CERTIFICATION TEST REPORT

Report Number. : 12289553-E1V2

Applicant	:	APPLE, INC. 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A.
Model	:	3.5
FCC ID	:	BCG-B35
IC	:	579C-B35
EUT Description	:	SLEEP MONITOR
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C ISED RSS-247 ISSUE 2 ISED RSS-GEN ISSUE 5

Date Of Issue:
October 30, 2018

Prepared by:
UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538 U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888

NVLAP Lab code: 200065-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	10/23/2018	Initial Issue	Chin Pang
V2	10/30/2018	Update Section 2 on KDB 414788	Chin Pang

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE, INC.
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A.

EUT DESCRIPTION: SLEEP MONITOR

MODEL: 3.5

SERIAL NUMBER: DLC8364003YJQJT13, DLC8364003SJQJT19

DATE TESTED: SEPTEMBER 21 – OCTOBER 17, 2018

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Complies
ISED RSS-247 Issue 2	Complies
ISED RSS-GEN Issue 5	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

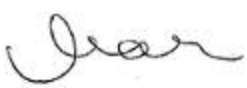
The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

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 the U.S. government.

Approved & Released For
UL Verification Services Inc. By:

Chin Pang
Senior Engineer
UL Verification Services Inc.

Prepared By:



Mona Hua
Lab Engineer
UL Verification Services Inc

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 v05, KDB 414788 for testing <30MHz, ANSI C63.10-2013, RSS-GEN Issue 5, and RSS-247 Issue 2.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, 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	47658 Kato Rd
☐ Chamber A (ISED:2324B-1)	☐ Chamber D (ISED:22541-1)	☐ Chamber K (ISED:2324A-1)
☐ Chamber B (ISED:2324B-2)	☐ Chamber E (ISED:22541-2)	☐ Chamber L (ISED:2324A-3)
☐ Chamber C (ISED:2324B-3)	☒ Chamber F (ISED:22541-3)	
	☐ Chamber G (ISED:22541-4)	
	☐ Chamber H (ISED:22541-5)	

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through C are covered under ISED company address code 2324B with site numbers 2324B -1 through 2324B-3, respectively. Chambers D through H are covered under ISED company address code 22541 with site numbers 22541 -1 through 22541-5, respectively. Chambers K and L are covered under ISED company address code 2324A with site numbers 2324A-1 and 2324A-3, respectively.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at NVLAP Lab Search.

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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
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case 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. EUT DESCRIPTION

The EUT is a sleep monitor with Bluetooth LE Radio and integrated antenna. It has no battery. It is powered by USB-A connector.

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	5.02	3.18

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Range (GHz)	Ant. (dBi)
2.4	-2.1

5.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was v004ef1.

5.5. WORST-CASE CONFIGURATION AND MODE

The EUT was investigated in three orthogonal orientations X, Y and Z and it was determined that Y(Landscape) orientation was the worst-case orientation.

Radiated emissions below 30MHz, below 1GHz, 1-18GHz & 18-26GHz and power line conducted emissions were performed with the EUT connected to an AC power adapter transmitting at the channel with the highest output power as the worst-case scenario.

There was no emission found below 30MHz within 20dB of the limit.

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Apple	Macbook Pro	C02P41RZG086	FCC DoC
Laptop AC/DC adapter	Liteon Technology	A1343	C062172045DDJ94A6	NA
EUT AC Adapter	Apple	A1385	D293154U2DTDHLHCW	NA
iPhone	Apple	AXXXX	C39N80EZG5QM	FCC DoC
Interface Board	NA	NA	NA	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	Shielded	0.3	To Spectrum Analyzer
2	USB	1	USB	Shielded	1	NA
3	AC/DC Adapter	1	2-Prong	Shielded	2	NA
4	Interface Board	NA	NA	NA	NA	NA

I/O CABLES (RADIATED AND CONDUCTED EMISSIONS)

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	USB	1	USB	Shielded	1	NA

TEST SETUP

The EUT is connected to a test laptop during the tests. Test software exercised the EUT.

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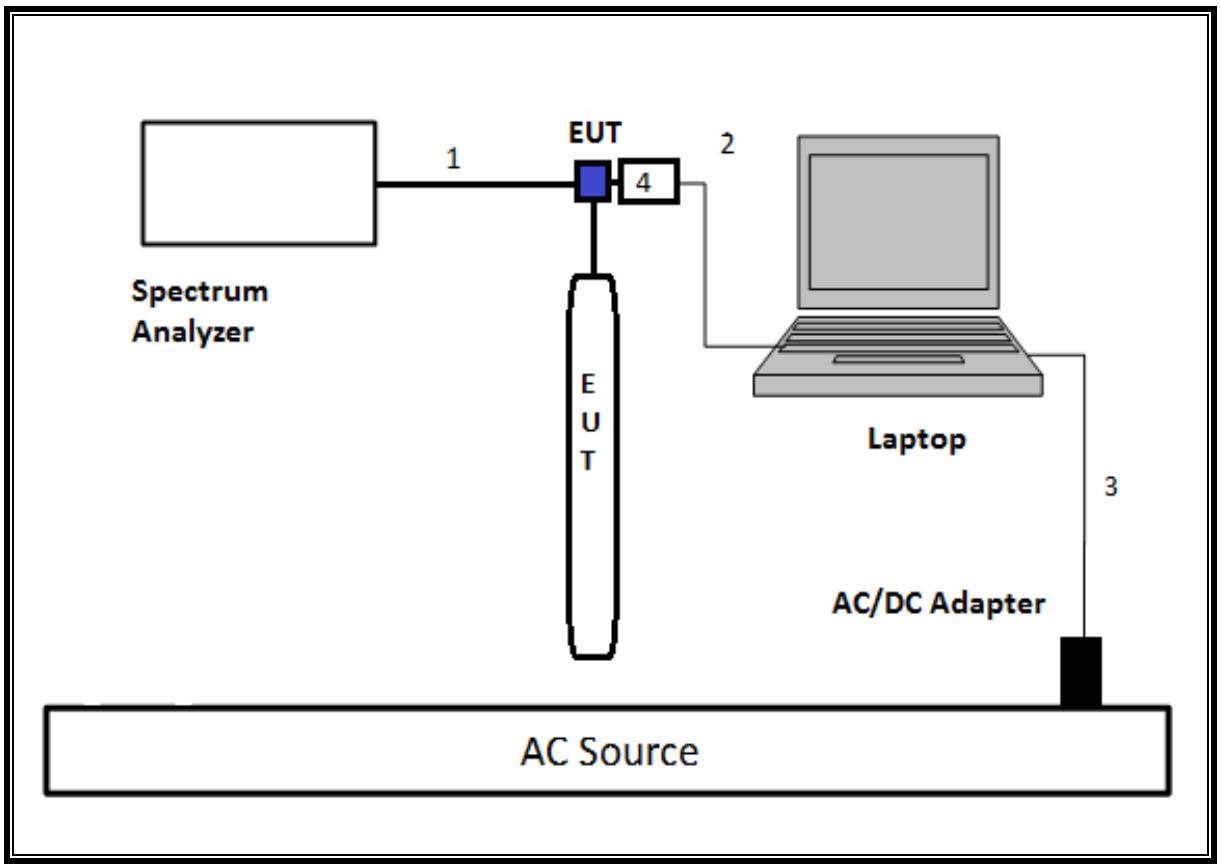
SETUP DIAGRAM FOR CONDUCTED TESTS

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



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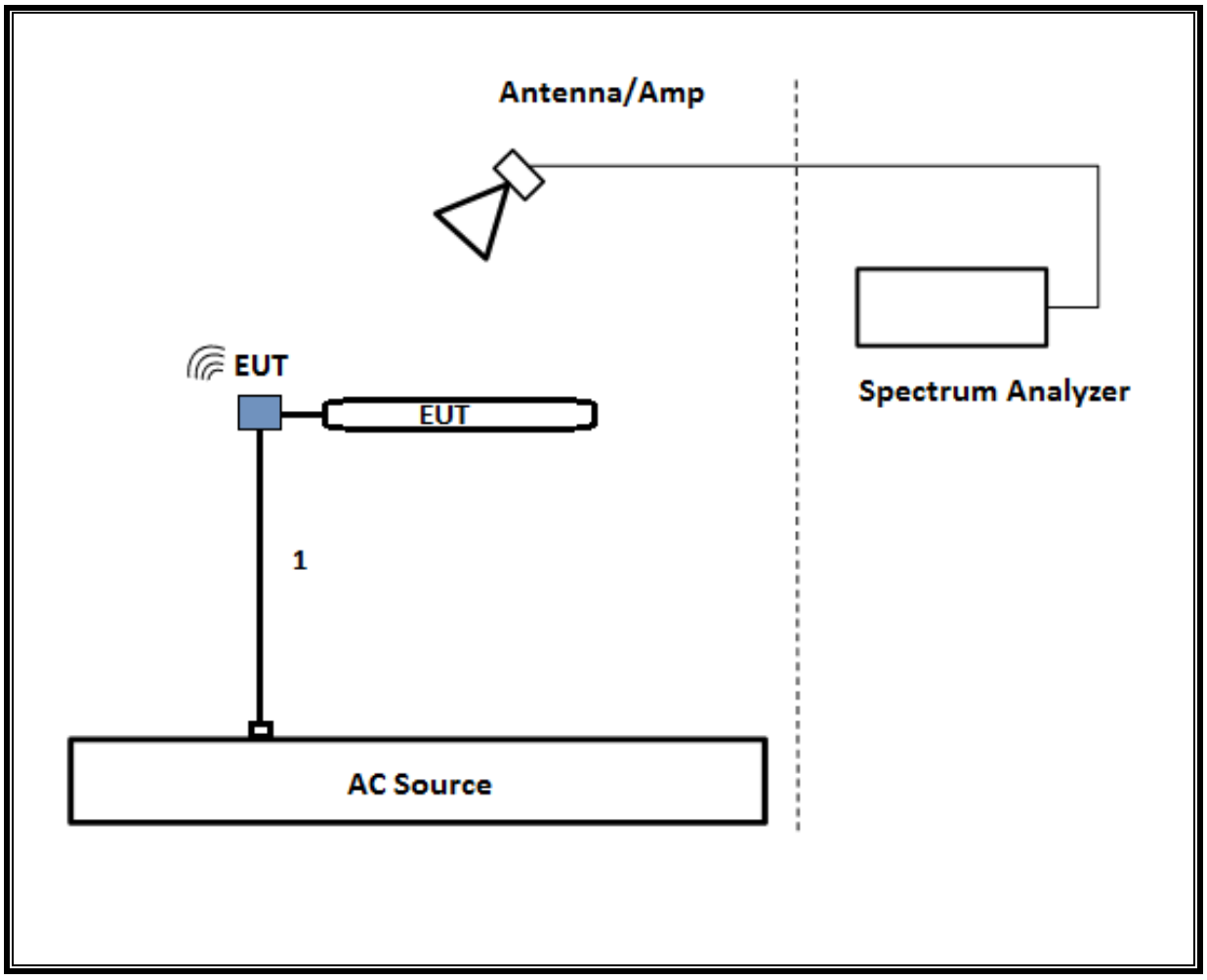
SETUP DIAGRAM FOR RADIATED TESTS ABOVE 1 GHz



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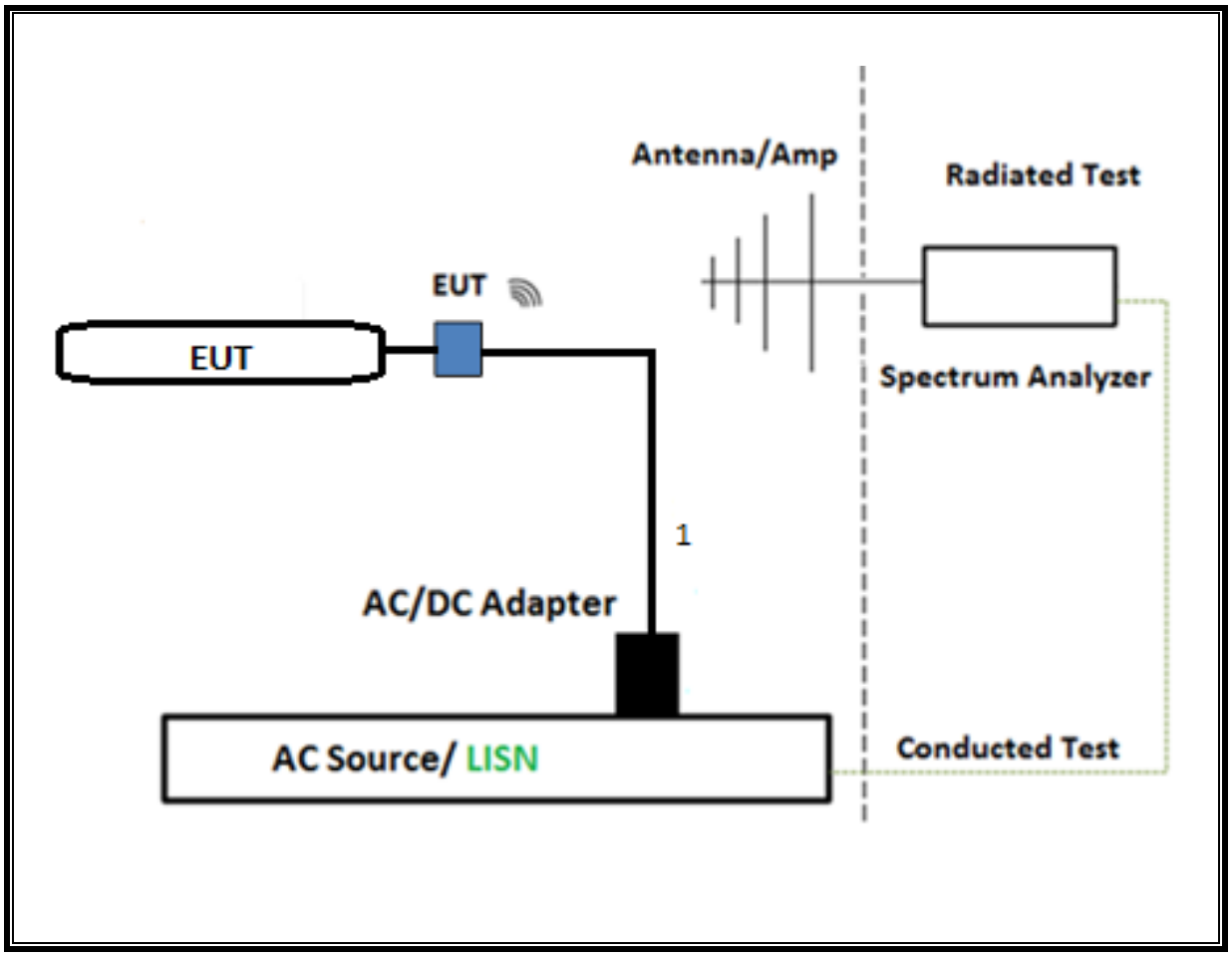
SETUP DIAGRAM FOR Below 1GHz and AC LINE CONDUCTED TEST



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6. MEASUREMENT METHOD

On Time and Duty Cycle: KDB 558074 D01 v05, Section 6.

6 dB BW: KDB 558074 D01 v05, Section 8.1.

Output Power: KDB 558074 D01 v05, Section 9.1.3.

Power Spectral Density: KDB 558074 D01 v05, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v05, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v05, Section 12.1.

Band-edge: KDB 558074 D01 v05, Section 12.1.

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

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7. TEST AND MEASUREMENT EQUIPMENT

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

Description	Manufacturer	Model	ID Num	Cal Due
Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	T742	12/04/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T711	01/30/2019
Pre-Amp 18-26GHz	Agilent Technology	8449B	T404	03/09/2019
Antenna Horn 18-26GHz	ARA	MWH-1826	T89	01/18/2019
Amplifier, 10KHz to 1GHz, 32dB	Sonoma Instrument	310	T173	07/06/2019
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	T408	12/15/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A-544	T1210	08/06/2019
Spectrum Analyzer, PSA 3Hz to 44GHz	Keysight	E4446A	T99	06/27/2019
Power Meter, P-series single channel	Keysight	N1911A	T1245	04/05/2019
Power Sensor	Keysight	N1921A	T1228	07/10/2019
AC Line Conducted				
EMI Test Receiver	Rohde & Schwarz	ESR	T1436	02/23/2019
LISN for Conducted Emissions CISPR-16	Fischer	50/250-25-2-01	T1310	06/19/2019
UL AUTOMATION SOFTWARE				
Radiated Software	UL	UL EMC	Ver 9.5, April 26, 2016	
Conducted Software	UL	UL EMC	Ver 5.4, October 13, 2016	
AC Line Conducted Software	UL	UL EMC	Ver 9.5, May 26, 2015	

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8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

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)
2.4GHz Band						
BLE	0.431	0.627	0.687	68.67%	1.63	2.323

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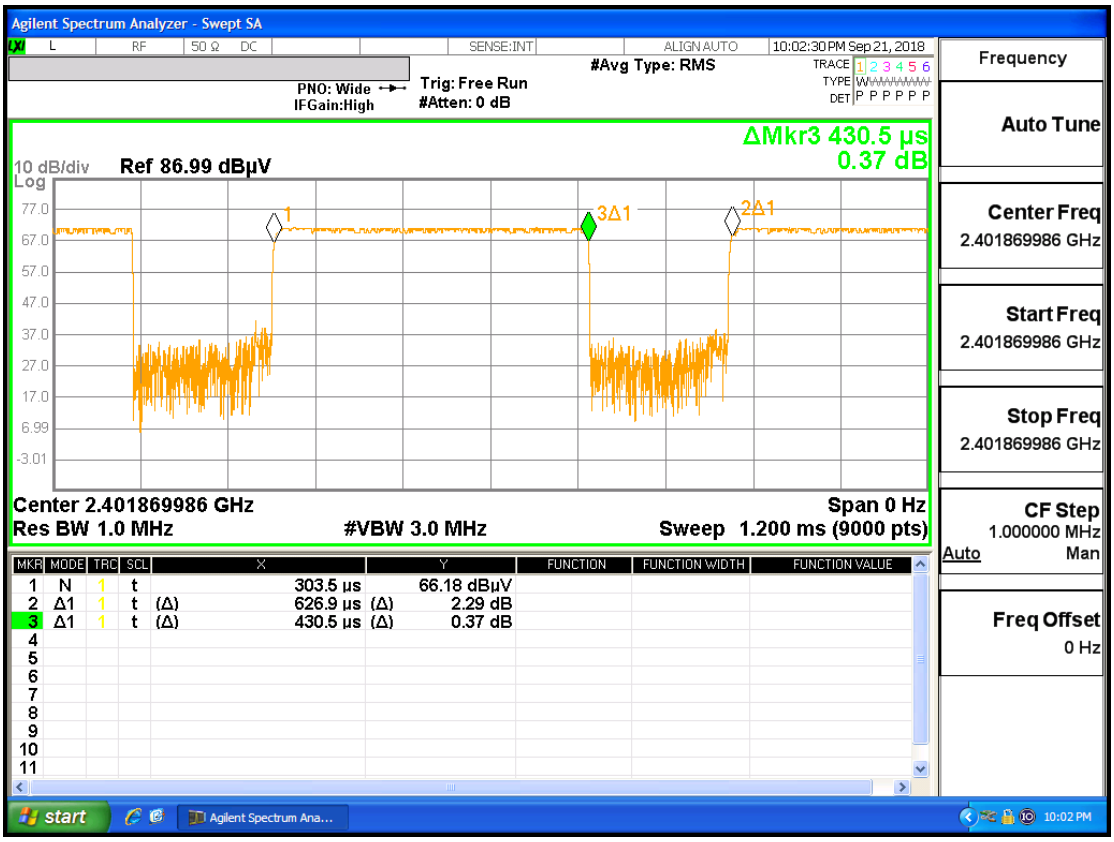
DUTY CYCLE PLOTS



DUTY CYCLE BLE

8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

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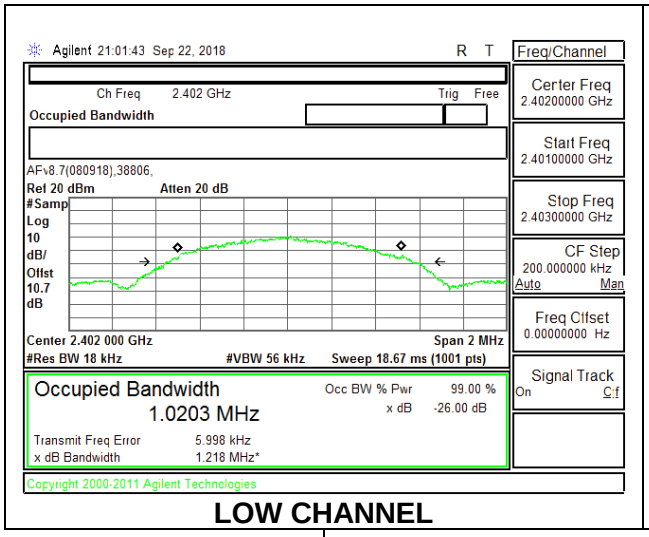
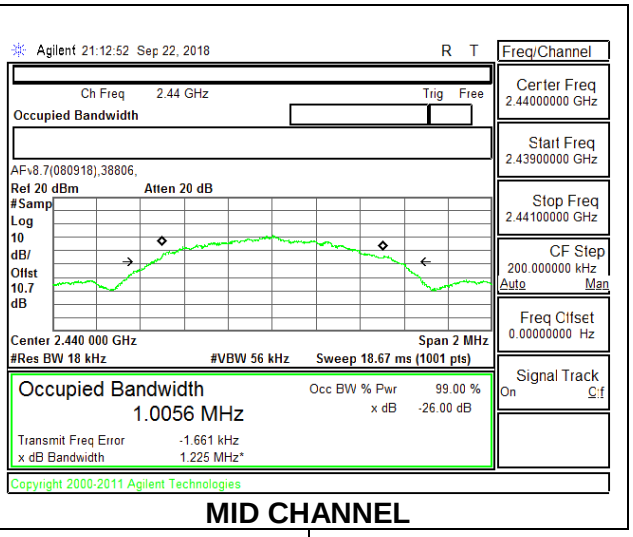
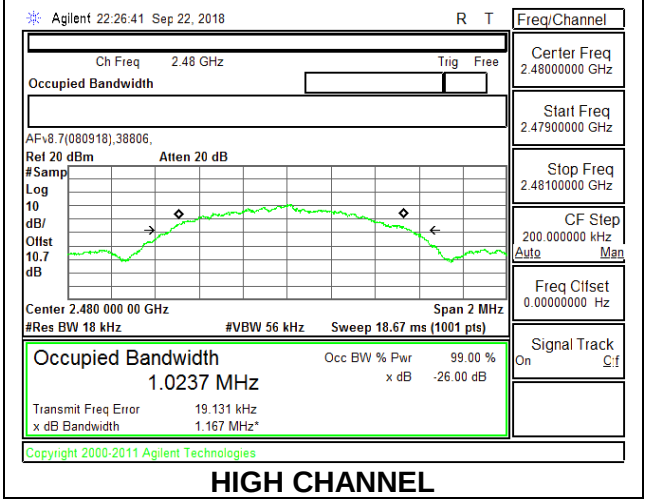
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0203
Middle	2440	1.0056
High	2480	1.0237



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

8.3. 6 dB BANDWIDTH

LIMITS

FCC §15.407 (e)

RSS-247 5.2 (a)

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

RESULTS

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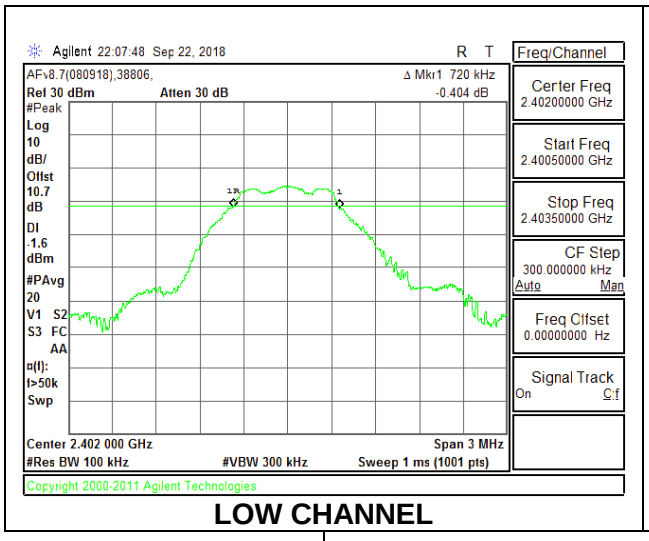
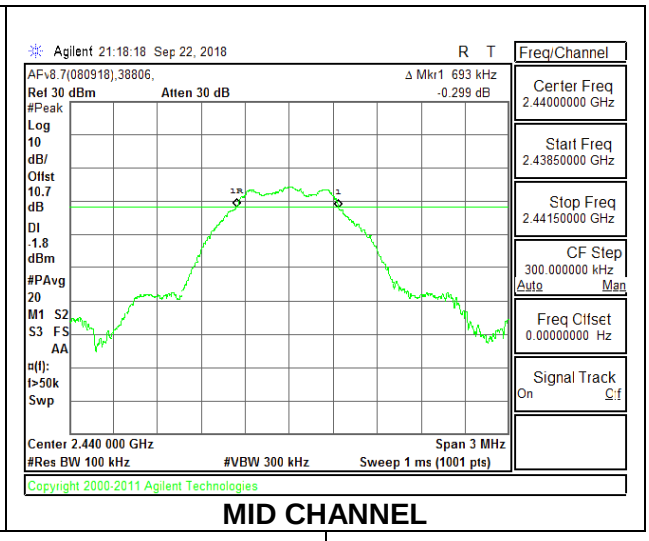
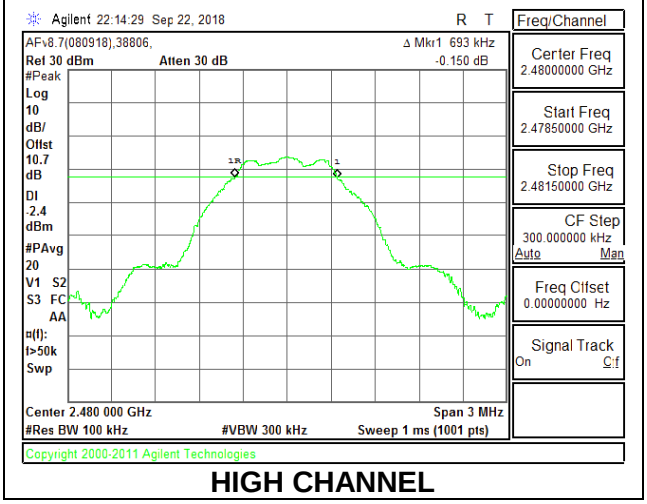
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.7200	0.5
Middle	2440	0.6930	0.5
High	2480	0.6930	0.5



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

8.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

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

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.7 dB (including 10 dB pad and 0.7 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

Tested By:	38806
Date:	10/11/2018

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.02	30	-24.98
Middle	2440	5.02	30	-24.98
High	2480	5.01	30	-24.99

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8.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.7 dB (including 10 dB pad and 0.7 dB cable) was entered as an offset in the power meter to allow for a gated average reading of power.

RESULTS

Tested By:	38806
Date:	10/11/2018

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	4.95
Middle	2440	4.95
High	2480	4.92

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8.6. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

RSS-247 (5.2) (b)

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

RESULTS

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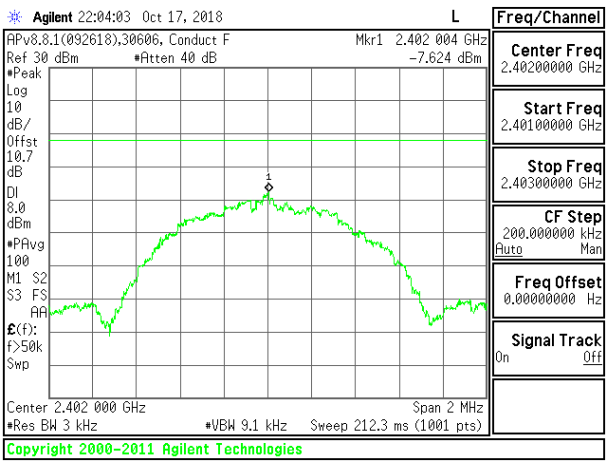
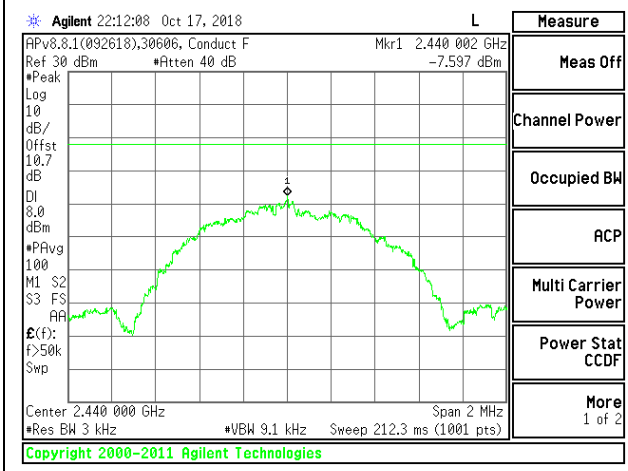
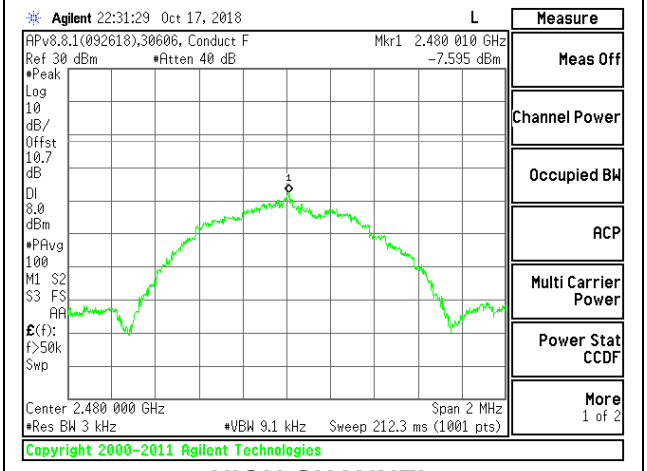
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	-7.62	8	-15.62
Middle	2440	-7.60	8	-15.60
High	2480	-8.85	8	-16.85



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

8.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

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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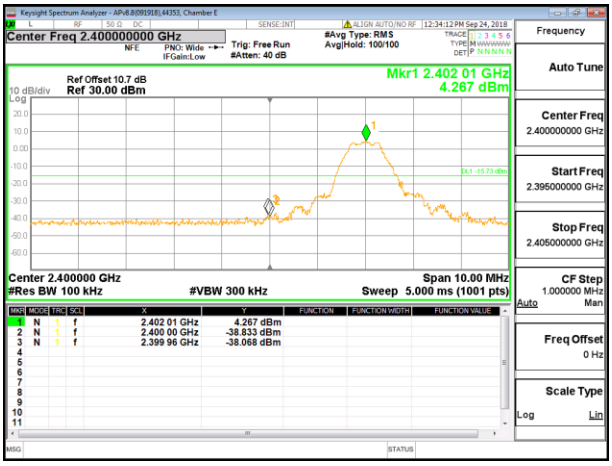
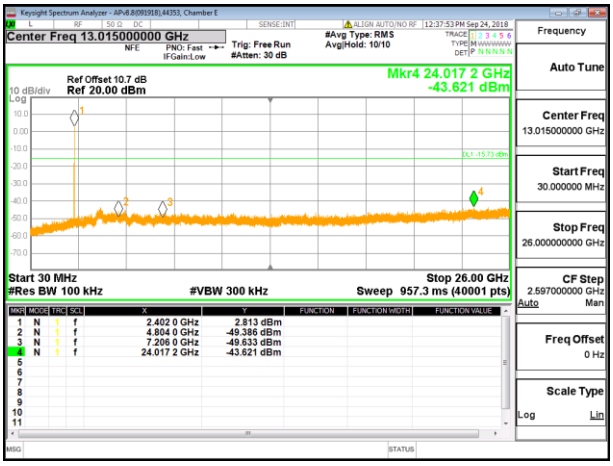
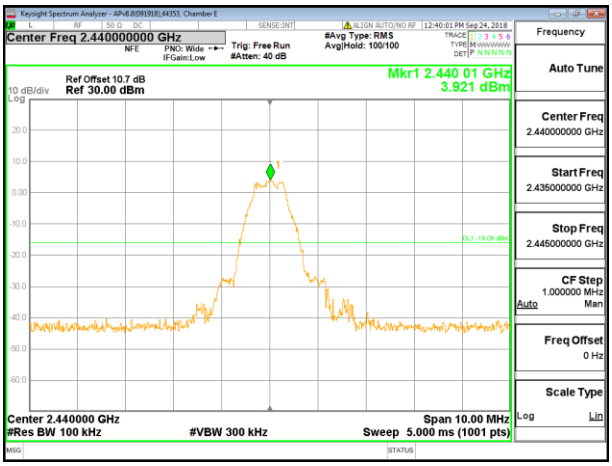


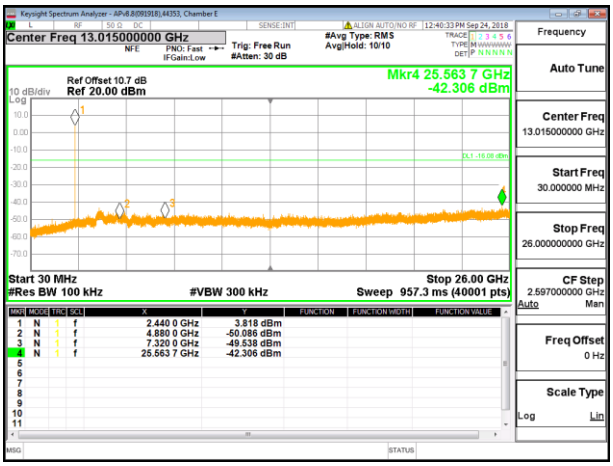
LOW CHANNEL BANDEDGE



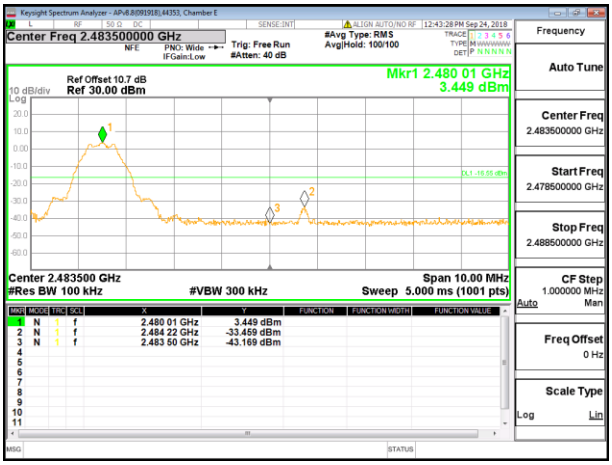
OUT-OF-BAND LOW CHANNEL



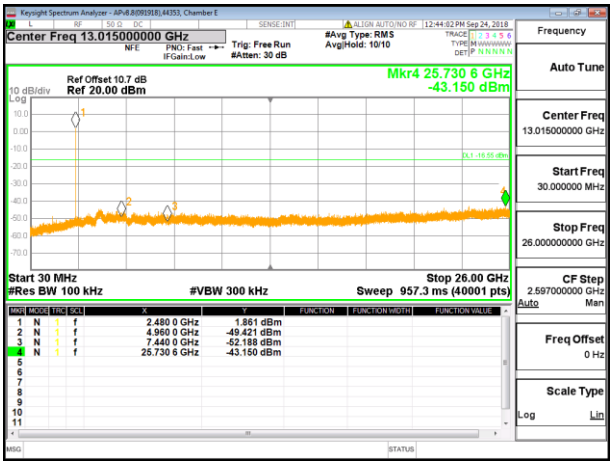
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
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 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest output power was tested.

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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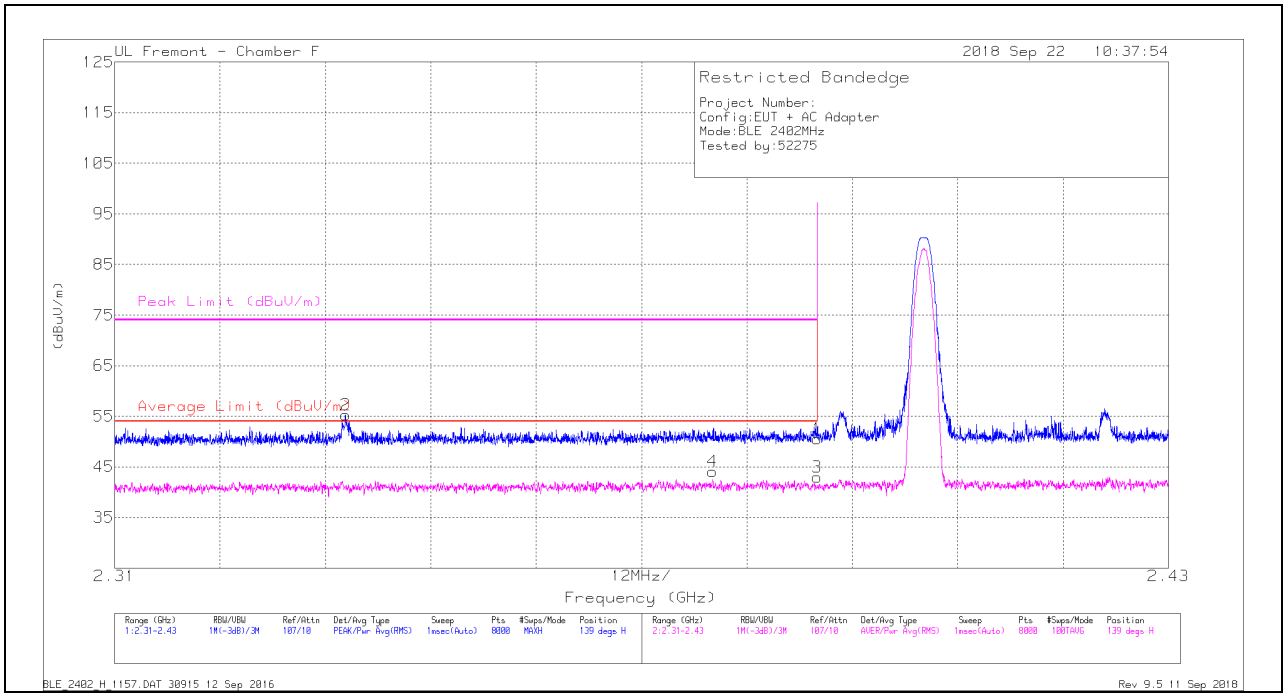
9.2. TRANSMITTER ABOVE 1 GHz

BANDEDGE (LOW CHANNEL)

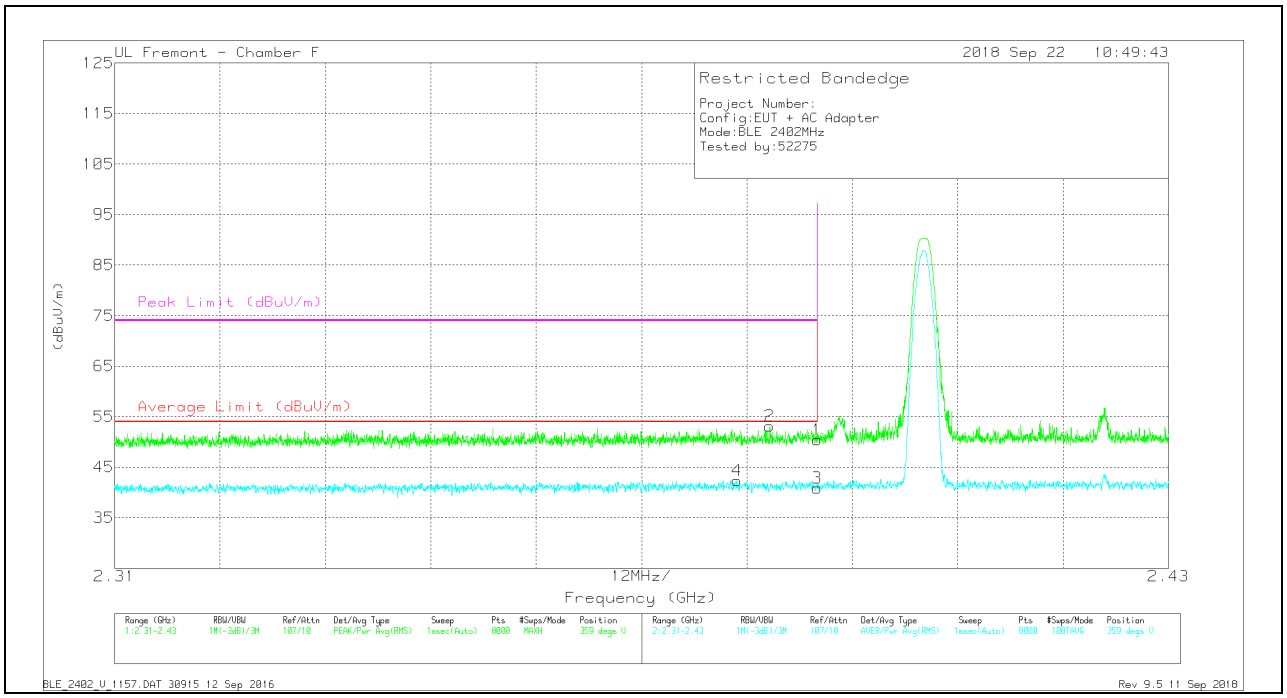
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/ Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	39.09	Pk	32.1	-20.6	0	50.59	-	-	74	-23.41	139	168	H
2	* 2.336	44.04	Pk	31.9	-20.7	0	55.24	-	-	74	-18.76	139	168	H
3	* 2.39	29.79	RMS	32.1	-20.6	1.63	42.92	54	-11.08	-	-	139	168	H
4	* 2.378	30.94	RMS	32.1	-20.6	1.63	44.07	54	-9.93	-	-	139	168	H

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

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	38.97	Pk	32.1	-20.6	0	50.47	-	-	74	-23.53	359	132	V
2	* 2.385	41.6	Pk	32.1	-20.6	0	53.1	-	-	74	-20.9	359	132	V
3	* 2.39	29.41	RMS	32.1	-20.6	1.63	42.54	54	-11.46	-	-	359	132	V
4	* 2.381	30.88	RMS	32.1	-20.6	1.63	44.01	54	-9.99	-	-	359	132	V

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

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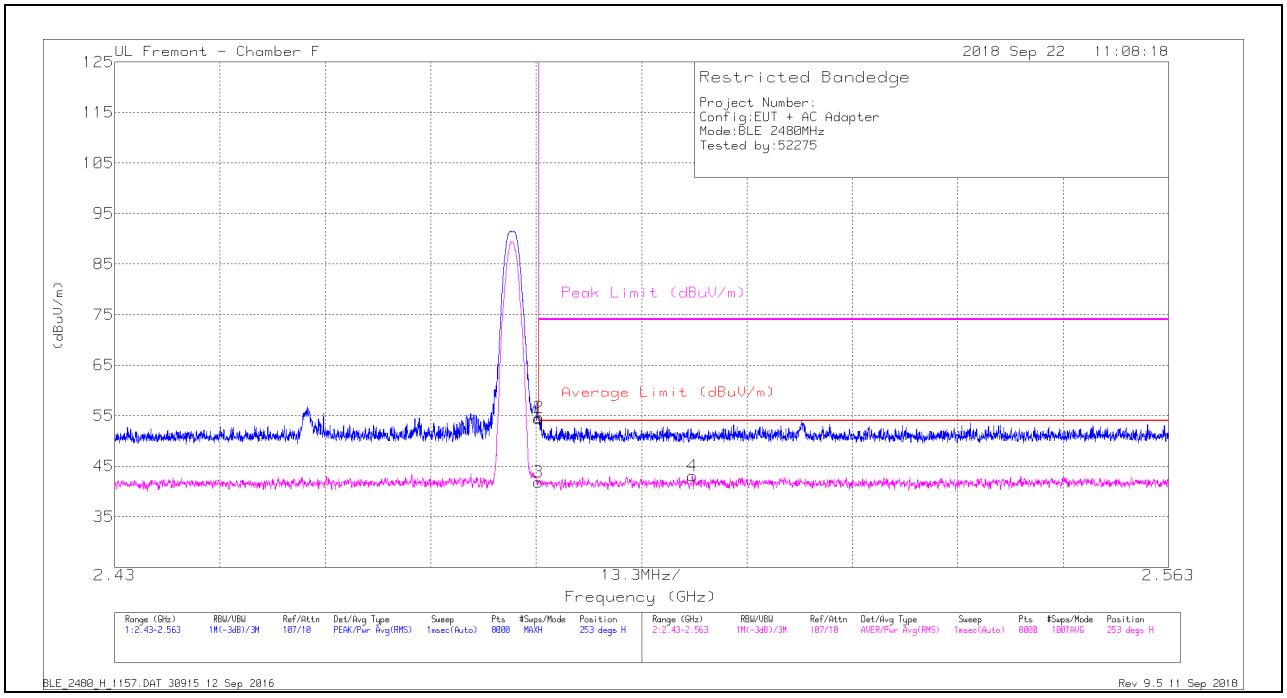
BANDEDGE (HIGH CHANNEL)

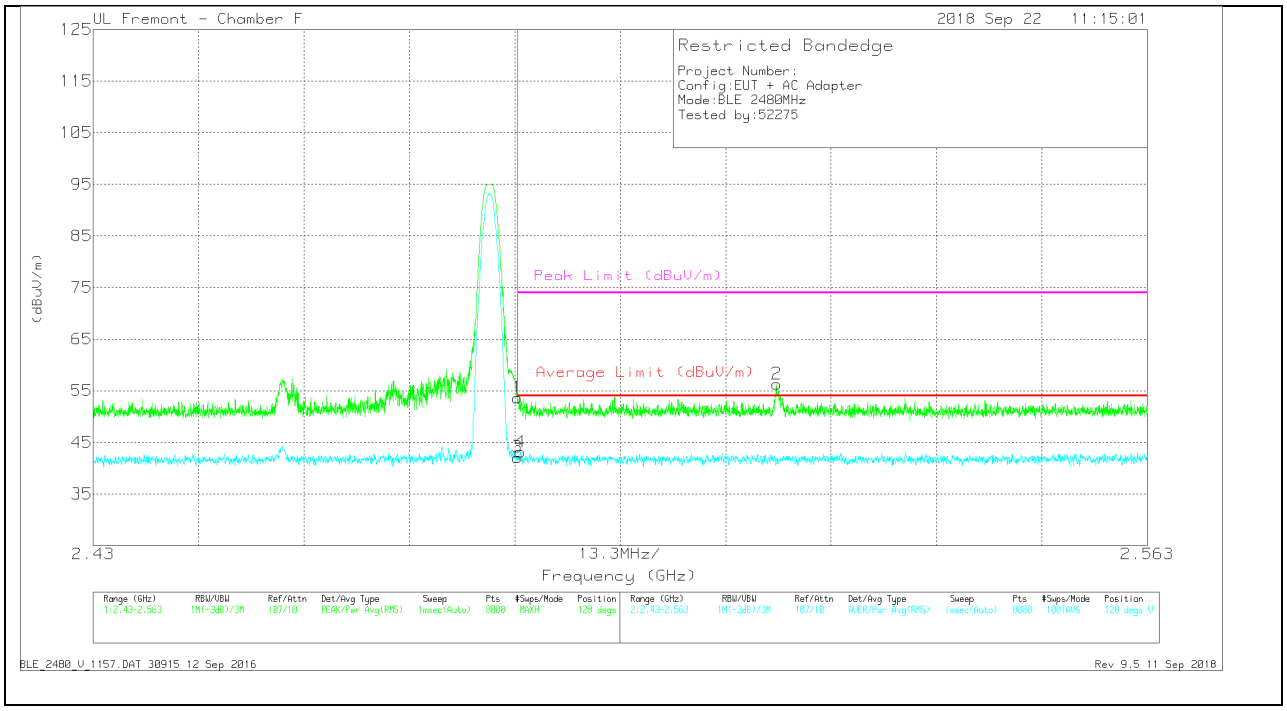
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	42.7	Pk	32.4	-20.7	0	54.4	-	-	74	-19.6	253	134	H
2	* 2.484	42.95	Pk	32.4	-20.7	0	54.65	-	-	74	-19.35	253	134	H
3	* 2.484	30.16	RMS	32.4	-20.7	1.63	43.49	54	-10.51	-	-	253	134	H
4	2.503	31.39	RMS	32.4	-20.7	1.63	44.72	54	-9.28	-	-	253	134	H

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

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	41.96	Pk	32.4	-20.7	0	53.66	-	-	74	-20.34	128	168	V
2	2.516	44.53	Pk	32.4	-20.6	0	56.33	-	-	74	-17.67	128	168	V
3	* 2.484	30.39	RMS	32.4	-20.7	1.63	43.72	54	-10.28	-	-	128	168	V
4	* 2.484	31.43	RMS	32.4	-20.7	1.63	44.76	54	-9.24	-	-	128	168	V

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

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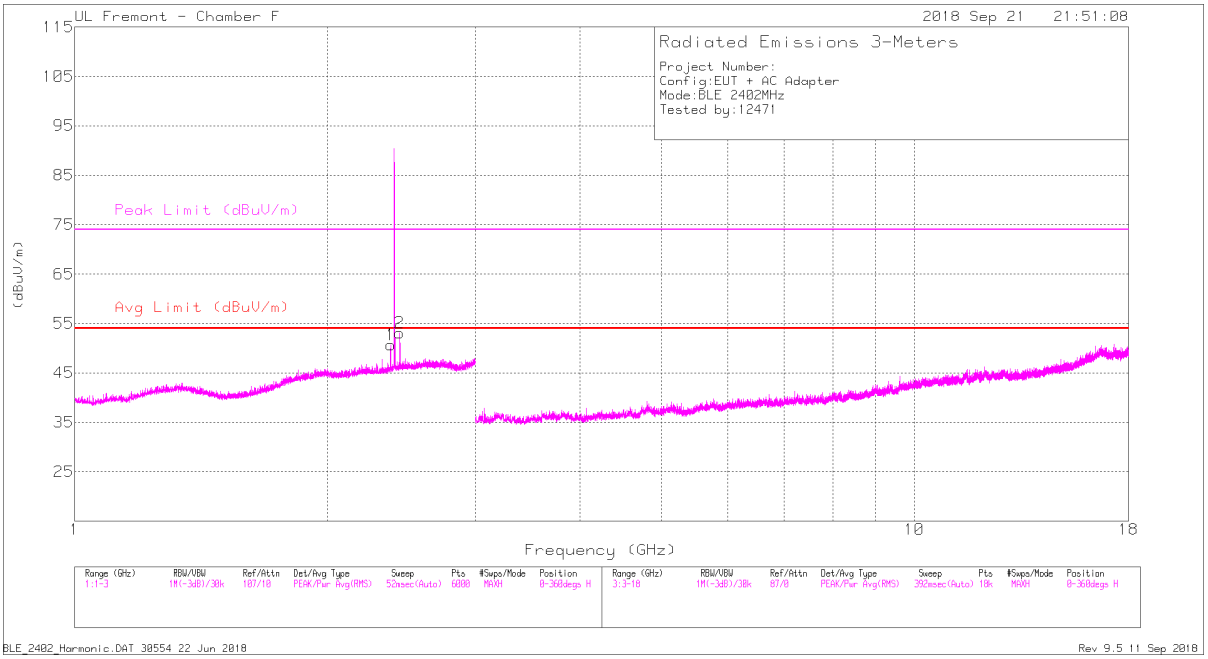
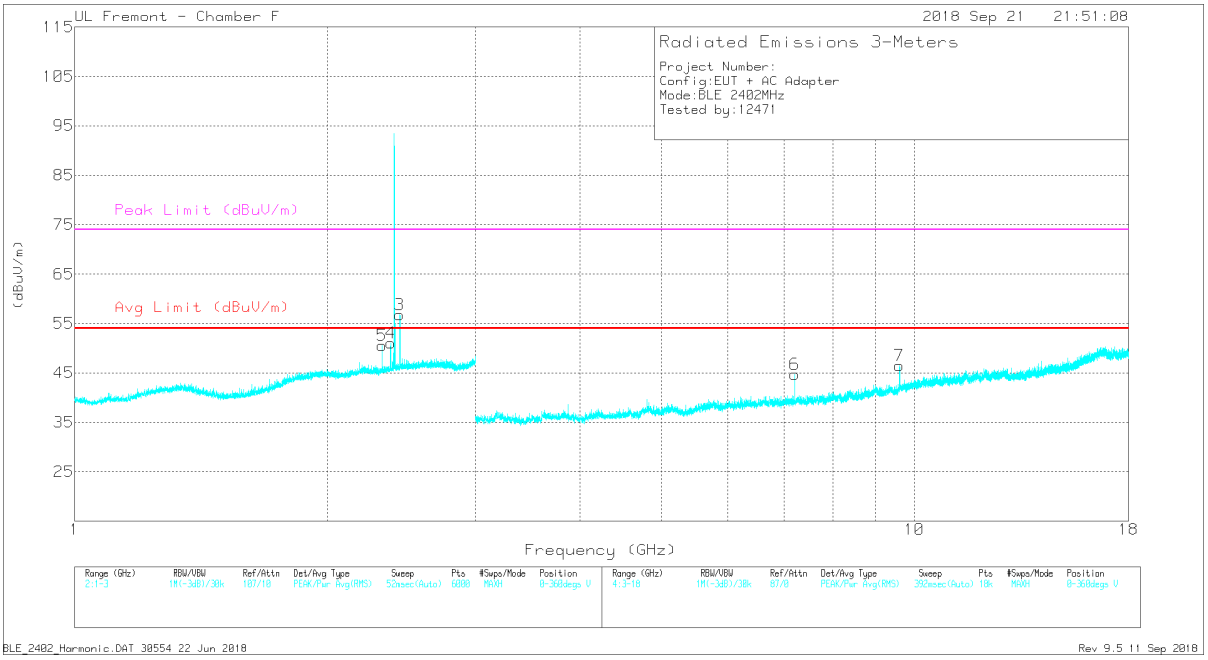
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZTONAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.379	43.77	PK2	32.1	-20.6	0	55.27	-	-	74	-18.73	345	151	H
	* 2.379	30.31	MAv1	32.1	-20.6	1.63	43.44	54	-10.56	-	-	345	151	H
2	2.44	46.58	PK2	32.4	-20.6	0	58.38	-	-	-	-	154	123	H
3	2.44	48.9	PK2	32.4	-20.6	0	60.7	-	-	-	-	22	100	V
4	* 2.379	47.43	PK2	32.1	-20.6	0	58.93	-	-	74	-15.07	24	103	V
	* 2.379	31.44	MAv1	32.1	-20.6	1.63	44.57	54	-9.43	-	-	24	103	V
5	* 2.323	46.48	PK2	31.8	-20.6	0	57.68	-	-	74	-16.32	134	104	V
	* 2.323	30.54	MAv1	31.8	-20.6	1.63	43.37	54	-10.63	-	-	134	104	V
6	7.205	40.57	PK2	35.6	-25.6	0	50.57	-	-	-	-	220	198	V
7	9.607	38.28	PK2	36.5	-21.5	0	53.28	-	-	-	-	302	179	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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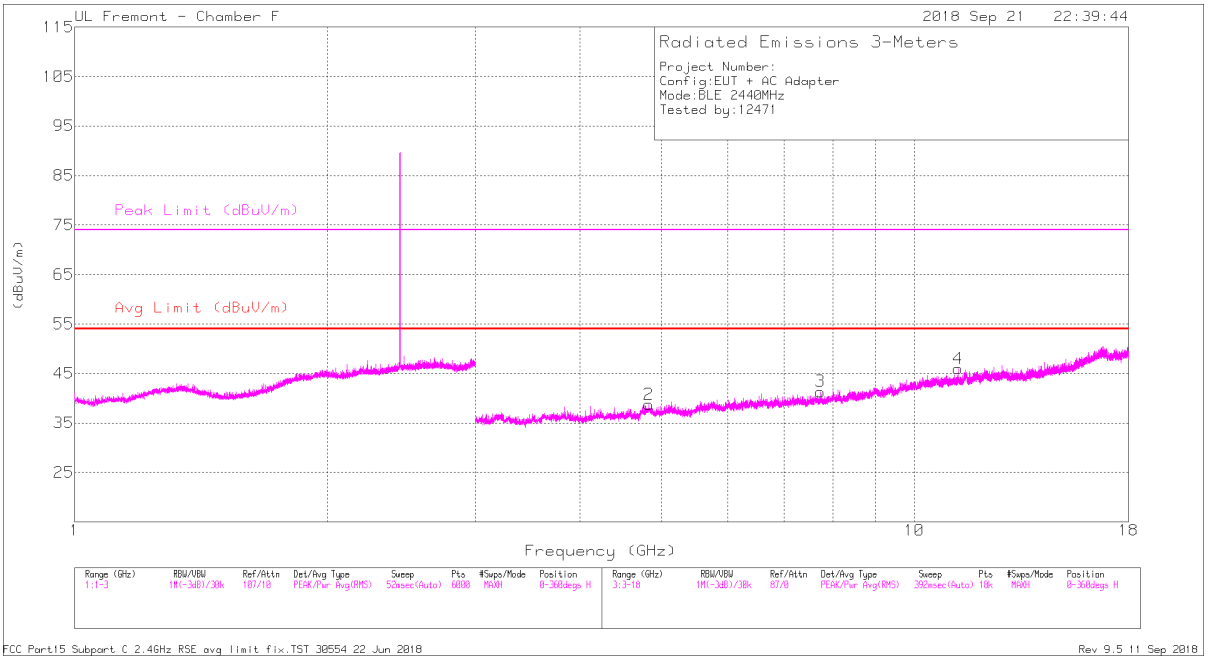
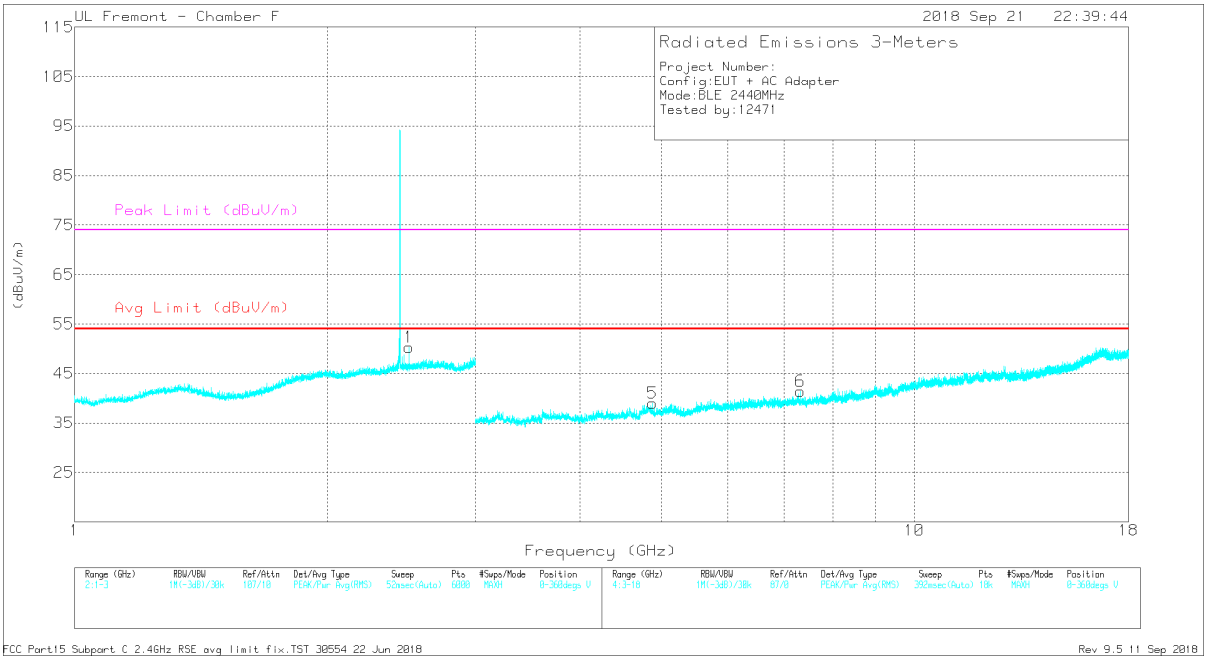
MID CHANNEL RESULTS



HORIZTONAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.503	45.41	PK2	32.4	-20.7	0	57.11	-	-	-	-	139	101	V
2	* 4.827	37.8	PK2	33.9	-26.9	0	44.8	-	-	74	-29.2	50	272	H
	* 4.83	26.53	MAv1	33.9	-26.9	1.63	35.16	54	-18.84	-	-	50	272	H
3	* 7.732	36.66	PK2	35.6	-24.8	0	47.46	-	-	74	-26.54	78	254	H
	* 7.729	25	MAv1	35.6	-24.9	1.63	37.33	54	-16.67	-	-	78	254	H
4	* 11.289	34.64	PK2	38	-21.1	0	51.54	-	-	74	-22.46	64	387	H
	* 11.287	22.99	MAv1	38	-21.1	1.63	41.52	54	-12.48	-	-	64	387	H
5	* 4.88	38.68	PK2	33.9	-27.4	0	45.18	-	-	74	-28.82	83	109	V
	* 4.88	28.02	MAv1	33.9	-27.4	1.63	36.15	54	-17.85	-	-	83	109	V
6	* 7.32	39.28	PK2	35.6	-25.9	0	48.98	-	-	74	-25.02	177	182	V
	* 7.32	28.11	MAv1	35.6	-25.9	1.63	39.44	54	-14.56	-	-	177	182	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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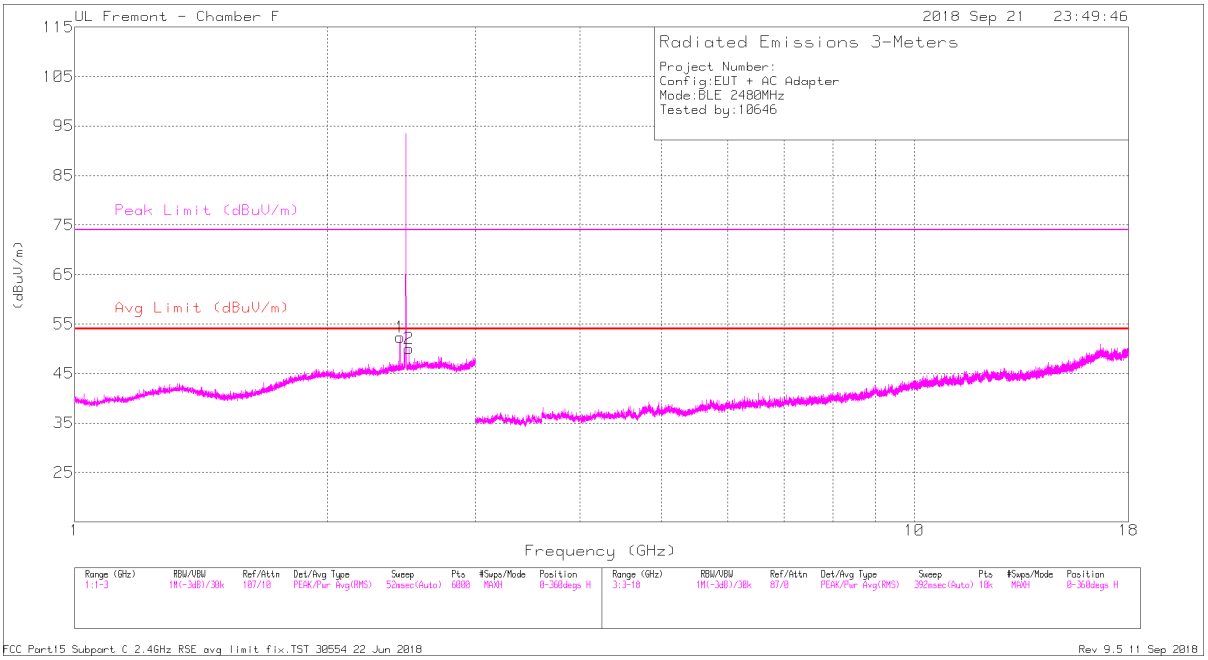
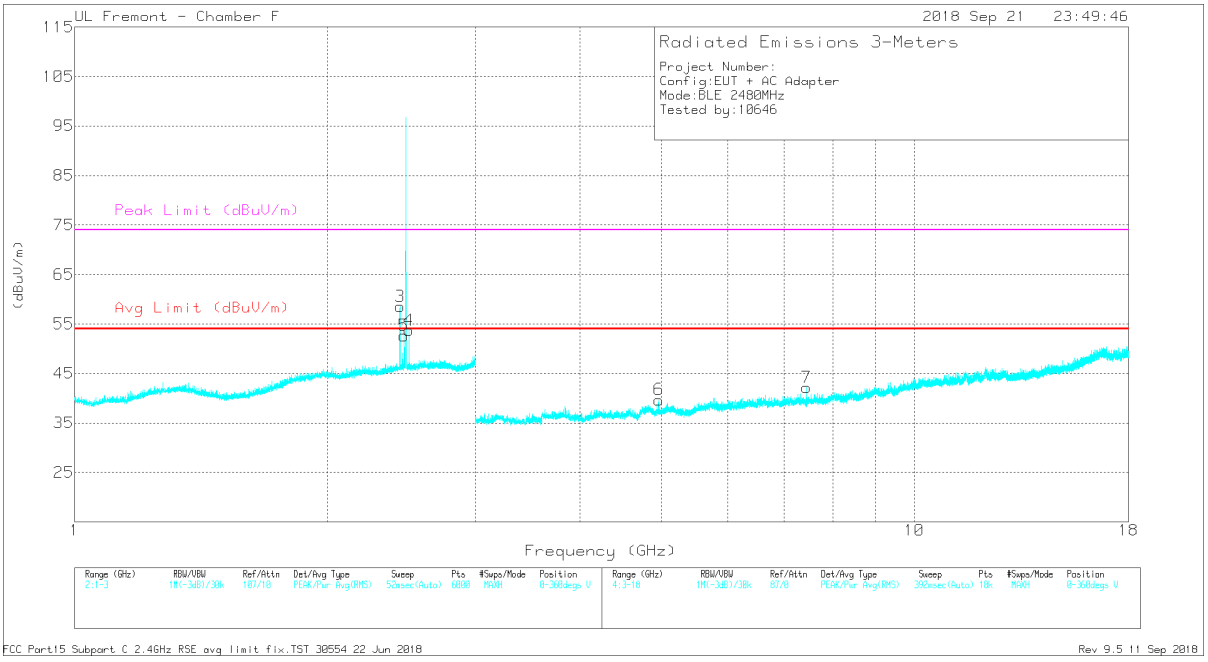
HIGH CHANNEL RESULTS



HORIZTONAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.44	47.81	PK2	32.4	-20.6	0	59.61	-	-	-	-	221	124	H
2	2.502	47.56	PK2	32.4	-20.7	0	59.26	-	-	-	-	216	130	H
3	2.44	50.43	PK2	32.4	-20.6	0	62.23	-	-	-	-	226	110	V
4	2.503	48.82	PK2	32.4	-20.7	0	60.52	-	-	-	-	239	101	V
5	2.469	50.08	PK2	32.4	-20.6	0	61.88	-	-	-	-	229	120	V
6	* 4.96	41.01	PK2	33.9	-28.2	0	46.71	-	-	74	-27.29	270	211	V
	* 4.96	30.19	MAv1	33.9	-28.2	1.63	37.52	54	-16.48	-	-	270	211	V
7	* 7.441	38.42	PK2	35.6	-25.1	0	48.92	-	-	74	-25.08	3	329	V
	* 7.44	27.95	MAv1	35.6	-25.1	1.63	40.08	54	-13.92	-	-	3	329	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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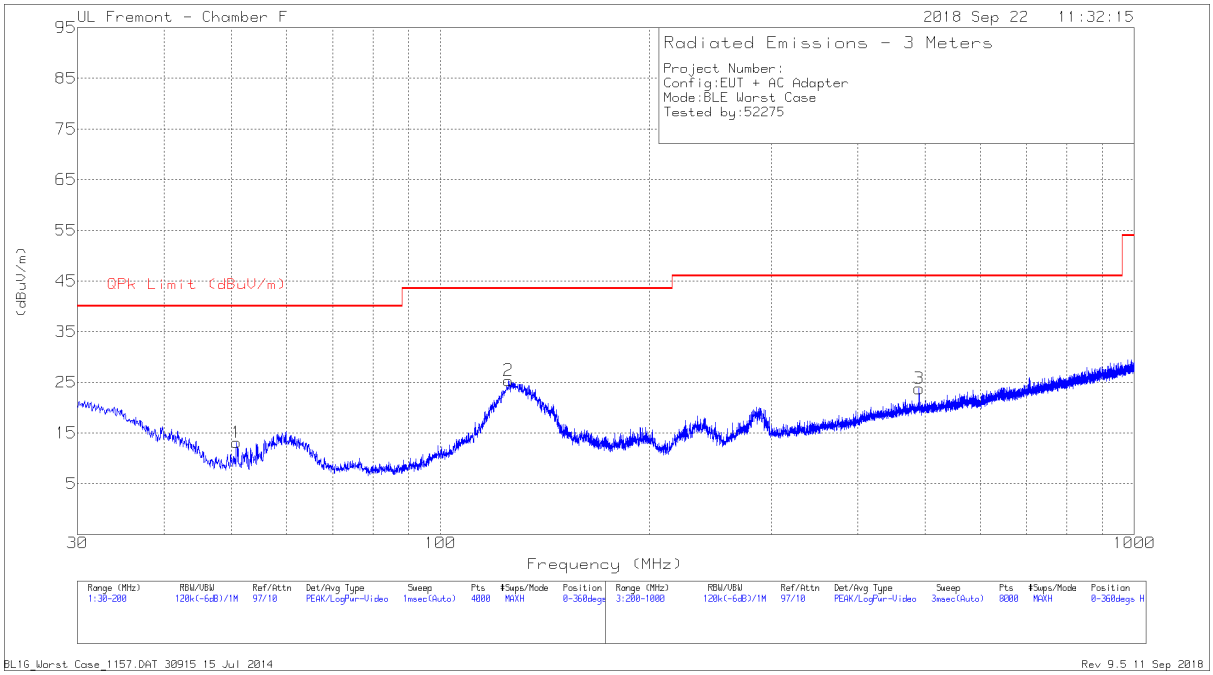
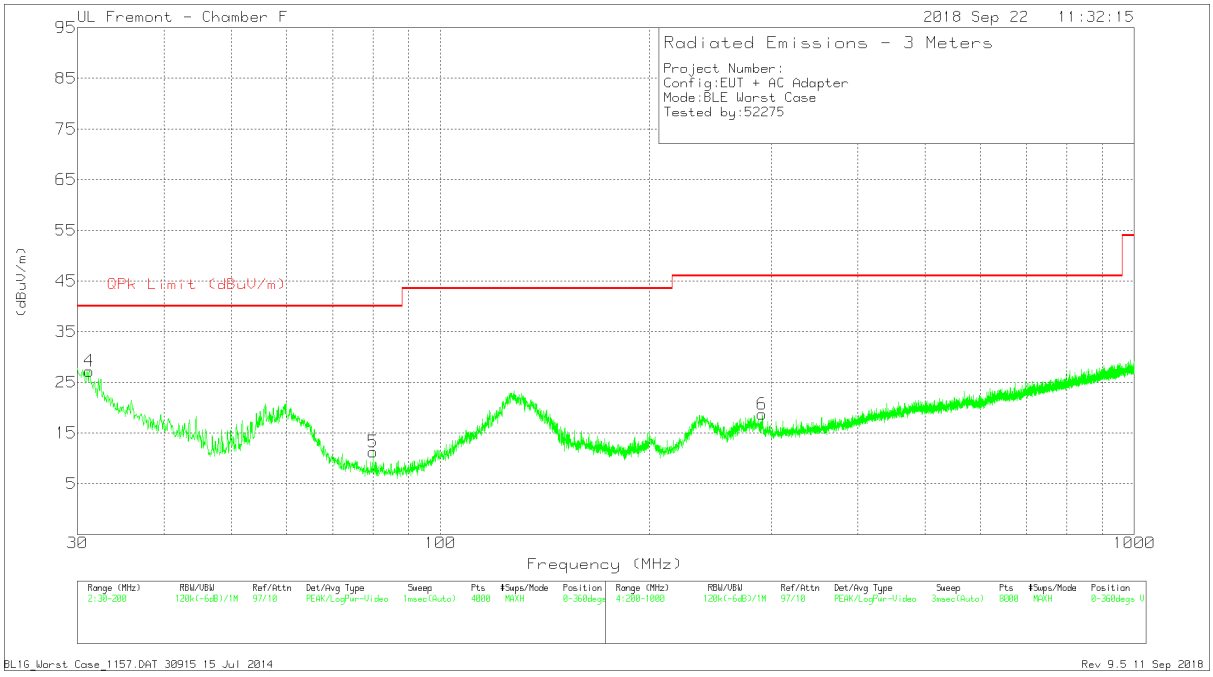
9.3. WORST CASE BELOW 1 GHz

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



HORIZTONAL



VERTICAL

Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T408 (dB/m)	Amp/Cbl (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	50.8729	33.42	Pk	11.4	-31.7	0	13.12	40	-26.88	0-360	299	H
2	* 125.4797	38.63	Pk	17.7	-31	0	25.33	43.52	-18.19	0-360	199	H
4	31.1903	34.53	Pk	24.6	-31.9	0	27.23	40	-12.77	0-360	100	V
5	79.9929	31.17	Pk	11.5	-31.4	0	11.27	40	-28.73	0-360	100	V
3	489.8377	31.28	Pk	21.6	-29.1	0	23.78	46.02	-22.24	0-360	299	H
6	290.9118	31.42	Pk	17.3	-30	0	18.72	46.02	-27.3	0-360	199	V

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

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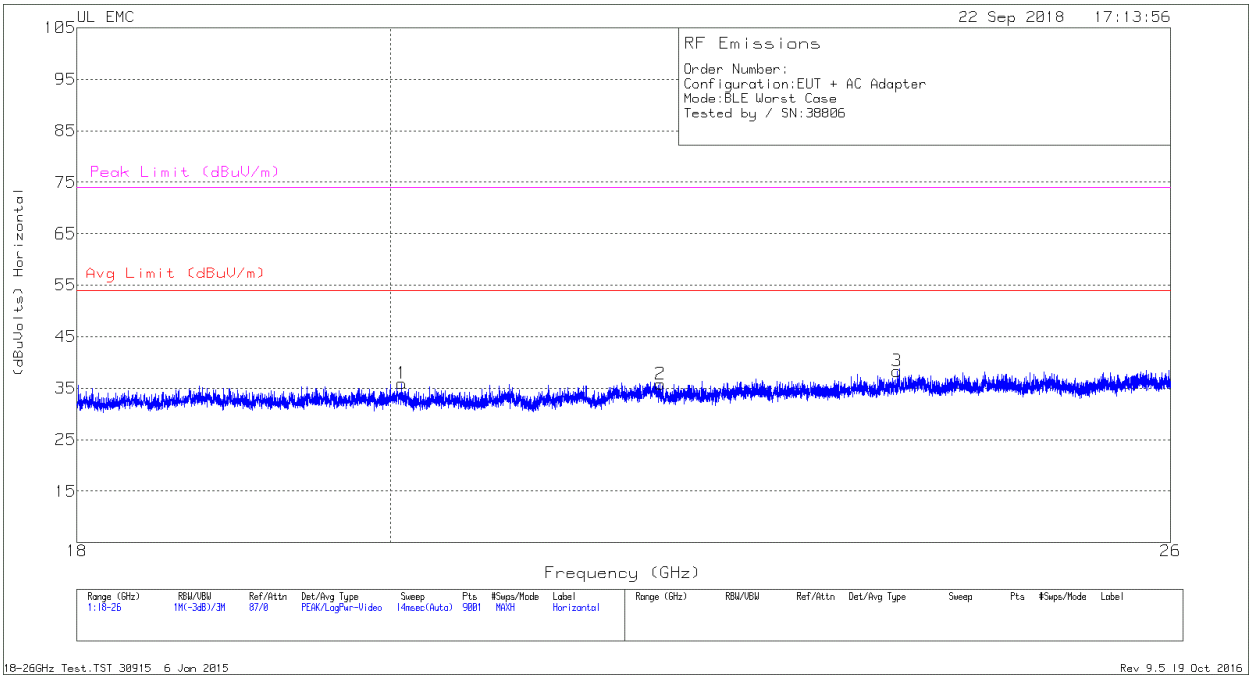
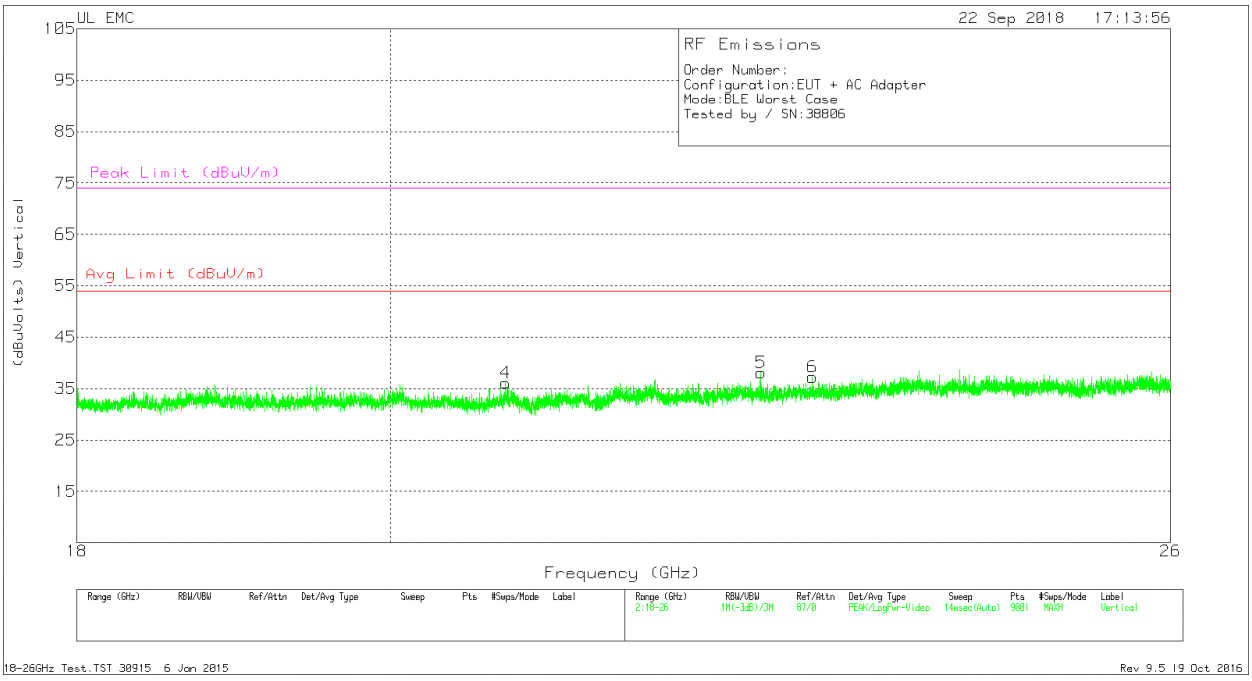
9.4. WORST CASE ABOVE 18-26 GHz

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



HORIZTONAL



VERTICAL

18 – 26GHz 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	20.076	37.53	Pk	32.9	-25	-9.5	35.93	54	-18.07	74	-38.07
2	21.9	37.34	Pk	33.3	-25.3	-9.5	35.84	54	-18.16	74	-38.16
3	23.715	38.3	Pk	33.7	-24.2	-9.5	38.3	54	-15.7	74	-35.7
4	20.789	37.78	Pk	32.7	-24.9	-9.5	36.08	54	-17.92	74	-37.92
5	22.652	39.28	Pk	33.3	-25	-9.5	38.08	54	-15.92	74	-35.92
6	23.049	38.33	Pk	33.6	-25.2	-9.5	37.23	54	-16.77	74	-36.77

Pk - Peak detector

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10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

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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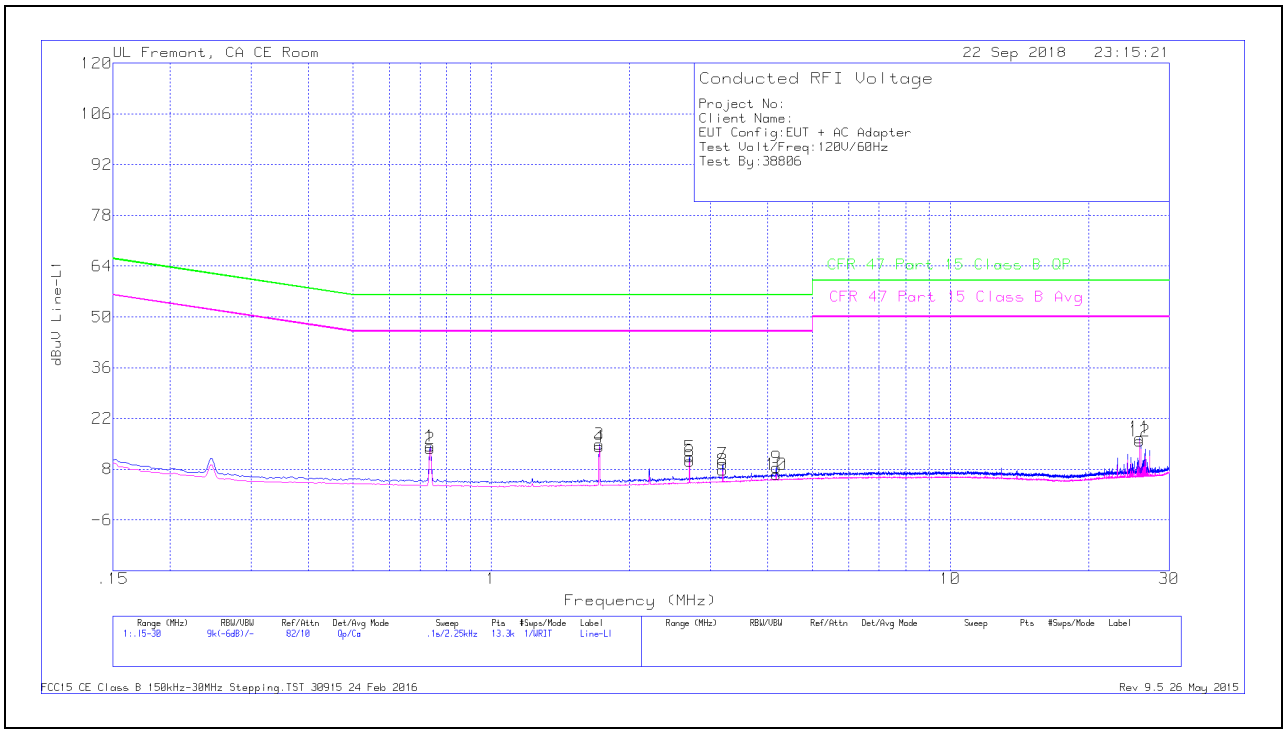
LINE 1 RESULTS

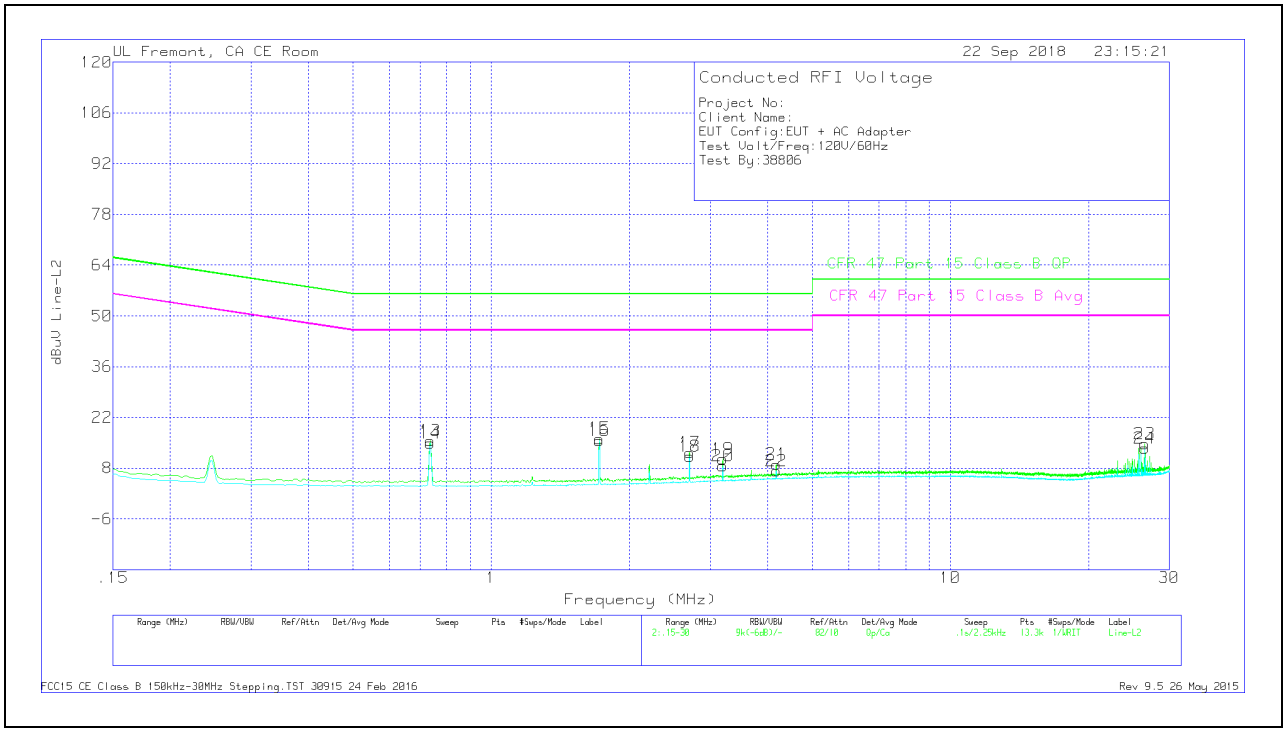


Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables C1&C3	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	.73725	4.32	Qp	0	0	10.1	14.42	56	-41.58	-	-
2	.73725	3.55	Ca	0	0	10.1	13.65	-	-	46	-32.35
3	1.7205	4.73	Qp	0	.1	10.1	14.93	56	-41.07	-	-
4	1.7205	4.05	Ca	0	.1	10.1	14.25	-	-	46	-31.75
5	2.70375	1.2	Qp	0	.1	10.1	11.4	56	-44.6	-	-
6	2.70375	-.05	Ca	0	.1	10.1	10.15	-	-	46	-35.85
7	3.19425	-.7	Qp	0	.1	10.1	9.5	56	-46.5	-	-
8	3.19425	-2.47	Ca	0	.1	10.1	7.73	-	-	46	-38.27
9	4.1775	-1.82	Qp	0	.1	10.1	8.38	56	-47.62	-	-
10	4.1775	-3.67	Ca	0	.1	10.1	6.53	-	-	46	-39.47
11	25.87875	5.81	Qp	.1	.3	10.5	16.71	60	-43.29	-	-
12	25.881	4.89	Ca	.1	.3	10.5	15.79	-	-	50	-34.21

Qp - Quasi-Peak detector
Ca - CISPR average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables C2&C3	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	.73725	5.43	Qp	0	0	10.1	15.53	56	-40.47	-	-
14	.73725	4.87	Ca	0	0	10.1	14.97	-	-	46	-31.03
15	1.7205	5.99	Qp	0	.1	10.1	16.19	56	-39.81	-	-
16	1.7205	5.36	Ca	0	.1	10.1	15.56	-	-	46	-30.44
17	2.70375	2.12	Qp	0	.1	10.1	12.32	56	-43.68	-	-
18	2.70375	1	Ca	0	.1	10.1	11.2	-	-	46	-34.8
19	3.19425	.33	Qp	0	.1	10.1	10.53	56	-45.47	-	-
20	3.19425	-1.52	Ca	0	.1	10.1	8.68	-	-	46	-37.32
21	4.1775	-1.14	Qp	0	.1	10.1	9.06	56	-46.94	-	-
22	4.1775	-2.95	Ca	0	.1	10.1	7.25	-	-	46	-38.75
23	26.49075	3.77	Qp	.1	.3	10.5	14.67	60	-45.33	-	-
24	26.49075	2.52	Ca	.1	.3	10.5	13.42	-	-	50	-36.58

Qp - Quasi-Peak detector
Ca - CISPR average detection

END OF REPORT

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11. SETUP PHOTOS

Please refer to 12289553-EP1V1 for setup photo

UL VERIFICATION SERVICES INC.
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