FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8

BLUETOOTH LOW ENERGY

CERTIFICATION TEST REPORT

FOR

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

MODEL NUMBER: LG-VS986, VS986, LGVS986, LG-AS986, AS986, LGAS986

FCC ID: ZNFVS986

IC: 2703C-VS986

REPORT NUMBER: 15I20402–E3
ISSUE DATE: April 16, 2015

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	4/16/15	Initial Issue	P. Zhang

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	**LG ELECTRONICS MOBILECOMM U.S.A., INC.**
EUT DESCRIPTION:	**GSM/WCDMA/CDMA/LTE PHABLET + Bluetooth, DTS/UNII a/b/g/n/ac & NFC.**
MODEL:	**LG-VS986, VS986, LGVS986, LG-AS986, AS986, LGAS986**
SERIAL NUMBER:	**0298-0469 (Conducted), 0298-0454 (Radiated)**
DATE TESTED:	**MAR 25 – APR 16, 2015**

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 4	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:

PENG ZHANG
PROJECT LEAD
UL Verification Services Inc.

Tested By:

JONATHAN HSU
LAB ENGINEER
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 4, and RSS-210 Issue 8.

Deviation -Radiated spurious emission above 1GHz EUT height is 1.5m not 0.8m.

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 Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

Spots check also performed on SMART COVER and CHARGING DOCK station.

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

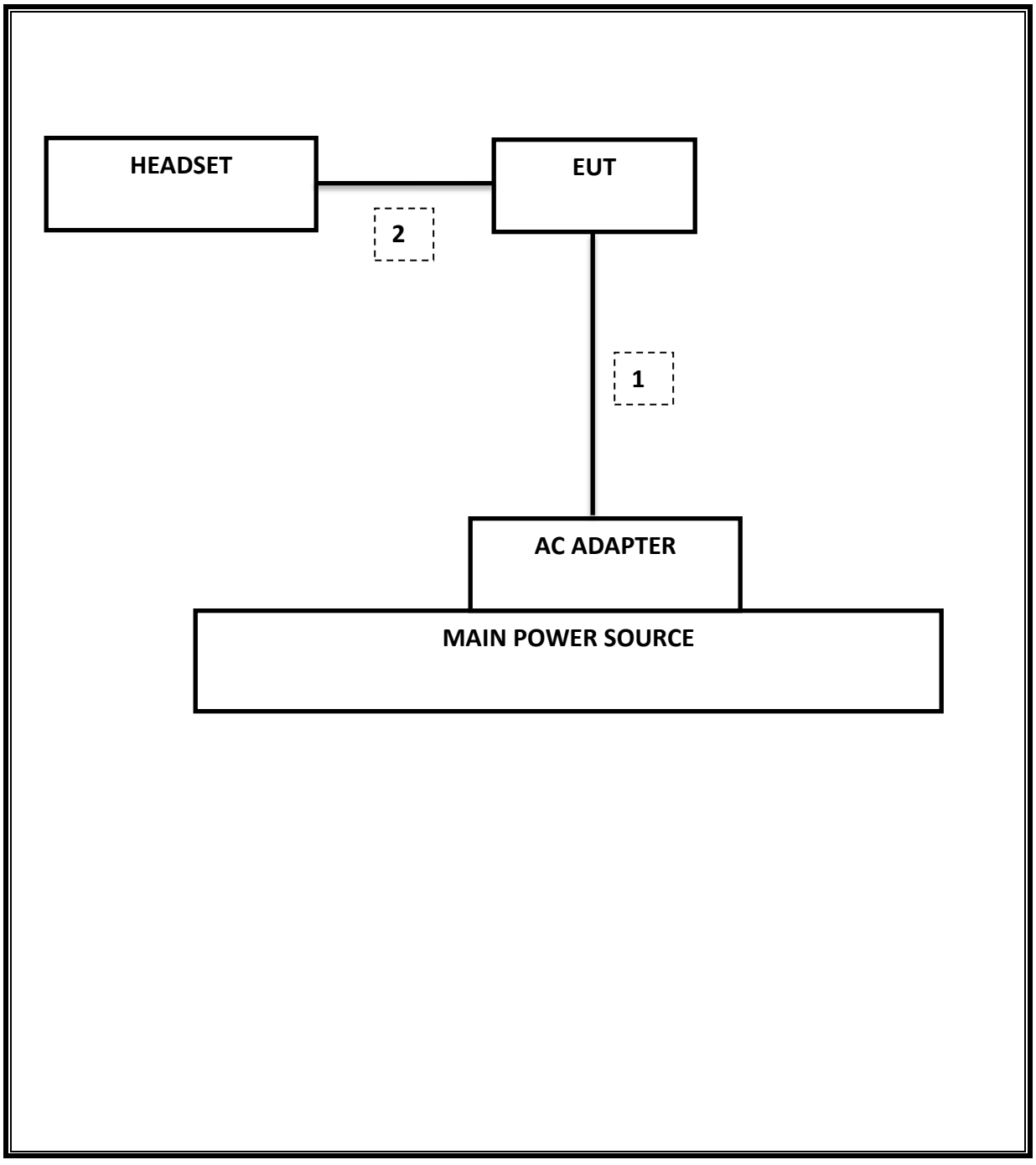
I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	DC Power	1	Mini-USB	Shielded	1.2m	N/A
2	Audio	1	Mini-Jack	Unshielded	1m	N/A

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

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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	0.717 MHz
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-56.36 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	-8.24 dBm
15.207 (a)	RSS-GEN 8.8	AC Power Line conducted emissions	Section 10	Radiated	Pass	54.26 dBuV(PK)
15.205, 15.209	RSS-GEN Clause 8.9, RSS-GEN Clause 7	Radiated Spurious Emission	< 54dBuV/m		Pass	40.36 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.

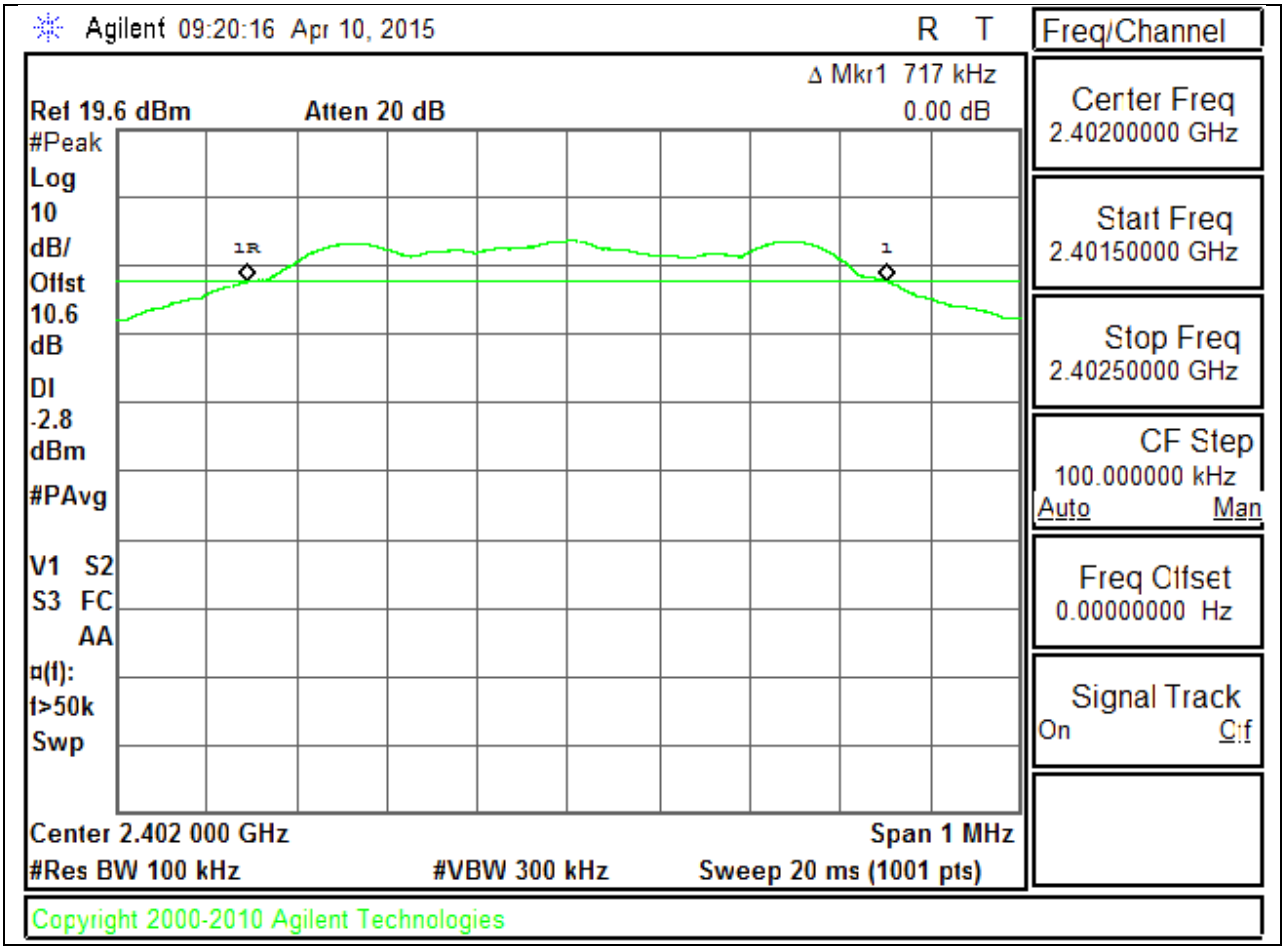
TEST PROCEDURE

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.

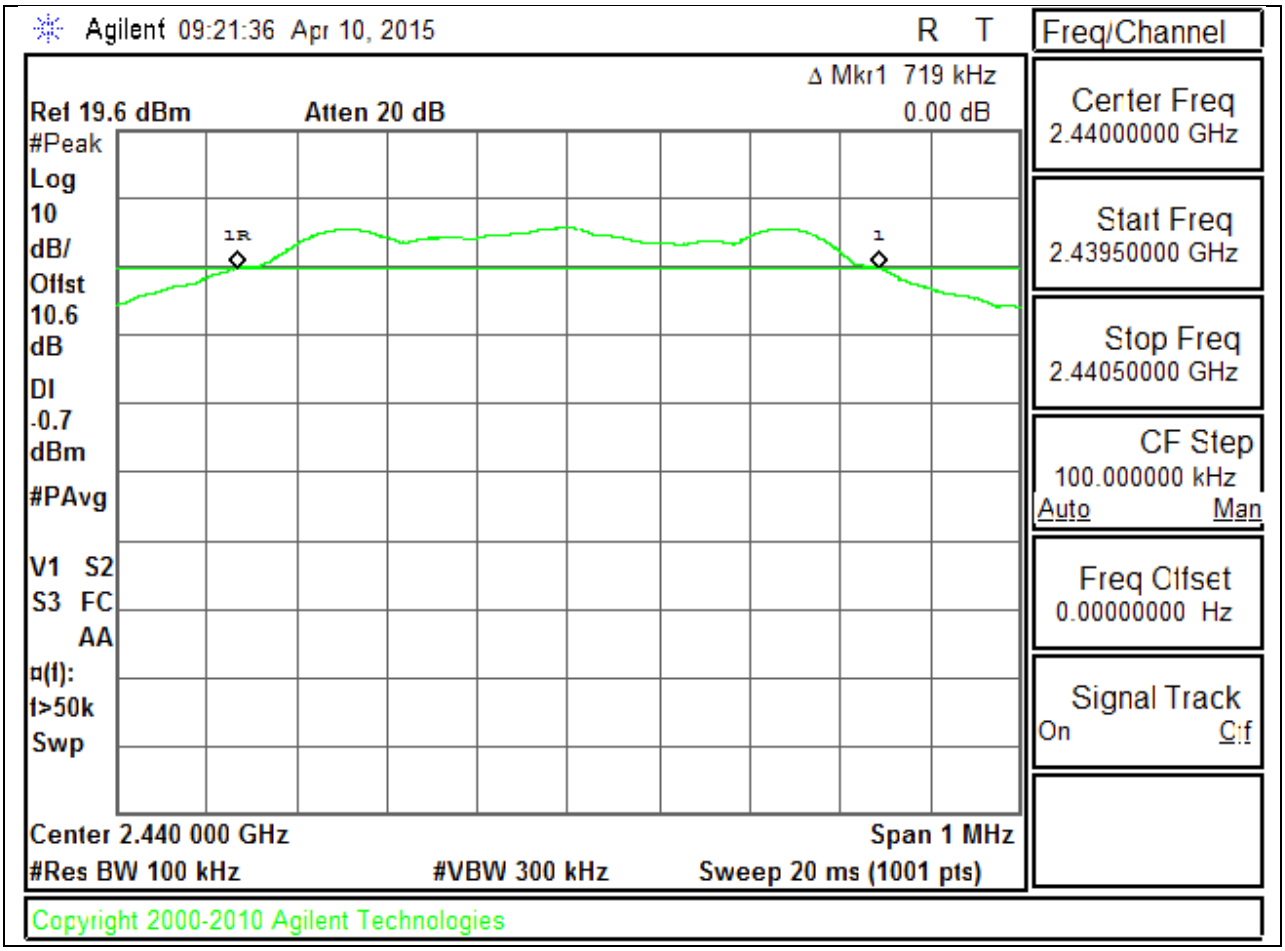
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.7170	0.5
Middle	2440	0.7190	0.5
High	2480	0.7190	0.5

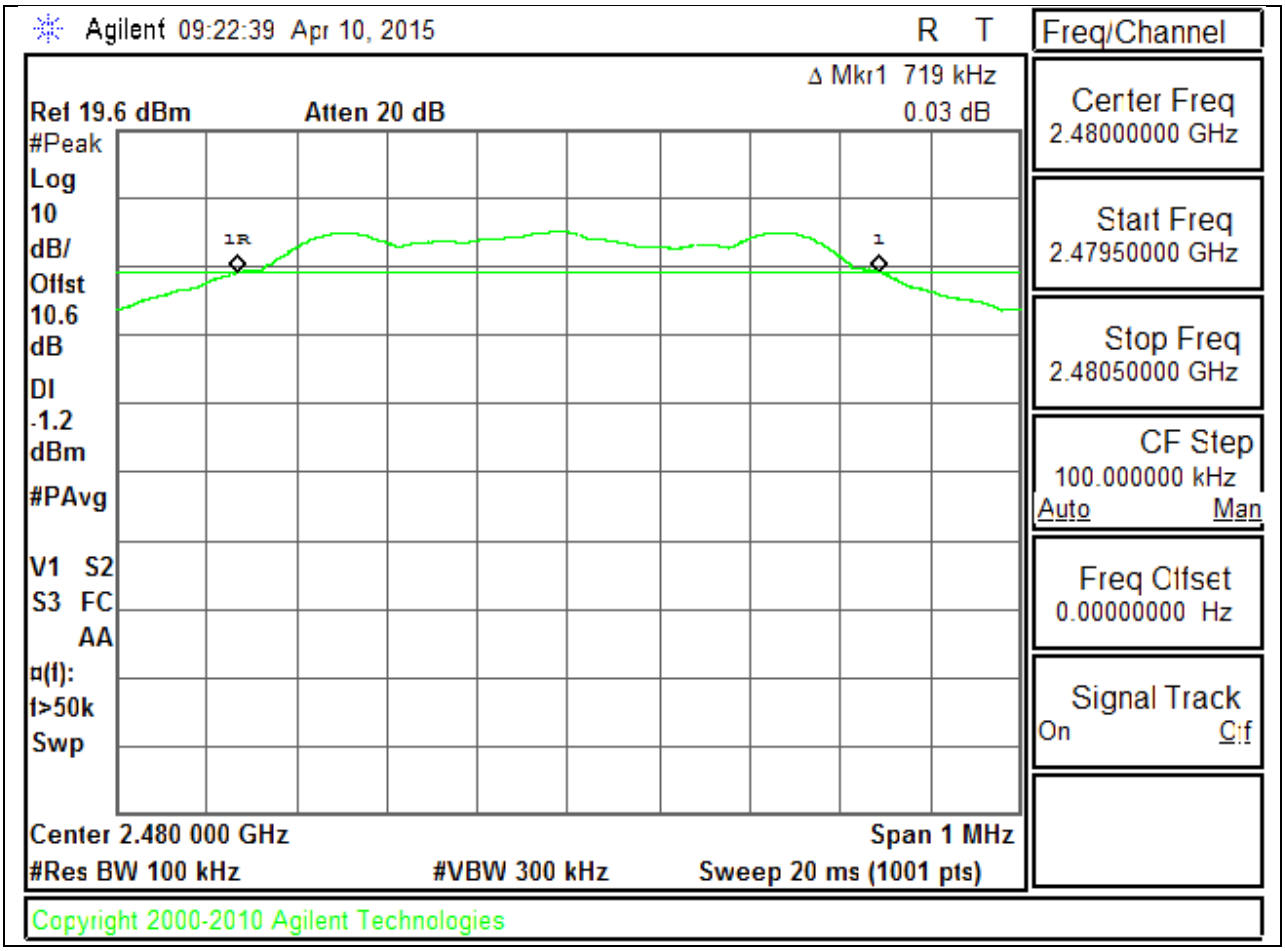
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

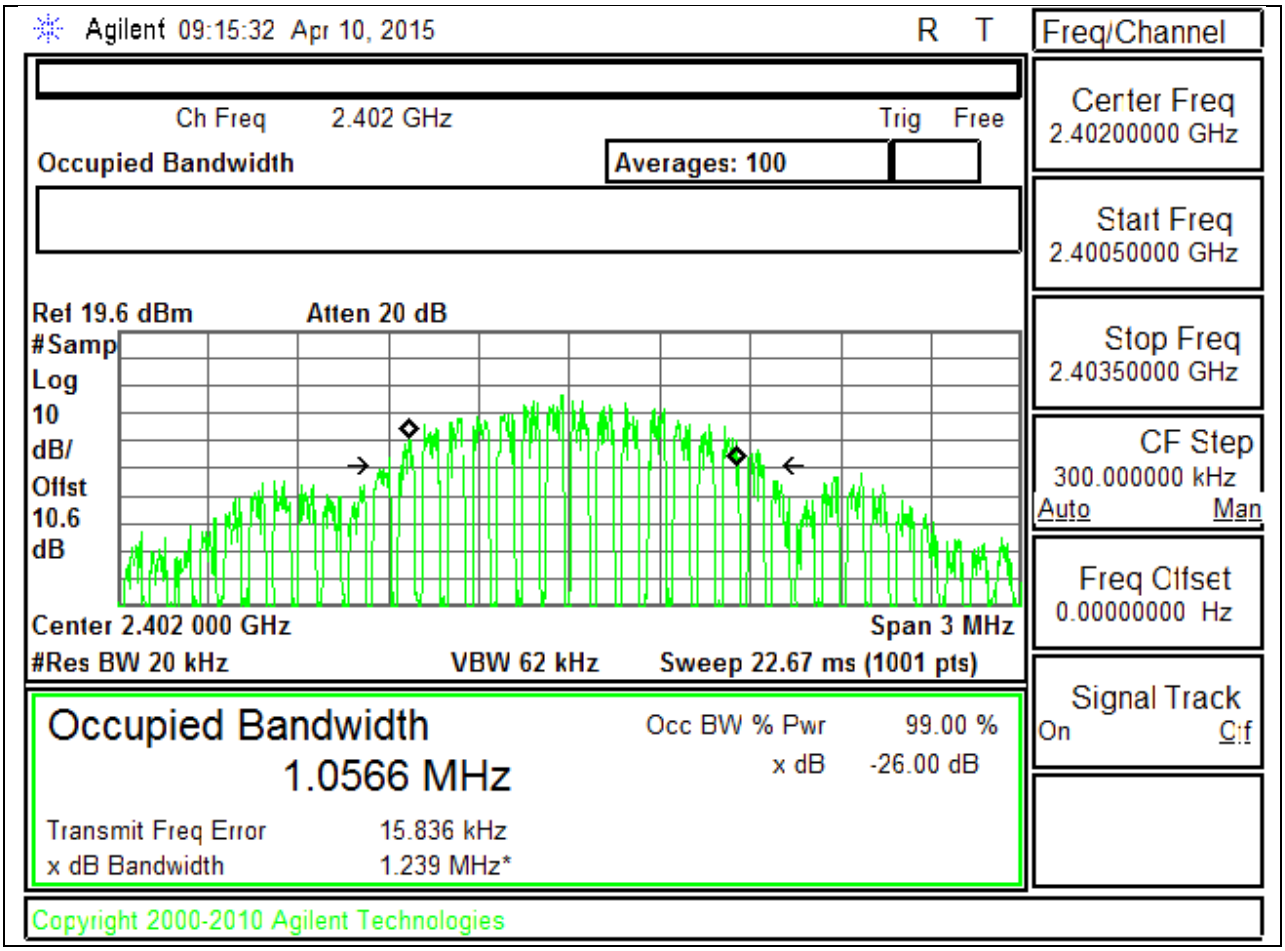
Reference to KDB558074 D01 DTS Meas Guidance v03r02: The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function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

RESULTS

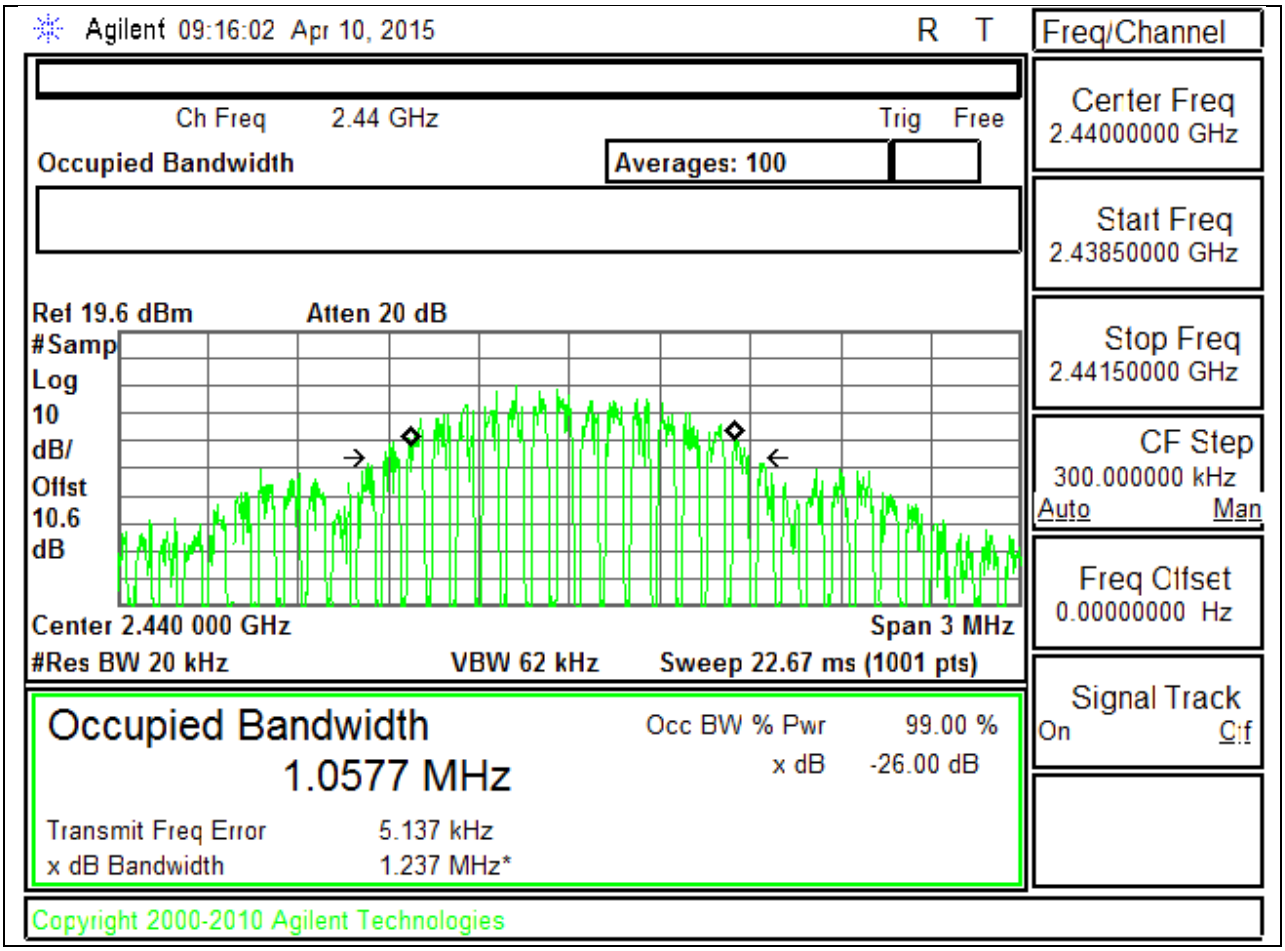
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0566
Middle	2440	1.0577
High	2480	1.0576

99% BANDWIDTH PLOTS

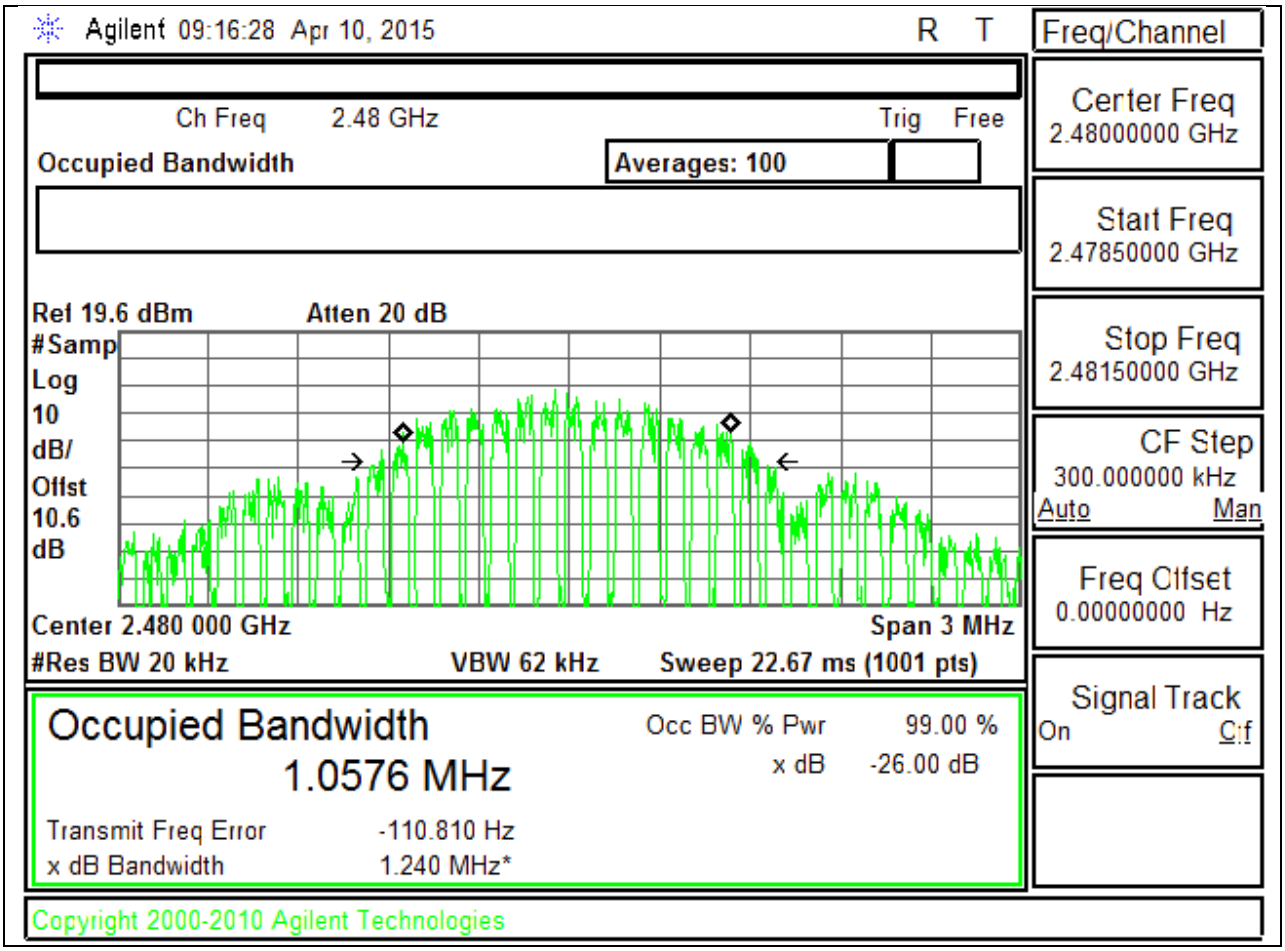
LOW CHANNEL



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

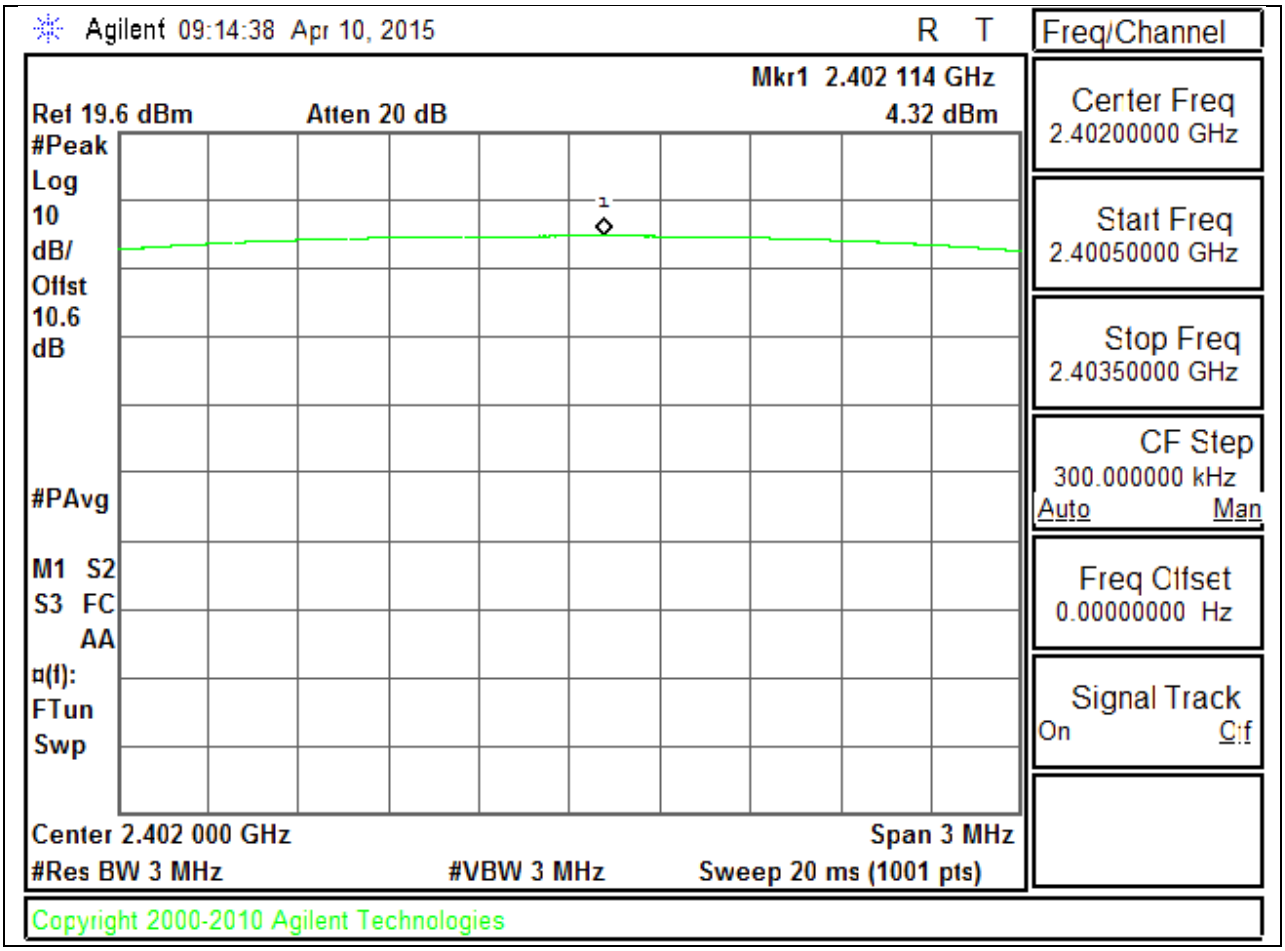
Peak power is measured using KDB558074 D01 DTS Meas Guidance v03r02 under section 9.1.1 utilizing spectrum analyze.

RESULTS

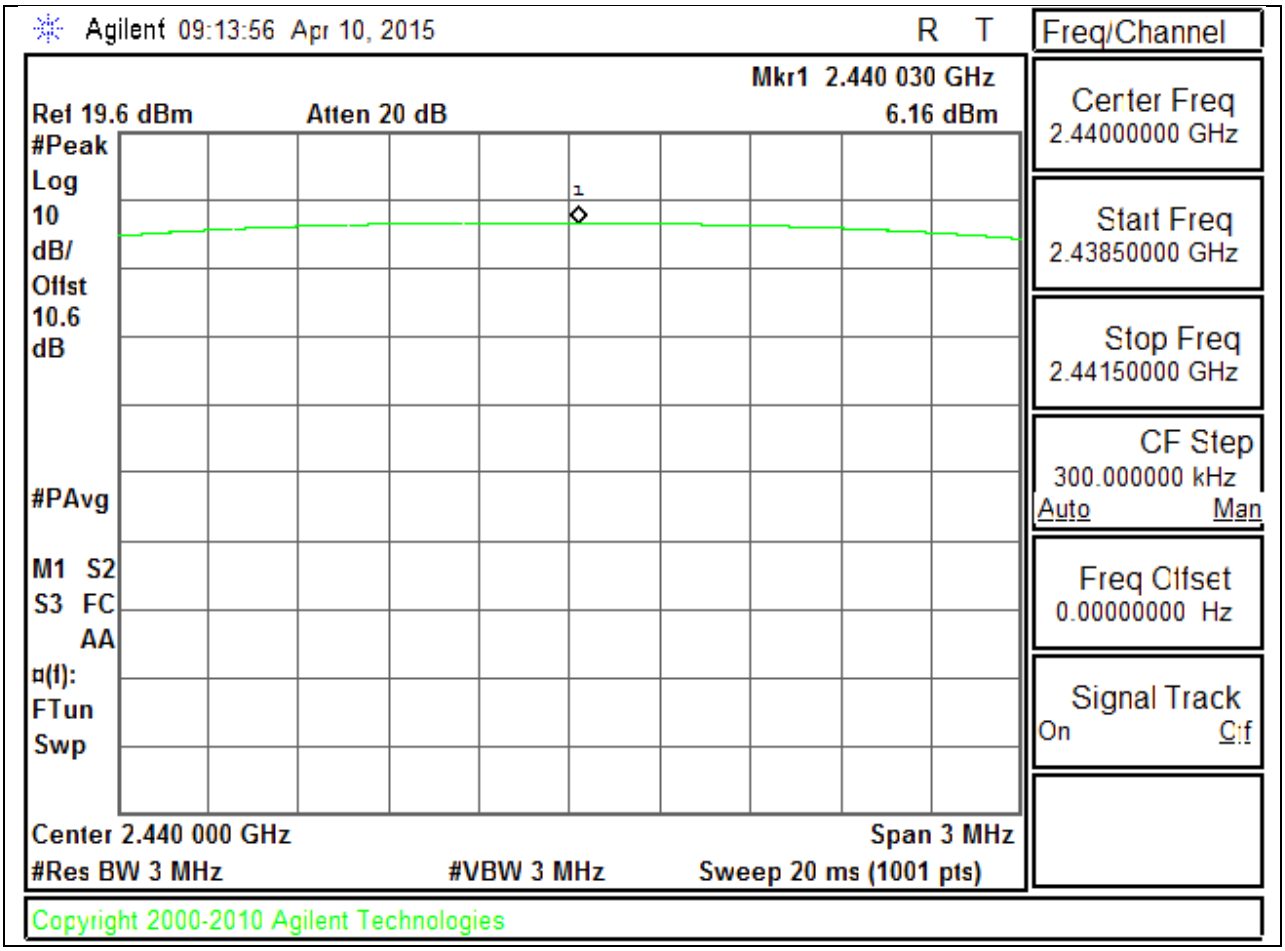
Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	4.320	30	-25.680
Middle	2440	6.160	30	-23.840
High	2480	5.660	30	-24.340

OUTPUT POWER PLOTS

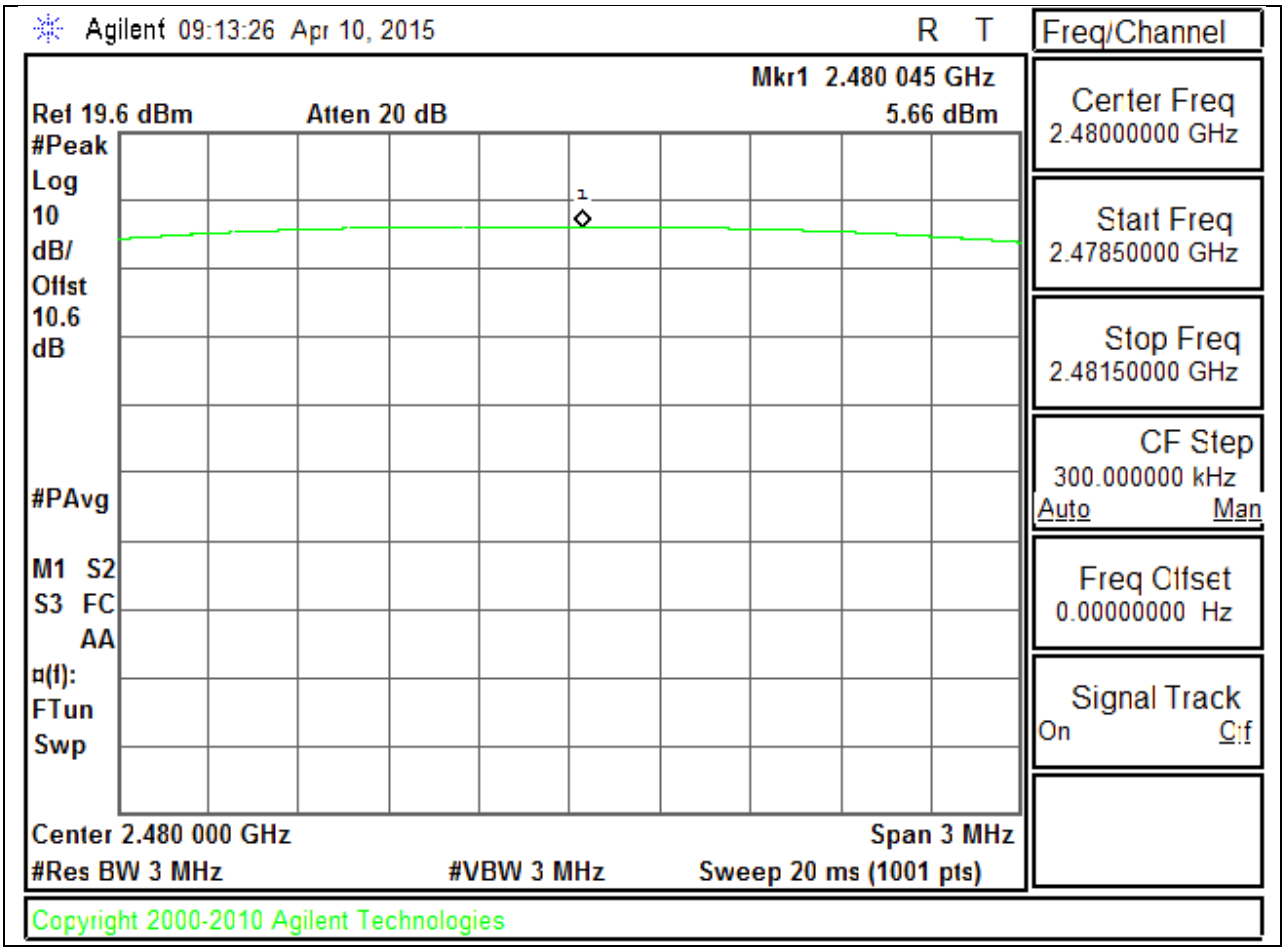
LOW CHANNEL



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	5.3

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

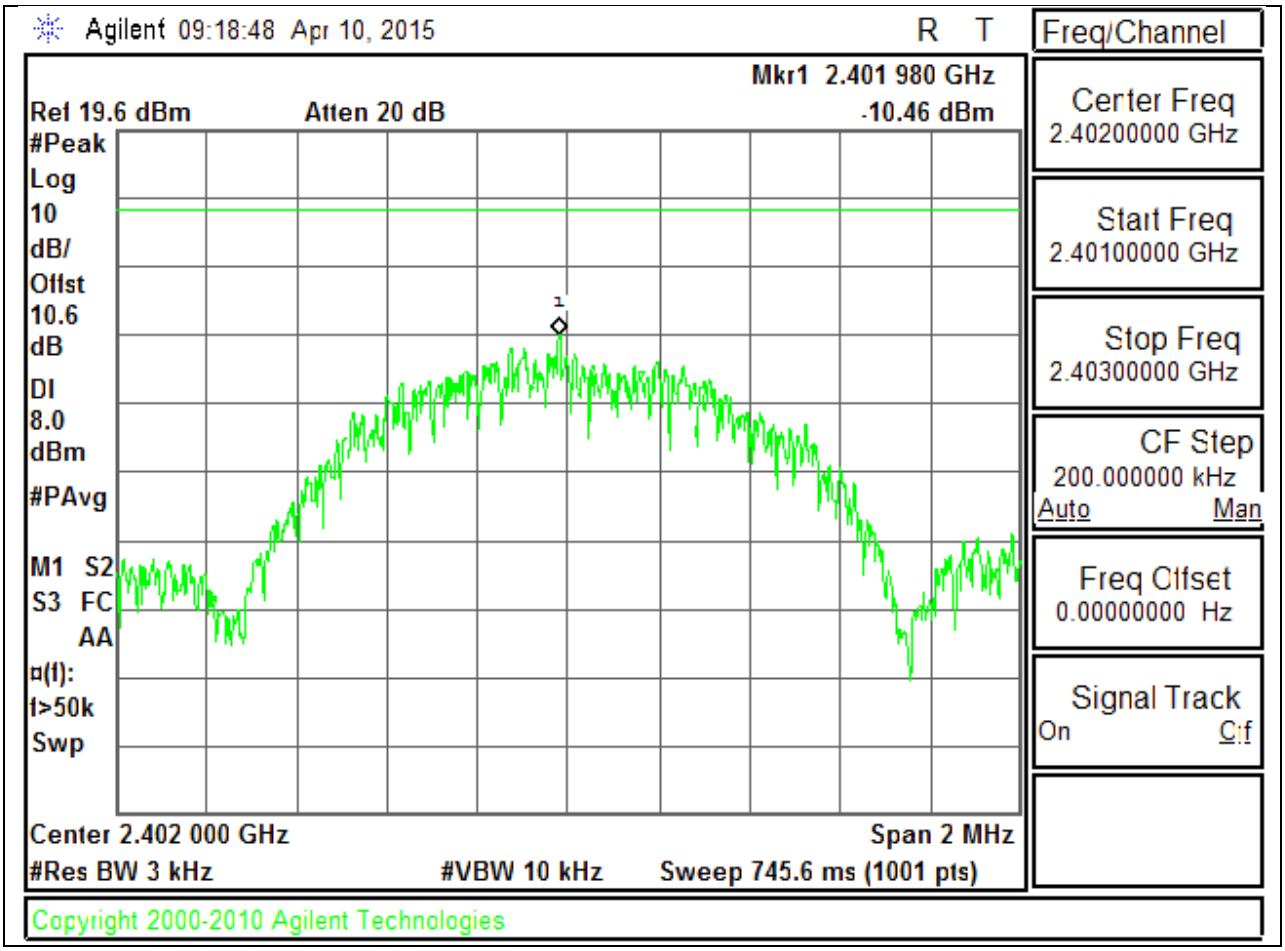
Power Spectral Density was performed utilizing the "Method PKPSD (Peak PSD)" under KDB558074 D01 DTS Meas Guidance v03r02

RESULTS

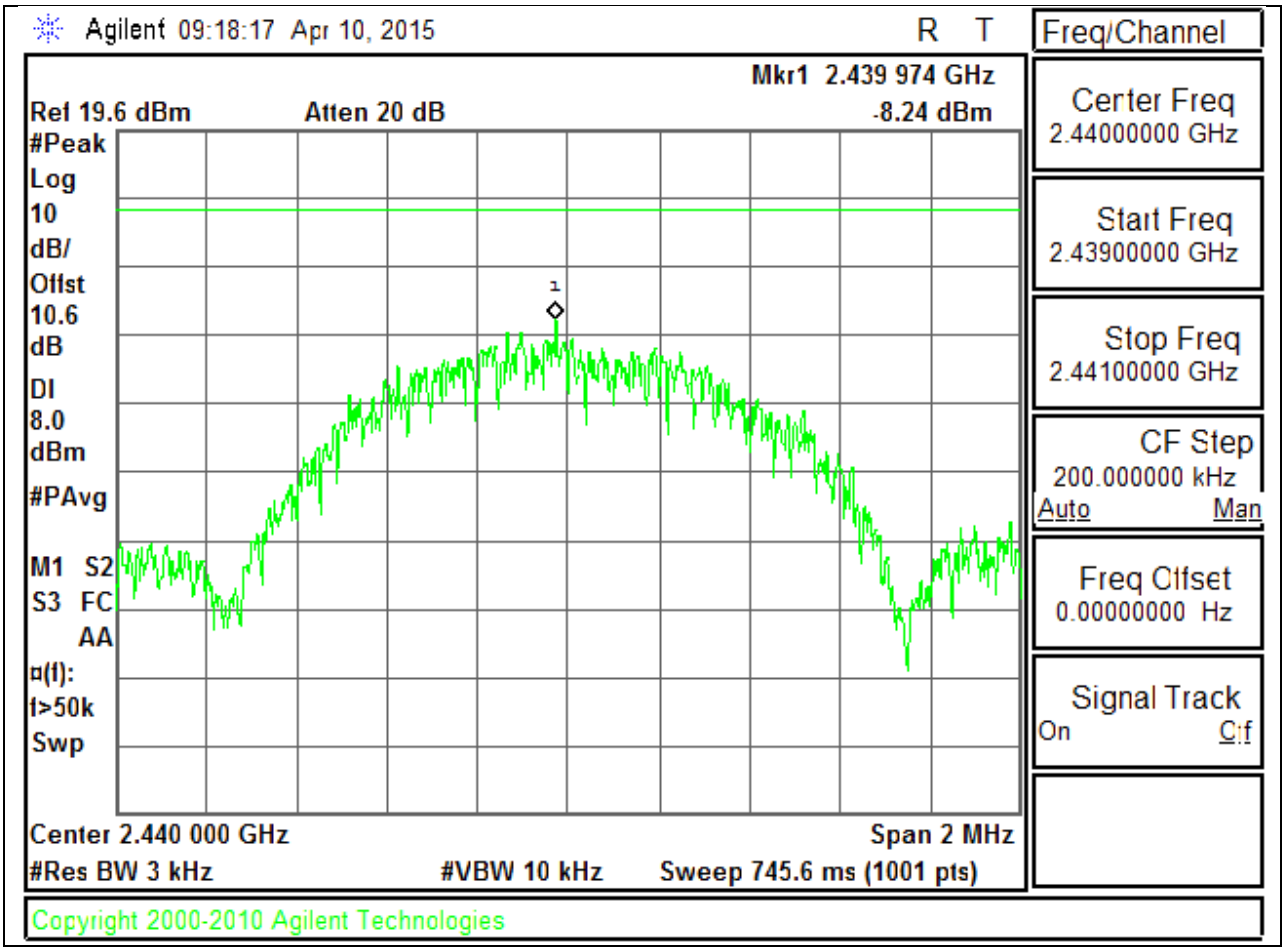
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-10.46	8	-18.46
Middle	2440	-8.24	8	-16.24
High	2480	-8.80	8	-16.80

POWER SPECTRAL DENSITY PLOTS

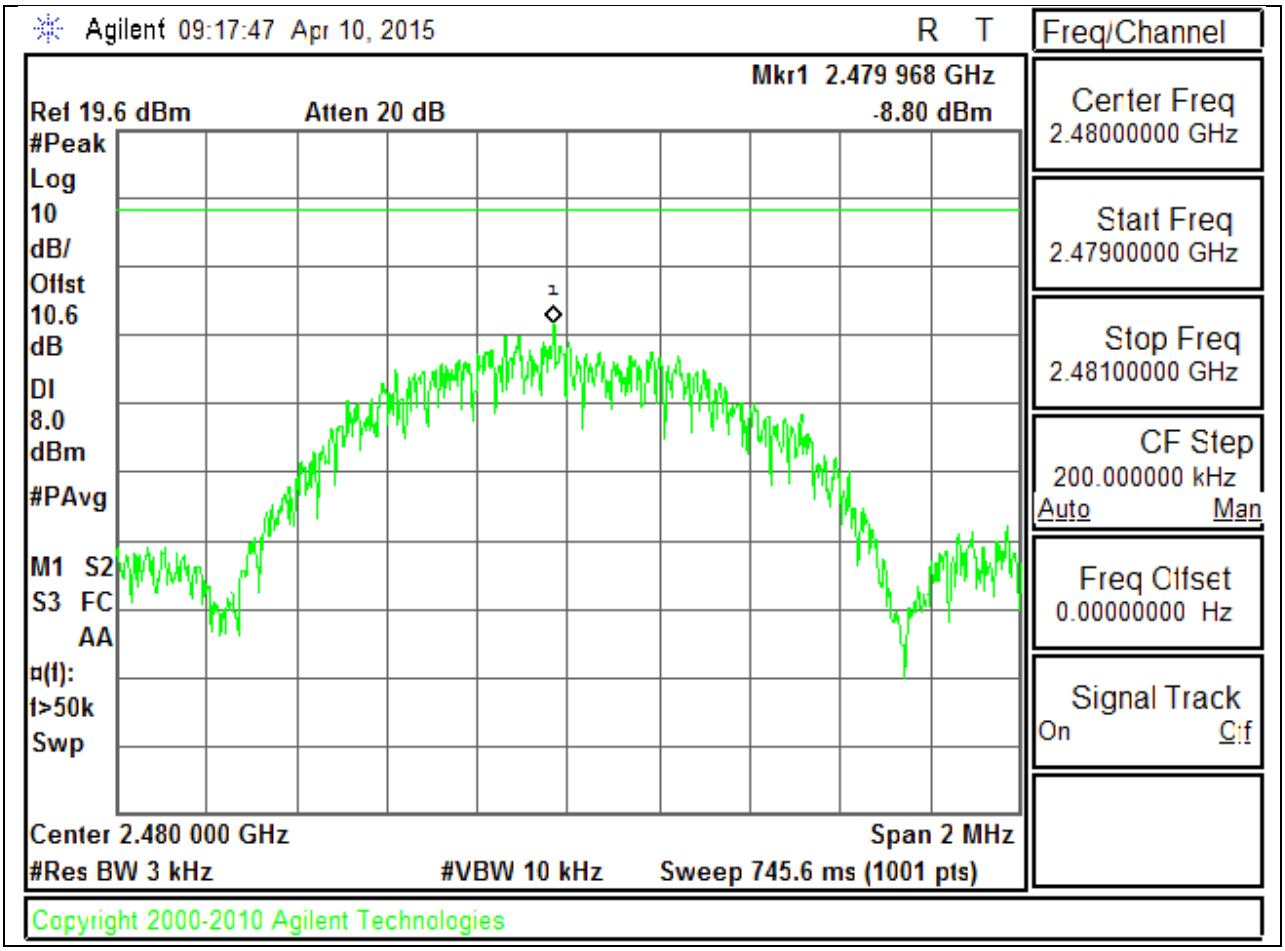
LOW CHANNEL



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

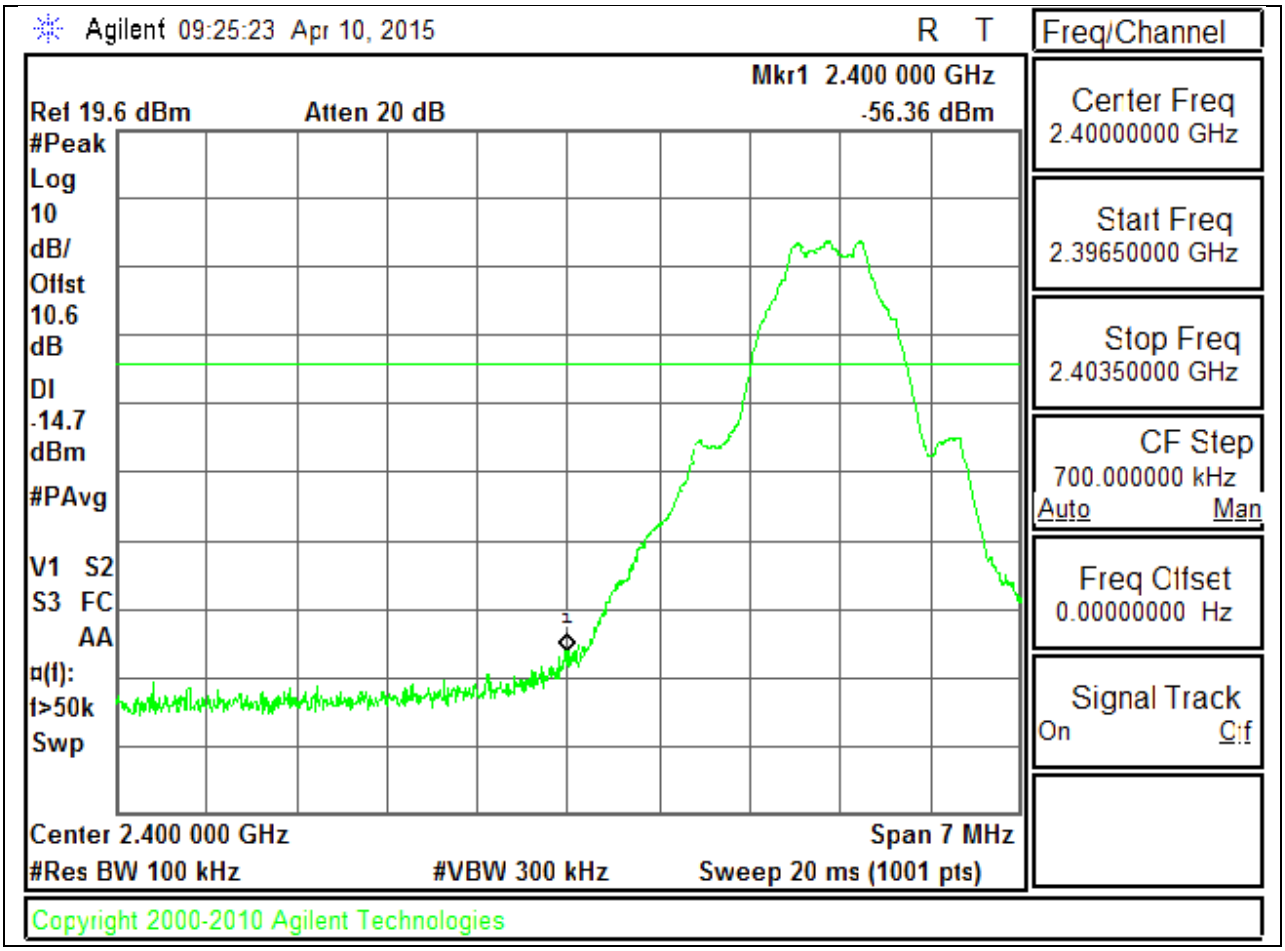
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

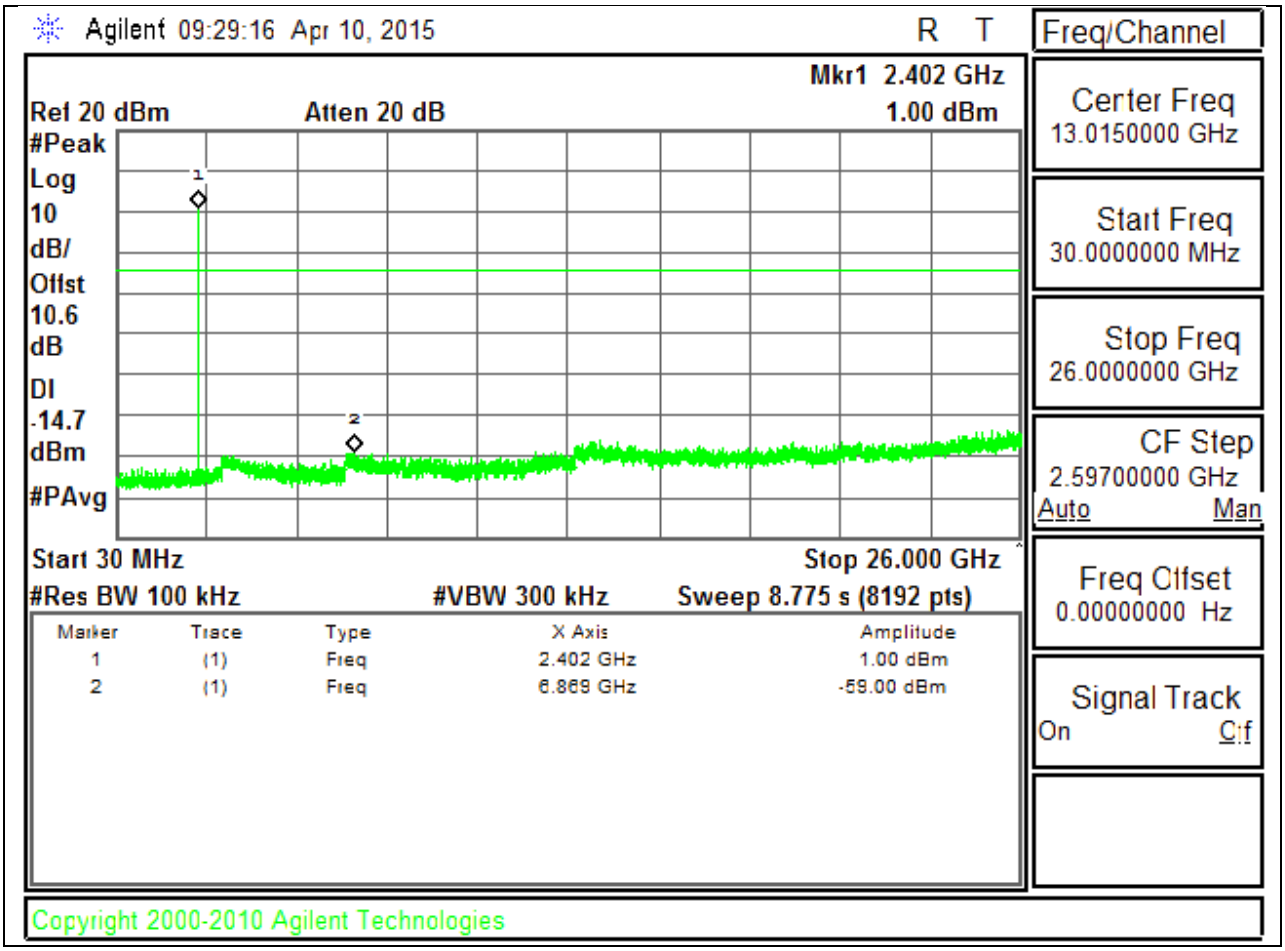
RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE

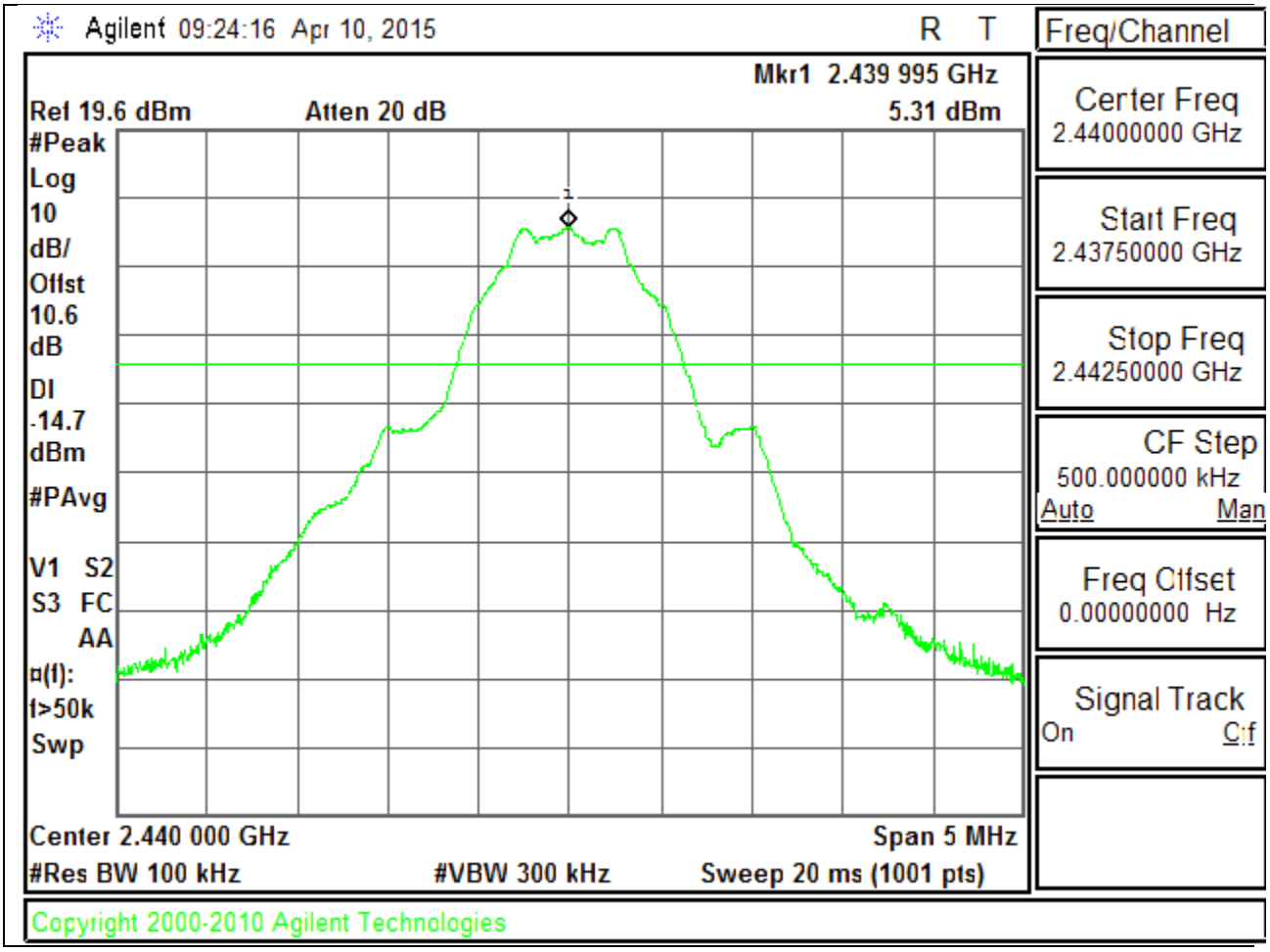


LOW CHANNEL SPURIOUS

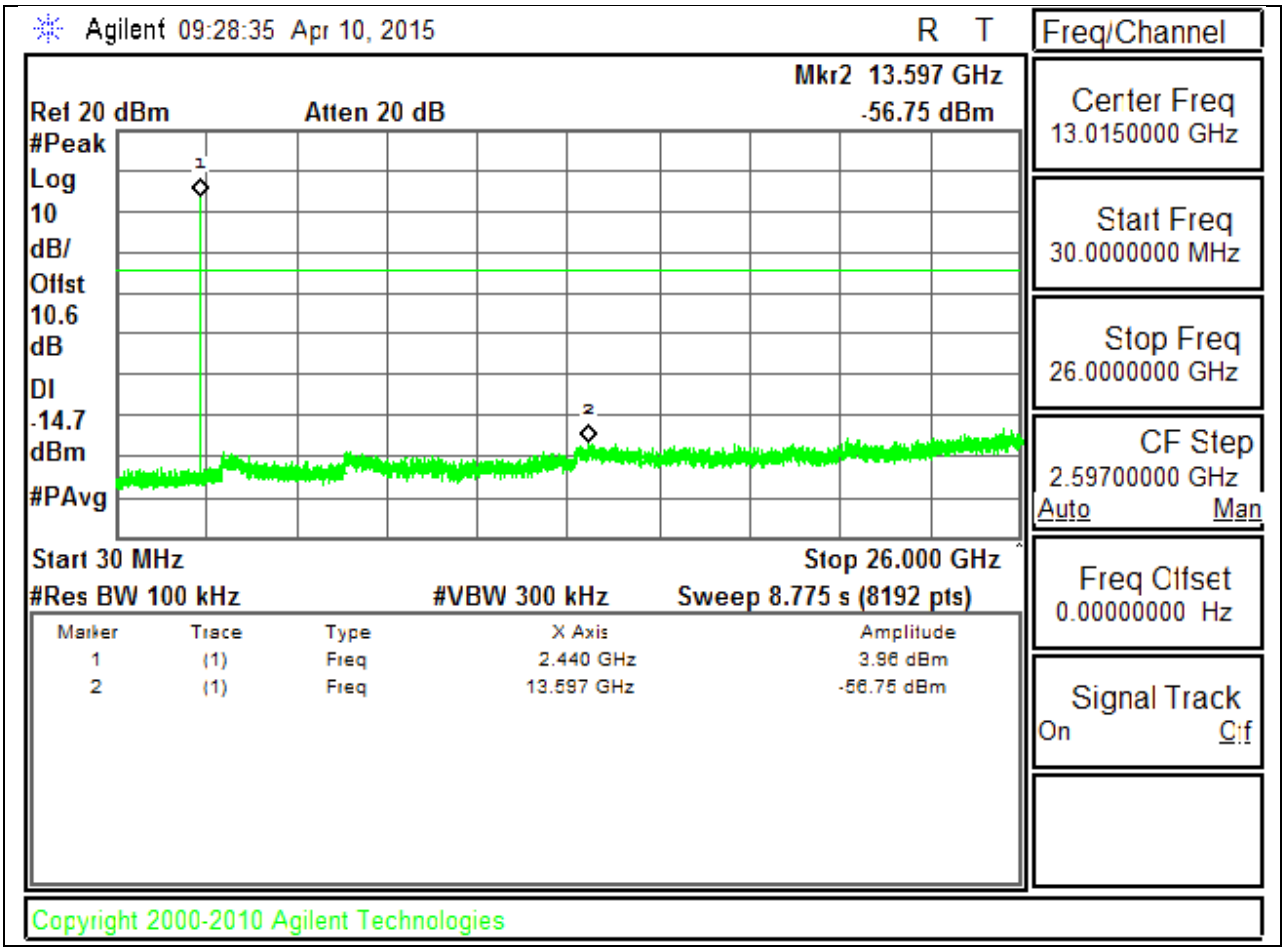


SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL REFERENCE

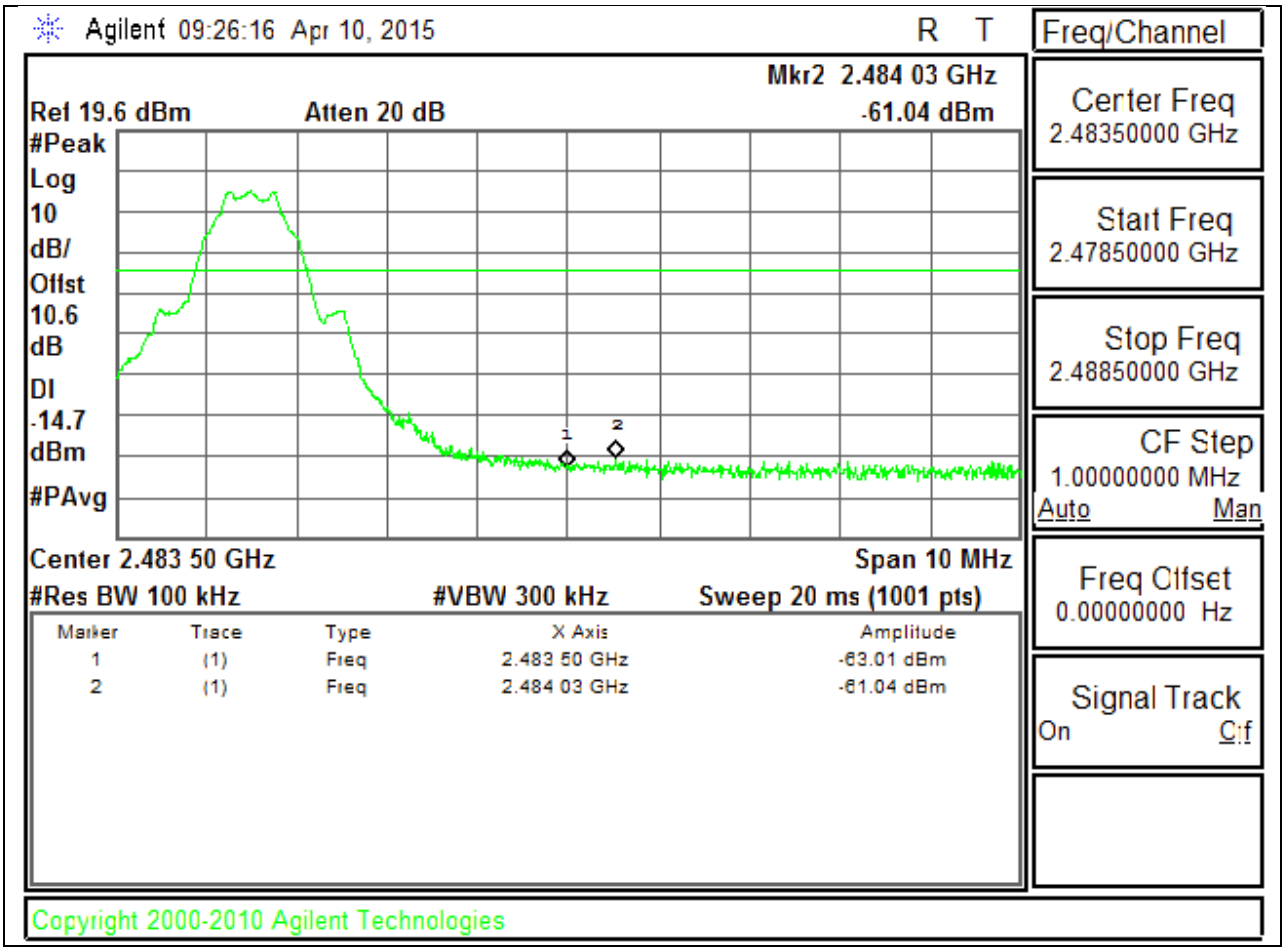


MID CHANNEL SPURIOUS

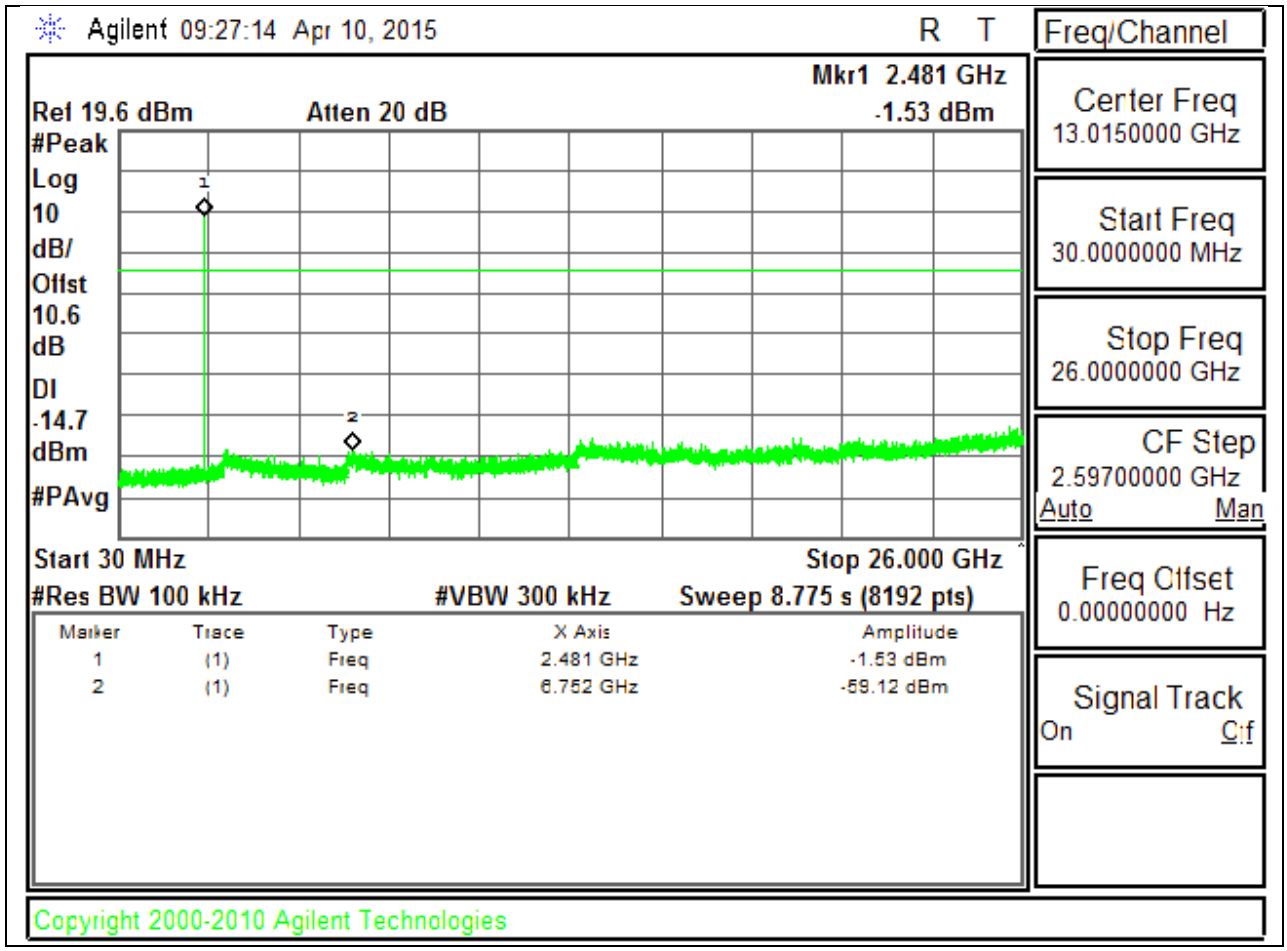


SPURIOUS EMISSIONS, HIGH CHANNEL

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(1/0.622)=2.06dB

(Spectrum Analyzer round it up to 2.1dB)

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.

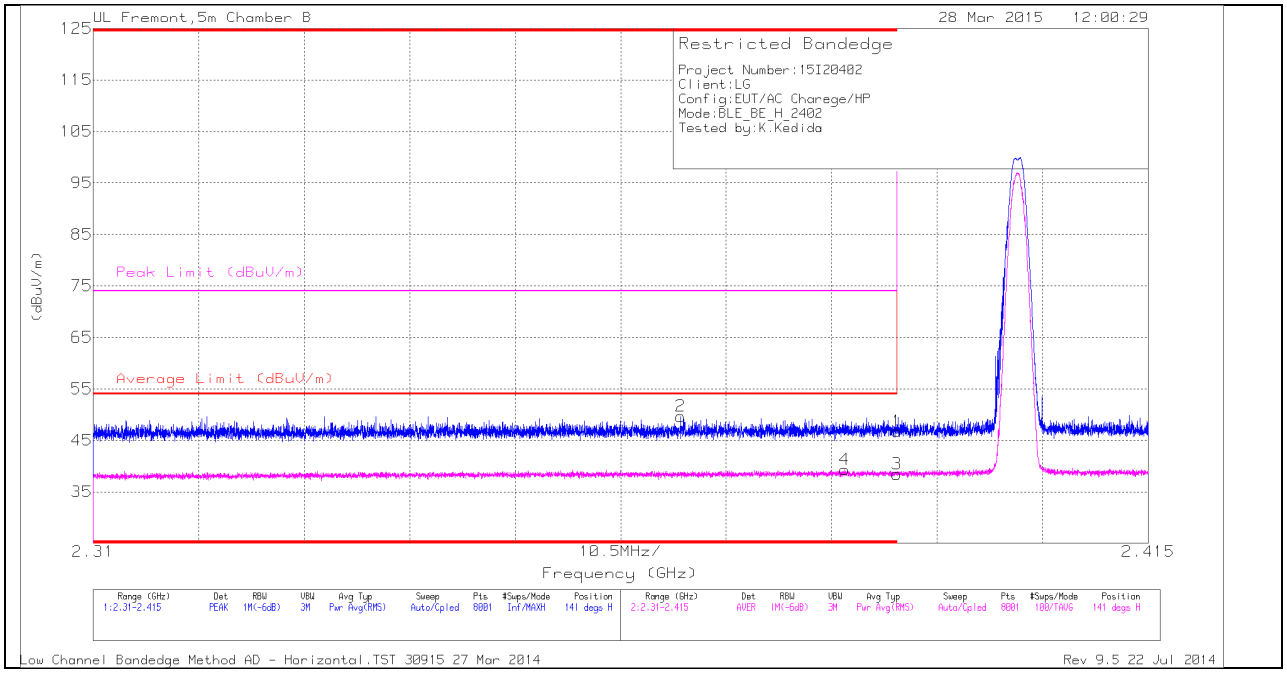
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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)

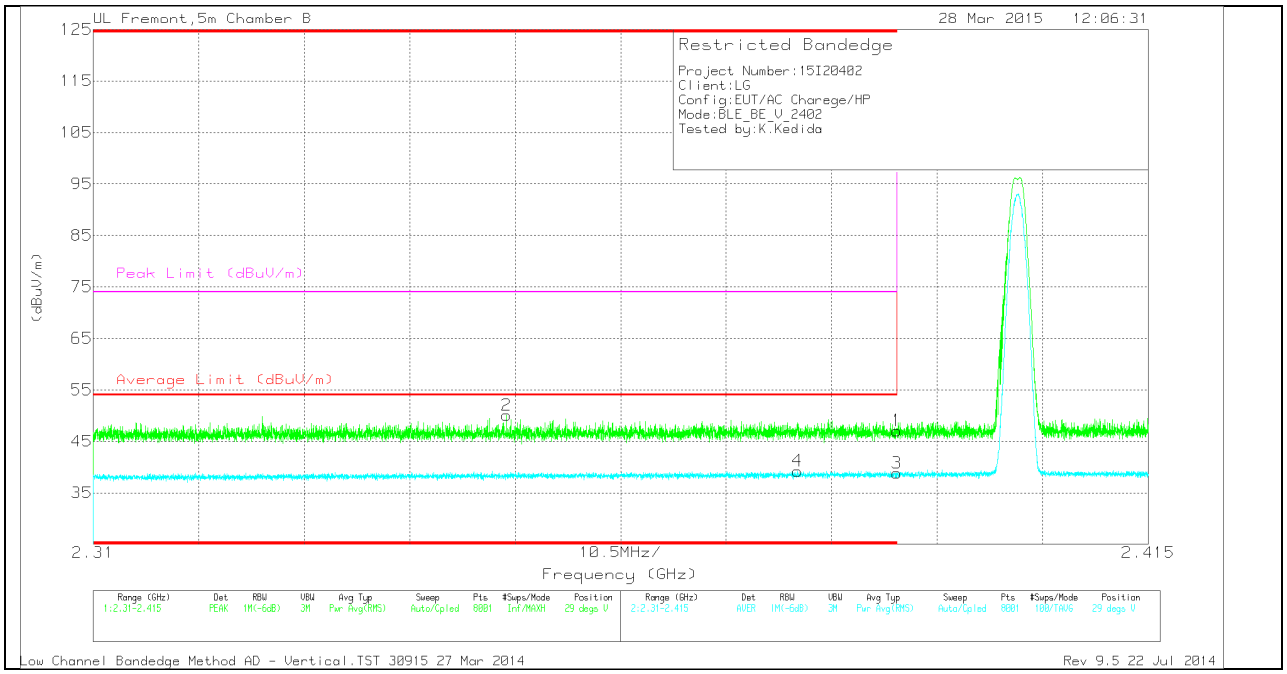
HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (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	* 2.39	37.37	PK	32	-22.6	0	46.77	-	-	74	-27.23	141	343	H
2	* 2.368	40.36	PK	31.9	-22.6	0	49.66	-	-	74	-24.34	141	343	H
3	* 2.39	28.48	RMS	32	-22.6	2.1	38.44	54	-15.56	-	-	141	343	H
4	* 2.385	29.37	RMS	32	-22.6	2.1	39.33	54	-14.67	-	-	141	343	H

VERTICAL PEAK AND AVERAGE PLOT

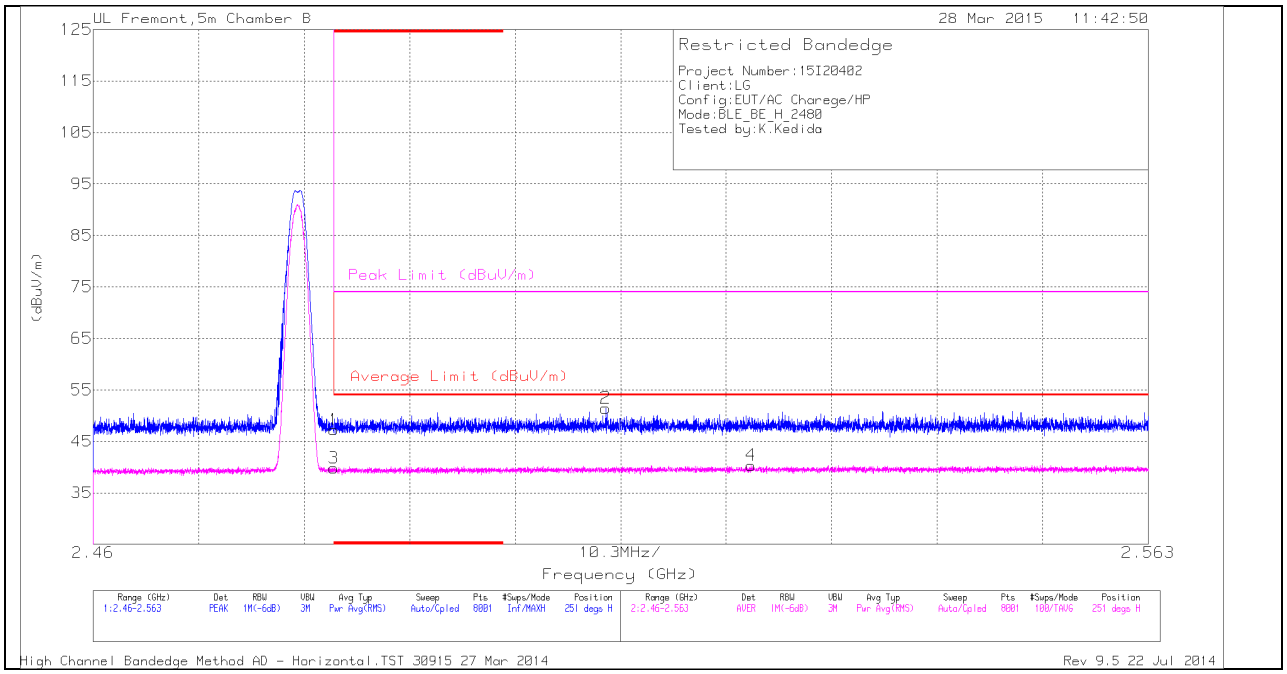


VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (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	37.65	PK	32	-22.6	0	47.05	-	-	74	-26.95	29	344	V
2	* 2.351	40.89	PK	31.8	-22.6	0	50.09	-	-	74	-23.91	29	344	V
3	* 2.39	28.87	RMS	32	-22.6	2.1	38.83	54	-15.17	-	-	29	344	V
4	* 2.38	29.3	RMS	32	-22.6	2.1	39.26	54	-14.74	-	-	29	344	V

AUTHORIZED BANDEDGE (HIGH CHANNEL)

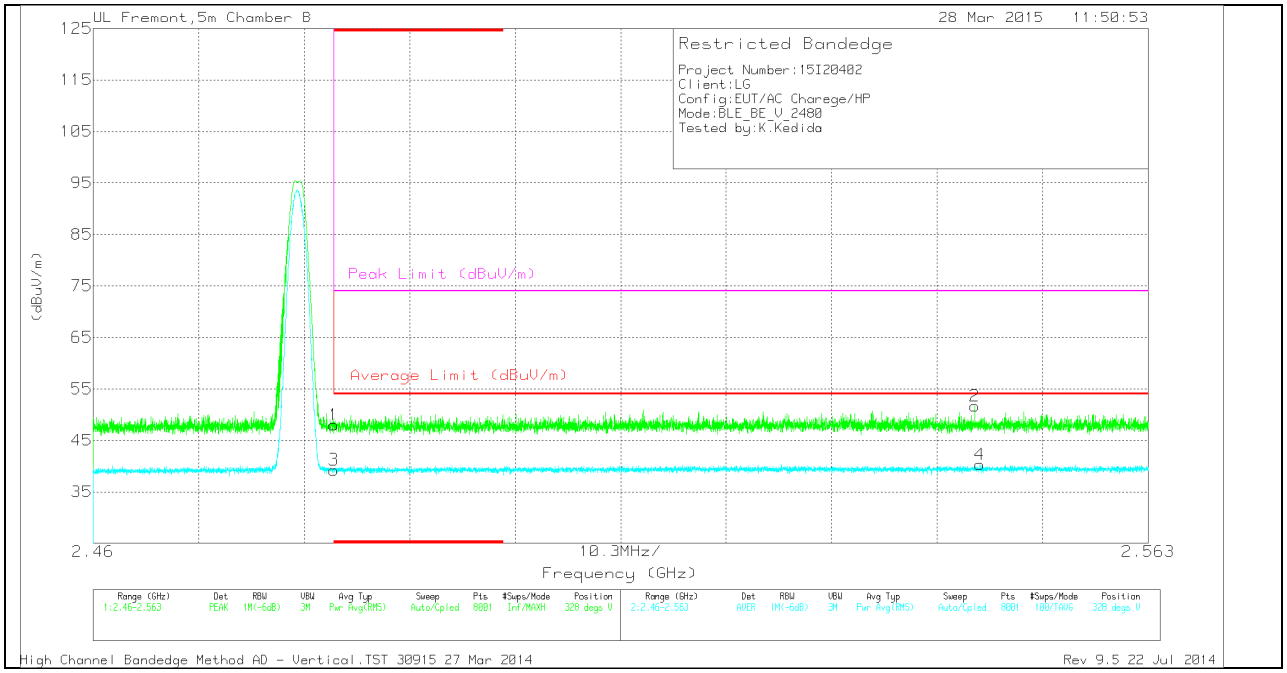
HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (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	37.17	PK	32.5	-22.4	0	47.27	-	-	74	-26.73	251	215	H
3	* 2.484	29.16	RMS	32.5	-22.4	2.1	39.82	54	-14.18	-	-	251	215	H
2	2.51	41.27	PK	32.6	-22.4	0	51.47	-	-	74	-22.53	251	215	H
4	2.524	29.5	RMS	32.6	-22.3	2.1	40.36	54	-13.64	-	-	251	215	H

VERTICAL PEAK AND AVERAGE PLOT

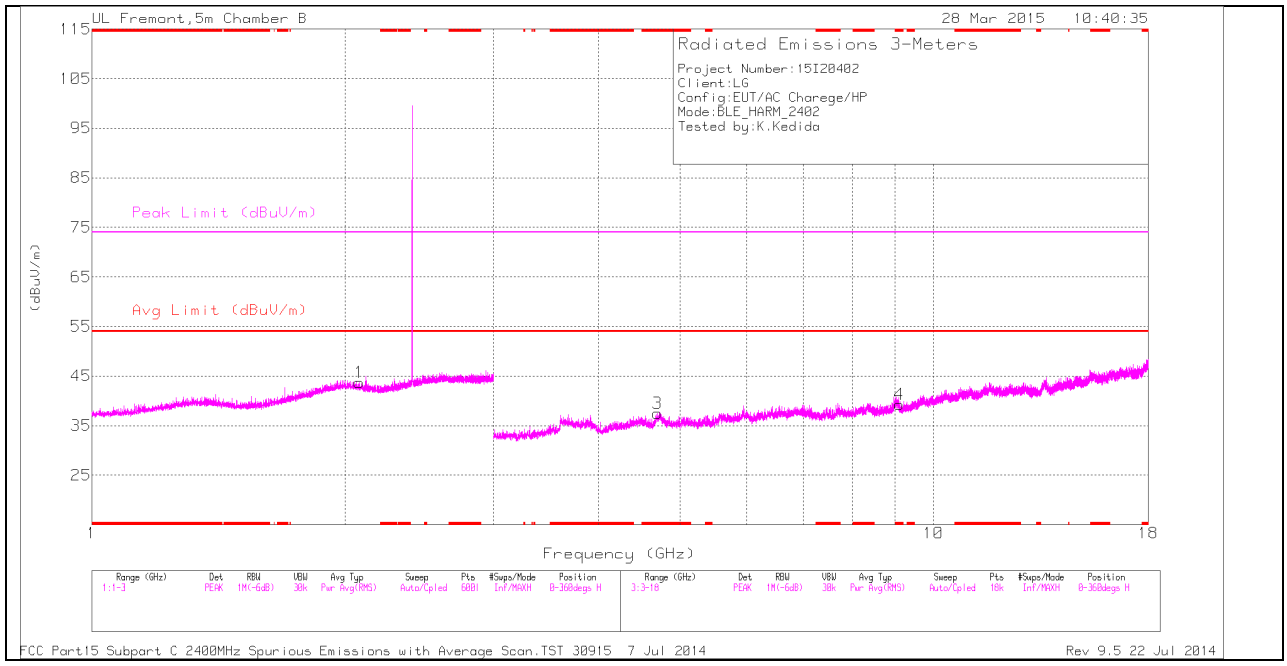


VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (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	37.9	PK	32.5	-22.4	0	48	-	-	74	-26	328	336	V
3	* 2.484	28.59	RMS	32.5	-22.4	2.1	39.25	54	-14.75	-	-	328	336	V
2	2.546	41.44	PK	32.6	-22.4	0	51.64	-	-	74	-22.36	328	336	V
4	2.547	29.55	RMS	32.6	-22.4	2.1	40.31	54	-13.69	-	-	328	336	V

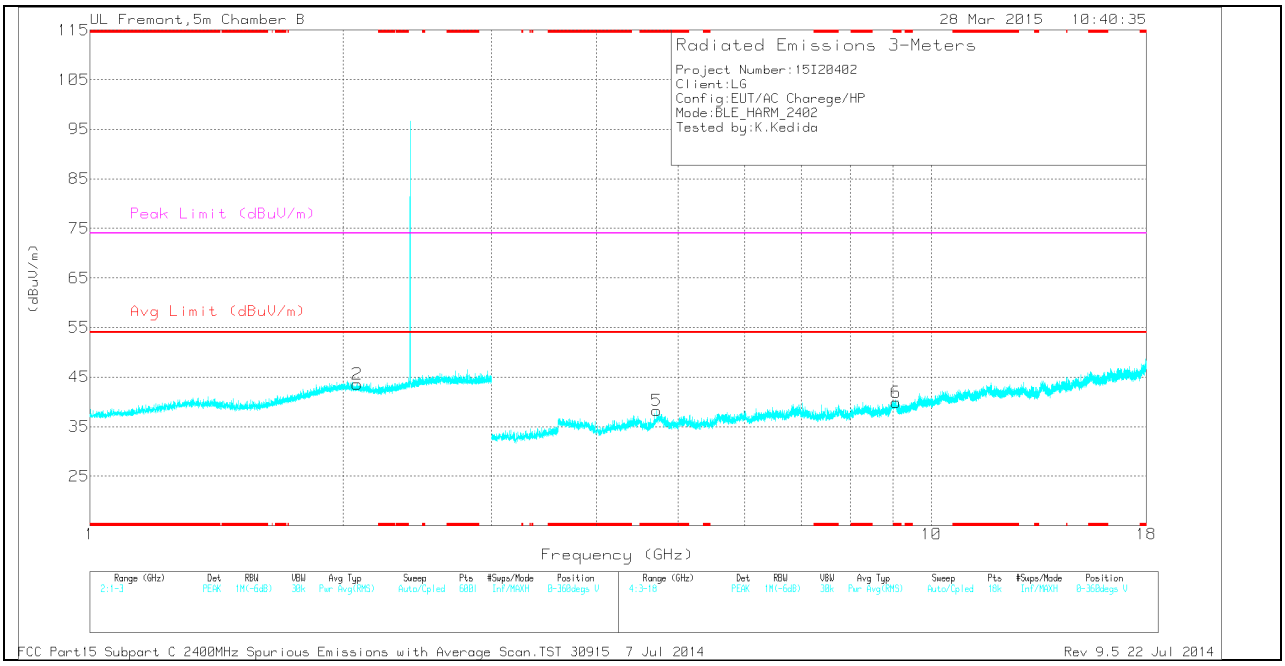
HARMONICS AND SPURIOUS EMISSIONS

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 T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.701	32.7	PK	34.2	-29.4	37.5	-	-	74	-36.5	0-360	199	H
4	* 9.104	27.93	PK	36.1	-24.8	39.23	-	-	74	-34.77	0-360	199	H
5	* 4.717	33.14	PK	34.2	-29.1	38.24	-	-	74	-35.76	0-360	199	V
6	* 9.075	28.15	PK	36.1	-24.4	39.85	-	-	74	-34.15	0-360	199	V
1	2.078	34.84	PK	31.9	-23.1	43.64	-	-	-	-	0-360	101	H
2	2.078	34.72	PK	31.9	-23.1	43.52	-	-	-	-	0-360	199	V

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.701	39.96	PK2	34.2	-29.4	44.76	-	-	74	-29.24	360	198	H
* 4.702	29.33	MAv1	34.2	-29.3	34.23	54	-19.77	-	-	360	198	H

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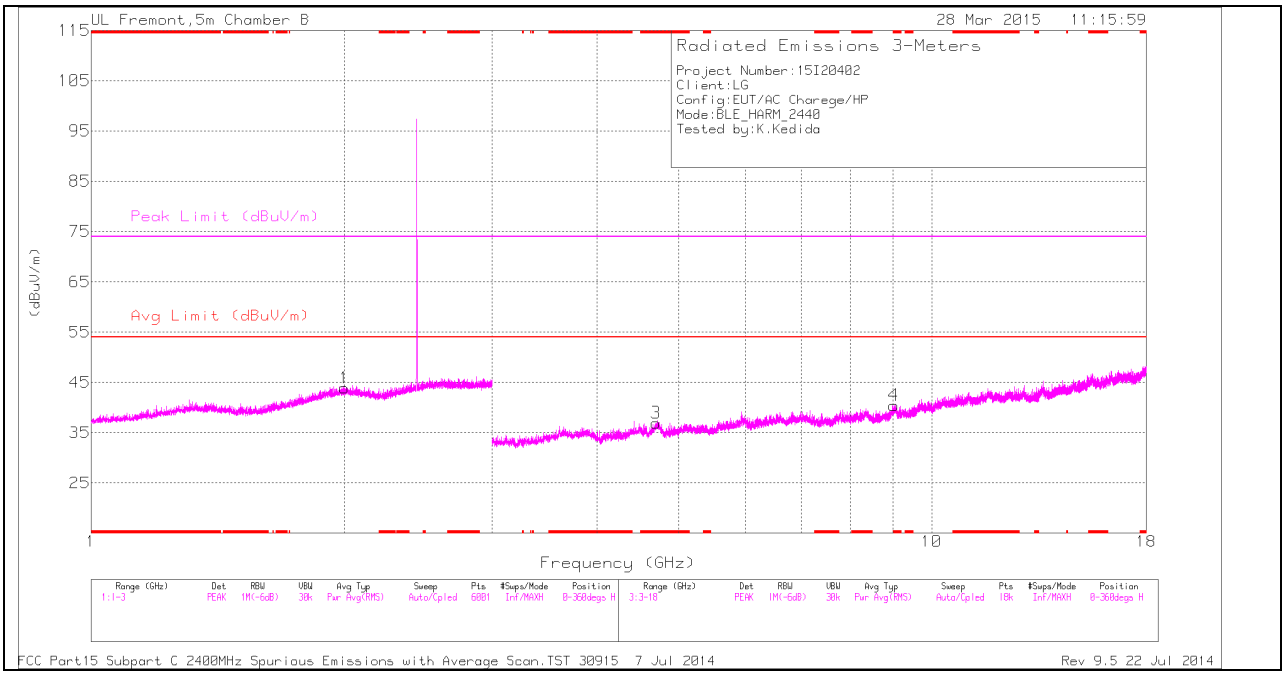
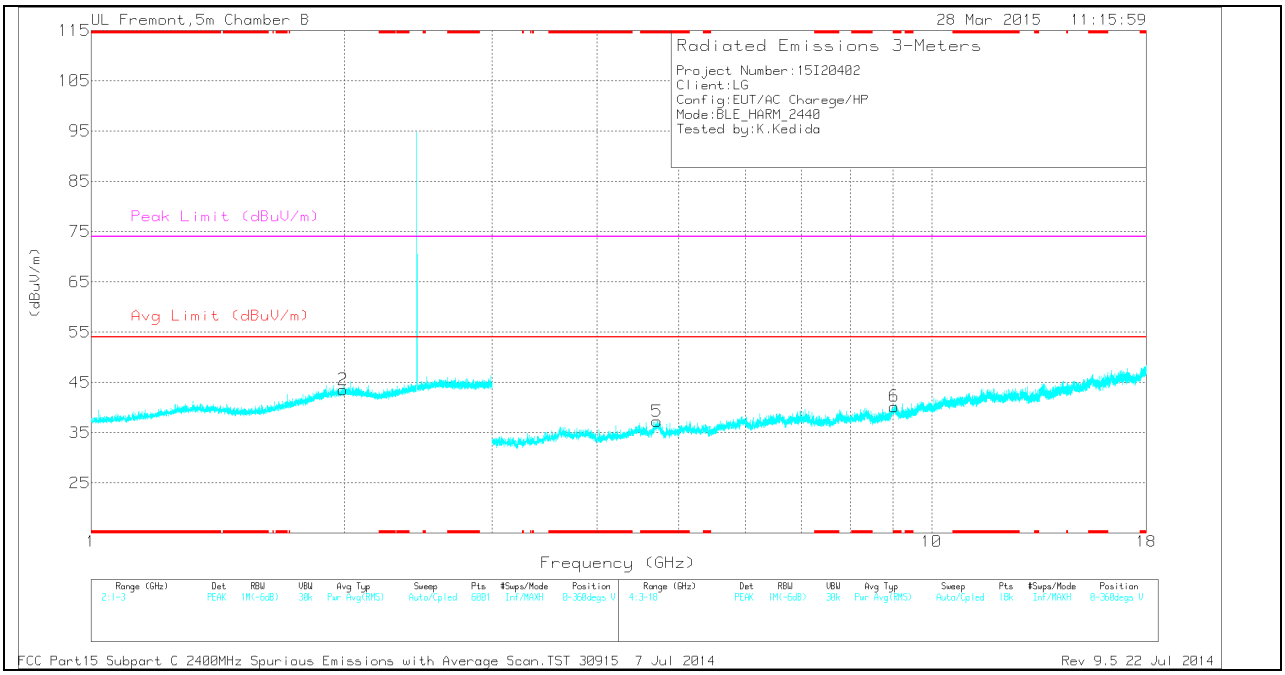
MID CHANNEL HORIZONTAL



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/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.698	32.23	PK	34.2	-29.5	36.93	-	-	74	-37.07	0-360	101	H
4	* 9.018	28.45	PK	36.1	-24.1	40.45	-	-	74	-33.55	0-360	199	H
5	* 4.712	32.27	PK	34.2	-29.2	37.27	-	-	74	-36.73	0-360	199	V
6	* 9.029	28.22	PK	36.1	-24.1	40.22	-	-	74	-33.78	0-360	101	V
2	1.993	34.45	PK	32.3	-23.2	43.55	-	-	-	-	0-360	199	V
1	2.002	34.77	PK	32.3	-23.2	43.87	-	-	-	-	0-360	199	H

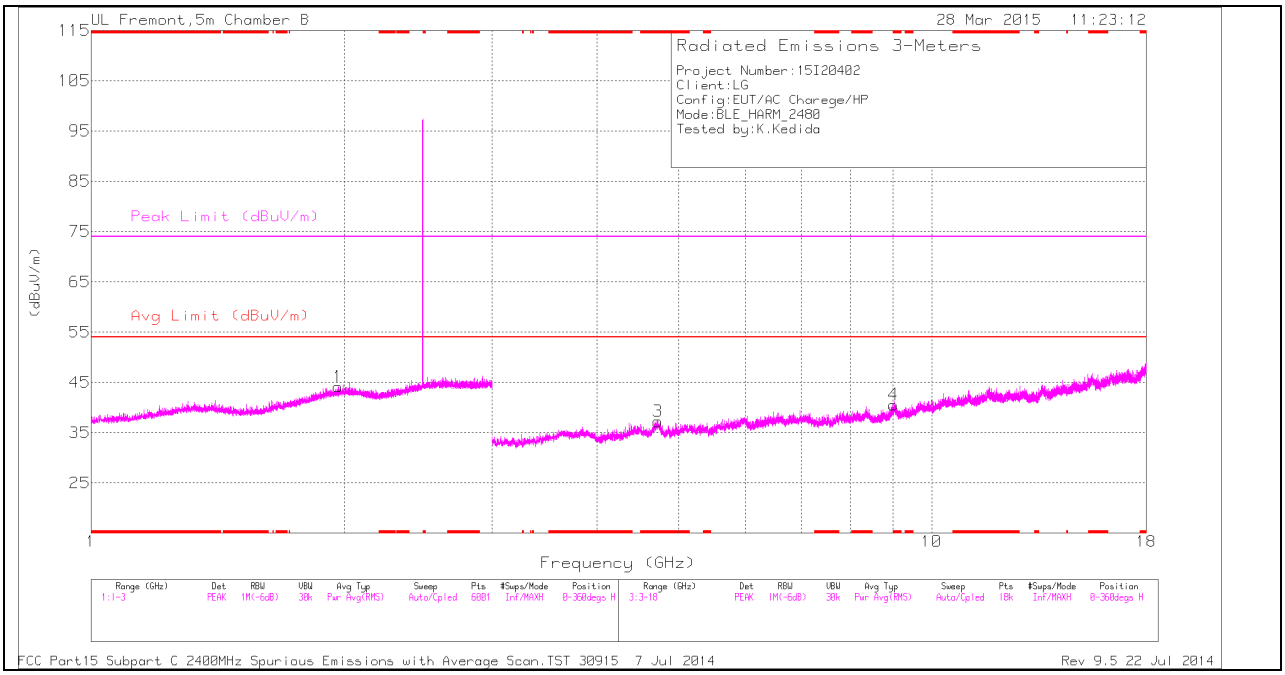
PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.7	40.4	PK2	34.2	-29.4	45.2	-	-	74	-28.8	360	102	H
* 4.698	29.41	MAv1	34.2	-29.5	34.11	54	-19.89	-	-	360	102	H

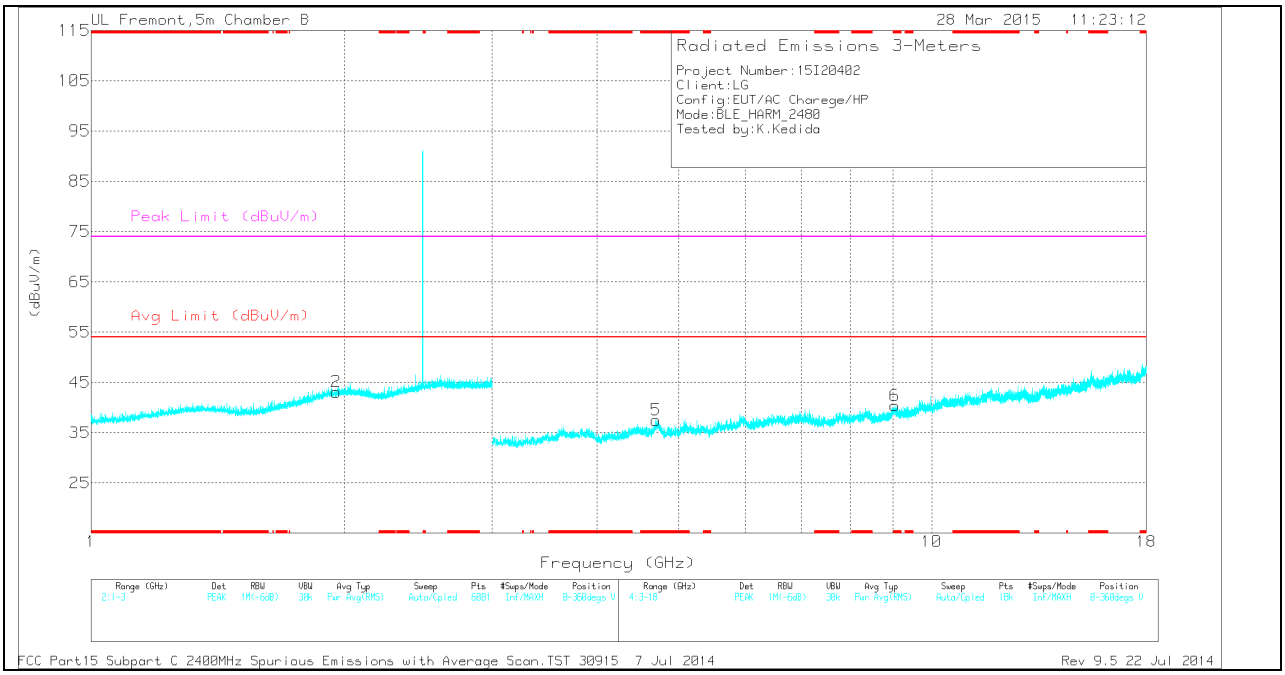
FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

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 T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.723	32.04	PK	34.3	-29.1	37.24	-	-	74	-36.76	0-360	199	H
4	* 9.01	28.65	PK	36.1	-24.2	40.55	-	-	74	-33.45	0-360	101	H
5	* 4.703	32.59	PK	34.2	-29.3	37.49	-	-	74	-36.51	0-360	101	V
6	* 9.035	28.28	PK	36.1	-24	40.38	-	-	74	-33.62	0-360	101	V
2	1.956	34.21	PK	32.1	-23.2	43.11	-	-	-	-	0-360	101	V
1	1.966	35.12	PK	32.2	-23.2	44.12	-	-	-	-	0-360	102	H

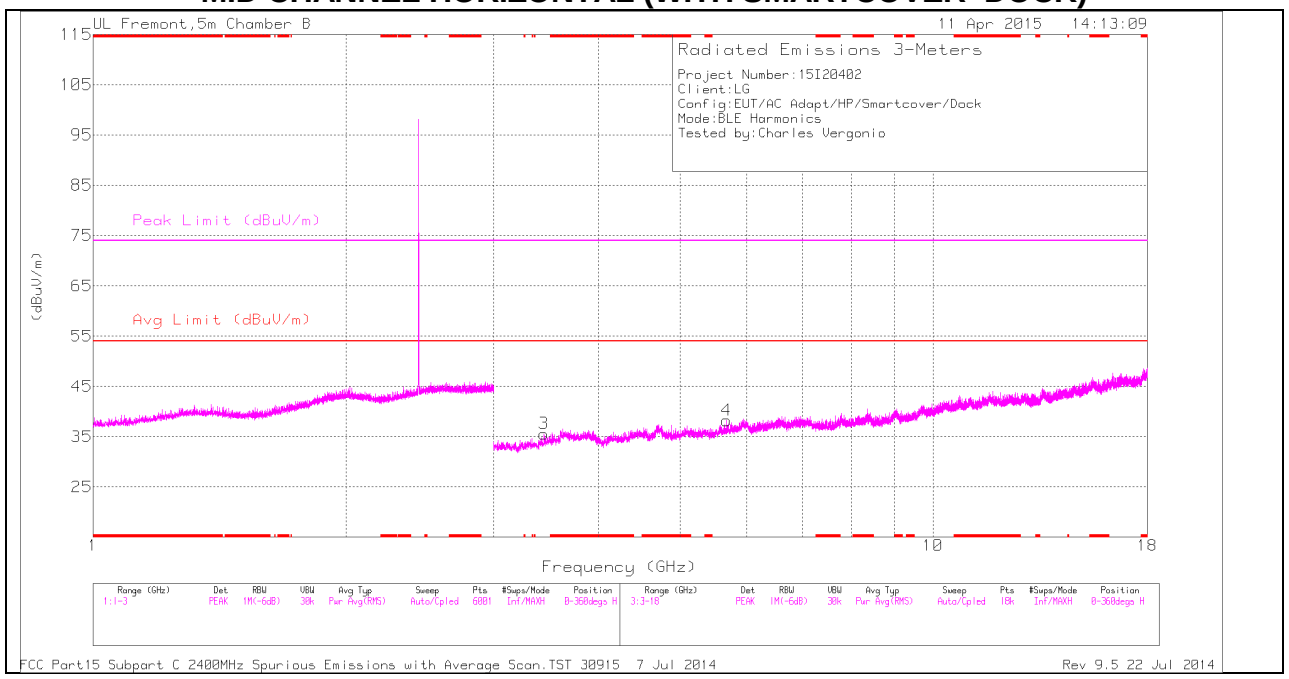
PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.722	39.86	PK2	34.3	-29.1	45.06	-	-	74	-28.94	360	199	H
* 4.724	29.3	MAv1	34.3	-29.1	34.5	54	-19.5	-	-	360	199	H

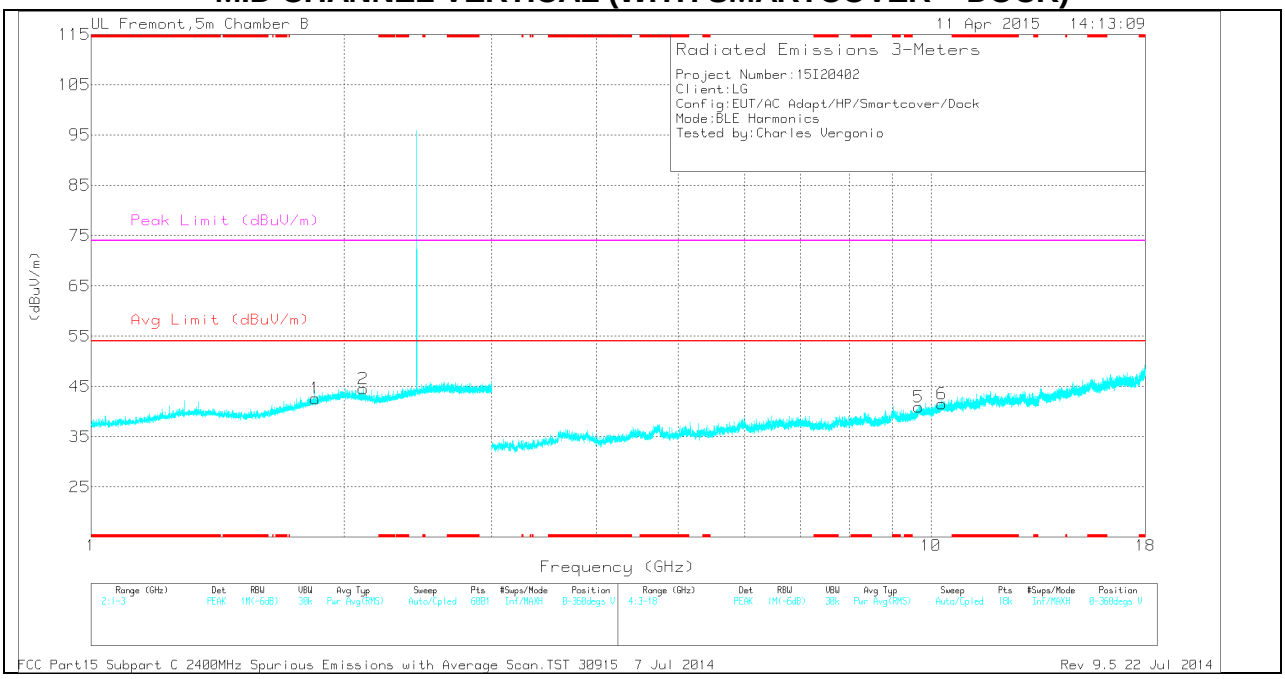
FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

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)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.849	34.6	PK	31.3	-23.3	42.6	-	-	-	-	0-360	199	V
2	2.109	35.83	PK	31.7	-23	44.53	-	-	-	-	0-360	199	V
3	3.444	33.09	PK	33.3	-30.8	35.59	-	-	-	-	0-360	199	H
4	5.681	32.53	PK	34.9	-29.2	38.23	-	-	-	-	0-360	101	H
5	9.67	27.7	PK	36.8	-23.6	40.9	-	-	-	-	0-360	101	V
6	10.306	27.13	PK	37.4	-23	41.53	-	-	-	-	0-360	101	V

PK - Peak detector

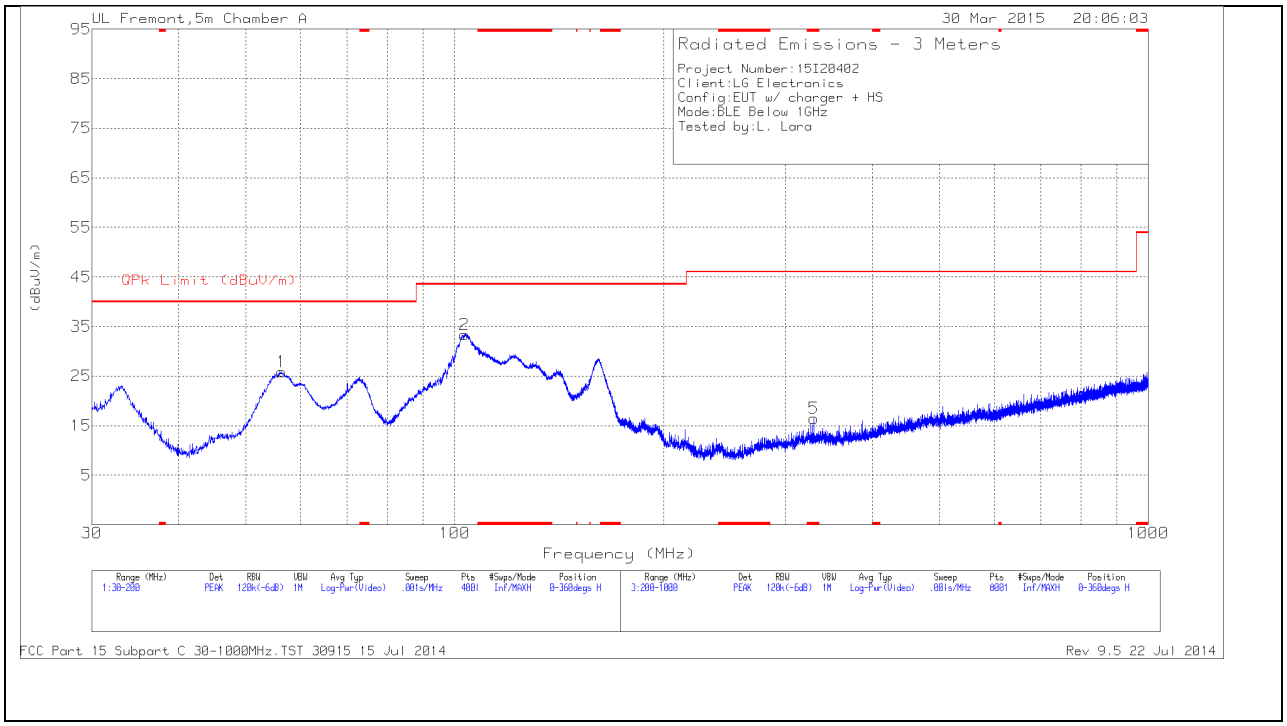
FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 7 Jul 2014

Rev 9.5 22 Jul 2014

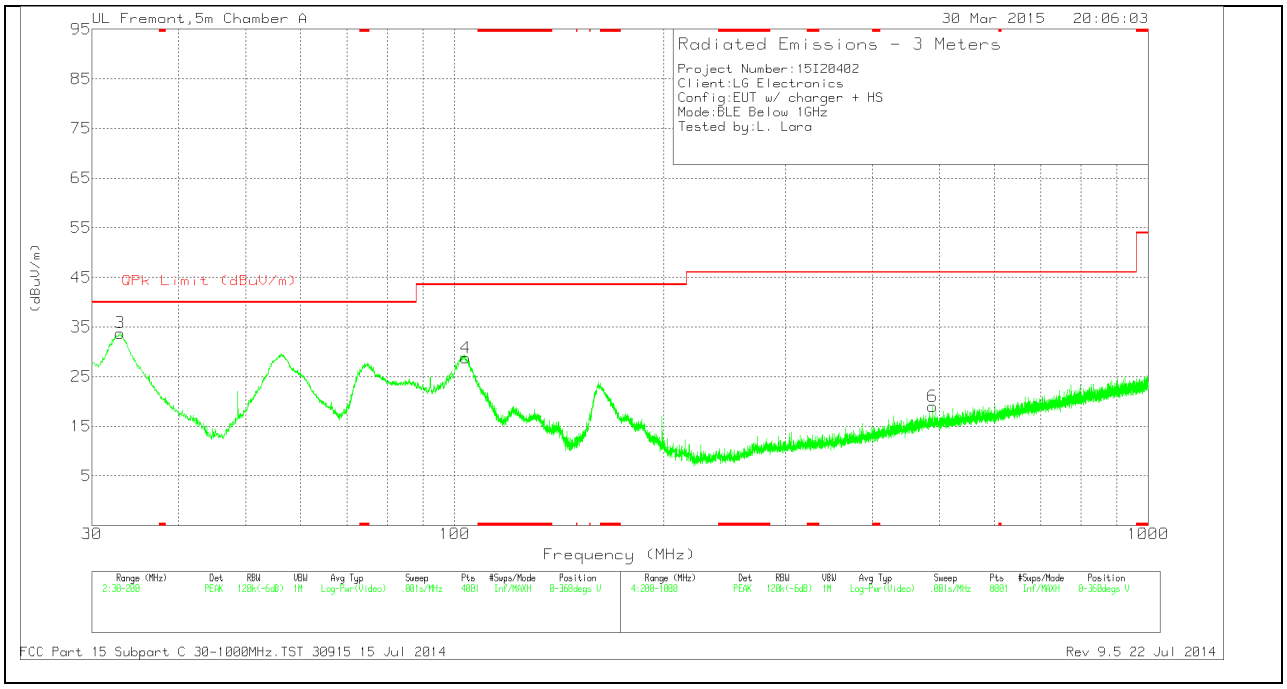
9.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



BELOW 1 GHz TABLE

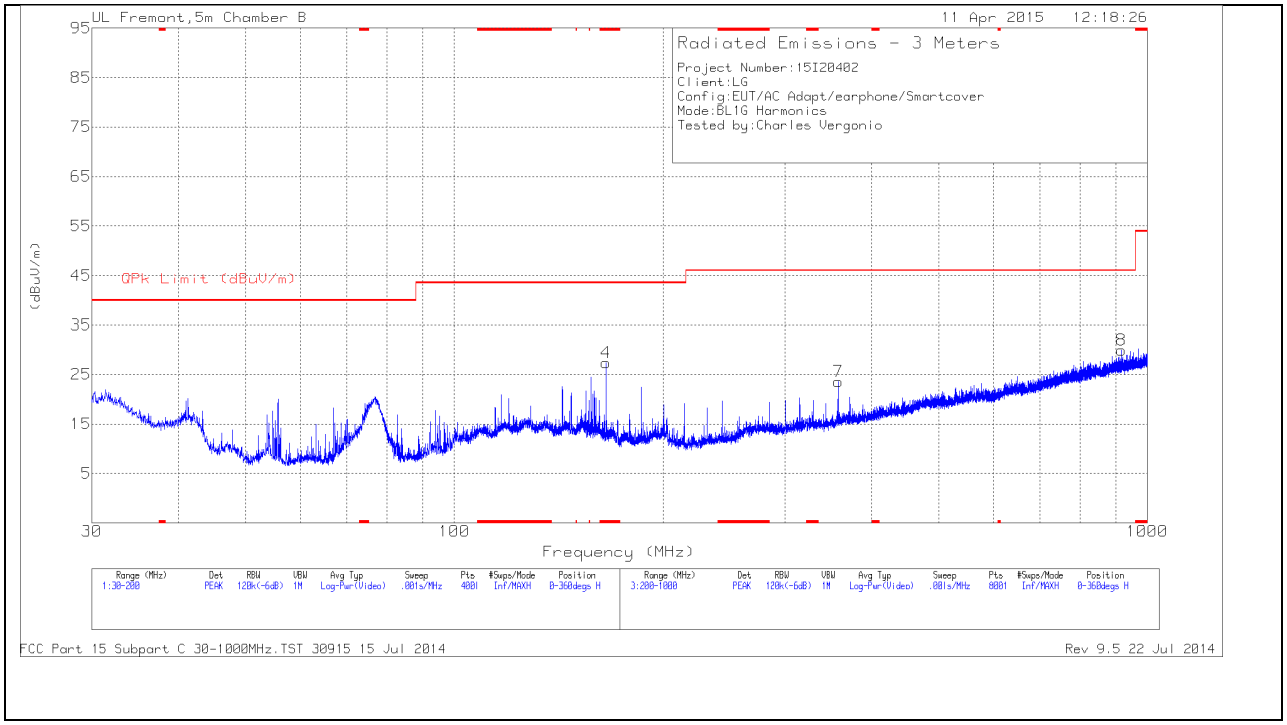
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 329.3	31.86	PK	13.9	-29.3	16.46	46.02	-29.56	0-360	200	H
3	32.9325	45.89	PK	19.1	-31.2	33.79	40	-6.21	0-360	101	V
1	56.3075	49.54	PK	7.2	-30.9	25.84	40	-14.16	0-360	400	H
2	103.2275	53.01	PK	10.8	-30.5	33.31	43.52	-10.21	0-360	300	H
4	103.78	48.23	PK	11	-30.5	28.73	43.52	-14.79	0-360	101	V
6	489.1	30.03	PK	17.7	-28.7	19.03	46.02	-26.99	0-360	200	V

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

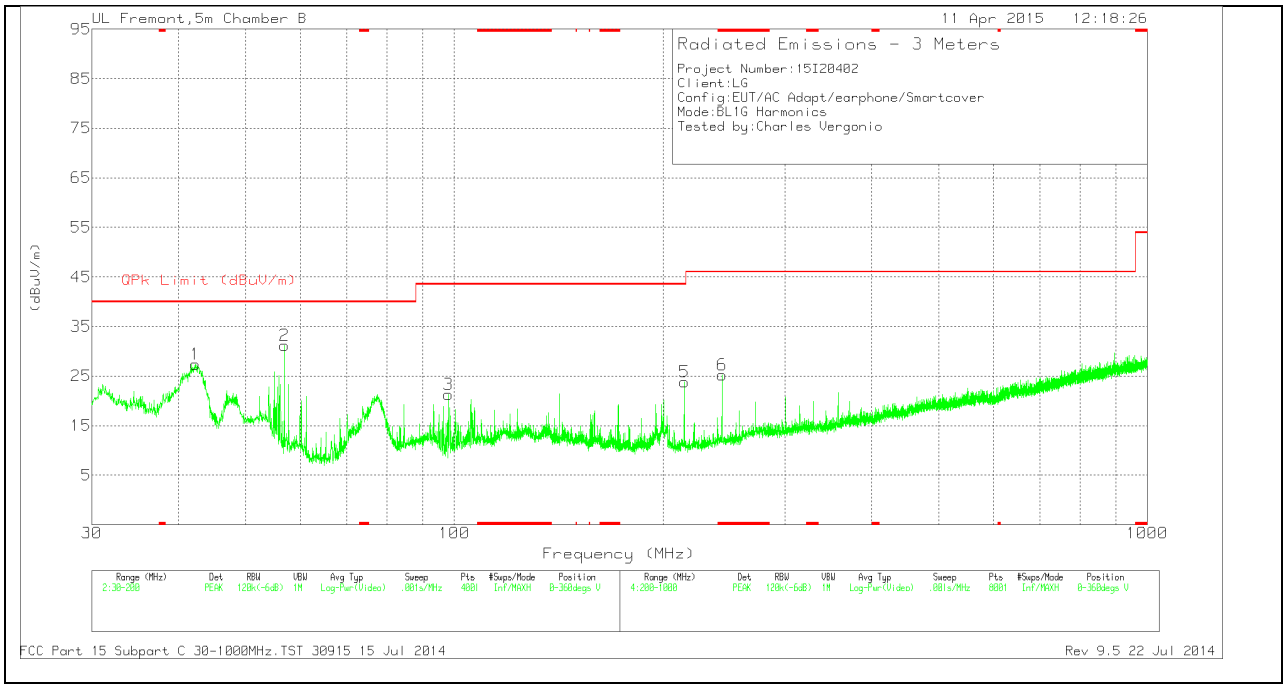
PK - Peak detector

FCC Part 15 Subpart C 30-1000MHz.TST 30915 9 Jul 2013 Rev 9.5 12 Jun 2013

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	* 165.6175	42.82	PK	11.9	-27.3	27.42	43.52	-16.1	0-360	200	H
6	* 243.4	40.16	PK	11.6	-26.5	25.26	46.02	-20.76	0-360	300	V
1	42.2825	43.62	PK	12.4	-28.7	27.32	40	-12.68	0-360	101	V
2	56.9025	52.23	PK	7.4	-28.5	31.13	40	-8.87	0-360	101	V
3	98.085	39.68	PK	9.7	-28.1	21.28	43.52	-22.24	0-360	101	V
5	214.8	40	PK	10.6	-26.8	23.8	43.52	-19.72	0-360	200	V
7	357.9	34.72	PK	14.8	-25.9	23.62	46.02	-22.4	0-360	200	H
8	918.5	30.13	PK	22.6	-22.8	29.93	46.02	-16.09	0-360	300	H

* - 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

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.

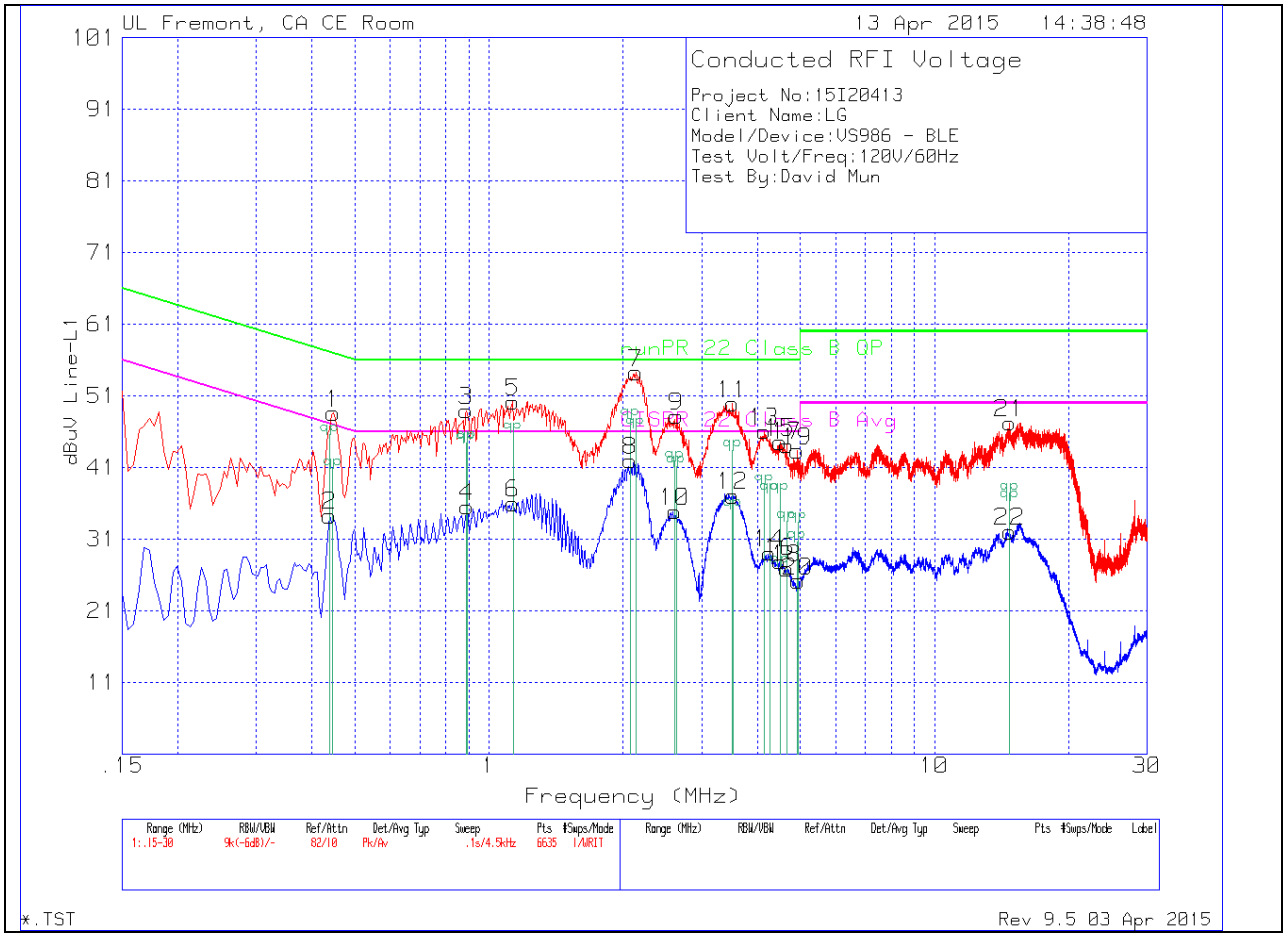
TEST PROCEDURE

ANSI C63.10

RESULTS

6 WORST EMISSIONS

LINE 1 PLOT



LINE 1 RESULTS

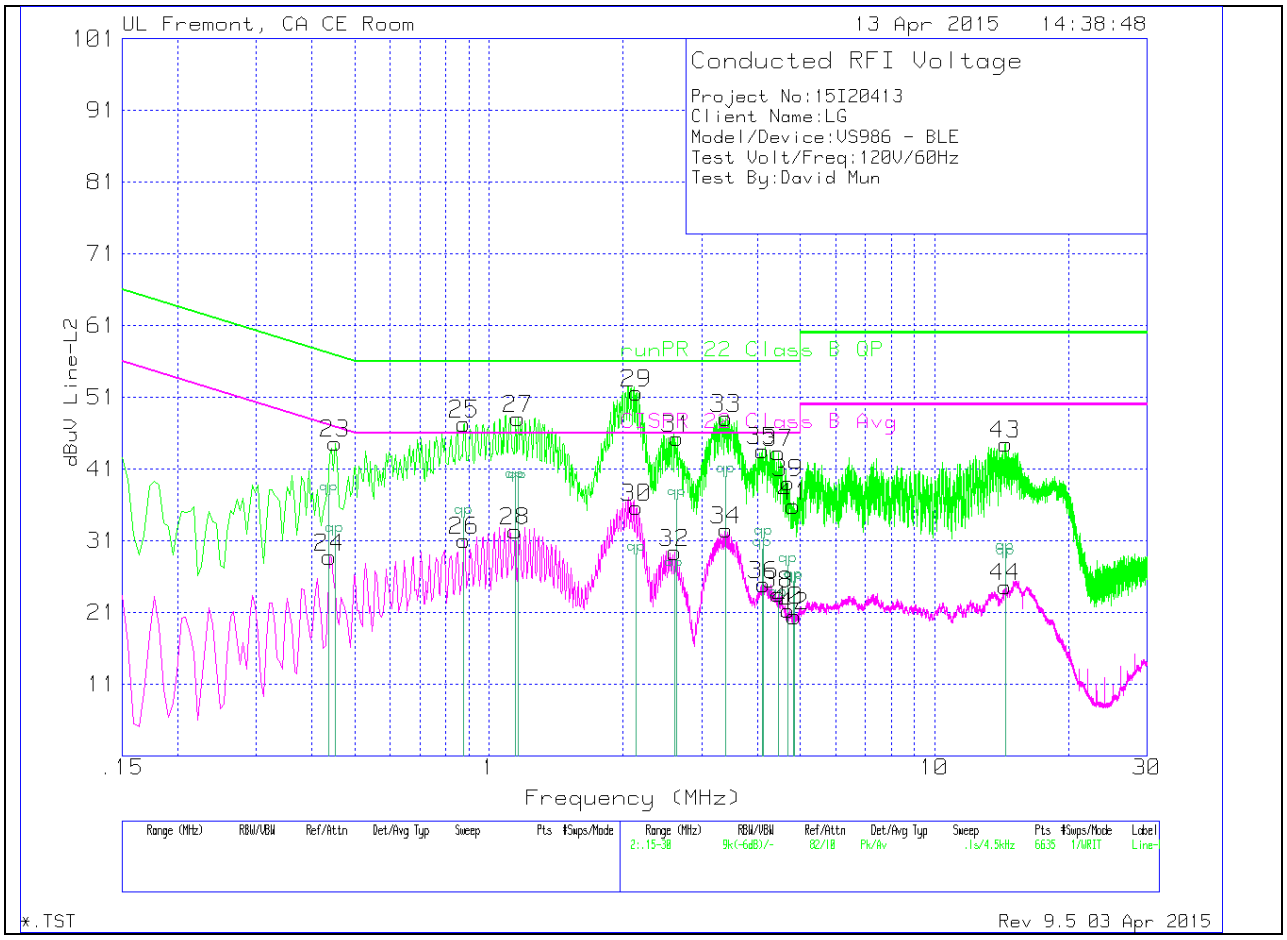
Range 1: Line-L1 .15 - 30MHz

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	48.22	Pk	.4	0	48.62	56.93	-8.31	-	-
2	.438	33.91	Av	.4	0	34.31	-	-	47.1	-12.79
3	.888	48.67	Pk	.3	0	48.97	56	-7.03	-	-
4	.8925	35.24	Av	.3	0	35.54	-	-	46	-10.46
5	1.131	49.97	Pk	.2	0	50.17	56	-5.83	-	-
6	1.131	35.81	Av	.2	0	36.01	-	-	46	-9.99
7	2.1345	53.96	Pk	.2	.1	54.26	56	-1.74	-	-
8	2.076	41.69	Av	.2	.1	41.99	-	-	46	-4.01
9	2.634	47.9	Pk	.2	.1	48.2	56	-7.8	-	-
10	2.6115	34.54	Av	.2	.1	34.84	-	-	46	-11.16
11	3.5205	49.62	Pk	.2	.1	49.92	56	-6.08	-	-
12	3.525	36.76	Av	.2	.1	37.06	-	-	46	-8.94
13	4.1505	45.75	Pk	.2	.1	46.05	56	-9.95	-	-
14	4.263	28.76	Av	.2	.1	29.06	-	-	46	-16.94
15	4.506	44.25	Pk	.2	.1	44.55	56	-11.45	-	-
16	4.497	27.59	Av	.2	.1	27.89	-	-	46	-18.11
17	4.6635	43.82	Pk	.2	.1	44.12	56	-11.88	-	-
18	4.6635	26.64	Av	.2	.1	26.94	-	-	46	-19.06
19	4.92	43.04	Pk	.2	.1	43.34	56	-12.66	-	-
20	4.9425	24.88	Av	.2	.1	25.18	-	-	46	-20.82
21	14.748	46.85	Pk	.2	.2	47.25	60	-12.75	-	-
22	14.7525	31.66	Av	.2	.2	32.06	-	-	50	-17.94

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)
23	.4515	44.21	Pk	.4	0	44.61	56.85	-12.24	-	-
24	.438	28.34	Av	.4	0	28.74	-	-	47.1	-18.36
25	.879	46.92	Pk	.3	.1	47.32	56	-8.68	-	-
26	.879	30.67	Av	.3	.1	31.07	-	-	46	-14.93
27	1.1625	47.76	Pk	.3	0	48.06	56	-7.94	-	-
28	1.1445	32.04	Av	.3	0	32.34	-	-	46	-13.66
29	2.1435	51.33	Pk	.2	.1	51.63	56	-4.37	-	-
30	2.1435	35.37	Av	.2	.1	35.67	-	-	46	-10.33
31	2.643	45	Pk	.2	.1	45.3	56	-10.7	-	-
32	2.6115	29.09	Av	.2	.1	29.39	-	-	46	-16.61
33	3.4035	47.81	Pk	.2	.1	48.11	56	-7.89	-	-
34	3.4035	32.23	Av	.2	.1	32.53	-	-	46	-13.47
35	4.11	43.29	Pk	.2	.1	43.59	56	-12.41	-	-
36	4.137	24.61	Av	.2	.1	24.91	-	-	46	-21.09
37	4.461	42.97	Pk	.2	.1	43.27	56	-12.73	-	-
38	4.461	23.25	Av	.2	.1	23.55	-	-	46	-22.45
39	4.695	38.79	Pk	.2	.1	39.09	56	-16.91	-	-
40	4.695	20.99	Av	.2	.1	21.29	-	-	46	-24.71
41	4.8255	35.53	Pk	.2	.1	35.83	56	-20.17	-	-
42	4.848	20.18	Av	.2	.1	20.48	-	-	46	-25.52
43	14.451	44.11	Pk	.2	.2	44.51	60	-15.49	-	-
44	14.4195	24.22	Av	.2	.2	24.62	-	-	50	-25.38

Pk - Peak detector

Av - Average detection