



FCC CFR47 PART 15 SUBPART C

**BLUETOOTH LOW ENERGY
CERTIFICATION TEST REPORT**

FOR

GSM/CDMA/WCDMA/LTE PHONE + BLUETOOTH, with DTS/UNII a/b/g/n/ac & NFC

MODEL NUMBER: LG-LS991, LS991, LGLS991

FCC ID: ZNFLS991

REPORT NUMBER: 15I20286-E3

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Prepared for

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NVLAP LAB CODE 200065-0

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/CDMA/WCDMA/LTE PHONE + BLUETOOTH, with DTS/UNII a/b/g/n/ac & NFC
MODEL: LG-LS991, LS991, LGLS991
SERIAL NUMBER: 1TLT3 (Conducted) and 1TLT7 (Radiated)
DATE TESTED: MARCH 10- APRIL 7, 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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WISE LAB ENGINEER
UL VERIFICATION SERVICES INC

2. TEST METHODOLOGY

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

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/CDMA/WCDMA/LTE PHONE + BLUETOOTH, with 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	6.54	4.51

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -1.21dBi.

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

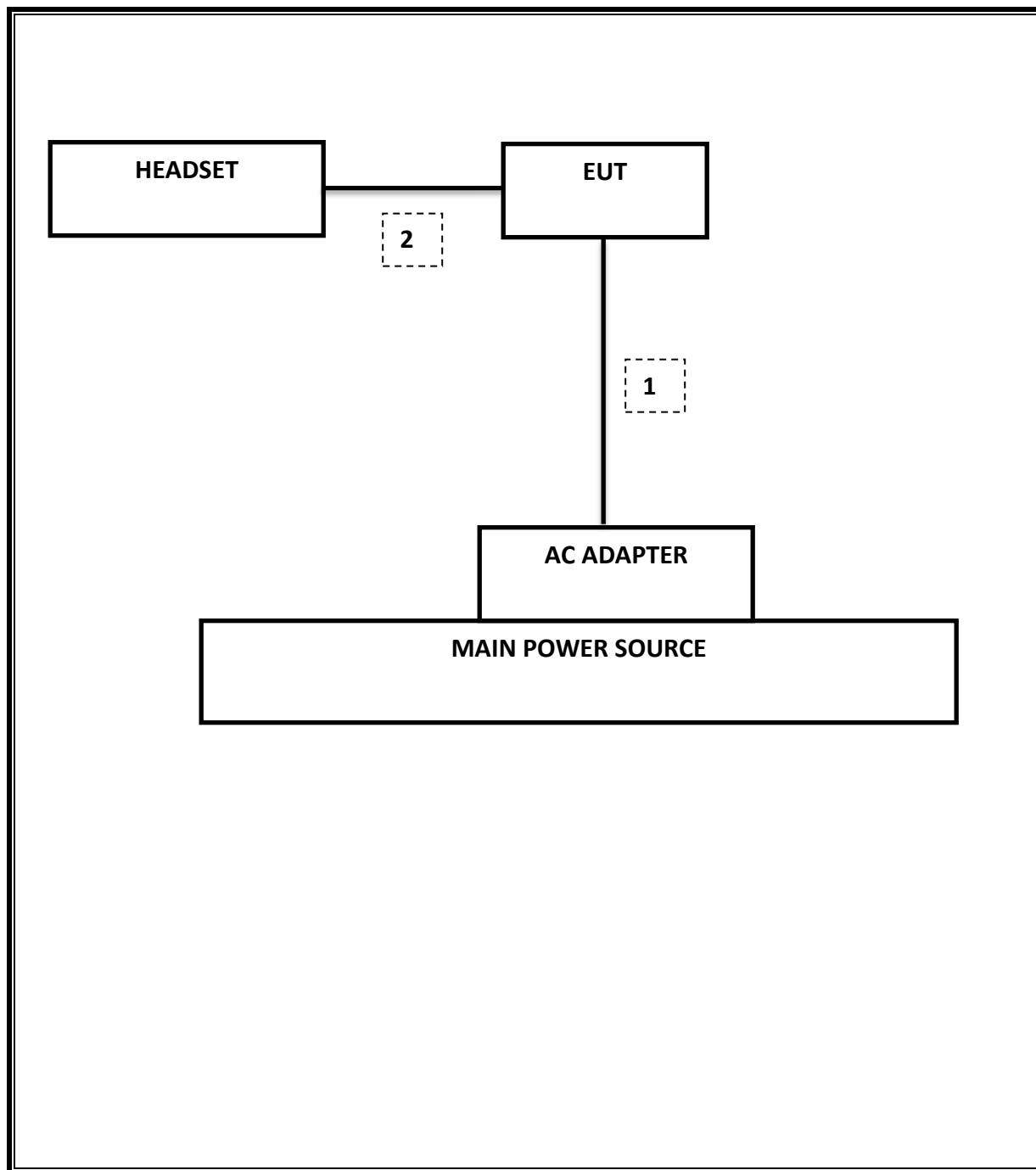
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Mini-USB	Shielded	1.2m	N/A
2	Audio	1	Mini-Jack	Unshielded	1m	N/A

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	Tnumber	Cal Due
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	122	02/13/16
Antenna, Horn, 18GHz	EMCO	3115	60	10/25/16
Antenna, Horn, 26.5 GHz	ARA	MWH-1826	89	11/14/15
Preamplifier, 10kHz to 1GHz	Agilent / HP	8447D	15	08/16/15
Preamplifier, 26.5 GHz	Agilent / HP	8449B	F00351	06/27/15
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	123	10/28/15
CBT Bluetooth Tester	R & S	CBT	258	07/08/15
Peak Power Meter	Agilent / HP	E4416A	84	01/26/16
Peak / Average Power Sensor	Agilent / HP	8481A	224	12/10/15
LISN, 30 MHz	FCC	50/250-25-2	24	01/16/16
Reject Filter, 2.4GHz	Micro-Tronics	BRM50702	N02684	CNR

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	0.6948 MHz
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-54.42 dBm
15.247	RSS-210 A8.4	TX conducted output power	<30dBm		Pass	6.54 dBm
15.247	RSS-210 A8.2	PSD	<8dBm		Pass	-7.49 dBm
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	44.15 dBuV(AV)
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	43.39 dBuV/m

8. ANTENNA PORT TEST RESULTS

8.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

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

TEST PROCEDURE

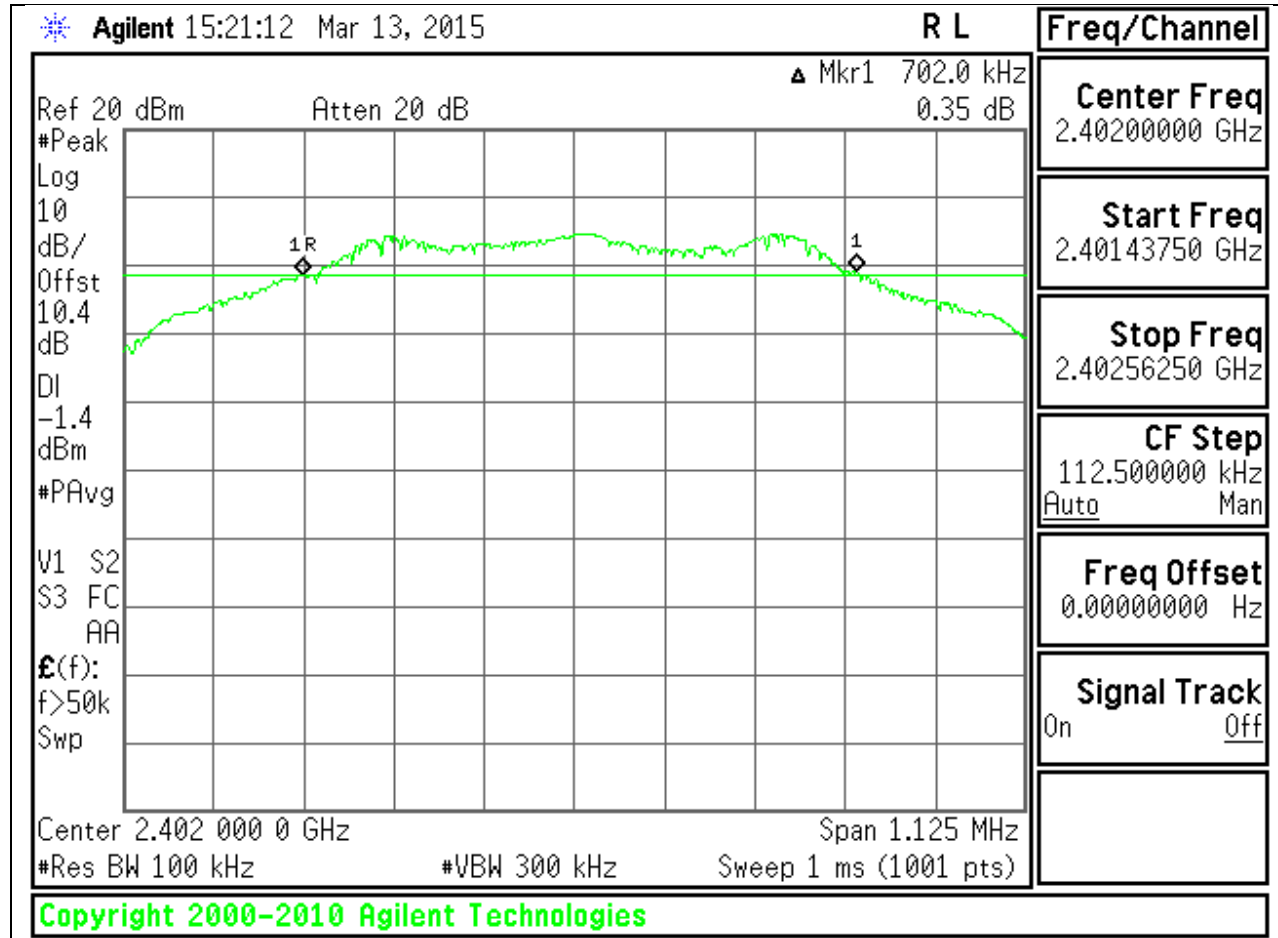
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

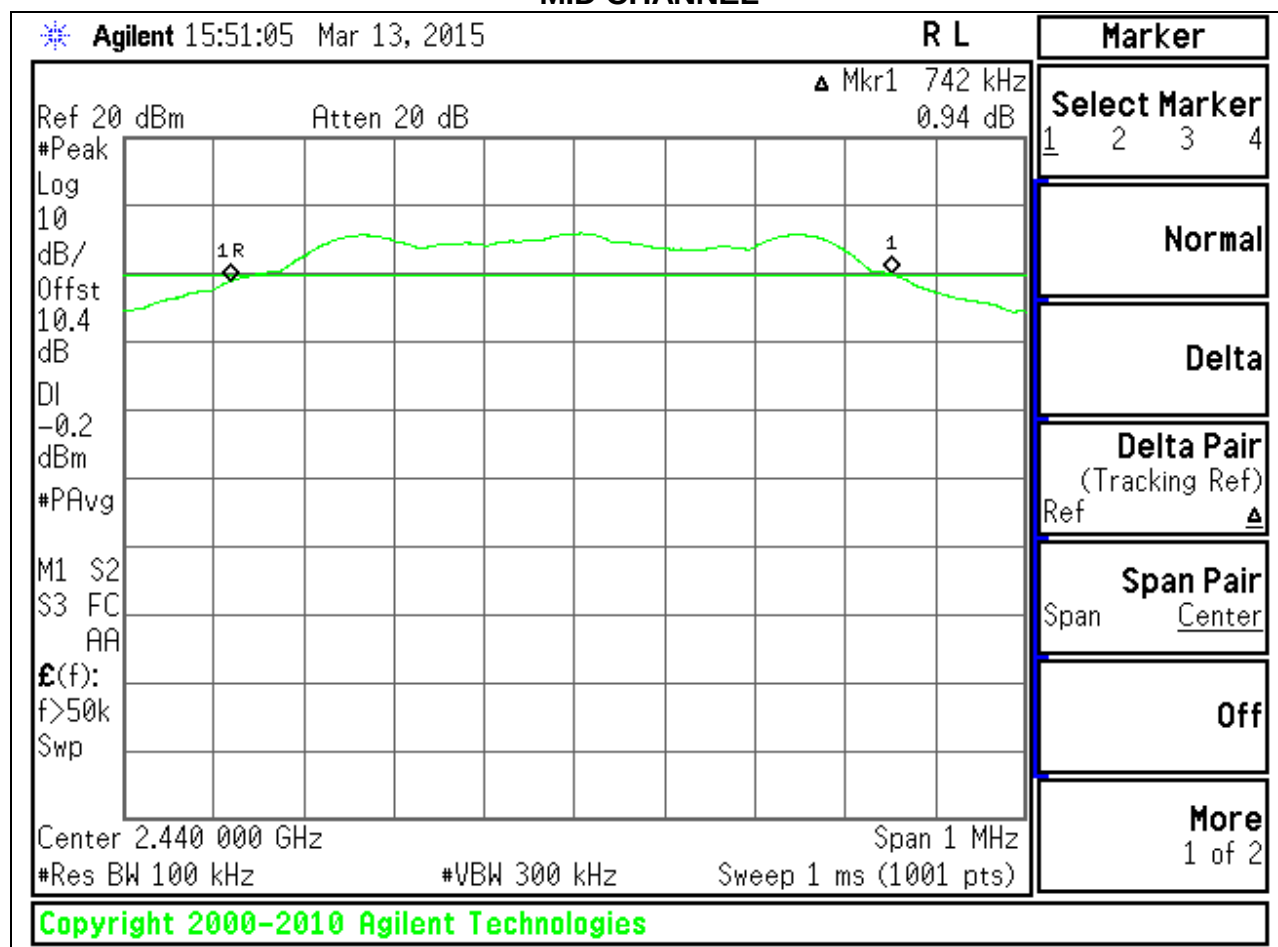
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.7020	0.5
Middle	2440	0.7420	0.5
High	2480	0.6948	0.5

6 dB BANDWIDTH PLOTS

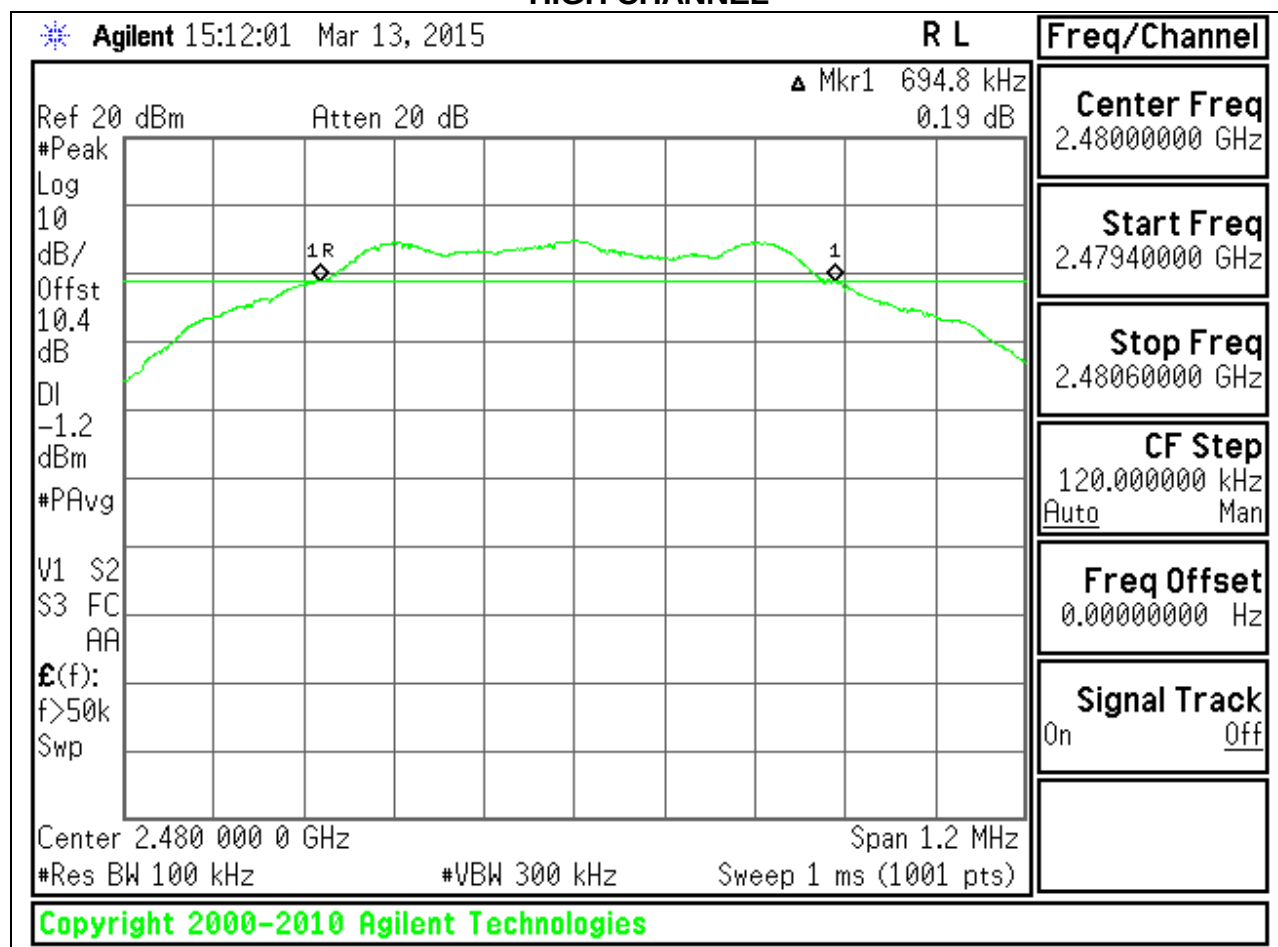
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

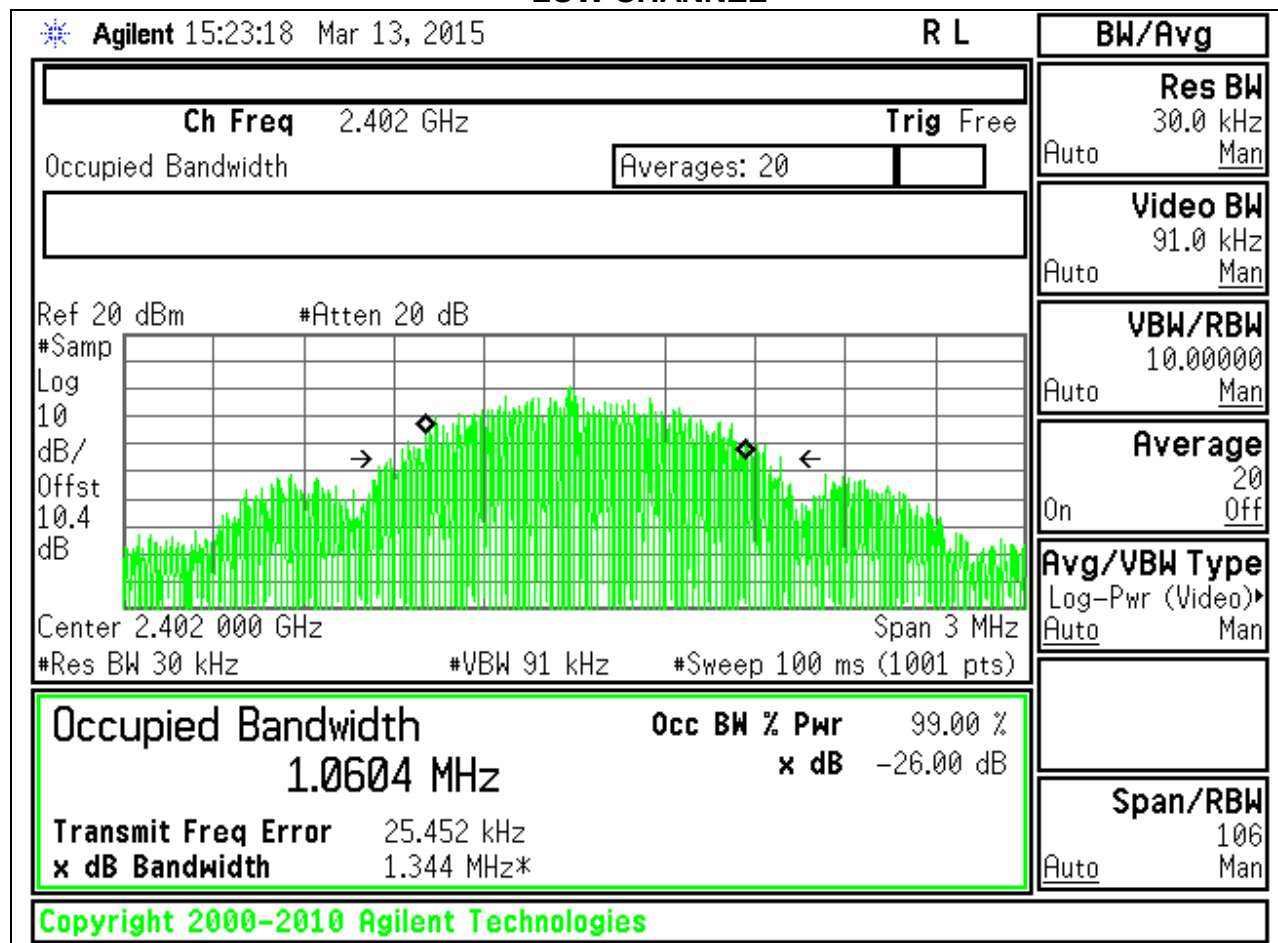
Reference to KDB558074 D01 DTS Meas Guidance v03r01: The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function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

RESULTS

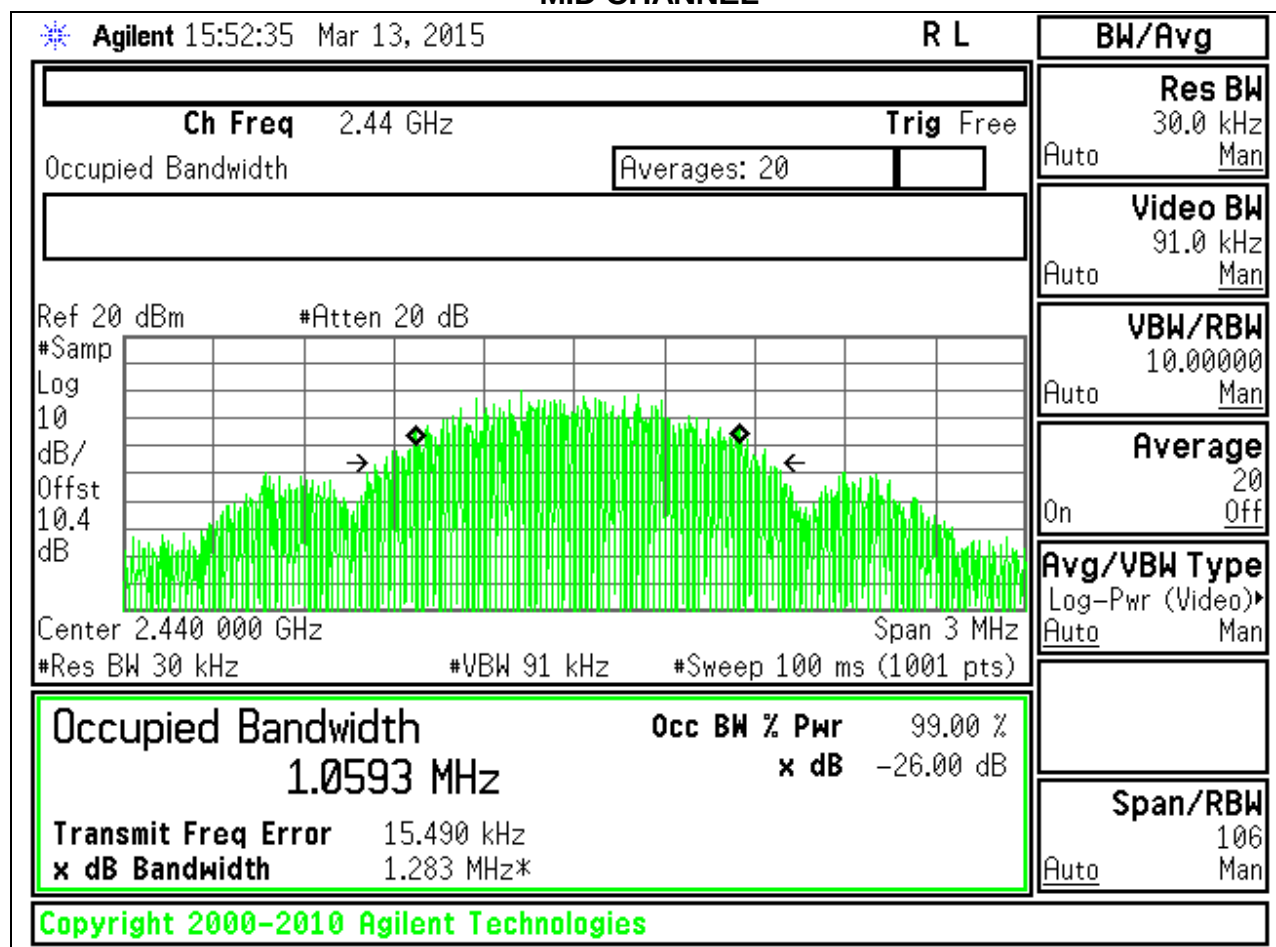
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0604
Middle	2440	1.0593
High	2480	1.0531

99% BANDWIDTH PLOTS

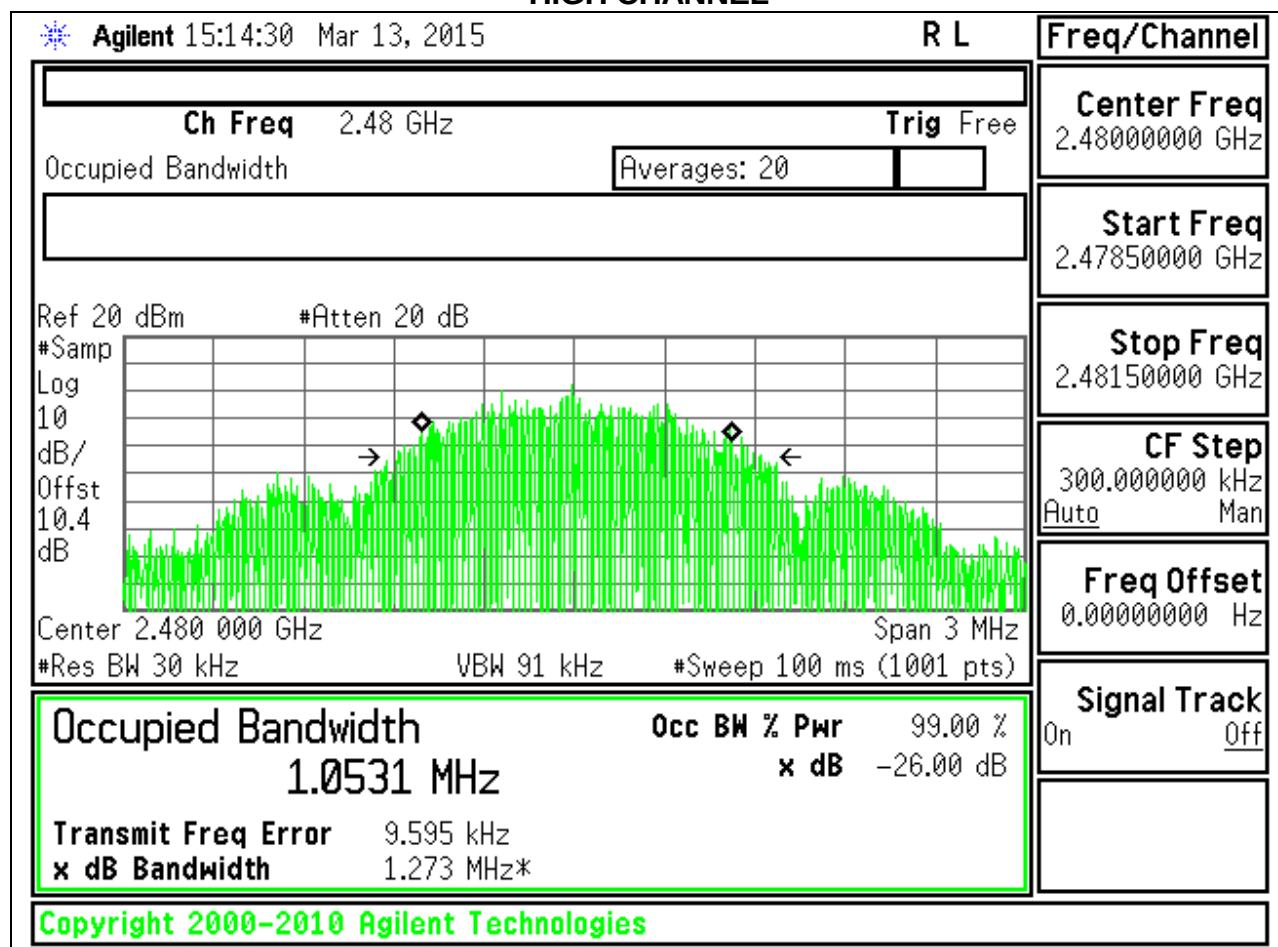
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

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

TEST PROCEDURE

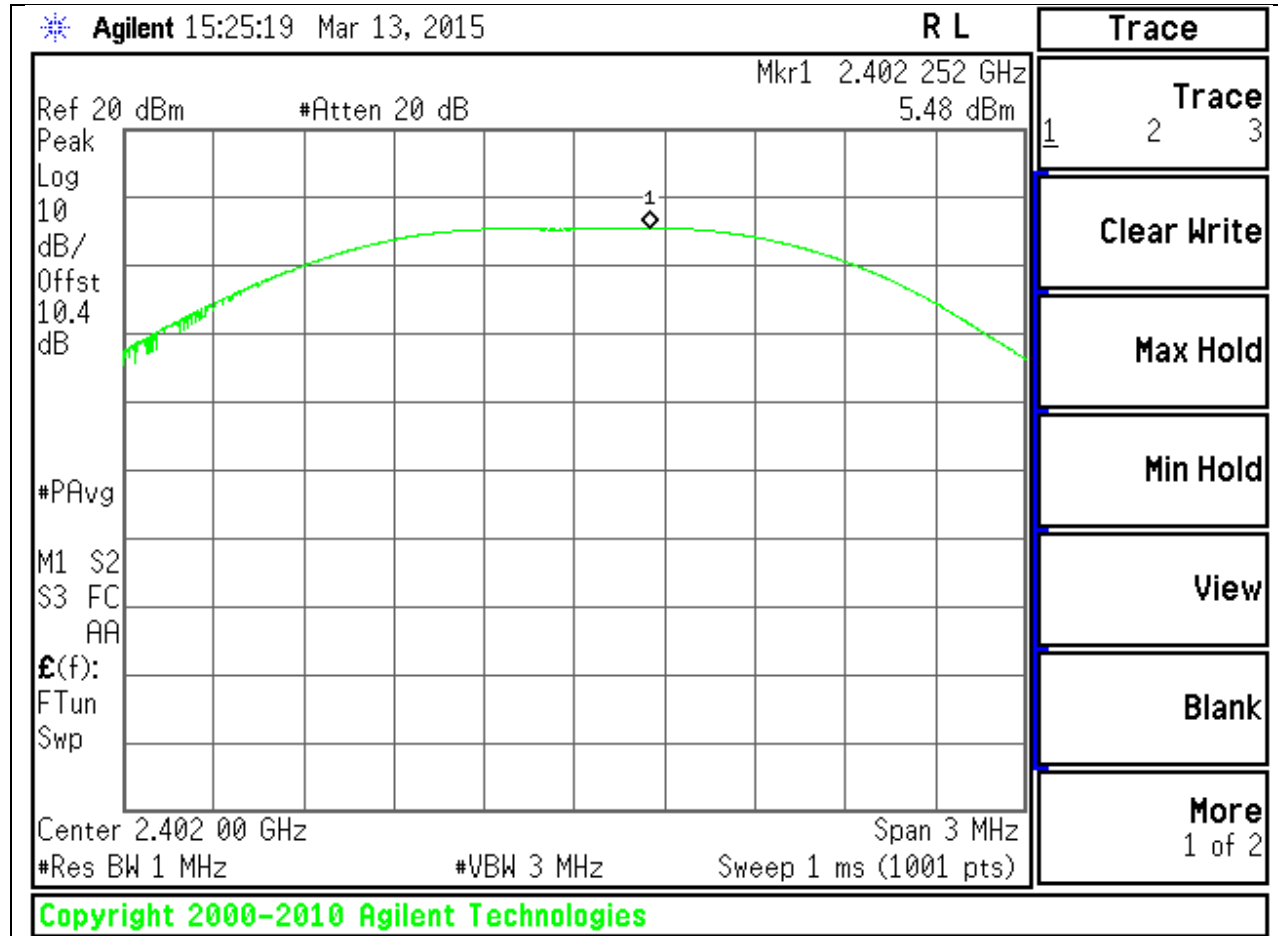
Peak power is measured using KDB558074 D01 DTS Meas Guidance v03r01 April 9, 2013 under section 9.1.1 utilizing spectrum analyzer.

RESULTS

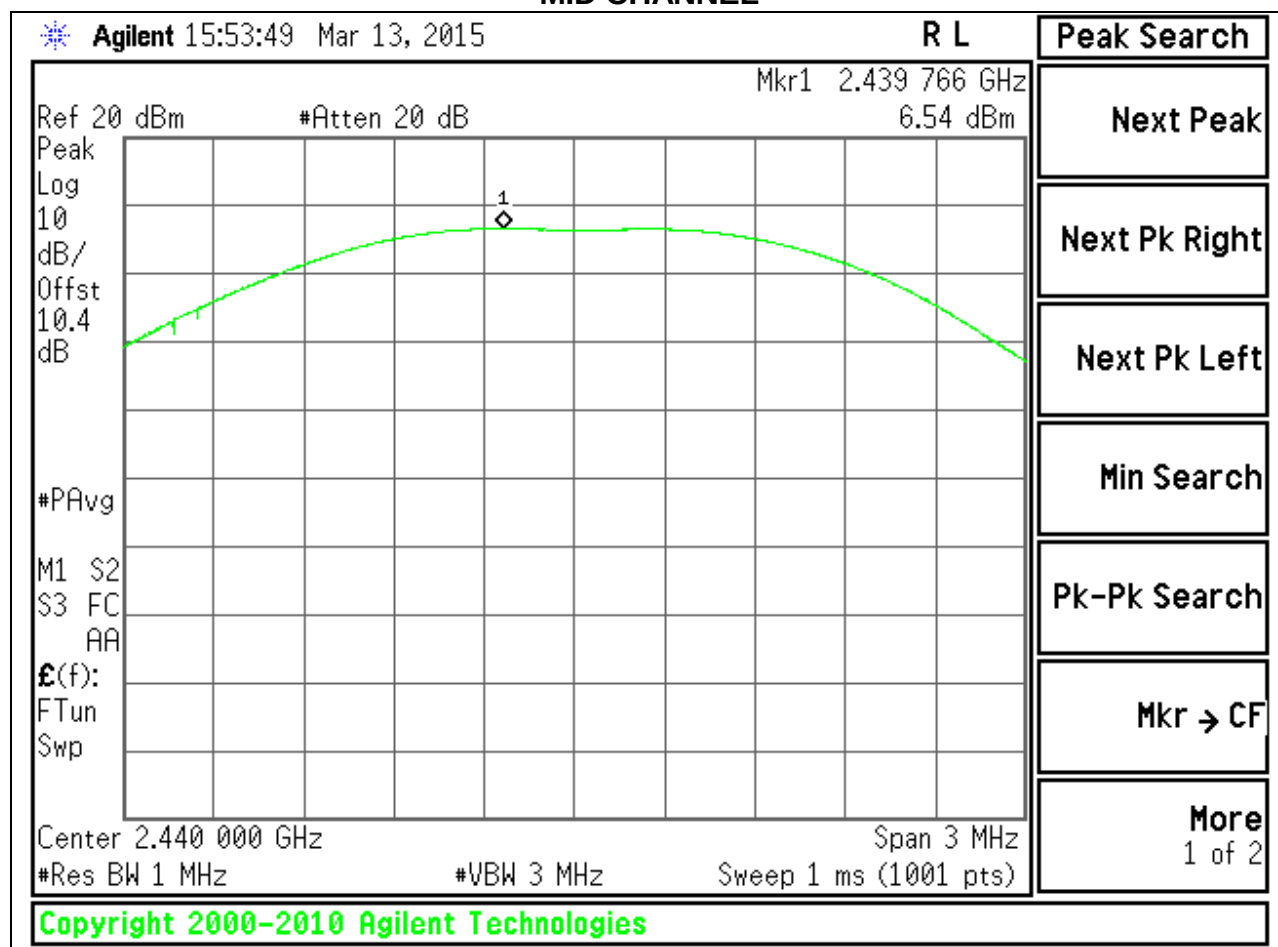
Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.480	30	-24.520
Middle	2440	6.540	30	-23.460
High	2480	5.480	30	-24.520

OUTPUT POWER PLOTS

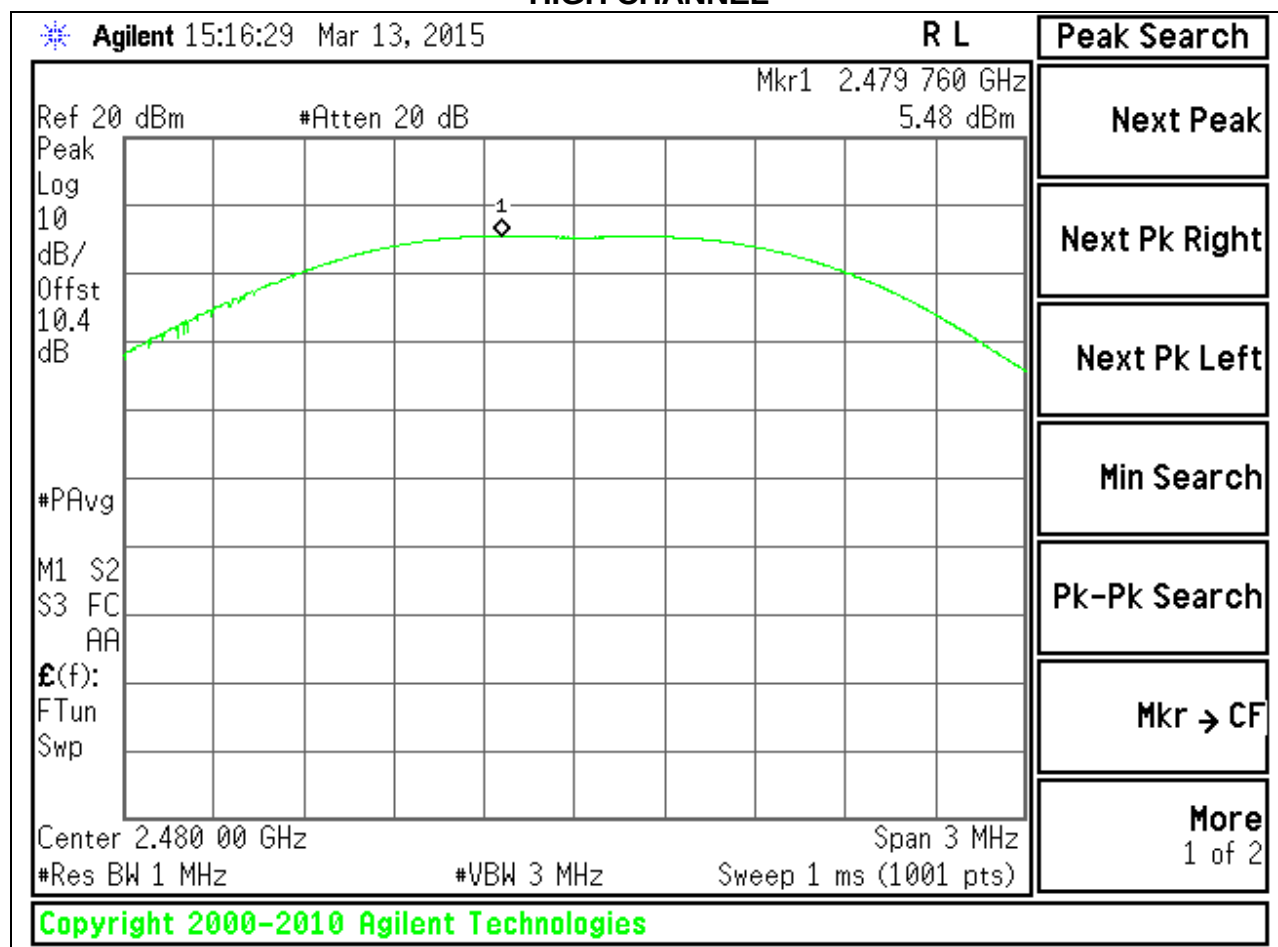
LOW CHANNEL



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	4.55
Middle	2440	5.75
High	2480	4.88

8.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

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

TEST PROCEDURE

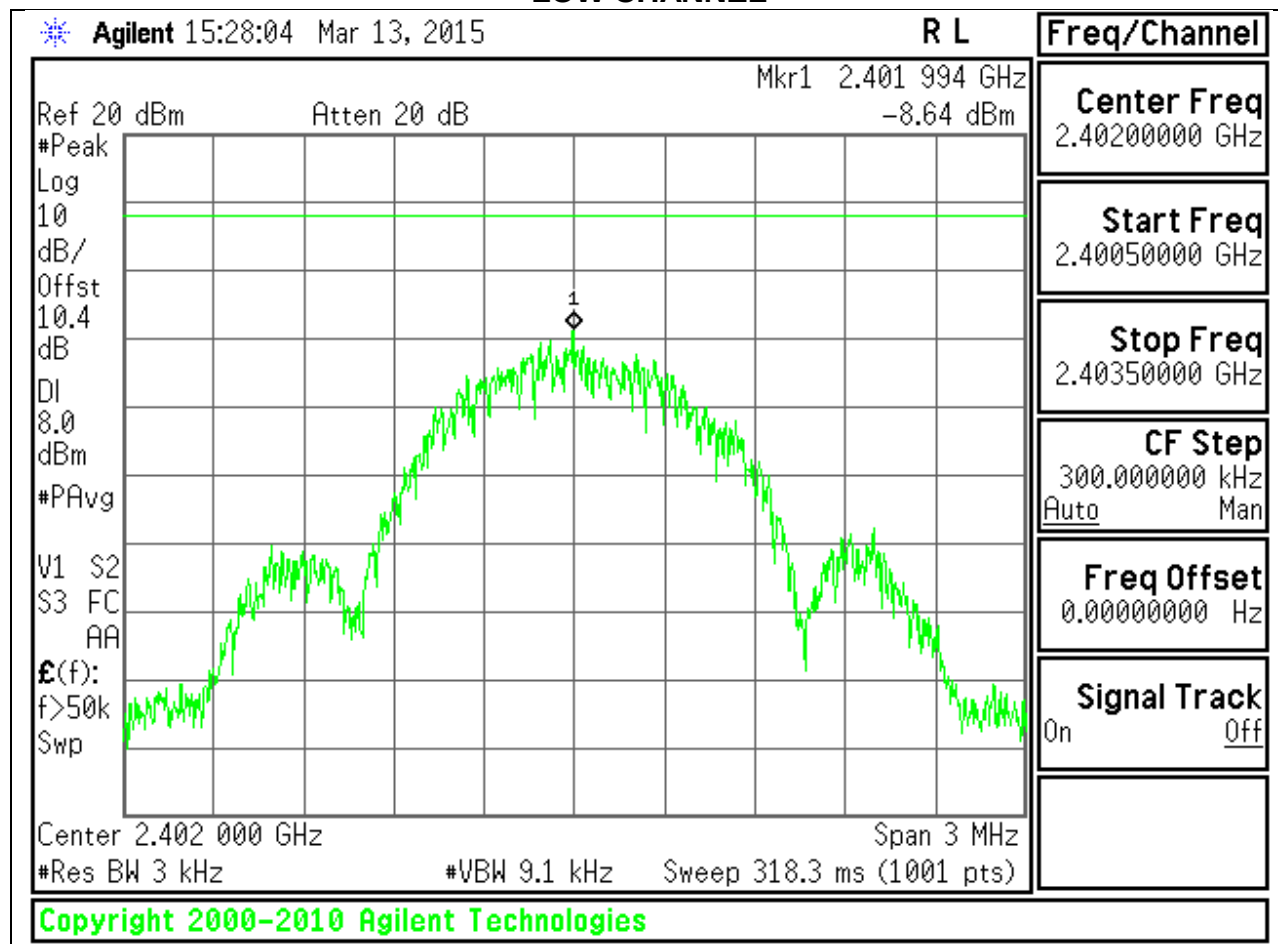
Power Spectral Density was performed utilizing the "Method PKPSD (Peak PSD)" under KDB558074 D01 DTS Meas Guidance v03r01, April 9, 2013

RESULTS

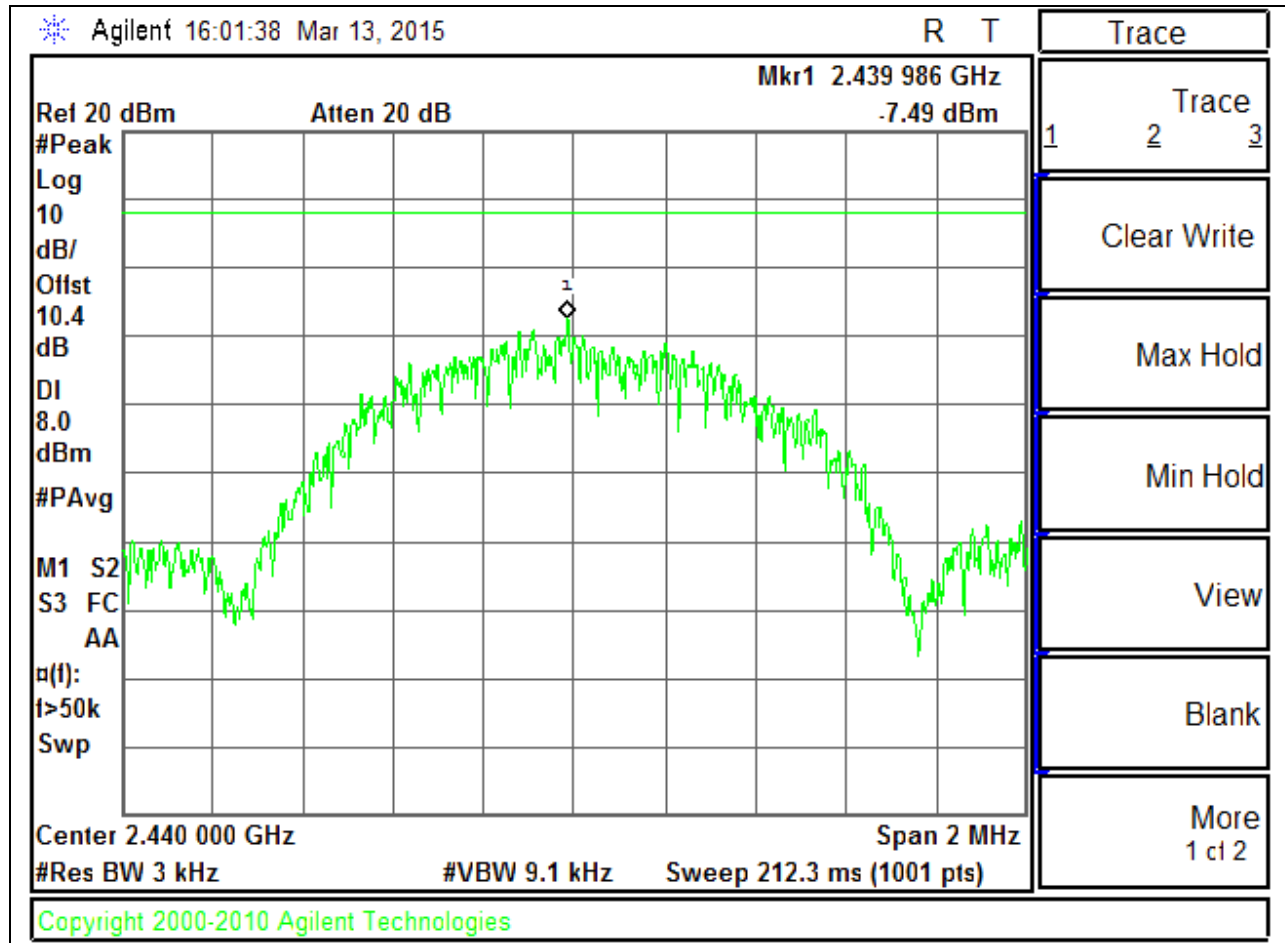
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-8.64	8	-16.64
Middle	2440	-7.49	8	-15.49
High	2480	-13.26	8	-21.26

POWER SPECTRAL DENSITY PLOTS

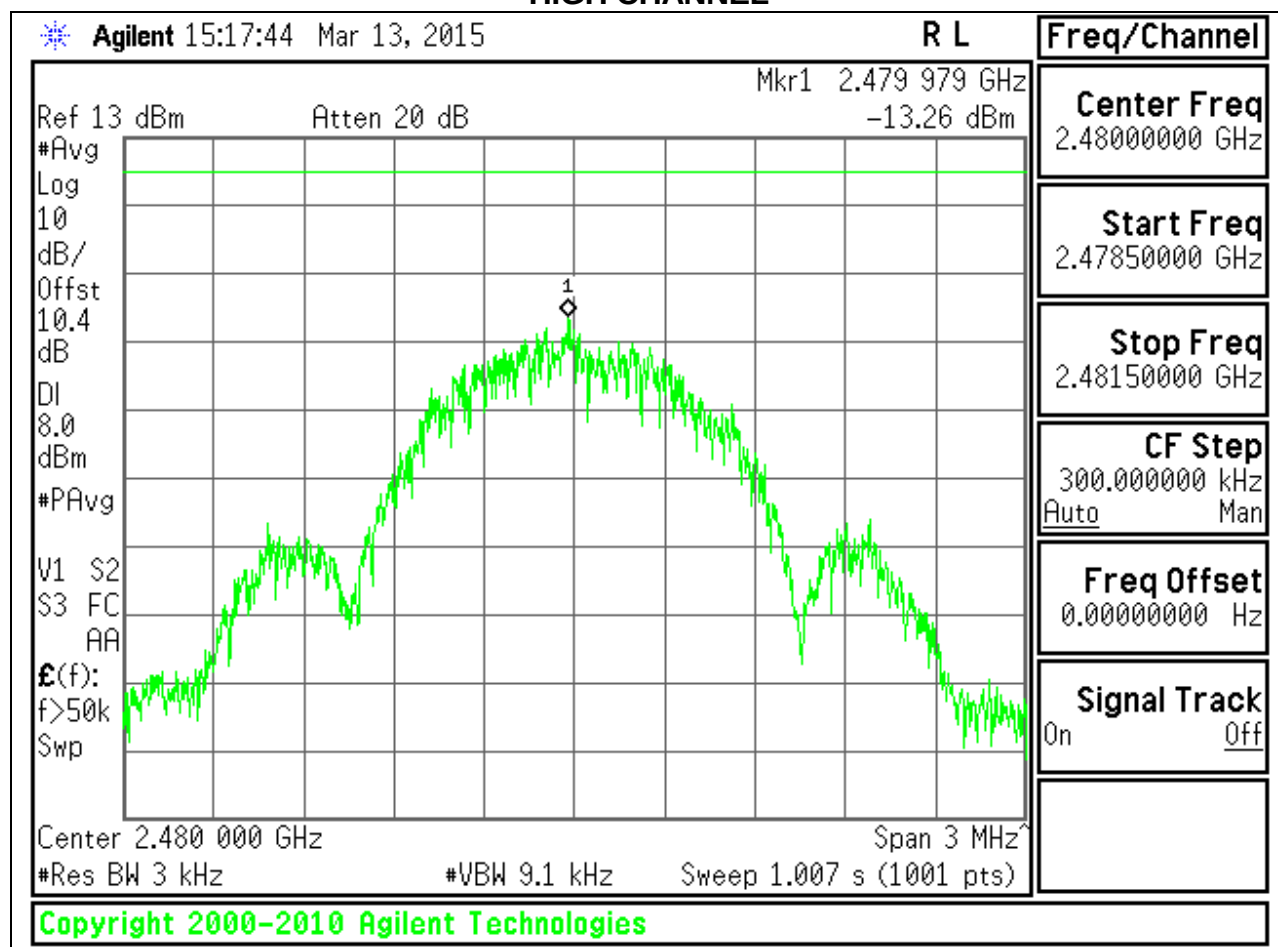
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

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

TEST PROCEDURE

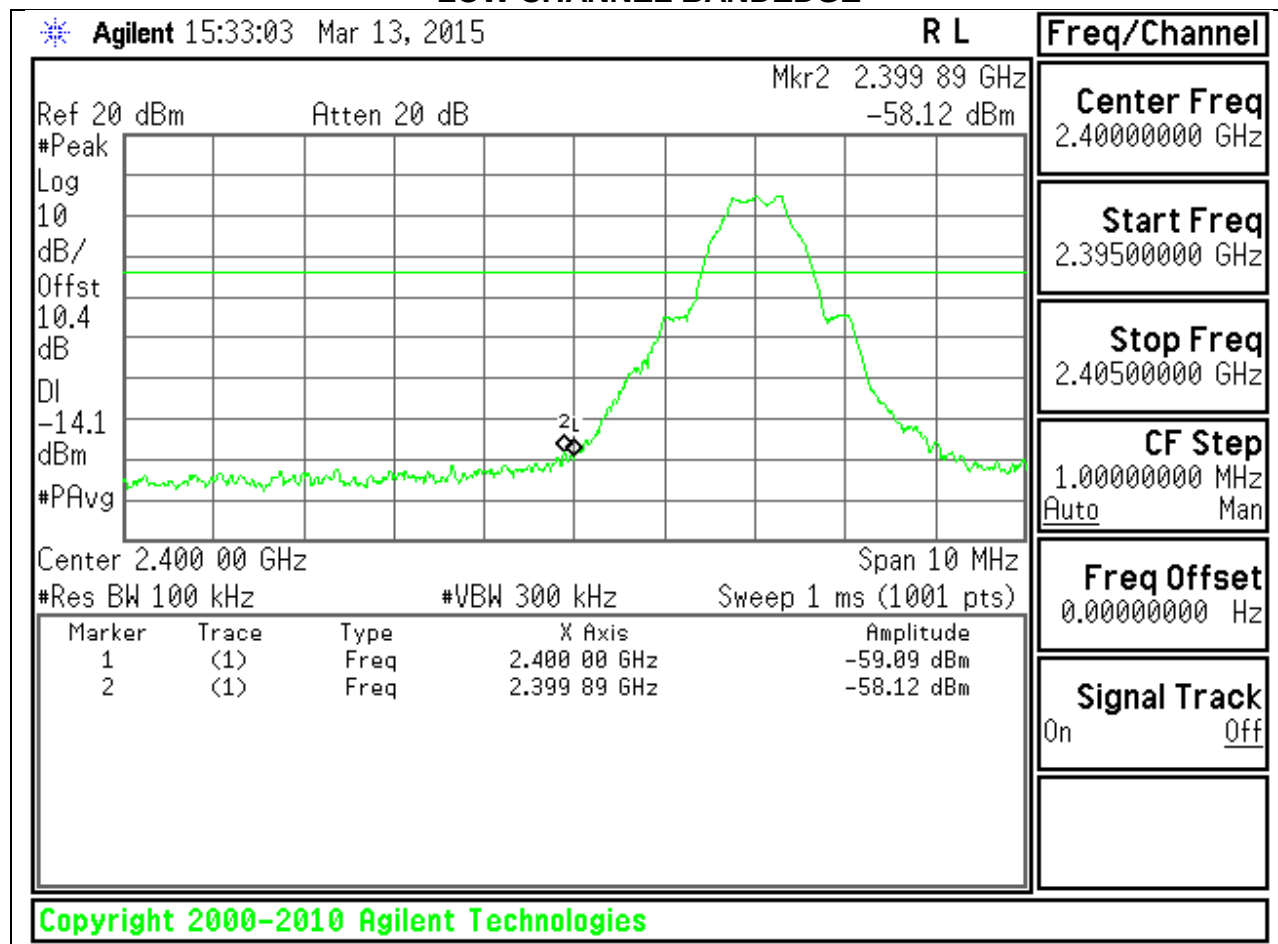
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

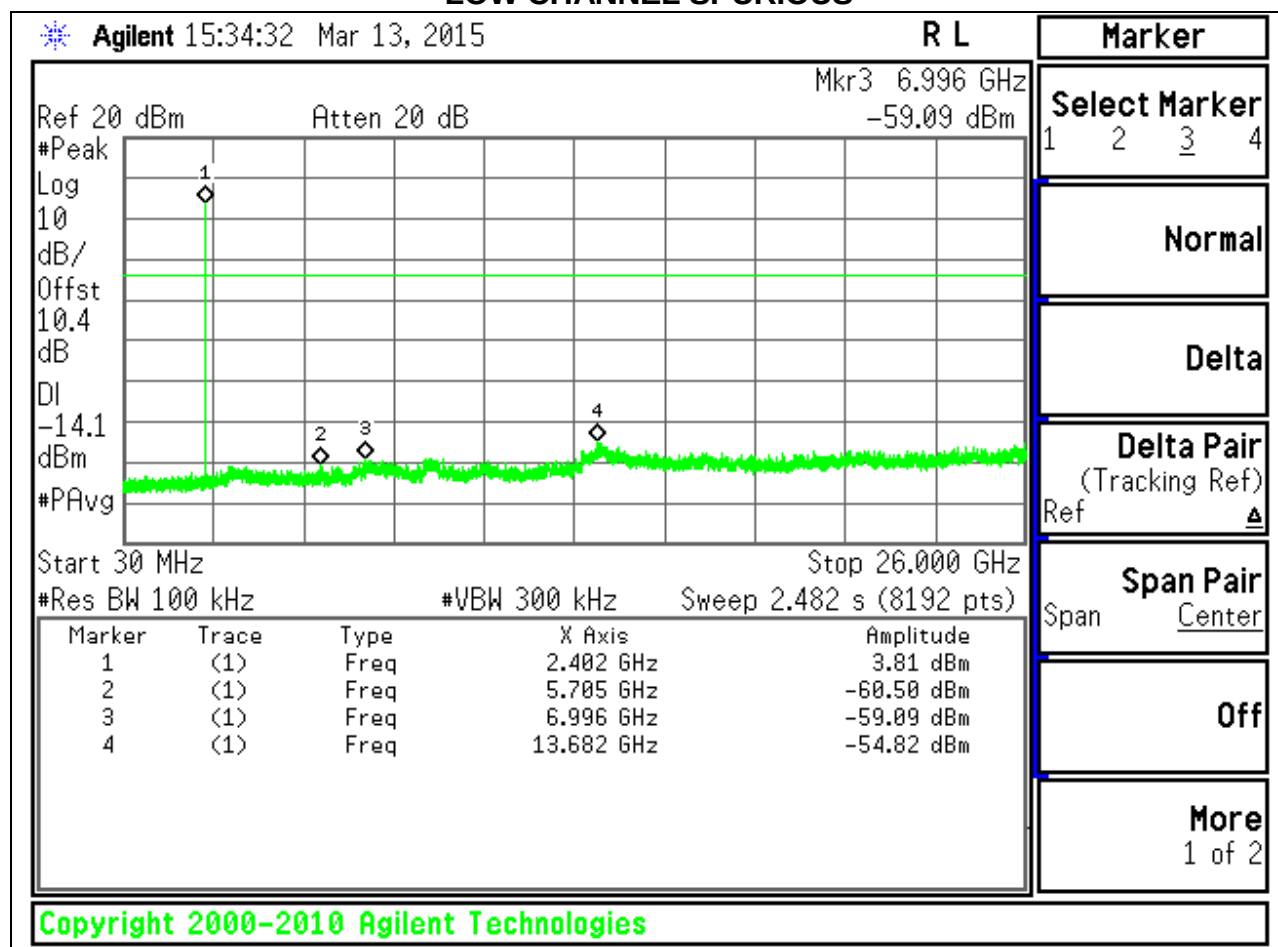
RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE

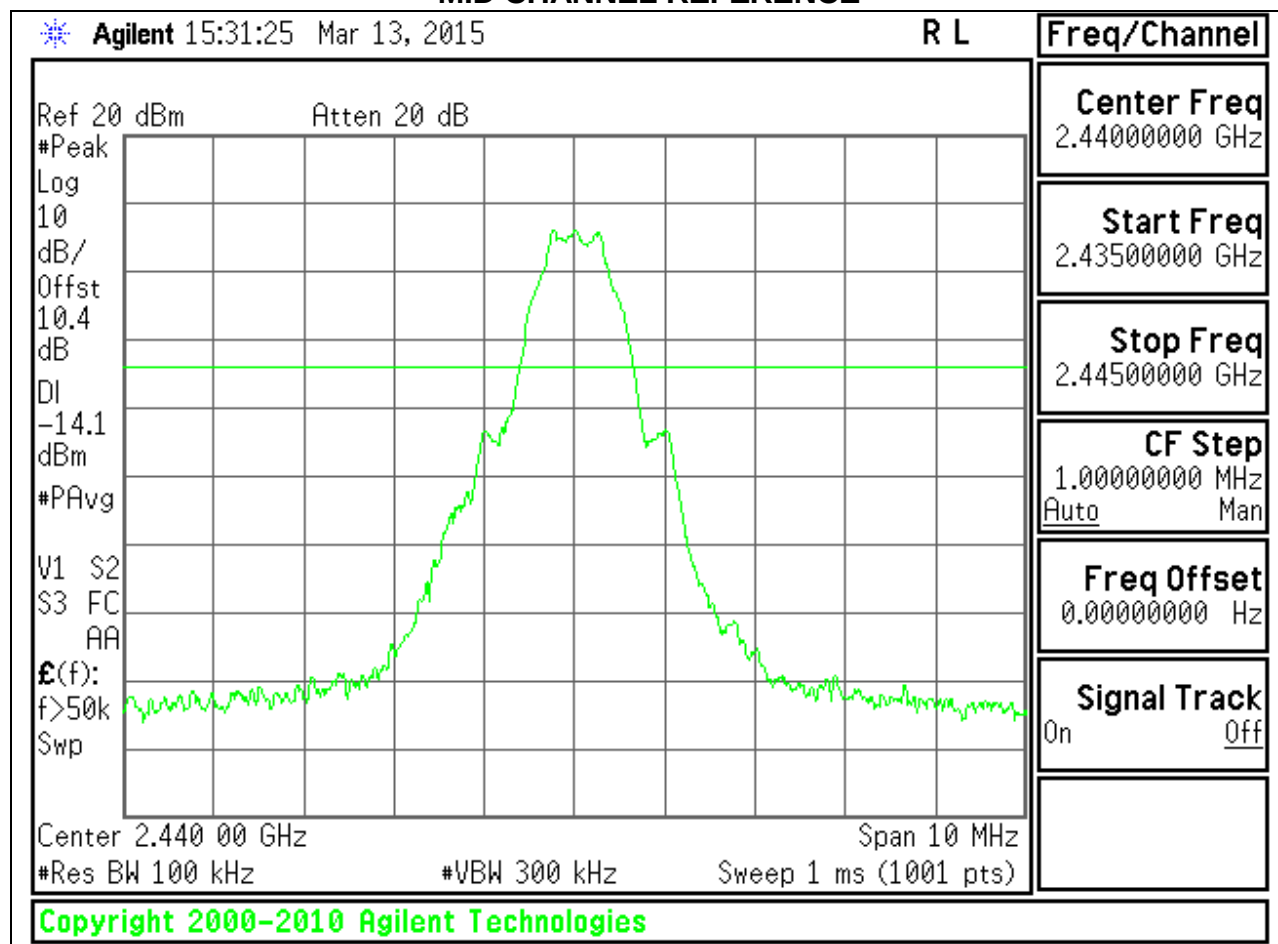


LOW CHANNEL SPURIOUS

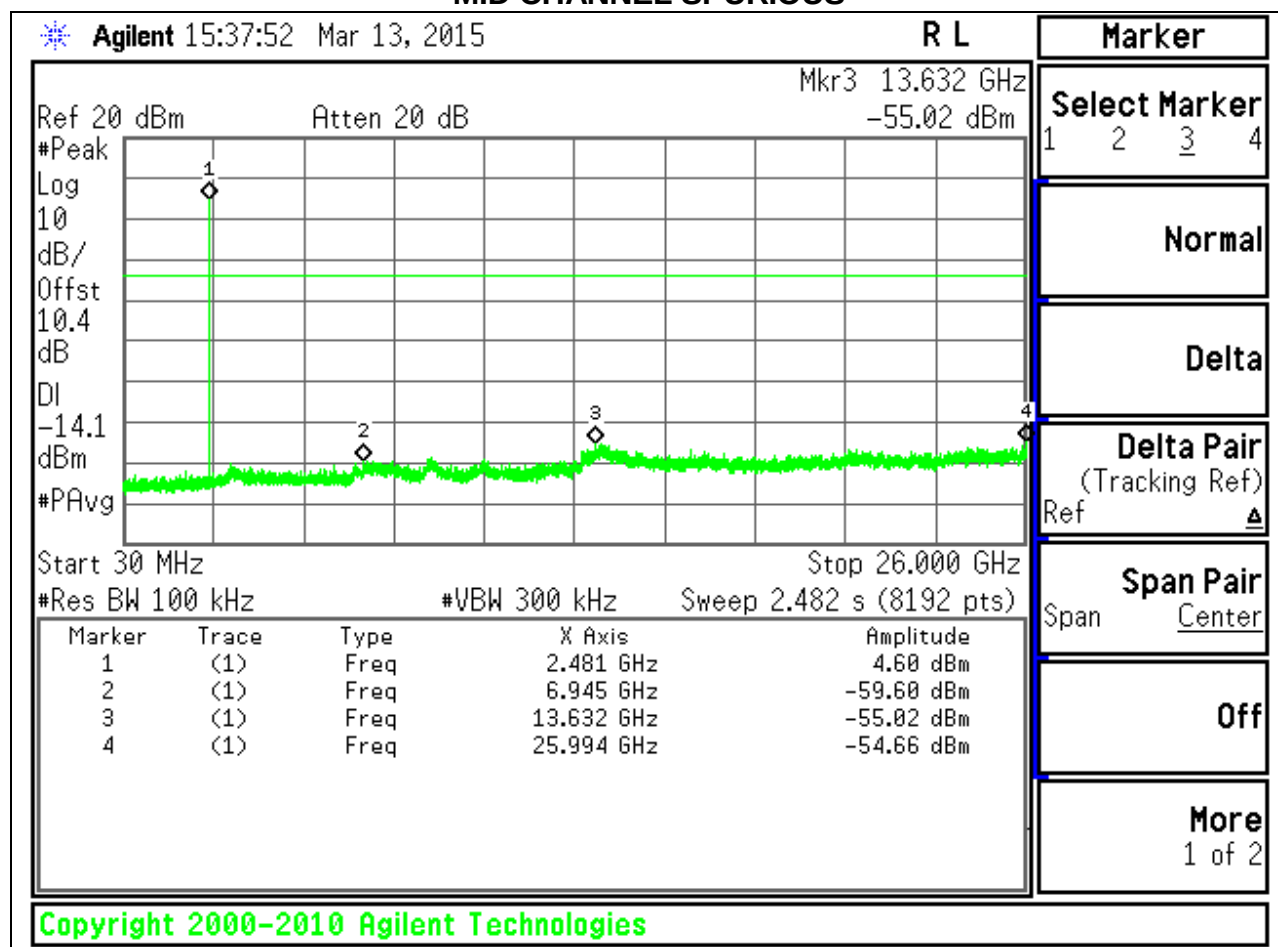


SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL REFERENCE

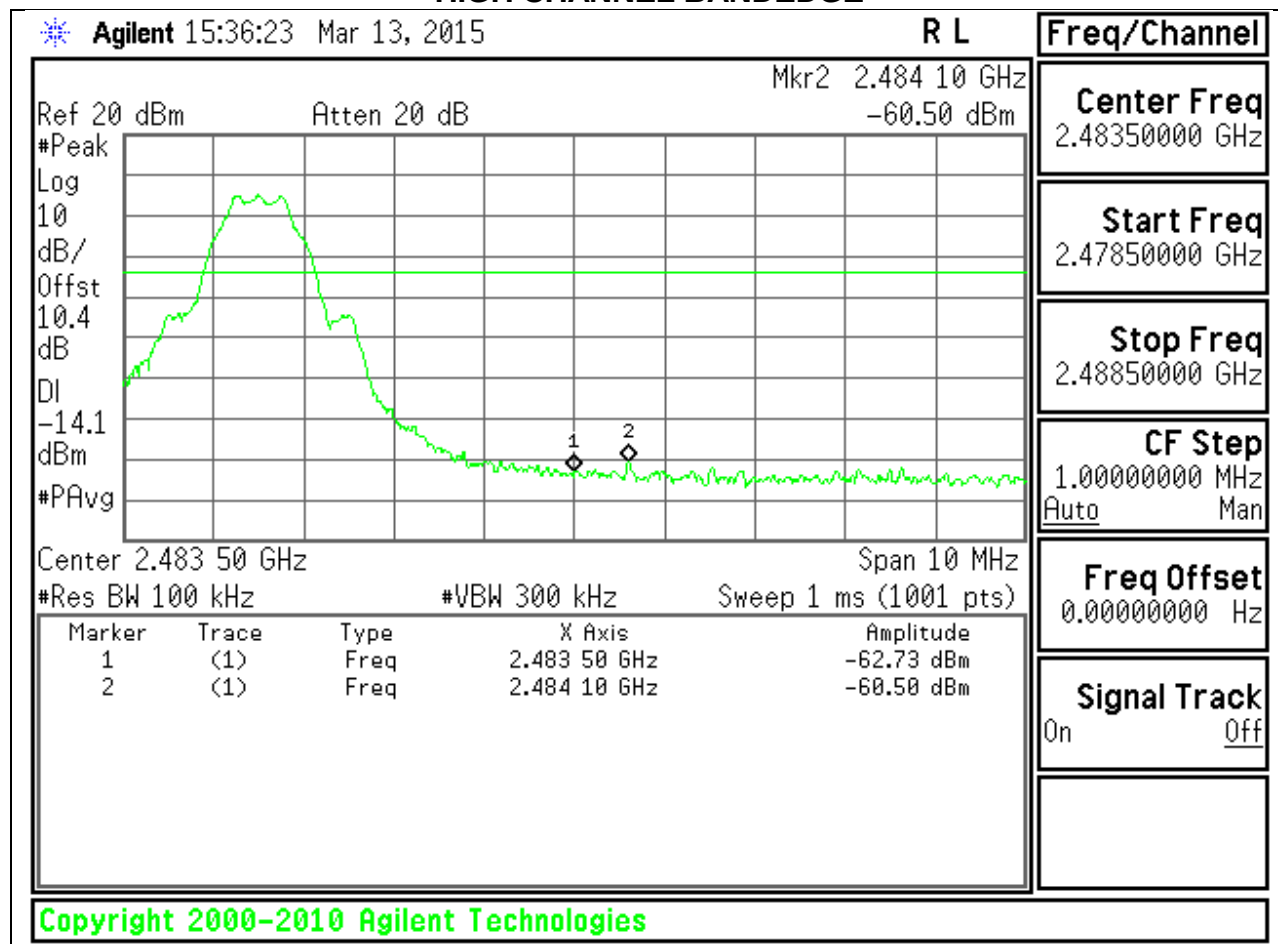


MID CHANNEL SPURIOUS

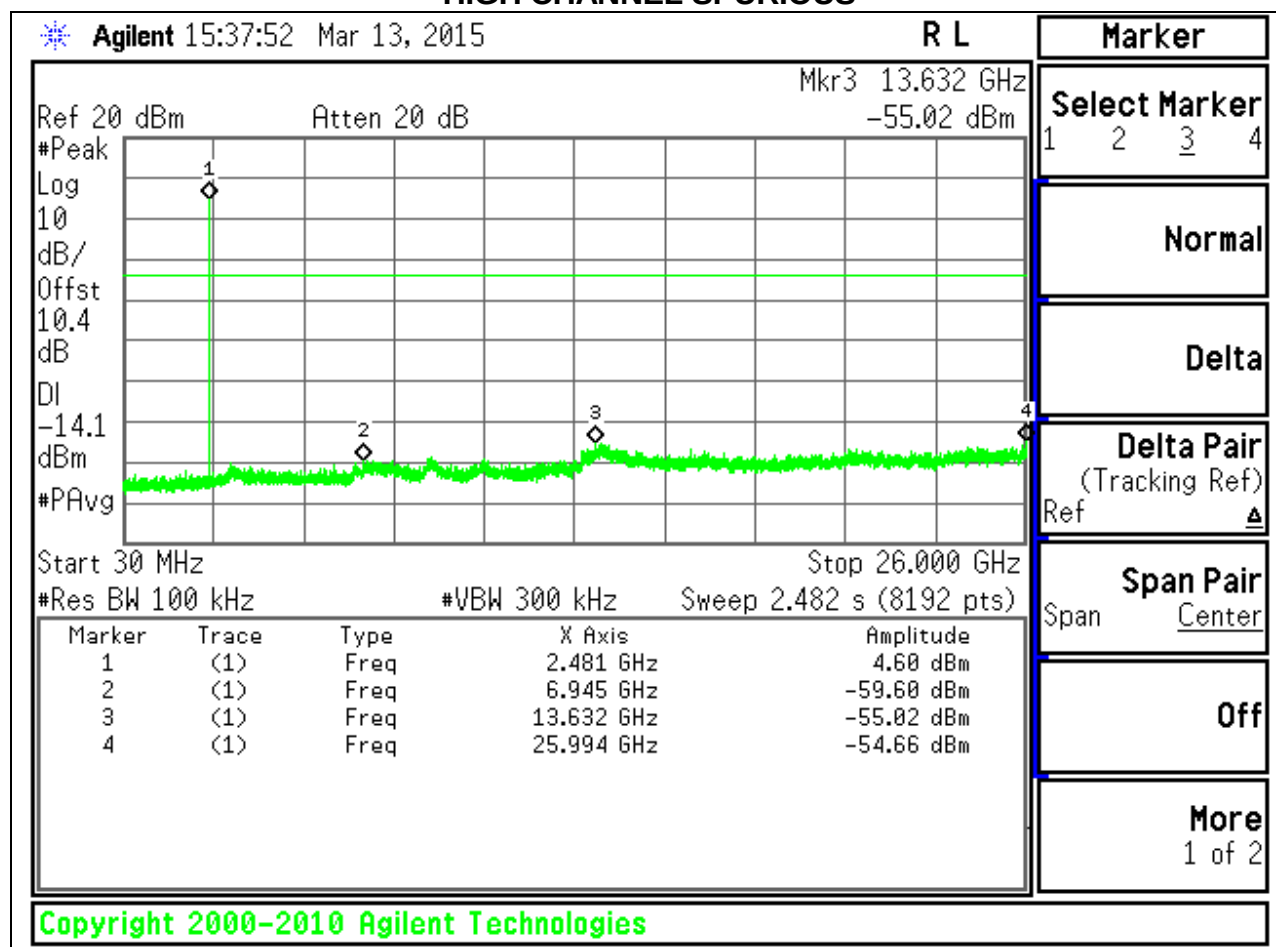


SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CHANNEL BANDEDGE



HIGH CHANNEL SPURIOUS



9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE LIMITS

FCC §15.205 and §15.209

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

TEST PROCEDURE

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

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

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor = $10 \log (1/x)$. For this sample: DCF = $10 \log (1/0.624) = 2.04 \text{ dB}$
(Spectrum Analyzer round it up to 2.1 dB)

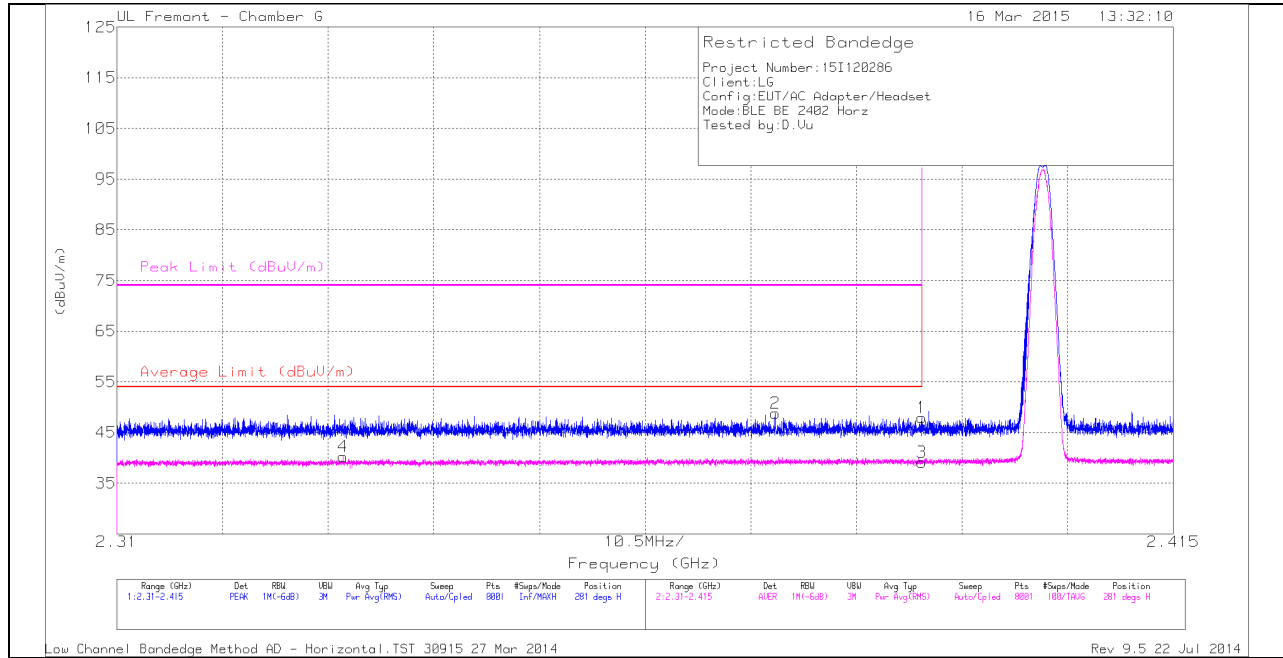
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The 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)

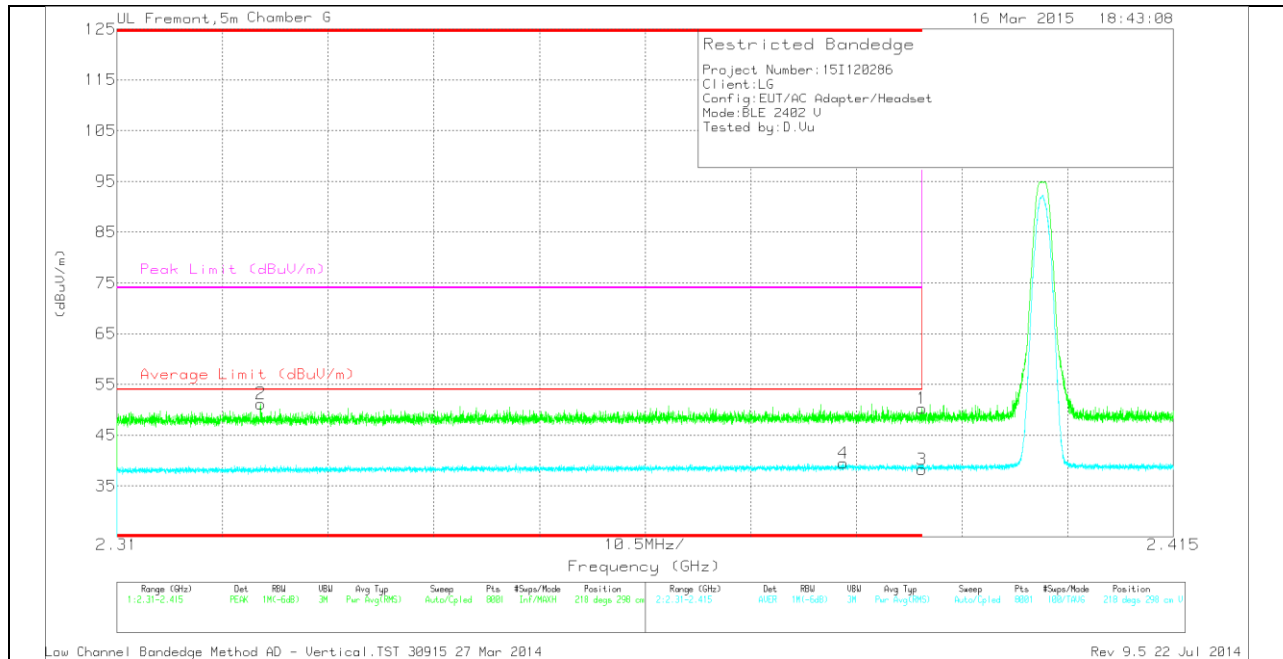
HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (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	* 2.39	41.01	PK	31.8	-24.9	0	47.91	-	-	74	-26.09	281	190	H
2	* 2.375	41.91	PK	31.8	-24.9	0	48.81	-	-	74	-25.19	281	190	H
3	* 2.39	29.8	RMS	31.8	-24.9	2.04	38.74	54	-15.26	-	-	281	190	H
4	* 2.332	31.04	RMS	31.7	-25	2.04	39.78	54	-14.22	-	-	281	190	H

VERTICAL PEAK AND AVERAGE PLOT

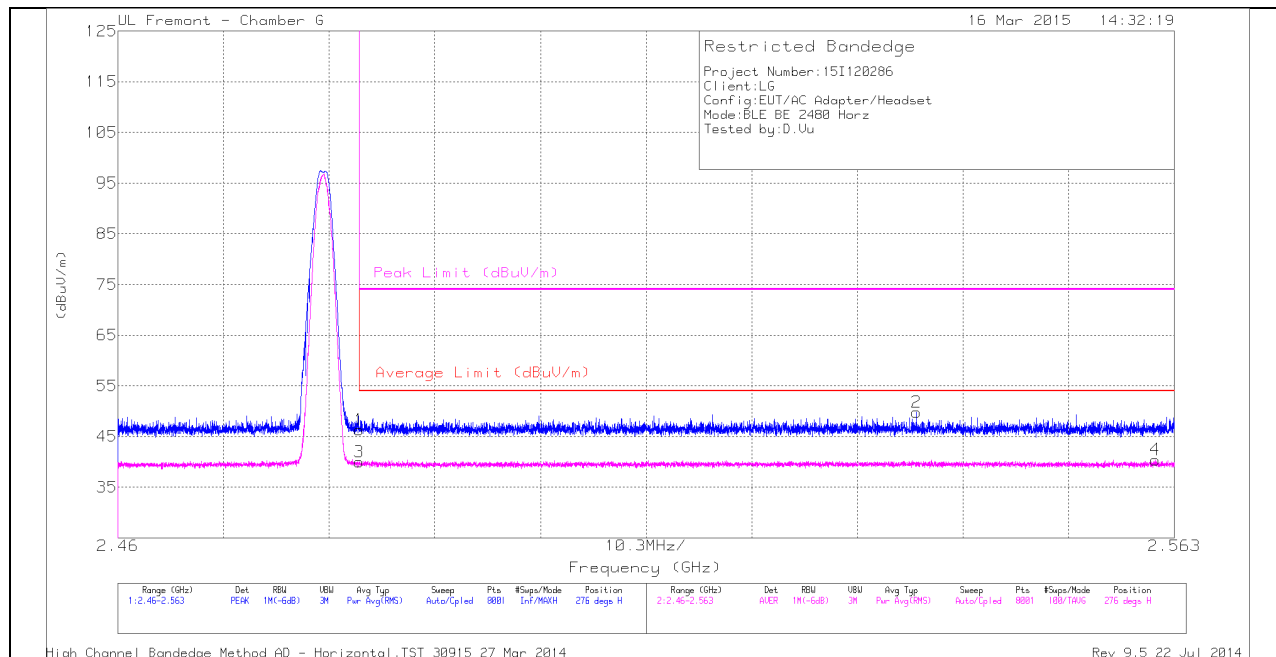


VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (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	38.51	PK	31.8	-24.9	0	45.41	-	-	74	-28.59	281	190	V
2	* 2.324	42.87	PK	31.7	-25	0	49.57	-	-	74	-24.43	281	190	V
3	* 2.39	29.92	RMS	31.8	-24.9	2.04	38.86	54	-15.14	-	-	281	190	V
4	* 2.382	30.76	RMS	31.7	-24.9	2.04	39.6	54	-14.4	-	-	281	190	V

AUTHORIZED BANDEDGE (HIGH CHANNEL)

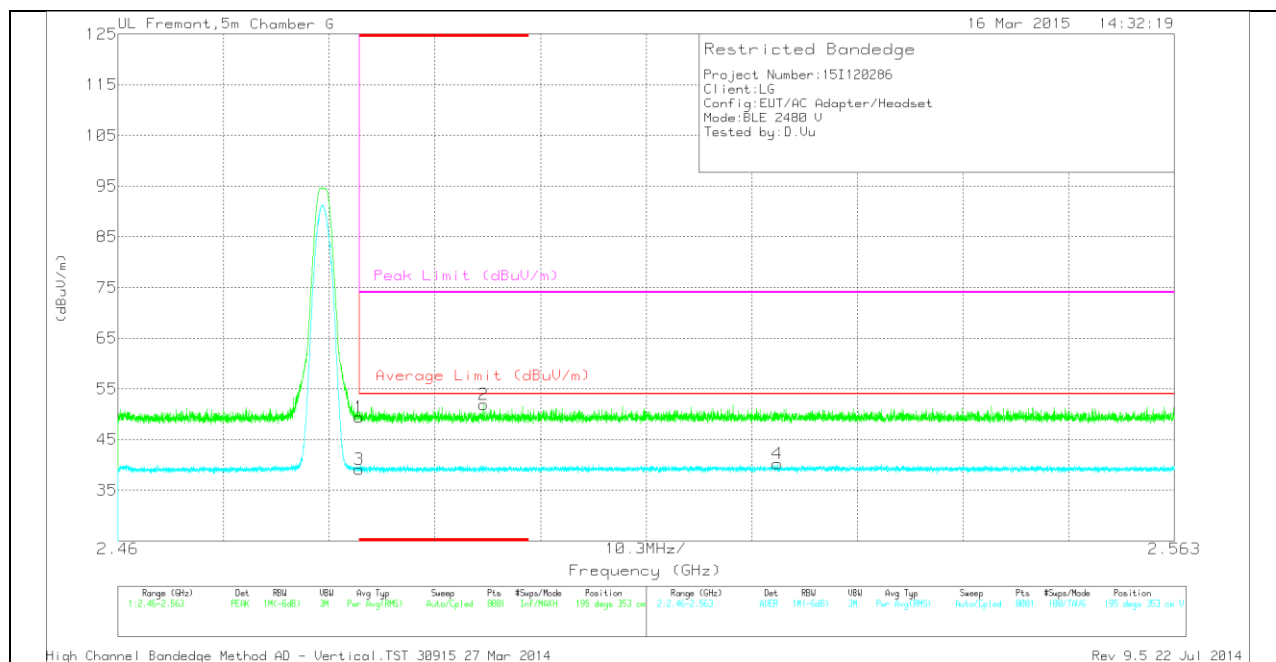
HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (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	39.17	PK	32	-24.9	0	46.27	-	-	74	-27.73	276	177	H
3	* 2.484	30.5	RMS	32	-24.9	2.04	39.64	54	-14.36	-	-	276	177	H
2	2.538	42.73	PK	32	-24.9	0	49.83	-	-	74	-24.17	276	177	H
4	2.561	30.88	RMS	32	-24.9	2.04	40.02	54	-13.98	-	-	276	177	H

VERTICAL PEAK AND AVERAGE PLOT

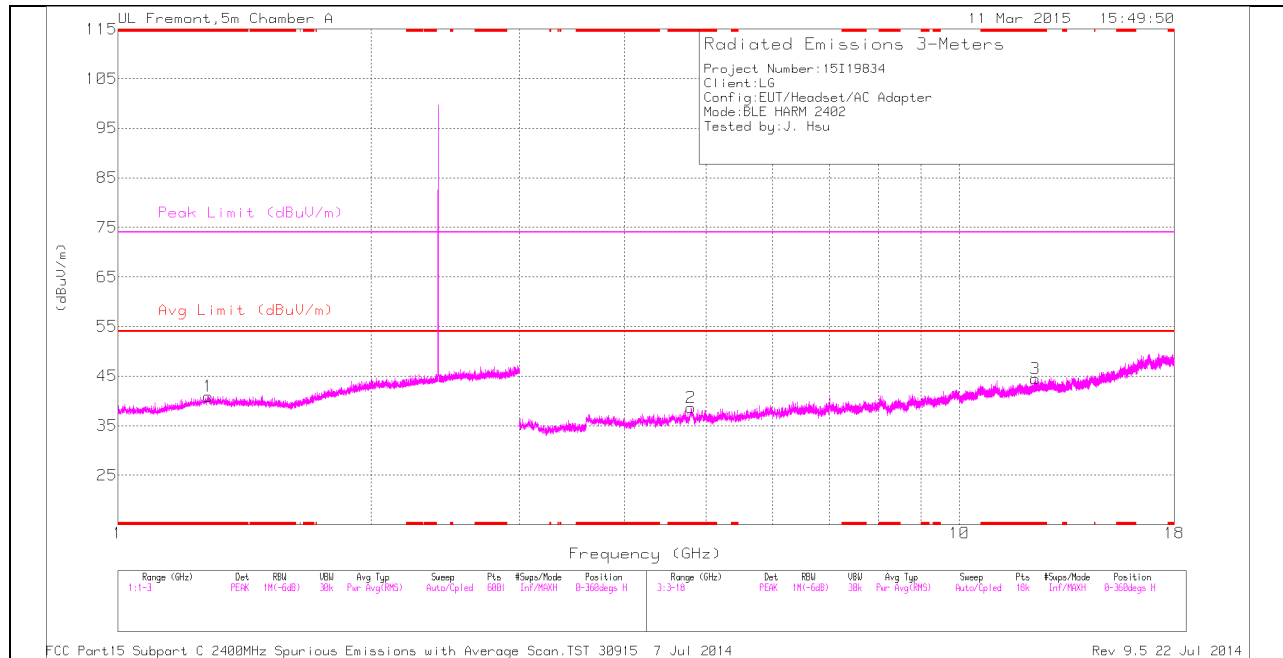


VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filt 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	39.28	PK	32	-24.9	0	46.38	-	-	74	-27.62	276	177	V
3	* 2.484	29.77	RMS	32	-24.9	2.04	38.91	54	-15.09	-	-	276	177	V
4	2.524	30.86	RMS	32	-24.9	2.04	40	54	-13	-	-	276	177	V
2	* 2.496	42.57	PK	32	-24.9	0	49.67	-	-	74	-24.33	276	177	V

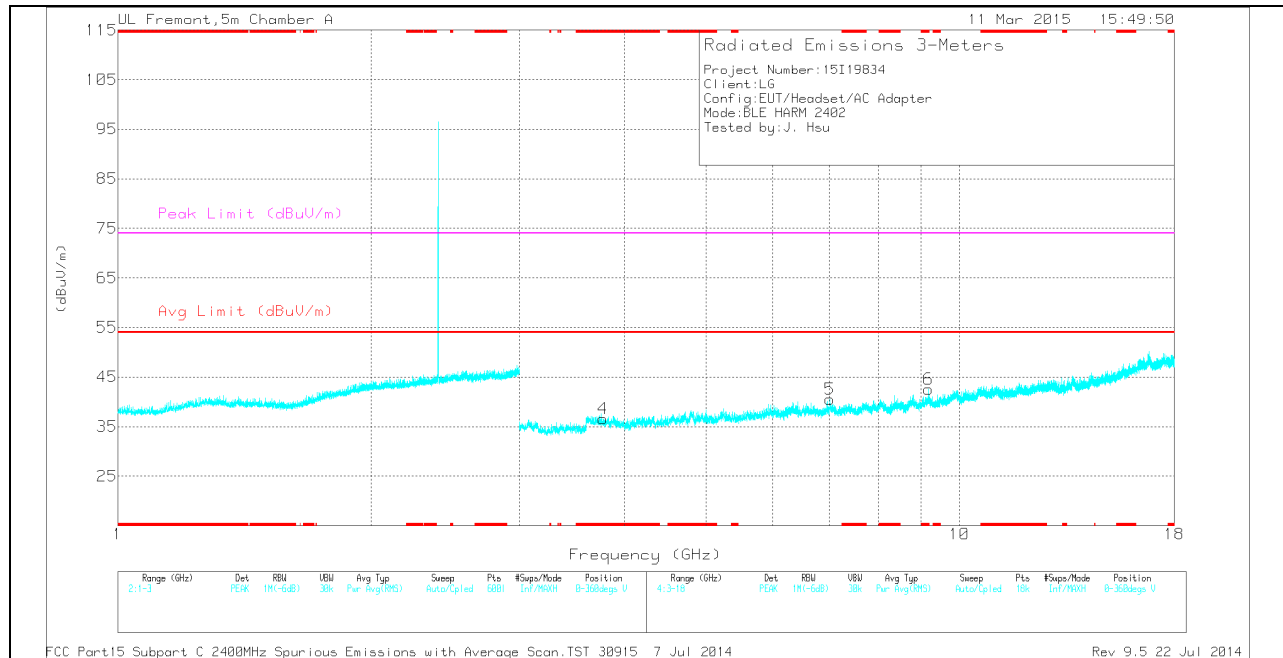
HARMONICS AND SPURIOUS EMISSIONS

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 T136 (dB/m)	Amp/Cbl/Ftr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.281	36.3	PK	28.7	-24.1	0	40.9	-	-	74	-33.1	0-360	100	H
2	* 4.795	32.99	PK	34	-28.4	0	38.59	-	-	74	-35.41	0-360	100	H
3	* 12.316	27.09	PK	39	-21.6	0	44.49	-	-	74	-29.51	0-360	100	H
4	* 3.77	33.04	PK	33.3	-29.8	0	36.54	-	-	74	-37.46	0-360	201	V
6	* 9.195	28.82	PK	36.3	-22.6	0	42.52	-	-	74	-31.48	0-360	201	V
5	7.011	30.23	PK	35.6	-25.3	0	40.53	-	-	-	-	0-360	201	V

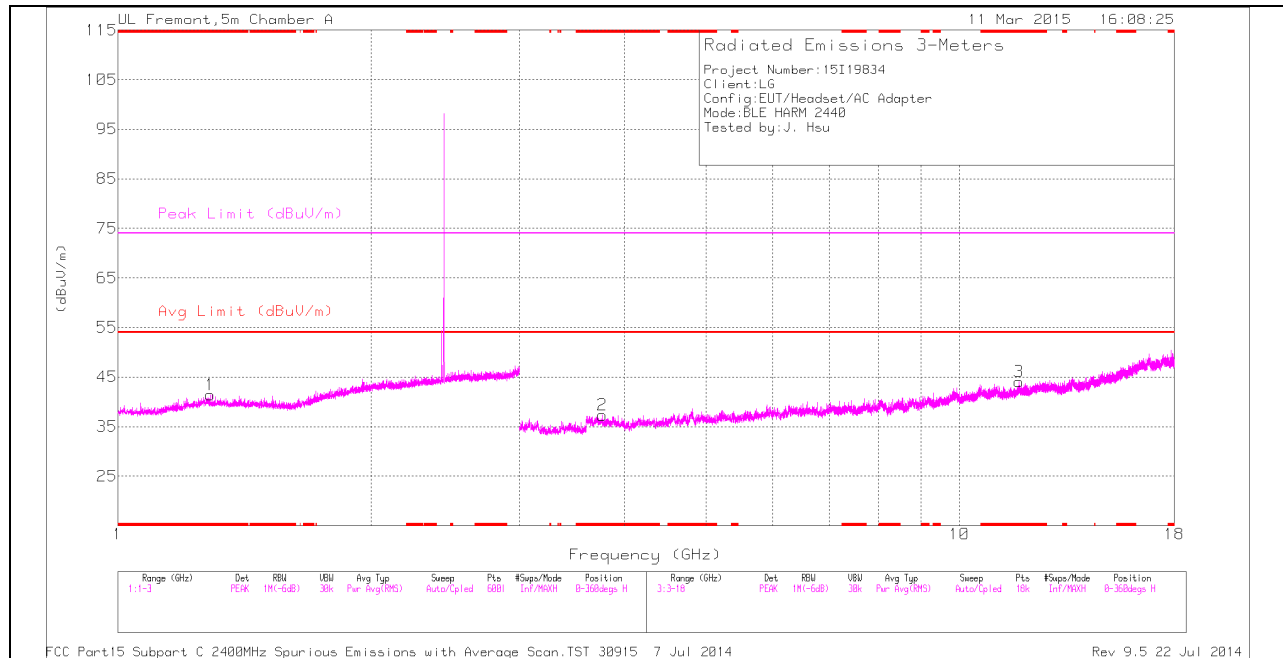
PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Ftr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 12.317	33.63	PK2	39	-21.6	0	51.03	-	-	74	-22.97	1	100	H
* 12.317	22.93	MAV1	39	-21.6	2.06	42.39	54	-11.61	-	-	1	100	H

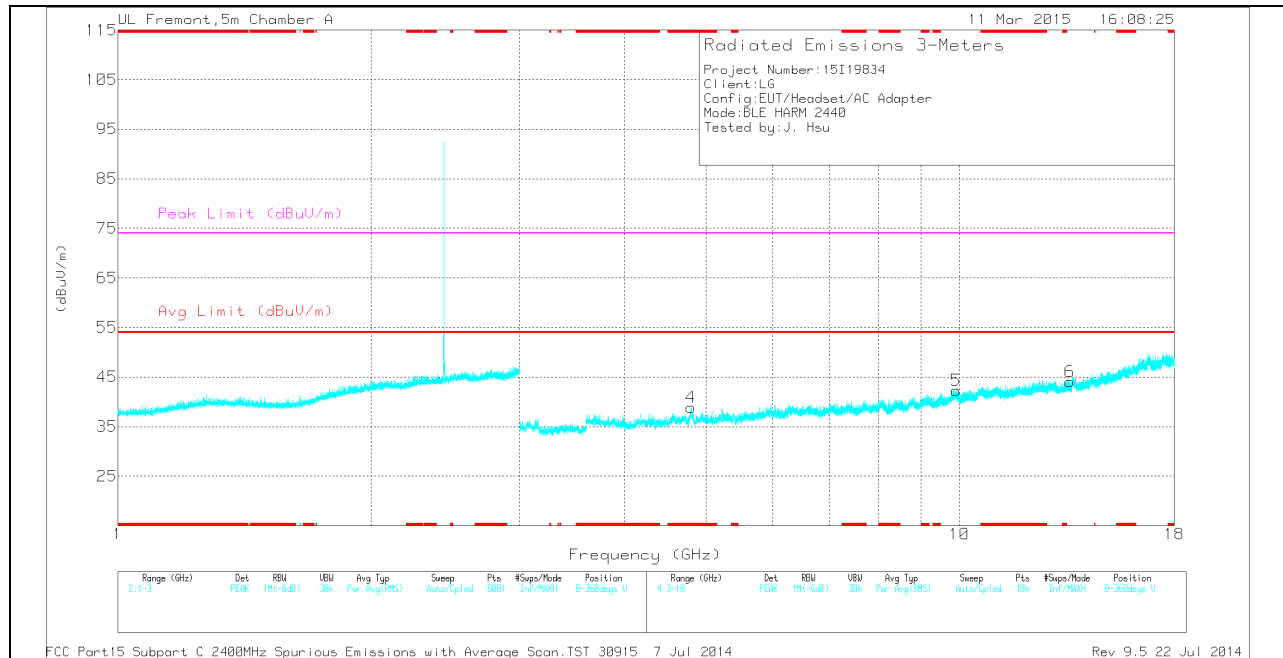
FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

MID CHANNEL HORIZONTAL



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

MID CHANNEL VERTICAL



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

MID CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cb/Ftr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.286	36.82	PK	28.7	-24.1	0	41.42	-	-	74	-32.58	0-360	201	H
2	* 3.763	33.79	PK	33.3	-29.8	0	37.29	-	-	74	-36.71	0-360	201	H
3	* 11.77	26.57	PK	38.3	-20.8	0	44.07	-	-	74	-29.93	0-360	201	H
4	* 4.796	33.22	PK	34	-28.4	0	38.82	-	-	74	-35.18	0-360	100	V
5	9.901	26.67	PK	37	-21.4	0	42.27	-	-	-	-	0-360	201	V
6	13.538	26.14	PK	39	-21.1	0	44.04	-	-	-	-	0-360	100	V

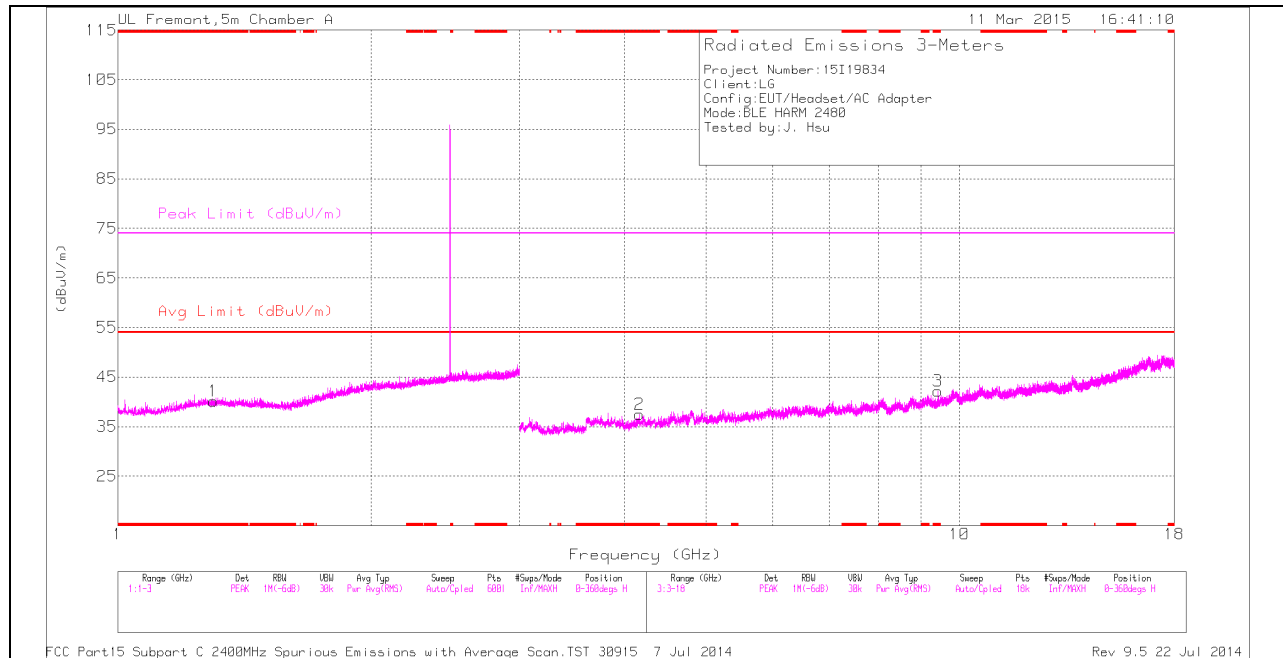
PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cb/Ftr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.796	41.87	PK2	34	-28.4	0	47.47	-	-	74	-26.53	1	100	V
* 4.796	29.69	MAV1	34	-28.4	2.06	37.35	54	-16.65	-	-	1	100	V

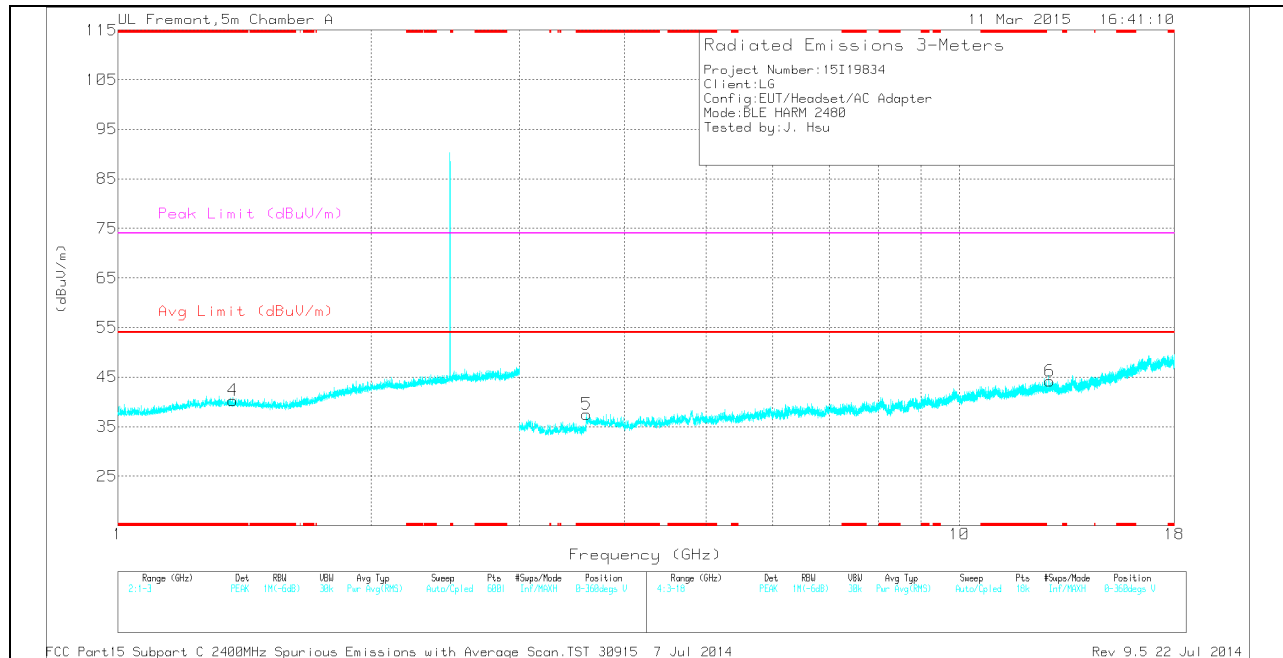
FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

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 T136 (dB/m)	Amp/Cbl/Fitr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.298	35.38	PK	28.8	-24	0	40.18	-	-	74	-33.82	0-360	201	H
4	* 1.37	35.83	PK	28.6	-24.1	0	40.33	-	-	74	-33.67	0-360	201	V
2	* 4.167	33.35	PK	33.3	-29.2	0	37.45	-	-	74	-36.55	0-360	100	H
3	* 9.434	28.59	PK	36.5	-22.9	0	42.19	-	-	74	-31.81	0-360	201	H
5	* 3.605	34.44	PK	33.1	-30	0	37.54	-	-	74	-36.46	0-360	201	V
6	12.804	26.23	PK	39.2	-21.2	0	44.23	-	-	-	-	0-360	100	V

PK - Peak detector

RADIATED EMISSIONS

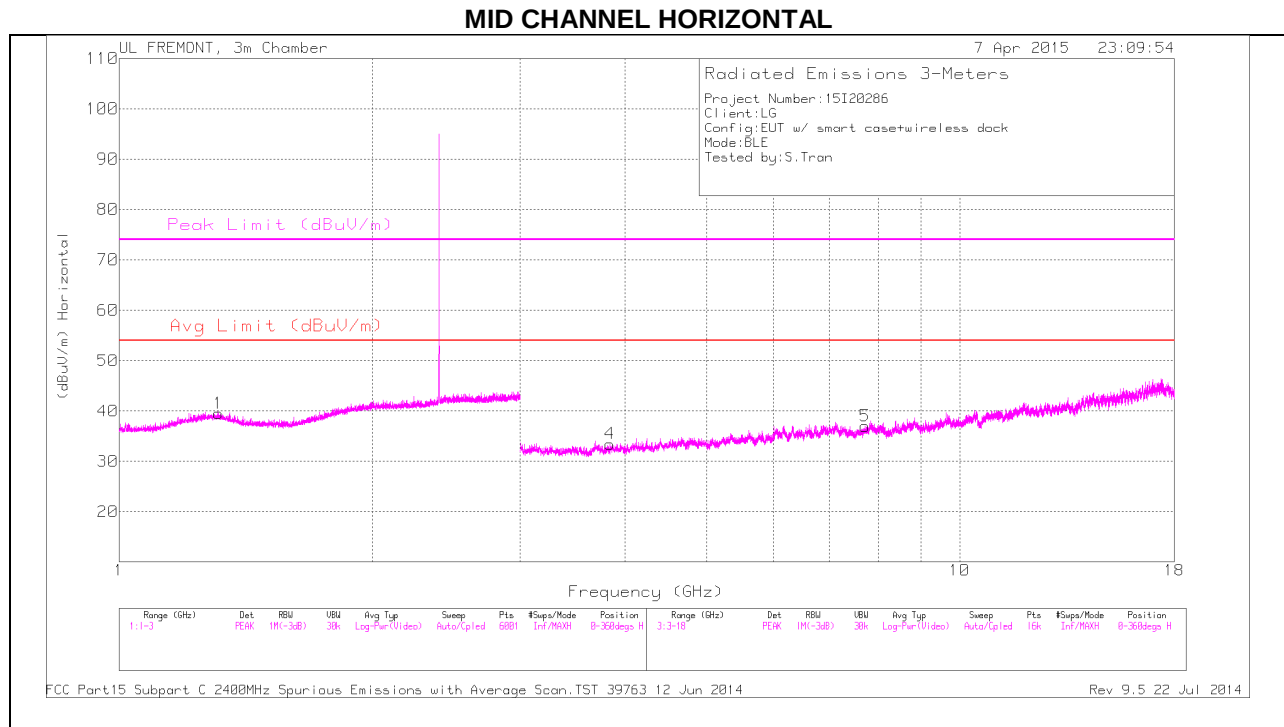
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fitr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.605	40.91	PK2	33.1	-30	0	44.01	-	-	74	-29.99	1	201	V
* 3.605	29.99	MAV1	33.1	-30	2.06	35.15	54	-18.85	-	-	1	201	V

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

9.3. ADDITIONAL TESTS (PHONE WITH SMART COVER)

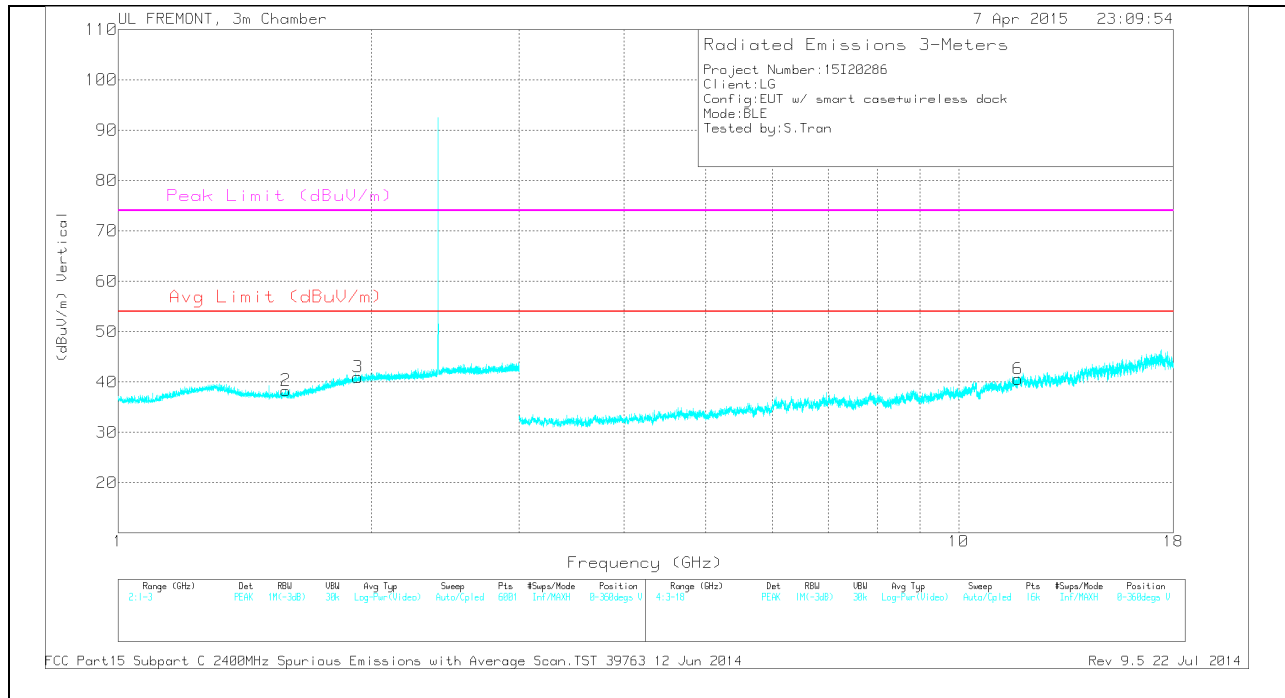
9.3.1. BLE MID CHANNEL (WORST CASE)

HARMONICS AND SPURIOUS EMISSIONS



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

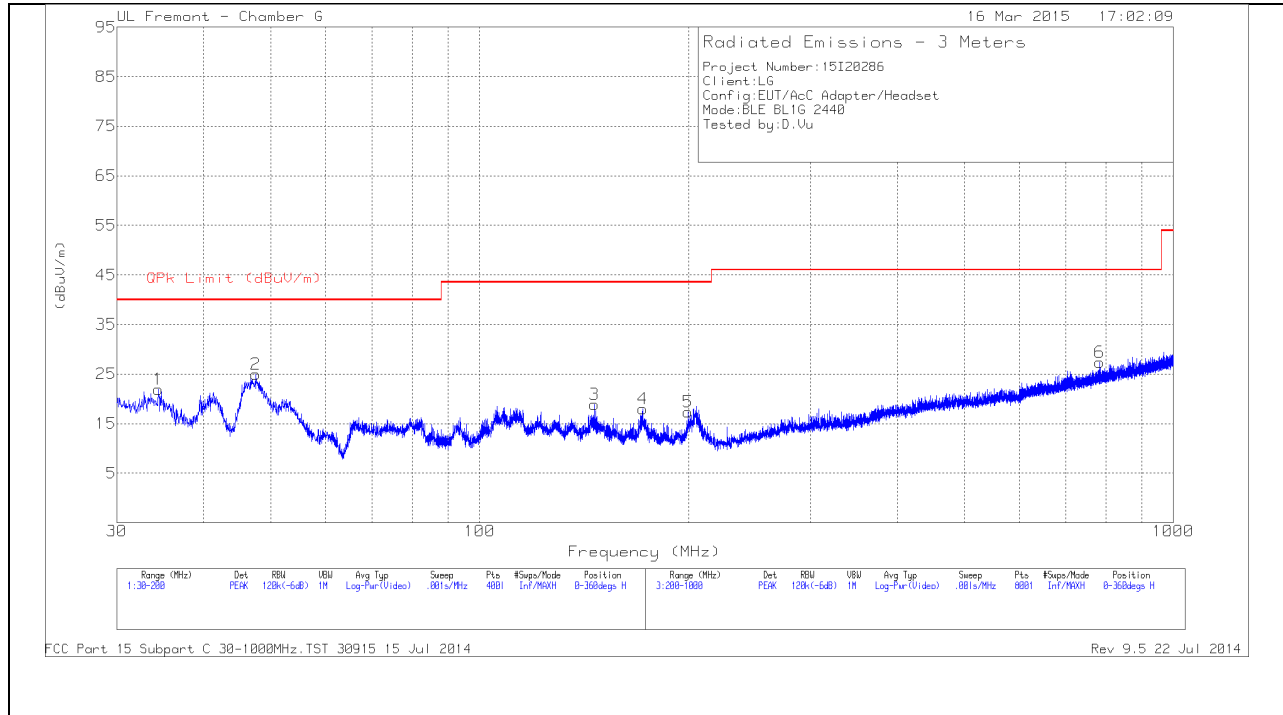
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/F ltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.313	33.62	PK	29.7	-23.8	39.52	-	-	74	-34.48	0-360	100	H
2	1.584	33.73	PK	28	-23.4	38.33	-	-	74	-35.67	0-360	100	V
3	1.929	33.08	PK	31.2	-23.3	40.98	-	-	-	-	0-360	100	V
4	3.837	31.47	PK	33.1	-31.1	33.47	-	-	74	-40.53	0-360	200	H
5	7.716	30.38	PK	35.8	-29.2	36.98	-	-	74	-37.02	0-360	100	H
6	11.759	27.71	PK	38.9	-26	40.61	-	-	74	-33.39	0-360	100	V

PK - Peak detector

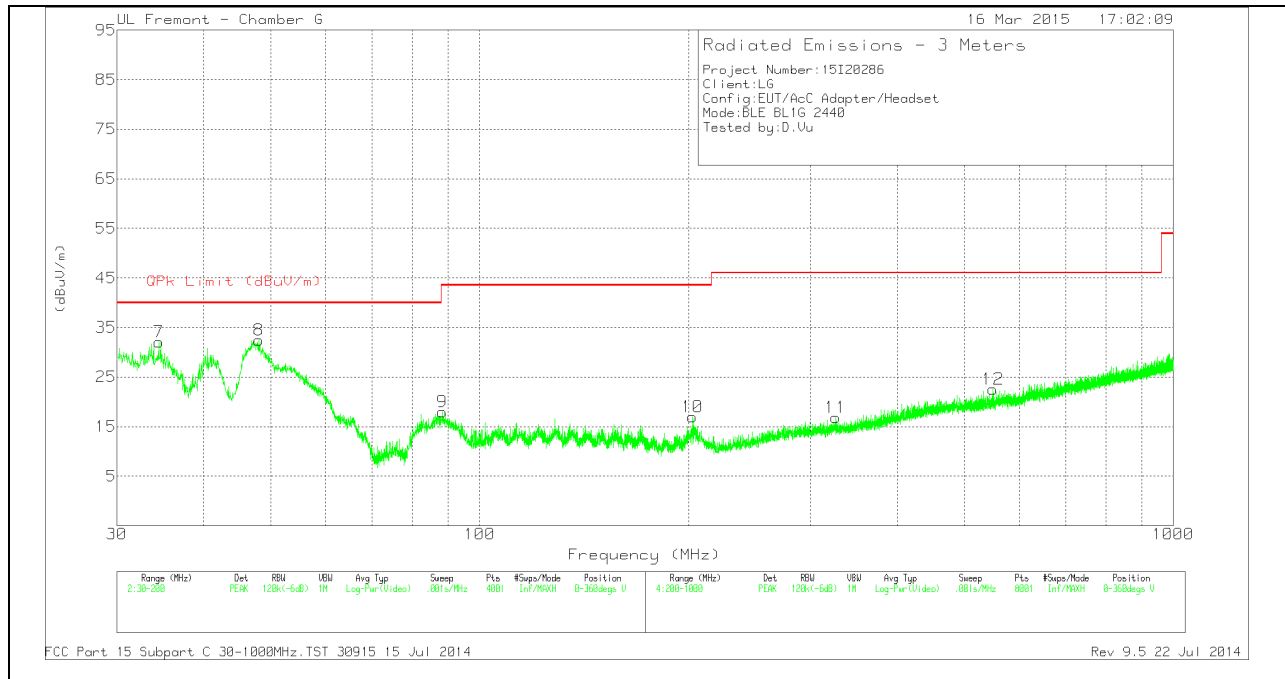
9.4. TRANSMITTER BELOW 1 GHz

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 T899 (dB/m)	Amp Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 171.7375	33.11	PK	14.8	-29.9	18.01	43.52	-25.51	0-360	201	H
11	* 326.4	28.88	PK	16.8	-28.8	16.88	46.02	-29.14	0-360	201	V
1	34.42	32.25	PK	21	-31.3	21.95	40	-18.05	0-360	401	H
7	34.4625	42.38	PK	21	-31.3	32.08	40	-7.92	0-360	100	V
2	47.595	43.93	PK	12	-31	24.93	40	-15.07	0-360	401	H
8	48.02	51.76	PK	11.7	-31	32.46	40	-7.54	0-360	100	V
9	88.4375	38.19	PK	10.4	-30.6	17.99	43.52	-25.53	0-360	100	V
3	146.28	32.95	PK	15.9	-30	18.85	43.52	-24.67	0-360	301	H
5	199.8725	31.45	PK	15.6	-29.7	17.35	43.52	-26.17	0-360	100	H
10	202.8	31.31	PK	15.3	-29.6	17.01	43.52	-26.51	0-360	100	V
12	549.9	29.01	PK	21.3	-27.8	22.51	46.02	-23.51	0-360	100	V
6	783	30.07	PK	24.1	-26.8	27.37	46.02	-18.65	0-360	201	H

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

^{*} Decreases with the logarithm of the frequency.

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 C63.4.

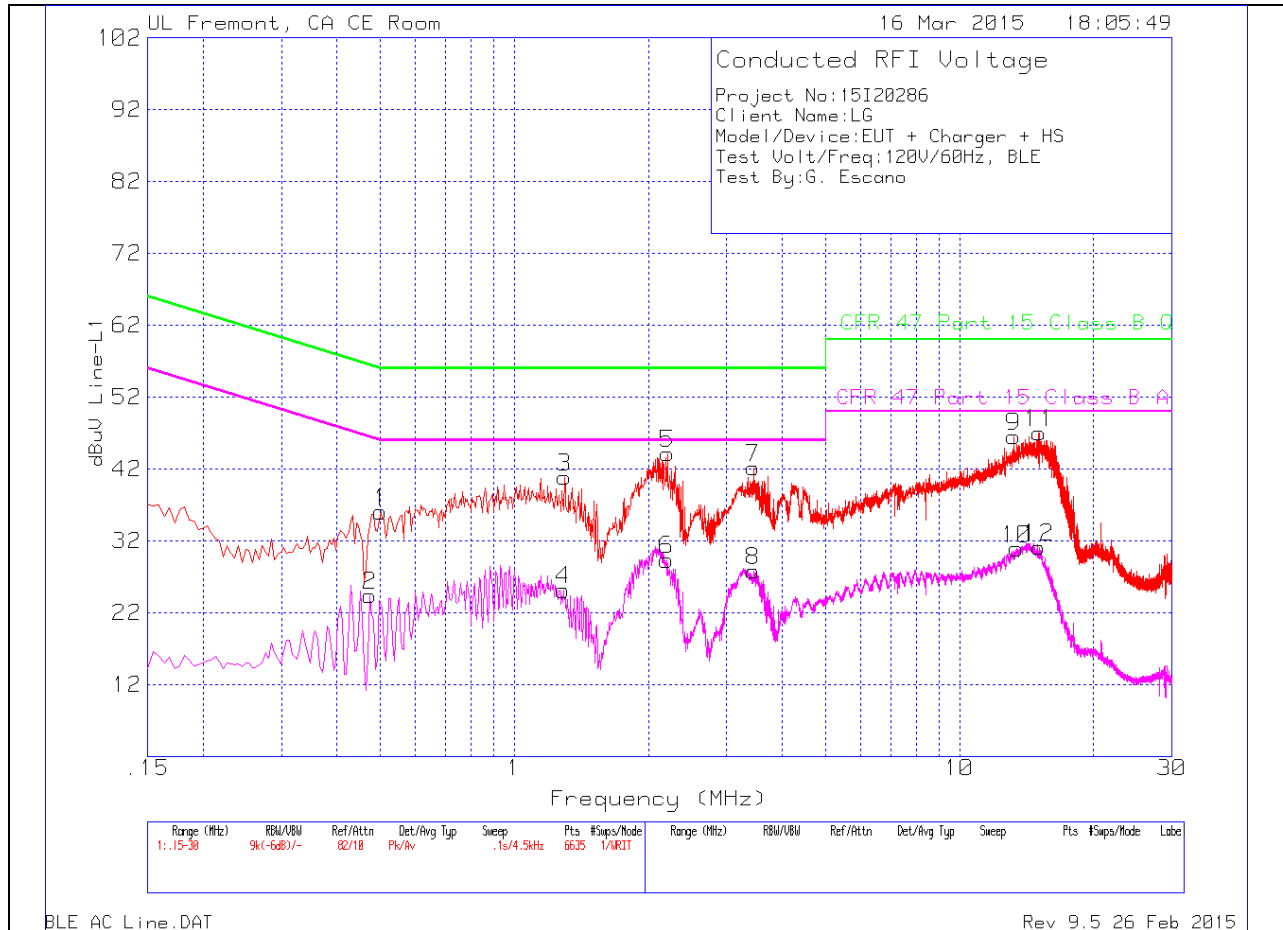
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

6 WORST EMISSIONS

LINE 1 PLOT

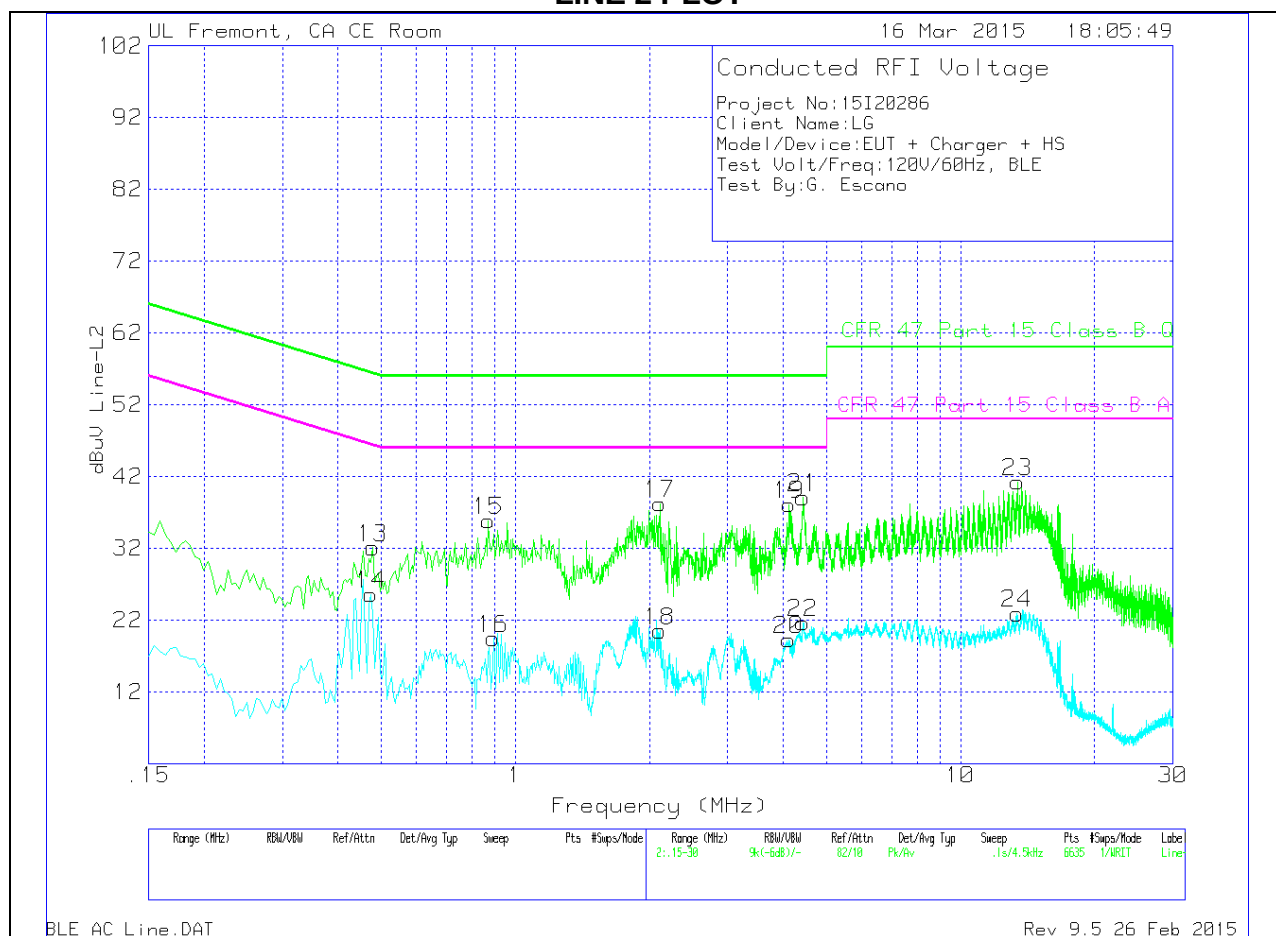


LINE 1 RESULTS

Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	Margin (dB)	CFR 47 Part 15 Class B Avg	Margin (dB)
1	.501	35.74	Pk	.3	0	36.04	56	-19.96	-	-
2	.474	24.04	Av	.4	0	24.44	-	-	46.44	-22
3	1.2975	40.57	Pk	.2	.1	40.87	56	-15.13	-	-
4	1.2885	24.86	Av	.2	.1	25.16	-	-	46	-20.84
5	2.211	43.85	Pk	.2	.1	44.15	56	-11.85	-	-
6	2.1975	29.07	Av	.2	.1	29.37	-	-	46	-16.63
7	3.444	41.88	Pk	.2	.1	42.18	56	-13.82	-	-
8	3.444	27.52	Av	.2	.1	27.82	-	-	46	-18.18
9	13.2405	46.12	Pk	.2	.2	46.52	60	-13.48	-	-
10	13.434	30.53	Av	.2	.2	30.93	-	-	50	-19.07
11	15.108	46.53	Pk	.3	.2	47.03	60	-12.97	-	-
12	15.0855	30.65	Av	.3	.2	31.15	-	-	50	-18.85

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	CFR 47 Part 15 Class B QP	Margin (dB)	CFR 47 Part 15 Class B Avg	Margin (dB)
13	.4785	31.72	Pk	.4	0	32.12	56.37	-24.25	-	-
14	.474	25.19	Av	.4	0	25.59	-	-	46.44	-20.85
15	.87	35.55	Pk	.3	0	35.85	56	-20.15	-	-
16	.8925	19.18	Av	.3	0	19.48	-	-	46	-26.52
17	2.112	37.96	Pk	.2	.1	38.26	56	-17.74	-	-
18	2.112	20.21	Av	.2	.1	20.51	-	-	46	-25.49
19	4.1235	37.82	Pk	.2	.1	38.12	56	-17.88	-	-
20	4.11	18.97	Av	.2	.1	19.27	-	-	46	-26.73
21	4.425	38.8	Pk	.2	.1	39.1	56	-16.9	-	-
22	4.425	21.35	Av	.2	.1	21.65	-	-	46	-24.35
23	13.4295	40.86	Pk	.2	.2	41.26	60	-18.74	-	-
24	13.3845	22.52	Av	.2	.2	22.92	-	-	50	-27.08