FCC CFR47 PART 15 SUBPART C

BLUETOOTH LOW ENERGY

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/CDMA/LTE Phone + Bluetooth, DTS/UNII a/b/g/n/ac & NFC

MODEL NUMBER: LG-US991, US991, LGUS991

FCC ID: ZNFUS991

REPORT NUMBER: 15I20405 – E3

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Prepared for
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Revision History

Rev.	Issue Date	Revisions	Revised By
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	**LG ELECTRONICS MOBILECOMM U.S.A., INC.**
EUT DESCRIPTION:	**GSM/WCDMA/CDMA/LTE Phone + Bluetooth, DTS/UNII a/b/g/n/ac & NFC.**
MODEL:	**LG-US991, US991, LGUS991**
SERIAL NUMBER:	**0699-0243 (Radiated); 0699-0249 (Conducted)**
DATE TESTED:	**MAR 27 – APR 16, 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 C63.10-2009, FCC CFR 47 Part 2, 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(IC: 2324B-1)	☐ Chamber D(IC: 2324B-4)
☒ Chamber B(IC: 2324B-2)	☐ Chamber E(IC: 2324B-5)
☒ Chamber C(IC: 2324B-3)	☐ Chamber F(IC: 2324B-6)
	☐ Chamber G(IC: 2324B-7)
	☐ 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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 26000 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/CDMA/LTE Phone + Bluetooth, DTS/UNII a/b/g/n/ac & NFC.

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	6.16	4.13

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -0.52 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-04WD2	EAY62991904	N/A
Smart Case Cover	LG	LG-P1	DK0227	N/A
Wireless Charger	LG	WCD-110	LF1212625283010049	N/A
Earphone	LG	N/A	N/A	N/A

I/O CABLES

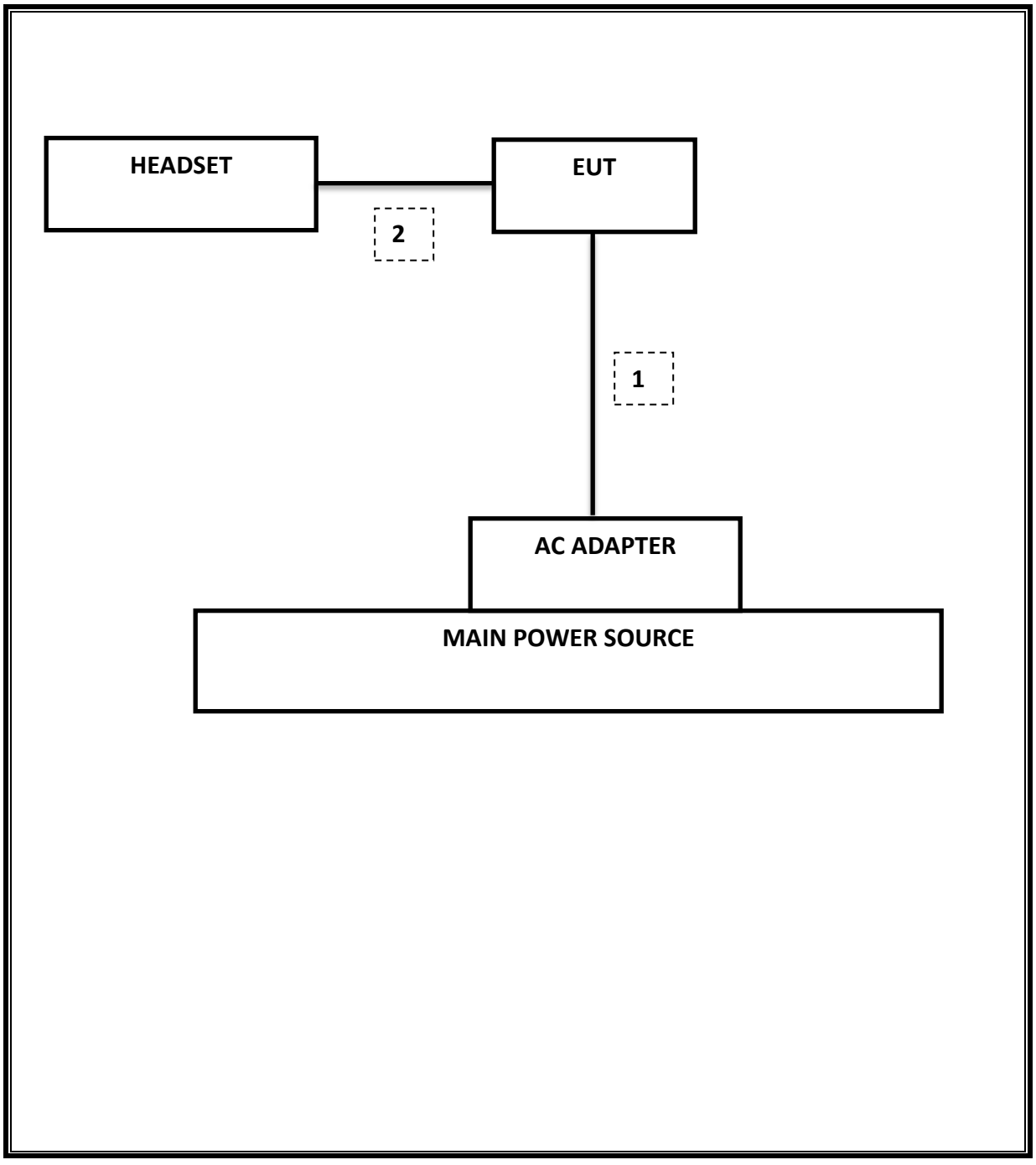
I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	DC Power	1	Mini-USB	Shielded	1.2m	N/A
2	Audio	1	Mini-Jack	Unshielded	1m	N/A

TEST SETUP

The EUT is continuously communicating to the Bluetooth tester during the tests.

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**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00986	4/1/2016
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	2/26/2016
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	8/8/2015
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	5/8/2015
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	10/22/2015
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	N/A	3/6/2016
Antenna, Horn, 18 GHz	ETS	3117	C01022	2/21/2016
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	12/17/2015
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/2015
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/2015
LISN, 30 MHz	FCC	50/250-25-2	C00626	1/14/2016

Test Software List			
Description	**Manufacturer**	**Model**	**Version**
Radiated Software	UL	UL EMC	Version 9.5, 07/22/14
Conducted Software	UL	UL EMC	Version 9.5, 05/17/14
CLT Software	UL	UL RF	Version 1.0, 02/02/15
Antenna Port Software	UL	UL RF	Version 2.1.1.1, 1/20/15

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	0.709 MHz
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-58.31 dBm
15.247	RSS-210 A8.4	TX conducted output power	<30dBm		Pass	6.16 dBm
15.247	RSS-210 A8.2	PSD	<8dBm		Pass	-7.89 dBm
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	53.46 dBuV(AV)
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	42.78 dBuV/m

ANTENNA PORT TEST RESULTS

8.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

TEST PROCEDURE

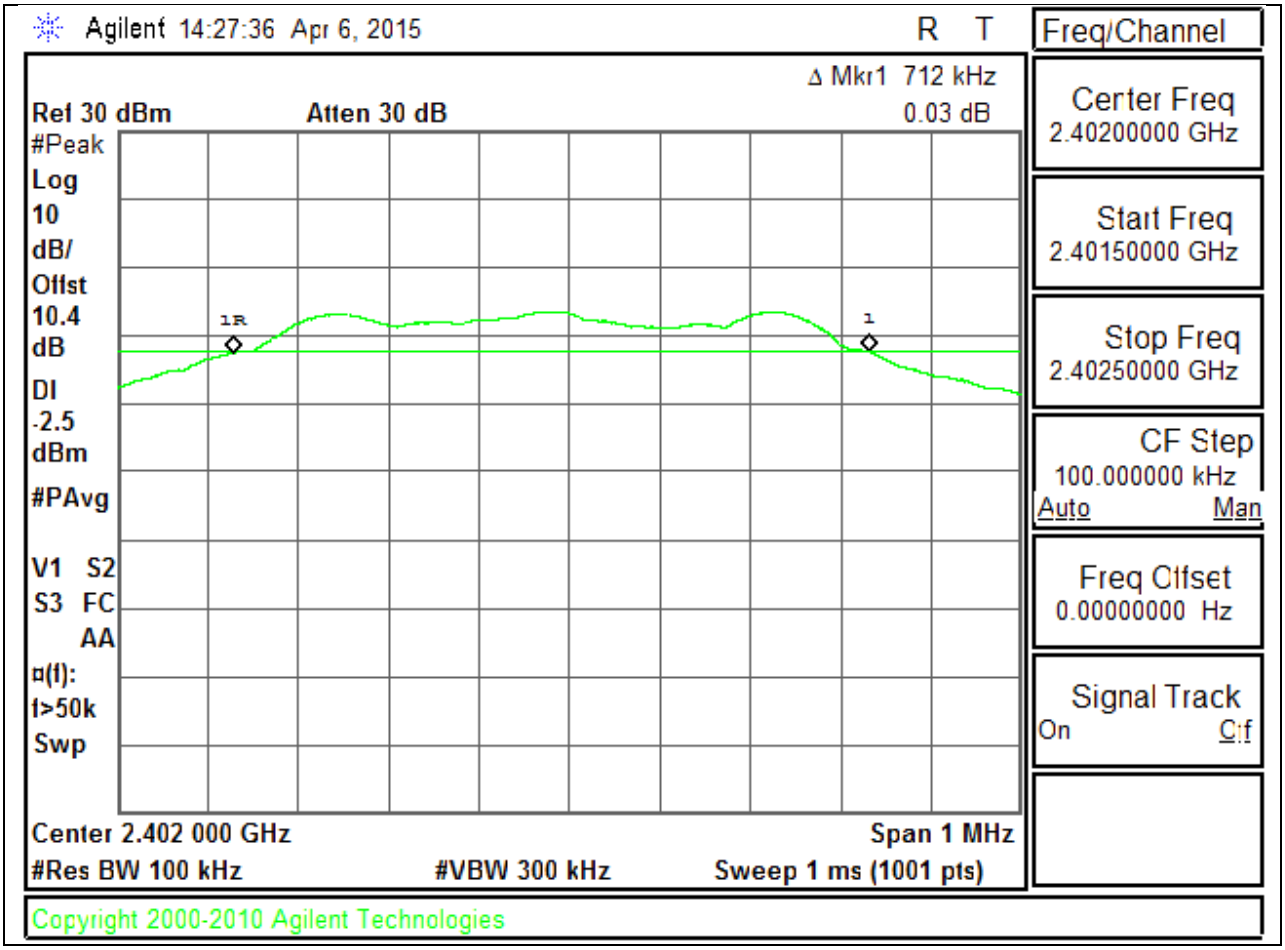
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

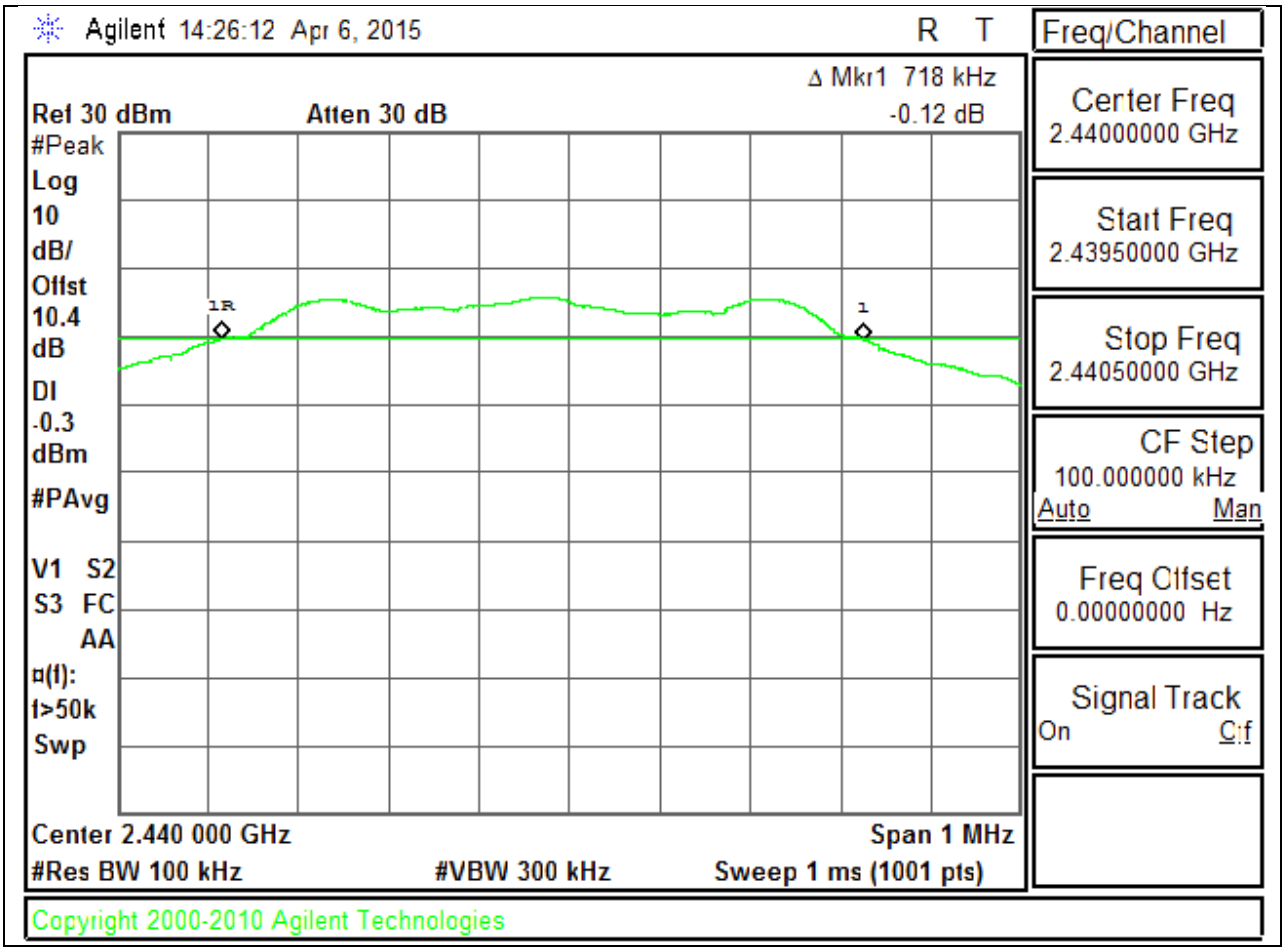
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.7120	0.5
Middle	2440	0.7180	0.5
High	2480	0.7090	0.5

6 dB BANDWIDTH PLOTS

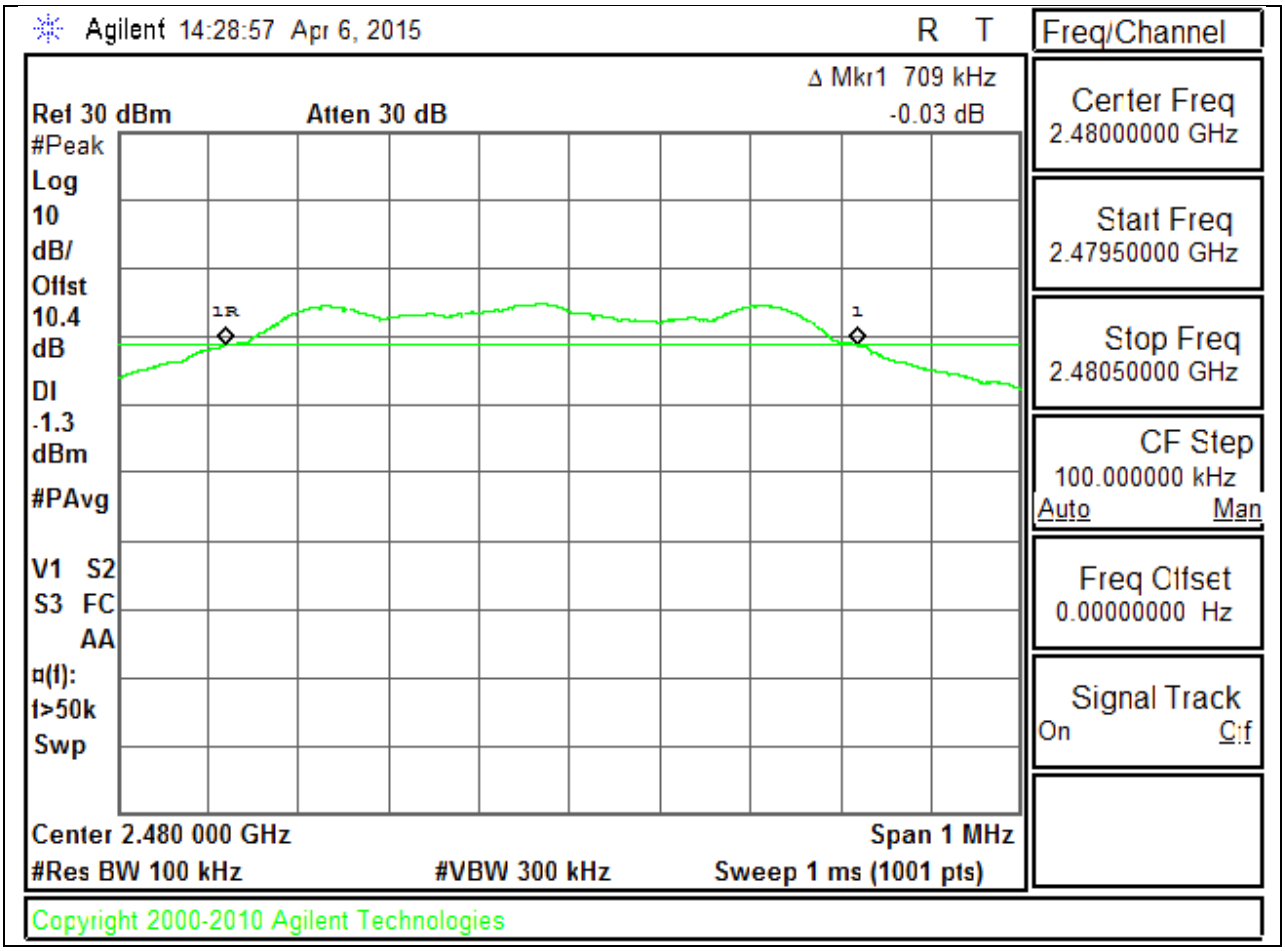
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

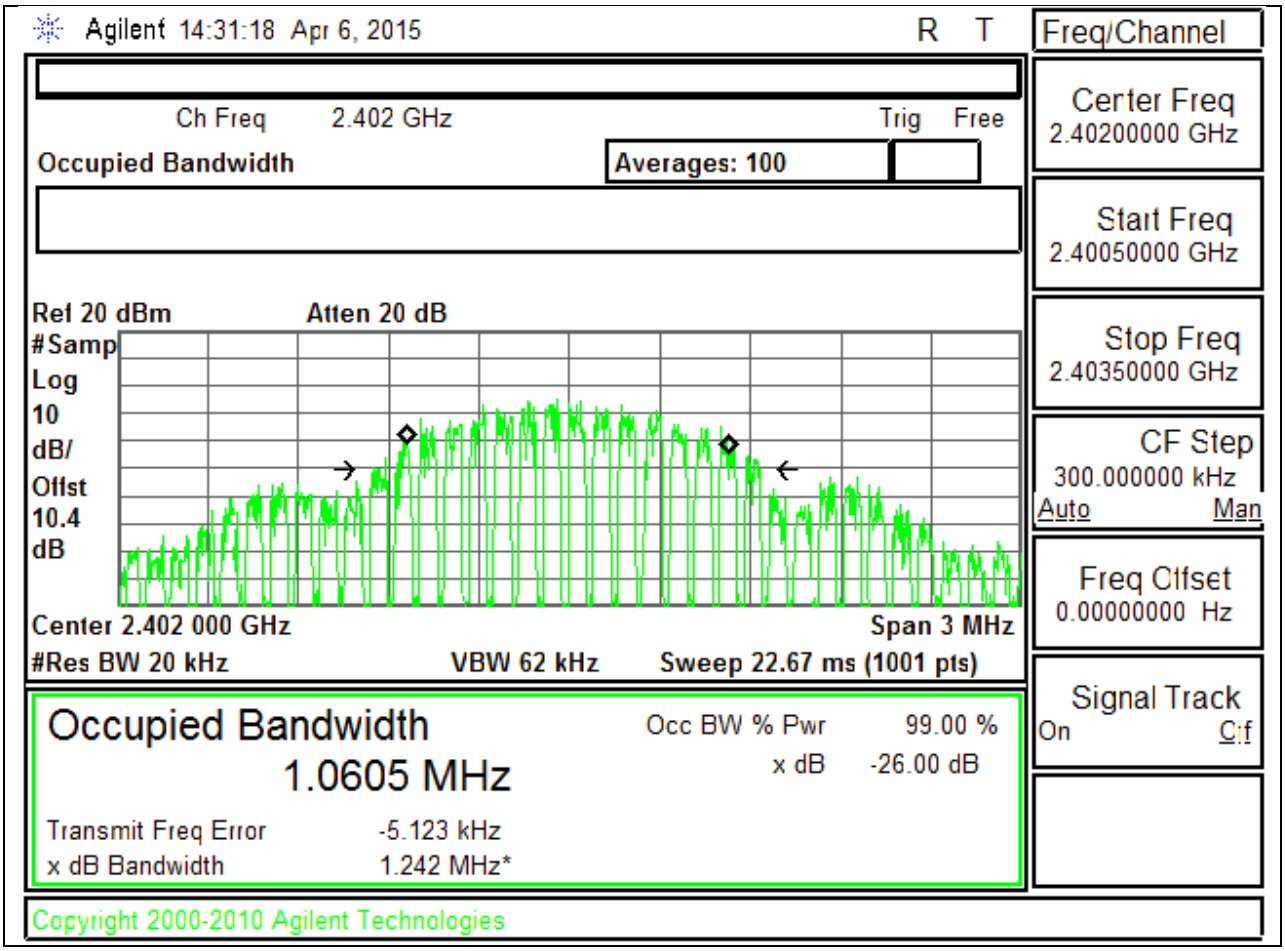
Reference to KDB558074 D01 DTS Meas Guidance v03r02: The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

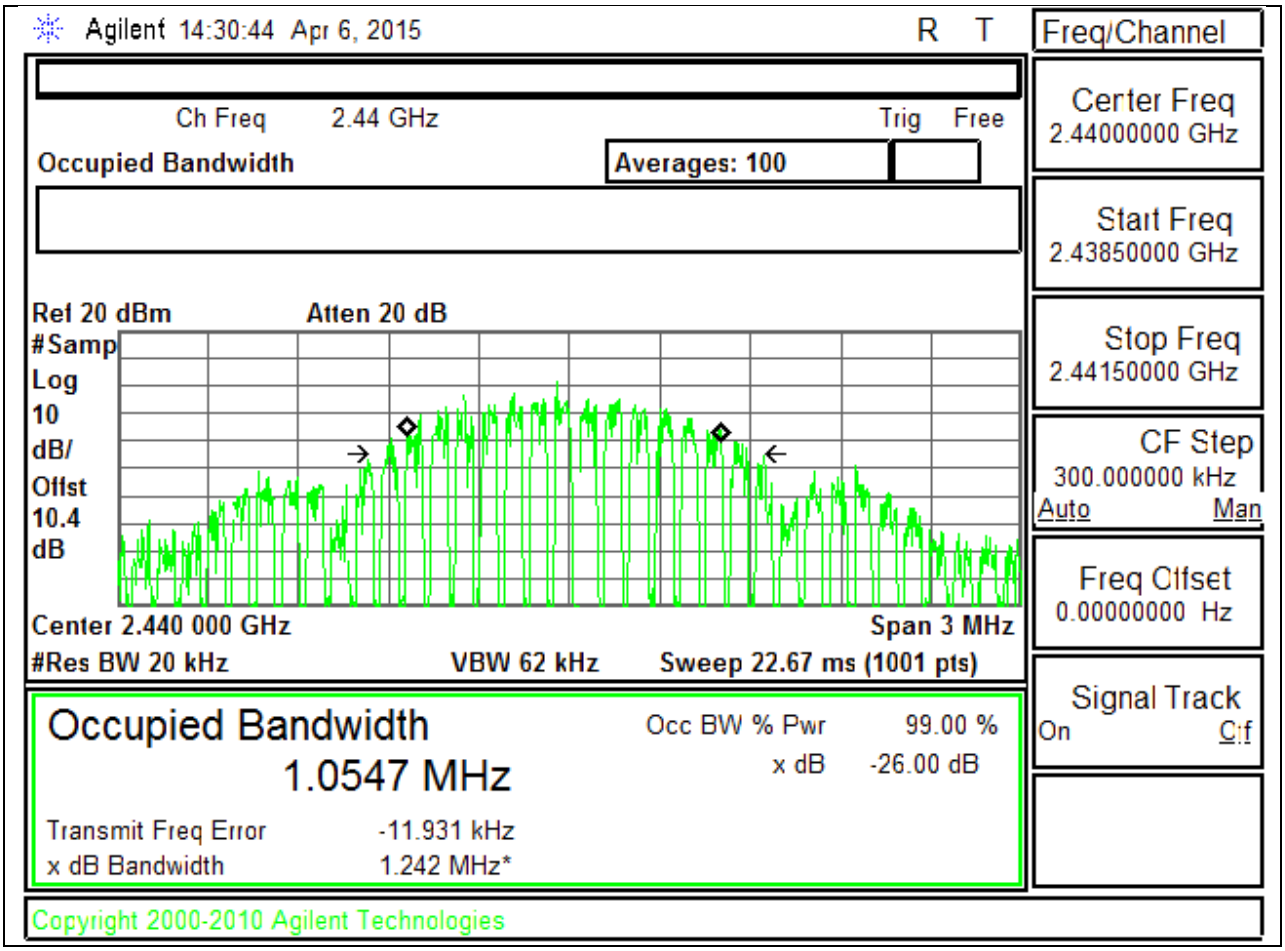
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0605
Middle	2440	1.0547
High	2480	1.0583

99% BANDWIDTH PLOTS

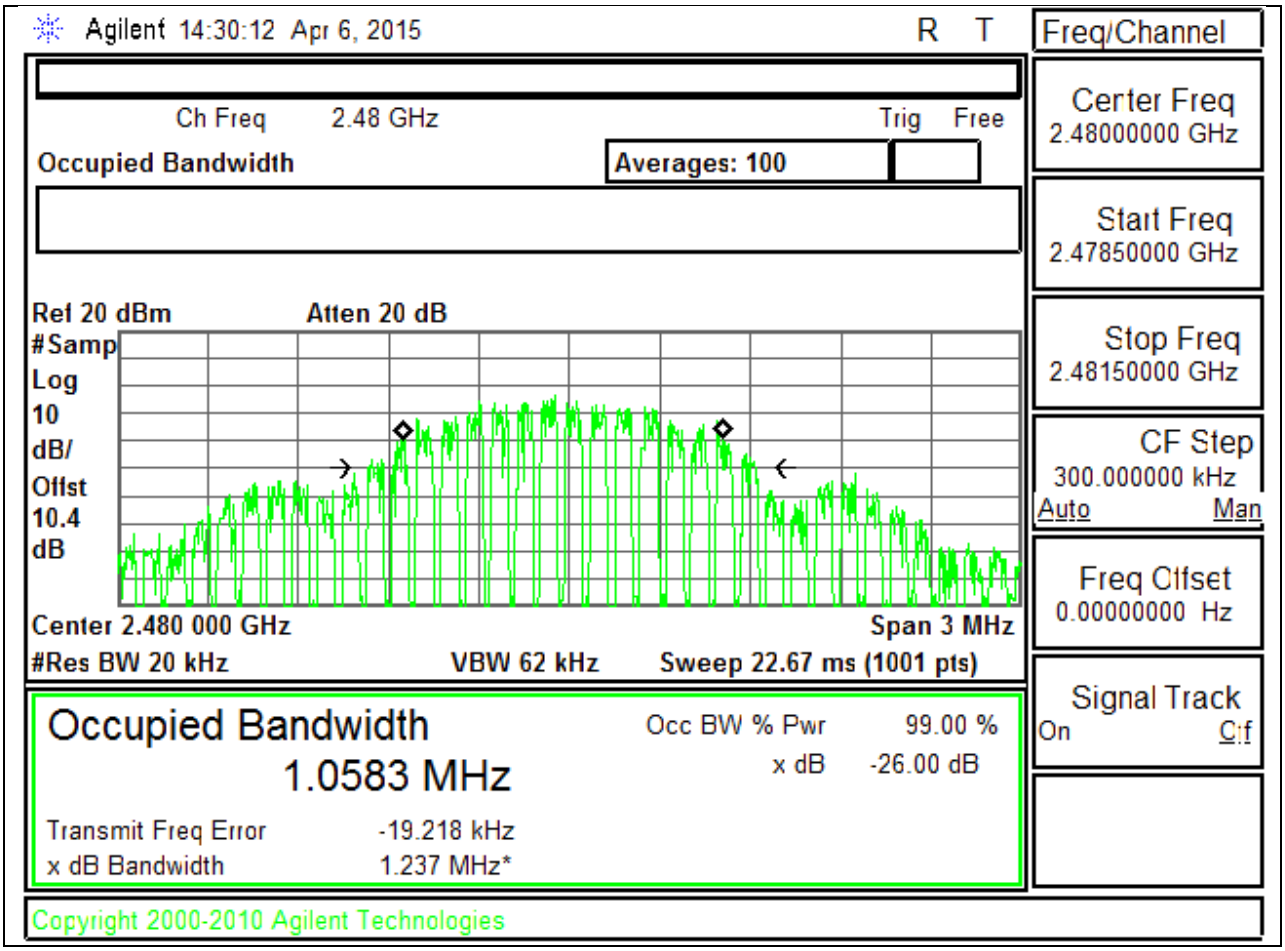
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

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

TEST PROCEDURE

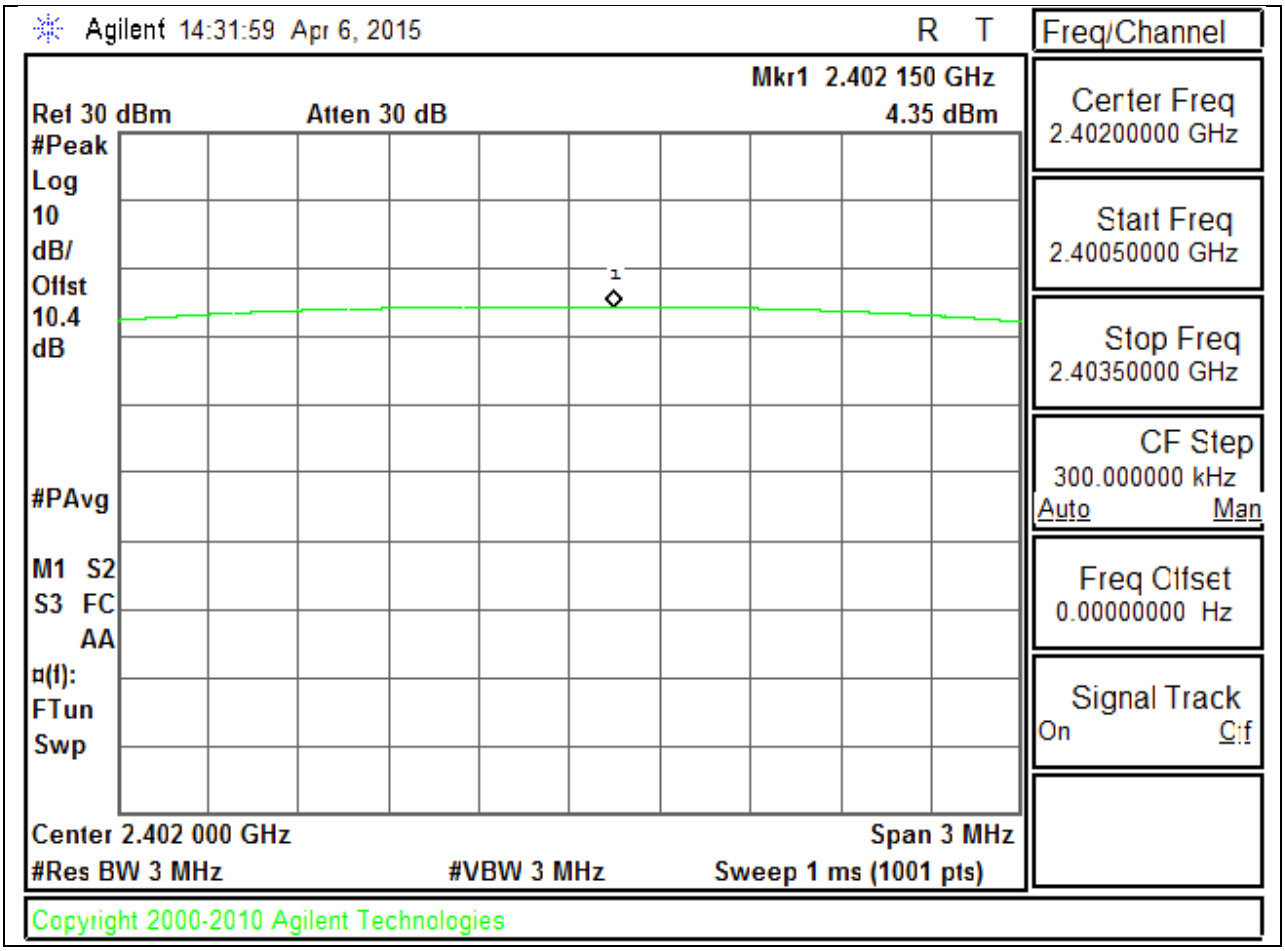
Peak power is measured using KDB558074 D01 DTS Meas Guidance v03r02 under section 9.1.1 utilizing spectrum analyze.

RESULTS

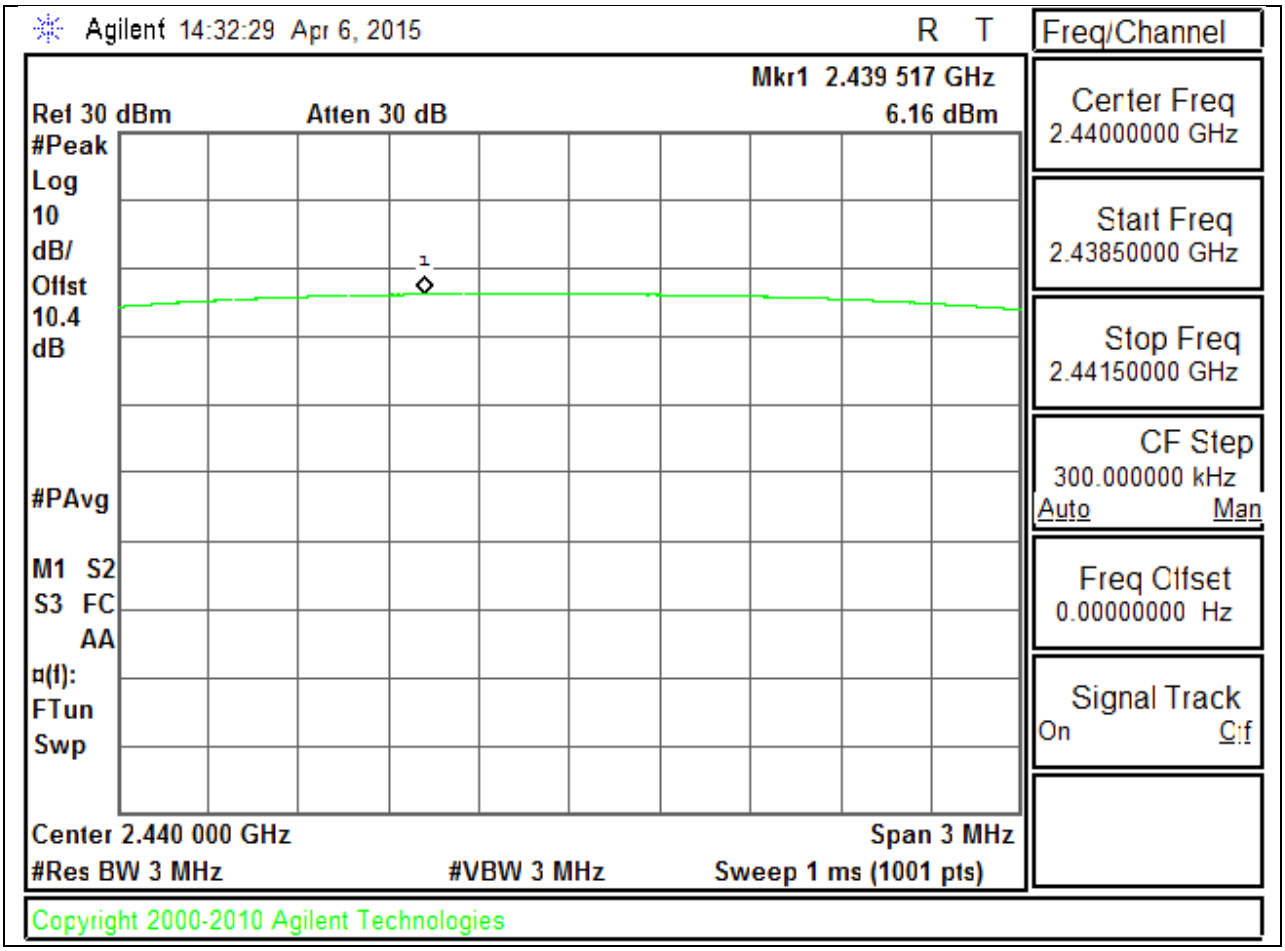
Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	4.350	30	-25.650
Middle	2440	6.160	30	-23.840
High	2480	5.410	30	-24.590

OUTPUT POWER PLOTS

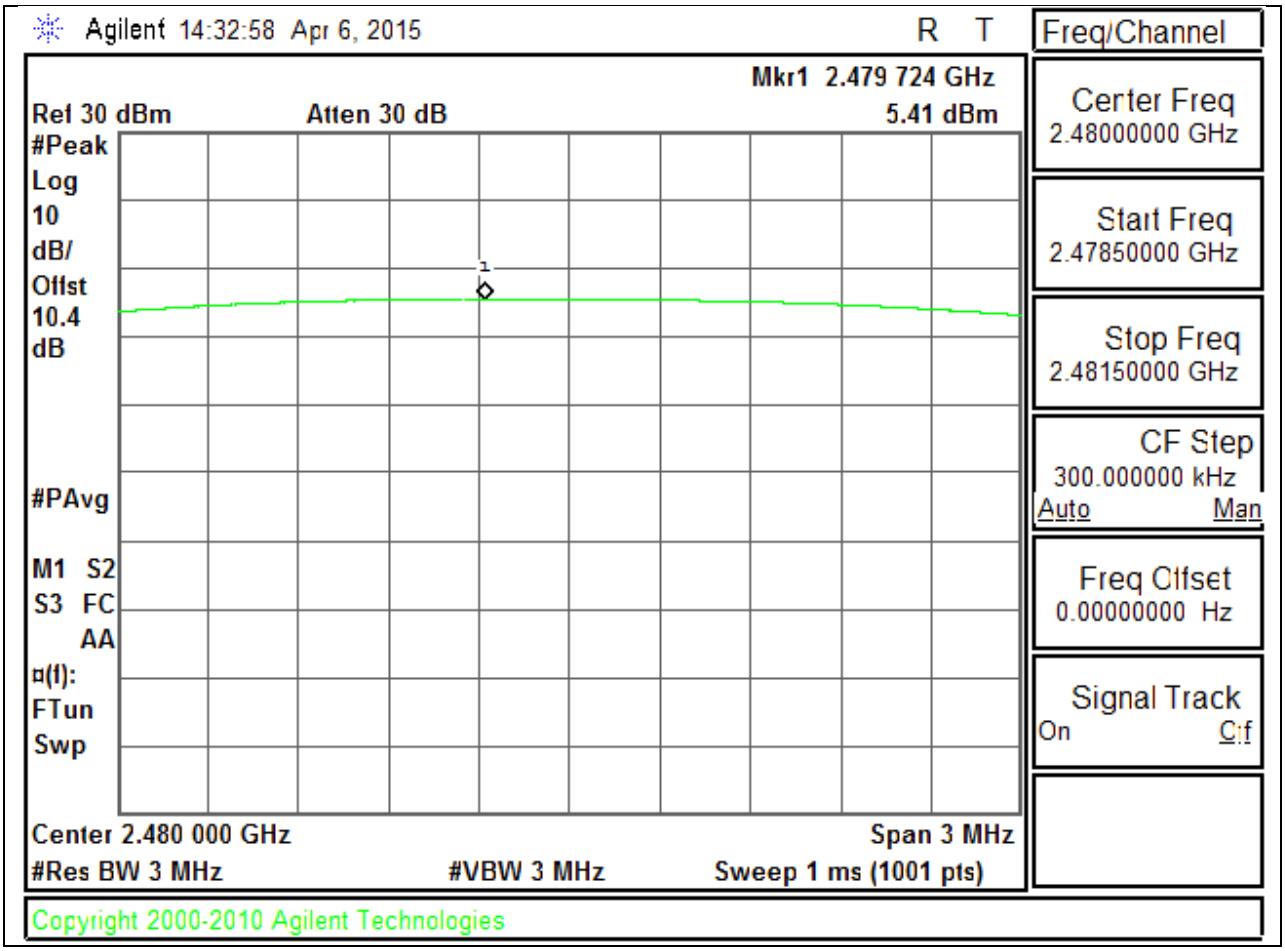
LOW CHANNEL



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	3.7
Middle	2440	5.9
High	2480	5.2

8.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

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

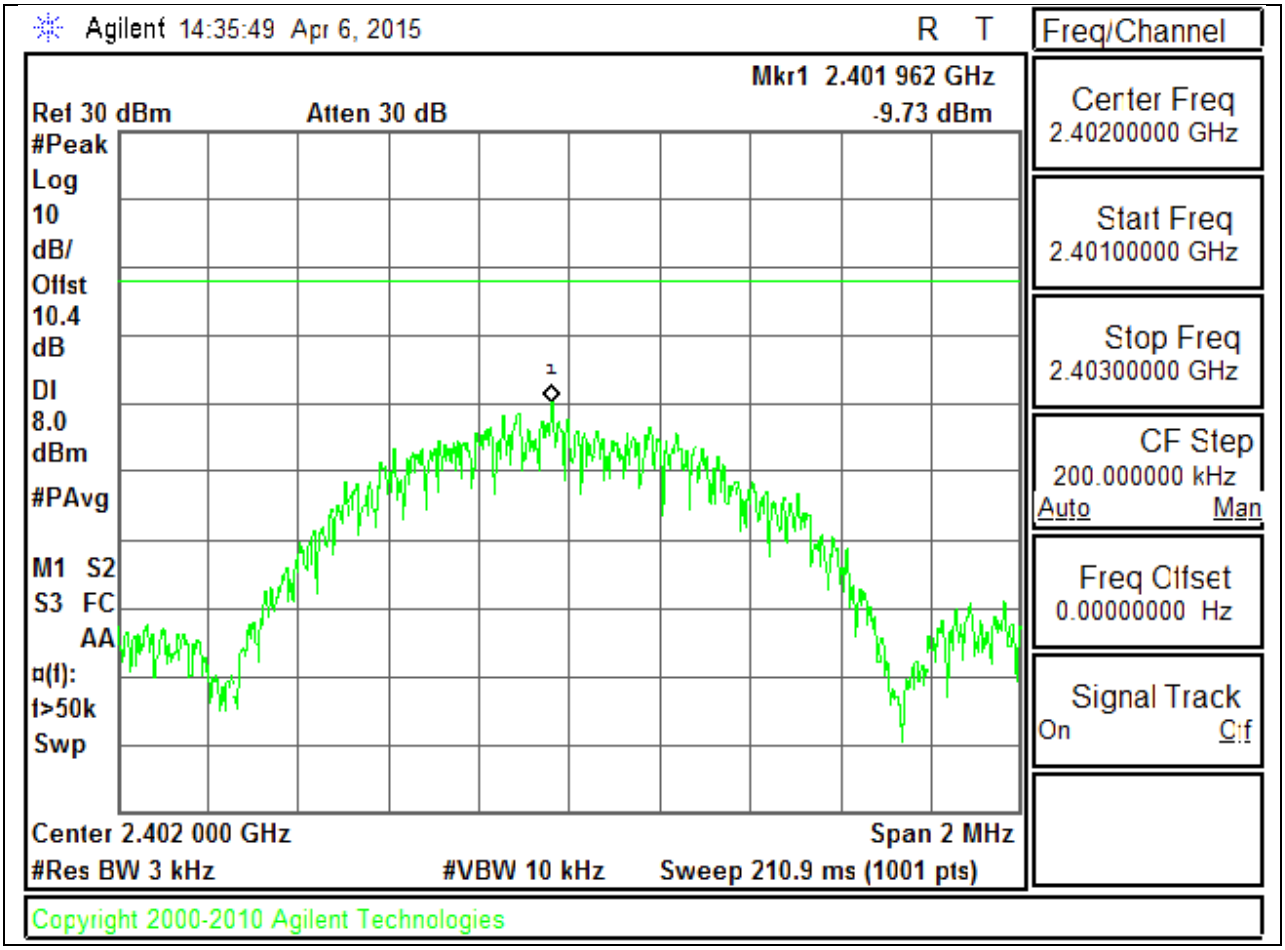
Power Spectral Density was performed utilizing the "Method PKPSD (Peak PSD)" under KDB558074 D01 DTS Meas Guidance v03r02

RESULTS

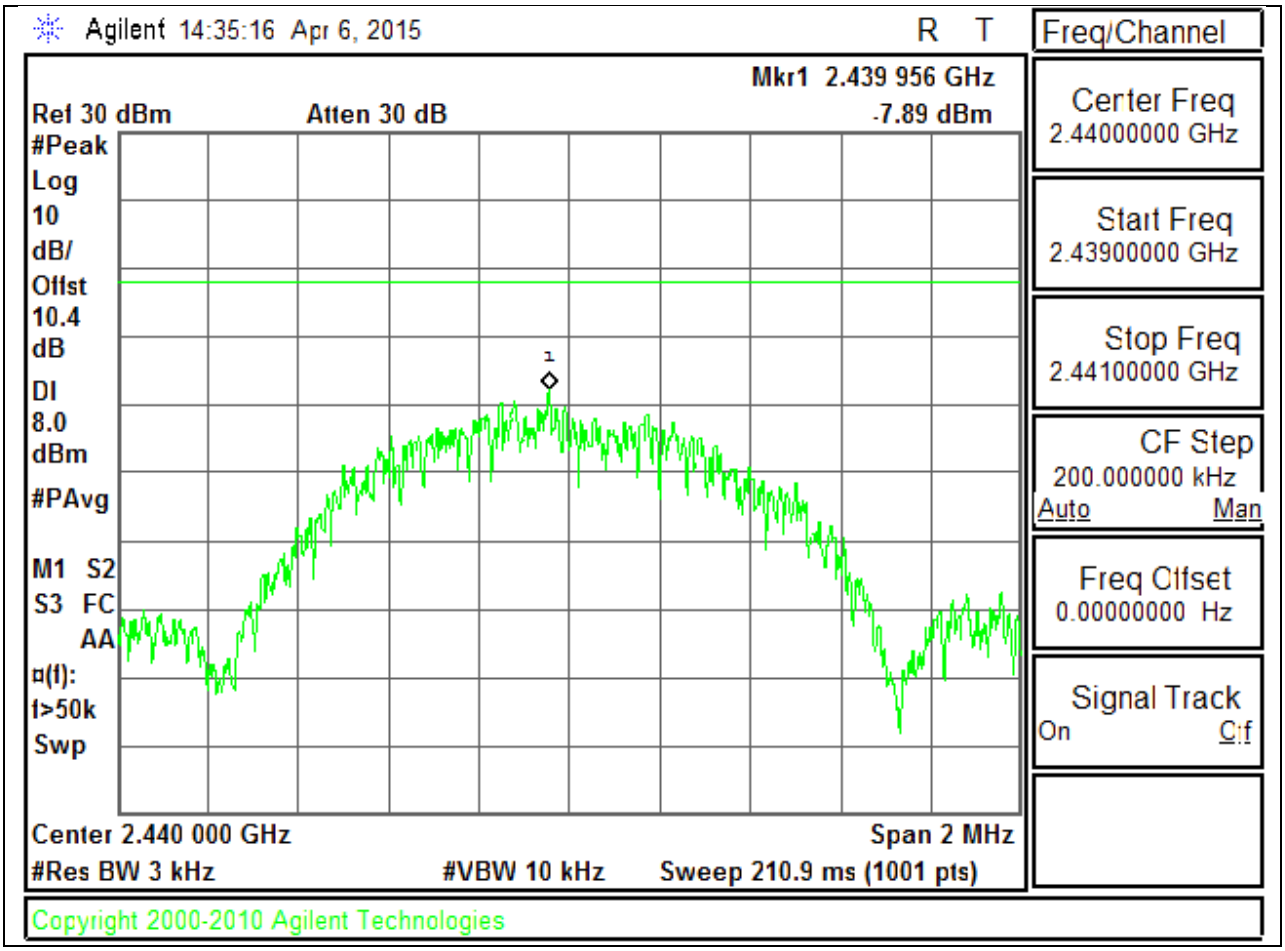
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-9.73	8	-17.73
Middle	2440	-7.89	8	-15.89
High	2480	-8.51	8	-16.51

POWER SPECTRAL DENSITY PLOTS

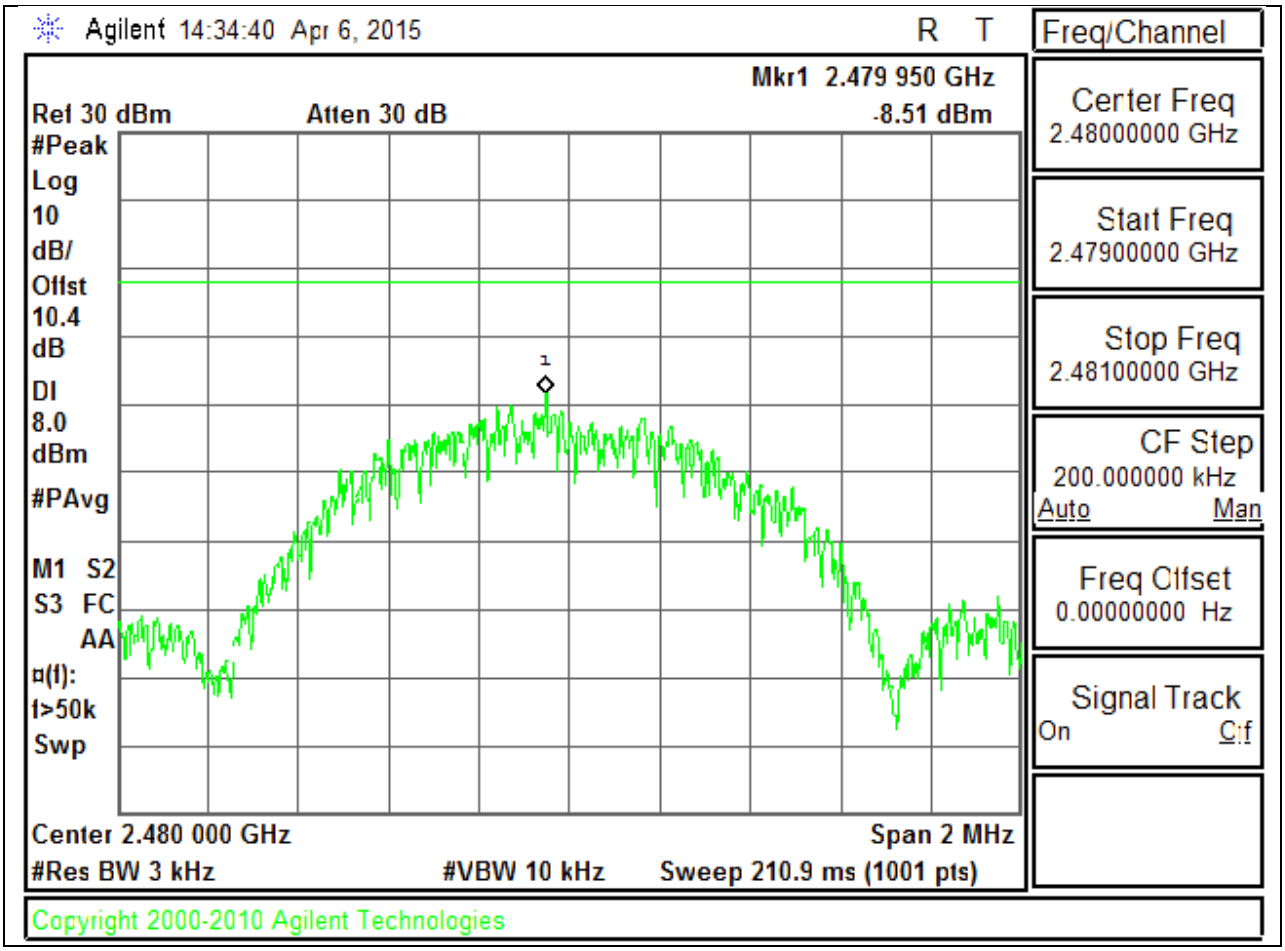
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

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

TEST PROCEDURE

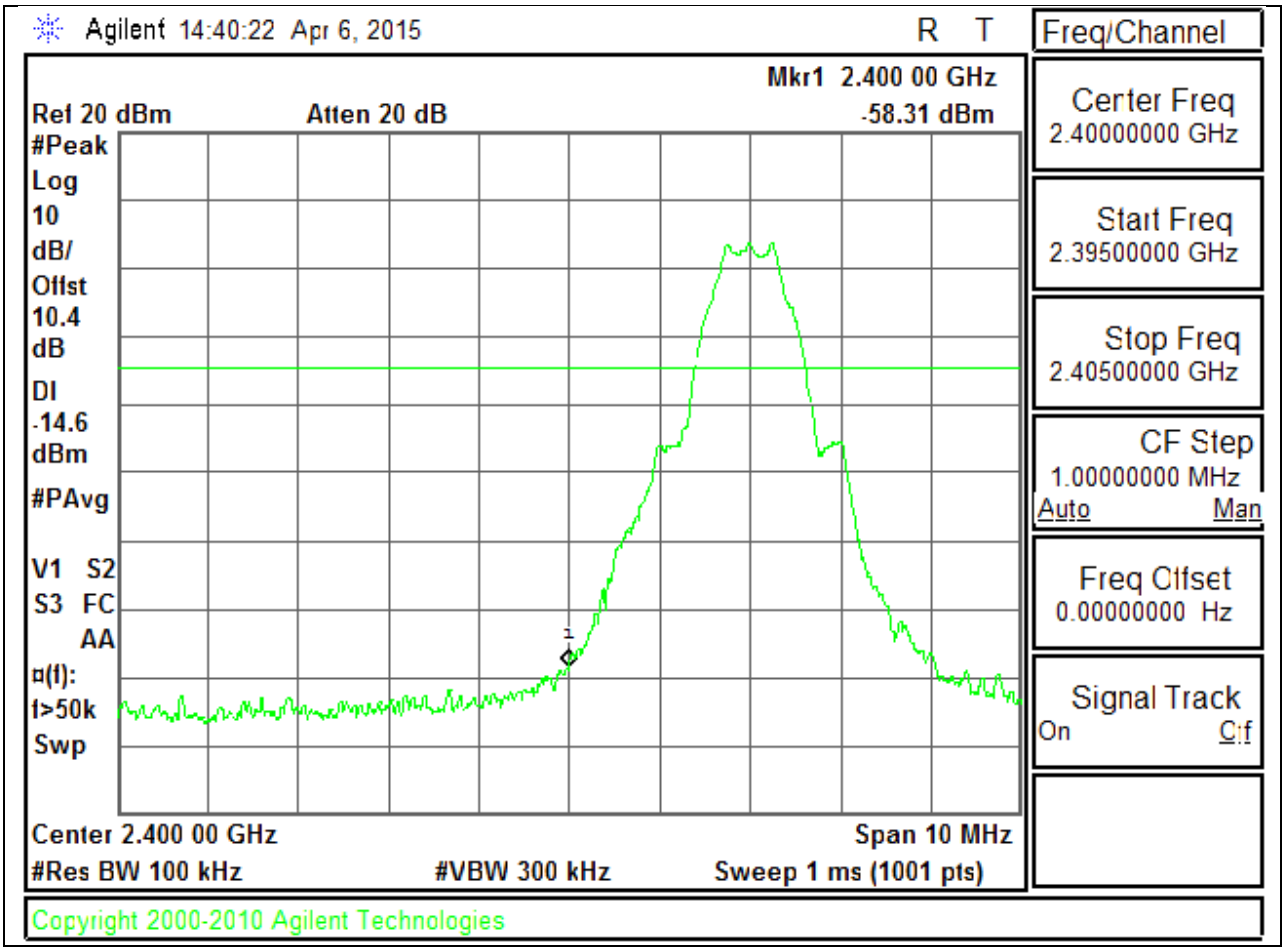
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

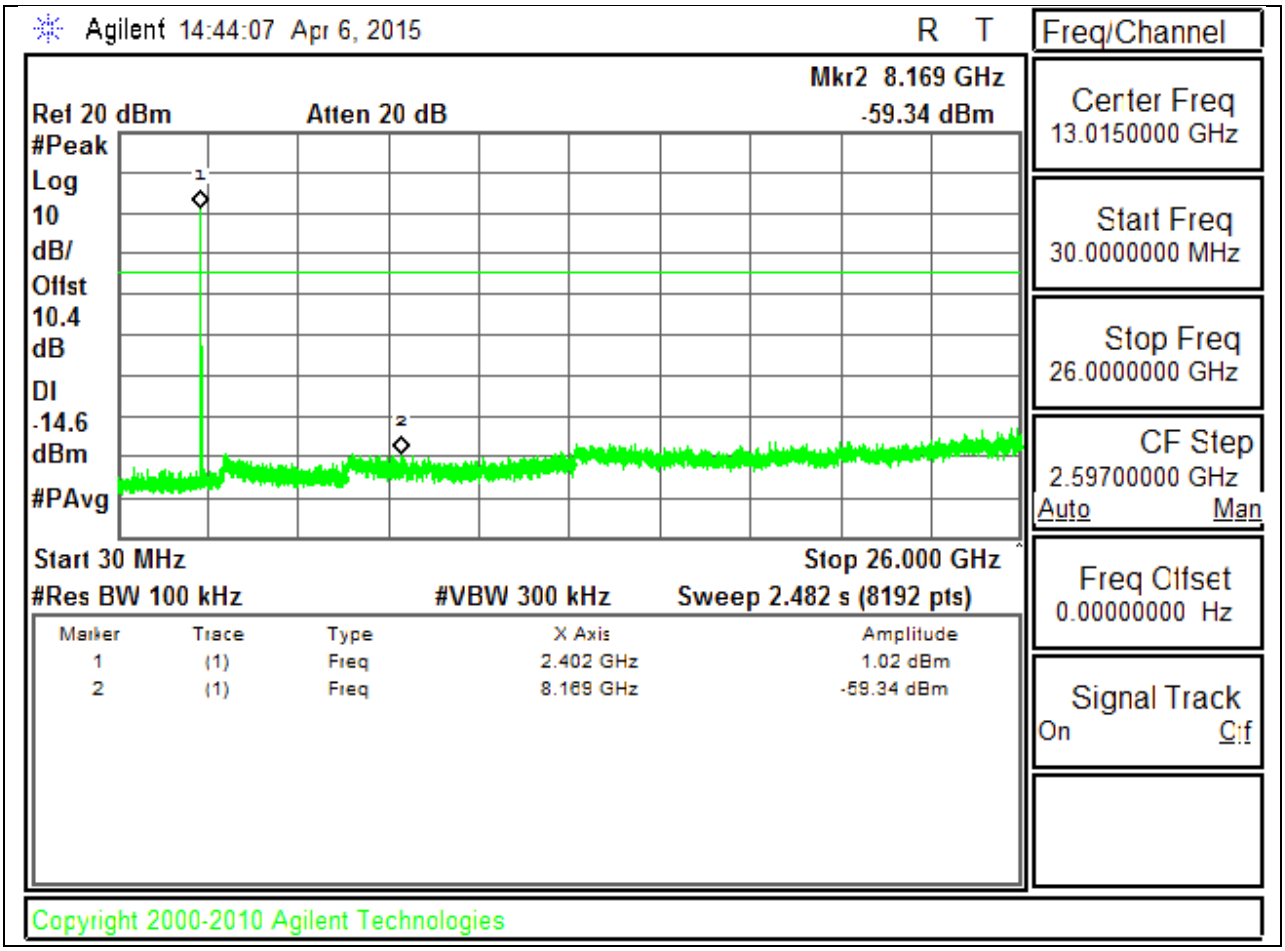
RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE

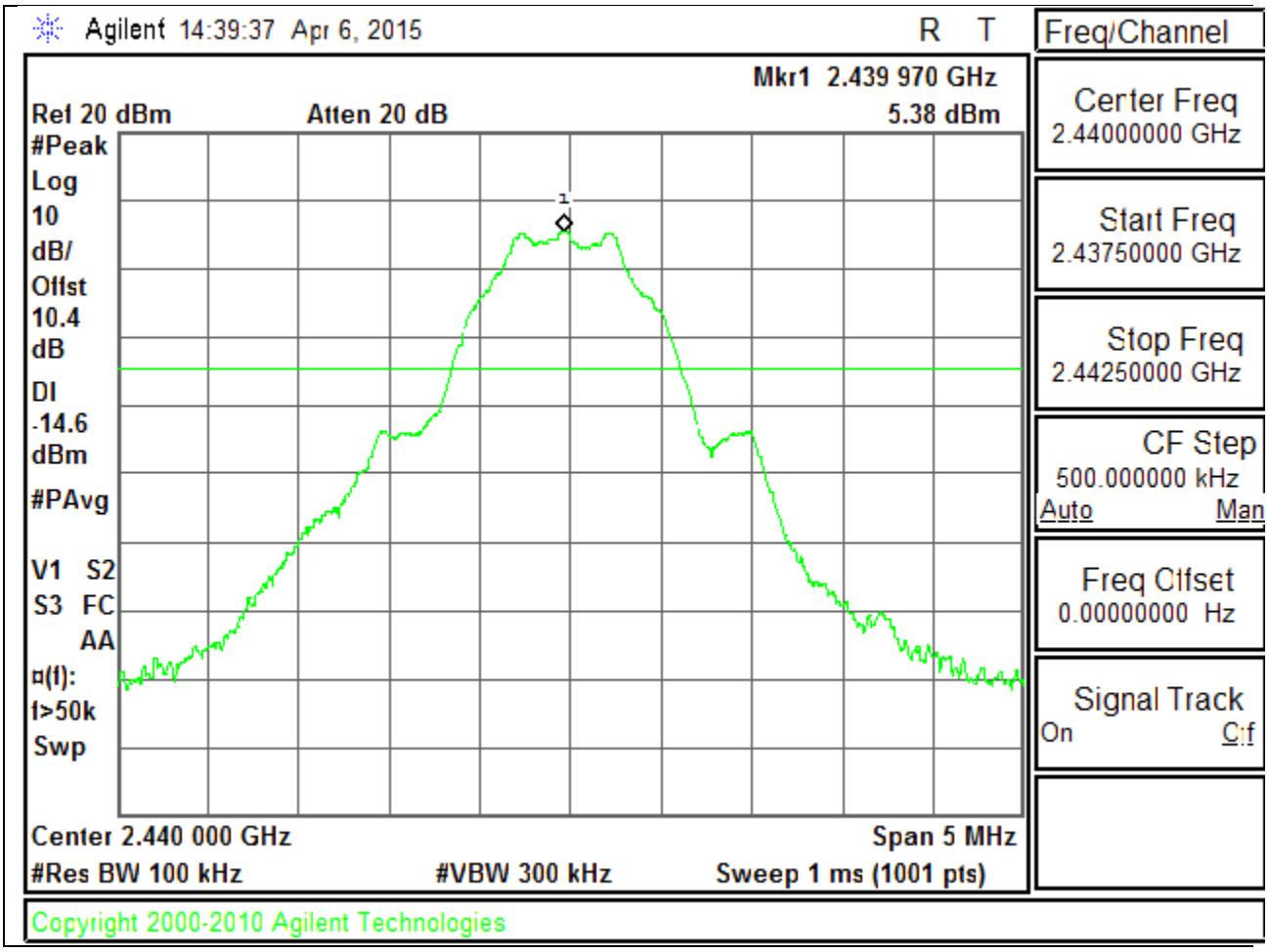


LOW CHANNEL SPURIOUS

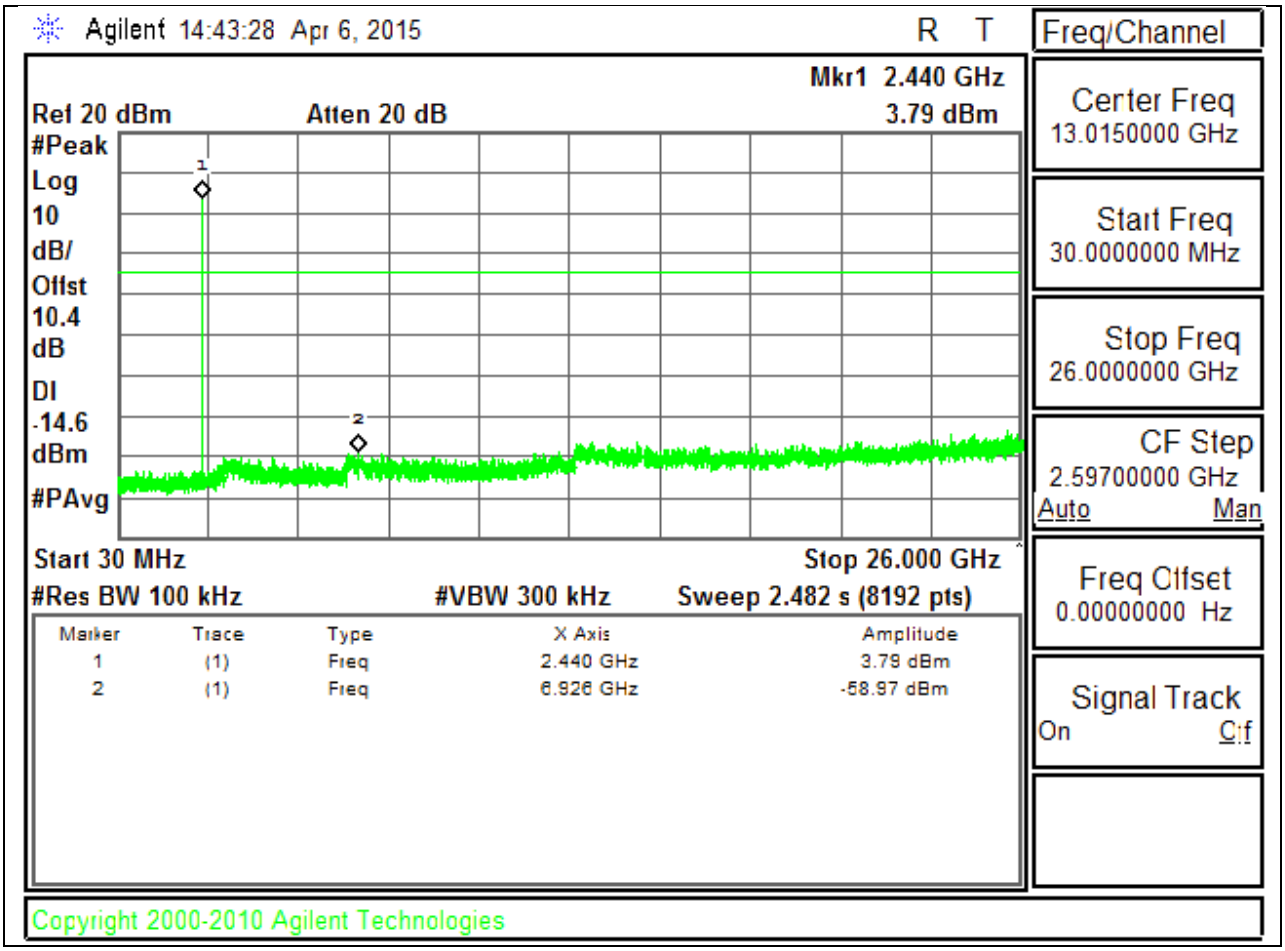


SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL REFERENCE

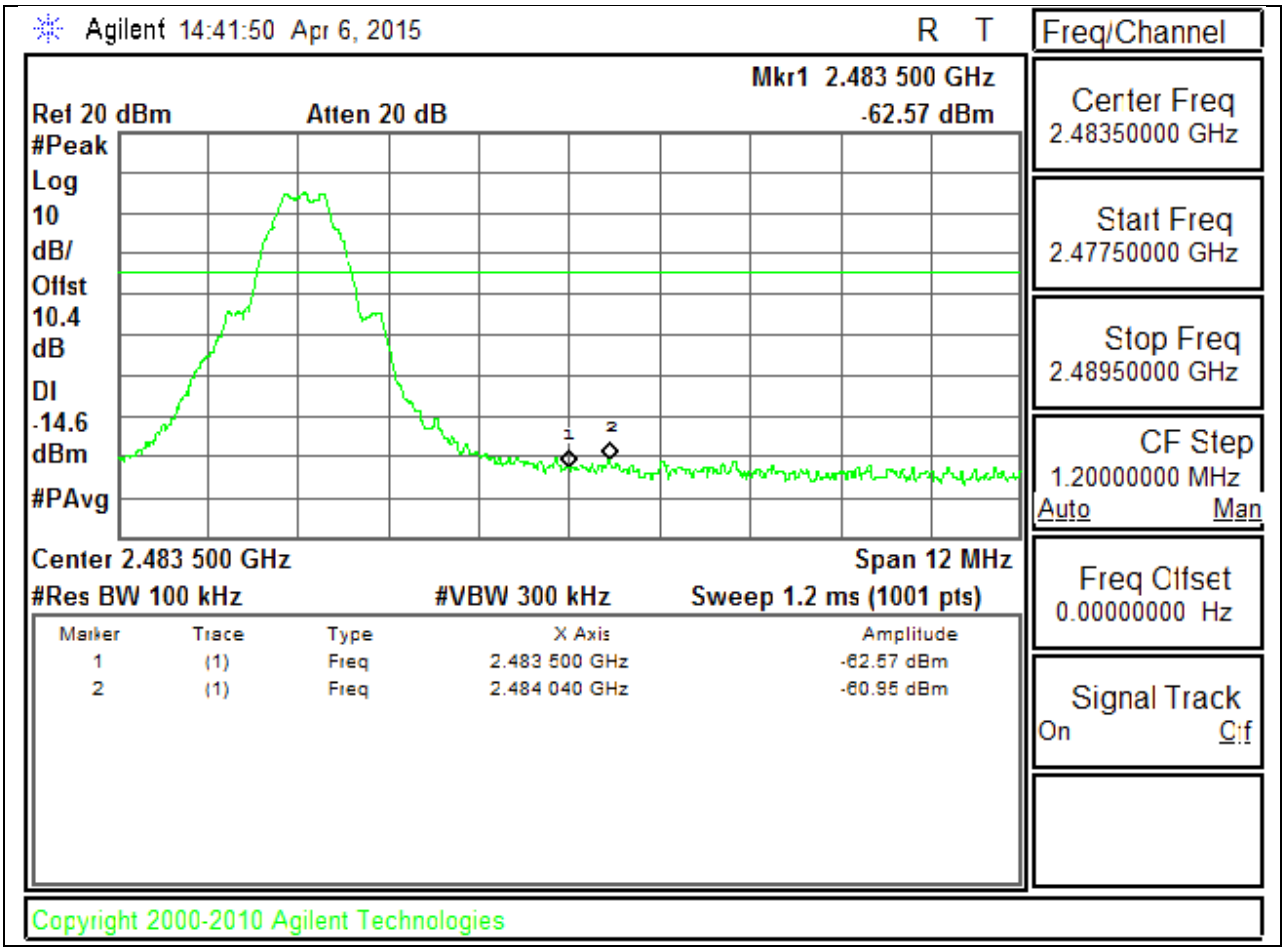


MID CHANNEL SPURIOUS

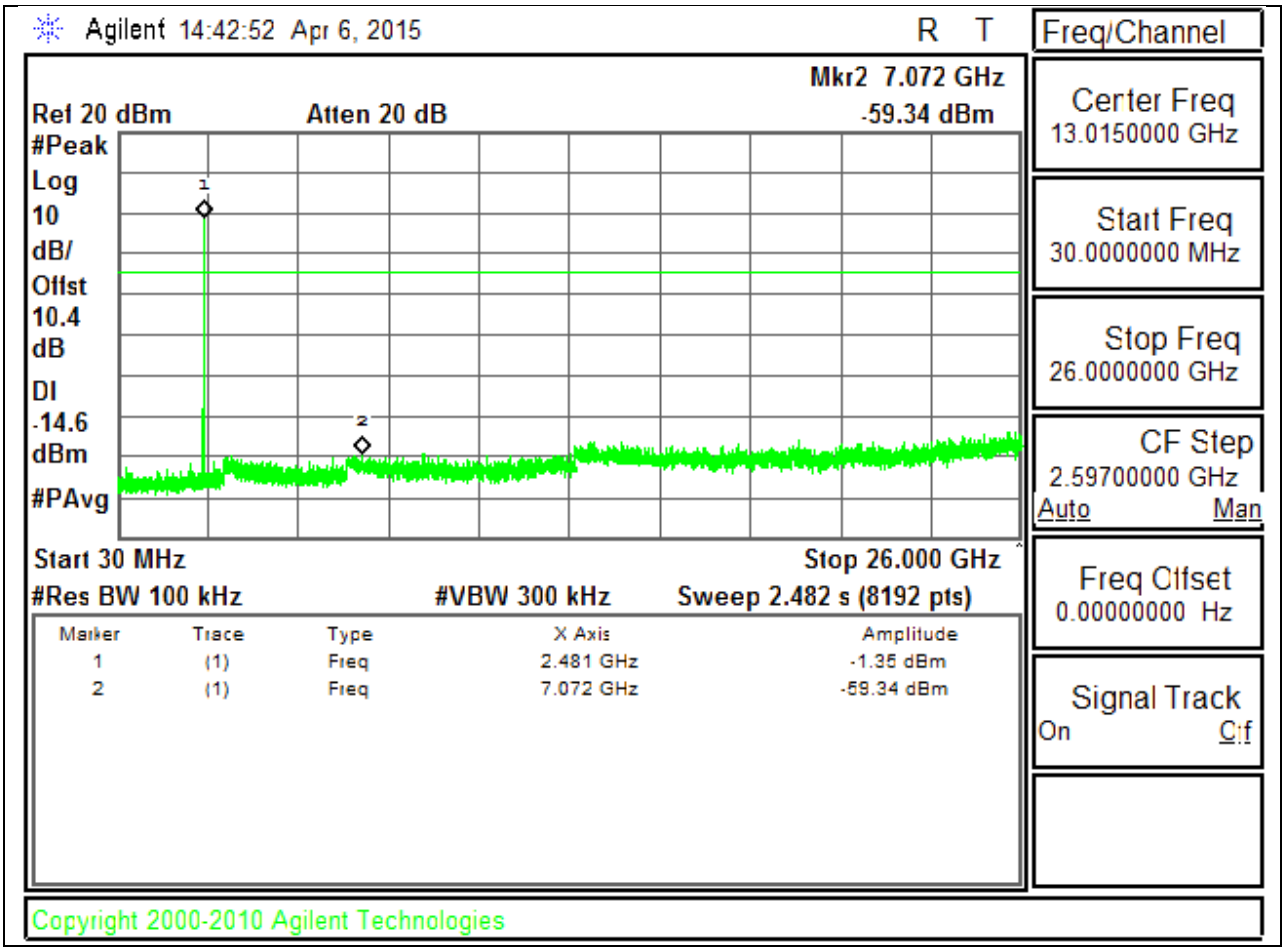


SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CHANNEL BANDEDGE



HIGH CHANNEL SPURIOUS



9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-GEN Clause 8.9 (Transmitter)

IC RSS-GEN Clause 7 (Receiver)

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 C63.10. 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 this sample: DCF = 10log(1/0.6224)=2.05dB

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.

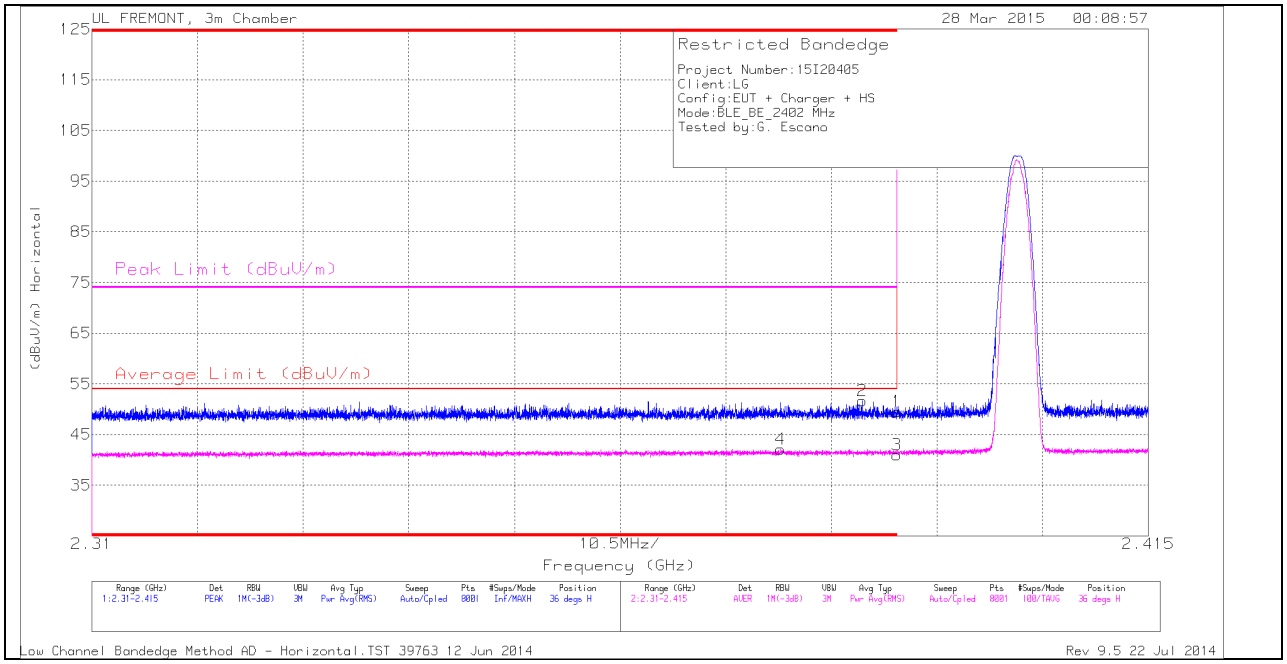
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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)

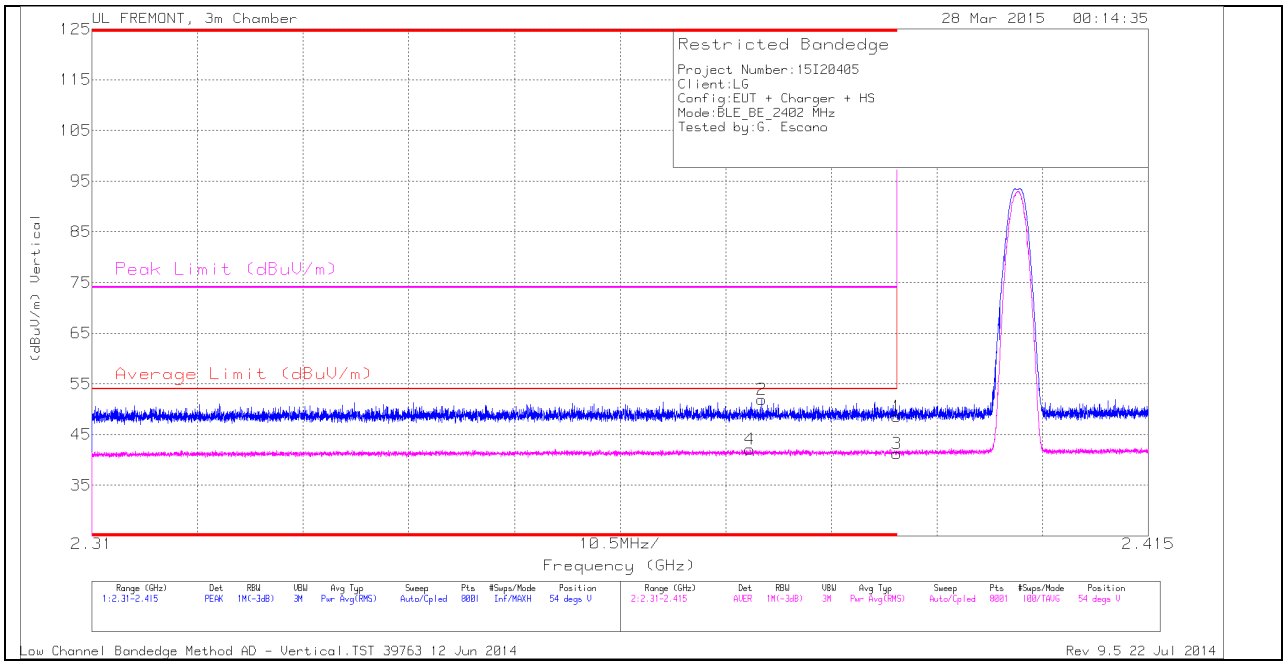
HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr/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	40.64	PK	32	-23.1	0	49.54	-	-	74	-24.46	36	193	H
2	* 2.387	42.76	PK	32	-23.1	0	51.66	-	-	74	-22.34	36	193	H
3	* 2.39	30.08	RMS	32	-23.1	2.05	41.03	54	-12.97	-	-	36	193	H
4	* 2.378	31.27	RMS	31.9	-23.1	2.05	42.12	54	-11.88	-	-	36	193	H

VERTICAL PEAK AND AVERAGE PLOT

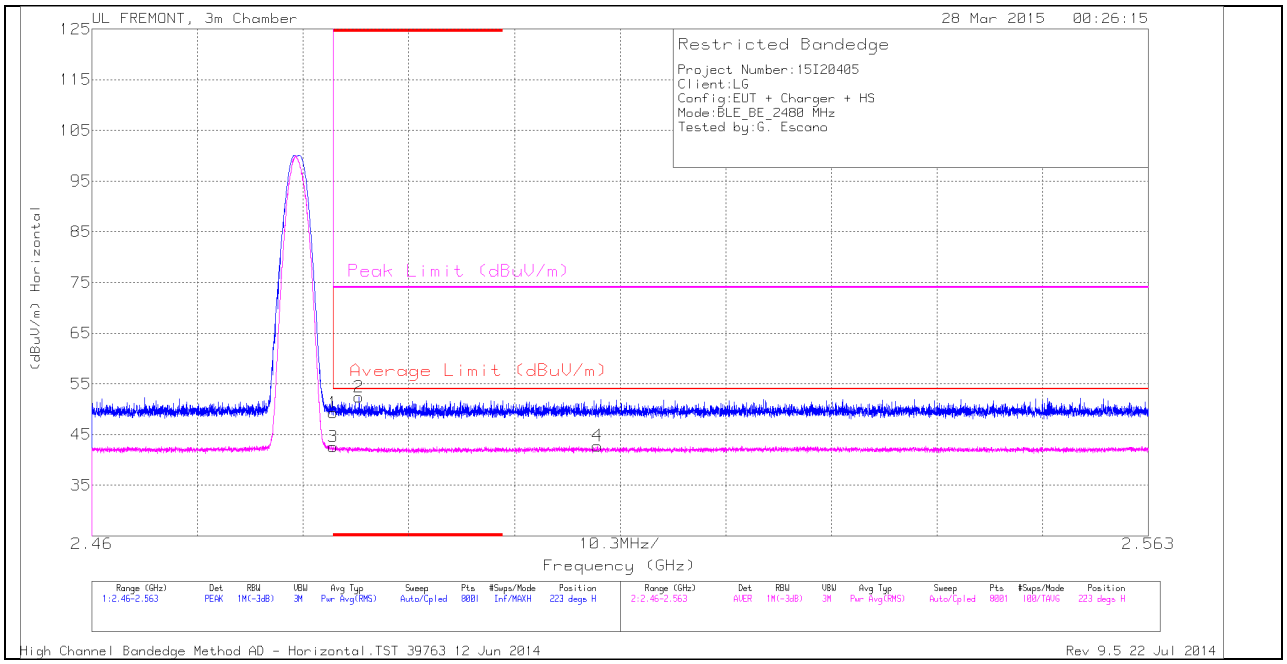


VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Flt 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
4	* 2.375	31.29	RMS	31.9	-23.1	2.05	42.14	54	-11.86	-	-	54	166	V
2	* 2.377	43.16	PK	31.9	-23.1	0	51.96	-	-	74	-22.04	54	166	V
1	* 2.39	39.71	PK	32	-23.1	0	48.61	-	-	74	-25.39	54	166	V
3	* 2.39	30.27	RMS	32	-23.1	2.05	41.22	54	-12.78	-	-	54	166	V

AUTHORIZED BANDEDGE (HIGH CHANNEL)

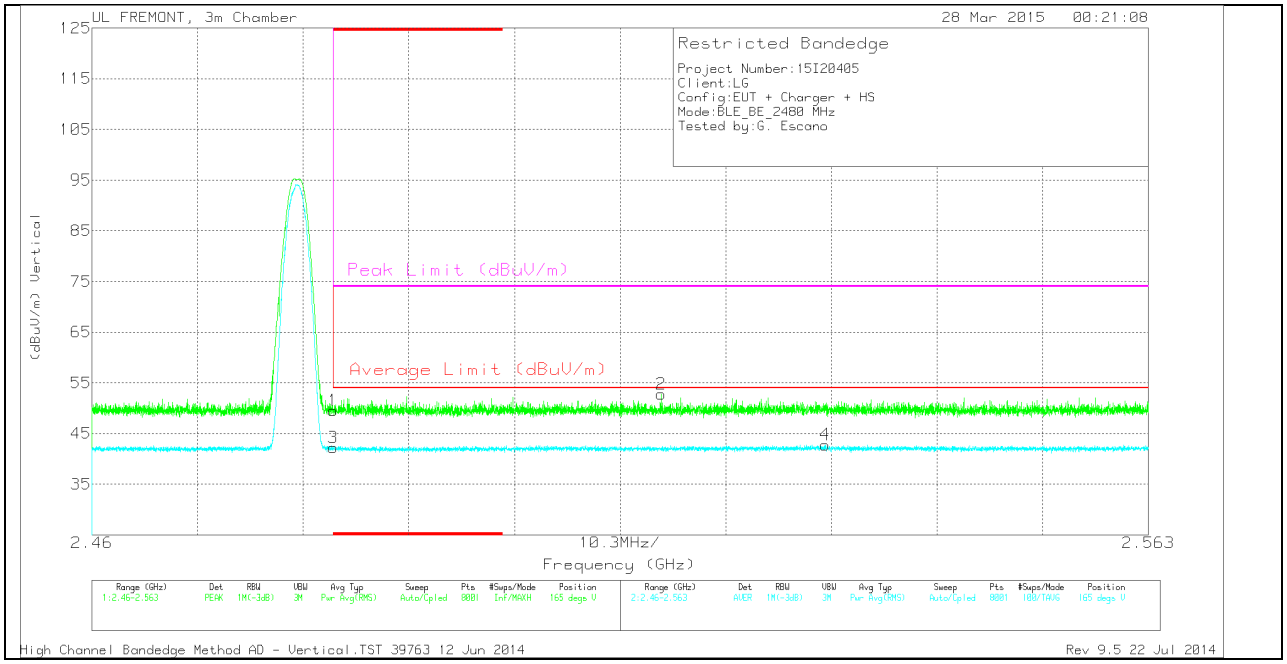
HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Flt 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	39.85	PK	32.3	-22.8	0	49.35	-	-	74	-24.65	223	298	H
3	* 2.484	31	RMS	32.3	-22.8	2.05	42.55	54	-11.45	-	-	223	298	H
2	* 2.486	42.85	PK	32.3	-22.8	0	52.35	-	-	74	-21.65	223	298	H
4	2.509	31.23	RMS	32.3	-22.8	2.05	42.78	54	-11.22	-	-	223	298	H

VERTICAL PEAK AND AVERAGE PLOT

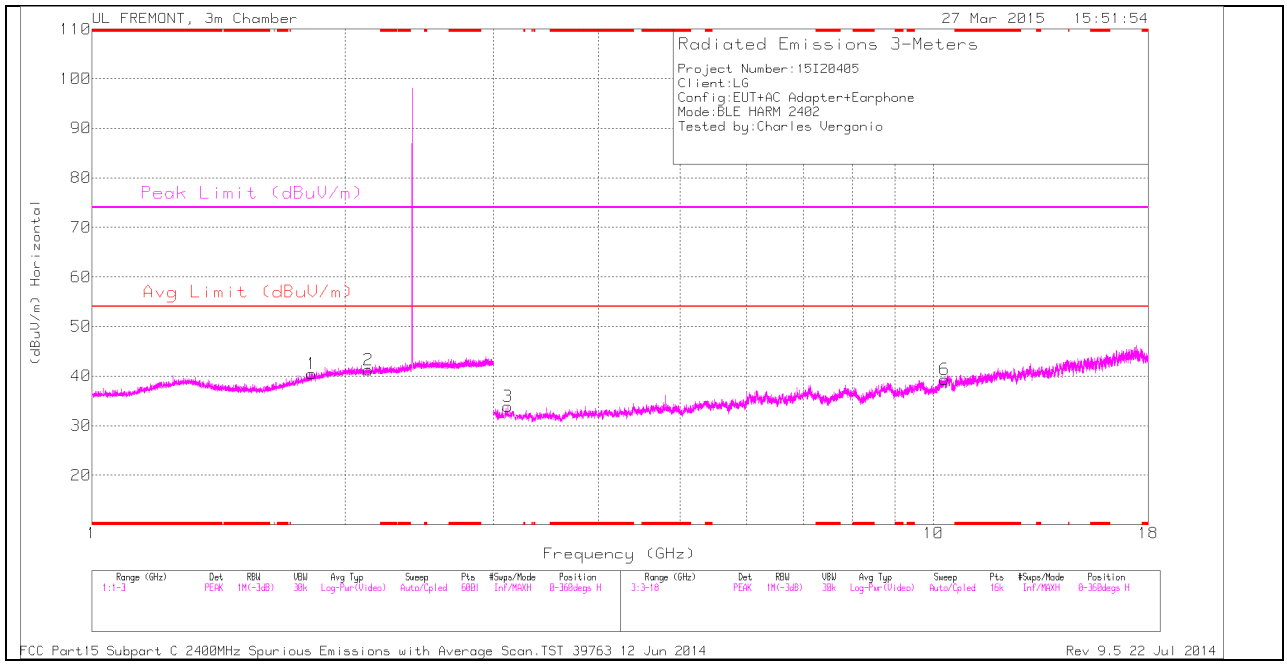


VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr/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	40.06	PK	32.3	-22.8	0	49.56	-	-	74	-24.44	165	302	V
3	* 2.484	30.67	RMS	32.3	-22.8	2.05	42.22	54	-11.78	-	-	165	302	V
2	2.516	43.26	PK	32.3	-22.8	0	52.76	-	-	74	-21.24	165	302	V
4	2.531	31.03	RMS	32.4	-22.7	2.05	42.78	54	-11.22	-	-	165	302	V

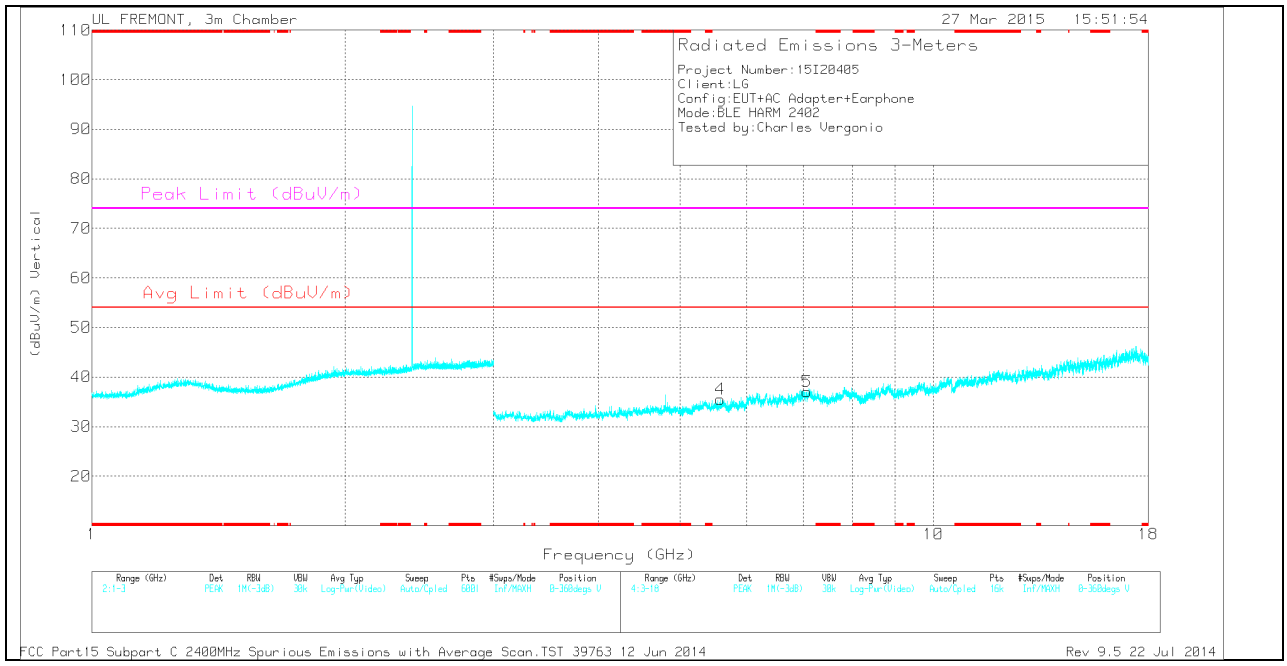
HARMONICS AND SPURIOUS EMISSIONS

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.

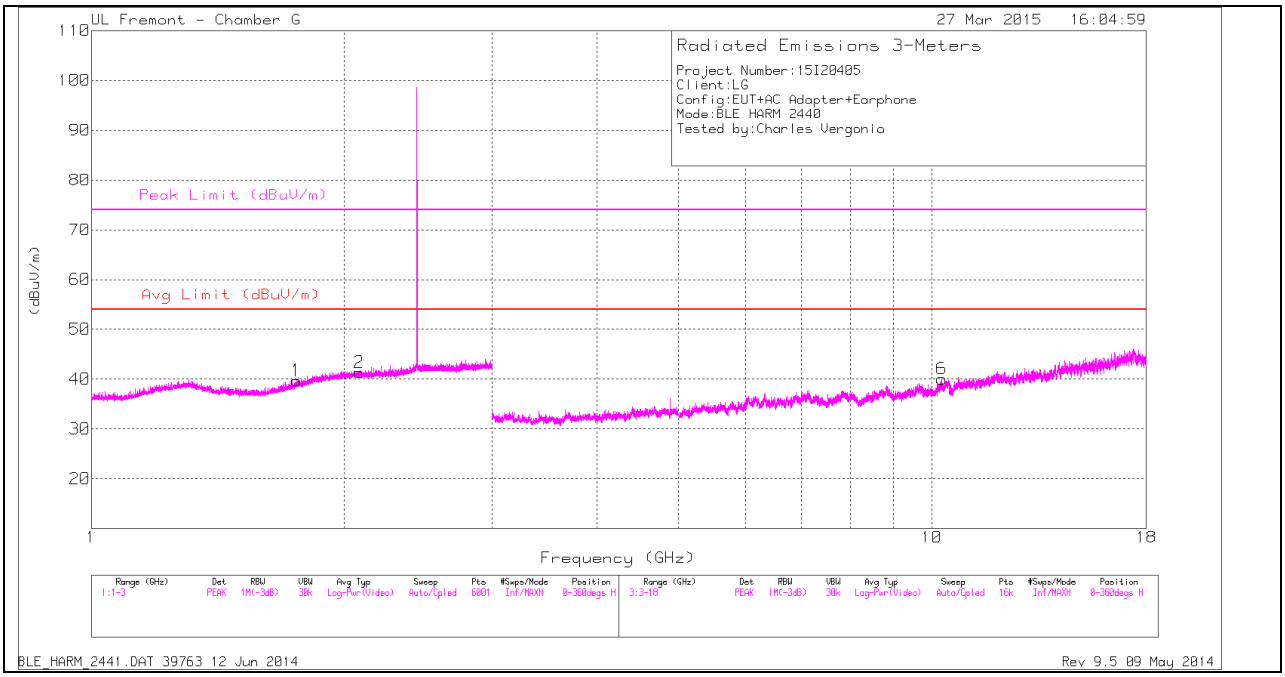
LOW CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/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	1.826	33.36	PK	30.4	-23.3	0	40.46	-	-	-	-	0-360	200	H
2	2.13	32.7	PK	31.5	-23	0	41.2	-	-	-	-	0-360	100	H
3	3.119	32.53	PK	32.7	-31.4	0	33.83	-	-	-	-	0-360	200	H
4	5.577	30	PK	34.6	-29.1	0	35.5	-	-	-	-	0-360	100	V
5	7.079	29.32	PK	35.6	-27.9	0	37.02	-	-	-	-	0-360	200	V
6	10.317	27.88	PK	37.1	-25.7	0	39.28	-	-	-	-	0-360	100	H

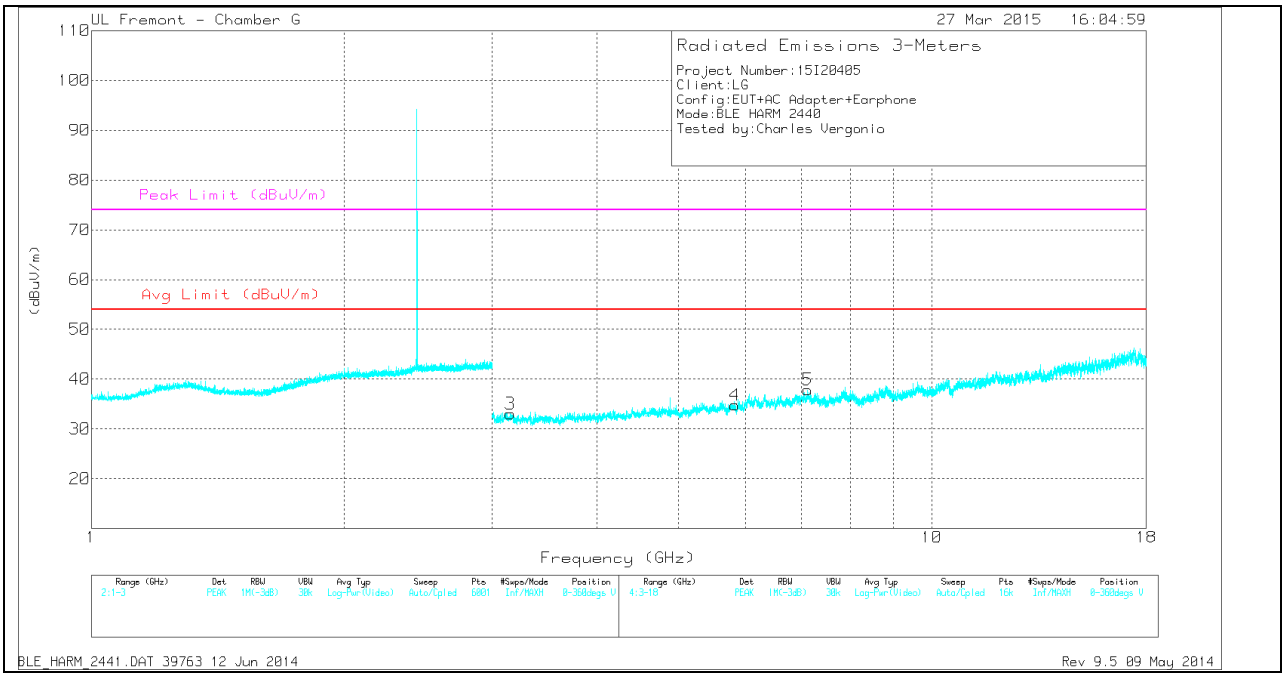
PK - Peak detector

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/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	1.755	33.42	PK	29.7	-23.4	0	39.72	-	-	-	-	0-360	100	H
2	2.085	32.86	PK	31.5	-23	0	41.36	-	-	-	-	0-360	100	H
3	3.153	31.35	PK	32.7	-31	0	33.05	-	-	-	-	0-360	200	V
4	5.833	29.22	PK	34.9	-29.3	0	34.82	-	-	-	-	0-360	100	V
5	7.119	30.27	PK	35.6	-28	0	37.87	-	-	-	-	0-360	100	V
6	10.28	28.68	PK	37.1	-25.7	0	40.08	-	-	-	-	0-360	200	H

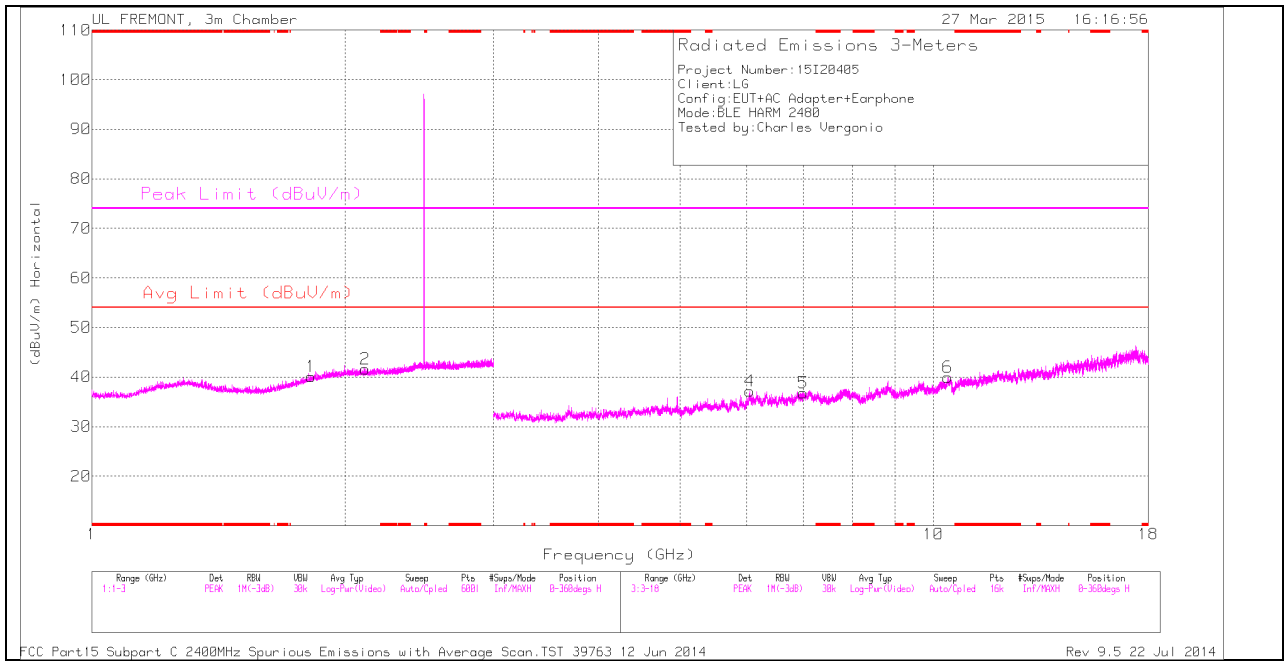
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

BLE_HARM_2441.DAT 39763 12 Jun 2014

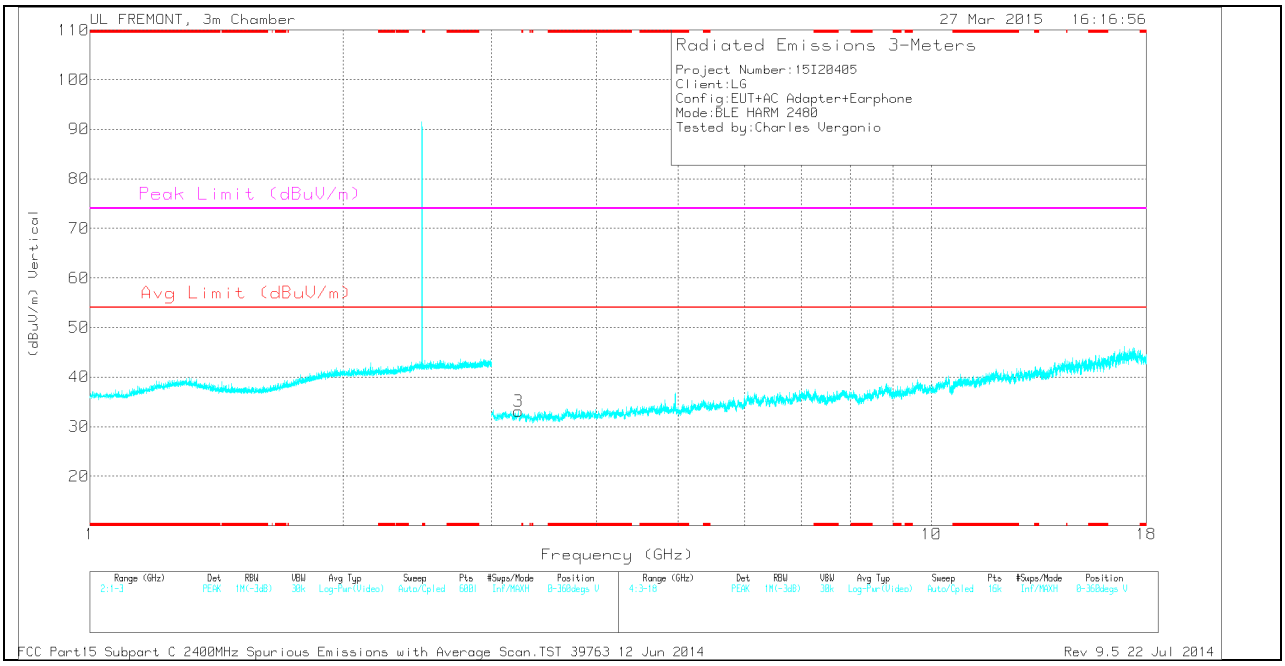
Rev 9.5 09 May 2014

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

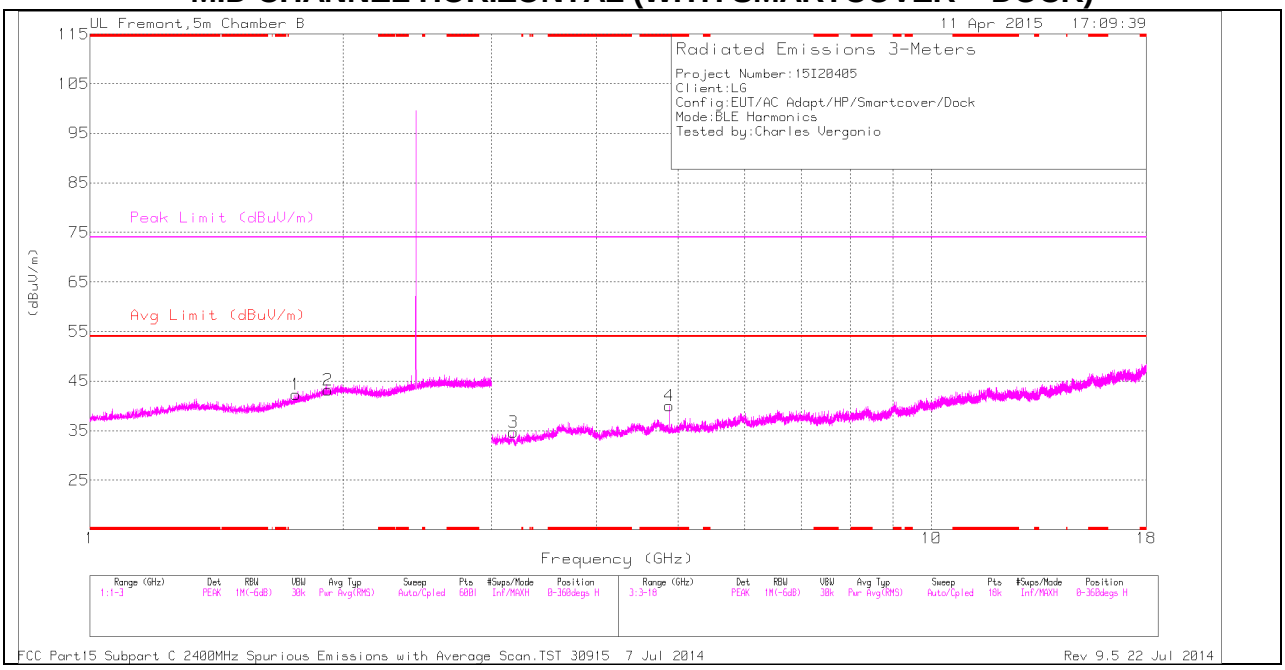
TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/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	1.821	33.02	PK	30.4	-23.3	0	40.12	-	-	-	-	0-360	200	H
2	2.112	33.09	PK	31.5	-23	0	41.59	-	-	-	-	0-360	200	H
3	3.228	32.03	PK	32.6	-31.5	0	33.13	-	-	-	-	0-360	100	V
4	6.049	31.23	PK	35.2	-29.3	0	37.13	-	-	-	-	0-360	200	H
5	7.001	30.52	PK	35.6	-29.3	0	36.82	-	-	-	-	0-360	200	H
6	10.403	27.85	PK	37.3	-25.2	0	39.95	-	-	-	-	0-360	200	H

PK - Peak detector

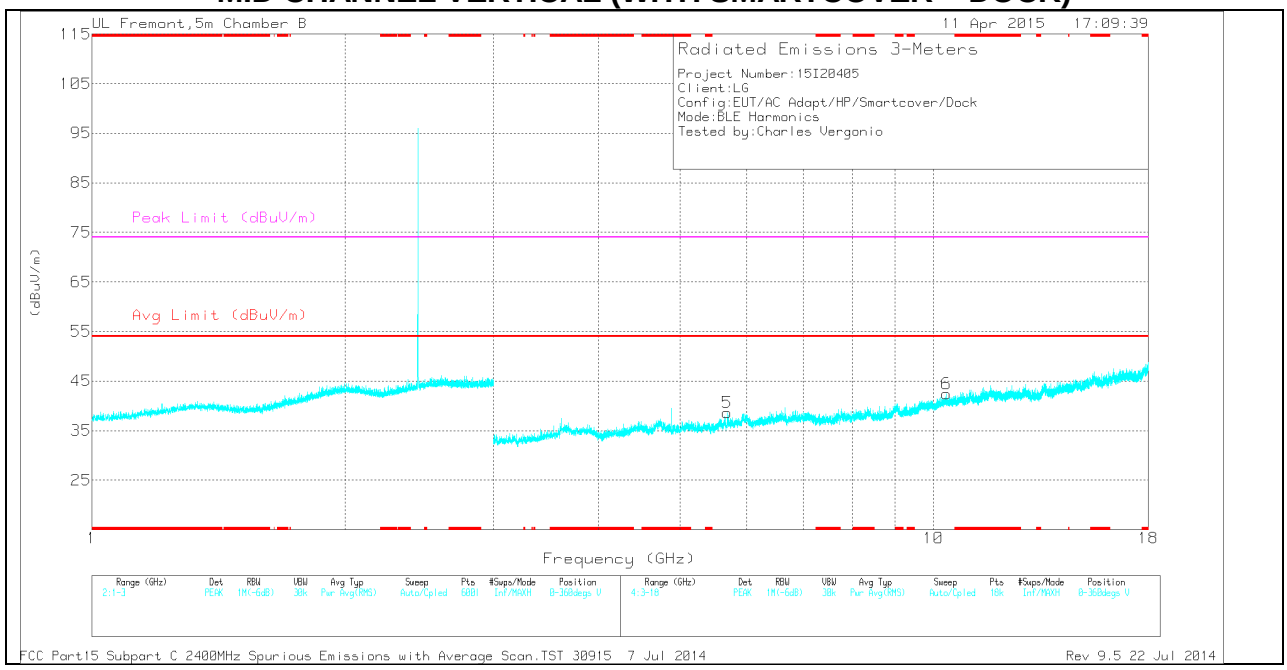
FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

MID CHANNEL HORIZONTAL (WITH SMARTCOVER + DOCK)



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 (WITH SMARTCOVER + DOCK)



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 (WITH SMARTCOVER + DOCK)

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (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
4	* 4.88	36.25	PK	34.2	-30.4	0	40.05	-	-	74	-33.95	0-360	101	H
1	1.758	35.34	PK	30.3	-23.3	0	42.34	-	-	-	-	0-360	199	H
2	1.917	34.54	PK	31.9	-23.2	0	43.24	-	-	-	-	0-360	100	H
3	3.187	32.96	PK	32.4	-30.7	0	34.66	-	-	-	-	0-360	101	H
5	5.691	32.87	PK	34.9	-29.2	0	38.57	-	-	-	-	0-360	101	V
6	10.354	27.78	PK	37.4	-22.7	0	42.48	-	-	-	-	0-360	199	V

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (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
* 4.881	43.39	PK2	34.2	-30.4	0	47.19	-	-	74	-26.81	230	115	H
* 4.88	33.95	MAv1	34.2	-30.4	0	37.75	54	-16.25	-	-	230	115	H

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

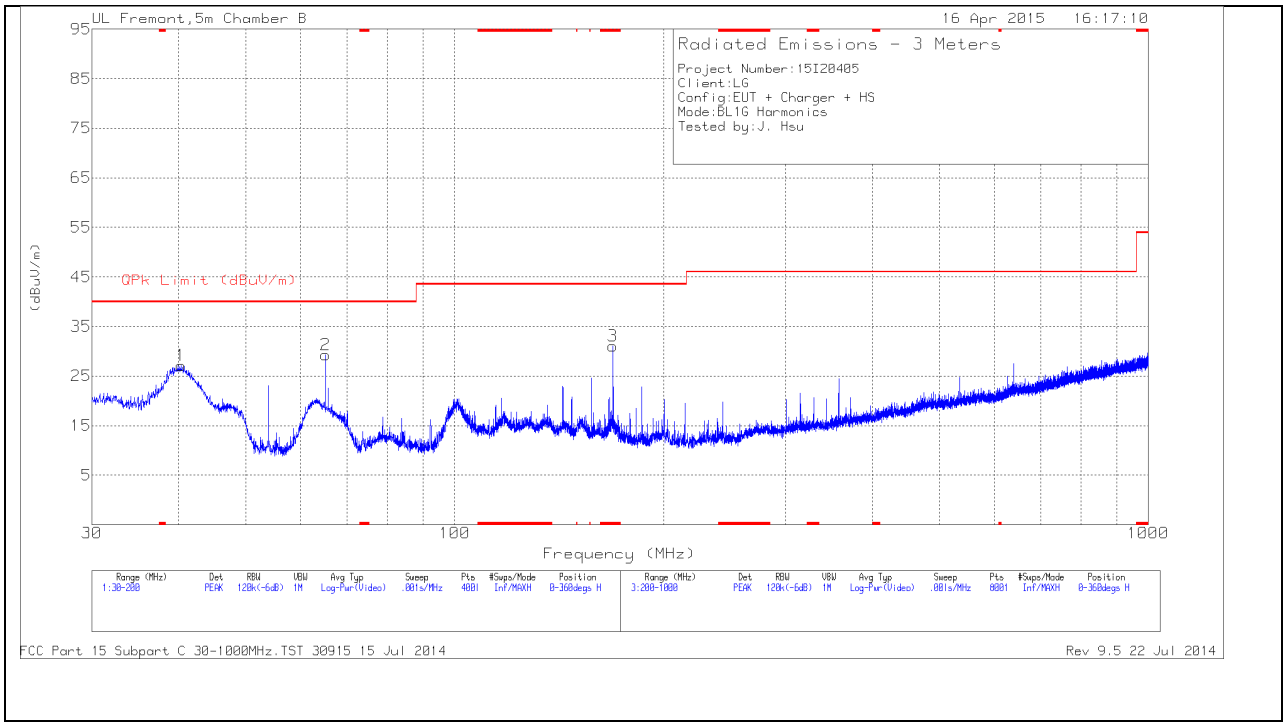
FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 7 Jul 2014

Rev 9.5 22 Jul 2014

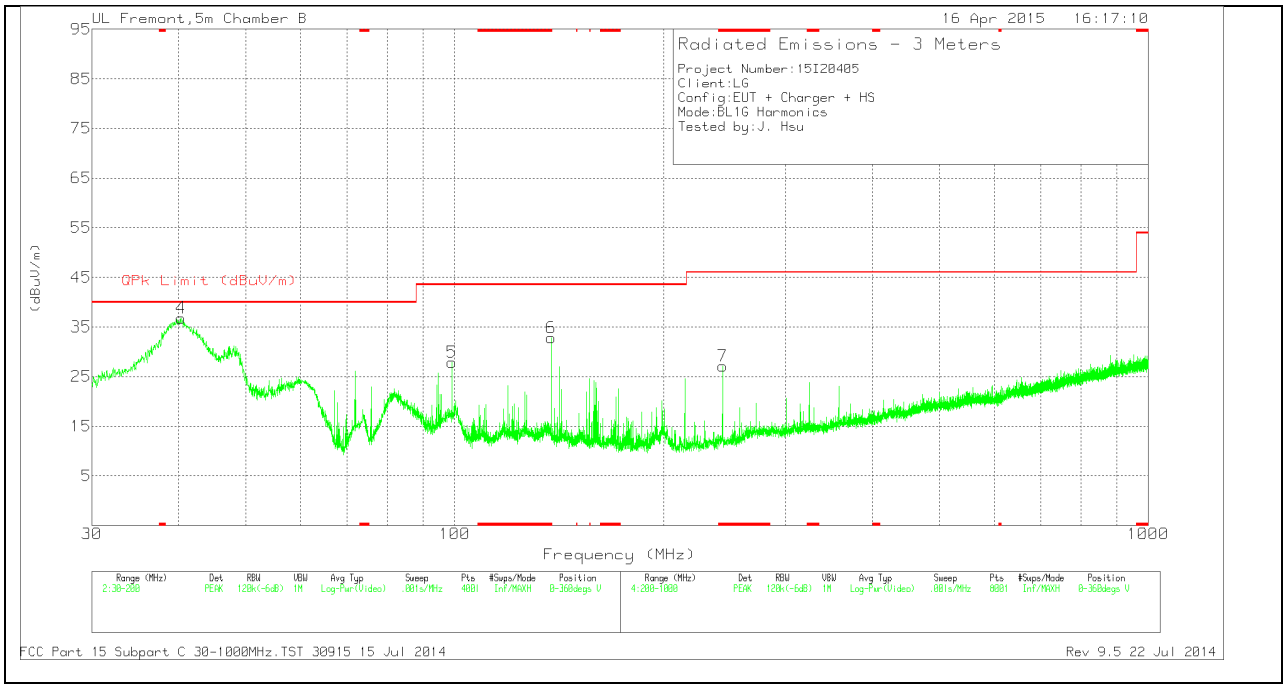
9.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



BELOW 1 GHz TABLE

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 169.1875	46.67	PK	11.7	-27.3	31.07	43.52	-12.45	0-360	101	H
6	* 137.865	47.1	PK	13.3	-27.6	32.8	43.52	-10.72	0-360	101	V
7	* 243.4	41.97	PK	11.6	-26.5	27.07	46.02	-18.95	0-360	200	V
1	40.3275	42.14	PK	13.8	-28.8	27.14	40	-12.86	0-360	300	H
4	40.3275	51.83	PK	13.8	-28.8	36.83	40	-3.17	0-360	101	V
2	65.19	49.84	PK	7.9	-28.5	29.24	40	-10.76	0-360	400	H
5	99.1475	46.02	PK	10	-28.1	27.92	43.52	-15.6	0-360	101	V

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

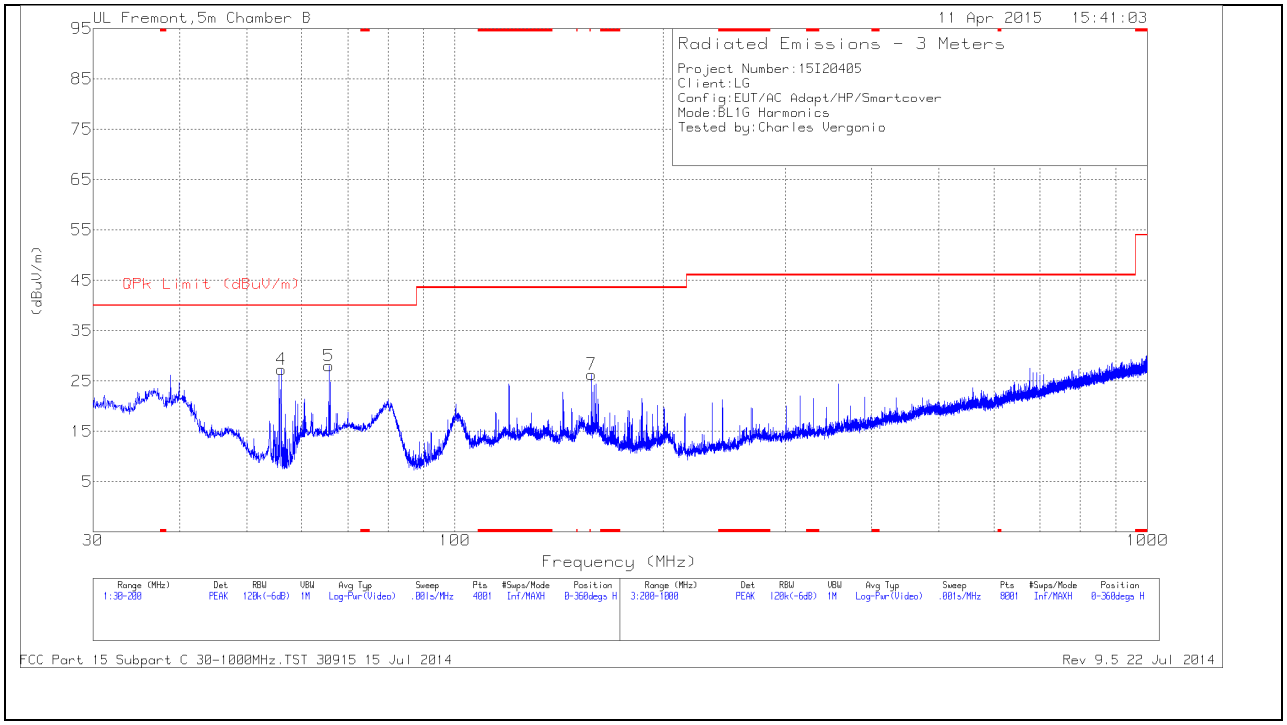
PK - Peak detector

FCC Part 15 Subpart C 30-1000MHz.TST 30915 15 Jul 2014

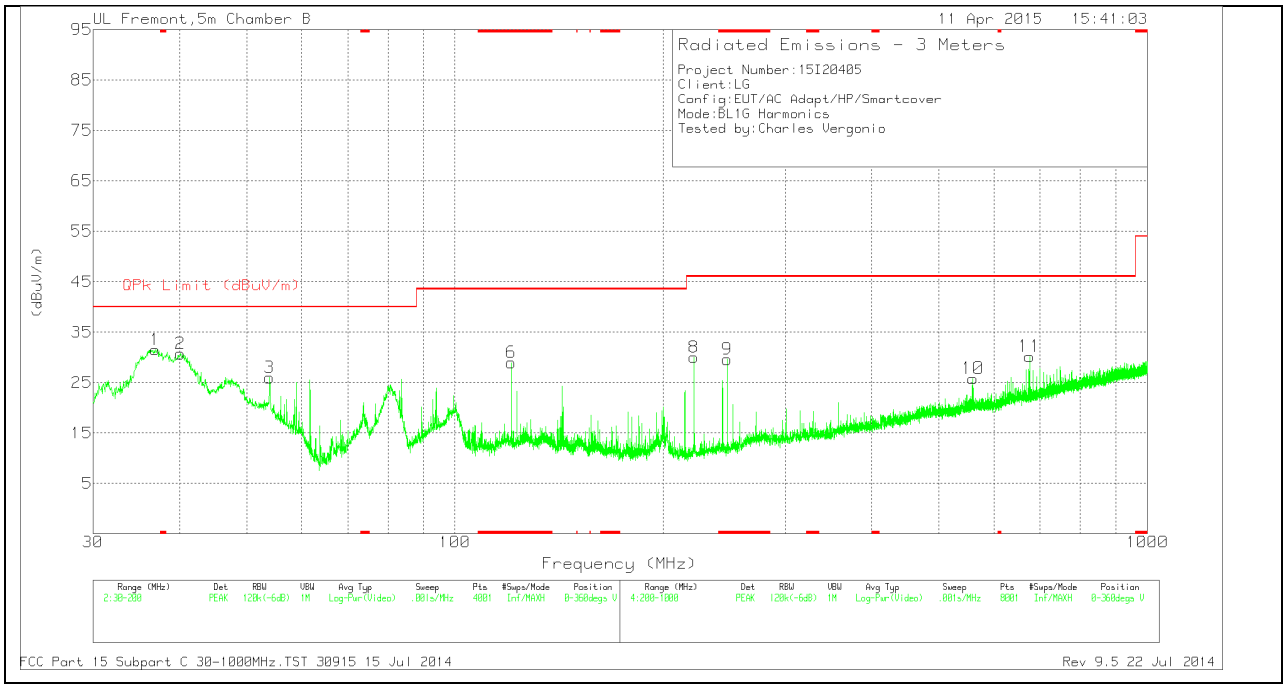
Rev 9.5 22 Jul 2014

SPURIOUS EMISSIONS 30 TO 1000 MHz (WITH SMARTCOVER)

HORIZONTAL PLOT



VERTICAL PLOT



BELOW 1 GHz TABLE

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 120.61	42.77	PK	14.1	-27.9	28.97	43.52	-14.55	0-360	101	V
9	* 247.4	44.51	PK	11.6	-26.5	29.61	46.02	-16.41	0-360	101	V
1	36.885	44.09	PK	16.2	-28.8	31.49	40	-8.51	0-360	101	V
2	40.115	45.53	PK	14	-28.8	30.73	40	-9.27	0-360	101	V
3	53.97	47.18	PK	7.4	-28.6	25.98	40	-14.02	0-360	101	V
4	56.1375	48.59	PK	7.3	-28.6	27.29	40	-12.71	0-360	300	H
5	65.7425	48.63	PK	7.9	-28.5	28.03	40	-11.97	0-360	400	H
7	157.5	41.4	PK	12.3	-27.4	26.3	43.52	-17.22	0-360	200	H
8	221.4	46.03	PK	10.7	-26.7	30.03	46.02	-15.99	0-360	300	V
10	560	32.72	PK	18.7	-25.6	25.82	46.02	-20.2	0-360	101	V
11	676	35.1	PK	19.9	-24.8	30.2	46.02	-15.82	0-360	200	V

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

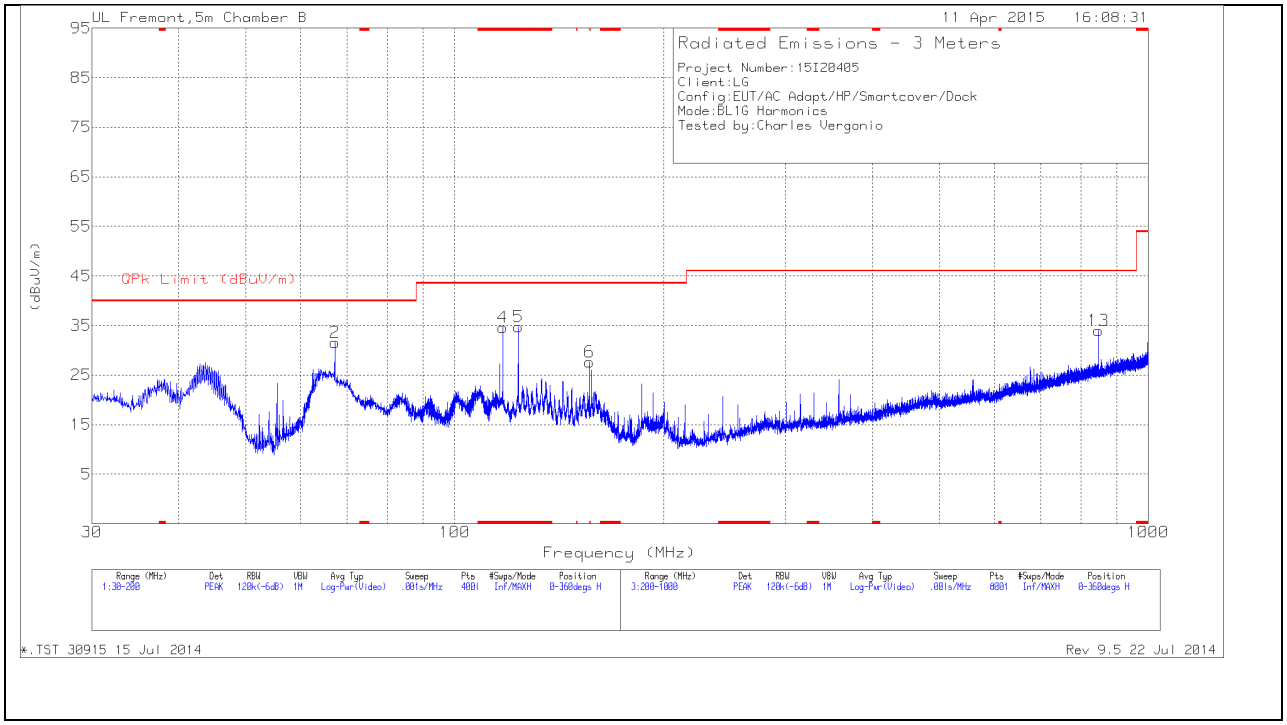
PK - Peak detector

FCC Part 15 Subpart C 30-1000MHz.TST 30915 15 Jul 2014

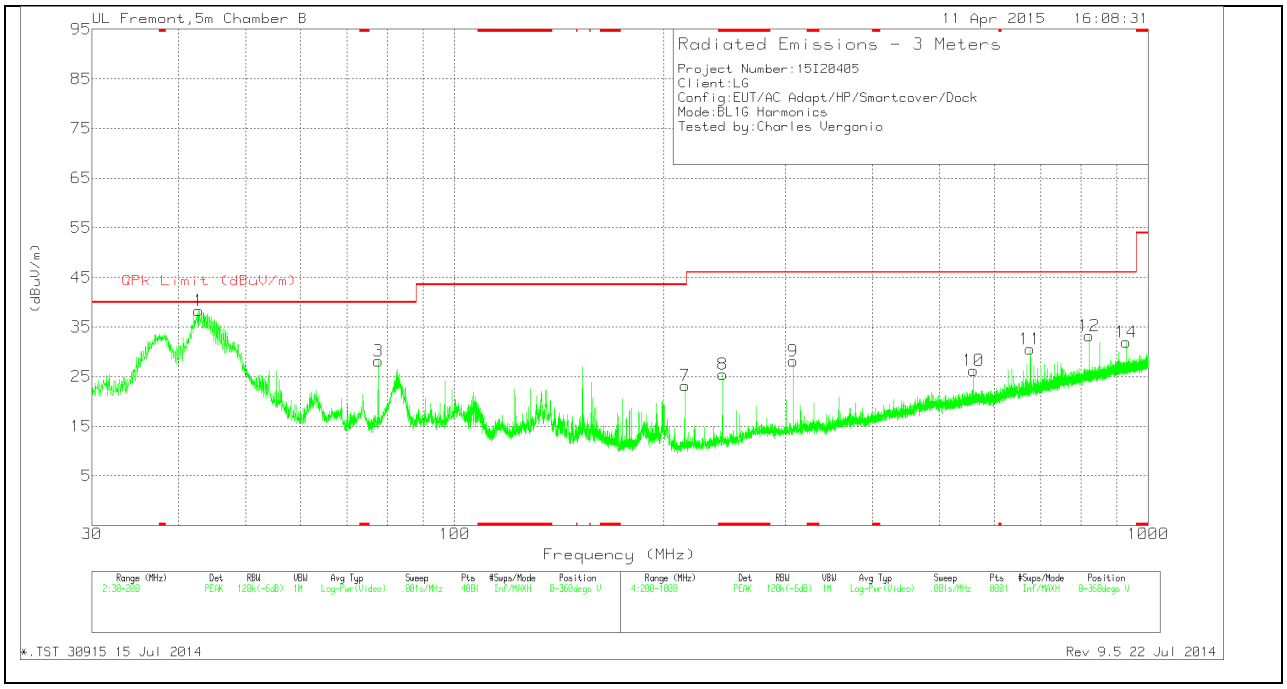
Rev 9.5 22 Jul 2014

SPURIOUS EMISSIONS 30 TO 1000 MHz (WITH SMARTCOVER_+ DOCK)

HORIZONTAL PLOT



VERTICAL PLOT



BELOW 1 GHz TABLE

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 117.3375	48.77	PK	13.8	-27.9	34.67	43.52	-8.85	0-360	200	H
5	* 123.5425	48.39	PK	14.2	-27.8	34.79	43.52	-8.73	0-360	200	H
8	* 243.4	40.37	PK	11.6	-26.5	25.47	46.02	-20.55	0-360	300	V
1	42.7925	54.89	PK	12.1	-28.7	38.29	40	-1.71	0-360	101	V
2	67.1875	52.03	PK	8	-28.5	31.53	40	-8.47	0-360	400	H
3	77.6	48.71	PK	7.7	-28.3	28.11	40	-11.89	0-360	101	V
6	156.5225	42.74	PK	12.3	-27.4	27.64	43.52	-15.88	0-360	300	H
7	214.8	39.37	PK	10.6	-26.8	23.17	43.52	-20.35	0-360	200	V
9	307.4	40.44	PK	13.7	-26	28.14	46.02	-17.88	0-360	200	V
10	560	33.12	PK	18.7	-25.6	26.22	46.02	-19.8	0-360	101	V
11	676	35.47	PK	19.9	-24.8	30.57	46.02	-15.45	0-360	300	V
12	821.9	35.16	PK	21.7	-23.6	33.26	46.02	-12.76	0-360	101	V
13	848	35.42	PK	22	-23.4	34.02	46.02	-12	0-360	200	H
14	930	31.91	PK	22.7	-22.7	31.91	46.02	-14.11	0-360	101	V

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
42.893	50.56	QP	12	-28.7	33.86	40	-6.14	341	117	V

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

QP - Quasi-Peak detector

*.TST 30915 15 Jul 2014

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10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

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.

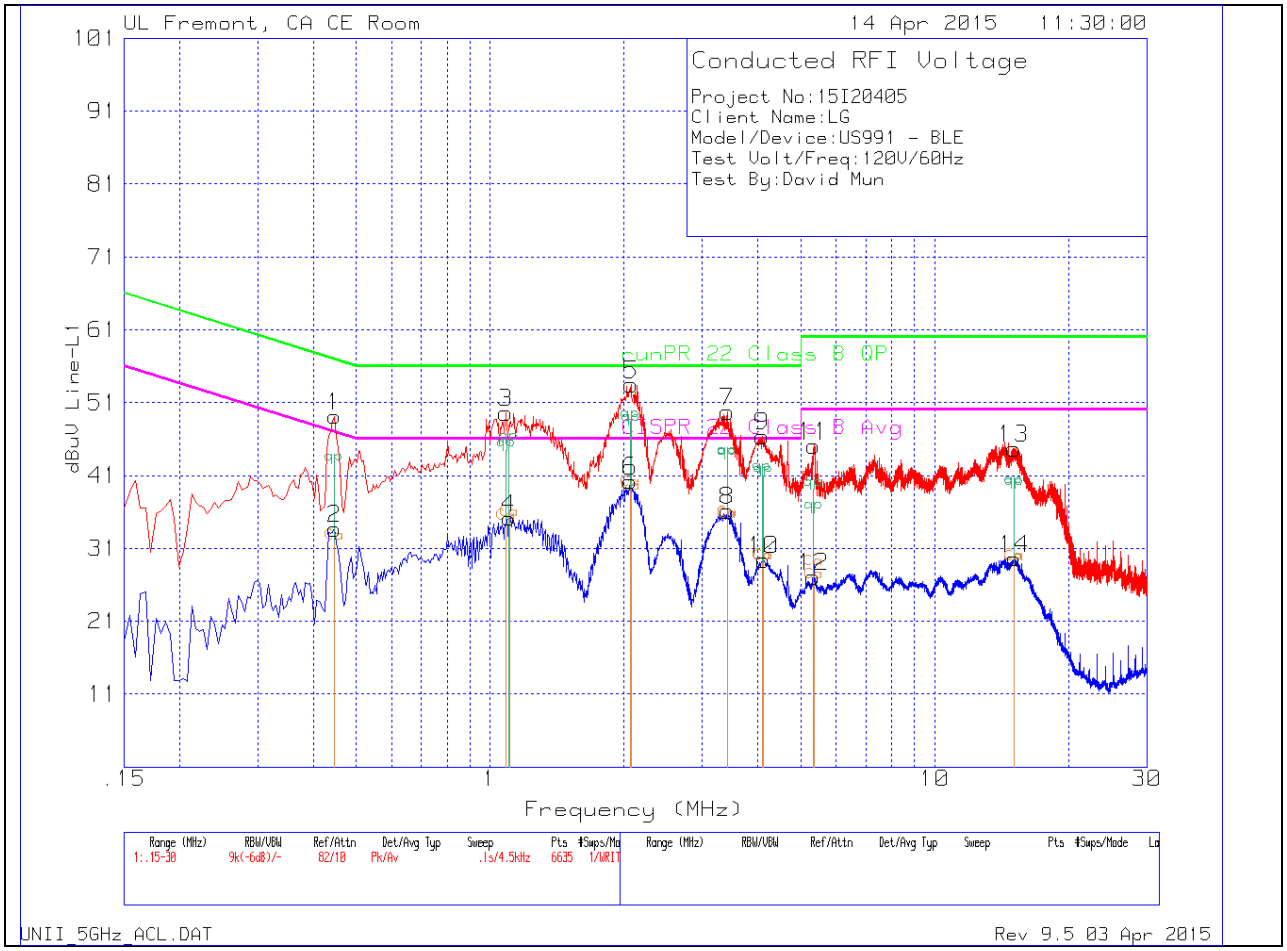
TEST PROCEDURE

ANSI C63.10

RESULTS

6 WORST EMISSIONS

LINE 1 PLOT



LINE 1 RESULTS

Trace Markers

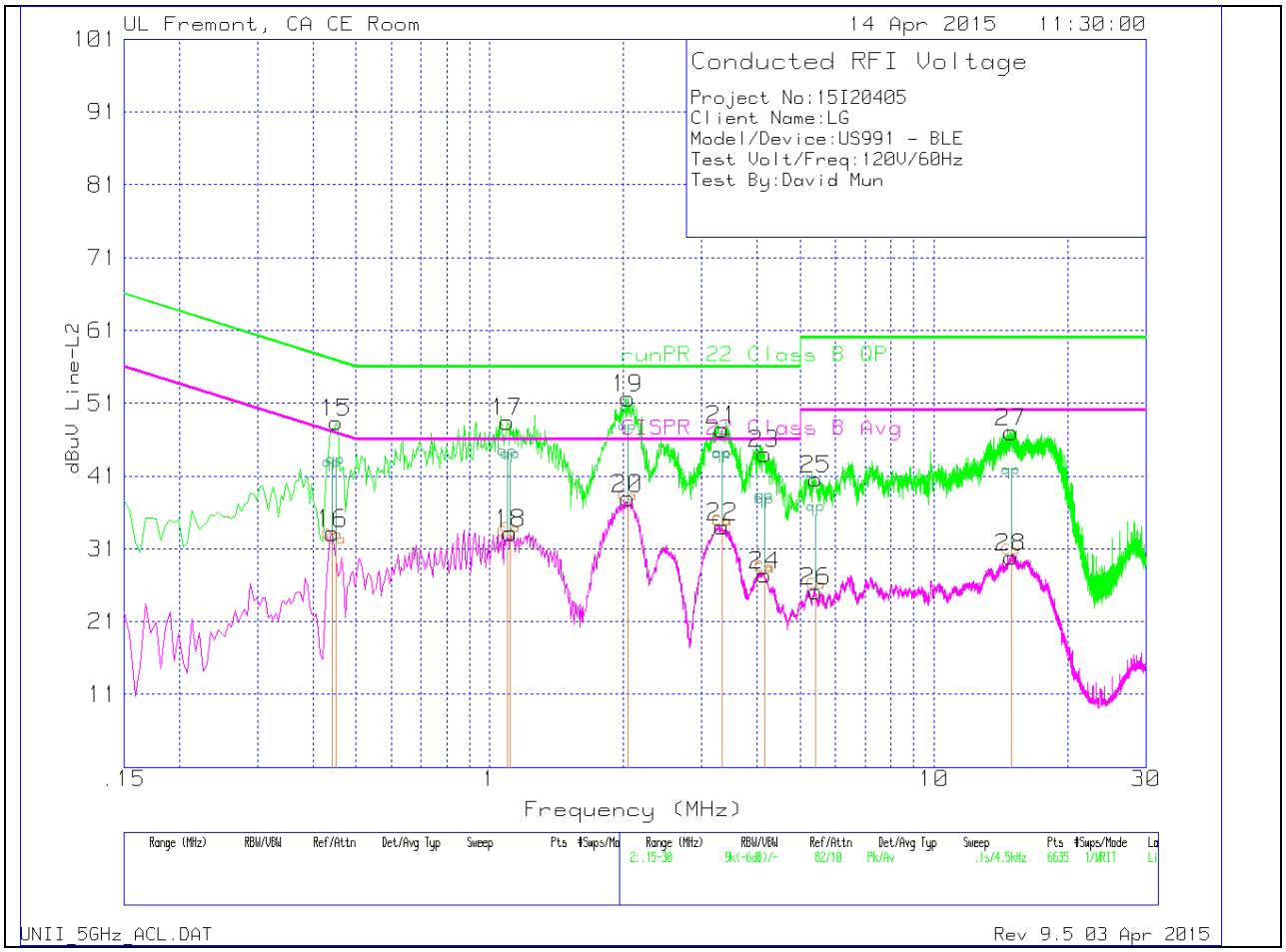
Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	runPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
1	.447	48.74	Pk	.4	0	49.14	56.93	-7.79	-	-
2	.447	33.31	Av	.4	0	33.71	-	-	46.93	-13.22
3	1.086	49.42	Pk	.2	0	49.62	56	-6.38	-	-
4	1.104	34.96	Av	.2	0	35.16	-	-	46	-10.84
5	2.076	53.16	Pk	.2	.1	53.46	56	-2.54	-	-
6	2.067	39.92	Av	.2	.1	40.22	-	-	46	-5.78
7	3.417	49.44	Pk	.2	.1	49.74	56	-6.26	-	-
8	3.4125	35.85	Av	.2	.1	36.15	-	-	46	-9.85
9	4.092	46.09	Pk	.2	.1	46.39	56	-9.61	-	-
10	4.119	29.1	Av	.2	.1	29.4	-	-	46	-16.6
11	5.343	44.75	Pk	.2	.1	45.05	60	-14.95	-	-
12	5.334	26.79	Av	.2	.1	27.09	-	-	50	-22.91
13	15.0675	44.18	Pk	.3	.2	44.68	60	-15.32	-	-
14	15.0945	29.1	Av	.3	.2	29.6	-	-	50	-20.4

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	runPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
15	.4515	47.96	Pk	.4	0	48.36	56.85	-8.49	-	-
16	.4425	32.72	Av	.4	0	33.12	-	-	47.01	-13.89
17	1.095	48.14	Pk	.3	0	48.44	56	-7.56	-	-
18	1.113	32.82	Av	.3	0	33.12	-	-	46	-12.88
19	2.0445	51.37	Pk	.2	.1	51.67	56	-4.33	-	-
20	2.0445	37.63	Av	.2	.1	37.93	-	-	46	-8.07
21	3.3315	47.08	Pk	.2	.1	47.38	56	-8.62	-	-
22	3.336	33.72	Av	.2	.1	34.02	-	-	46	-11.98
23	4.1505	43.75	Pk	.2	.1	44.05	56	-11.95	-	-
24	4.155	27.1	Av	.2	.1	27.4	-	-	46	-18.6
25	5.4195	40.28	Pk	.2	.1	40.58	60	-19.42	-	-
26	5.4195	24.87	Av	.2	.1	25.17	-	-	50	-24.83
27	14.91	46.61	Pk	.2	.2	47.01	60	-12.99	-	-
28	14.9055	29.45	Av	.2	.2	29.85	-	-	50	-20.15

Pk - Peak detector

Av - Average detection