FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-247 ISSUE 1

BLUETOOTH LOW ENERGY CERTIFICATION TEST REPORT

FOR

WIRELESS HEADSET

MODEL NUMBER: A1722

FCC ID: BCG-A1722

IC: 579C-A1722

REPORT NUMBER: 16U23784-E3V3

ISSUE DATE: AUGUST 29, 2016

Prepared for
APPLE, INC.
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

Prepared by
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	08/22/2016	Initial Issue	Chin Pang
V2	08/26/2016	Address TCB's Questions	Chin Pang
V3	08/29/2016	Add below 1GHz and LC data	Chin Pang

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TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS 5

2. TEST METHODOLOGY 6

3. FACILITIES AND ACCREDITATION 6

4. CALIBRATION AND UNCERTAINTY 7

4.1. MEASURING INSTRUMENT CALIBRATION 7

4.2. SAMPLE CALCULATION 7

4.3. MEASUREMENT UNCERTAINTY 7

5. EQUIPMENT UNDER TEST 8

5.1. DESCRIPTION OF EUT 8

5.2. MAXIMUM OUTPUT POWER 8

5.3. DESCRIPTION OF AVAILABLE ANTENNAS 8

5.4. SOFTWARE AND FIRMWARE 8

5.5. WORST-CASE CONFIGURATION AND MODE 9

5.6. DESCRIPTION OF TEST SETUP 10

6. TEST AND MEASUREMENT EQUIPMENT 15

7. ANTENNA PORT TEST RESULTS 16

7.1. MEASUREMENT METHODS 16

7.2. ON TIME, DUTY CYCLE 17

7.3. 6 dB BANDWIDTH 19

7.4. 99% BANDWIDTH 22

7.5. AVERAGE POWER 25

7.6. OUTPUT POWER 26

7.7. POWER SPECTRAL DENSITY 27

7.8. CONDUCTED SPURIOUS EMISSIONS 30

8. RADIATED TEST RESULTS 34

8.1. LIMITS AND PROCEDURE 34

8.2. TRANSMITTER ABOVE 1 GHz 35

8.2.1. RESTRICTED BANDEDGE 35

8.2.2. HARMONICS AND SPURIOUS EMISSIONS 39

8.3. WORST-CASE BELOW 1 GHz 45

8.4. WORST-CASE 18 to 26 GHz 47

9. AC POWER LINE CONDUCTED EMISSIONS 49

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10. SETUP PHOTOS 53

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE, INC.
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

EUT DESCRIPTION: WIRELESS HEADSET

MODEL: A1722

SERIAL NUMBER: CC4S30UKGQC9 (Conducted) CCS32F9GQC9 (Radiated)

DATE TESTED: AUGUST 04, 2016 - AUGUST 26, 2016

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-247 Issue 1	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
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SENIOR ENGINEER
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Prepared By:

JOE VANG
EMC WISE ENGINEER
UL VERIFICATION SERVICES INC.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, KDB 558074 D01 v03r05, ANSI C63.10-2013, RSS-GEN Issue 4, and RSS-247 Issue 1.

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	☐ Chamber D
☐ Chamber B	☐ Chamber E
☐ Chamber C	☐ Chamber F
	☒ Chamber G
	☐ Chamber H

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through H are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-8, respectively.

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.

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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, 9KHz to 0.15 MHz	3.84 dB
Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Radiated Disturbance,1000 to 18000 MHz	4.32 dB
Radiated Disturbance,18000 to 26000 MHz	4.45 dB
Radiated Disturbance,26000 to 40000 MHz	5.24 dB

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

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT (left) is one of a pair of ear buds for left and right ears, with Bluetooth Radio. It has an integral battery, microphone and antenna. The rechargeable battery is not user accessible. It can change via bottom contacts and charge case. It is designed to work in conjunction with the right ear bud.

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	10.01	10.02

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Band (GHz)	Antenna Gain (dBi)
2.4	-6.60

5.4. SOFTWARE AND FIRMWARE

The software installed in the EUT during testing was 9A217.

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5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case mode and channel used for 30-1000 MHz radiated emissions and AC line conducted emission were including AC/DC charger, mode and channel with the highest output power.

Above 1G radiated emission were performed with low, middle and high channels. And above 18GHz radiated emission were performed with the EUT only 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-flatbed orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in x-flatbed orientation.

Data rates set for test:

BLE: 1 Mbps

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop AC/DC adapter	Apple	A1424	NSW25679	N/A
Laptop	Apple	MacBook AIR	C02P52H6G085	N/A
USB	Apple	N/A	N/A	N/A
Test Jig	Apple	Proto2 Controller ARM	920-01148-01	N/A

I/O CABLES (CONDUCTED TEST)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Antenna	1	SMA	Un-Shielded	0.2	To spectrum Analyzer
2	USB	1	USB	Shielded	1	N/A
3	AC	1	AC	Un-shielded	2	N/A

I/O CABLES (RADIATED ABOVE 1 GHZ)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
None Used						

I/O CABLES (BELOW 1GHz AND AC LINE CONDUCTED: AC/DC ADAPTER)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	USB	Un-shielded	1	N/A

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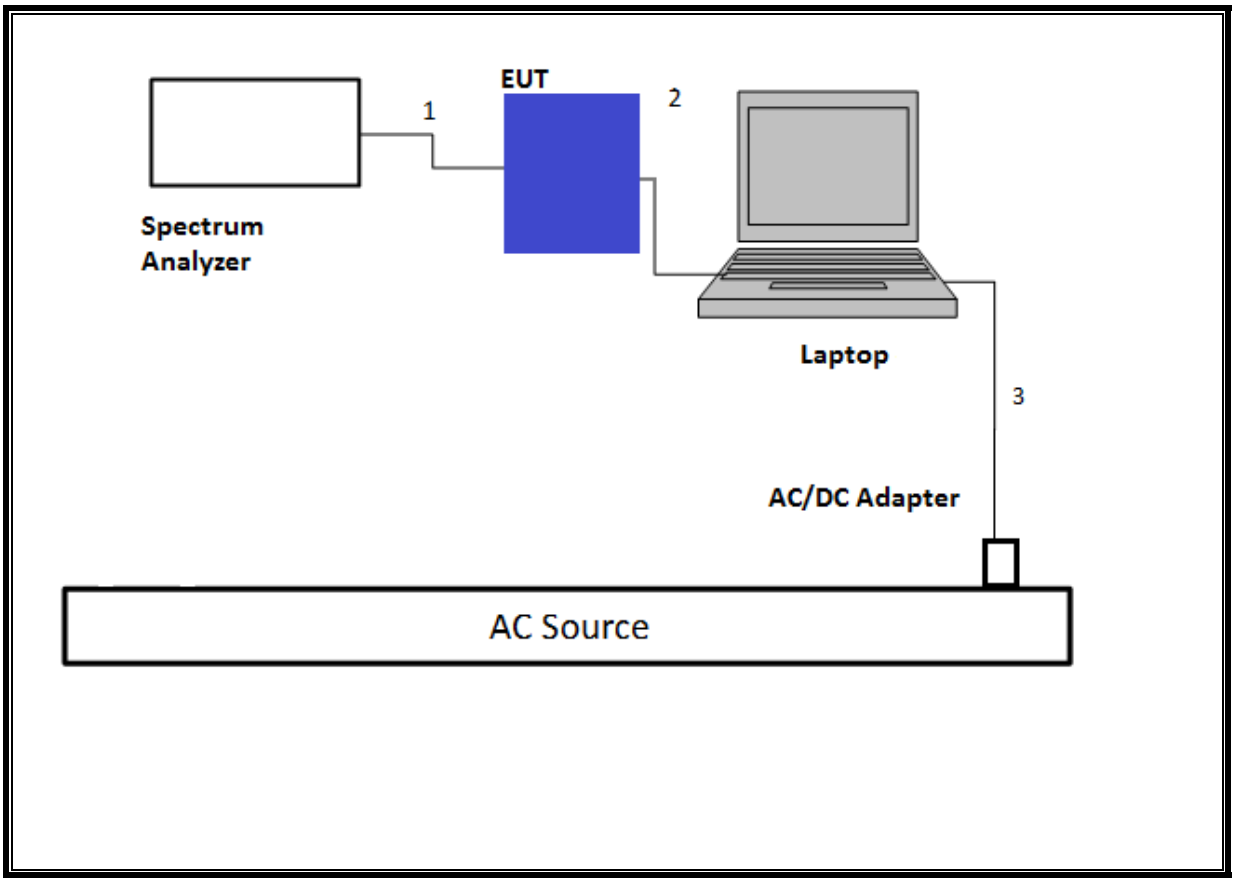
TEST SETUP- CONDUCTED PORT

The EUT was tested connected to a host Laptop via USB cable adapter and spectrum analyzer to antenna port. Test software exercised the EUT.

SETUP DIAGRAM



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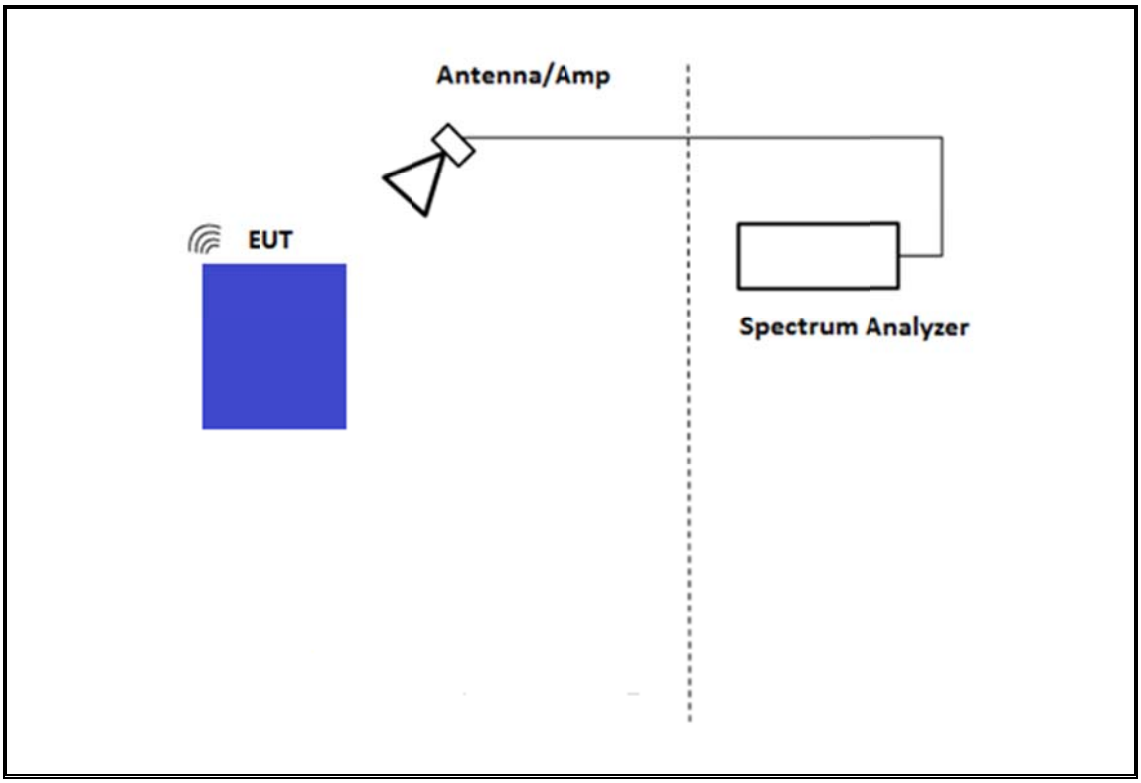
TEST SETUP- RADIATED-ABOVE 1 GHZ

The EUT was powered by battery. Test software exercised the EUT.

SETUP DIAGRAM



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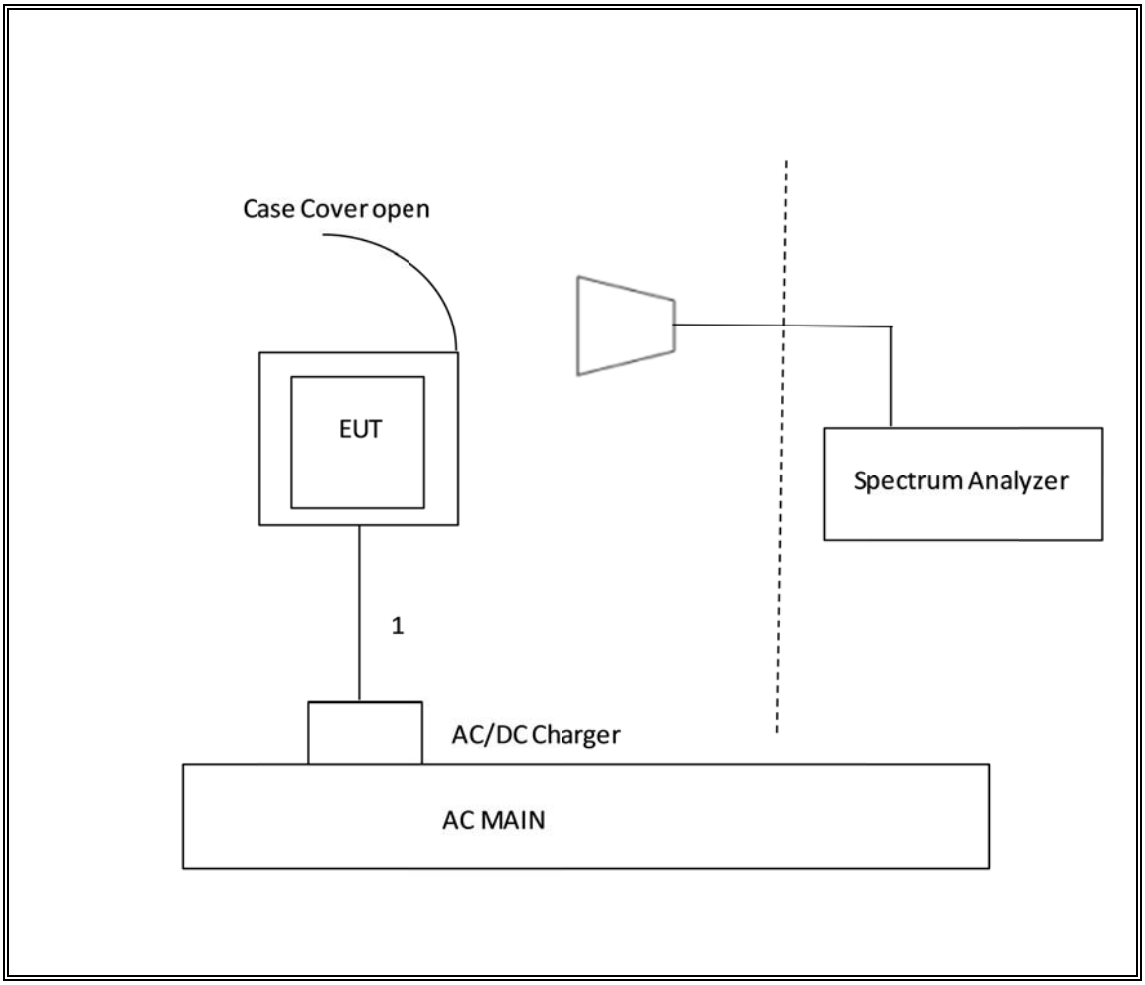
TEST SETUP- BELOW 1GHz

The EUT was tested with Case Cover open while charging and powered by AC/DC adapter via USB cable.

SETUP DIAGRAM



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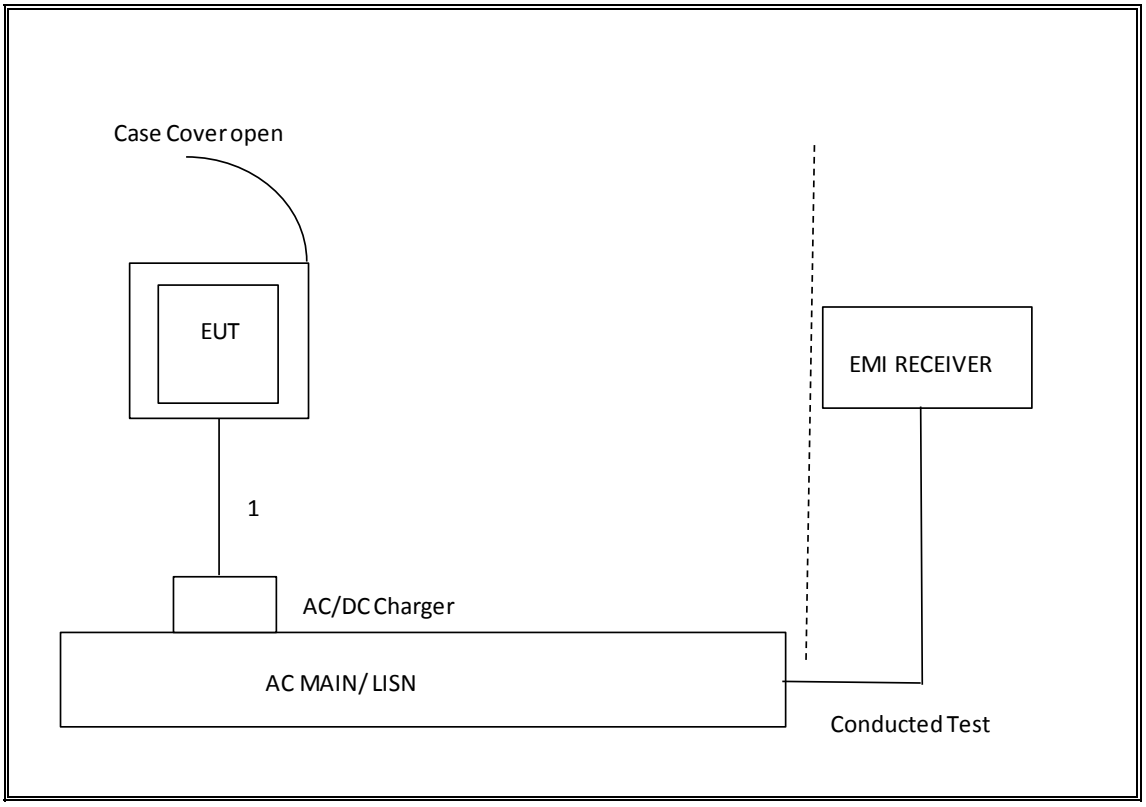
TEST SETUP- AC LINE CONDUCTED: AC/DC ADAPTER

The EUT was tested in charging capsule and powered by AC/DC adapter via USB cable. Test software exercised the EUT.

SETUP DIAGRAM



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6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	**Manufacturer**	**Model**	**T Number**	**Cal Due**
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T863	4/26/2017
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	T900	5/3/2017
Amplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S-42	T495	10/20/2016
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	T835	6/18/2017
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	T341	10/14/2016
Power Meter, P-series single channel	Agilent	N1911A	T1271	7/8/2017
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Agilent	N1921A	T1228	6/20/2017
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826	T447	6/16/2017
Spectrum Analyzer, 40 GHz	Agilent	N9030A	T340	11/15/2016
Amplifier, 1 to 26.5GHz, 23.5dB Gain minimum	Keysight	8449B	T402	7/5/2017
AC Line Conducted				
EMI Test Receiver 9Khz-7GHz	Rohde & Schwarz	ESCI7	T1436	12/19/2016
LISN for Conducted Emissions CISPR-16	Fischer	50/250-25-2-01	T1310	6/8/2017
AC Source	Shaffner	NSG 1007	T134	9/11/2016
UL SOFTWARE				
* Radiated Software	UL	UL EMC	Ver 9.5, June 24, 2015	
* Conducted Software	UL	UL EMC	Ver 4.0, January 11, 2016	
* AC Line Conducted Software	UL	UL EMC	Ver 9.5, May 26, 2015	

Note: * indicates automation software version used in the compliance certification testing

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7. ANTENNA PORT TEST RESULTS

7.1. MEASUREMENT METHODS

6 dB BW: KDB 558074 D01 v03r05, Section 8.1.

Output Power: KDB 558074 D01 v03r05, Section 9.1.2.

Power Spectral Density: KDB 558074 D01 v03r05, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r05, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r05, Section 12.1.

Band-edge: KDB 558074 D01 v03r05, Section 12.1.

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7.2. ON TIME, DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
BLE	100.000	100.000	1.000	100.00%	0.00	0.010

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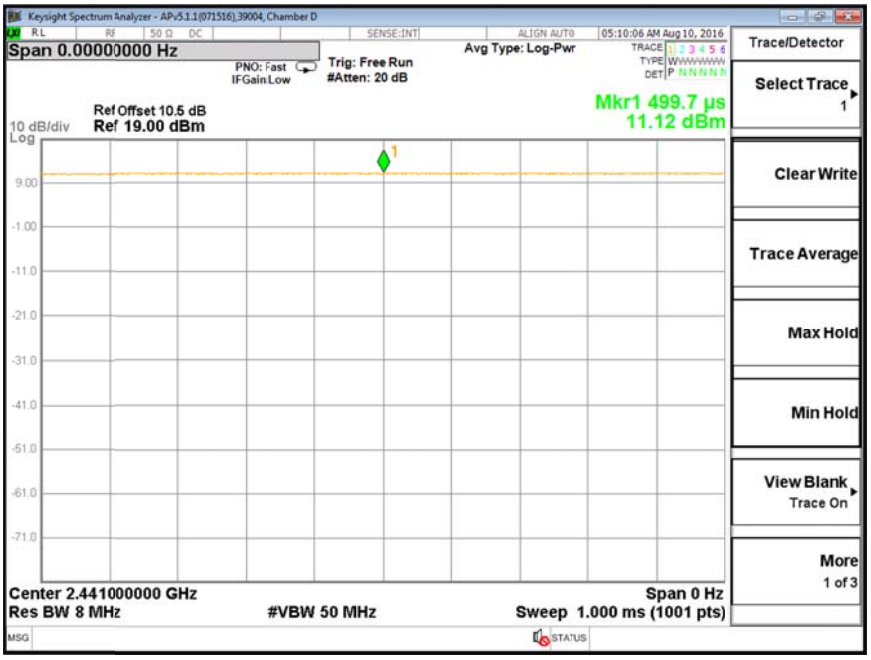
DUTY CYCLE PLOTS

DUTY CYCLE BLE MODE



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7.3. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-247 (5.2) (1)

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

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.724	0.5
Middle	2440	0.756	0.5
High	2480	0.758	0.5

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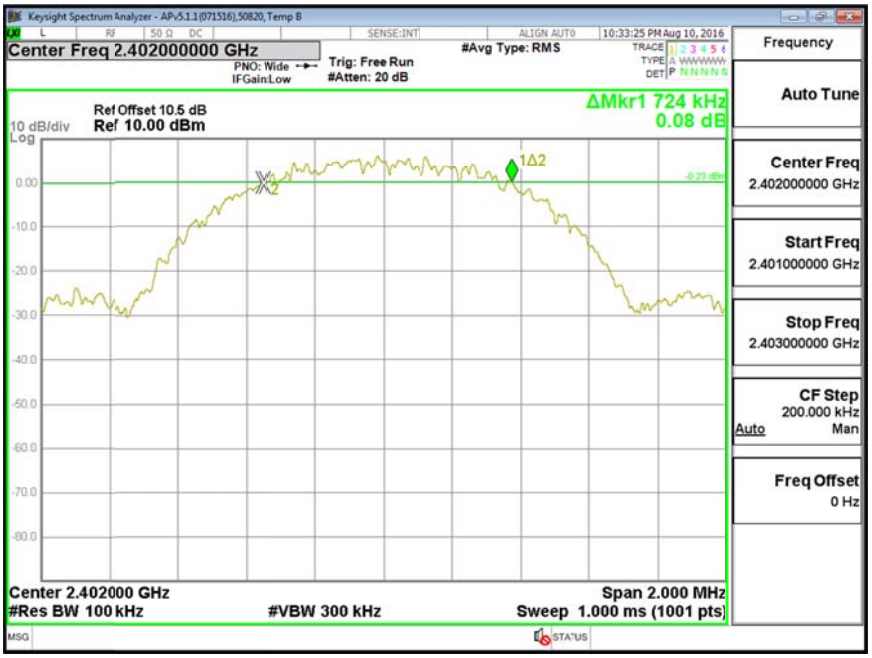
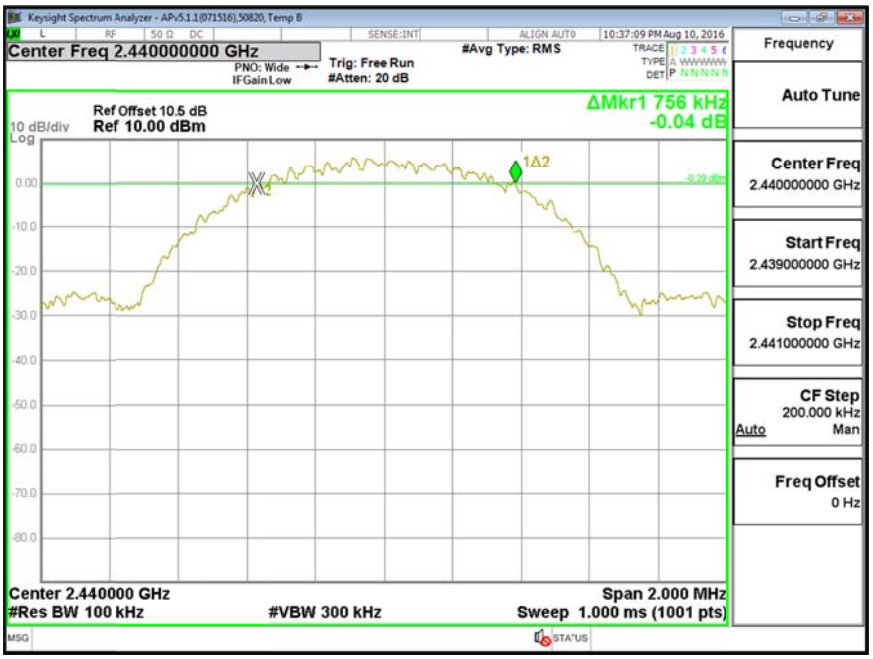
6 dB BANDWIDTH

6 dB BANDWIDTH LOW CH



6 dB BANDWIDTH MID CH



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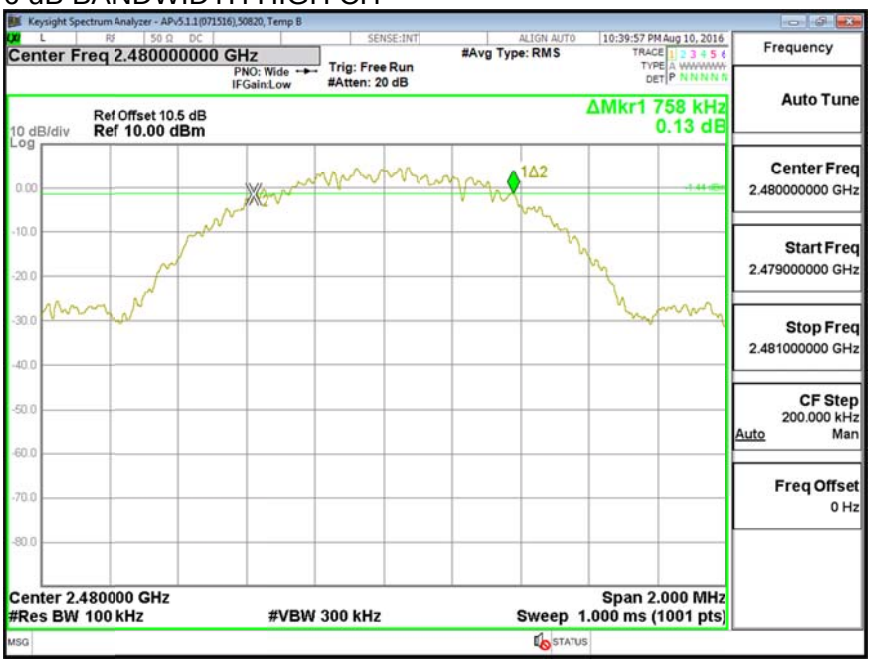
6 dB BANDWIDTH HIGH CH



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7.4. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth or 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	1.0348
Middle	2440	1.0393
High	2480	1.0432

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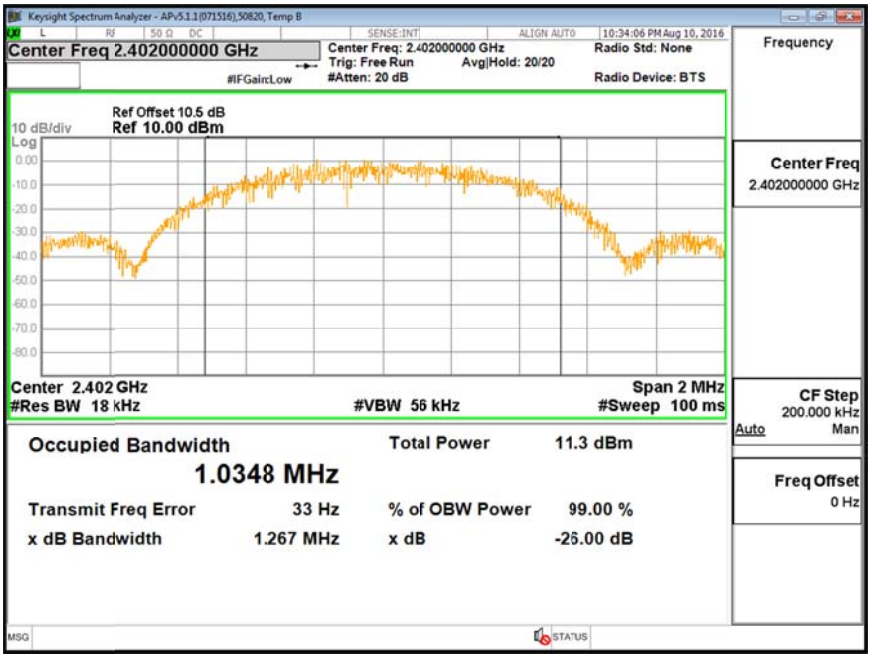
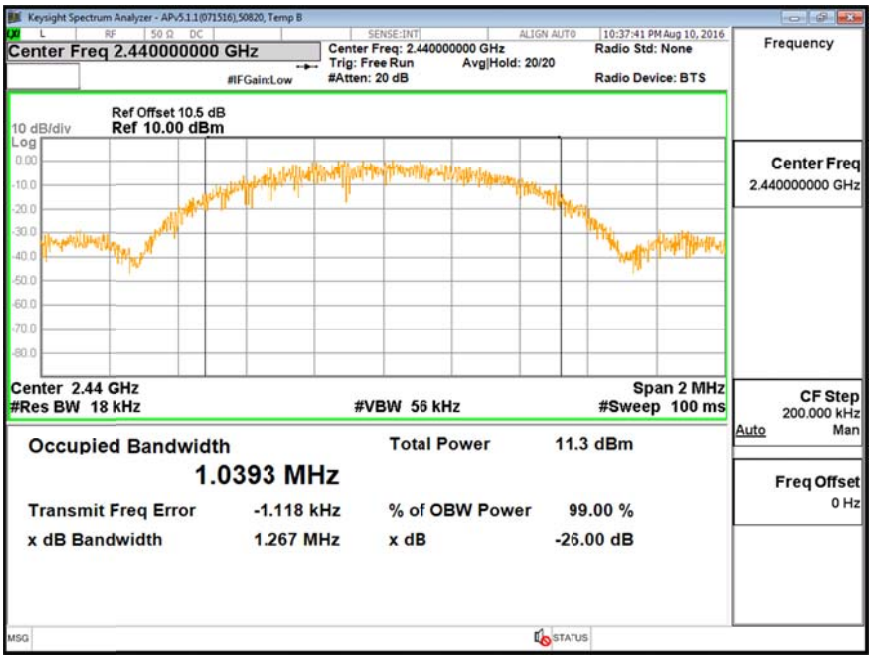
99% BANDWIDTH

99% BANDWIDTH LOW CH



99% BANDWIDTH MID CH



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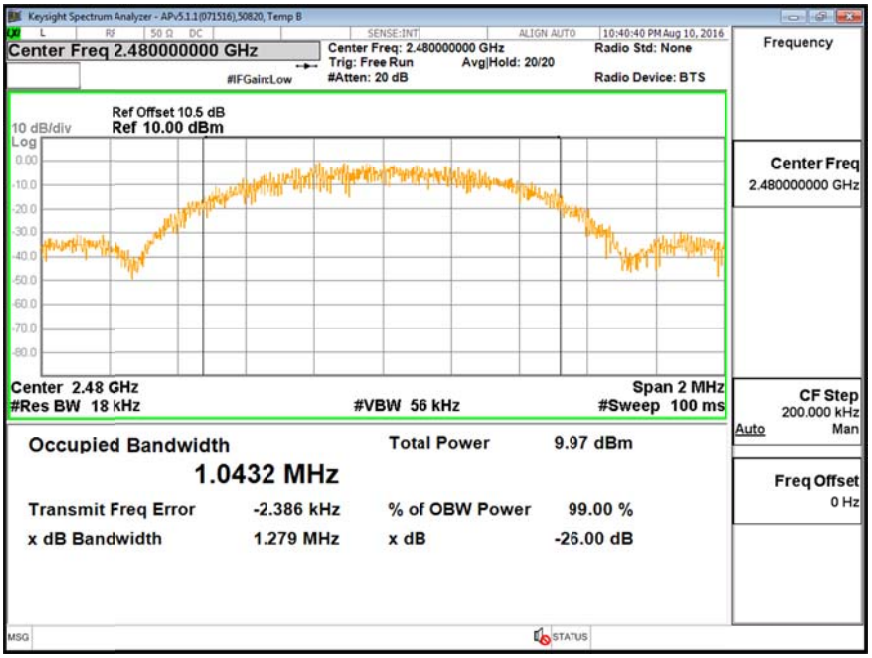
99% BANDWIDTH HIGH CH



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7.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

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.

ID:	50820	Date:	8/10/16

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	9.99
Middle	2440	10
High	2480	9.98

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7.6. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-247 (5.4) (4)

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

RESULTS

ID:	50820	Date:	8/10/16

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	10.00	30	-20.000
Middle	2440	10.01	30	-19.990
High	2480	10.00	30	-20.000

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7.7. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-247 (5.2) (2)

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.

RESULTS

ID:	29435	Date:	8/26/16

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-4.66	8	-12.66
Middle	2440	-4.57	8	-12.57
High	2480	-5.02	8	-13.02

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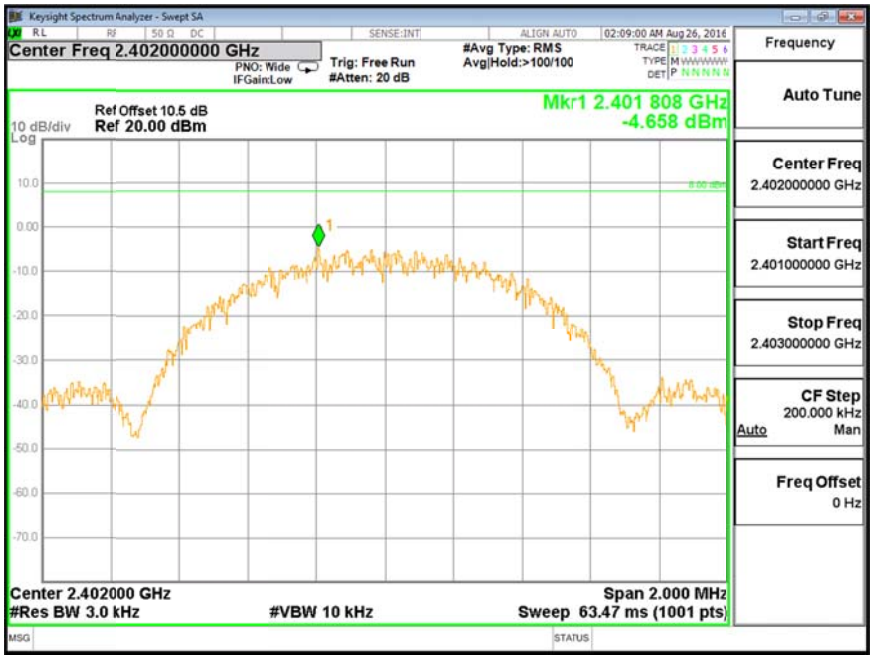
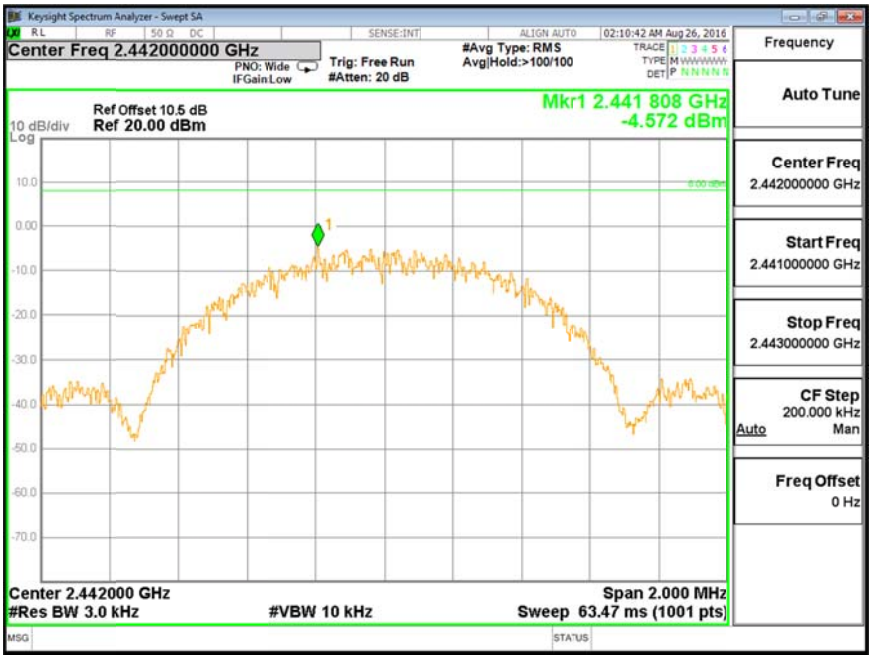
POWER SPECTRAL DENSITY

PSD LOW CH



PSD MID CH



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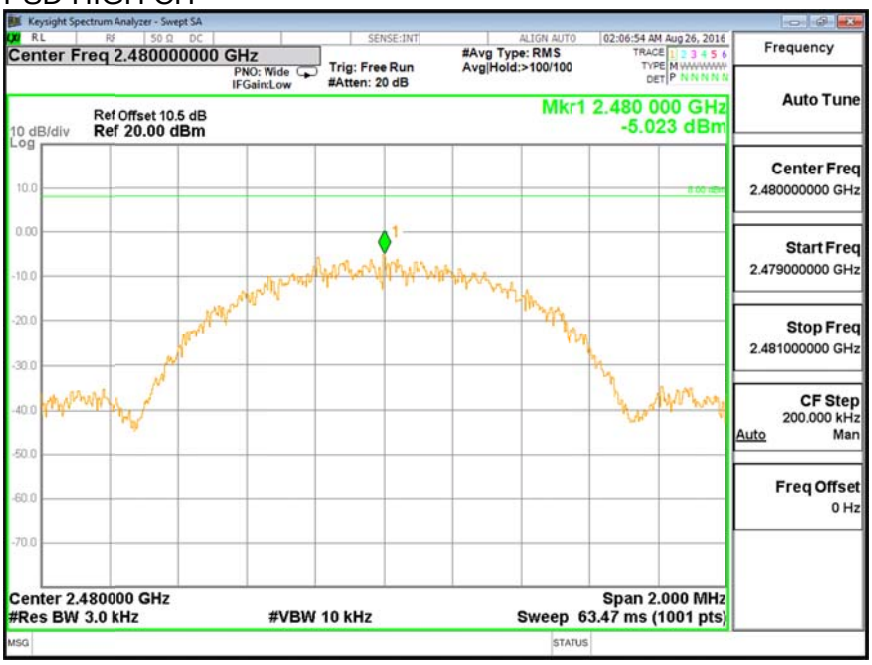
PSD HIGH CH



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7.8. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-247 (5.5)

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

RESULTS

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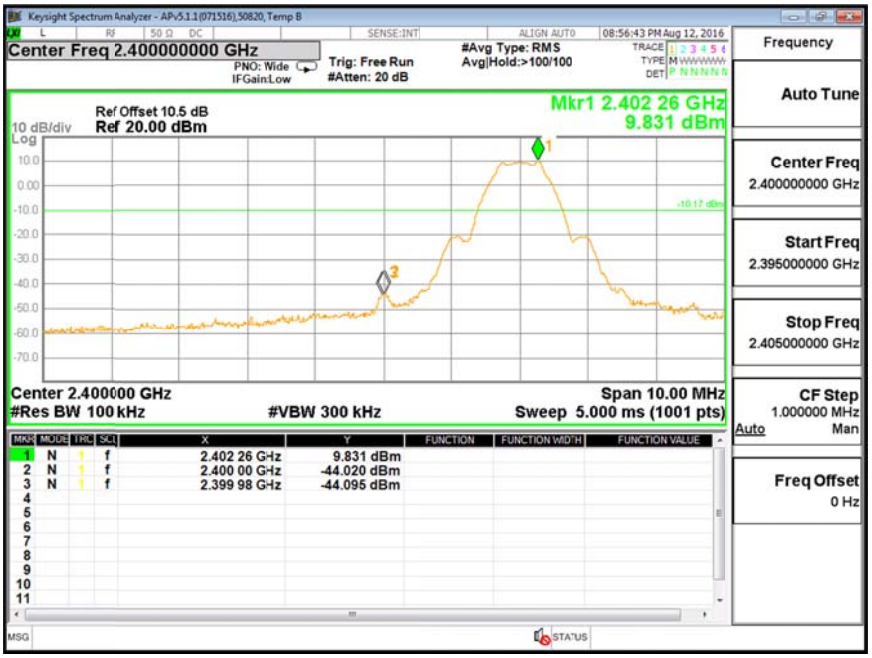
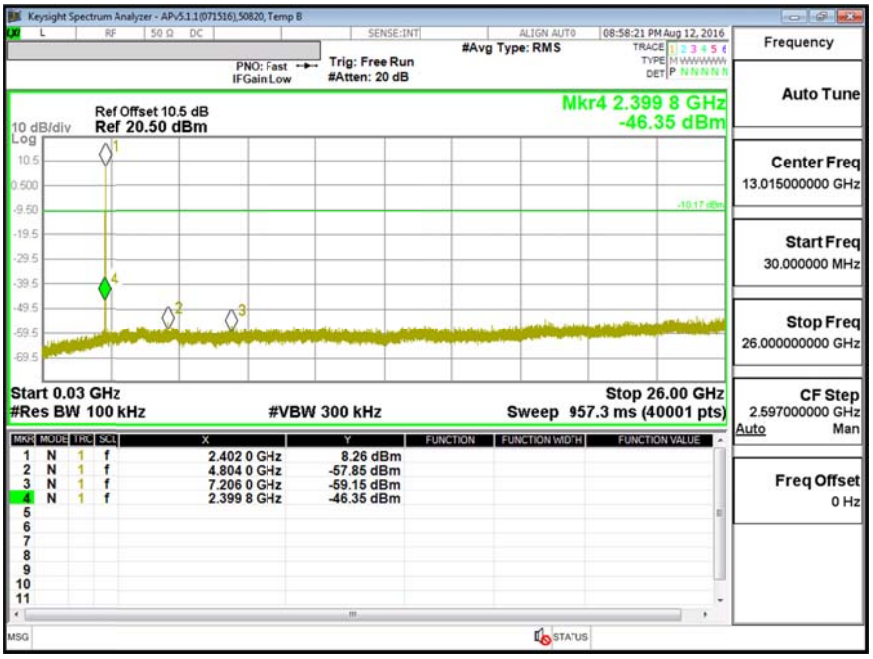
SPURIOUS EMISSIONS, LOW CHANNEL

LOW CH BANDEDGE



LOW CH SPURIOUS



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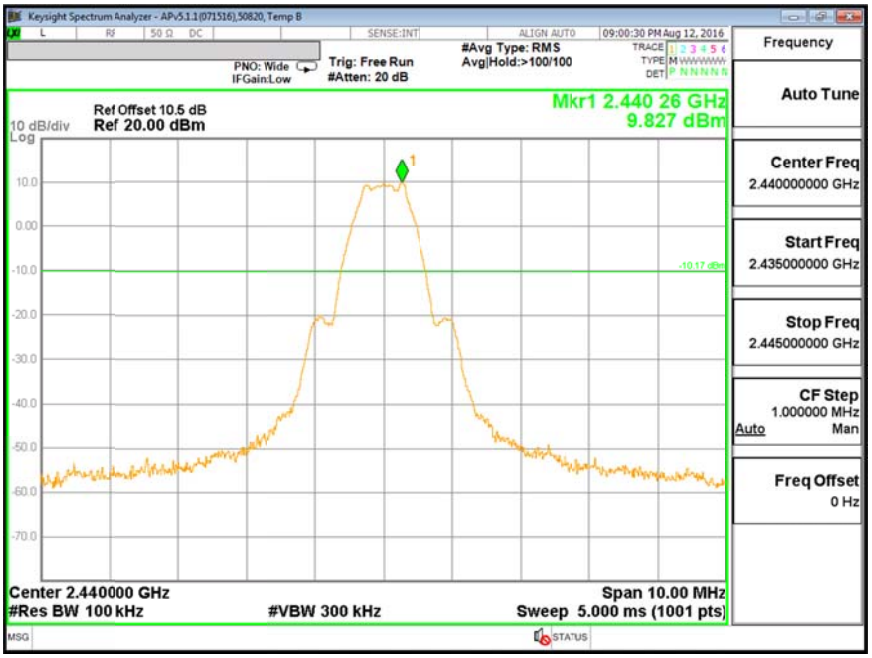
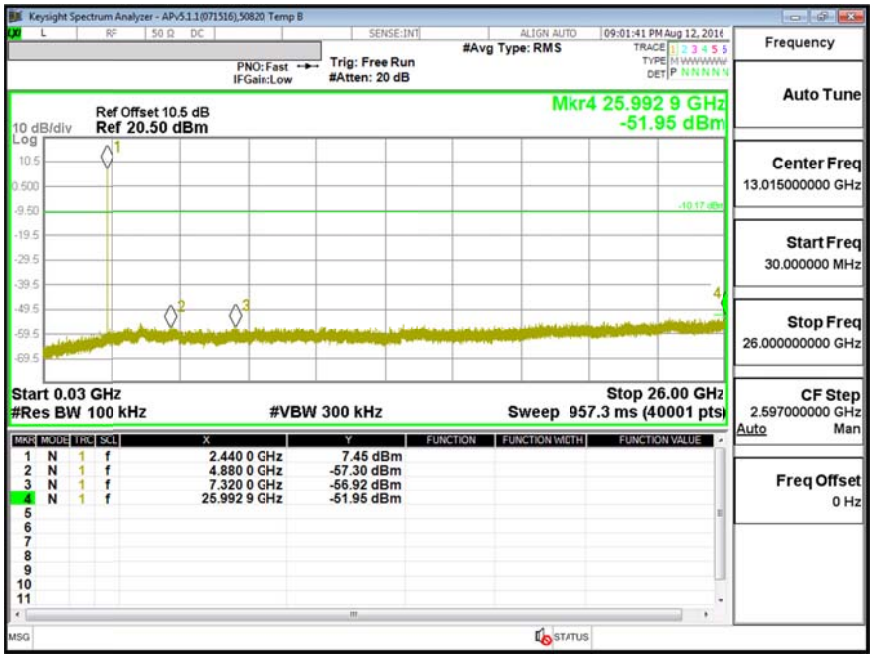
SPURIOUS EMISSIONS, MID CHANNEL

MID CH REFERENCE



MID CH SPURIOUS



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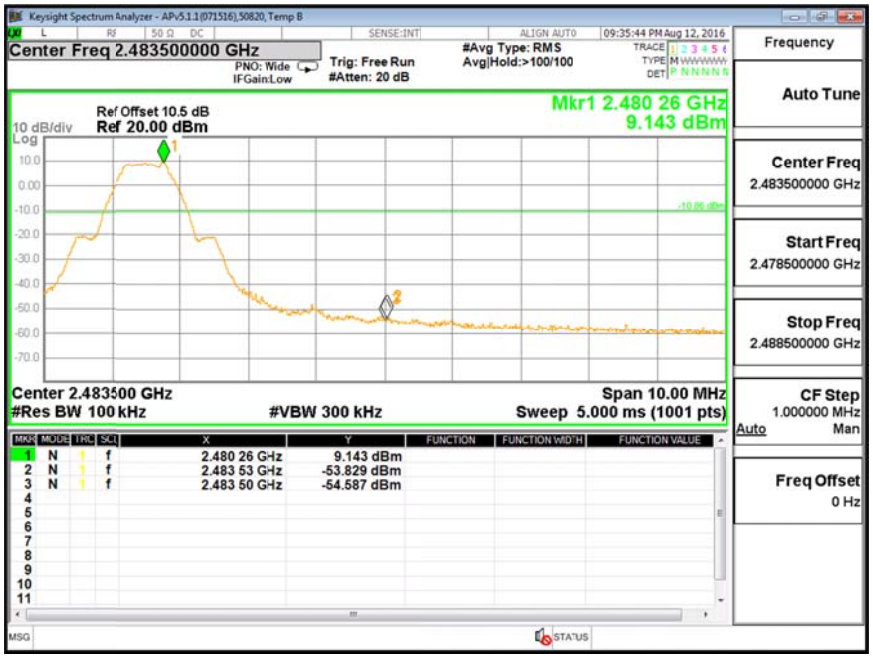
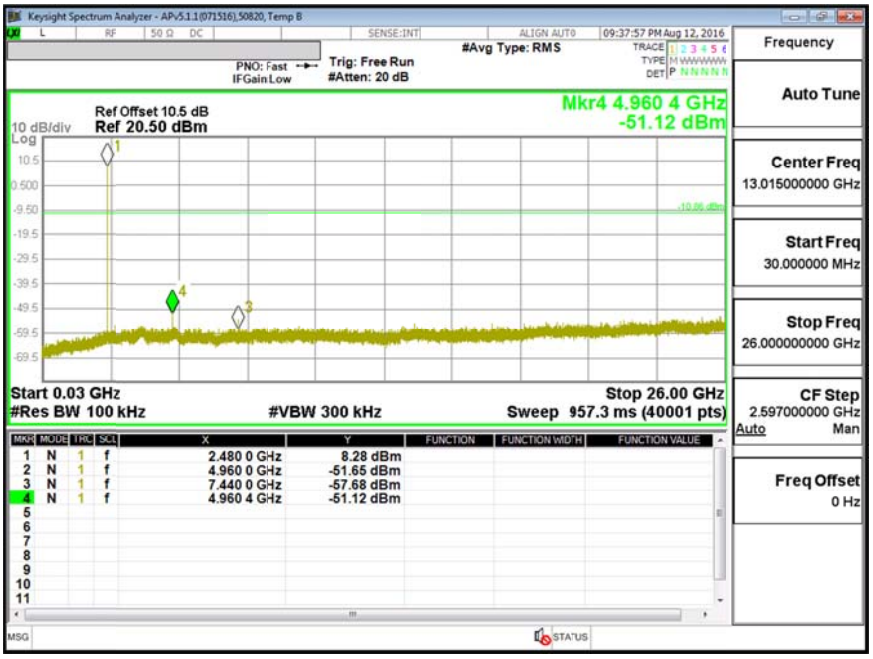
SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CH BANDEDGE



HIGH CH SPURIOUS



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8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-GEN, Section 8.9 and 8.10.

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

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

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

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

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

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

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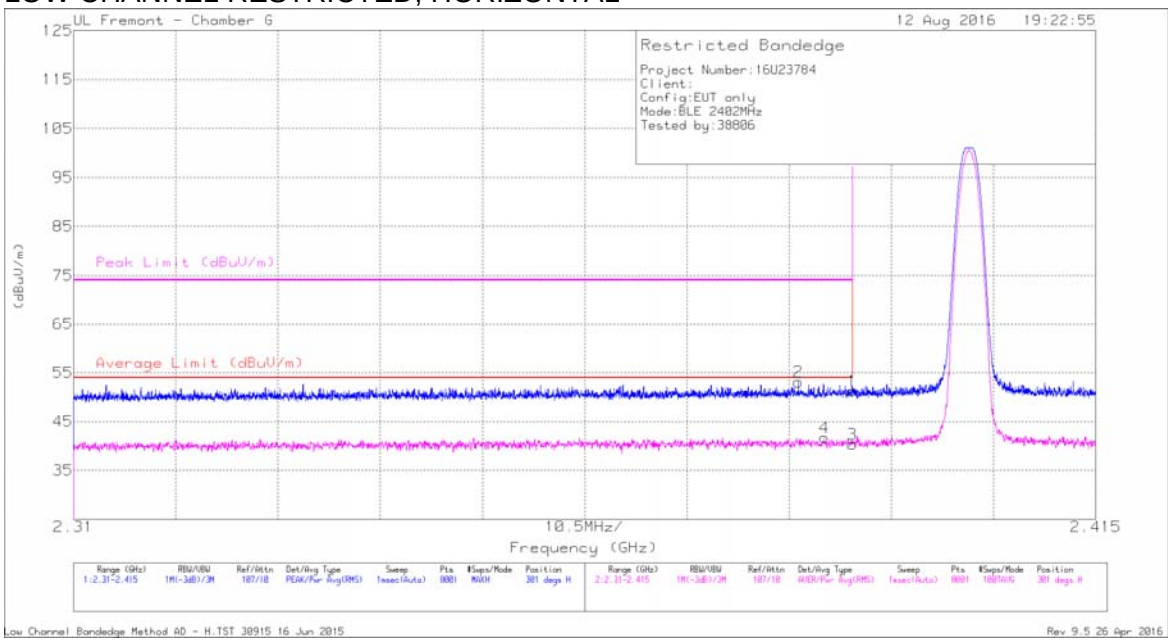
8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. RESTRICTED BANDEDGE

LOW CHANNEL RESTRICTED, HORIZONTAL



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl /Fltr/Pad (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	42.87	Pk	32.1	-23.7	51.27	-	-	74	-22.73	301	226	H
2	* 2.384	44.69	Pk	32.1	-23.7	53.09	-	-	74	-20.91	301	226	H
3	* 2.39	32.01	RMS	32.1	-23.7	40.41	54	-13.59	-	-	301	226	H
4	* 2.387	33.29	RMS	32.1	-23.7	41.69	54	-12.31	-	-	301	226	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

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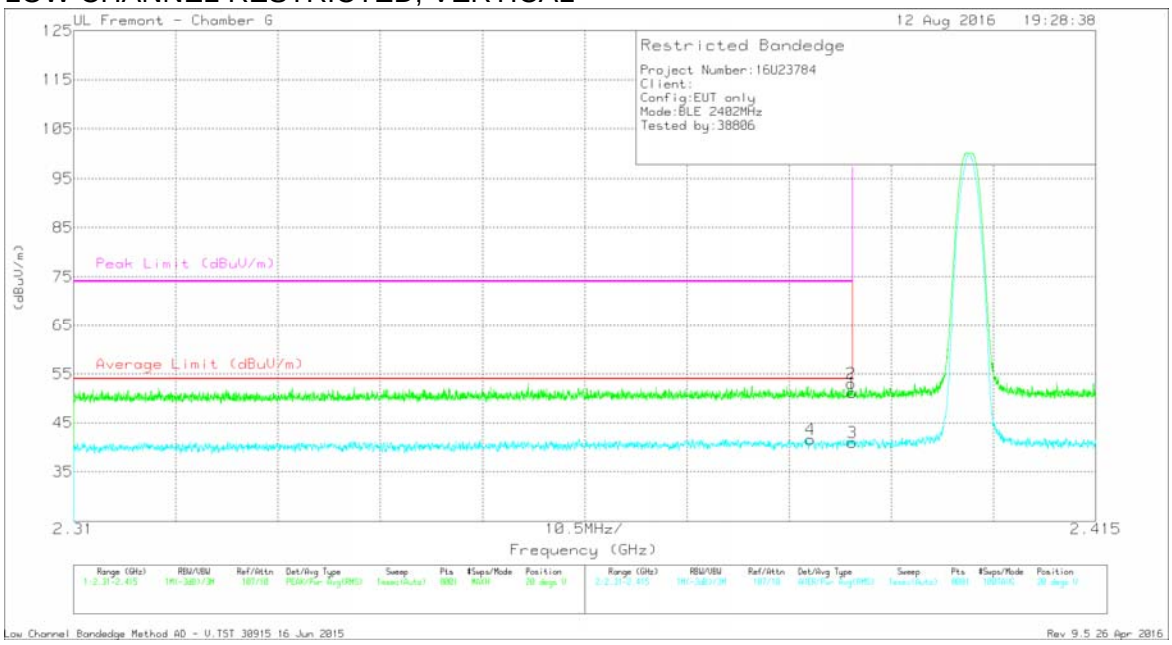
LOW CHANNEL RESTRICTED, VERTICAL



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl /Fltr/Pad (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	42.78	Pk	32.1	-23.7	51.18	-	-	74	-22.82	20	372	V
2	* 2.39	44.58	Pk	32.1	-23.7	52.98	-	-	74	-21.02	20	372	V
3	* 2.39	32.53	RMS	32.1	-23.7	40.93	54	-13.07	-	-	20	372	V
4	* 2.386	33.26	RMS	32.1	-23.7	41.66	54	-12.34	-	-	20	372	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

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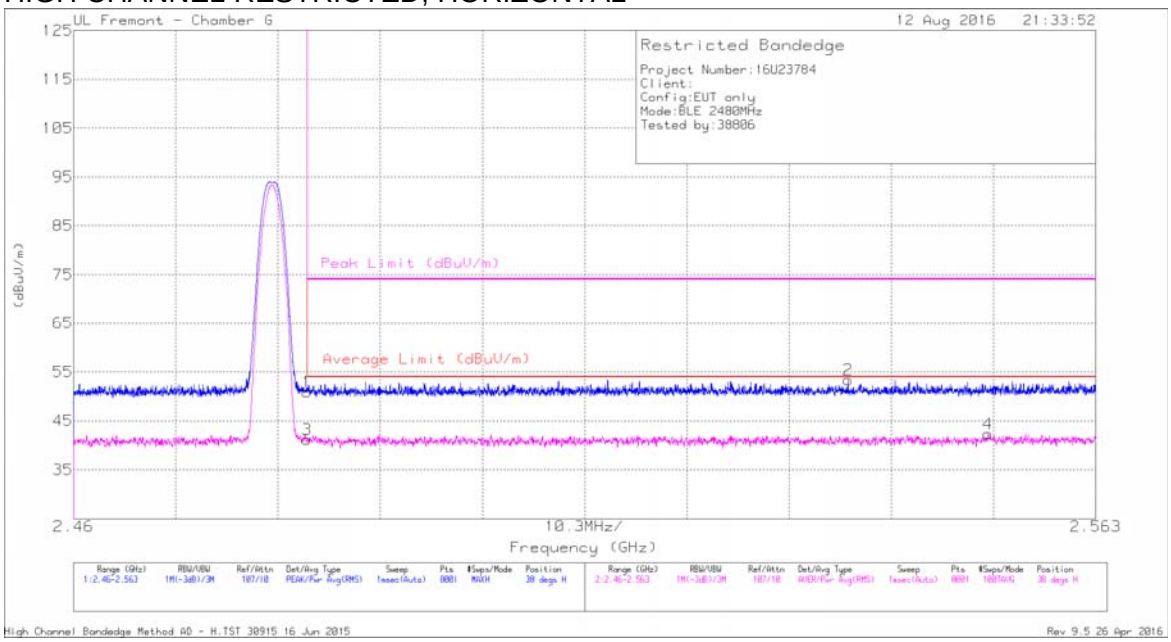
HIGH CHANNEL RESTRICTED, HORIZONTAL



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Fltr/Pad (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	42.28	Pk	32.3	-23.7	50.88	-	-	74	-23.12	38	129	H
2	2.538	44.59	Pk	32.5	-23.7	53.39	-	-	74	-20.61	38	129	H
3	* 2.484	32.61	RMS	32.3	-23.7	41.21	54	-12.79	-	-	38	129	H
4	2.552	33.48	RMS	32.6	-23.7	42.38	54	-11.62	-	-	38	129	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

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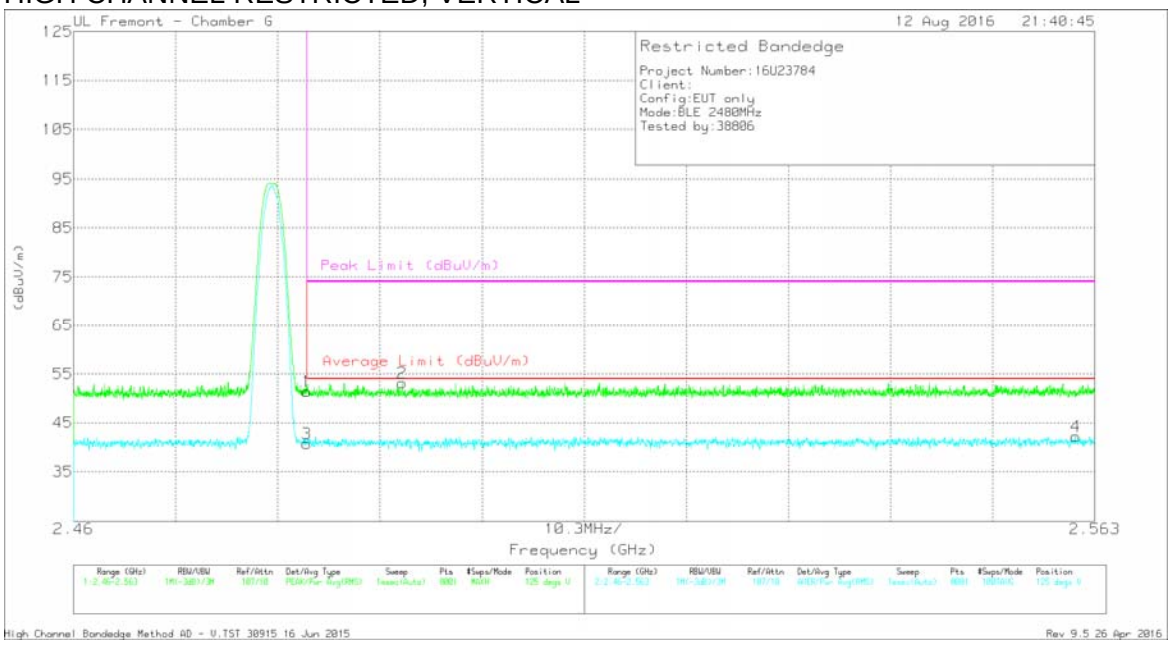
HIGH CHANNEL RESTRICTED, VERTICAL



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl /Fltr/Pad (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	42.76	Pk	32.3	-23.7	51.36	-	-	74	-22.64	125	388	V
2	* 2.493	44.47	Pk	32.4	-23.7	53.17	-	-	74	-20.83	125	388	V
3	* 2.484	32.17	RMS	32.3	-23.7	40.77	54	-13.23	-	-	125	388	V
4	2.561	33.32	RMS	32.6	-23.7	42.22	54	-11.78	-	-	125	388	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

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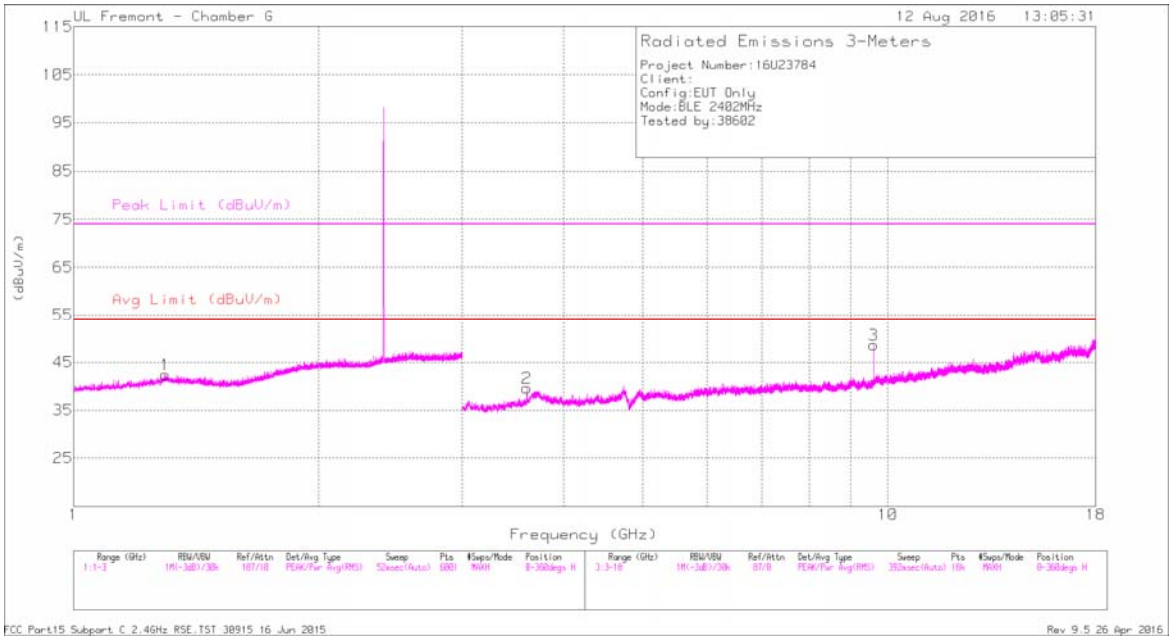
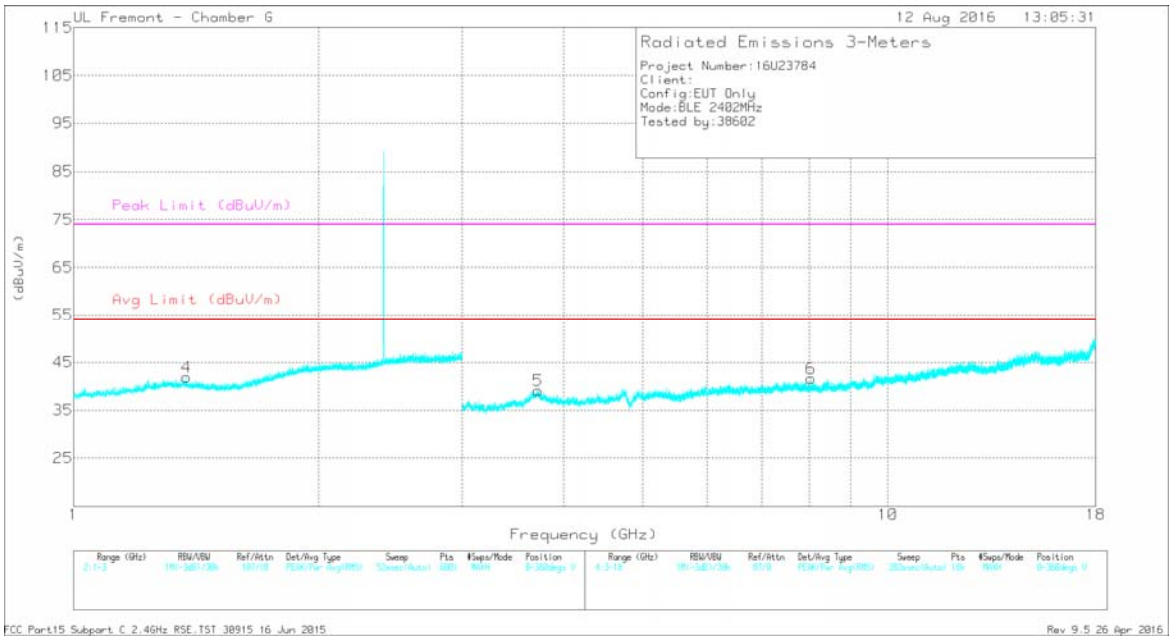
8.2.2. HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



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DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.297	44.54	PK2	29.2	-25	48.74	-	-	74	-25.26	29	192	H
	* 1.296	33.53	MAv1	29.2	-25	37.73	54	-16.27	74	-36.27	29	192	H
2	* 3.603	43.97	PK2	34	-32.3	45.67	-	-	74	-28.33	204	113	H
	* 3.603	35.21	MAv1	34	-32.3	36.91	54	-17.09	74	-37.09	204	113	H
3	9.607	44.31	PK2	36.7	-27.6	53.41	-	-	-	-	78	111	H
4	* 1.378	44.72	PK2	28.9	-24.9	48.72	-	-	74	-25.28	182	194	V
	* 1.374	33.32	MAv1	28.9	-24.9	37.32	54	-16.68	74	-36.68	182	194	V
5	* 3.715	42.09	PK2	34.2	-30.7	45.59	-	-	74	-28.41	247	392	V
	* 3.717	31	MAv1	34.2	-30.7	34.5	54	-19.5	74	-39.5	247	392	V
6	* 8.049	40.61	PK2	35.8	-29.5	46.91	-	-	74	-27.09	128	106	V
	* 8.049	29.78	MAv1	35.8	-29.5	36.08	54	-17.92	74	-37.92	128	106	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

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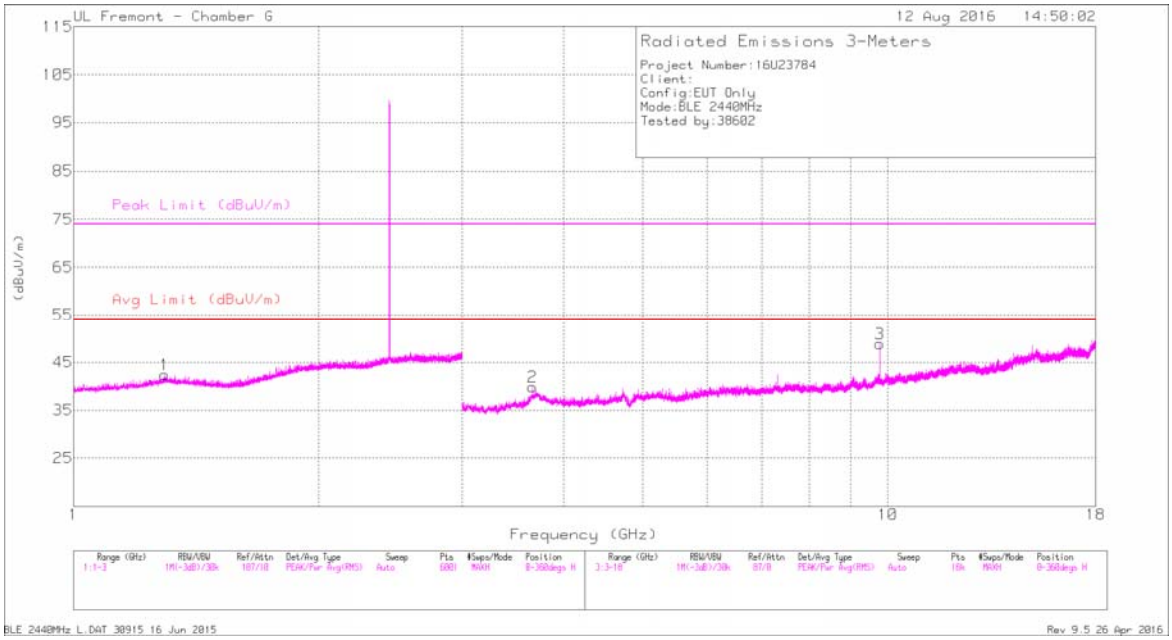
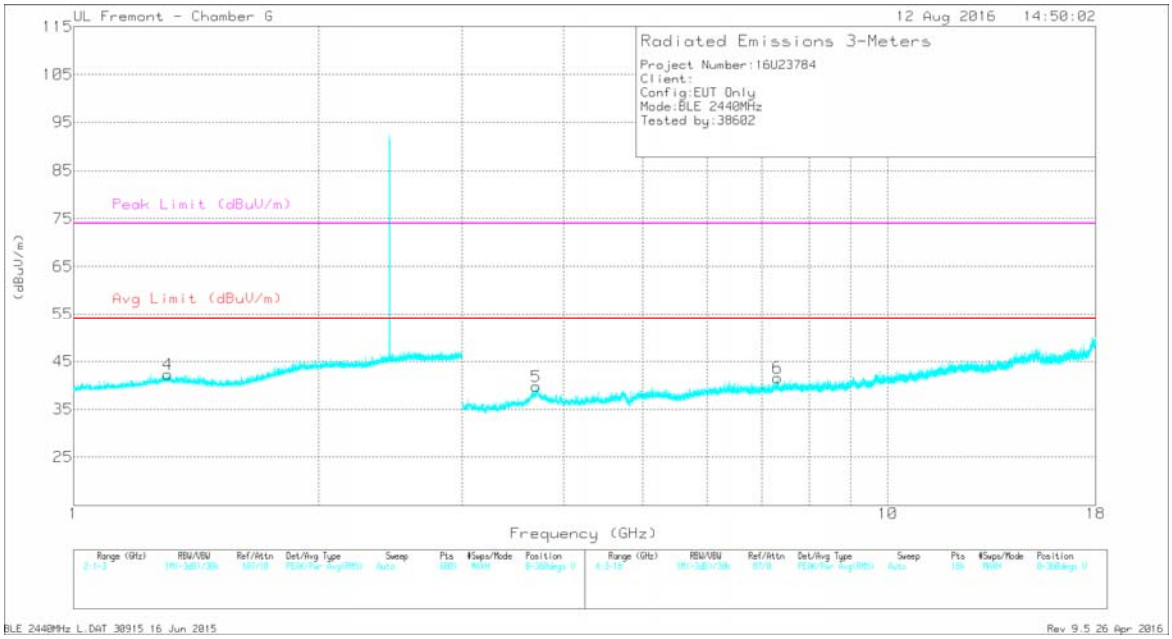
MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



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DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (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	* 1.293	44.74	PK2	29.2	-25	48.94	-	-	74	-25.06	45	187	H
	* 1.296	33.97	MAv1	29.2	-25	38.17	54	-15.83	-	-	45	187	H
2	* 3.663	43.08	PK2	34.2	-31.1	46.18	-	-	74	-27.82	200	118	H
	* 3.663	33.38	MAv1	34.2	-31.1	36.48	54	-17.52	-	-	200	118	H
3	9.767	29.3	MAv1	36.9	-27.6	38.6	-	-	-	-	72	106	H
	9.768	39.73	PK2	36.9	-27.6	49.03	-	-	-	-	72	106	H
4	* 1.304	44.23	PK2	29.2	-25	48.43	-	-	74	-25.57	176	191	V
	* 1.305	33.86	MAv1	29.2	-25	38.06	54	-15.94	-	-	176	191	V
5	* 3.7	42.48	PK2	34.3	-30.7	46.08	-	-	74	-27.92	245	388	V
	* 3.7	31.66	MAv1	34.3	-30.7	35.26	54	-18.74	-	-	245	388	V
6	* 7.325	43.34	PK2	35.8	-29.9	49.24	-	-	74	-24.76	131	114	V
	* 7.327	33.63	MAv1	35.8	-29.9	39.53	54	-14.47	-	-	131	114	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

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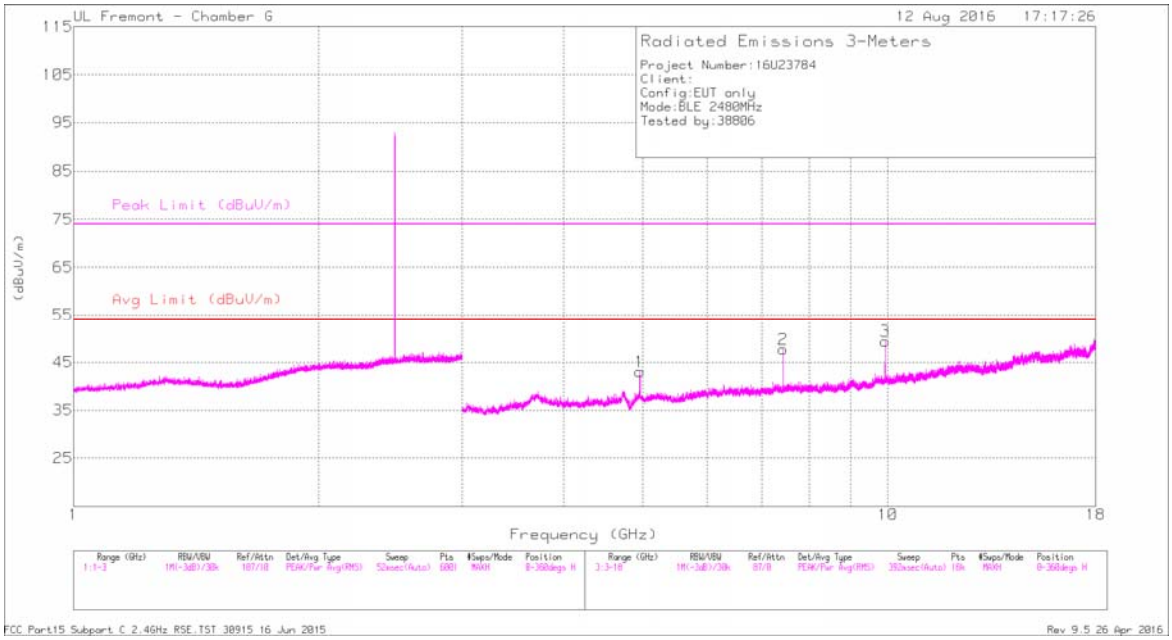
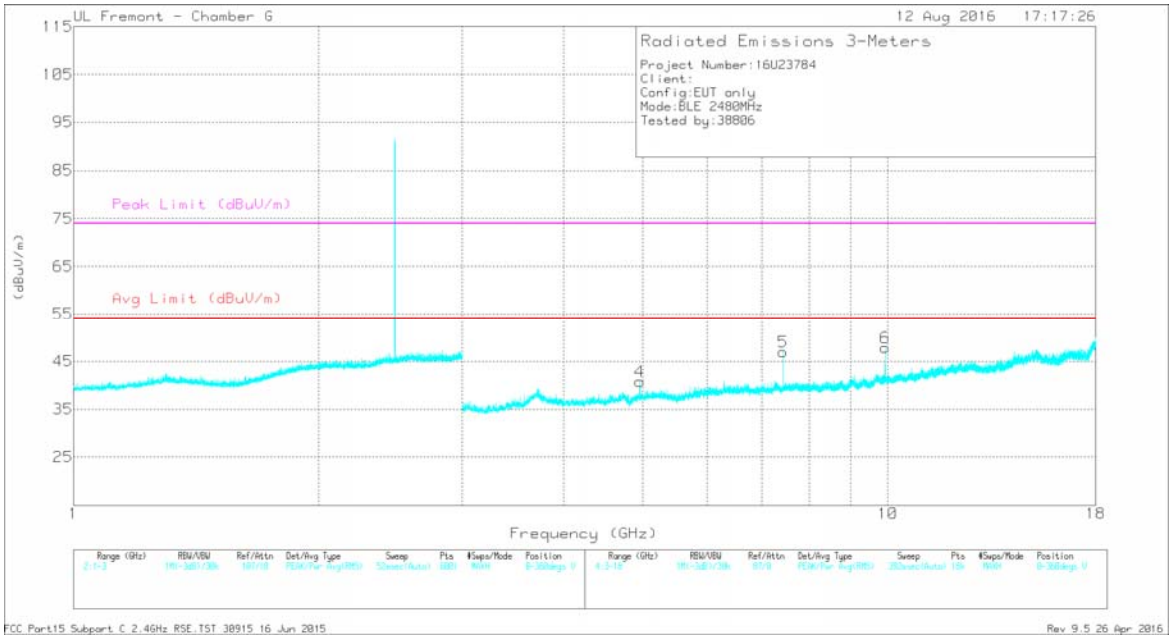
HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



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DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (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	* 4.96	46.89	PK2	34.6	-31.8	49.69	-	-	74	-24.31	229	155	H
	* 4.96	37.91	MAv1	34.6	-31.8	40.71	54	-13.29	-	-	229	155	H
2	* 7.439	47.49	PK2	35.9	-30.2	53.19	-	-	74	-20.81	29	288	H
	* 7.439	39.71	MAv1	35.9	-30.2	45.41	54	-8.59	-	-	29	288	H
3	9.919	45.41	PK2	37.1	-27.1	55.41	-	-	-	-	119	105	H
	9.919	37.94	MAv1	37.1	-27.1	47.94	-	-	-	-	119	105	H
4	* 4.961	46.81	PK2	34.6	-31.8	49.61	-	-	74	-24.39	274	284	V
	* 4.96	37.45	MAv1	34.6	-31.8	40.25	54	-13.75	-	-	274	284	V
5	* 7.441	47.99	PK2	35.9	-30.2	53.69	-	-	74	-20.31	216	119	V
	* 7.439	39.42	MAv1	35.9	-30.2	45.12	54	-8.88	-	-	216	119	V
6	9.919	45.1	PK2	37.1	-27.1	55.1	-	-	-	-	288	255	V
	9.919	37.04	MAv1	37.1	-27.1	47.04	-	-	-	-	288	255	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

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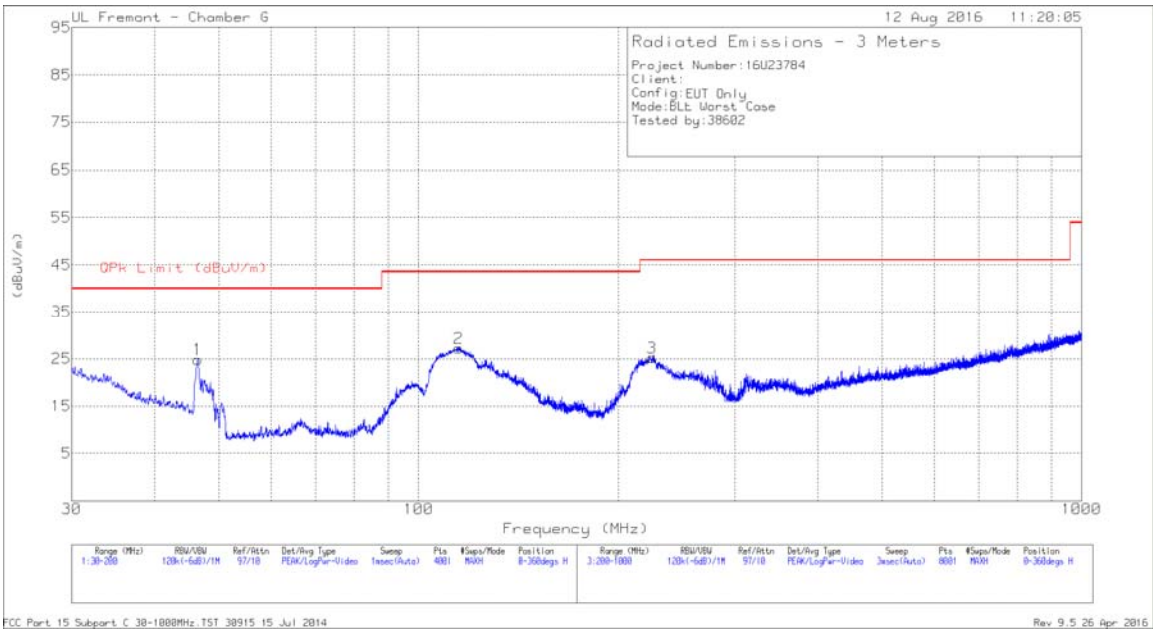
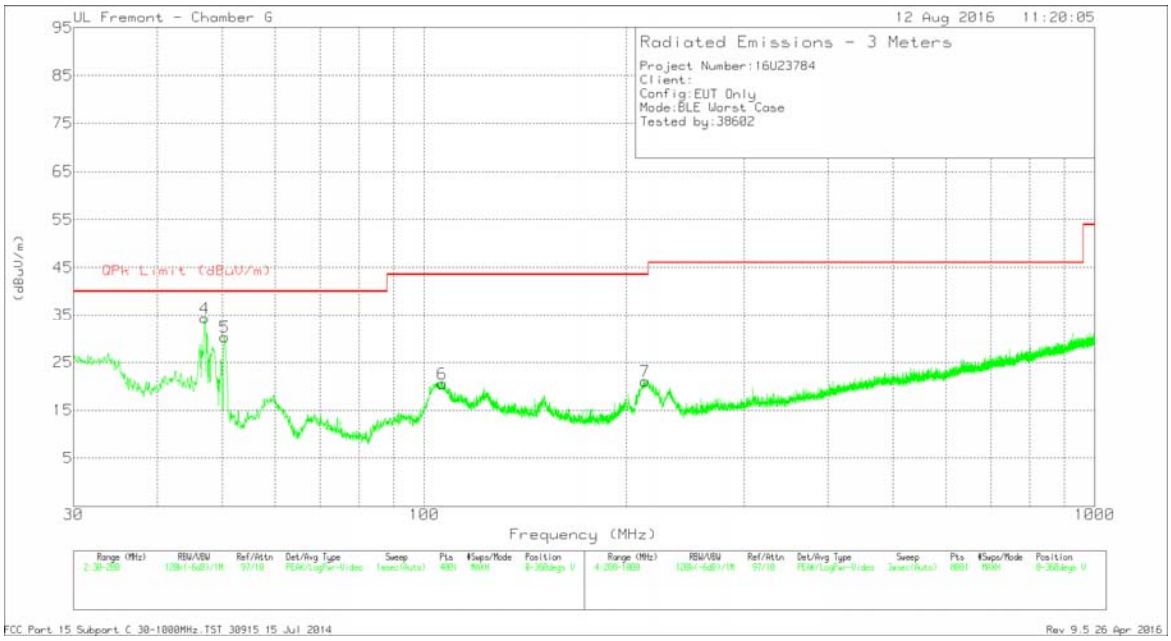
8.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



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DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T900 (dB/m)	Amp Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	46.49	42.4	Pk	13.5	-31	24.9	40	-15.1	0-360	300	H
2	* 114.915	40.42	Pk	17.2	-30.4	27.22	43.52	-16.3	0-360	200	H
3	225	39.93	Pk	14.7	-29.4	25.23	46.02	-20.79	0-360	100	H
4	47.085	52.39	Pk	13	-31	34.39	40	-5.61	0-360	100	V
5	50.3788	49.98	Pk	11.4	-31.1	30.28	40	-9.72	0-360	100	V
6	106.415	35.09	Pk	15.8	-30.4	20.49	43.52	-23.03	0-360	100	V
7	213.5	36.15	Pk	14.4	-29.5	21.05	43.52	-22.47	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector

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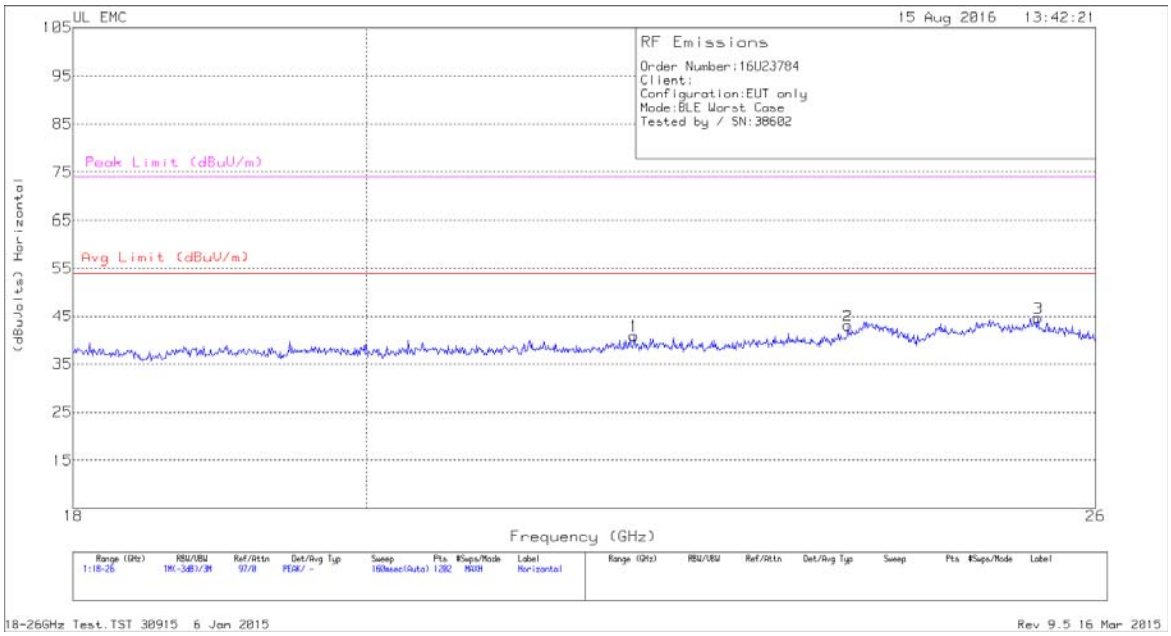
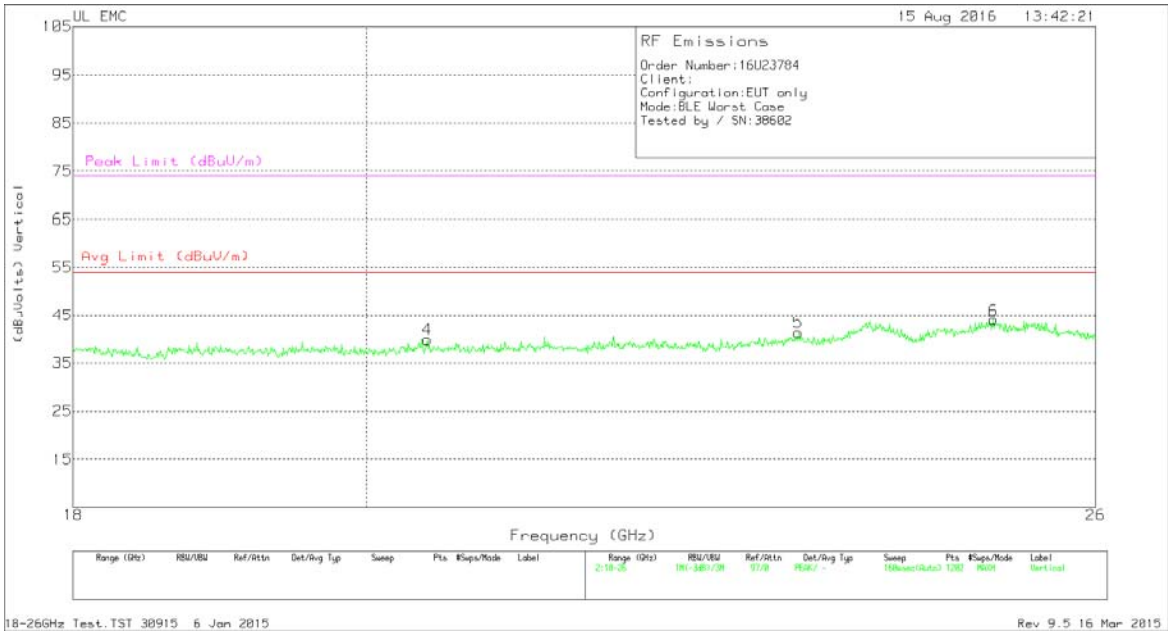
8.4. WORST-CASE 18 to 26 GHz

SPURIOUS EMISSIONS 18 to 26 GHz (WORST-CASE CONFIGURATION)

HORIZONTAL PLOT



VERTICAL PLOT



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DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T449 (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	22.023	41.93	Pk	33.5	-25.1	-9.5	40.8	54	-13.16	74	-33.1
2	23.782	42.9	Pk	33.8	-24.2	-9.5	43	54	-11	74	-31
3	25.467	44.37	Pk	34.4	-24.6	-9.5	44.6	54	-9.3	74	-29.3
4	20.445	41.53	Pk	32.9	-25.1	-9.5	39.8	54	-14.1	74	-34.1
5	23.362	41.93	Pk	33.6	-24.7	-9.5	41.3	54	-12.6	74	-32.6
6	25.061	44.2	Pk	34.3	-25	-9.5	44	54	-10	74	-30

Pk - Peak detector

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9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	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 C63.10.

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

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

RESULTS

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Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	.17025	40.77	Qp	0	0	10.1	50.87	64.95	-14.08	-	-
2	.17025	24.03	Ca	0	0	10.1	34.13	-	-	54.95	-20.82
3	.25575	37.72	Qp	0	0	10.1	47.82	61.57	-13.75	-	-
4	.258	20.57	Ca	0	0	10.1	30.67	-	-	51.5	-20.83
5	.339	34.37	Qp	0	0	10.1	44.47	59.23	-14.76	-	-
6	.3435	17.43	Ca	0	0	10.1	27.53	-	-	49.12	-21.59
7	.78	25.08	Qp	0	0	10.1	35.18	56	-20.82	-	-
8	.77775	15.89	Ca	0	0	10.1	25.99	-	-	46	-20.01
9	3.3135	15.65	Qp	0	.1	10.1	25.85	56	-30.15	-	-
10	3.3135	9.76	Ca	0	.1	10.1	19.96	-	-	46	-26.04
11	18.285	14.38	Qp	0	.2	10.3	24.88	60	-35.12	-	-
12	18.285	5.16	Ca	0	.2	10.3	15.66	-	-	50	-34.34

Qp - Quasi-Peak detector

Ca - CISPR average detection

Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	.17025	41.46	Qp	0	0	10.1	51.56	64.95	-13.39	-	-
14	.17025	25.2	Ca	0	0	10.1	35.3	-	-	54.95	-19.65
15	.25575	37.85	Qp	0	0	10.1	47.95	61.57	-13.62	-	-
16	.25575	22.19	Ca	0	0	10.1	32.29	-	-	51.57	-19.28
17	.339	33.47	Qp	0	0	10.1	43.57	59.23	-15.66	-	-
18	.3435	18.74	Ca	0	0	10.1	28.84	-	-	49.12	-20.28
19	.77775	26.09	Qp	0	0	10.1	36.19	56	-19.81	-	-
20	.77775	19.81	Ca	0	0	10.1	29.91	-	-	46	-16.09
21	3.3135	17.37	Qp	0	.1	10.1	27.57	56	-28.43	-	-
22	3.3135	11.23	Ca	0	.1	10.1	21.43	-	-	46	-24.57
23	18.15225	16.52	Qp	0	.2	10.3	27.02	60	-32.98	-	-
24	18.168	10.67	Ca	0	.2	10.3	21.17	-	-	50	-28.83

Qp - Quasi-Peak detector

Ca - CISPR average detection

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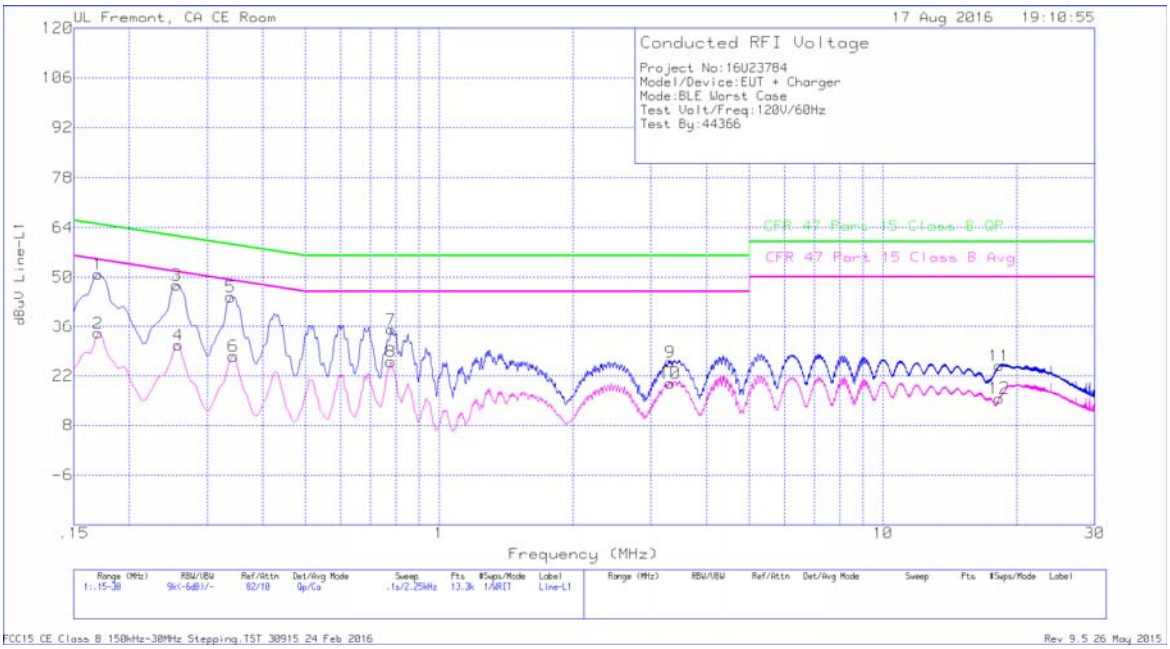
LINE 1 RESULTS



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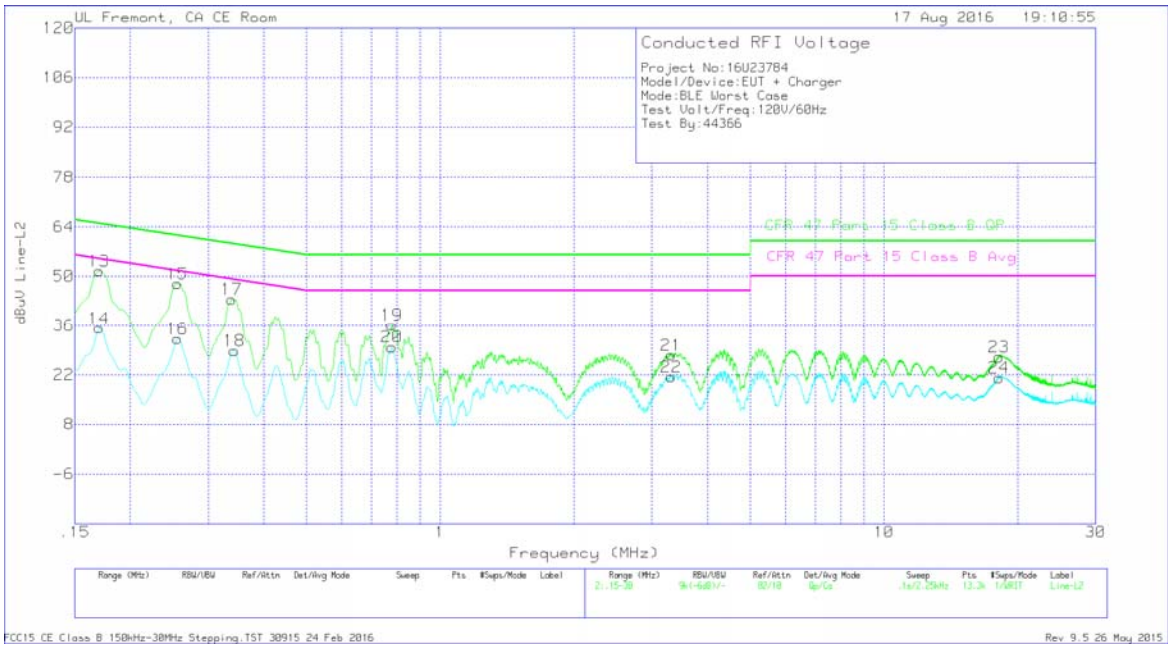
LINE 2 RESULTS



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