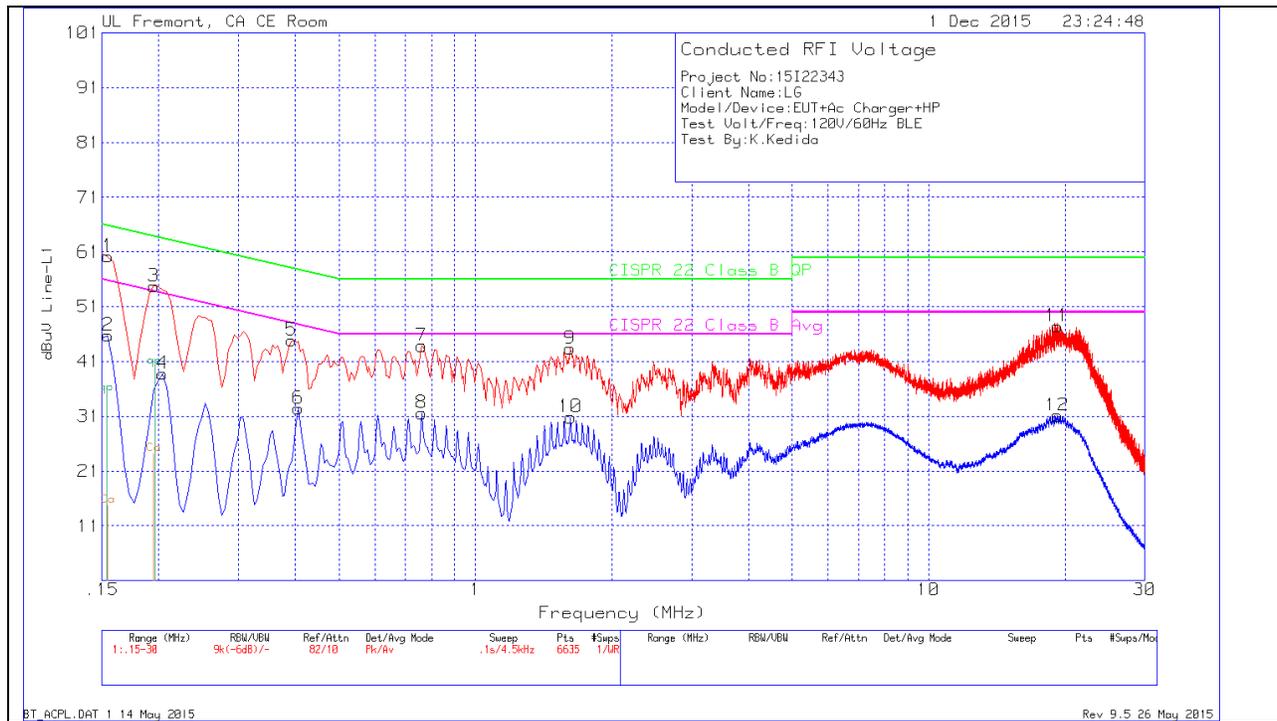
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

6 WORST EMISSIONS

LINE 1 PLOT



LINE 1 RESULTS

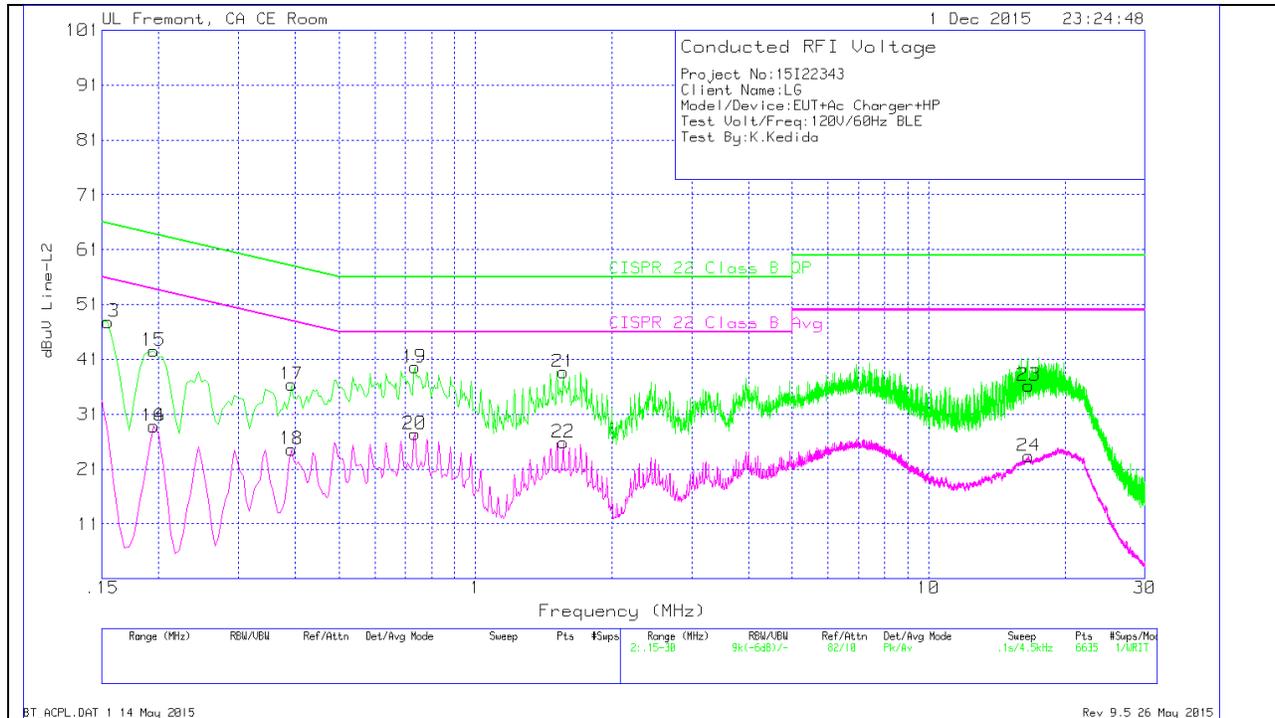
Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
1	.1545	58.86	Pk	1.3	0	60.16	65.75	-5.59		
2	.1545	44.46	Av	1.3	0	45.76	-	-	55.75	-9.99
3	.195	53.74	Pk	1	0	54.74	63.82	-9.08		
4	.204	37.84	Av	.9	0	38.74	-	-	53.45	-14.71
5	.393	44.46	Pk	.4	0	44.86	58	-13.14		
6	.4065	32.02	Av	.4	0	32.42	-	-	47.72	-15.3
7	.762	43.56	Pk	.3	0	43.86	56	-12.14		
8	.762	31.28	Av	.3	0	31.58	-	-	46	-14.42
9	1.617	43.05	Pk	.2	.1	43.35	56	-12.65		
10	1.6215	30.51	Av	.2	.1	30.81	-	-	46	-15.19
11	19.23	46.9	Pk	.3	.2	47.4	60	-12.6		
12	19.2255	30.6	Av	.3	.2	31.1	-	-	50	-18.9

Pk - Peak detector

Av - Average detection

LINE 2 PLOT



LINE 2 RESULTS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
13	.1545	46.42	Pk	1.4	0	47.82	65.75	-17.93		
14	.195	27.82	Av	1	0	28.82	-	-	53.82	-25
15	.195	41.57	Pk	1	0	42.57	63.82	-21.25		
16	.195	27.82	Av	1	0	28.82	-	-	53.82	-25
17	.393	36.02	Pk	.4	0	36.42	58	-21.58		
18	.393	24.19	Av	.4	0	24.59	-	-	48	-23.41
19	.735	39.3	Pk	.3	0	39.6	56	-16.4		
20	.735	27.09	Av	.3	0	27.39	-	-	46	-18.61
21	1.563	38.39	Pk	.2	.1	38.69	56	-17.31		
22	1.563	25.55	Av	.2	.1	25.85	-	-	46	-20.15
23	16.629	35.72	Pk	.3	.2	36.22	60	-23.78		
24	16.6245	22.85	Av	.3	.2	23.35	-	-	50	-26.65

Pk - Peak detector

Av - Average detection