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

BLUETOOTH LOW ENERGY CERTIFICATION TEST REPORT

FOR

APPLE TV

MODEL NUMBER: A1625

FCC ID: BCGA1625
IC: 579C-A1625

REPORT NUMBER: 15U20087-E2, REVISION C

ISSUE DATE: JULY 25, 2015

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
--	04/20/2015	Initial Issue	M. Mekuria
A	06/01/2015	Revised report to RSS-247 standard, Section 2 and Section 7.1	T. Chu
B	06/17/2015	Updated Section 7.1 KDB version	T. Chu
C	07/25/2015	Update report per ANSI 63.10-2013 standard	E. YU

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: APPLE TV

MODEL: A1625

SERIAL NUMBER: C07NW001GFM5

DATE TESTED: FEBRUARY 28, 2015 - APRIL 17, 2015

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.

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UL Verification Services Inc. By:

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SENIOR ENGINEER
UL VERIFICATION SERVICES INC.

Tested By:

TINA CHU
EMC 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, 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 Benicia Street, Fremont, California, USA.

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, 0.15 to 30 MHz	± 3.52 dB
Radiated Disturbance, 30 to 1000 MHz	± 4.94 dB
Radiated Disturbance, 1 to 6 GHz	± 3.86 dB
Radiated Disturbance, 6 to 18 GHz	± 4.23 dB
Radiated Disturbance, 18 to 26 GHz	± 5.30 dB
Radiated Disturbance, 26 to 40 GHz	± 5.23 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 Apple TV device is a digital media receiver designed to play internet content onto a TV through an HDMI port. It incorporates Wi-Fi and Bluetooth radios.

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	10.26	10.62

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Band (GHz)	Antenna Gain
2.4	0.25

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Broadcom BlueTool version 1.8.4.

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5.5. 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 Y-landscape orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in Y-landscape orientation.

Worst-case data rates as provided by the client were:
Based on the baseline scan, the worst-case data rates were:

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	Lenovo	92P1160	11S92P1160Z1ZBGH798B12	NA
Laptop	Lenovo	7659	L3-AL664 08/03	NA
Dongle	N/A	N/A	HDG1409226823	NA

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	3	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
1	AC	1	AC	Un-shielded	3	N/A

I/O CABLES (AC POWER CONDUCTED TEST AND BELOW 1 GHZ)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Un-shielded	3	N/A

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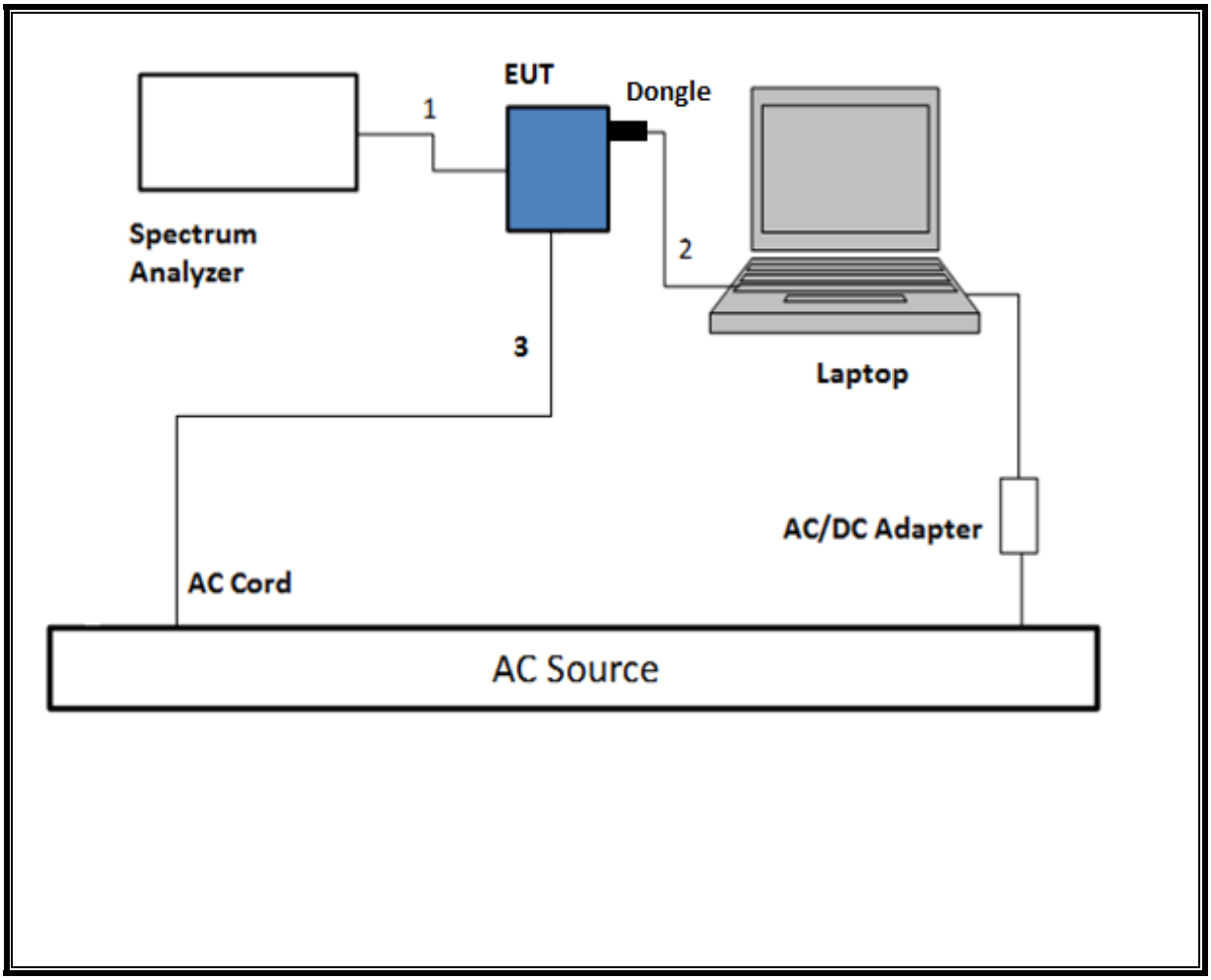
TEST SETUP

The EUT was powered by AC cord. Test software exercised the radio card.

SETUP DIAGRAM



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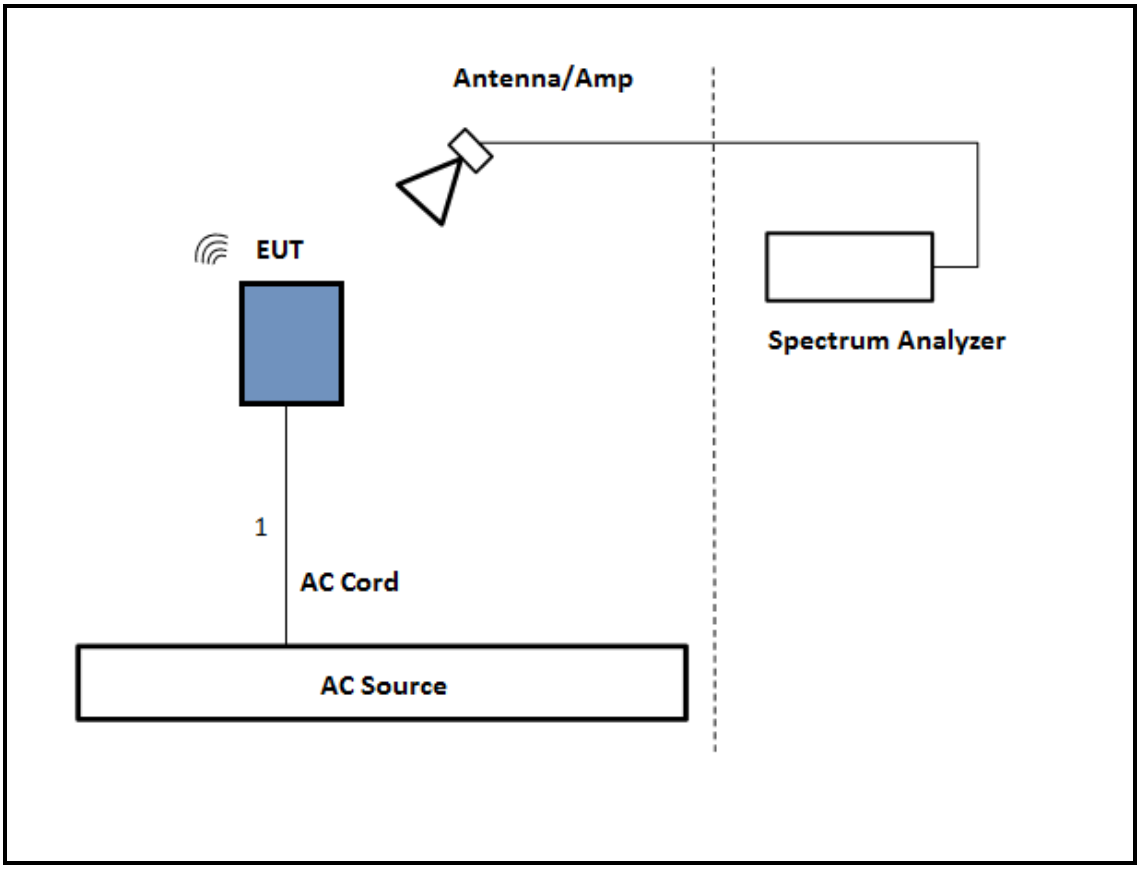
TEST SETUP- RADIATED-ABOVE 1 GHZ

The EUT was powered by AC cord. Test software exercised the EUT.

SETUP DIAGRAM



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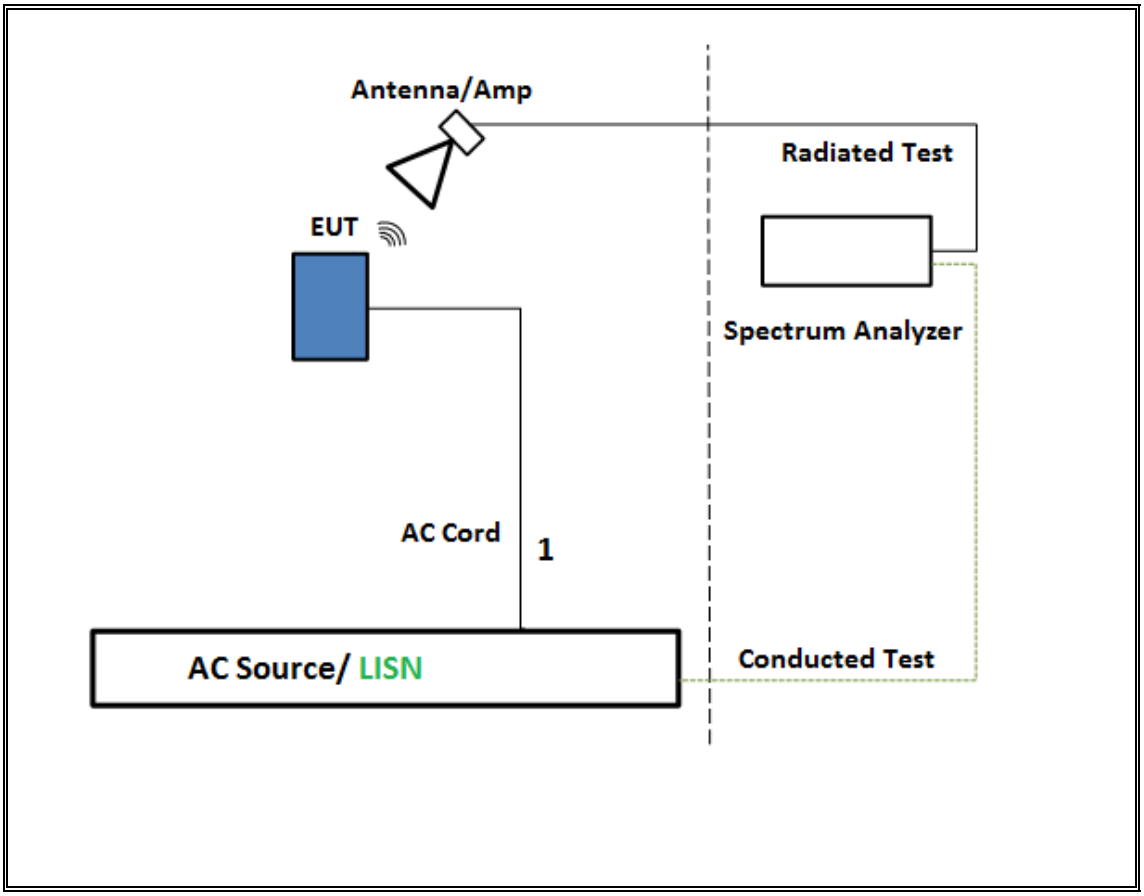
TEST SETUP- BELOW 1GHZ & AC LINE CONDUCTED TESTS

The EUT was powered by AC cord. 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**	**Asset**	**Cal Due**
Antenna, Horn 1-18GHz	ETS Lindgren	3117	00143449	2/10/2016
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	A022813-1	1/14/2016
Amplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S-42	1782158	1/26/2016
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	323561	5/28/2015
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	US51350187	5/2/2015
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	185623	6/7/2015
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	MY51380911	2/20/2016
Power Meter, P-series single channel	Agilent	N1911A	GB45100212	10/9/2015
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Agilent	N1921A	MY53260010	7/12/2015
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826	1049	12/17/2015
Spectrum Analyzer, 40 GHz	Agilent	8564E	3943A01643	8/6/2015
Amplifier, 1 to 26.5GHz, 23.5dB Gain minimum	Agilent	8449B	3008A01114	10/4/2015
AC Line Conducted				
EMI Test Receiver 9Khz-7GHz	Rohde & Schwarz	ESCI7	100935	9/16/2015
LISN for Conducted Emissions CISPR-16	FCC	50/250-25-2	114	1/16/2016
Power Cable, Line Conducted Emissions ANSI 63.4	U L	PG1	N/A	7/28/2015
UL SOFTWARE				
Radiated Software	UL	UL EMC	Ver 9.5, July 22, 2014	
Conducted Software	UL	UL EMC	Ver 2.2, March 31, 2015	
AC Line Conducted Software	UL	UL EMC	Ver 9.5, February 26, 2015	

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7. ANTENNA PORT TEST RESULTS

7.1. MEASUREMENT METHODS

MEASUREMENT METHODS

6 dB BW: KDB 558074 D01 v03r03, Section 8.1.

Output Power: KDB 558074 D01 v03r03, Section 9.1.2.

Power Spectral Density: KDB 558074 D01 v03r03, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r03, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r03, Section 12.1.

Band-edge: KDB 558074 D01 v03r03, 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	5.000	5.000	1.000	100.00%	0.00	0.010

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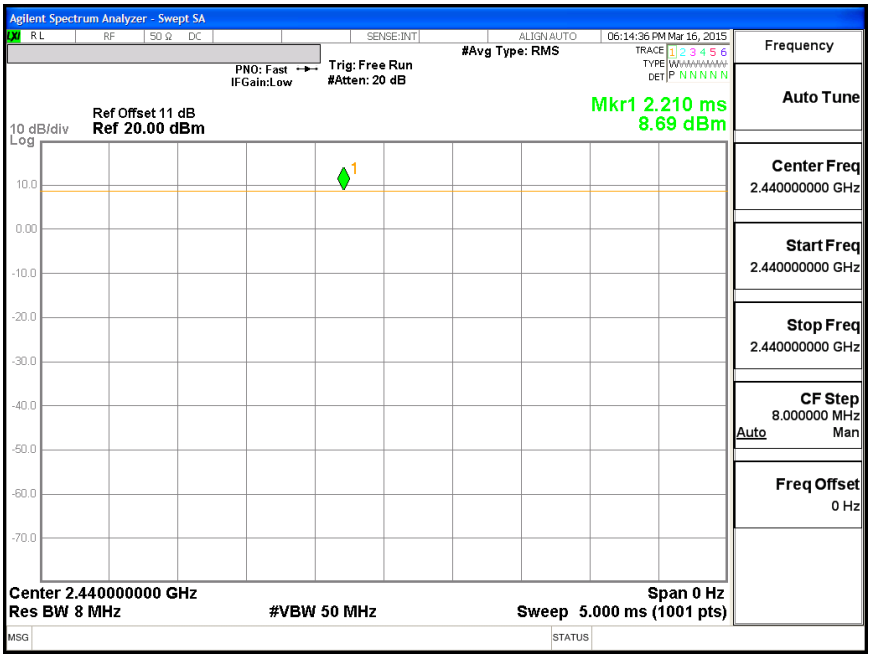
DUTY CYCLE PLOTS

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	0.723	0.5
Middle	2440	0.719	0.5
High	2480	0.714	0.5

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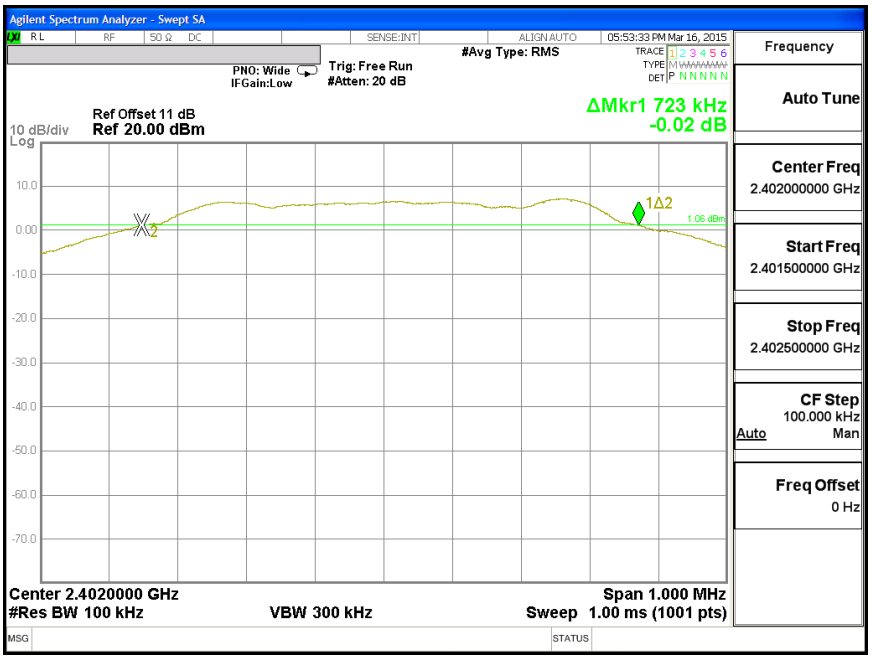
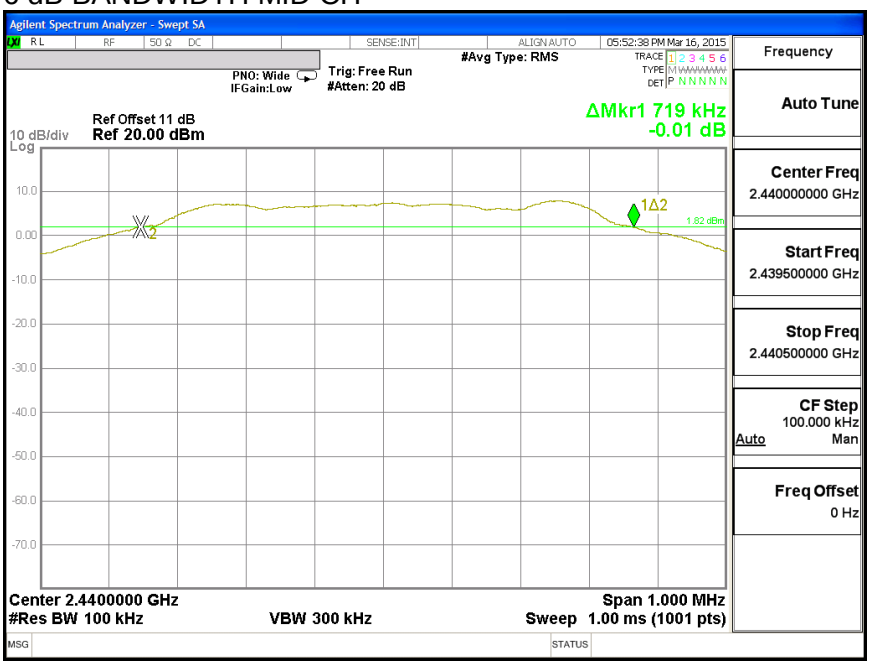
6 dB BANDWIDTH

6 dB BANDWIDTH LOW CH



6 dB BANDWIDTH MID CH



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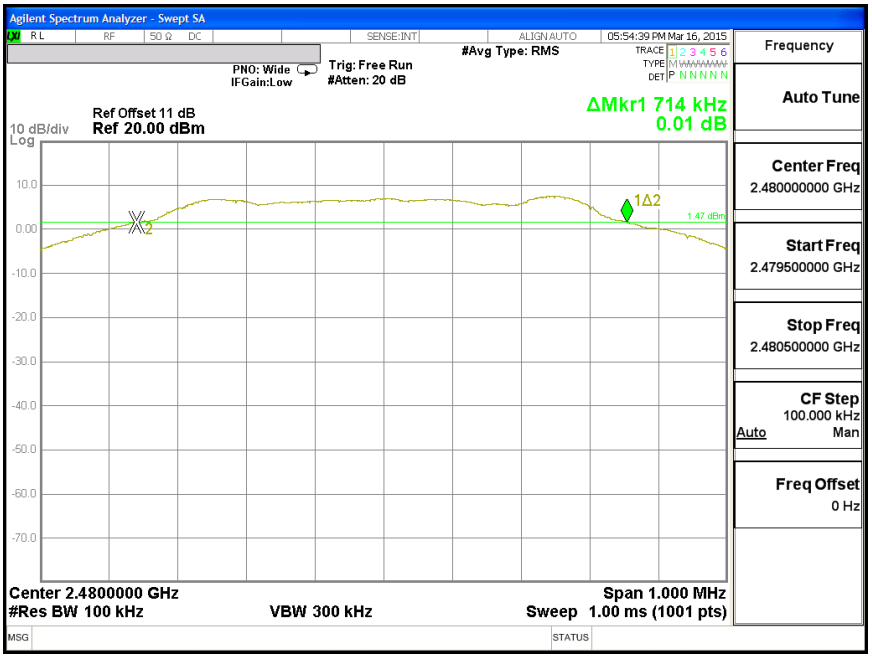
6 dB BANDWIDTH HIGH CH



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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 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	1.0571
Middle	2440	1.0388
High	2480	1.0848

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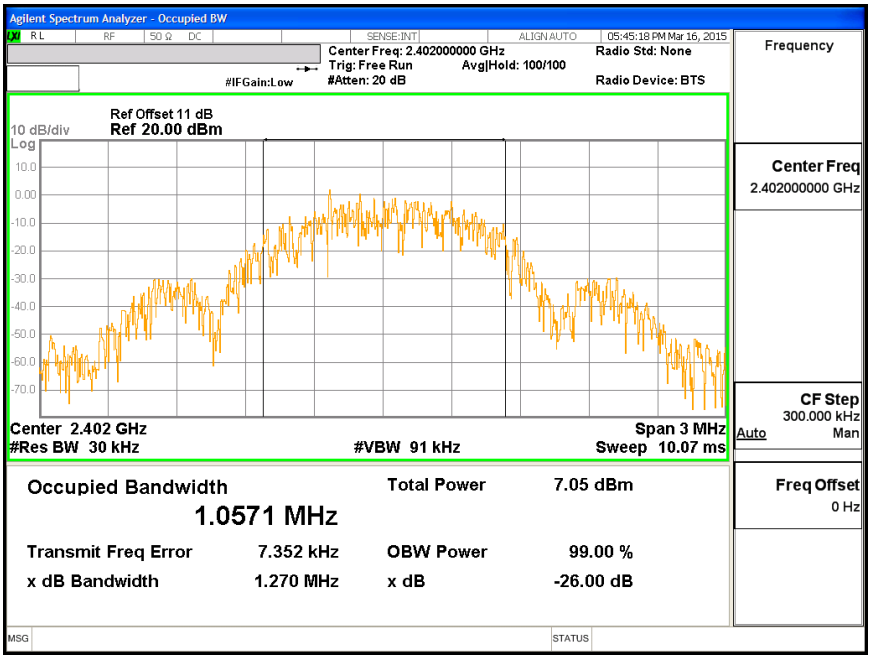
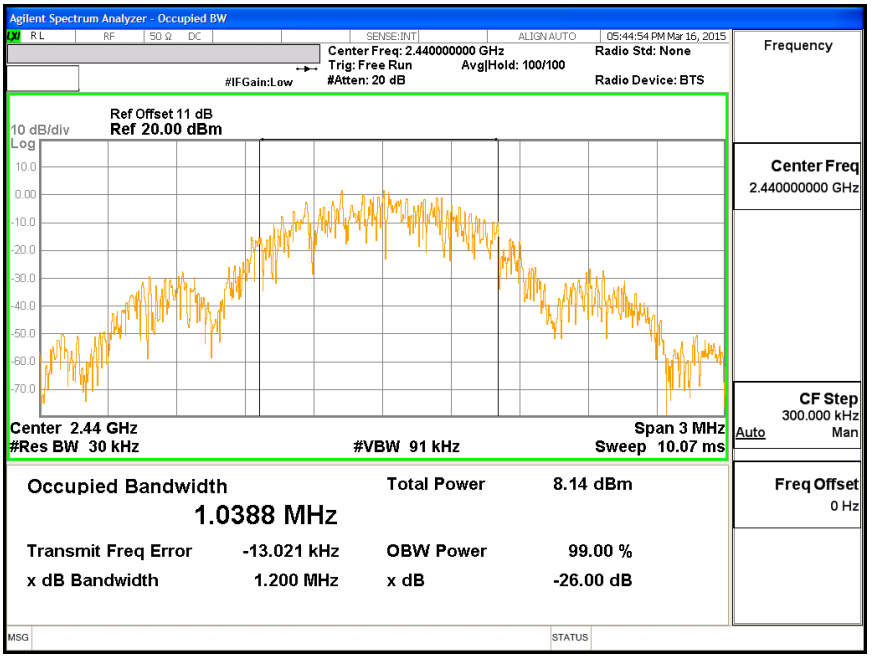
99% BANDWIDTH

99% BANDWIDTH LOW CH



99% BANDWIDTH MID CH



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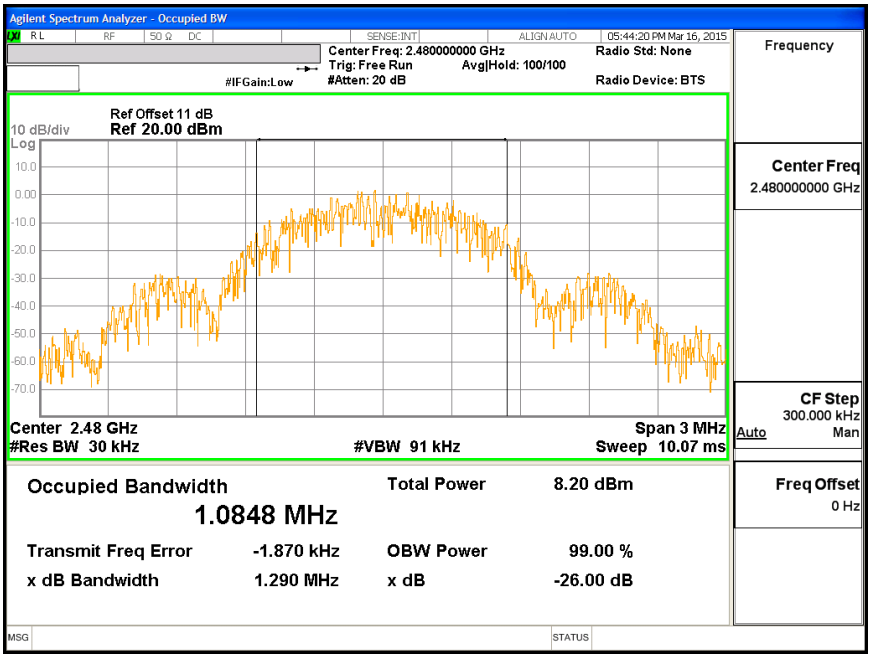
99% BANDWIDTH HIGH CH



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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.

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	7.73
Middle	2440	8.37
High	2480	8.14

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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

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	9.50	30	-20.500
Middle	2440	10.26	30	-19.740
High	2480	9.89	30	-20.110

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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

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-8.78	8	-16.78
Middle	2440	-8.02	8	-16.02
High	2480	-8.44	8	-16.44

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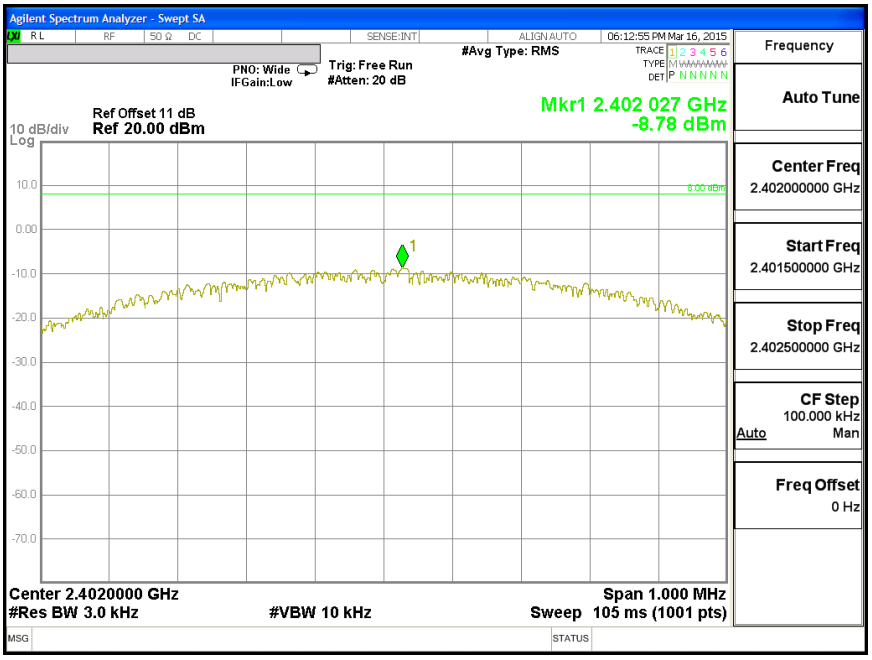
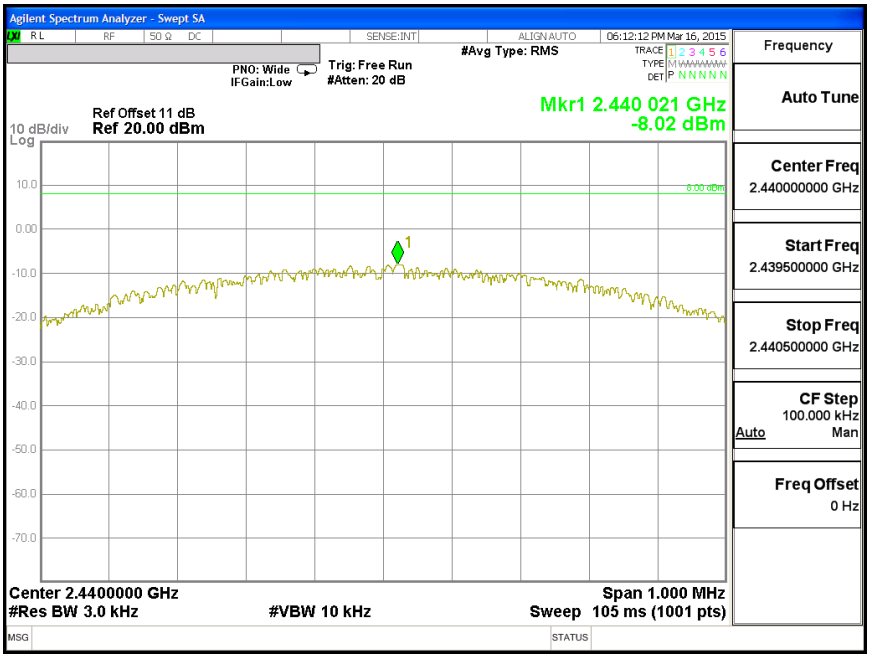
POWER SPECTRAL DENSITY

PSD LOW CH



PSD MID CH



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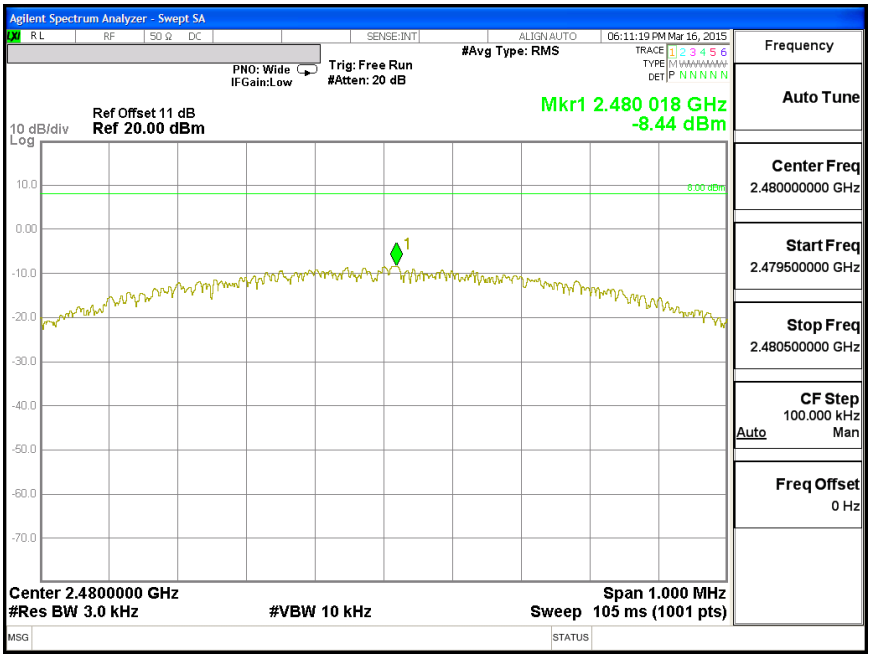
PSD HIGH CH



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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.

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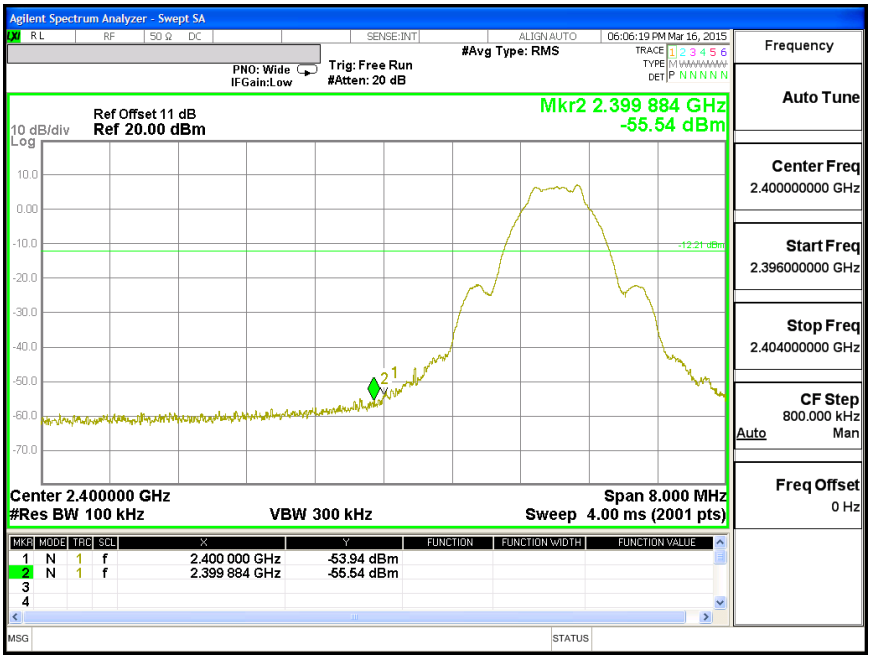
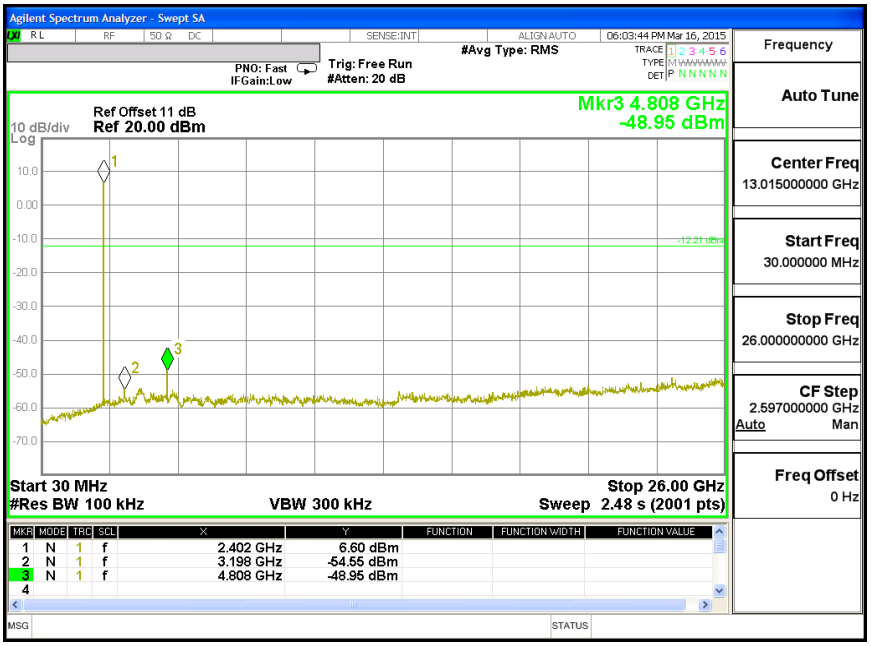
RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CH BANDEDGE



LOW CH SPURIOUS



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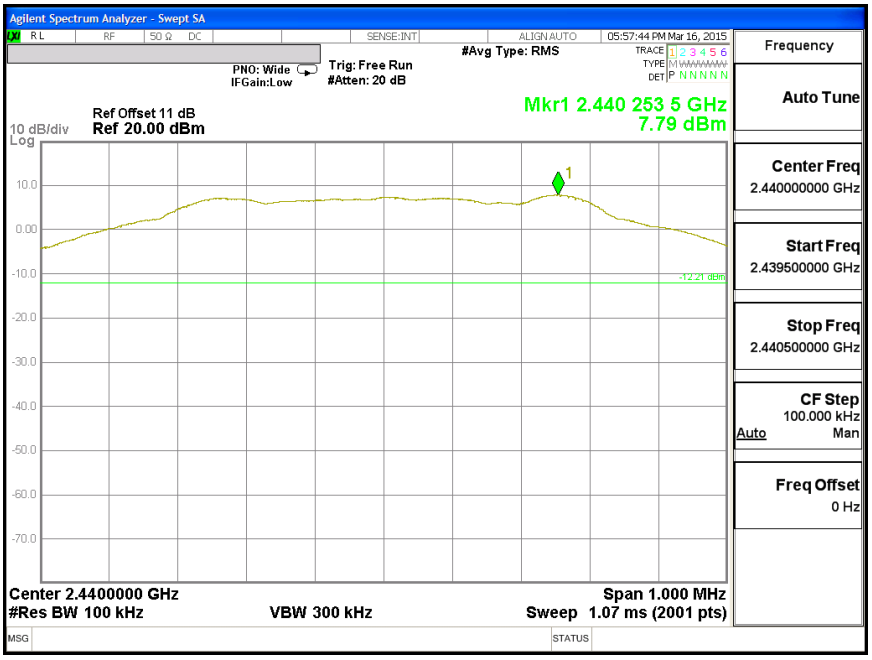
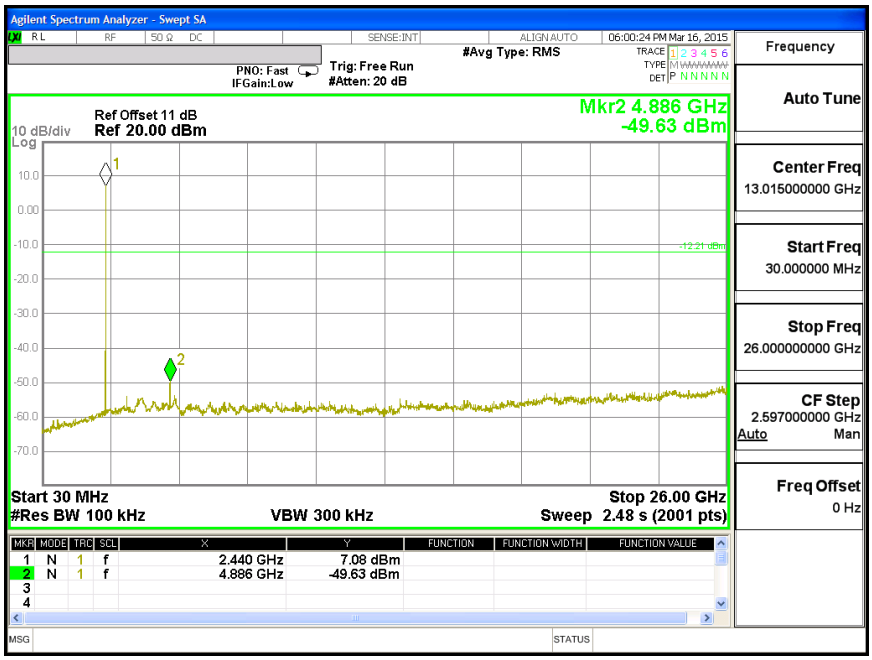
SPURIOUS EMISSIONS, MID CHANNEL

MID CH REFERENCE



MID CH SPURIOUS



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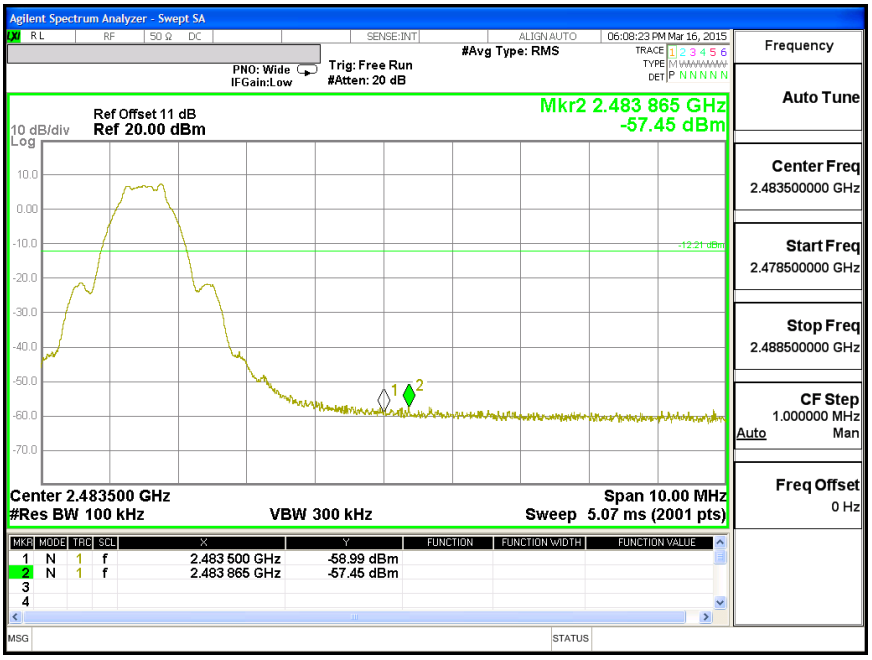
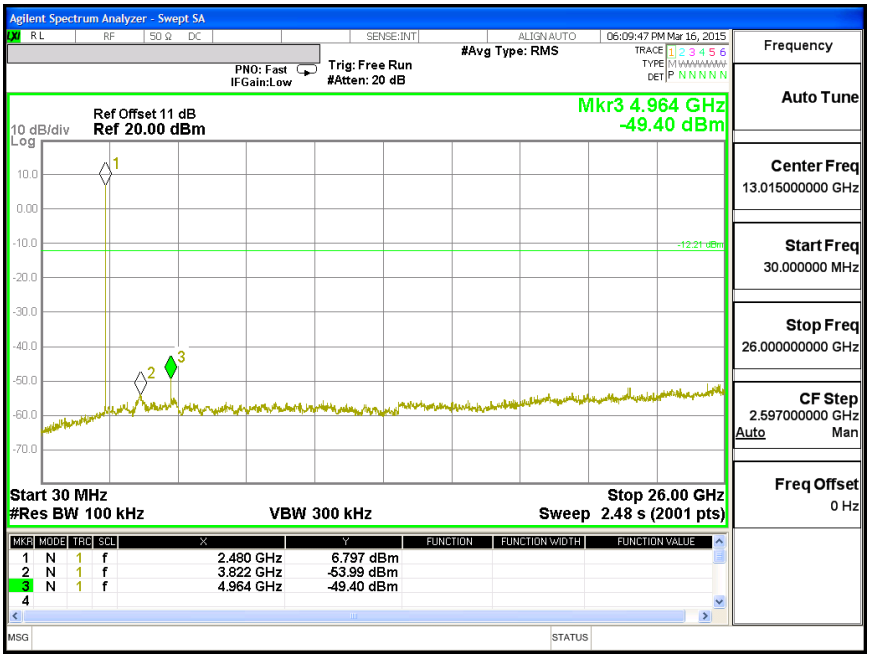
SPURIOUS EMISSIONS, HIGH CHANNEL

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 measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 3MHz video bandwidth with average detector 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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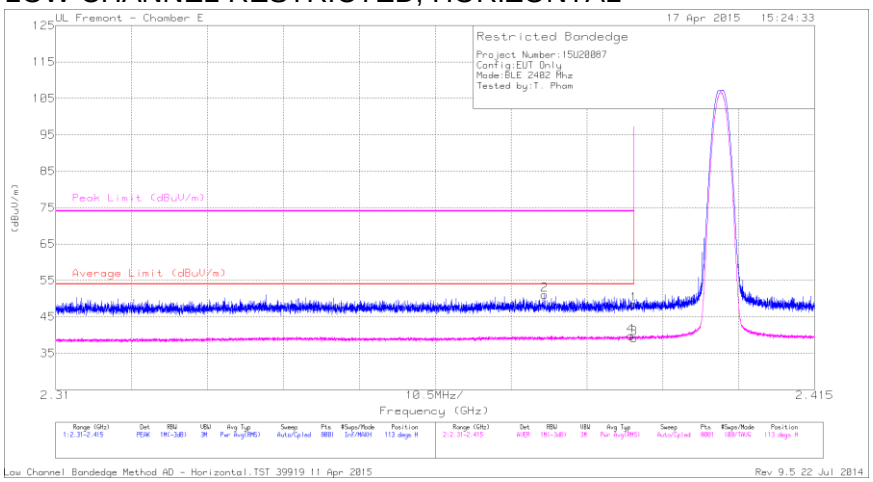
8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. RESTRICTED BANDEDGE

LOW CHANNEL RESTRICTED, HORIZONTAL



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
2	* 2.378	43.66	PK	32	-24.6	51.06	-	-	74	-22.94	113	343	H
1	* 2.39	40.98	PK	32.1	-24.7	48.38	-	-	74	-25.62	113	343	H
3	* 2.39	31.72	RMS	32.1	-24.7	39.12	54	-14.88	-	-	113	343	H
4	* 2.39	32.37	RMS	32.1	-24.7	39.77	54	-14.23	-	-	113	343	H

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.
PK - Peak detector
RMS - RMS detection

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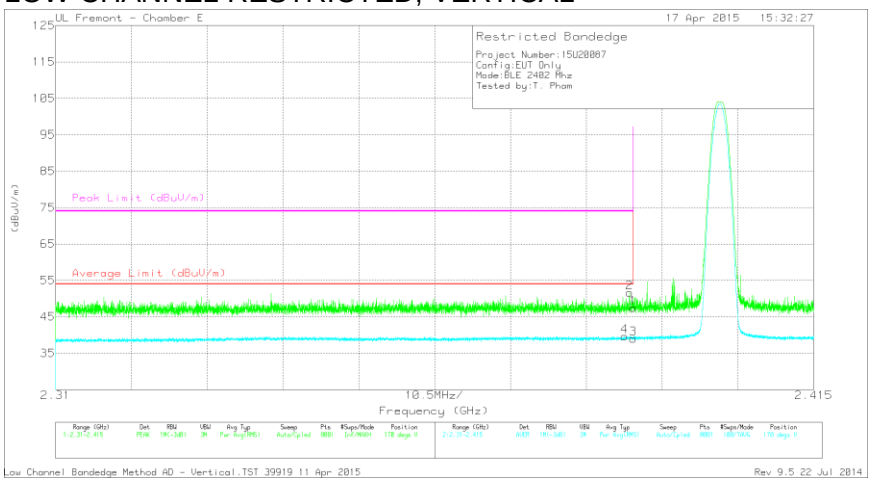
LOW CHANNEL RESTRICTED, VERTICAL



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
2	* 2.389	44.21	PK	32.1	-24.7	51.61	-	-	74	-22.39	170	161	V
4	* 2.389	32.24	RMS	32.1	-24.7	39.64	54	-14.36	-	-	170	161	V
1	* 2.39	40.06	PK	32.1	-24.7	47.46	-	-	74	-26.54	170	161	V
3	* 2.39	31.65	RMS	32.1	-24.7	39.05	54	-14.95	-	-	170	161	V

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.
PK - Peak detector
RMS - RMS detection

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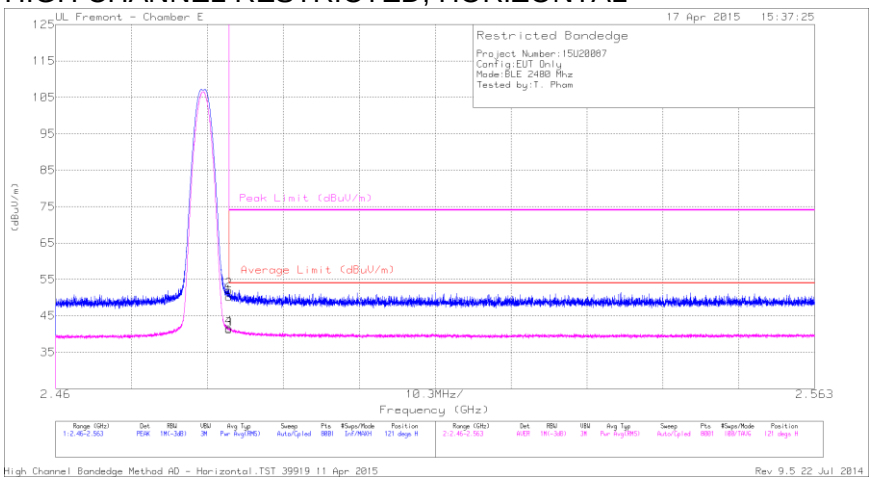
HIGH CHANNEL RESTRICTED, HORIZONTAL



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	42.24	PK	32.2	-24.3	50.14	-	-	74	-23.86	121	314	H
2	* 2.484	44.13	PK	32.2	-24.3	52.03	-	-	74	-21.97	121	314	H
3	* 2.484	33.29	RMS	32.2	-24.3	41.19	54	-12.81	-	-	121	314	H
4	* 2.484	33.73	RMS	32.2	-24.3	41.63	54	-12.37	-	-	121	314	H

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.
PK - Peak detector
RMS - RMS detection

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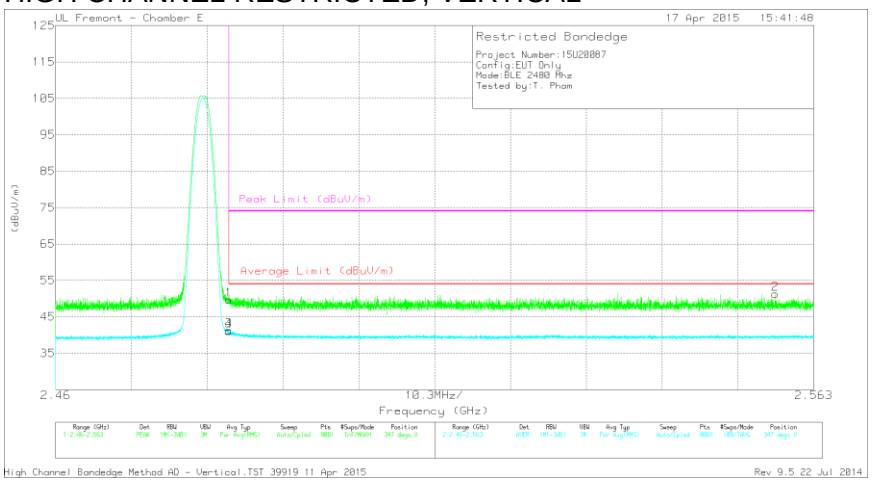
HIGH CHANNEL RESTRICTED, VERTICAL



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	41.75	PK	32.2	-24.3	49.65	-	-	74	-24.35	347	379	V
3	* 2.484	33.34	RMS	32.2	-24.3	41.24	54	-12.76	-	-	347	379	V
4	* 2.484	33.24	RMS	32.2	-24.3	41.14	54	-12.86	-	-	347	379	V
2	2.558	43.09	PK	32.3	-24.1	51.29	-	-	74	-22.71	347	379	V

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.
PK - Peak detector
RMS - RMS detection

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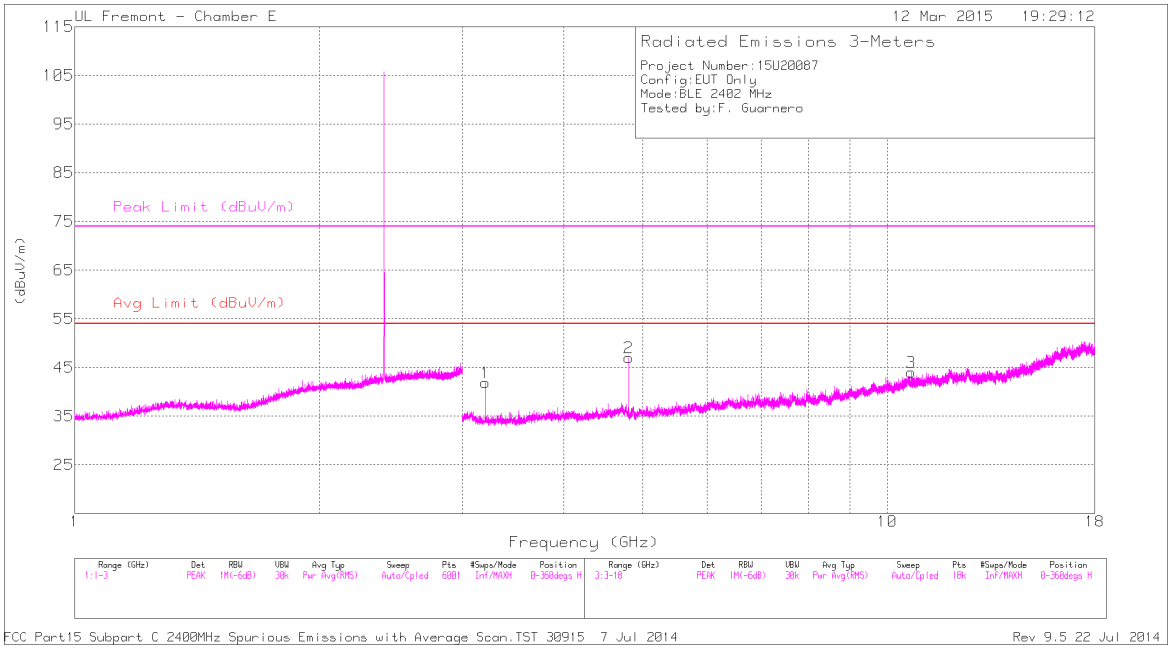
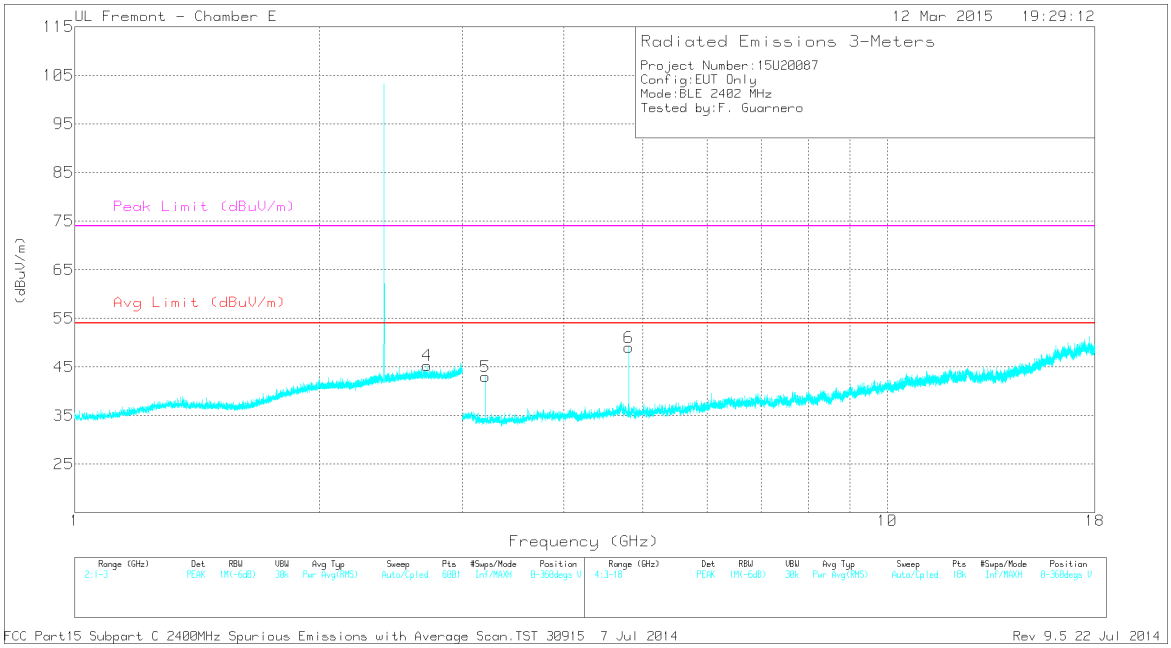
8.2.2. HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



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DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 2.716	43.43	PK2	32.4	-23.9	51.93	-	-	74	-22.07	178	356	V
	* 2.717	31.56	MAv1	32.4	-23.9	40.06	54	-13.94	-	-	178	356	V
2	* 4.804	49.04	PK2	34.1	-30.9	52.24	-	-	74	-21.76	354	339	H
	* 4.804	44.19	MAv1	34.1	-30.9	47.39	54	-6.61	-	-	354	339	H
3	* 10.705	36.34	PK2	37.9	-23.6	50.64	-	-	74	-23.36	83	302	H
	* 10.704	25.05	MAv1	37.9	-23.6	39.35	54	-14.65	-	-	83	302	H
6	* 4.804	50.78	PK2	34.1	-30.9	53.98	-	-	74	-20.02	270	204	V
	* 4.804	46.33	MAv1	34.1	-30.9	49.53	54	-4.47	-	-	270	204	V
1	3.203	47	PK2	32.7	-31.9	47.8	-	-	-	-	171	151	H
5	3.203	48.28	PK2	32.7	-31.9	49.08	-	-	-	-	278	155	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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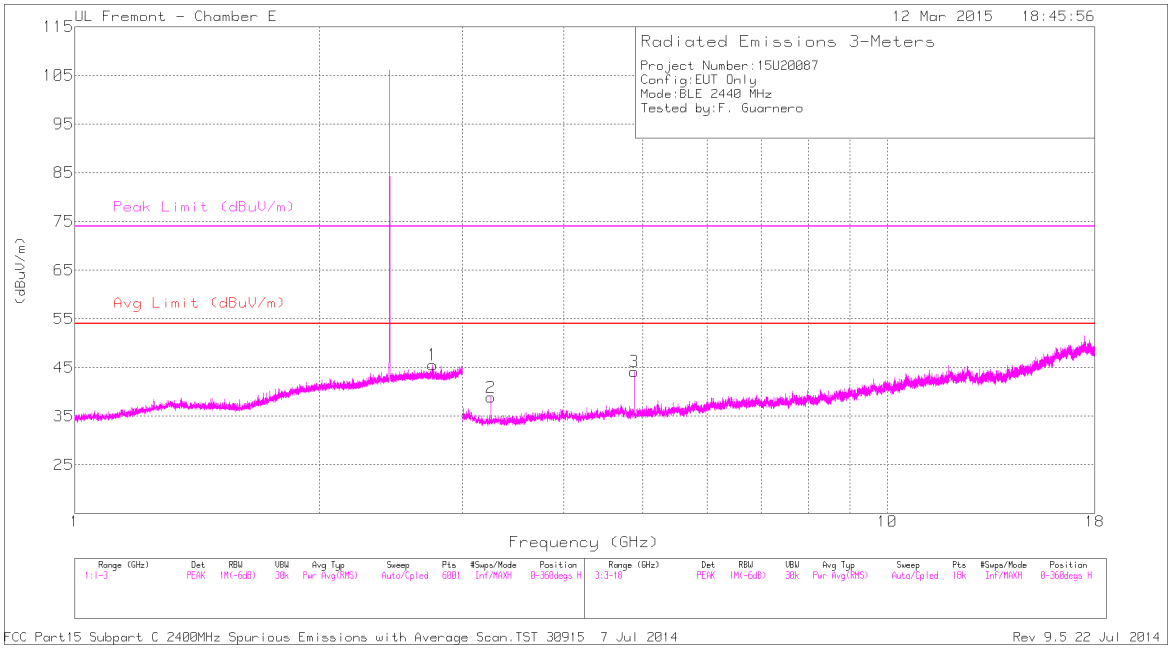
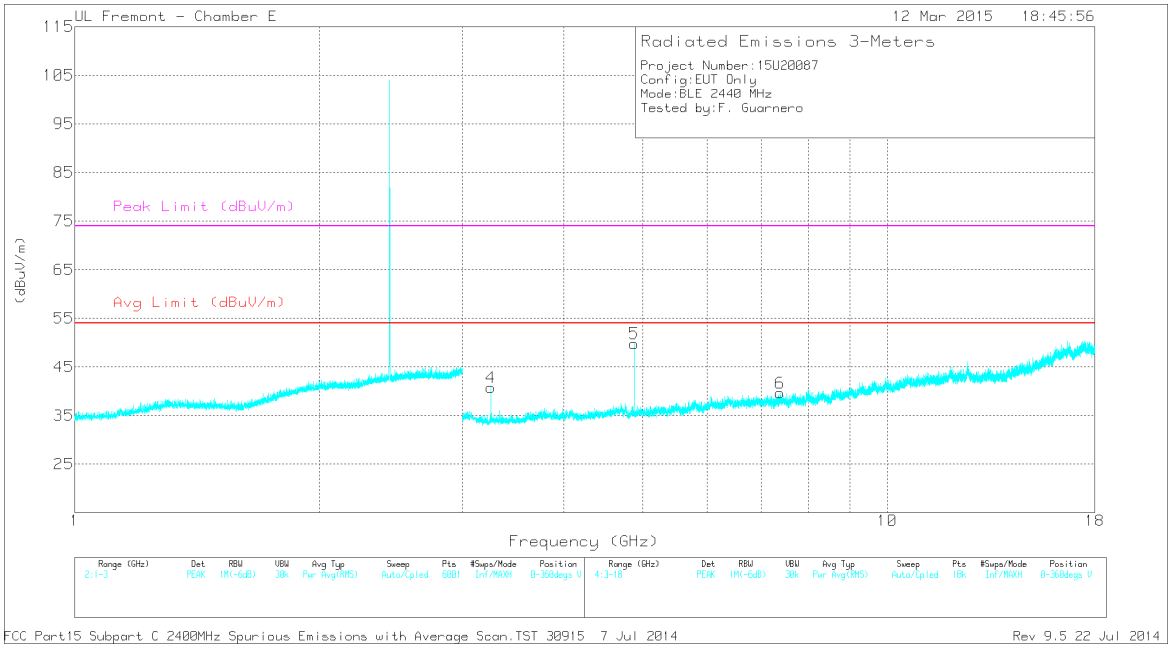
MID CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



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DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 2.757	43.47	PK2	32.4	-23.9	51.97	-	-	74	-22.03	298	110	H
	* 2.757	31.55	MAv1	32.4	-23.9	40.05	54	-13.95	-	-	298	110	H
3	* 4.88	47.8	PK2	34.1	-31	50.9	-	-	74	-23.1	0	363	H
	* 4.88	41.72	MAv1	34.1	-31	44.82	54	-9.18	-	-	0	363	H
5	* 4.88	50.93	PK2	34.1	-31	54.03	-	-	74	-19.97	257	223	V
	* 4.88	46.59	MAv1	34.1	-31	49.69	54	-4.31	-	-	257	223	V
6	* 7.384	38.85	PK2	35.5	-26.9	47.45	-	-	74	-26.55	299	162	V
	* 7.385	26.76	MAv1	35.5	-26.9	35.36	54	-18.64	-	-	299	162	V
4	3.253	47.16	PK2	32.7	-32.1	47.76	-	-	-	-	274	151	V
2	3.254	46.99	PK2	32.7	-32.1	47.59	-	-	-	-	173	241	H

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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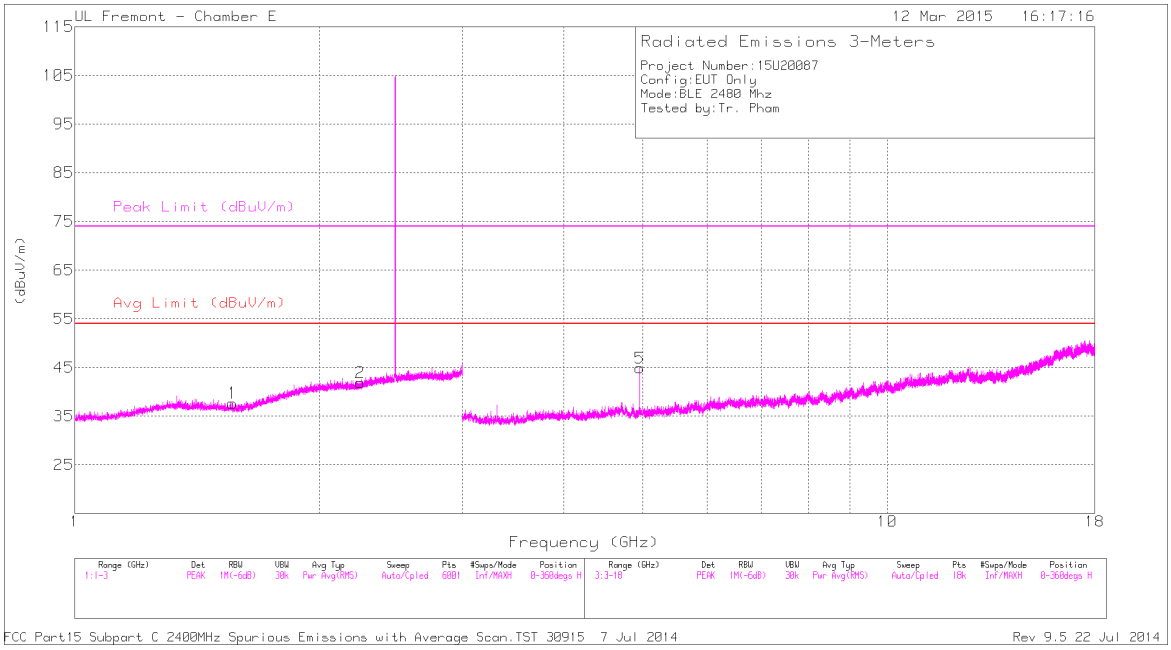
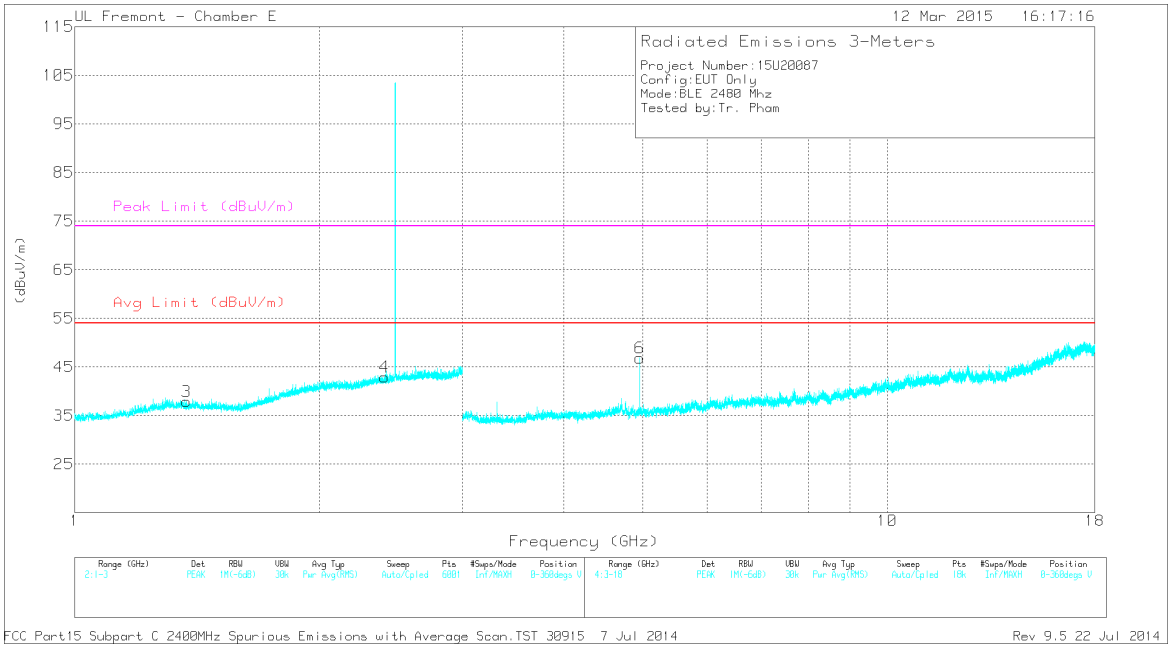
HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



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FORM NO: CCSUP4701I

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DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 1.564	43.99	PK2	28	-26.4	45.59	-	-	74	-28.41	360	101	H
	* 1.564	32.62	MAv1	28	-26.4	34.22	54	-19.78	-	-	360	101	H
2	* 2.245	43.78	PK2	31.6	-25.2	50.18	-	-	74	-23.82	360	101	H
	* 2.245	32.34	MAv1	31.6	-25.2	38.74	54	-15.26	-	-	360	101	H
3	* 1.374	43.93	PK2	28.6	-26.6	45.93	-	-	74	-28.07	360	101	V
	* 1.372	32.5	MAv1	28.6	-26.6	34.5	54	-19.5	-	-	360	101	V
4	* 2.386	43.59	PK2	32	-24.7	50.89	-	-	74	-23.11	360	101	V
	* 2.386	32.37	MAv1	32	-24.7	39.67	54	-14.33	-	-	360	101	V
5	* 4.96	46.73	PK2	34.1	-30.2	50.63	-	-	74	-23.37	41	310	H
	* 4.96	41.27	MAv1	34.1	-30.2	45.17	54	-8.83	-	-	41	310	H
6	* 4.961	49.73	PK2	34.1	-30.2	53.63	-	-	74	-20.37	11	313	V
	* 4.96	44.9	MAv1	34.1	-30.2	48.8	54	-5.2	-	-	11	313	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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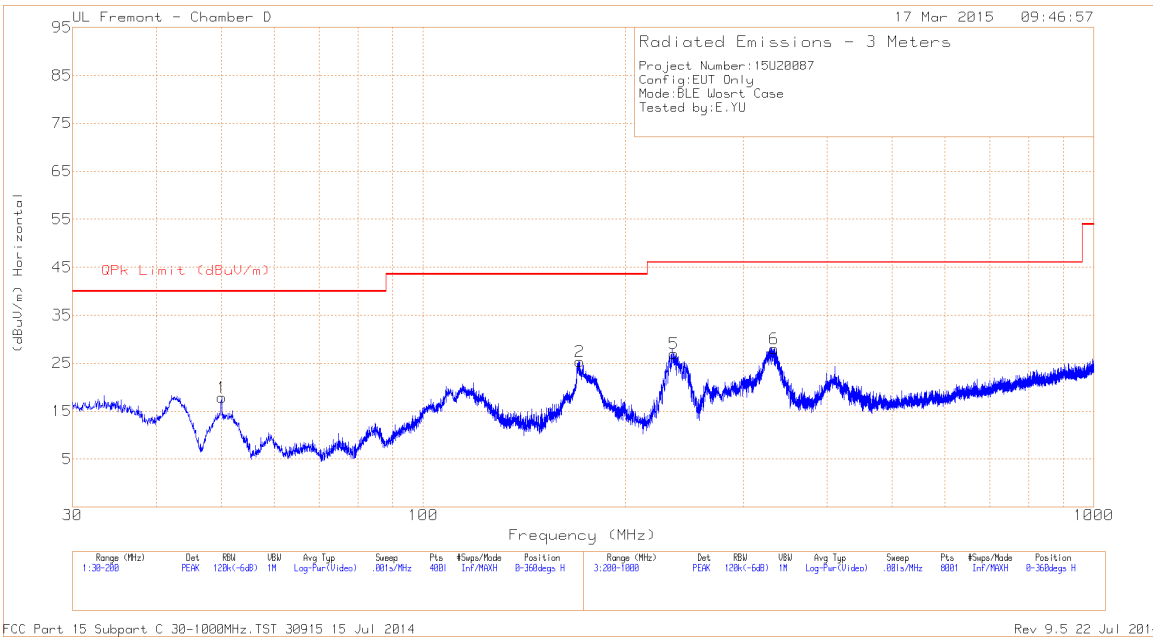
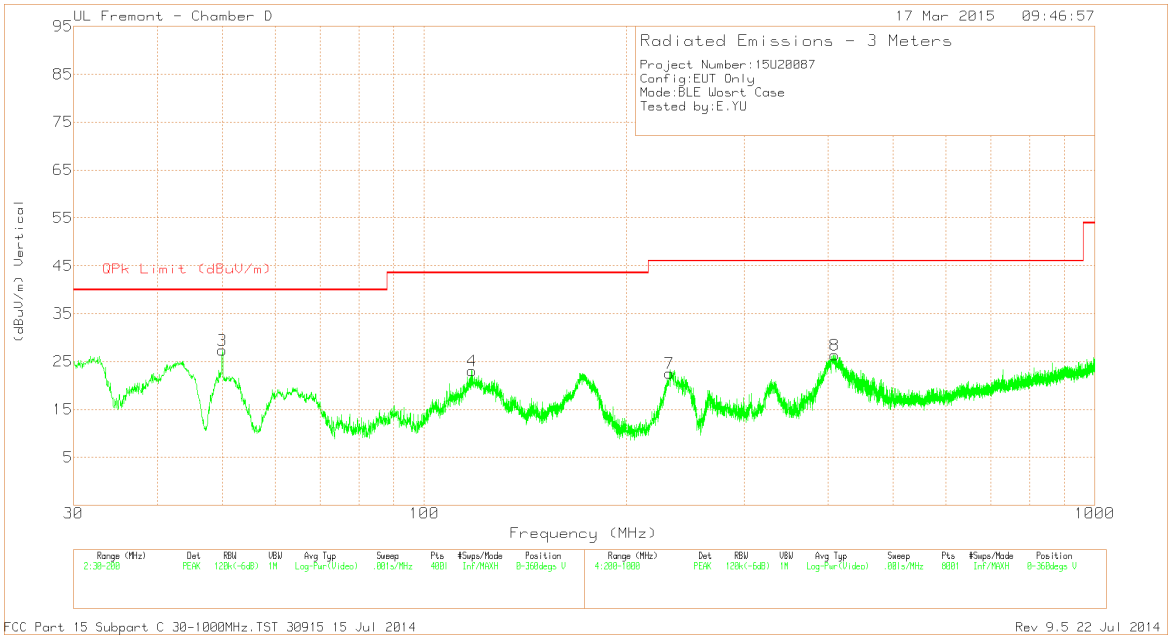
8.3. WORST-CASE BELOW 1 GHz

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 T407 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 171.0575	44.81	PK	11.5	-31	25.31	43.52	-18.21	0-360	98	H
4	* 117.9325	40.72	PK	13.6	-31.2	23.12	43.52	-20.4	0-360	100	V
6	* 333.4	44.27	PK	14	-30.2	28.07	46.02	-17.95	0-360	100	H
8	* 409.1	40.89	PK	15.4	-29.9	26.39	46.02	-19.63	0-360	100	V
3	50.0175	50.97	PK	8.1	-31.7	27.37	40	-12.63	0-360	100	V
1	50.06	41.46	PK	8.1	-31.7	17.86	40	-22.14	0-360	401	H
7	232.1	42.07	PK	11.1	-30.6	22.57	46.02	-23.45	0-360	201	V
5	236.4	46.38	PK	11.3	-30.7	26.98	46.02	-19.04	0-360	100	H

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

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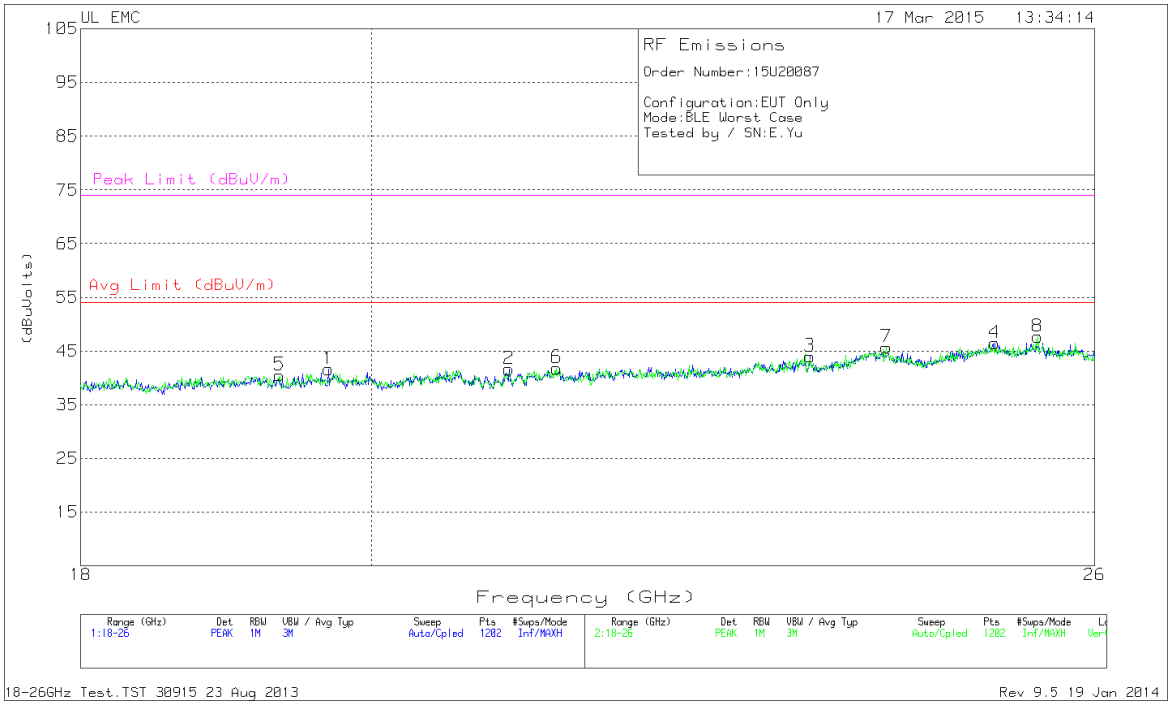
8.4. WORST-CASE 18 to 26 GHz

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

HORIZONTAL AND VERTICAL PLOT



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DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T89 AF (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	19.692	42.47	PK	33	-24.3	-9.5	41.67	54	-12.34	74	-32.34
2	21.024	41.67	PK	33.3	-23.8	-9.5	41.67	54	-12.34	74	-32.34
3	23.449	42.3	PK	34	-22.8	-9.5	44	54	-10	74	-30
4	25.074	44.3	PK	34.5	-22.8	-9.5	46.5	54	-7.5	74	-27.5
5	19.346	41.3	PK	32.8	-24.1	-9.5	40.5	54	-13.5	74	-33.5
6	21.391	41.73	PK	33.3	-23.7	-9.5	41.83	54	-12.17	74	-32.17
7	24.108	43.87	PK	34.2	-22.9	-9.5	45.67	54	-8.33	74	-28.33
8	25.467	45.07	PK	34.7	-22.6	-9.5	47.68	54	-6.33	74	-26.33

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 (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

C63.10.

RESULTS

6 WORST EMISSIONS

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Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
1	.159	47.16	Pk	1.3	0	48.46	-	-	55.52	-7.06
2	.1545	25.21	Av	1.3	0	26.51	65.75	-39.24	55.75	-29.24
3	.411	26.54	Pk	.4	0	26.94	-	-	47.63	-20.69
4	.393	12.08	Av	.4	0	12.48	58	-45.52	48	-35.52
5	1.5585	25.54	Pk	.2	.1	25.84	-	-	46	-20.16
6	1.5405	12.24	Av	.2	.1	12.54	56	-43.46	46	-33.46
7	4.9245	30.91	Pk	.2	.1	31.21	-	-	46	-14.79
8	4.929	12.97	Av	.2	.1	13.27	56	-42.73	46	-32.73
9	13.2315	40.15	Pk	.2	.2	40.55	-	-	50	-9.45
10	13.236	25.38	Av	.2	.2	25.78	60	-34.22	50	-24.22
11	23.901	35.95	Pk	.3	.2	36.45	-	-	50	-13.55
12	23.8965	18.09	Av	.3	.2	18.59	60	-41.41	50	-31.41

Pk - Peak detector
Av - Average detection

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
13	.159	46.1	Pk	1.4	0	47.5	-	-	55.52	-8.02
14	.1545	22.43	Av	1.4	0	23.83	65.75	-41.92	55.75	-31.92
15	.411	26.81	Pk	.4	0	27.21	-	-	47.63	-20.42
16	.3975	11.07	Av	.4	0	11.47	57.91	-46.44	47.91	-36.44
17	1.257	25.68	Pk	.2	0	25.88	-	-	46	-20.12
18	1.257	15.12	Av	.2	0	15.32	56	-40.68	46	-30.68
19	4.8525	31.43	Pk	.2	.1	31.73	-	-	46	-14.27
20	4.857	12.5	Av	.2	.1	12.8	56	-43.2	46	-33.2
21	12.057	41.02	Pk	.2	.2	41.42	-	-	50	-8.58
22	12.084	24.95	Av	.2	.2	25.35	60	-34.65	50	-24.65
23	24.1035	35.63	Pk	.3	.2	36.13	-	-	50	-13.87
24	24.1125	25.48	Av	.3	.2	25.98	60	-34.02	50	-24.02

Pk - Peak detector
Av - Average detection
CE 150K-30MHz CISPR 11-22 Class A & B Step Rcvr.TST
Rev 9.5 26 Feb 2015

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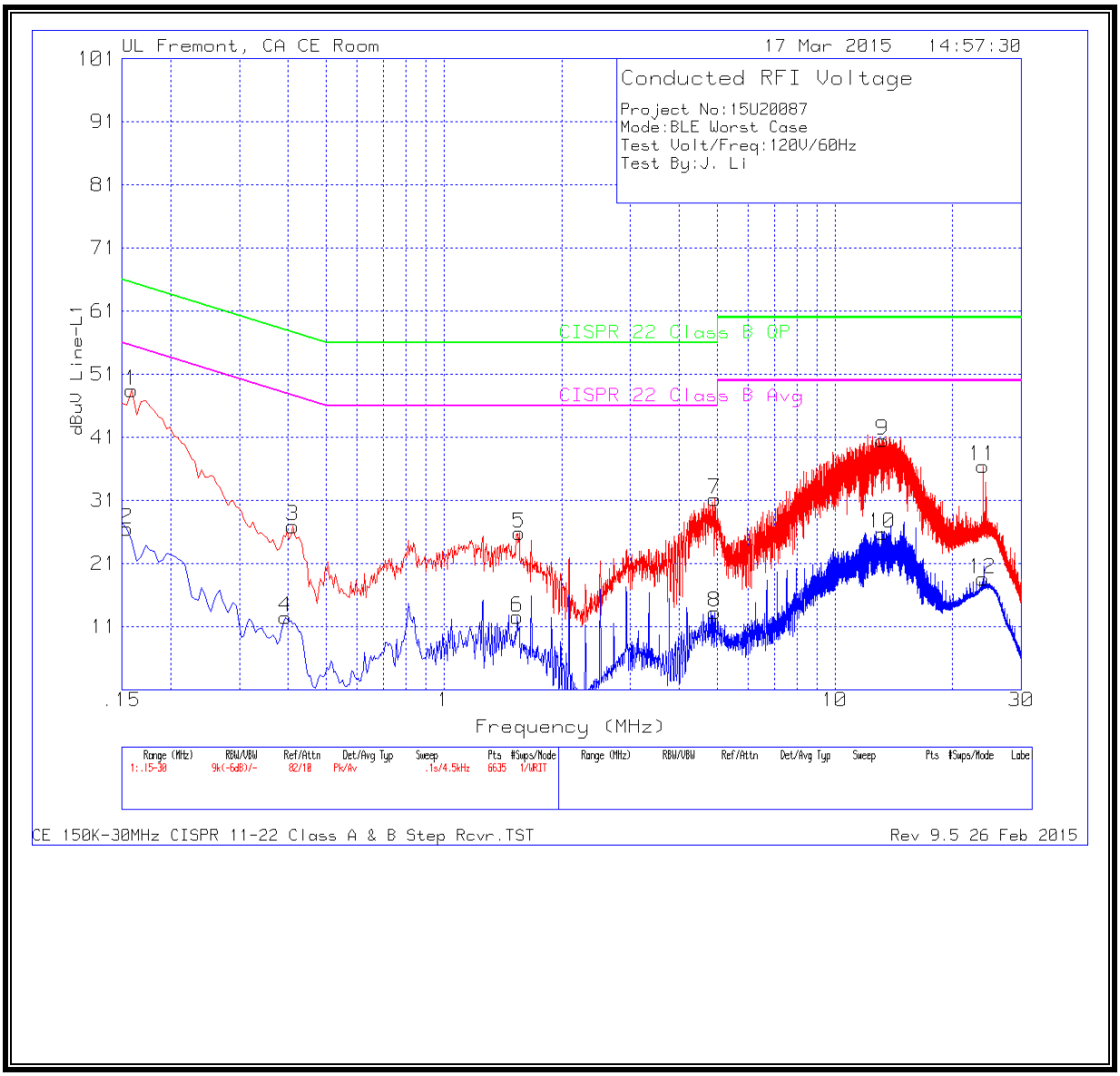
LINE 1 RESULTS



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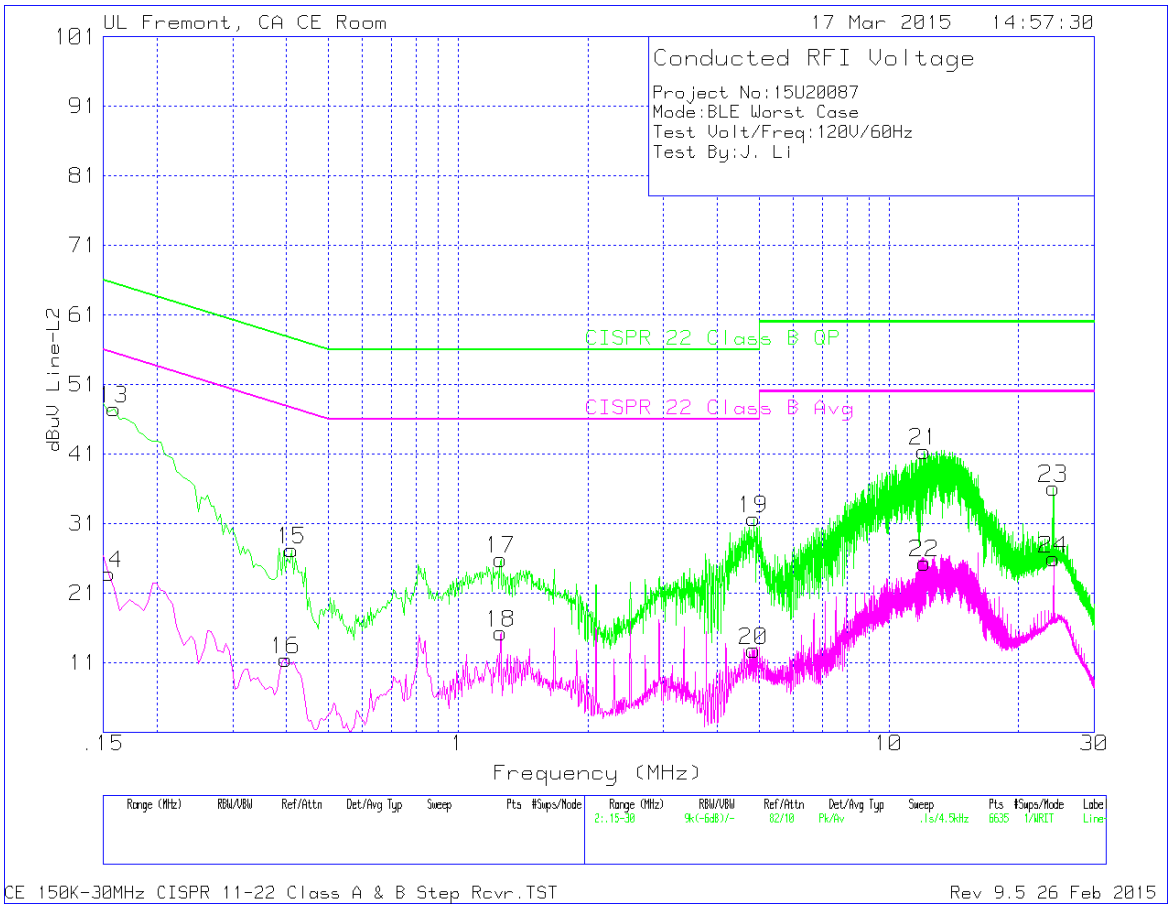
LINE 2 RESULTS



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