



# **CERTIFICATION TEST REPORT**

**Report Number. : 13280103-E1V2**

**Applicant :** APPLE, INC.  
1 APPLE PARK WAY  
CUPERTINO, CA 95014, U.S.A.

**Model :** A2453

**FCC ID :** BCGA2453

**IC :** 579C-A2453

**EUT Description :** Totally Wireless High-Performance Earphones

**Test Standard(s) :** FCC 47 CFR PART 15 SUBPART C  
ISED RSS-247 ISSUE 2  
ISED RSS-GEN ISSUE 5

**Date Of Issue:**  
March 31, 2020

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## REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	3/27/2020	Initial Issue	Francisco Guarnero
V2	3/31/2020	Address TCB's Questions	Chin Pang

## TABLE OF CONTENTS

<b>REPORT REVISION HISTORY .....</b>	<b>2</b>
<b>TABLE OF CONTENTS .....</b>	<b>3</b>
<b>1. ATTESTATION OF TEST RESULTS .....</b>	<b>5</b>
<b>2. TEST RESULTS SUMMARY.....</b>	<b>6</b>
<b>3. TEST METHODOLOGY .....</b>	<b>7</b>
<b>4. FACILITIES AND ACCREDITATION .....</b>	<b>7</b>
<b>5. DECISION RULES AND MEASUREMENT UNCERTAINTY .....</b>	<b>8</b>
5.1. <i>METROLOGICAL TRACEABILITY</i> .....	8
5.2. <i>DECISION RULES</i> .....	8
5.3. <i>MEASUREMENT UNCERTAINTY</i> .....	8
5.4. <i>SAMPLE CALCULATION</i> .....	8
<b>6. EQUIPMENT UNDER TEST .....</b>	<b>9</b>
6.1. <i>EUT DESCRIPTION</i> .....	9
6.2. <i>MAXIMUM OUTPUT POWER</i> .....	9
6.3. <i>DESCRIPTION OF AVAILABLE ANTENNAS</i> .....	9
6.4. <i>SOFTWARE AND FIRMWARE</i> .....	9
6.5. <i>WORST-CASE CONFIGURATION AND MODE</i> .....	9
6.6. <i>DESCRIPTION OF TEST SETUP</i> .....	10
<b>7. MEASUREMENT METHOD.....</b>	<b>17</b>
<b>8. TEST AND MEASUREMENT EQUIPMENT .....</b>	<b>18</b>
<b>9. ANTENNA PORT TEST RESULTS .....</b>	<b>19</b>
9.1. <i>ON TIME AND DUTY CYCLE</i> .....	19
9.2. <i>99% BANDWIDTH</i> .....	21
9.2.1. <i>BLE (1Mbps)</i> .....	21
9.2.2. <i>BLE (2Mbps)</i> .....	22
9.3. <i>6 dB BANDWIDTH</i> .....	23
9.3.1. <i>BLE (1Mbps)</i> .....	24
9.3.2. <i>BLE (2Mbps)</i> .....	25
9.4. <i>OUTPUT POWER</i> .....	26
9.4.1. <i>BLE (1Mbps)</i> .....	26
9.4.2. <i>BLE (2Mbps)</i> .....	26
9.5. <i>AVERAGE POWER</i> .....	27

9.5.1. BLE (1Mbps).....	27
9.5.2. BLE (2Mbps).....	27
9.6. <i>POWER SPECTRAL DENSITY</i> .....	28
9.6.1. BLE (1Mbps).....	29
9.6.2. BLE (2Mbps).....	30
9.7. <i>CONDUCTED SPURIOUS EMISSIONS</i> .....	31
9.7.1. BLE (1Mbps).....	32
9.7.2. BLE (2Mbps).....	33
<b>10. RADIATED TEST RESULTS .....</b>	<b>34</b>
10.1. <i>LIMITS AND PROCEDURE</i> .....	34
10.2. <i>TRANSMITTER ABOVE 1 GHz</i> .....	36
10.2.1. BLE (1Mbps) .....	36
10.2.2. BLE (2Mbps) .....	46
10.3. <i>WORST CASE BELOW 1 GHz</i> .....	56
10.4. <i>WORST CASE 18-26 GHz</i> .....	58
<b>11. AC POWER LINE CONDUCTED EMISSIONS .....</b>	<b>60</b>
11.1.1. AC Power Line Host .....	61
11.1.2. AC Power Line Norm .....	63
<b>12. SETUP PHOTOS .....</b>	<b>65</b>

## 1. ATTESTATION OF TEST RESULTS

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

**EUT DESCRIPTION:** Totally Wireless High-Performance Earphones

**MODEL:** A2453

**SERIAL NUMBER:** CC2C902LPNC9 (Conducted) CC2C904HPNC9 (Radiated)

**DATE TESTED:** MARCH 12 – 26, 2020

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:



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Chin Pang  
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Consumer Technology Division  
UL Verification Services Inc.

Prepared By:



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Francisco Guarnero  
Test Engineer  
Consumer Technology Division  
UL Verification Services Inc.

## 2. TEST RESULTS SUMMARY

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6.
See Comment	RSS-GEN 6.7	99% OBW	Reporting purposes only	ANSI C63.10 Section 6.9.3.
15.247 (a) (2)	RSS-247 5.2 (a)	6dB BW		None.
15.247 (b) (3)	RSS-247 5.4 (d)	Output Power		None.
See Comment		Average power	Reporting purposes only	Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (e)	RSS-247 5.2 (b)	PSD		None.
15.247 (d)	RSS-247 5.5	Conducted Spurious Emissions		None.
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions		None.
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions		None.

### 3. 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, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01, RSS-GEN Issue 5, and RSS-247 Issue 2.

### 4. 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.
<input type="checkbox"/> Chamber A (IC:2324B-1)	<input type="checkbox"/> Chamber D (IC:22541-1)	<input type="checkbox"/> Chamber I (IC: 2324A-5)
<input checked="" type="checkbox"/> Chamber B (IC:2324B-2)	<input type="checkbox"/> Chamber E (IC:22541-2)	<input type="checkbox"/> Chamber J (IC: 2324A-6)
<input type="checkbox"/> Chamber C (IC:2324B-3)	<input type="checkbox"/> Chamber F (IC:22541-3)	<input type="checkbox"/> Chamber K (IC: 2324A-1)
	<input checked="" type="checkbox"/> Chamber G (IC:22541-4)	<input type="checkbox"/> Chamber L (IC: 2324A-3)
	<input type="checkbox"/> Chamber H (IC:22541-5)	<input type="checkbox"/> Chamber M (IC: 2324A-2)

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code: 2324A.

## 5. DECISION RULES AND MEASUREMENT UNCERTAINTY

### 5.1. METROLOGICAL TRACEABILITY

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.

### 5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

### 5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	$U_{Lab}$
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.39 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.07 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.52 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	4.88 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.24 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.37 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.17 dB

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

### 5.4. SAMPLE CALCULATION

#### RADIATED EMISSIONS

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)

$$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$$

#### MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.

$$36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$$

## 6. EQUIPMENT UNDER TEST

### 6.1. EUT DESCRIPTION

The EUT, model A2453 is a totally wireless high performance earphones. It has an integral battery, microphone and antenna. It can charge via bottom contacts with charging case.

### 6.2. 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 (1M)	4.75	2.99
2402 - 2480	BLE (2M)	4.84	3.05

### 6.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Band (GHz)	Antenna Gain (dBi)
2.4	-5.40

### 6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 1A610

### 6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z with and without charging case and AC/DC adapter, and it was determined that Z (portrait) orientation was the worst-case orientation with EUT only on below and above 1GHz configuration.; therefore, all final radiated testing was performed with the EUT only in Z (portrait) orientation.

AC line conducted emission was investigated on the following configuration: EUT with charging case and AC/DC adapter and EUT with charging case and Laptop. Below 30 MHz was tested with charging case and AC/DC adapter as the worst case.

There were no emissions found below 30MHz within 20dB of the limit.

## 6.6. 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	PA-1450-BA1	B123	NA
AC/DC Adapter	Apple	A1385	D292365CDYADHLHC3	NA
Charger Case	Apple	A2078	CC2C903GPNJH	579C-A2078
10dB Fixed Attenuator	Pasternack	PE7087-10	Label ID: 178584	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	AC	1	AC	Un-shielded	2	N/A
2	USB	1	Lightning	Shielded	1	N/A
3	Antenna	1	SMA	Un-Shielded	0.3	To spectrum Analyzer / Power Meter

### 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
NA						

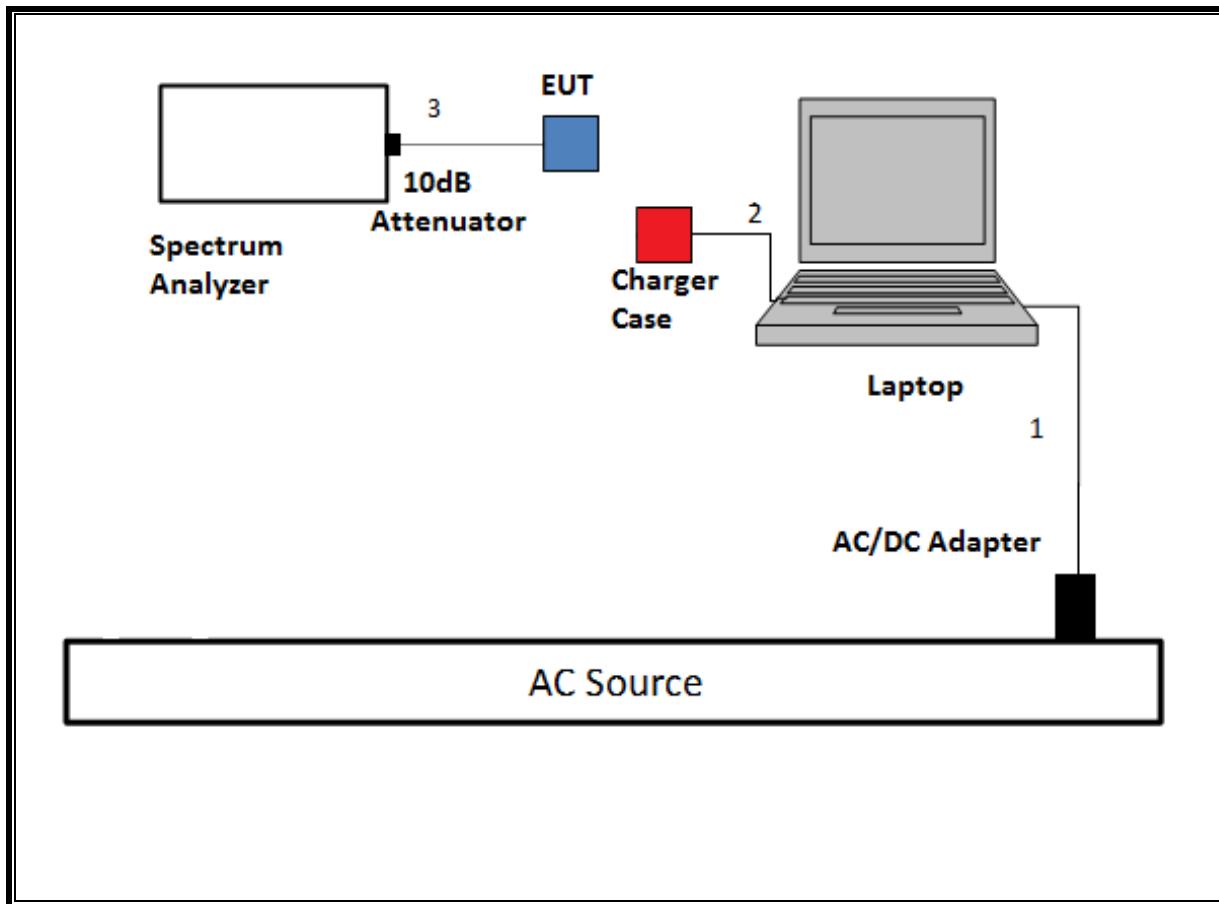
### I/O CABLES (BELOW 1GHz AND AC POWER LINE TEST WITH ADAPTER AND LAPTOP)

Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Un-shielded	1	N/A
2	USB	1	Lightning	Shielded	1	N/A

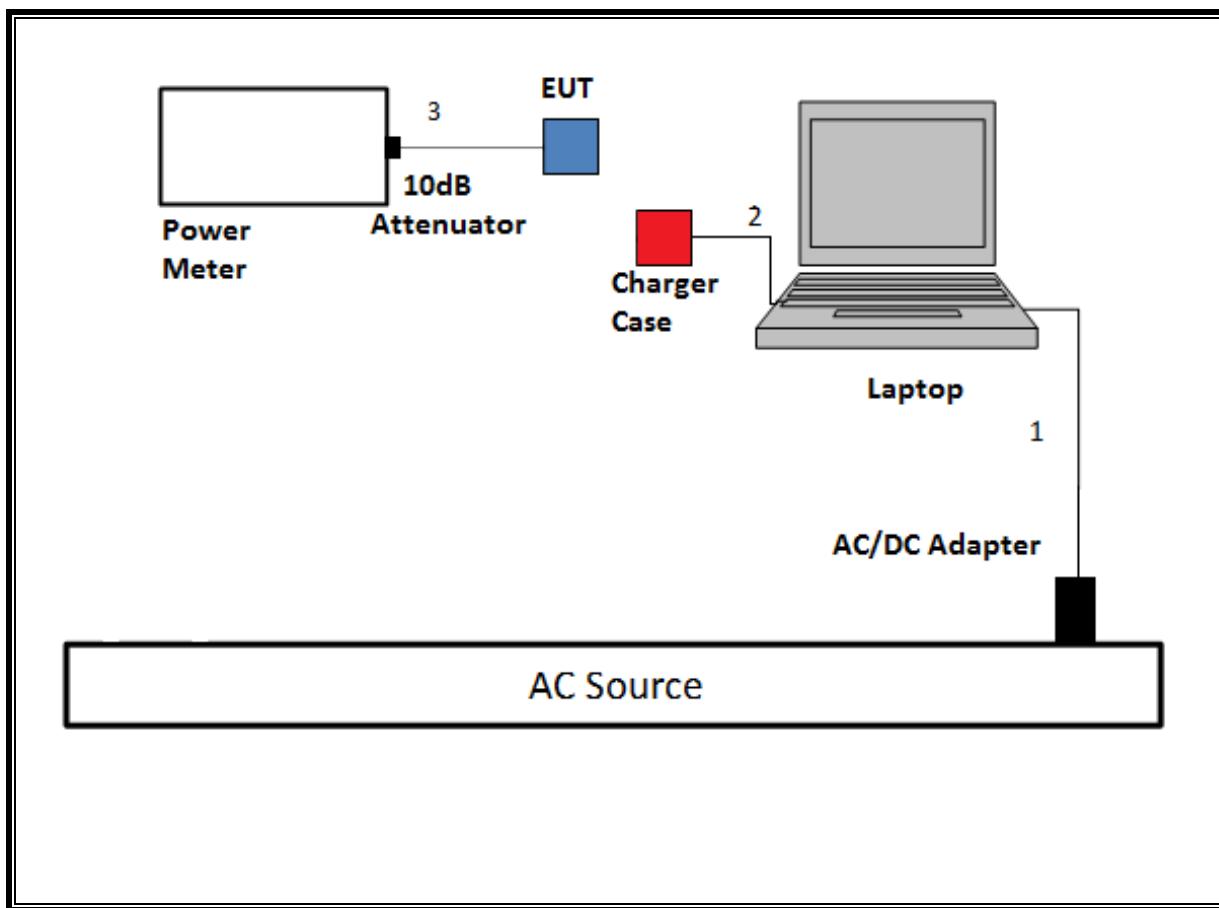
### TEST SETUP

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

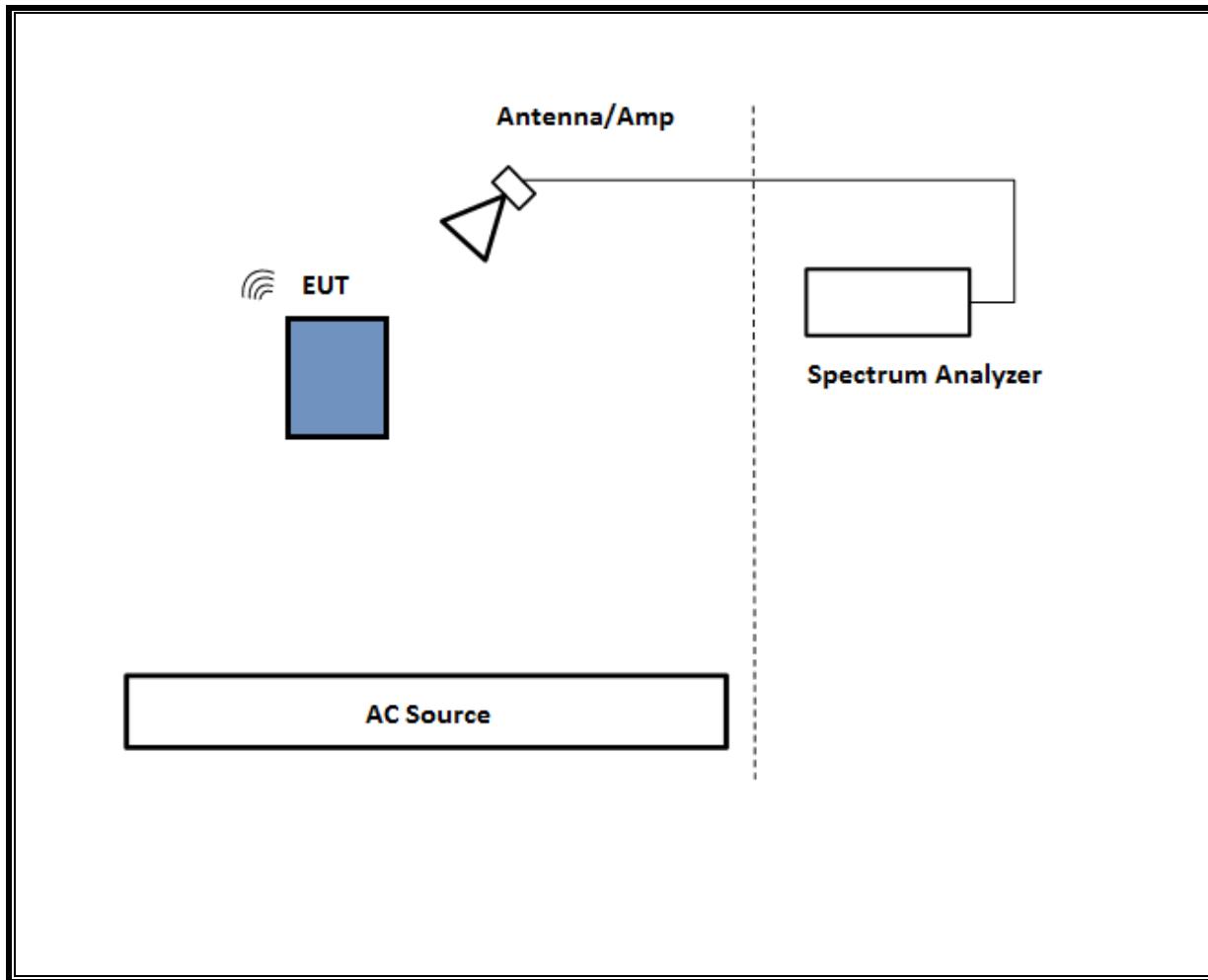
**SETUP DIAGRAM FOR CONDUCTED TESTS**



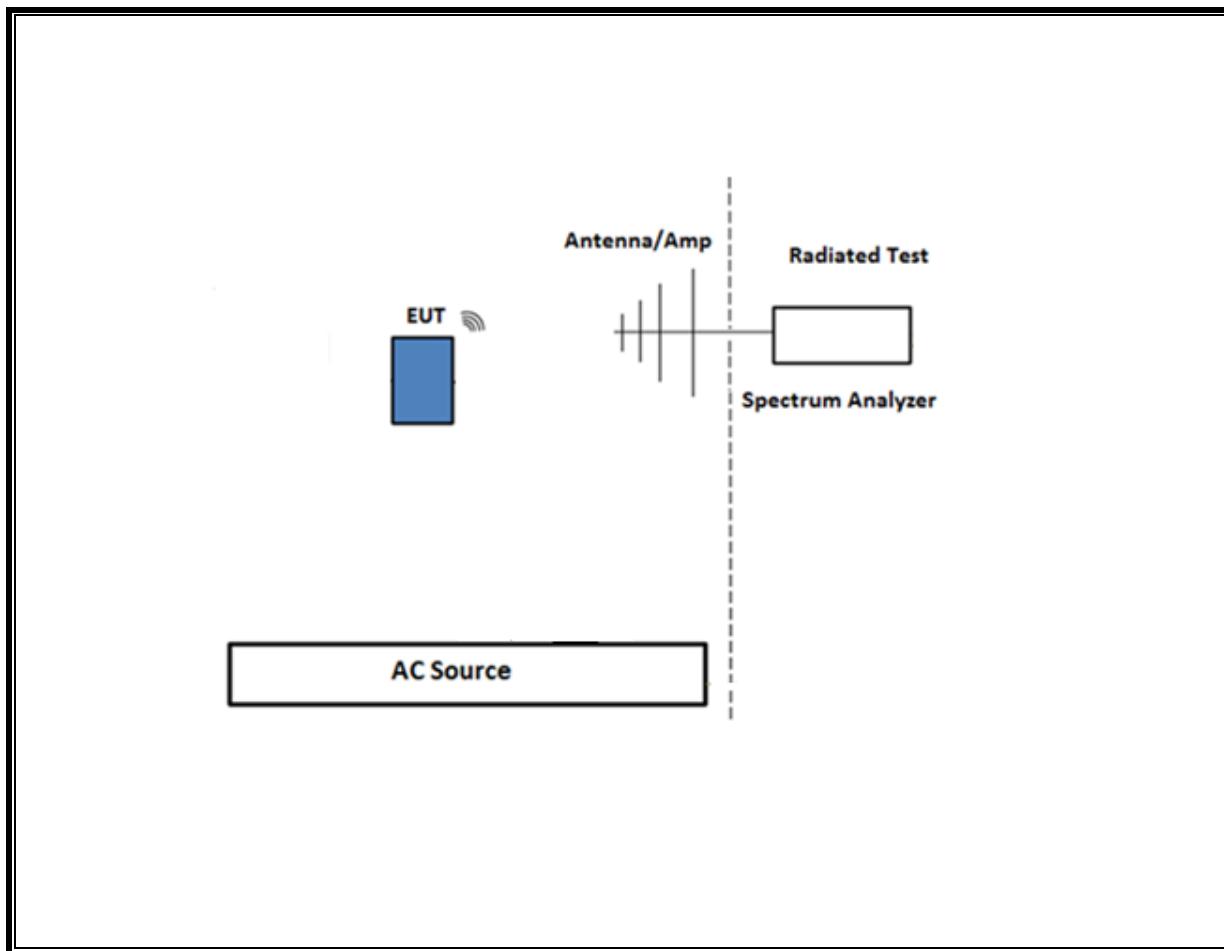
**SETUP DIAGRAM FOR CONDUCTED TESTS: POWER METER CONFIGURATION**



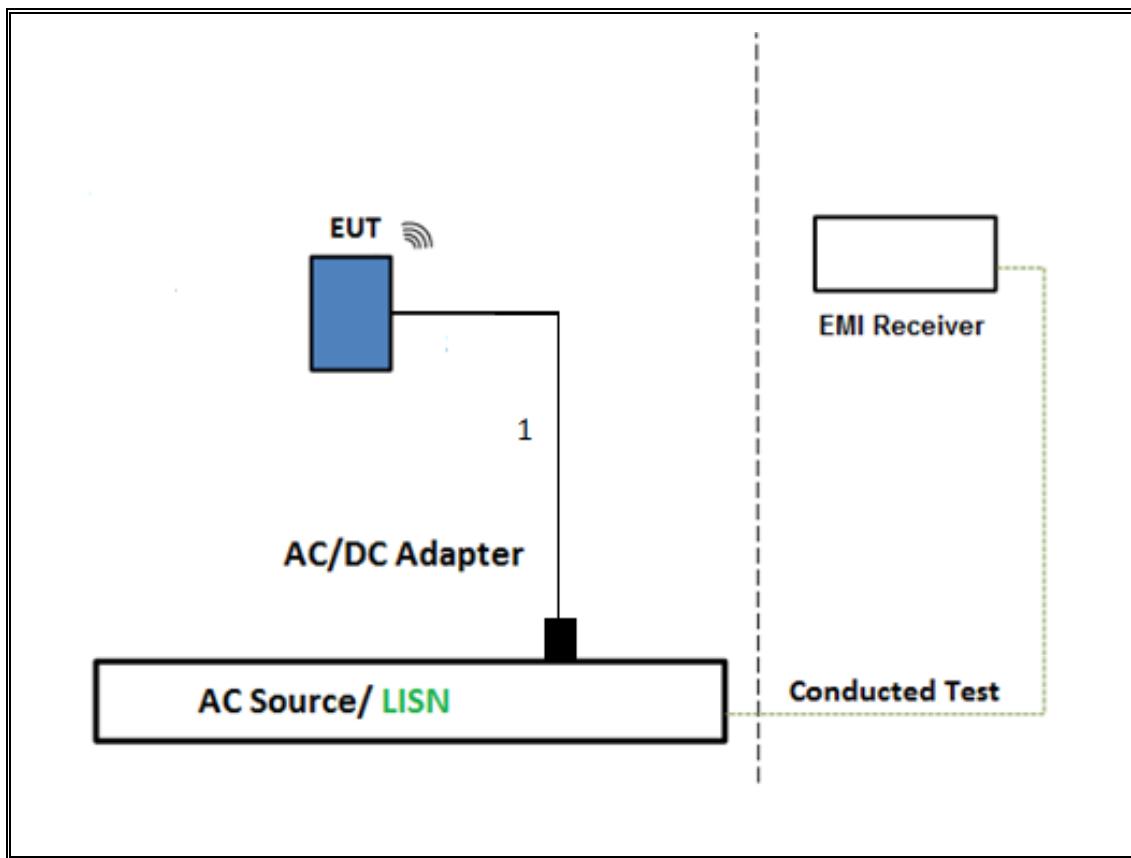
**SETUP DIAGRAM FOR RADIATED TESTS ABOVE 1GHz**



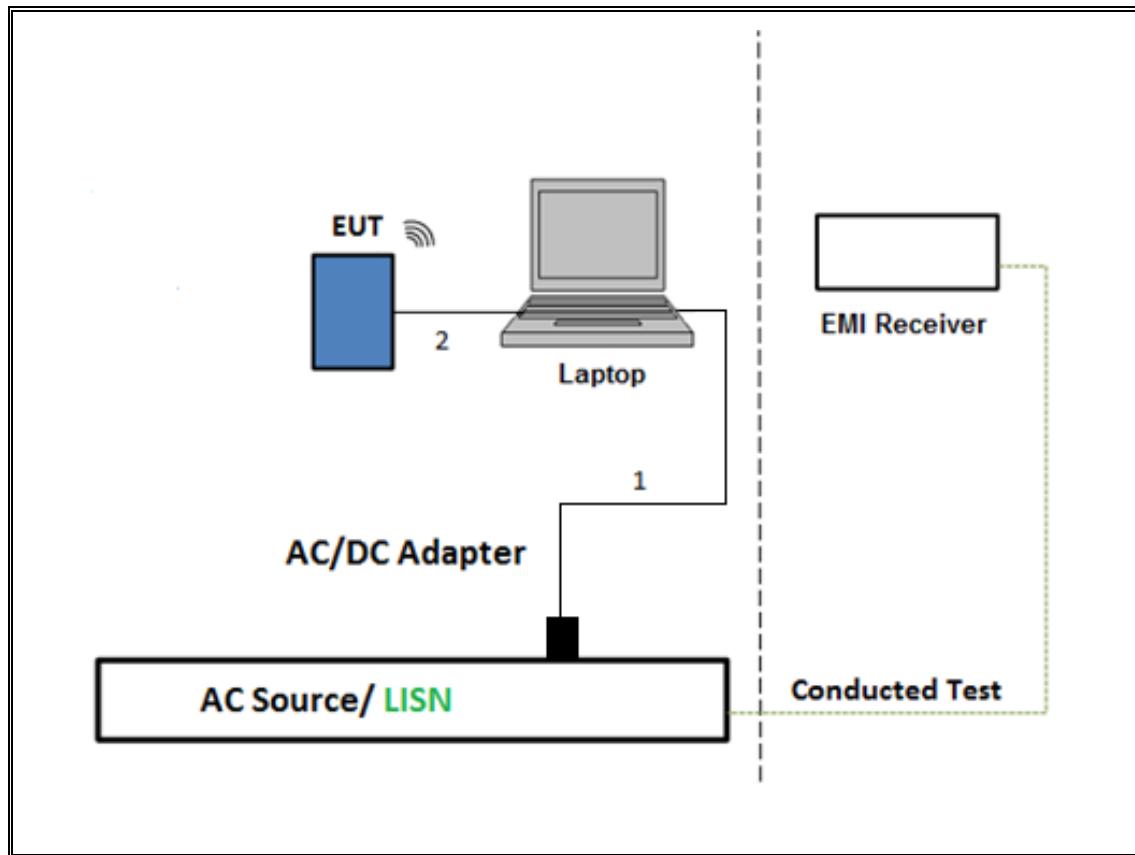
**SETUP DIAGRAM FOR BELOW 1GHz**



**TEST SETUP- AC LINE CONDUCTED: CHARGER CONFIGURATION**



**TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION**



## 7. MEASUREMENT METHOD

6 dB BW: ANSI C63.10 Subclause -11.8.1 RBW  $\geq$  DTS BW

Occupied BW (99%): ANSI C63.10-2013 Section 6.9.3

Output Power: ANSI C63.10 Subclause -11.9.1.3 Method PKPM1 Peak-reading power meter

Output Power: ANSI C63.10 Subclause -11.9.2.3.1 Method AVGPM (Measurement using an RF average-reading power meter)

PSD: ANSI C63.10 Subclause -11.10.2 Method PKPSD (peak PSD)

Radiated emissions non-restricted frequency bands: ANSI C63.10 Subclause -11.11

Radiated emissions restricted frequency bands: ANSI C63.10 Subclause -11.12.1

Conducted emissions in restricted frequency bands: ANSI C63.10 Subclause -11.12.2

Band-edge: ANSI C63.10 Subclause -11.13.3.3 Integration method -Trace averaging with continuous transmission at full power

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

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2013 Section 6.4

## 8. 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	ID Num	Cal Due	Last Cal
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	T477	06/06/2020	06/06/2019
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB3	T130	09/09/2020	09/09/2019
Antenna, Double Ridge Guide Horn Antenna 700MHz to 18GHz	A.H. SYSTEMS, INC.	SAS-571	T962	01/26/2021	01/26/2020
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T119	03/22/2021	03/22/2020
Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	T740	07/31/2020	07/31/2019
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T906	01/23/2021	01/23/2020
Antenna Horn, 18 to 26GHz	ARA	MWH-1826	T447	06/16/2020	06/16/2019
Pre-Amp 18-26GHz	Agilent Technology	8449B	T404	03/23/2021	03/23/2020
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T342	01/23/2021	01/23/2020
Antenna, Active Loop 9KHz to 30MHz	ETS-Lindgren	6502	T1683	06/06/2020	06/06/2019
Power Meter, P-series single channel	Keysight	N1911A	PRE0177682	01/21/2021	01/21/2020
Power Sensor	Keysight	N1921A	T1226	02/13/2021	02/13/2020
Antenna, Active Loop 9KHz to 30MHz	ETS-Lindgren	6502	T1683	06/06/2020	06/06/2019
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	T1454	01/23/2021	01/23/2020
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	T339	01/22/2021	01/22/2020

AC Line Conducted					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
EMI Test Receiver 9Khz-7GHz	Rohde & Schwarz	ESCI7	T1436	04/10/2020	04/10/2019
Power Cable, Line Conducted Emissions	UL	PG1	T861	10/27/2020	10/27/2019
LISN for Conducted Emissions CISPR-16	Fischer	50/250-25-2-01	T1310	01/23/2021	01/23/2020

UL AUTOMATION SOFTWARE					
Radiated Software	UL	UL EMC	Ver 9.5, Mar 6, 2020		
Conducted Software	UL	UL EMC	2020.2.26		
AC Line Conducted Software	UL	UL EMC	Ver 9.5, February 21, 2020		

## 9. ANTENNA PORT TEST RESULTS

### 9.1. ON TIME AND DUTY CYCLE

#### LIMITS

None; for reporting purposes only.

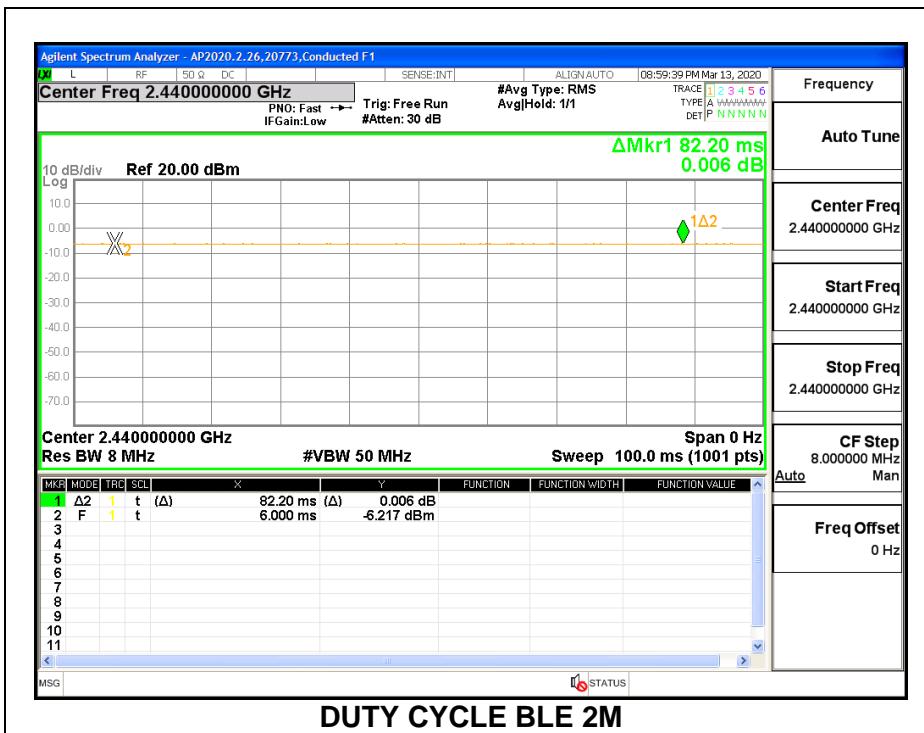
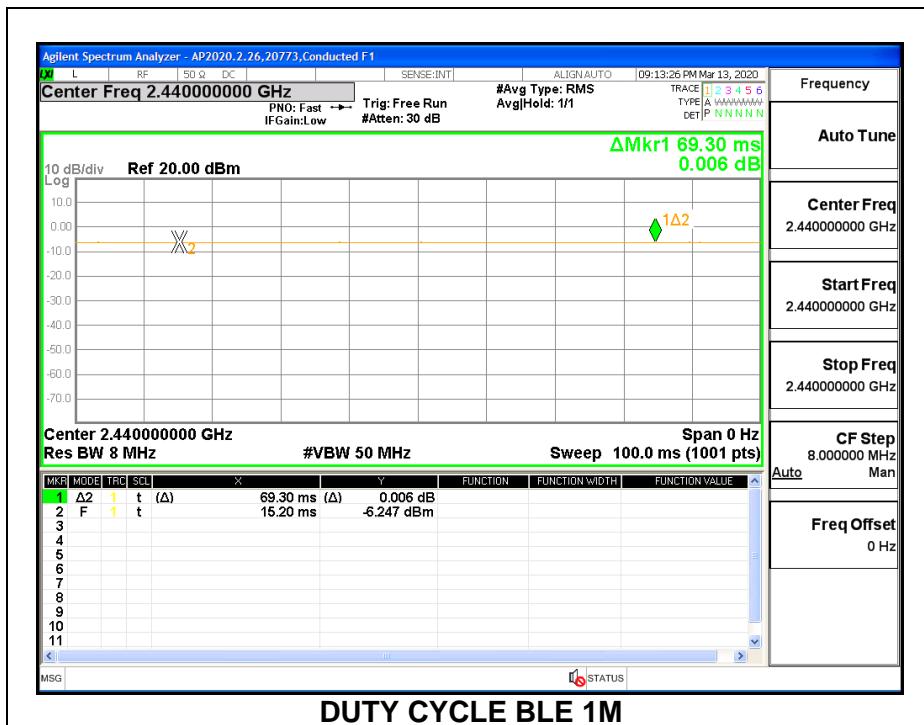
#### PROCEDURE

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)
<b>2.4GHz Band</b>						
BLE 1M	69.300	69.300	1.000	100.00	0.00	0.010
BLE 2M	82.200	82.200	1.000	100.00	0.00	0.010

## DUTY CYCLE PLOTS



## 9.2. 99% BANDWIDTH

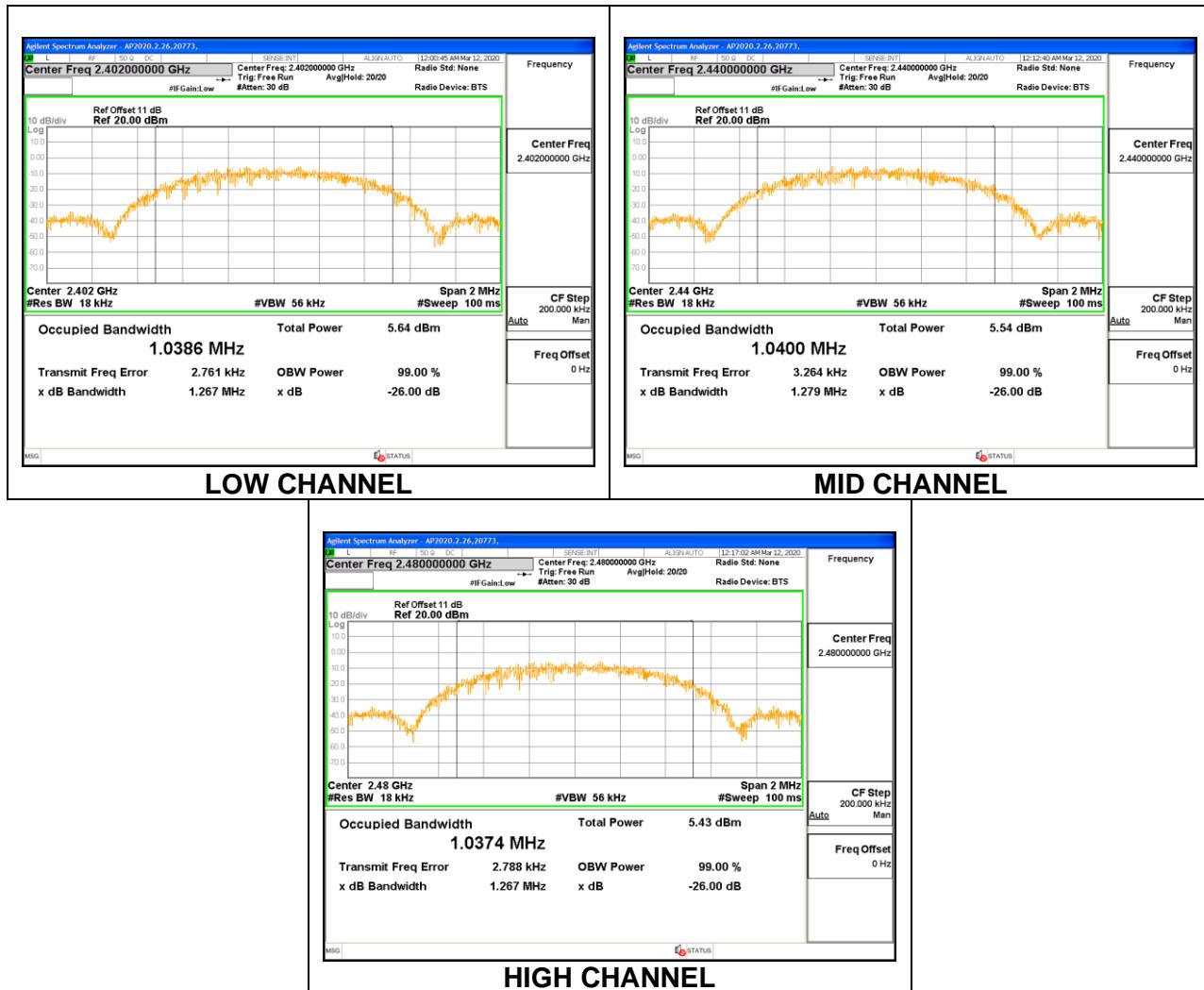
### LIMITS

None; for reporting purposes only.

### RESULTS

#### 9.2.1. BLE (1Mbps)

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0390
Middle	2440	1.0400
High	2480	1.0370



### 9.2.2. BLE (2Mbps)

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	2.0830
Middle	2440	2.0840
High	2480	2.0819



### **9.3. 6 dB BANDWIDTH**

#### **LIMITS**

FCC §15.247 (a) (2)

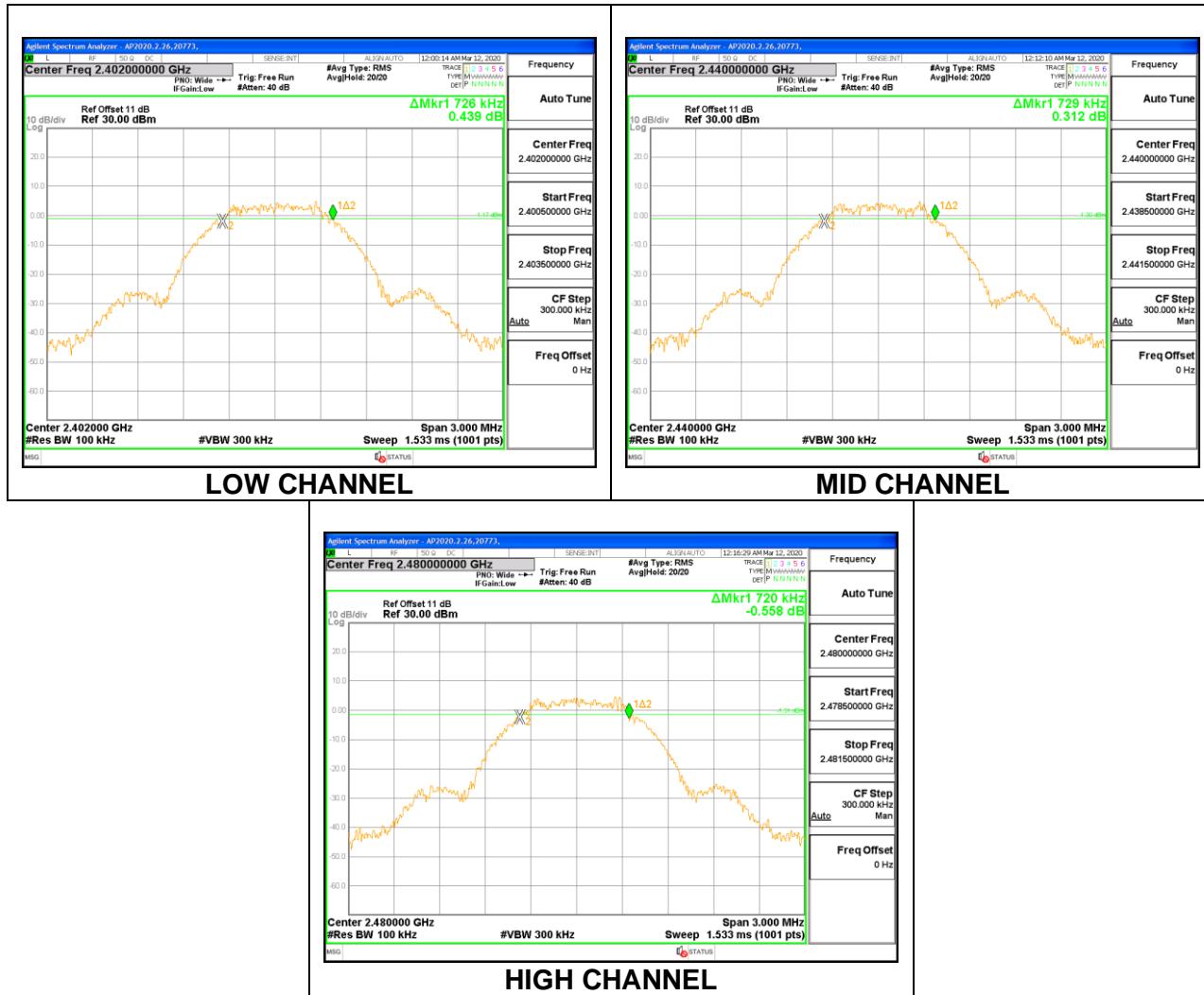
RSS-247 5.2 (a)

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

#### **RESULTS**

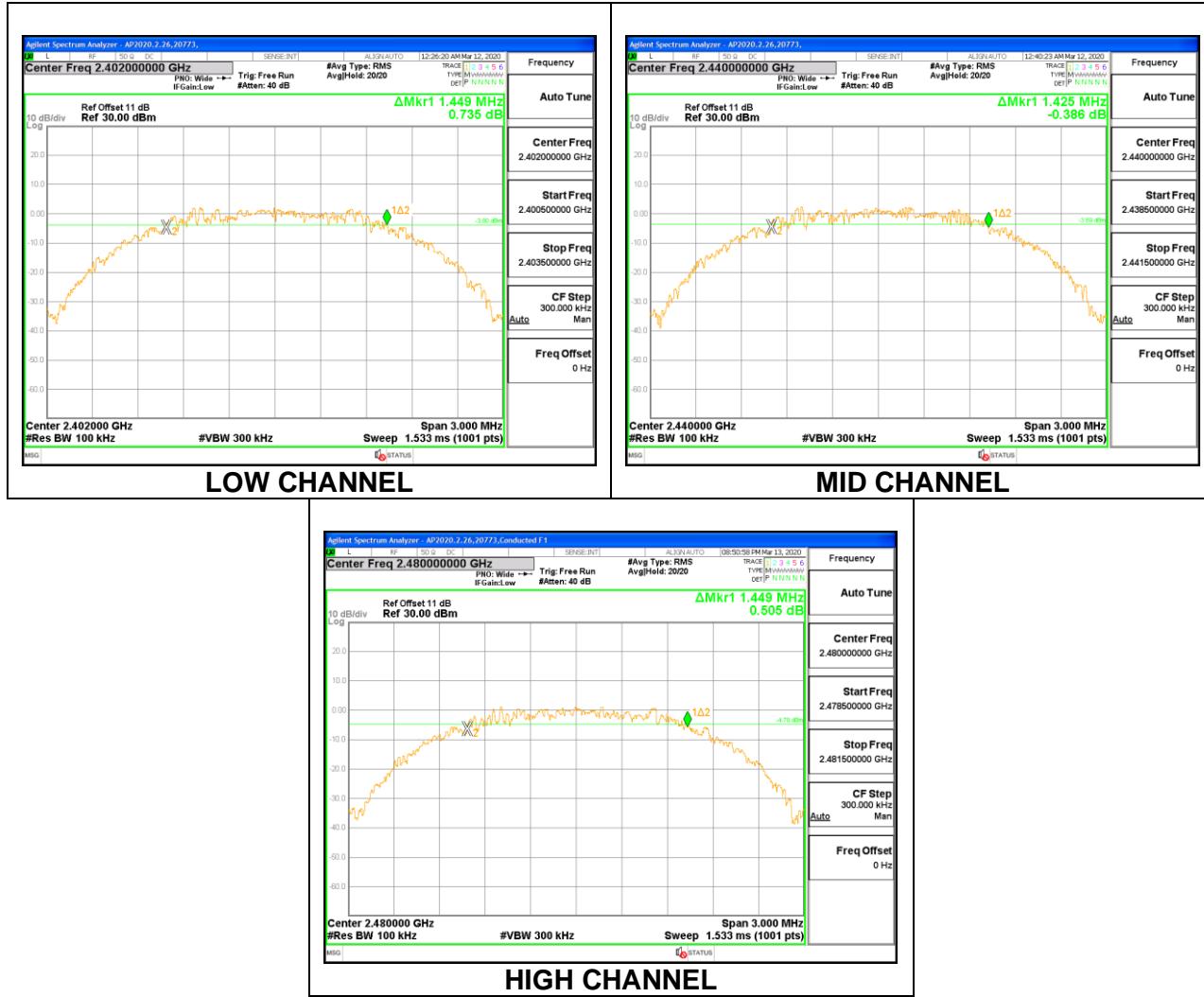
### 9.3.1. BLE (1Mbps)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.7260	0.5
Middle	2440	0.7290	0.5
High	2480	0.7200	0.5



### 9.3.2. BLE (2Mbps)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	1.4490	0.5
Middle	2440	1.4250	0.5
High	2480	1.4490	0.5



## 9.4. 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 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

### RESULTS

#### 9.4.1. BLE (1Mbps)

Tested By:	20773
Date:	3/14/2020

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	4.75	30	-25.250
Middle	2440	4.67	30	-25.330
High	2480	4.73	30	-25.270

#### 9.4.2. BLE (2Mbps)

Tested By:	20773
Date:	3/14/2020

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	4.84	30	-25.160
Middle	2440	4.68	30	-25.320
High	2480	4.73	30	-25.270

## 9.5. 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 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for a gated average reading of power.

### RESULTS

#### 9.5.1. BLE (1Mbps)

Tested By:	20773
Date:	3/14/2020

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	4.57
Middle	2440	4.56
High	2480	4.59

#### 9.5.2. BLE (2Mbps)

Tested By:	20773
Date:	3/14/2020

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	4.70
Middle	2440	4.57
High	2480	4.60

## 9.6. POWER SPECTRAL DENSITY

### LIMITS

FCC §15.247 (e)

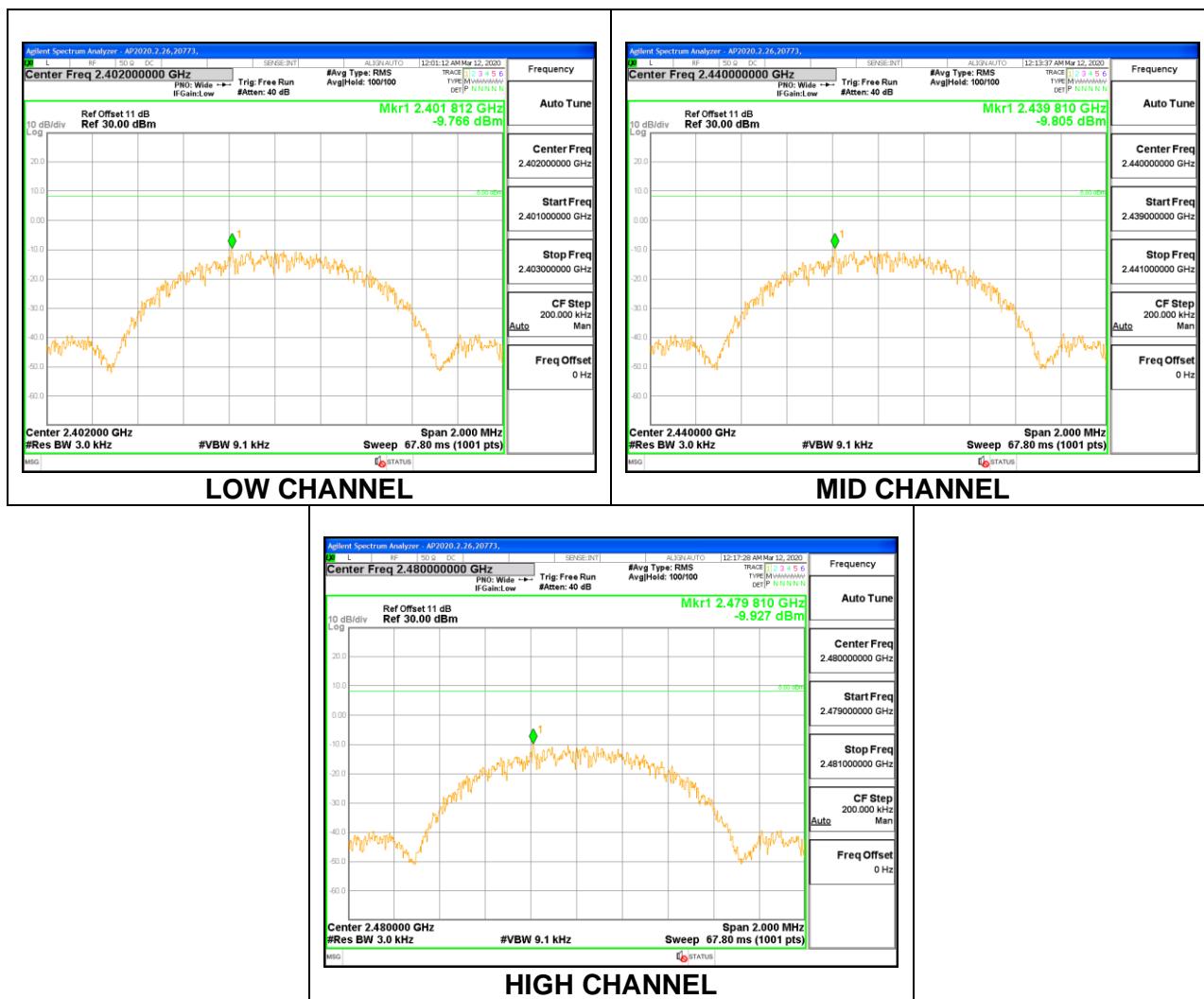
RSS-247 (5.2) (b)

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

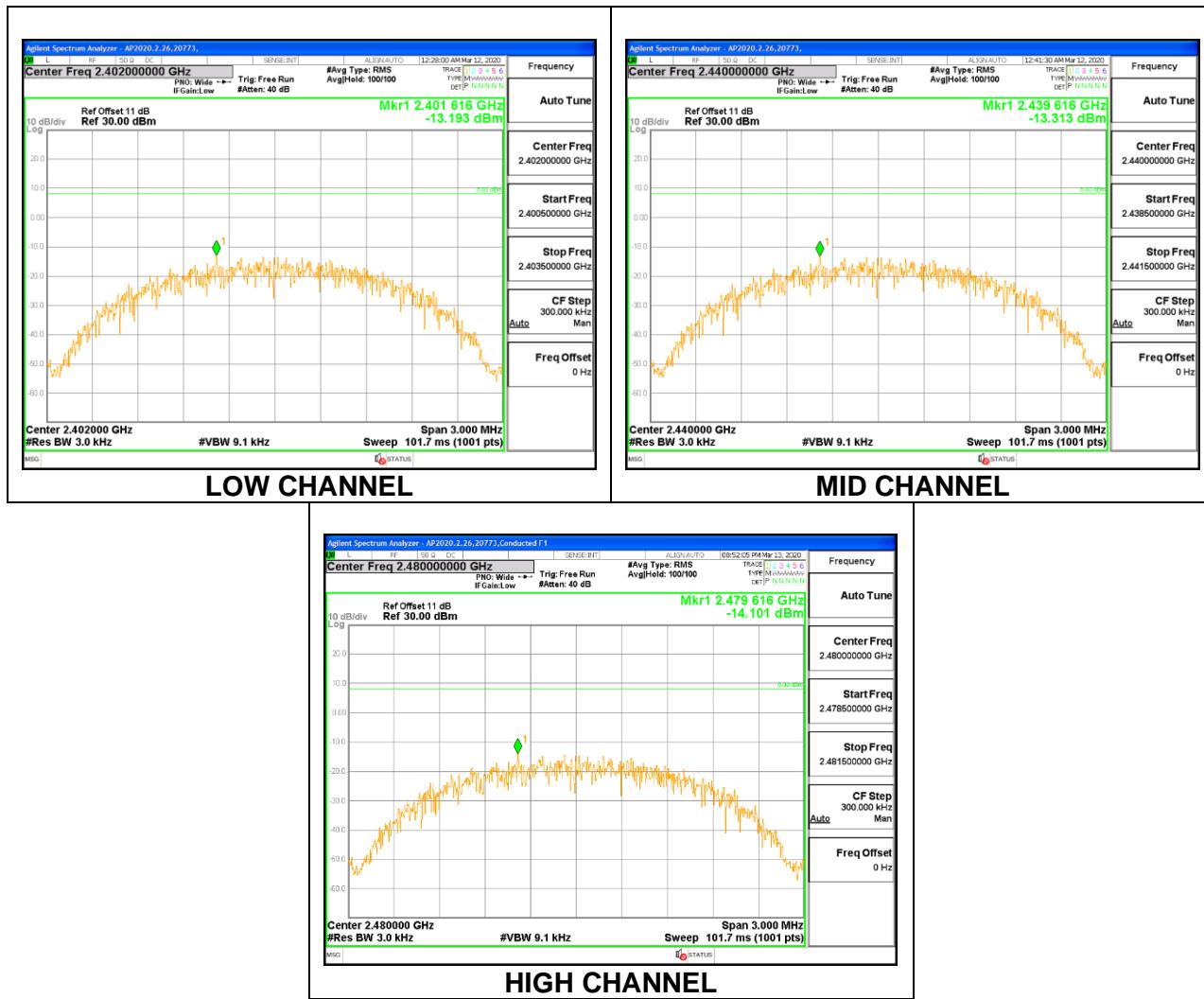
### 9.6.1. BLE (1Mbps)

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	-9.77	8	-17.77
Middle	2440	-9.81	8	-17.81
High	2480	-9.93	8	-17.93



### 9.6.2. BLE (2Mbps)

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	-13.19	8	-21.19
Middle	2440	-13.31	8	-21.31
High	2480	-14.01	8	-22.01



## 9.7. CONDUCTED SPURIOUS EMISSIONS

### LIMITS

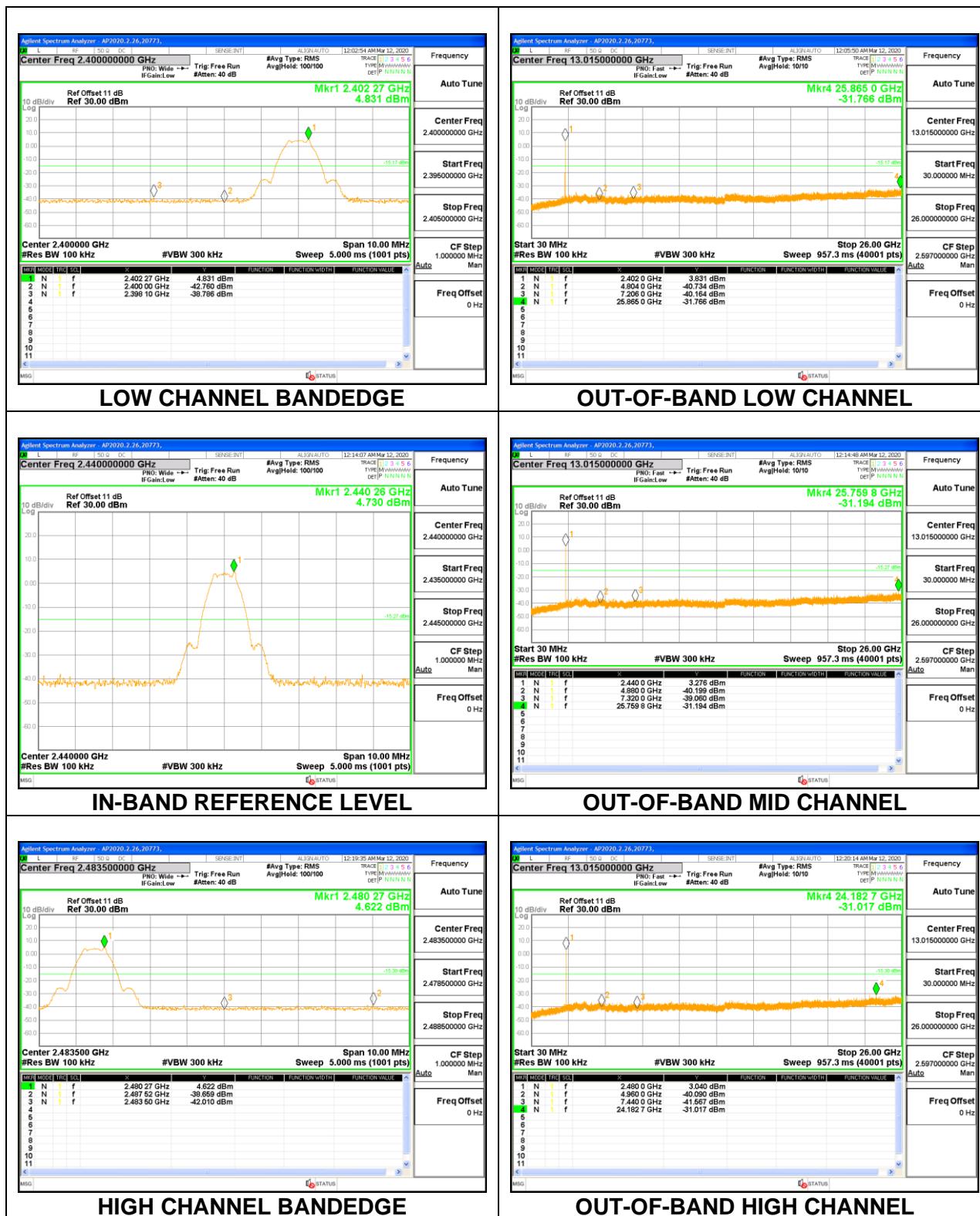
FCC §15.247 (d)

RSS-247 5.5

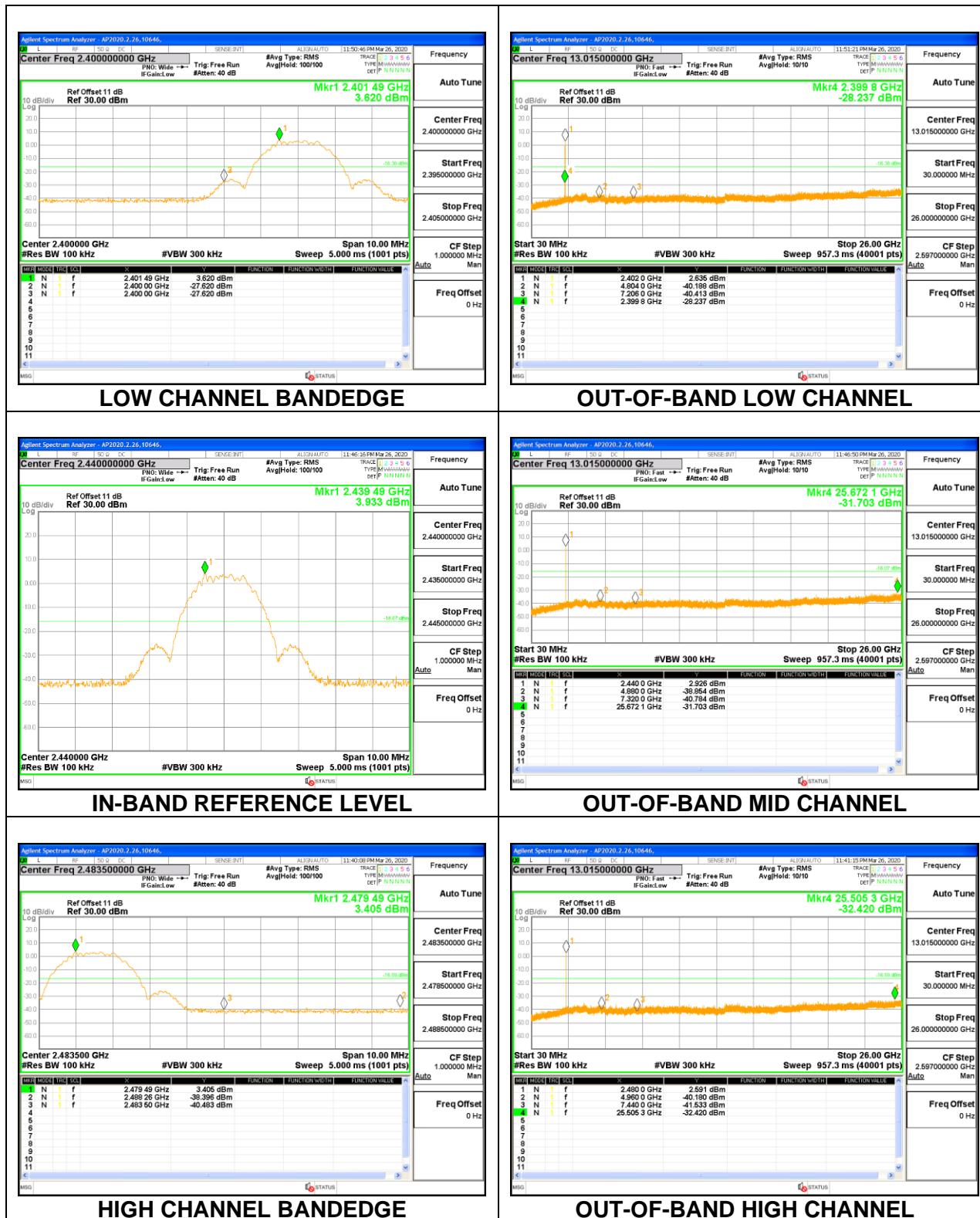
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

### RESULTS

### 9.7.1. BLE (1Mbps)



### 9.7.2. BLE (2Mbps)



## 10. RADIATED TEST RESULTS

### 10.1. 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.

For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.

**KDB 414788 Open Field Site(OFS) and Chamber Correlation Justification**

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

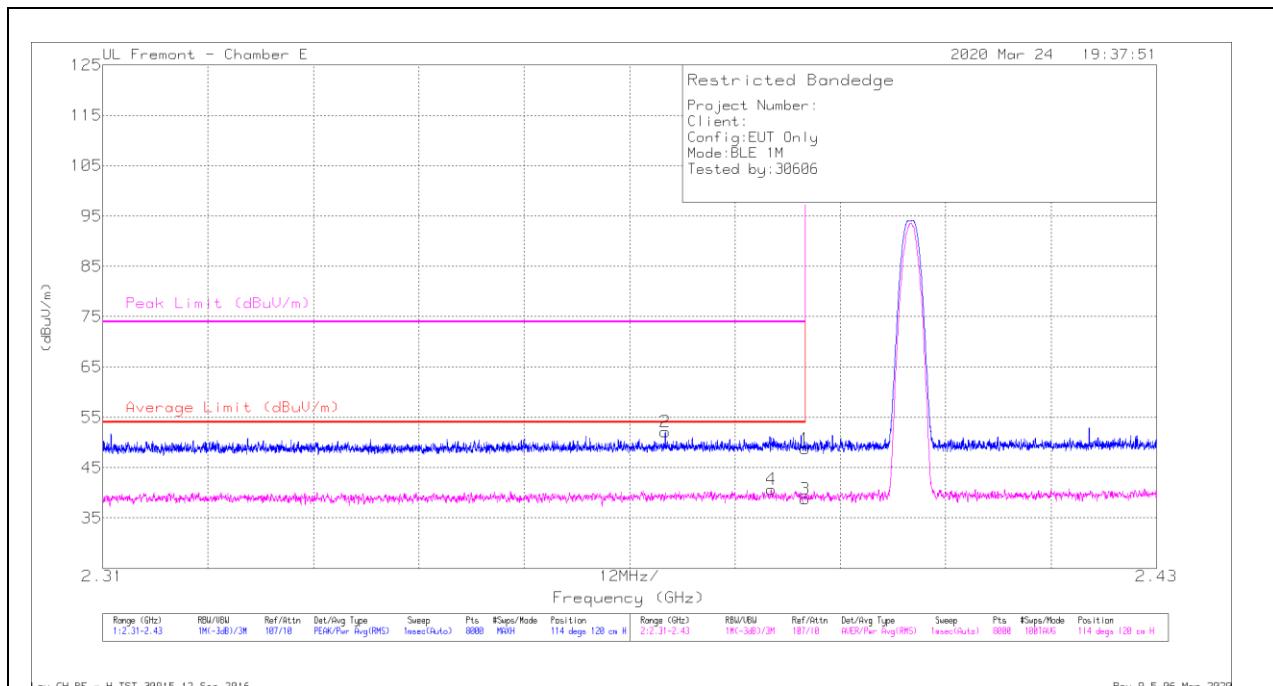
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

## 10.2. TRANSMITTER ABOVE 1 GHz

### 10.2.1. BLE (1Mbps)

#### BANDEDGE (LOW CHANNEL)

#### HORIZONTAL RESULT



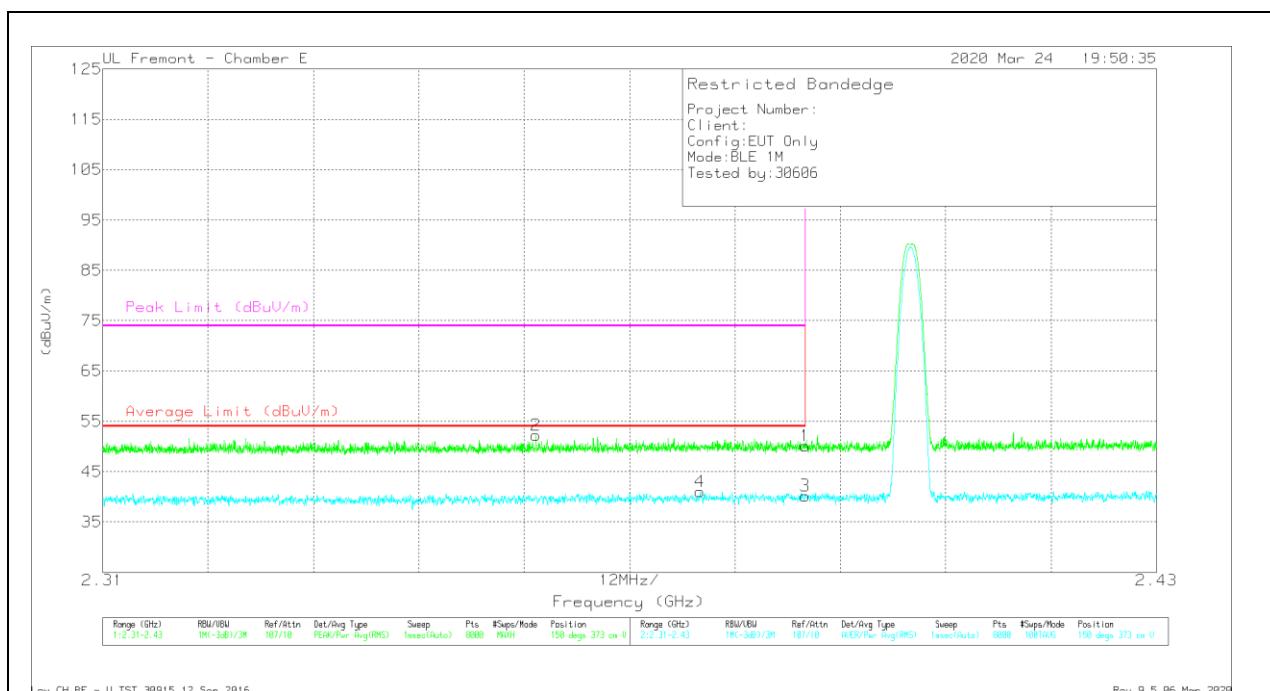
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbf/Filt/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	42.89	Pk	32.3	-26.4	48.79	-	-	74	-25.21	114	120	H
2	* 2.37406	46.41	Pk	32.2	-26.5	52.11	-	-	74	-21.89	114	120	H
3	* 2.38999	32.84	RMS	32.3	-26.4	38.74	54	-15.26	-	-	114	120	H
4	* 2.38614	34.92	RMS	32.3	-26.5	40.72	54	-13.28	-	-	114	120	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 T119 (dB/m)	Amp/Cbl/Filt/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	* 2.38999	44.18	Pk	32.3	-26.4	50.08	-	-	74	-23.92	150	373	V
2	* 2.35934	46.64	Pk	32.1	-26.5	52.24	-	-	74	-21.76	150	373	V
3	* 2.38999	34.32	RMS	32.3	-26.4	40.22	54	-13.78	-	-	150	373	V
4	* 2.37803	35.28	RMS	32.2	-26.4	41.08	54	-12.92	-	-	150	373	V

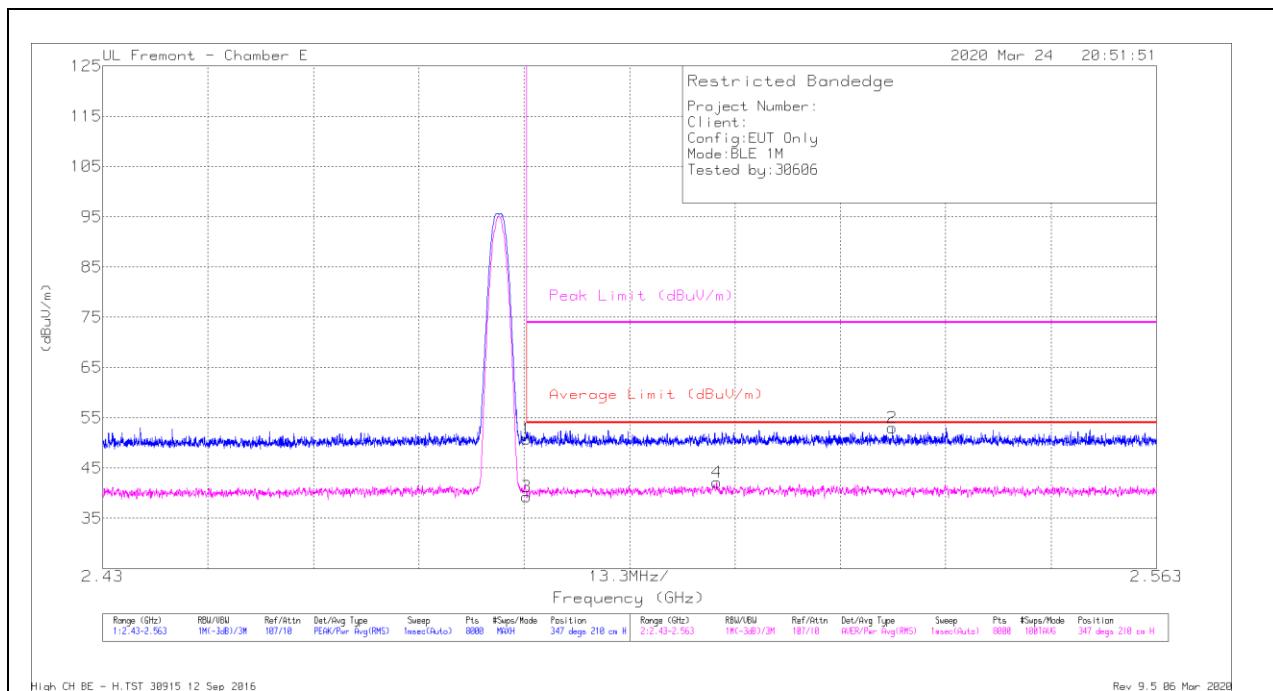
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - Peak detector

RMS - RMS detection

## BANDEDGE (HIGH CHANNEL)

### HORIZONTAL RESULT



High CH BE - H.TST 30915 12 Sep 2016

Rev 9.5 06 Mar 2020

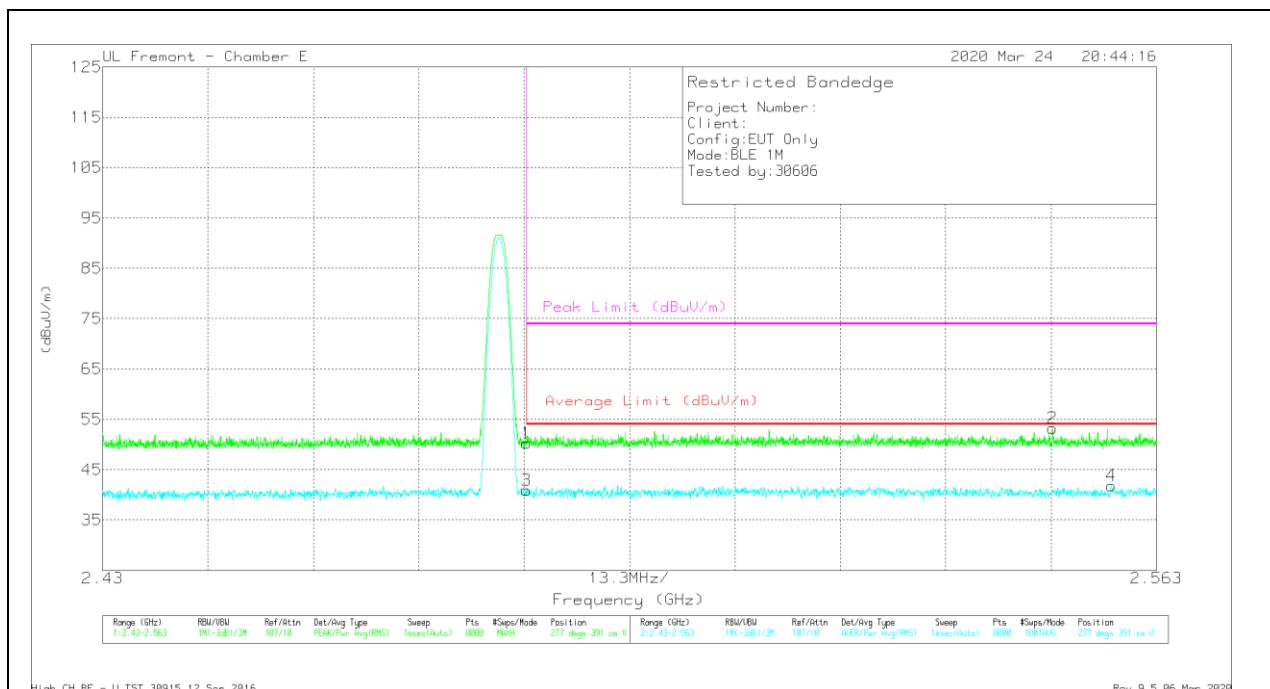
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filt/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	44.46	Pk	32.8	-26.5	50.76	-	-	74	-23.24	347	210	H
2	2.52966	46.59	Pk	32.9	-26.5	52.99	-	-	74	-21.01	347	210	H
3	* 2.48351	33.02	RMS	32.8	-26.5	39.32	54	-14.68	-	-	347	210	H
4	2.50748	35.64	RMS	32.9	-26.4	42.14	54	-11.86	-	-	347	210	H

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - Peak detector

RMS - RMS detection

## VERTICAL RESULT



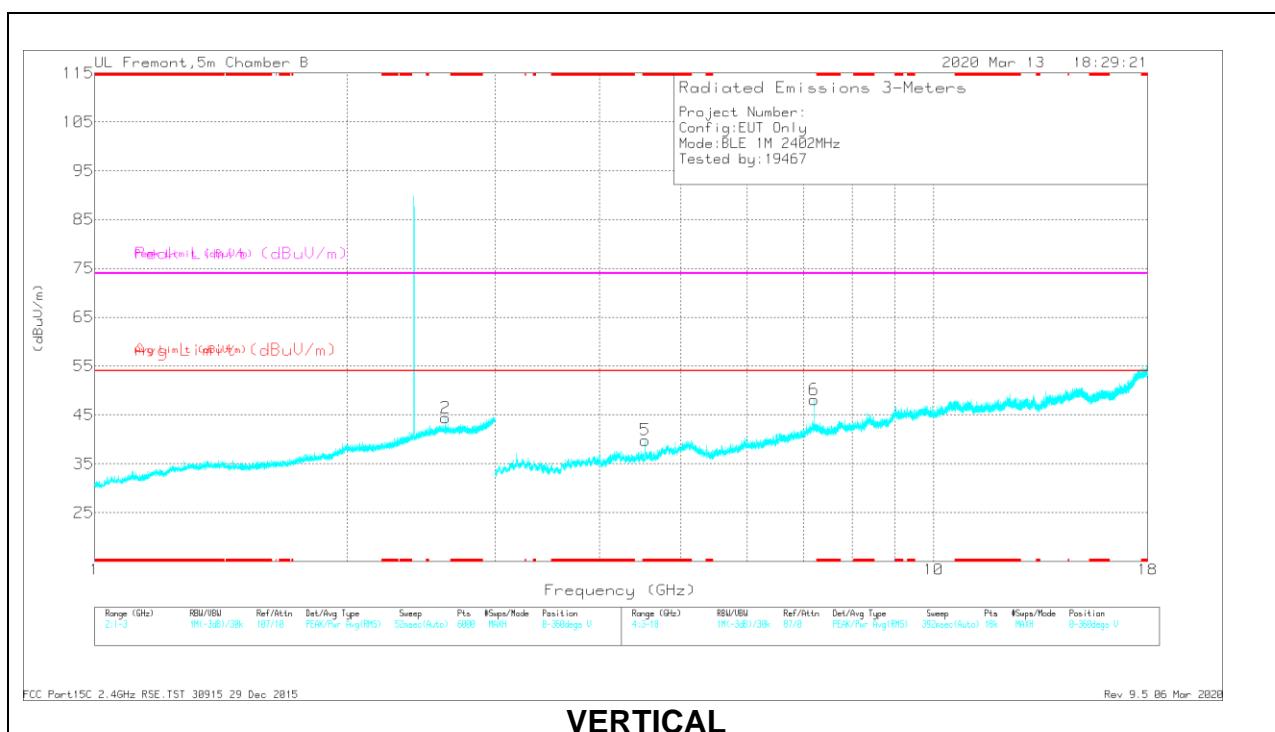
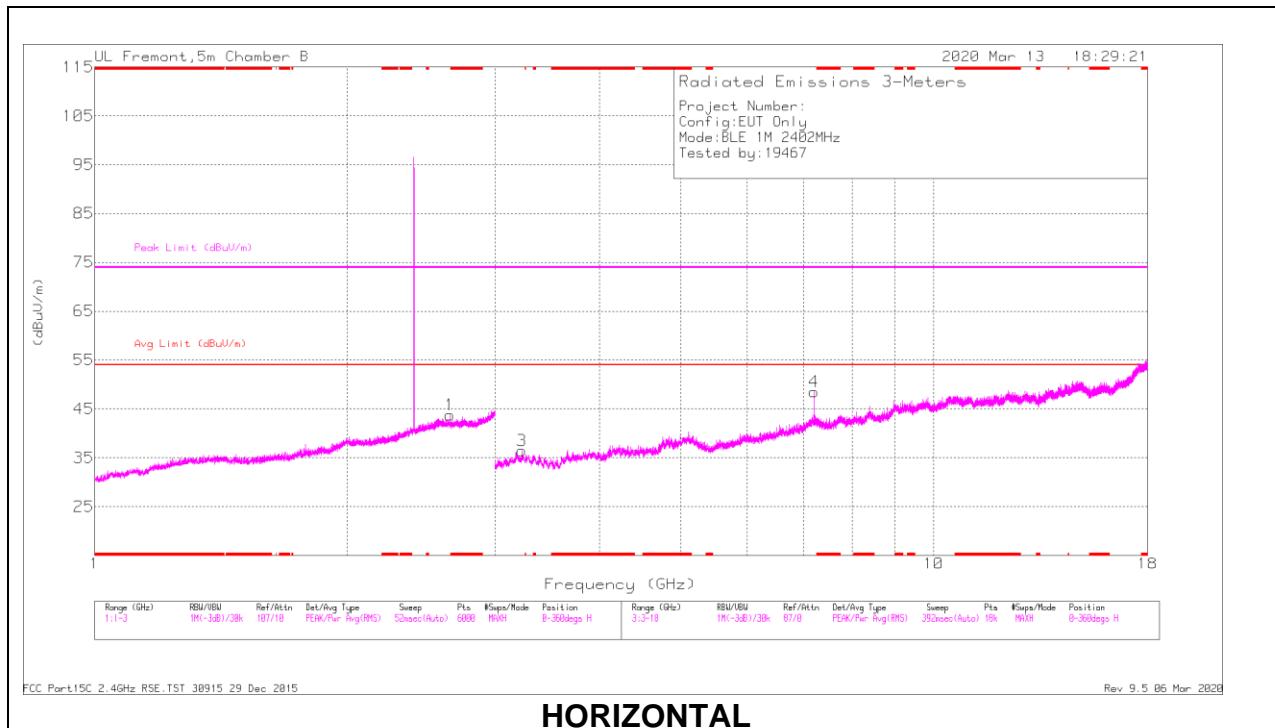
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - Peak detector

RMS - RMS detection

## HARMONICS AND SPURIOUS EMISSIONS

### LOW CHANNEL RESULTS



## RADIATED EMISSIONS

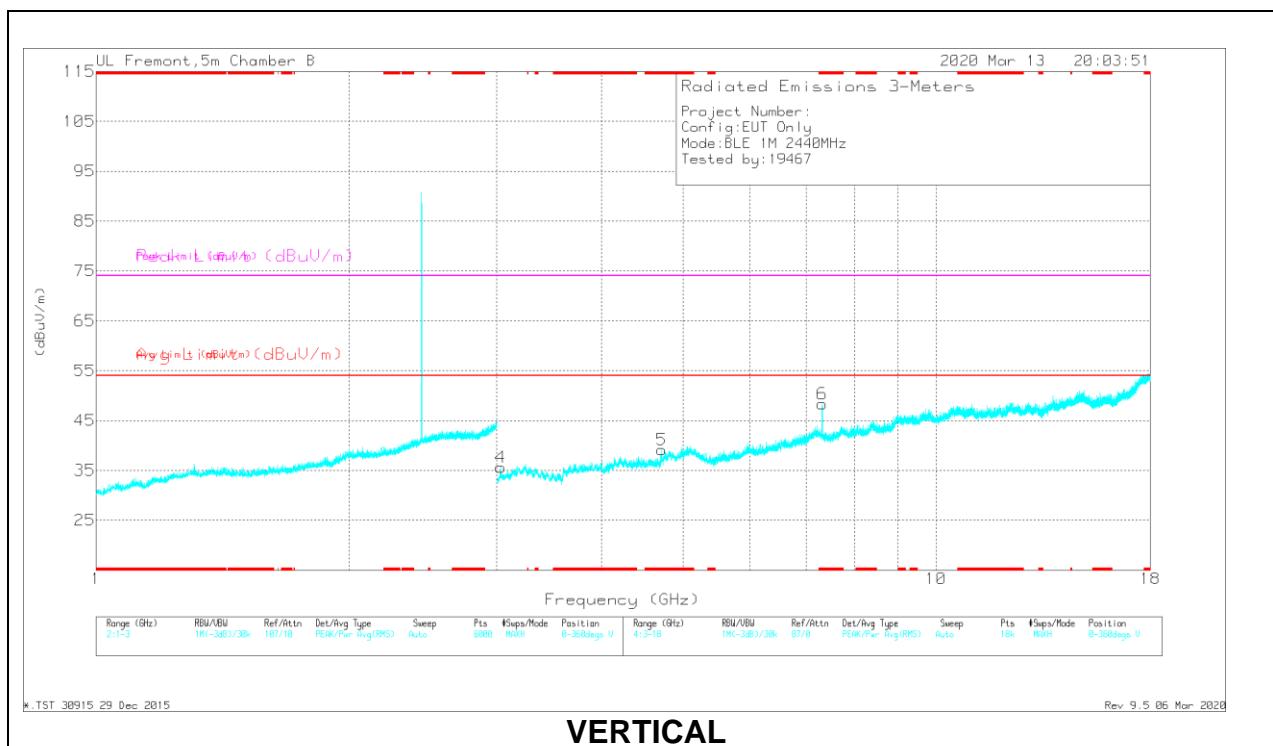
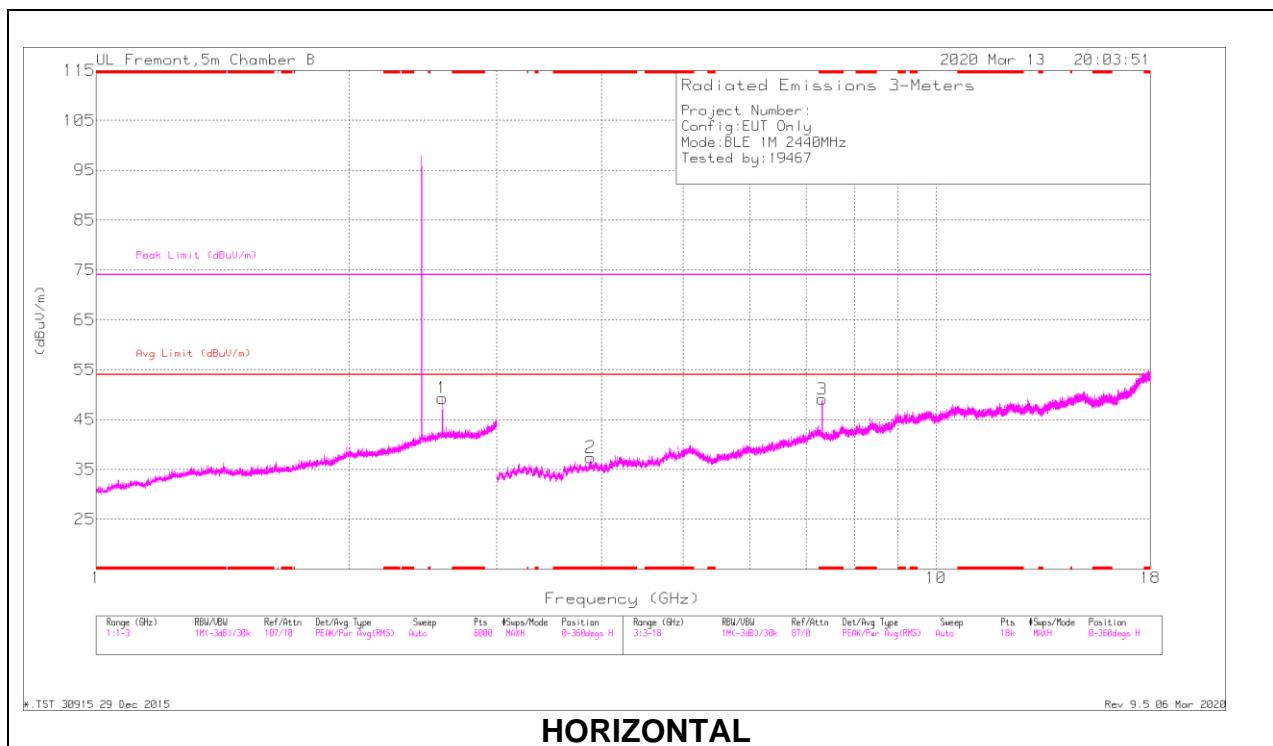
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cb/Fitr/P ad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.6519	38.87	PK2	29.2	-18.7	49.37	-	-	74	-24.63	134	270	H
2	2.61938	38.97	PK2	29.2	-18.8	49.37	-	-	74	-24.63	308	154	V
3	3.23251	38.1	PK2	31.4	-26.6	42.9	-	-	74	-31.1	194	136	H
4	7.20532	39.01	PK2	37.1	-21.7	54.41	-	-	74	-19.59	0	108	H
5	* 4.53052	36.87	PK2	31.9	-24.9	43.87	-	-	74	-30.13	93	108	V
	* 4.53173	24.96	MAv1	31.9	-24.9	31.96	54	-22.04	-	-	93	108	V
6	7.20529	39.06	PK2	37.1	-21.7	54.46	-	-	74	-19.54	339	101	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

## MID CHANNEL RESULTS



## RADIATED EMISSIONS

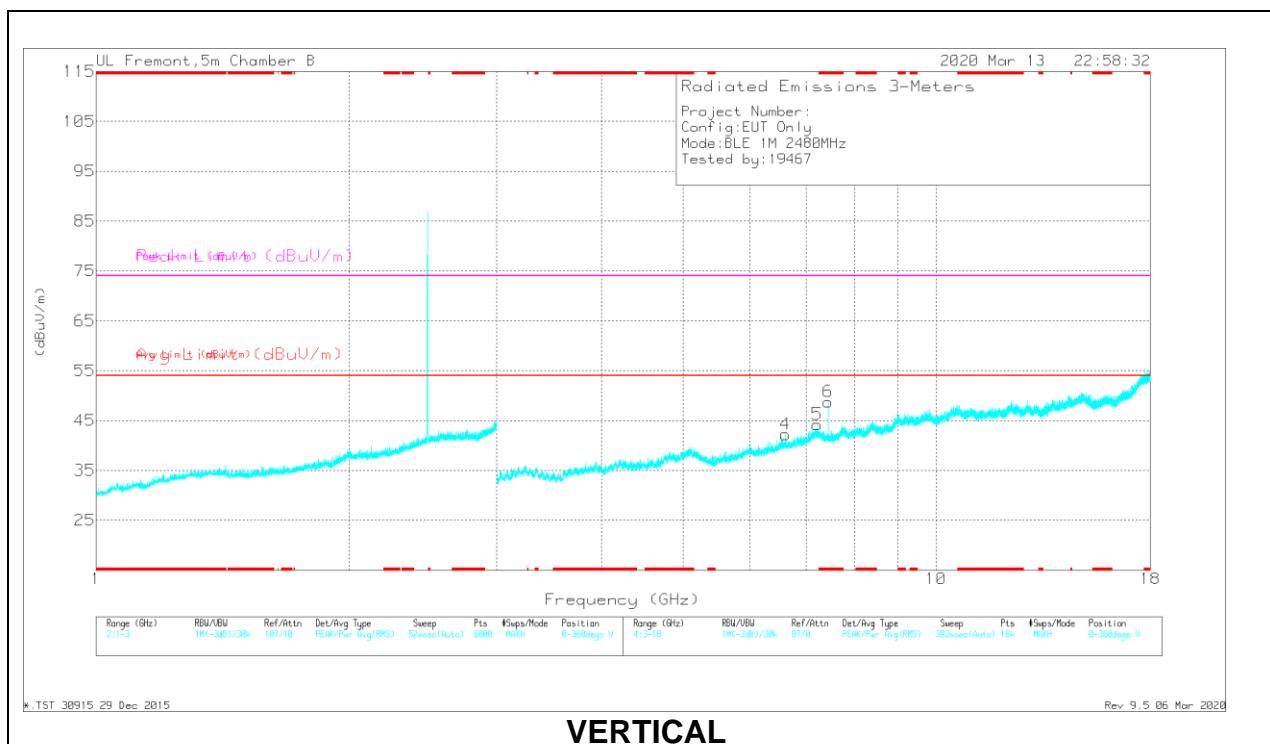
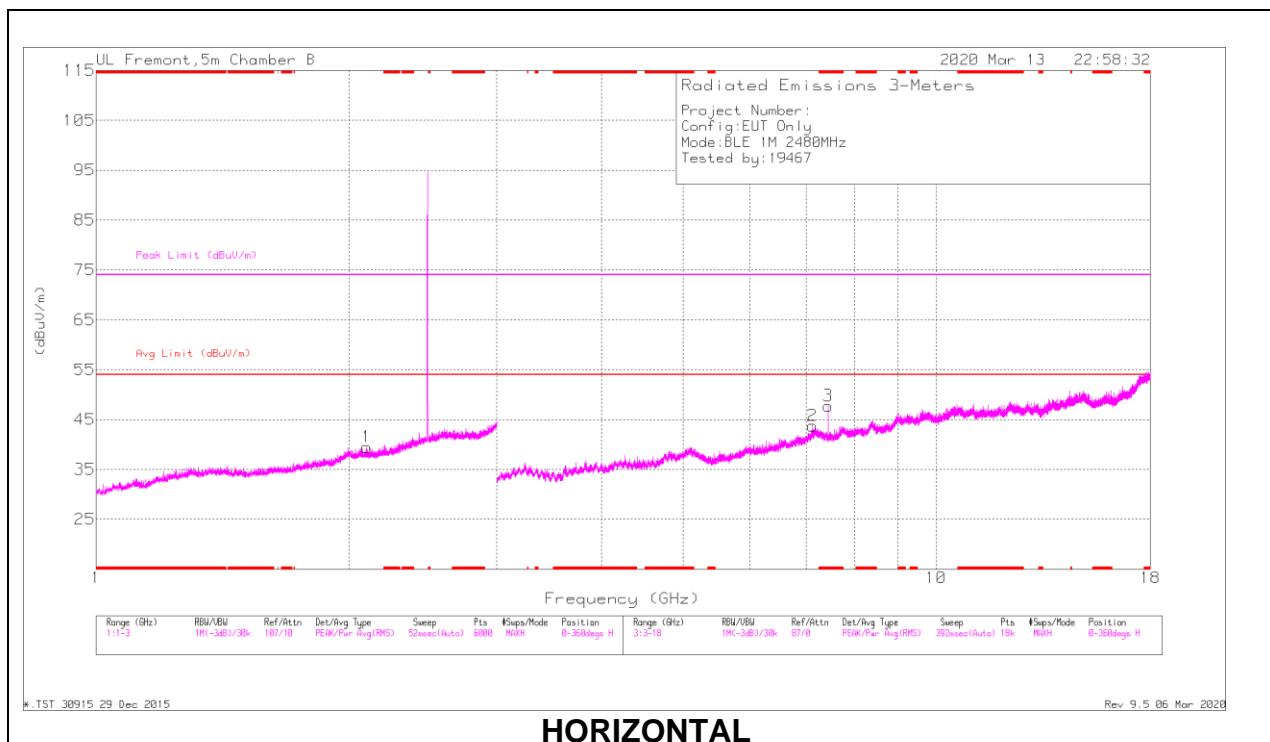
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbf/Ftr/P ad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.58149	39.05	PK2	29.3	-18.8	49.55	-	-	74	-24.45	45	274	H
2	* 3.87828	38	PK2	31.4	-26.1	43.3	-	-	74	-30.7	181	282	H
	* 3.88075	26.57	MAv1	31.3	-26.1	31.77	54	-22.23	-	-	181	282	H
3	* 7.3196	40.02	PK2	37	-22.6	54.42	-	-	74	-19.58	159	101	H
	* 7.31939	31.86	MAv1	37	-22.6	46.26	54	-7.74	-	-	159	101	H
4	3.03151	38.94	PK2	30.1	-26.8	42.24	-	-	74	-31.76	41	315	V
5	* 4.71127	37.66	PK2	32.5	-25.1	45.06	-	-	74	-28.94	264	101	V
	* 4.71068	25.64	MAv1	32.5	-25.1	33.04	54	-20.96	-	-	264	101	V
6	* 7.32072	39.78	PK2	37	-22.6	54.18	-	-	74	-19.82	340	327	V
	* 7.3206	32.19	MAv1	37	-22.6	46.59	54	-7.41	-	-	340	327	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

## HIGH CHANNEL RESULTS



## RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbf/Ftr/Pa d (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.09845	37.56	PK2	26.9	-18.9	45.56	-	-	74	-28.44	256	272	H
2	7.12287	34.62	PK2	36.9	-21.7	49.82	-	-	74	-24.18	169	219	H
3	* 7.43981	39.2	PK2	36.9	-22	54.1	-	-	74	-19.9	355	105	H
	* 7.44054	30.4	MAV1	36.9	-22	45.3	54	-8.7	-	-	355	105	H
4	6.61573	35.61	PK2	35.6	-23	48.21	-	-	74	-25.79	172	283	V
5	7.21959	35.1	PK2	37.1	-21.9	50.3	-	-	74	-23.7	279	140	V
6	* 7.4393	38.79	PK2	36.9	-22	53.69	-	-	74	-20.31	326	172	V
	* 7.4406	30.1	MAV1	36.9	-22	45	54	-9	-	-	326	172	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

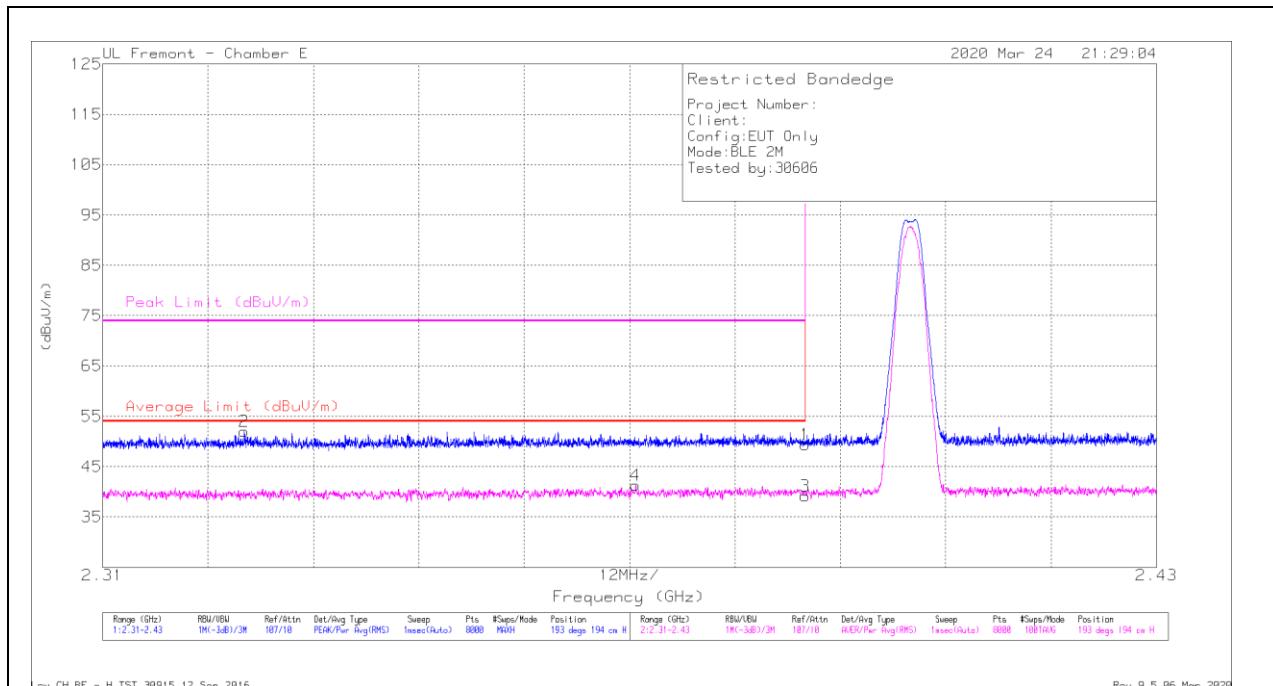
PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

## 10.2.2. BLE (2Mbps)

### BANDEDGE (LOW CHANNEL)

#### HORIZONTAL RESULT



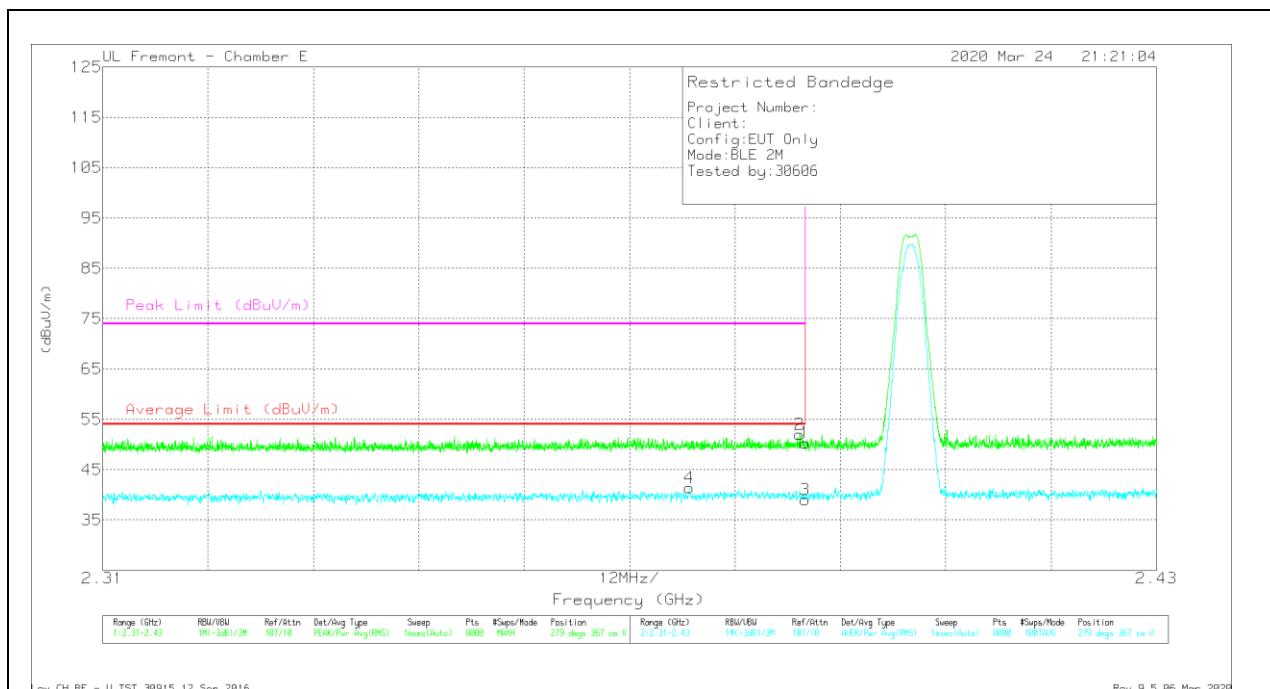
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr/Pa d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	43.53	Pk	32.3	-26.4	49.43	-	-	74	-24.57	193	194	H
2	* 2.32613	46.46	Pk	32	-26.5	51.96	-	-	74	-22.04	193	194	H
3	* 2.38999	33.24	RMS	32.3	-26.4	39.14	54	-14.86	-	-	193	194	H
4	* 2.3707	35.6	RMS	32.2	-26.5	41.3	54	-12.7	-	-	193	194	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 T119 (dB/m)	Amp/Cbl/Filt/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	* 2.38999	44.42	Pk	32.3	-26.4	50.32	-	-	74	-23.68	279	367	V
2	* 2.38938	46.13	Pk	32.3	-26.4	52.03	-	-	74	-21.97	279	367	V
3	* 2.38999	33.19	RMS	32.3	-26.4	39.09	54	-14.91	-	-	279	367	V
4	* 2.3768	35.64	RMS	32.2	-26.4	41.44	54	-12.56	-	-	279	367	V

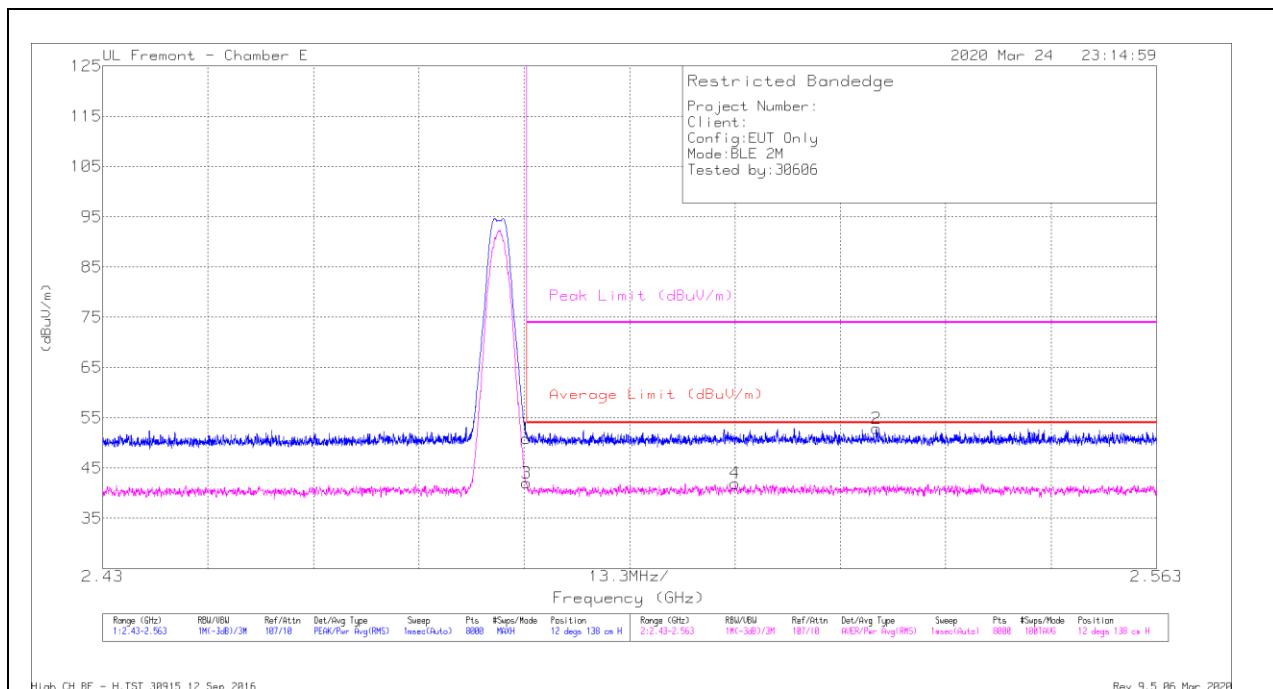
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - Peak detector

RMS - RMS detection

## BANDEDGE (HIGH CHANNEL)

### HORIZONTAL RESULT



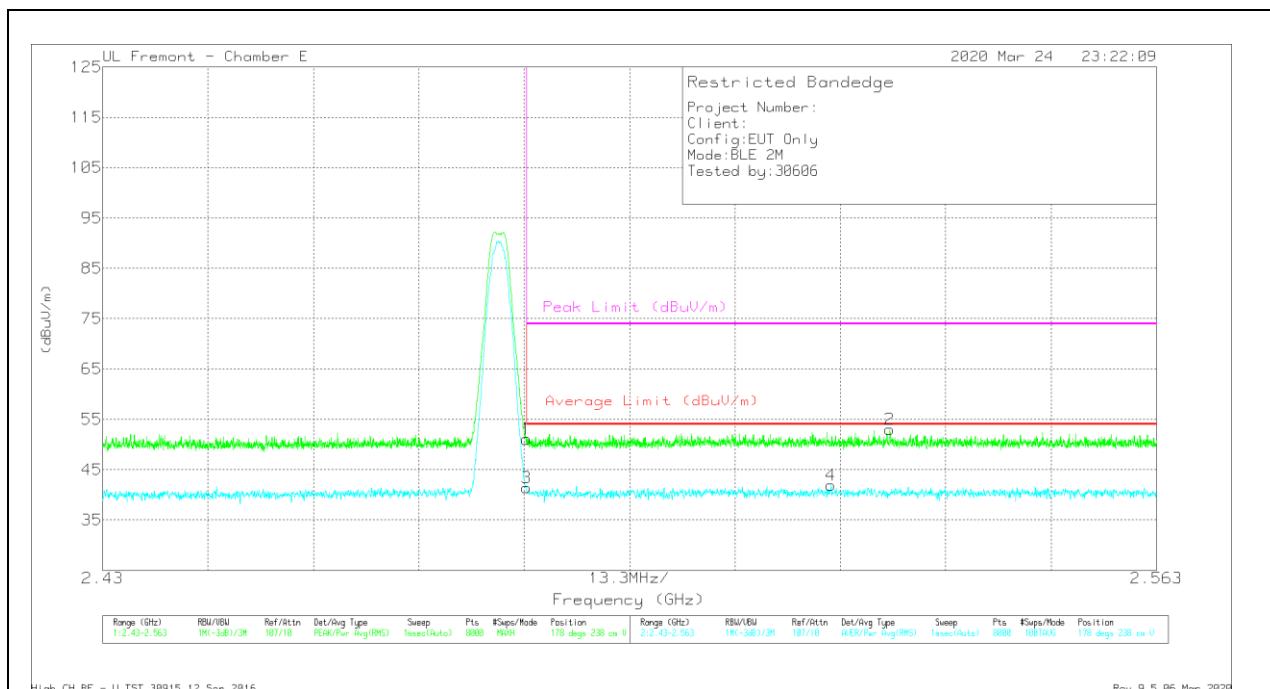
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filt/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	44.54	Pk	32.8	-26.5	50.84	-	-	74	-23.16	12	138	H
2	2.52763	46.52	Pk	32.9	-26.5	52.92	-	-	74	-21.08	12	138	H
3	* 2.48351	35.7	RMS	32.8	-26.5	42	54	-12	-	-	12	138	H
4	2.50983	35.47	RMS	32.9	-26.4	41.97	54	-12.03	-	-	12	138	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 T119 (dB/m)	Amp/Cbl/Filt/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	* 2.48351	44.77	Pk	32.8	-26.5	51.07	-	-	74	-22.93	178	238	V
2	2.52935	46.57	Pk	32.9	-26.5	52.97	-	-	74	-21.03	178	238	V
3	* 2.48351	35.13	RMS	32.8	-26.5	41.43	54	-12.57	-	-	178	238	V
4	2.52191	35.56	RMS	32.9	-26.5	41.96	54	-12.04	-	-	178	238	V

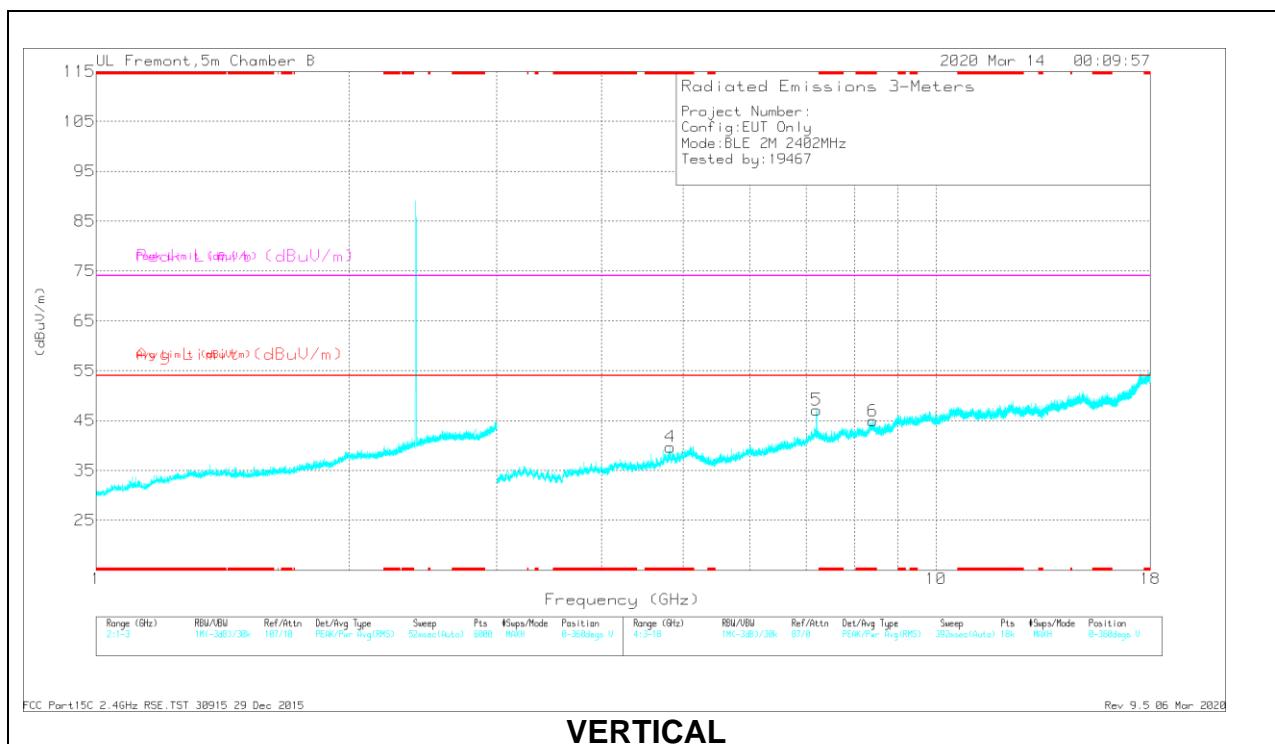
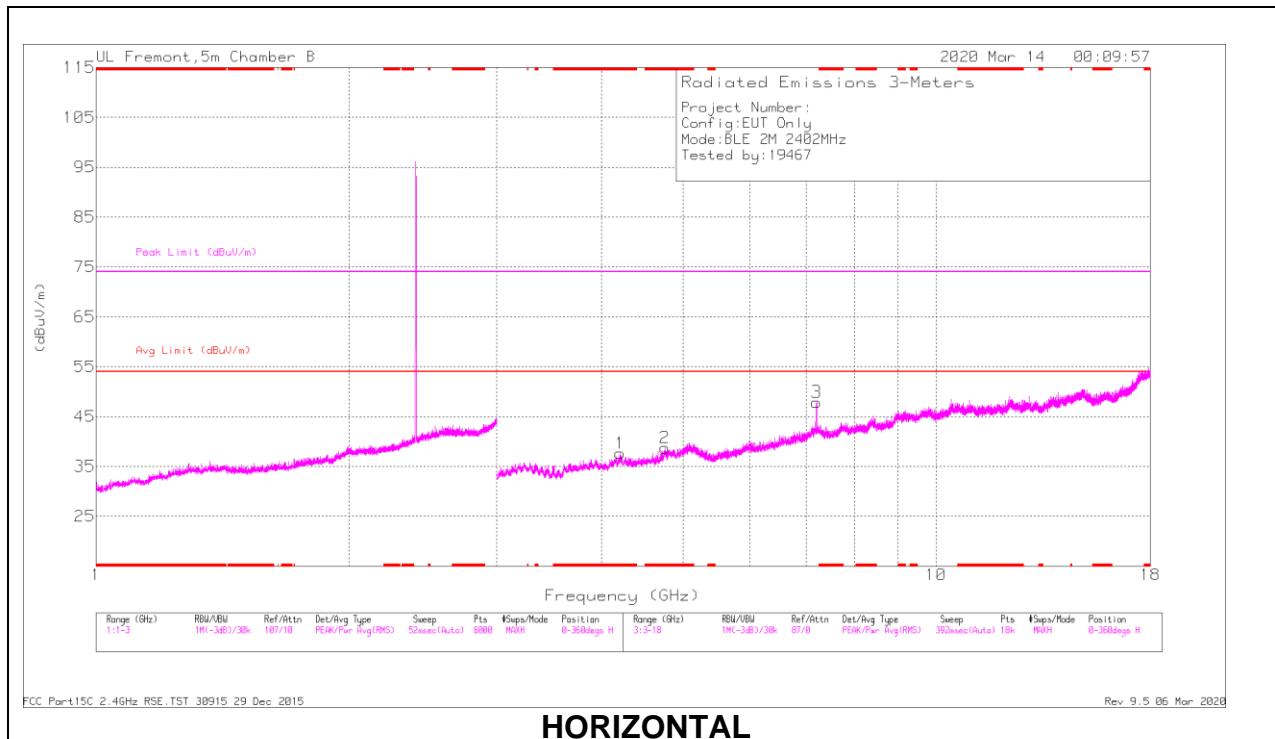
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - Peak detector

RMS - RMS detection

## **HARMONICS AND SPURIOUS EMISSIONS**

## LOW CHANNEL RESULTS



## RADIATED EMISSIONS

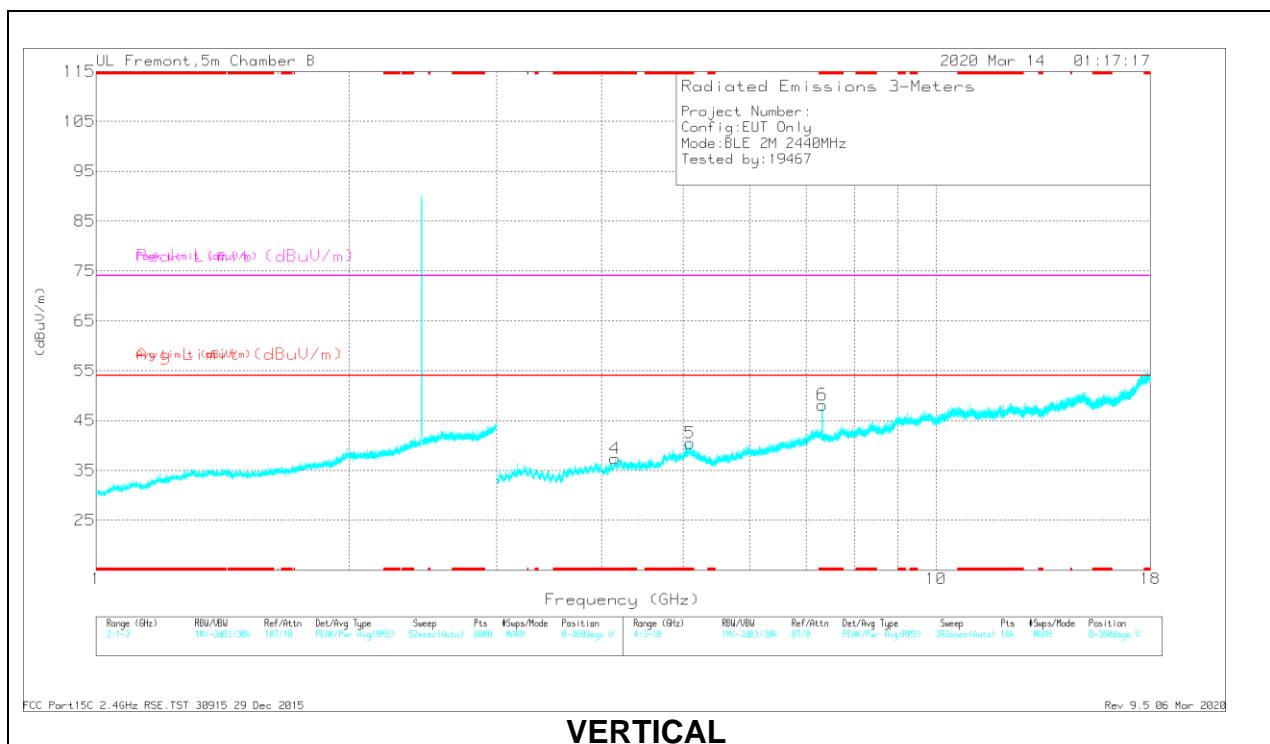
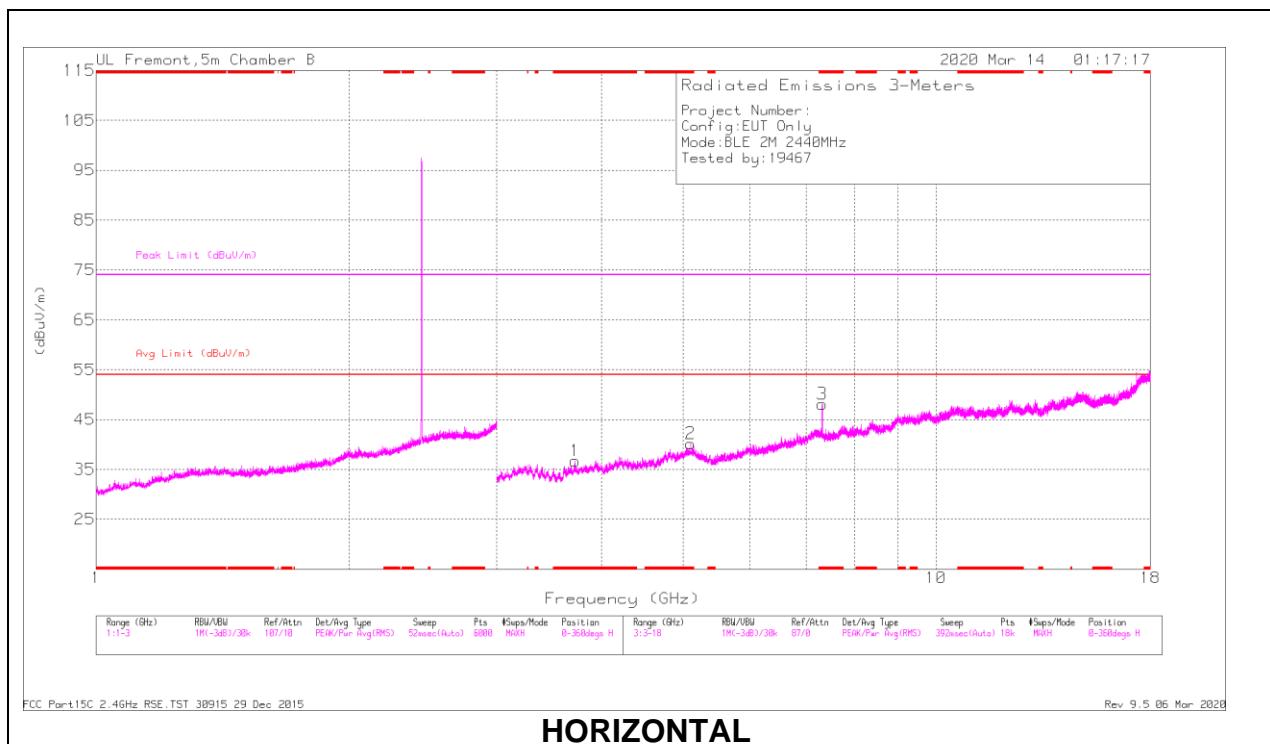
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cb/Ftr/P ad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.20528	36.63	PK2	31.8	-24.7	43.73	-	-	74	-30.27	219	290	H
	* 4.2048	25.11	MAv1	31.8	-24.7	32.21	54	-21.79	-	-	219	290	H
2	* 4.75355	37.42	PK2	32.7	-24.4	45.72	-	-	74	-28.28	237	106	H
	* 4.75328	25.8	MAv1	32.7	-24.4	34.1	54	-19.9	-	-	237	106	H
3	7.20721	38.38	PK2	37.1	-21.7	53.78	-	-	74	-20.22	356	142	H
4	* 4.82655	37.04	PK2	33.1	-24.6	45.54	-	-	74	-28.46	279	123	V
	* 4.82534	25.29	MAv1	33.1	-24.6	33.79	54	-20.21	-	-	279	123	V
5	7.20739	38.42	PK2	37.1	-21.8	53.72	-	-	74	-20.28	217	101	V
6	* 8.40353	33.96	PK2	37.5	-19.9	51.56	-	-	74	-22.44	96	167	V
	* 8.40422	22.27	MAv1	37.5	-19.9	39.87	54	-14.13	-	-	96	167	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

## MID CHANNEL RESULTS



## RADIATED EMISSIONS

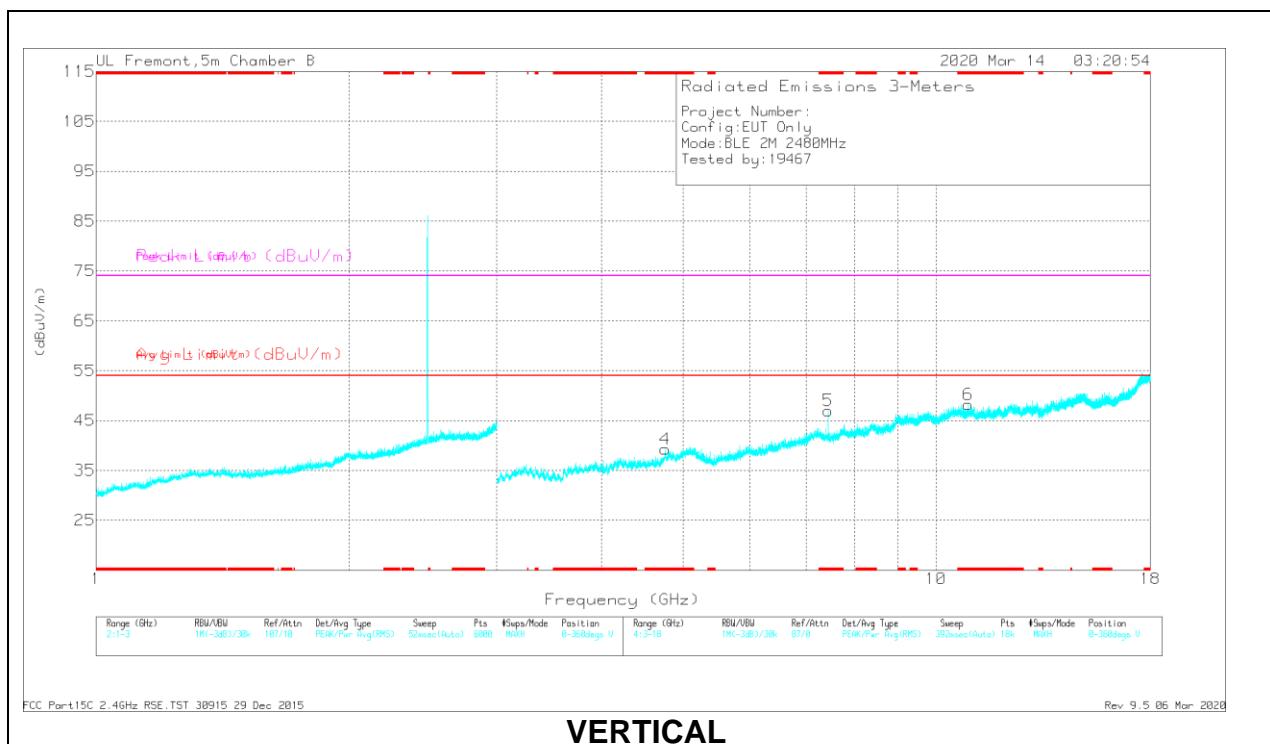
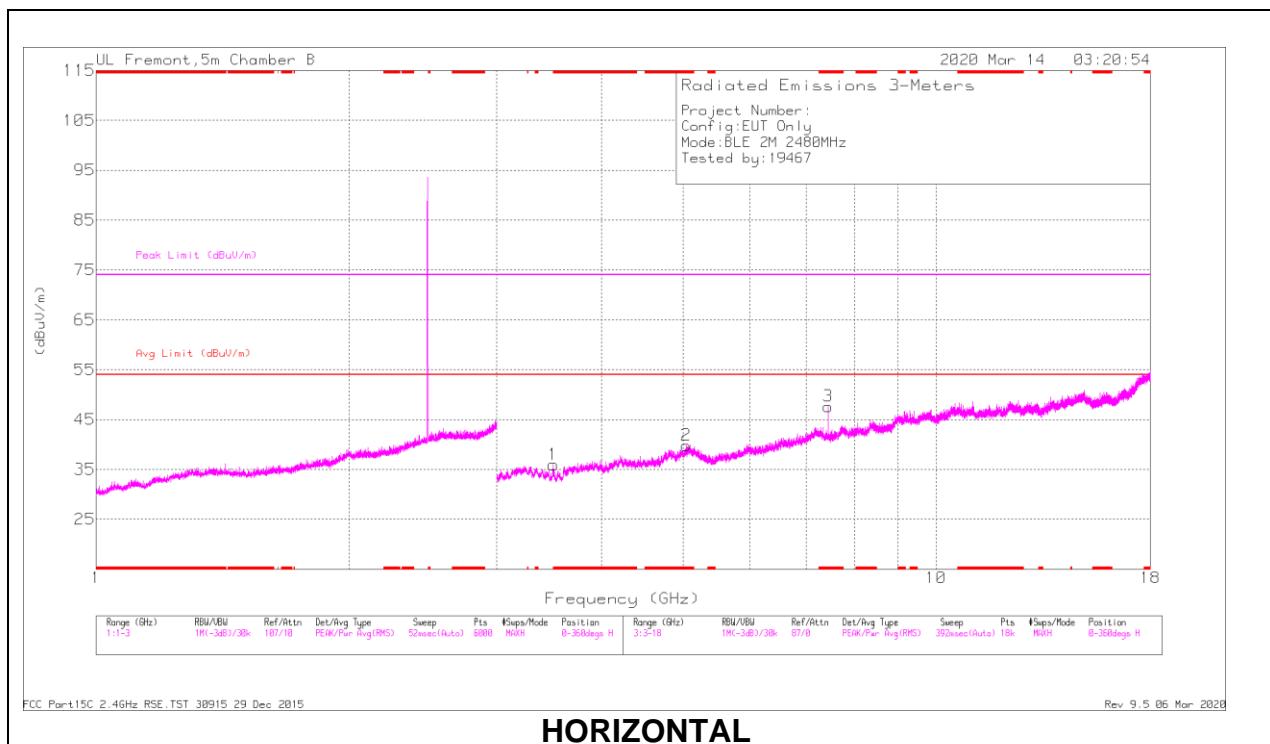
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cb/Fitr/P ad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.71716	38.19	PK2	30.4	-26.4	42.19	-	-	74	-31.81	350	160	H
	* 3.71669	26.69	MAv1	30.4	-26.4	30.69	54	-23.31	-	-	350	160	H
2	* 5.10652	37.12	PK2	34	-23.8	47.32	-	-	74	-26.68	19	386	H
	* 5.10564	24.96	MAv1	34	-23.8	35.16	54	-18.84	-	-	19	386	H
3	* 7.32174	39.92	PK2	37	-22.7	54.22	-	-	74	-19.78	177	101	H
	* 7.32133	30.85	MAv1	37	-22.6	45.25	54	-8.75	-	-	177	101	H
4	* 4.14651	37.37	PK2	31.8	-25.3	43.87	-	-	74	-30.13	120	315	V
	* 4.14815	25.54	MAv1	31.8	-25.3	32.04	54	-21.96	-	-	120	315	V
5	* 5.09341	36.85	PK2	33.9	-23.9	46.85	-	-	74	-27.15	12	336	V
	* 5.09507	25.01	MAv1	33.9	-23.9	35.01	54	-18.99	-	-	12	336	V
6	* 7.32147	38.65	PK2	37	-22.6	53.05	-	-	74	-20.95	16	319	V
	* 7.32141	29.31	MAv1	37	-22.6	43.71	54	-10.29	-	-	16	319	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

## HIGH CHANNEL RESULTS

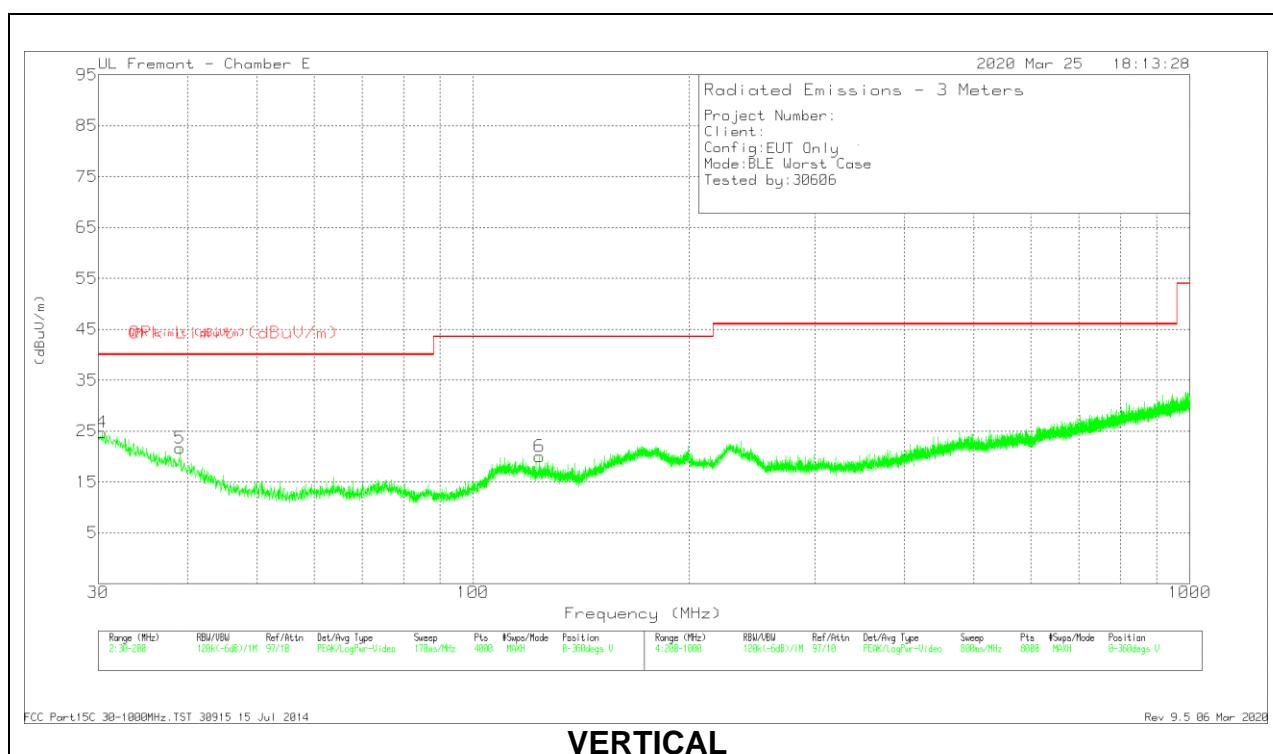
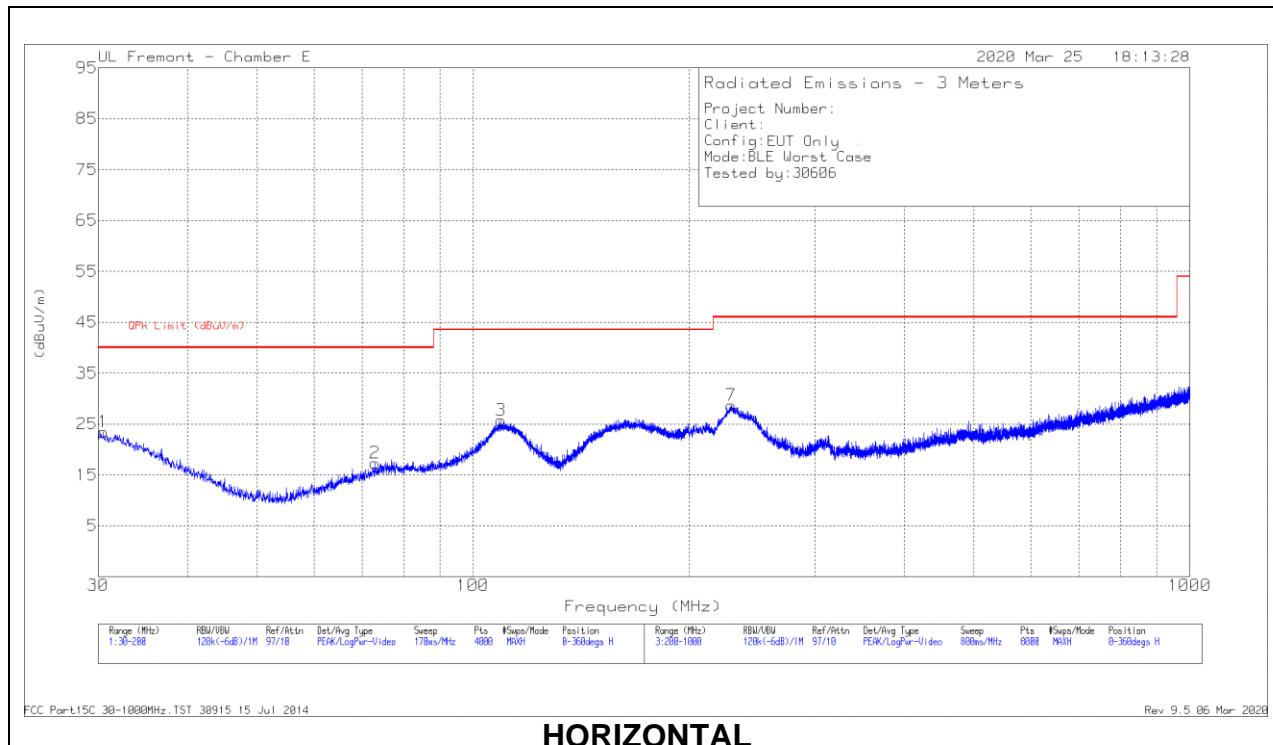


## RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl/Filt/P ad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.50279	38.21	PK2	30.2	-26.3	42.11	-	-	74	-31.89	197	282	H
	* 3.50293	26.27	MAv1	30.2	-26.3	30.17	54	-23.83	-	-	197	282	H
2	* 5.04133	37.35	PK2	33.7	-24.2	46.85	-	-	74	-27.15	264	176	H
	* 5.04265	25	MAv1	33.7	-24.2	34.5	54	-19.5	-	-	264	176	H
3	* 7.4411	38.2	PK2	36.8	-22	53	-	-	74	-21	332	110	H
	* 7.44142	29.26	MAv1	36.8	-22	44.06	54	-9.94	-	-	332	110	H
4	* 4.76254	37.27	PK2	32.8	-24.4	45.67	-	-	74	-28.33	44	367	V
	* 4.7605	25.74	MAv1	32.8	-24.4	34.14	54	-19.86	-	-	44	367	V
5	* 7.44123	38.44	PK2	36.8	-22	53.24	-	-	74	-20.76	135	339	V
	* 7.44147	29.31	MAv1	36.8	-22	44.11	54	-9.89	-	-	135	339	V
6	* 10.92814	32.5	PK2	39.4	-17.9	54	-	-	74	-20	75	259	V
	* 10.92603	21.04	MAv1	39.3	-17.9	42.44	54	-11.56	-	-	75	259	V

### 10.3. WORST CASE BELOW 1 GHz

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



## Below 1GHz Data

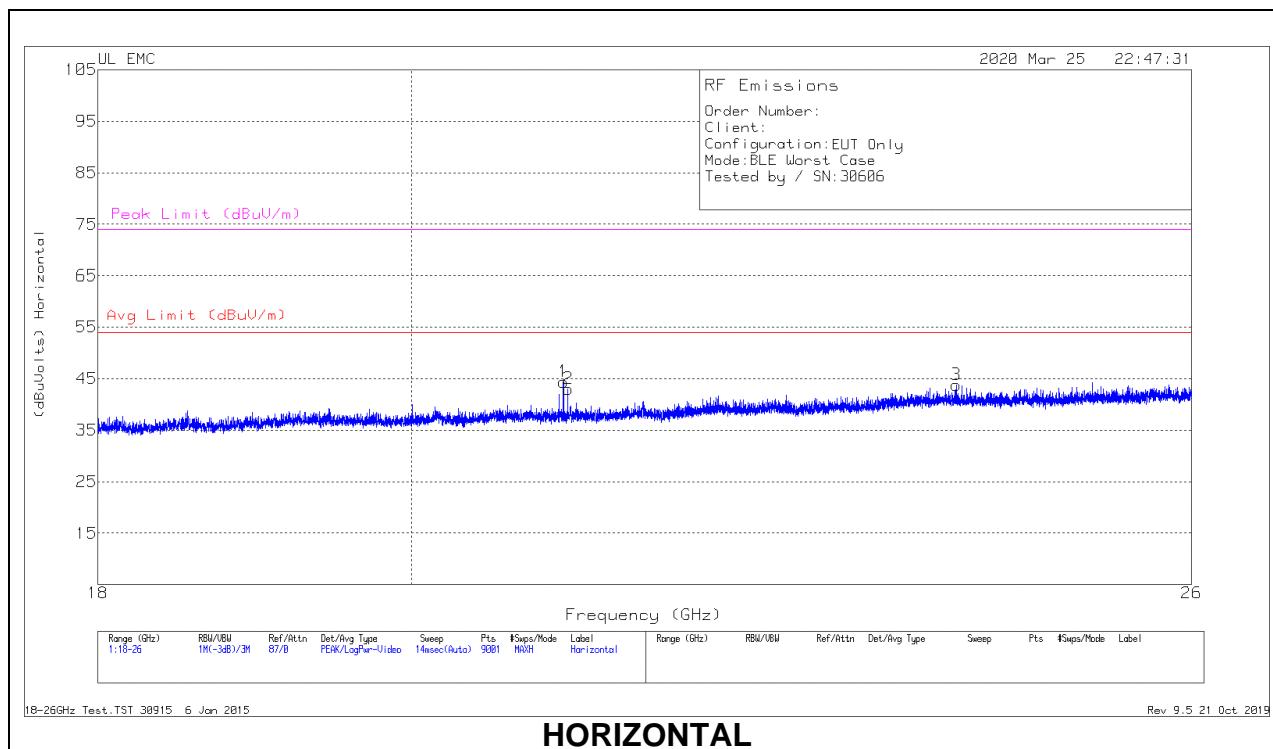
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 109.4956	37.74	Pk	18.6	-30.6	25.74	43.52	-17.78	0-360	301	H
6	* 123.8218	30.46	Pk	20.1	-30.6	19.96	43.52	-23.56	0-360	100	V
4	30.3826	29.65	Pk	26.6	-31.6	24.65	40	-15.35	0-360	100	V
1	30.5101	28.54	Pk	26.5	-31.6	23.44	40	-16.56	0-360	301	H
5	39.0123	32.97	Pk	20.1	-31.4	21.67	40	-18.33	0-360	100	V
2	72.9786	34.45	Pk	13.9	-31	17.35	40	-22.65	0-360	401	H
7	229.1038	41.41	Pk	16.9	-29.7	28.61	46.02	-17.41	0-360	99	H

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

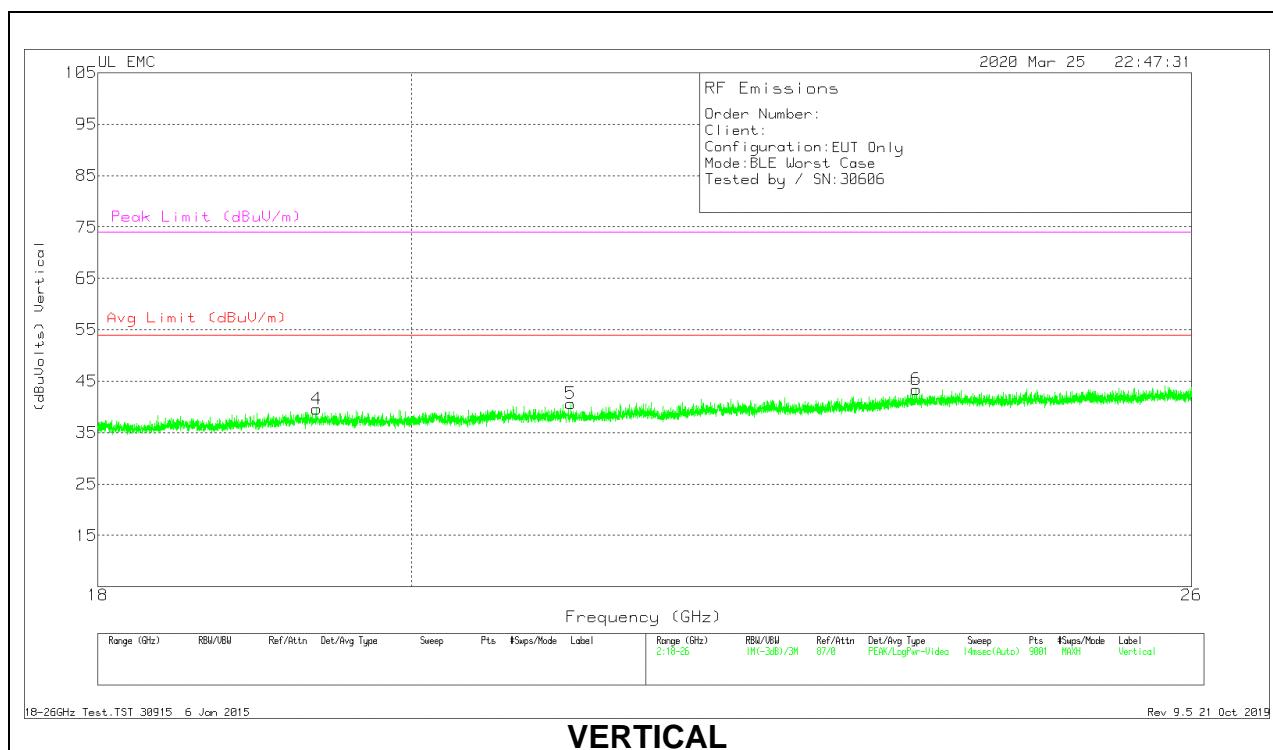
Pk - Peak detector

## 10.4. WORST CASE 18-26 GHz

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



**HORIZONTAL**



**VERTICAL**

## 18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T447 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	21.04978	41.79	Pk	33.1	-21	-9.5	44.39	-	-	74	-29.61
	21.04924	30.84	Av	33.1	-21	-9.5	33.44	54	-20.56	-	-
2	21.08089	40.33	Pk	33.1	-20.9	-9.5	43.03	-	-	74	-30.97
	21.08031	37.59	Av	33.1	-20.9	-9.5	40.29	54	-13.71	-	-
3	24.02045	38.58	Pk	34.3	-19.6	-9.5	43.78	-	-	74	-30.22
4	19.37244	37.73	Pk	32.7	-21.3	-9.5	39.63	-	-	74	-34.37
5	21.10133	38.03	Pk	33.1	-21	-9.5	40.63	-	-	74	-33.37
6	23.69956	38.54	Pk	34.1	-19.7	-9.5	43.44	-	-	74	-30.56

Pk - Peak detector

Av - Average detection

## 11. 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 <sup>*</sup>	56 to 46 <sup>*</sup>
0.5-5	56	46
5-30	60	50

<sup>\*</sup> 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.

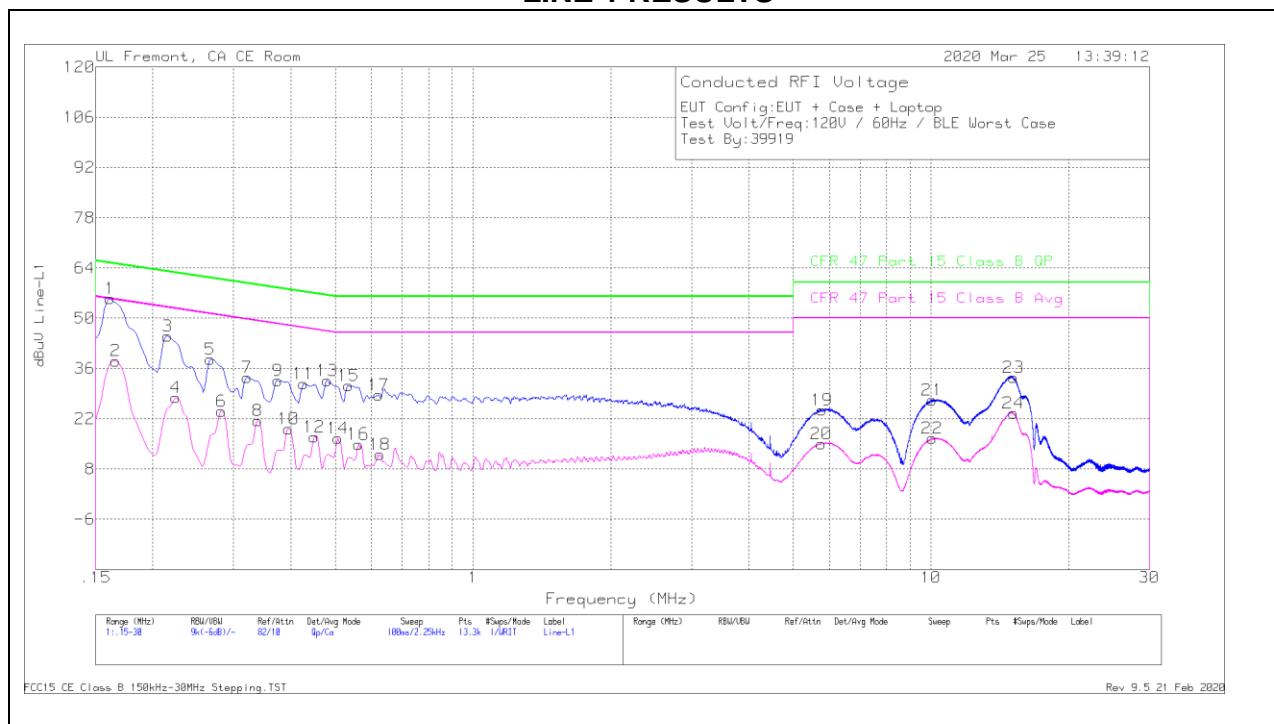
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

### RESULTS

### 11.1.1. AC Power Line Host

#### LINE 1 RESULTS

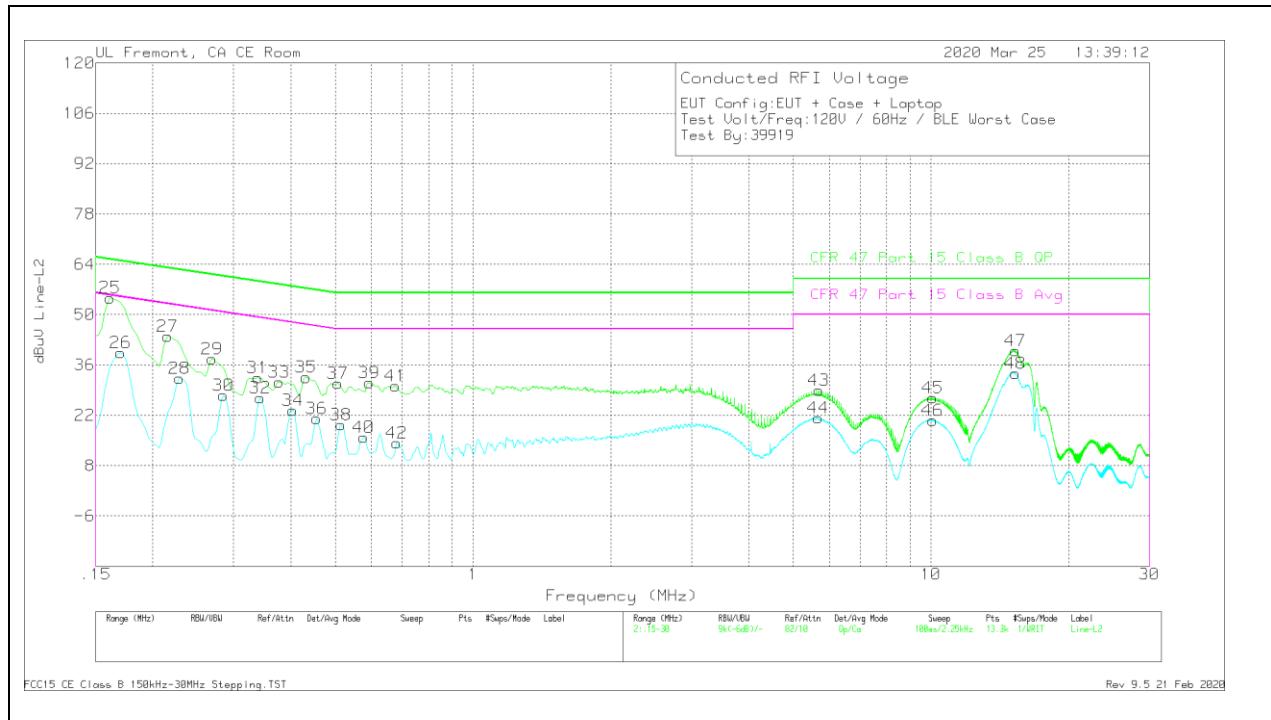


Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1 (dB)	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B OP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)M margin (dB)
1	.16125	45.31	Qp	.1	0	10	55.41	65.4	-9.99	-	-
2	.16575	28.03	Ca	.1	0	10	38.13	-	-	55.17	-17.04
3	.21525	34.99	Qp	0	0	10	44.99	63	-18.01	-	-
4	.22425	17.97	Ca	0	0	10	27.97	-	-	52.66	-24.69
5	.267	28.62	Qp	0	0	10	38.62	61.21	-22.59	-	-
6	.28275	14.04	Ca	0	0	10	24.04	-	-	50.73	-26.69
7	.321	23.51	Qp	0	0	10	33.51	59.68	-26.17	-	-
8	.339	11.49	Ca	0	0	10	21.49	-	-	49.23	-27.74
9	.375	22.58	Qp	0	0	10	32.58	58.39	-25.81	-	-
10	.39525	9.27	Ca	0	0	10	19.27	-	-	47.95	-28.68
11	.42675	21.74	Qp	0	0	10	31.74	57.32	-25.58	-	-
12	.44925	6.92	Ca	0	0	10	16.92	-	-	46.89	-29.97
13	.48075	22.65	Qp	0	0	10	32.65	56.33	-23.68	-	-
14	.50775	6.5	Ca	0	0	10	16.5	-	-	46	-29.5
15	.53475	21.31	Qp	0	0	10	31.31	56	-24.69	-	-
16	.56175	4.92	Ca	0	0	10	14.92	-	-	46	-31.08
17	.6225	18.68	Qp	0	0	10	28.68	56	-27.32	-	-
18	.627	2.1	Ca	0	0	10	12.1	-	-	46	-33.9
19	5.77275	14.19	Qp	0	.2	10.1	24.49	60	-35.51	-	-
20	5.766	4.76	Ca	0	.2	10.1	15.06	-	-	50	-34.94
21	10.07025	16.93	Qp	0	.2	10.1	27.23	60	-32.77	-	-
22	10.06913	6.23	Ca	0	.2	10.1	16.53	-	-	50	-33.47
23	15.135	22.95	Qp	0	.3	10.2	33.45	60	-26.55	-	-
24	15.126	13.02	Ca	0	.3	10.2	23.52	-	-	50	-26.48

Qp - Quasi-Peak detector

Ca - CISPR average detection

## LINE 2 RESULTS



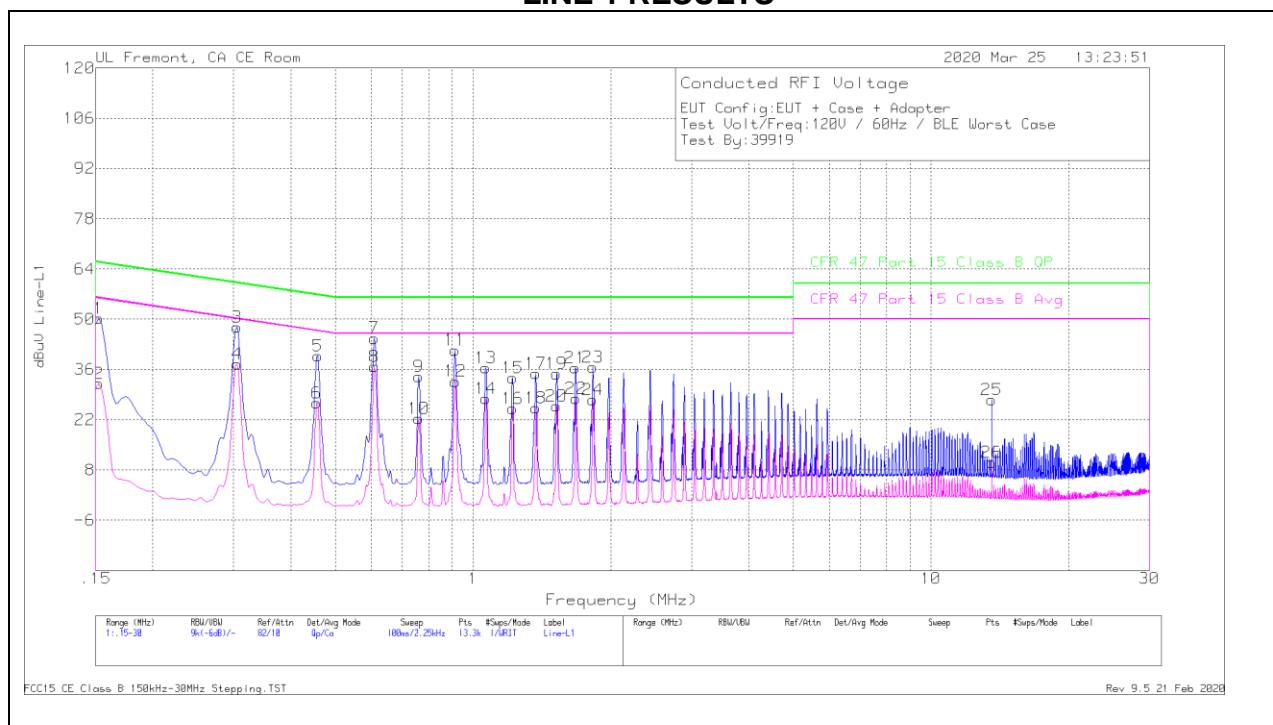
Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2 (dB)	LC Cables C2&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)M margin (dB)
25	.16125	44.7	Qp	0	0	10	54.7	65.4	-10.7	-	-
26	.17025	29.39	Ca	0	0	10	39.39	-	-	54.95	-15.56
27	.21525	34.03	Qp	0	0	10	44.03	63	-18.97	-	-
28	.22875	22.3	Ca	0	0	10	32.3	-	-	52.49	-20.19
29	.26925	27.71	Qp	0	0	10	37.71	61.14	-23.43	-	-
30	.285	17.51	Ca	0	0	10	27.51	-	-	50.67	-23.16
31	.339	22.41	Qp	0	0	10	32.41	59.23	-26.82	-	-
32	.3435	16.8	Ca	0	0	10	26.8	-	-	49.12	-22.32
33	.37725	21.22	Qp	0	0	10	31.22	58.34	-27.12	-	-
34	.40425	13.44	Ca	0	0	10	23.44	-	-	47.77	-24.33
35	.43125	22.55	Qp	0	0	10	32.55	57.23	-24.68	-	-
36	.456	11.15	Ca	0	0	10	21.15	-	-	46.77	-25.62
37	.50775	20.88	Qp	0	0	10	30.88	56	-25.12	-	-
38	.5145	9.32	Ca	0	0	10	19.32	-	-	46	-26.68
39	.59325	21.04	Qp	0	0	10	31.04	56	-24.96	-	-
40	.5775	5.82	Ca	0	0	10	15.82	-	-	46	-30.18
41	.6765	20.24	Qp	0	0	10	30.24	56	-25.76	-	-
42	.681	4.36	Ca	0	0	10	14.36	-	-	46	-31.64
43	5.68275	18.62	Qp	0	.2	10.1	28.92	60	-31.08	-	-
44	5.66925	11.04	Ca	0	.2	10.1	21.34	-	-	50	-28.66
45	10.08375	16.53	Qp	0	.2	10.1	26.83	60	-33.17	-	-
46	10.077	10.33	Ca	0	.2	10.1	20.63	-	-	50	-29.37
47	15.29025	29.46	Qp	0	.3	10.2	39.96	60	-20.04	-	-
48	15.29925	23.19	Ca	0	.3	10.2	33.69	-	-	50	-16.31

Qp - Quasi-Peak detector

Ca - CISPR average detection

### 11.1.2. AC Power Line Norm

#### LINE 1 RESULTS



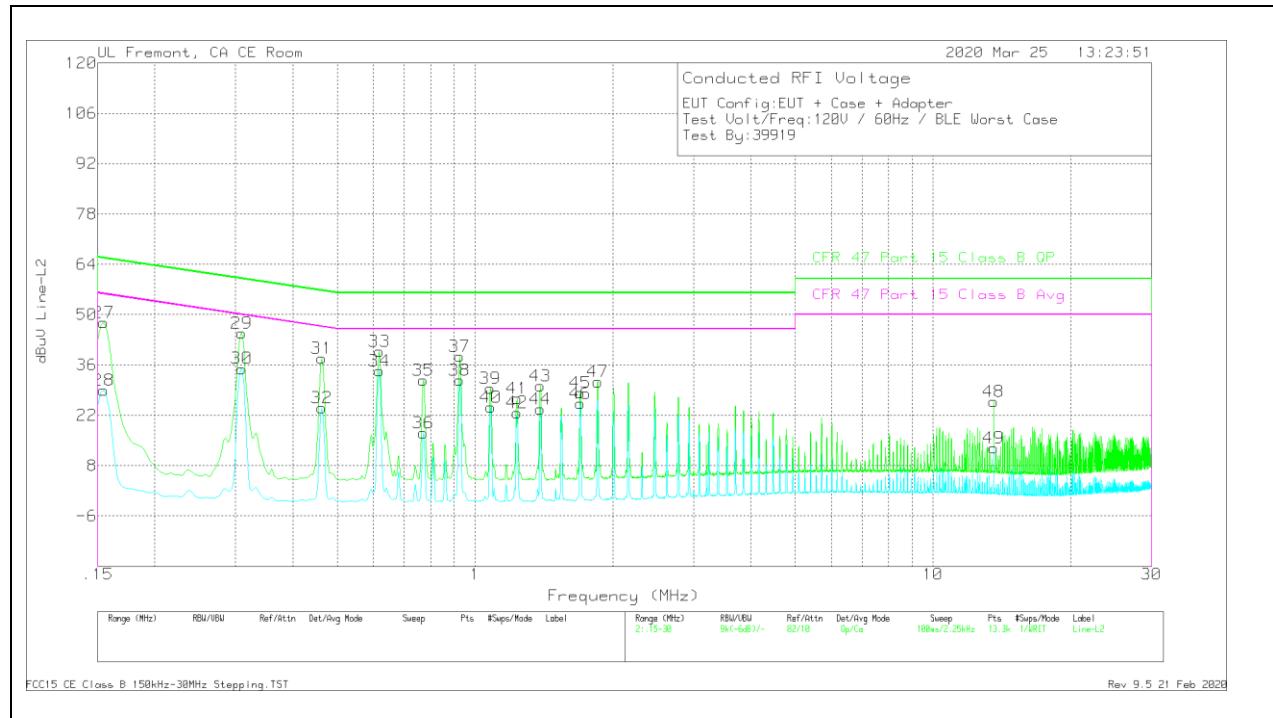
Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1 (dB)	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)M margin (dB)
1	.15225	40.15	Qp	.1	0	10	50.25	65.88	-15.63	-	-
2	.15225	22.04	Ca	.1	0	10	32.14	-	-	55.88	-23.74
3	.30525	37.84	Qp	0	0	10	47.84	60.1	-12.26	-	-
4	.30525	27.55	Ca	0	0	10	37.55	-	-	50.1	-12.55
5	.45825	29.73	Qp	0	0	10	39.73	56.72	-16.99	-	-
6	.456	16.77	Ca	0	0	10	26.77	-	-	46.77	-20
7	.609	34.76	Qp	0	0	10	44.76	56	-11.24	-	-
8	.609	26.81	Ca	0	0	10	36.81	-	-	46	-9.19
9	.762	24.09	Qp	0	0	10	34.09	56	-21.91	-	-
10	.762	12.34	Ca	0	0	10	22.34	-	-	46	-23.66
11	.91275	31.44	Qp	0	0	10	41.44	56	-14.56	-	-
12	.915	22.72	Ca	0	0	10	32.72	-	-	46	-13.28
13	1.06575	26.39	Qp	0	.1	10	36.49	56	-19.51	-	-
14	1.06575	17.79	Ca	0	.1	10	27.89	-	-	46	-18.11
15	1.21875	23.64	Qp	0	.1	10	33.74	56	-22.26	-	-
16	1.21875	15.05	Ca	0	.1	10	25.15	-	-	46	-20.85
17	1.3695	24.73	Qp	0	.1	10	34.83	56	-21.17	-	-
18	1.37175	15.25	Ca	0	.1	10	25.35	-	-	46	-20.65
19	1.5225	24.72	Qp	0	.1	10	34.82	56	-21.18	-	-
20	1.5225	15.77	Ca	0	.1	10	25.87	-	-	46	-20.13
21	1.67325	26.4	Qp	0	.1	10	36.5	56	-19.5	-	-
22	1.6755	17.9	Ca	0	.1	10	28	-	-	46	-18
23	1.82625	26.48	Qp	0	.1	10	36.58	56	-19.42	-	-
24	1.8285	17.41	Ca	0	.1	10	27.51	-	-	46	-18.49
25	*13.56	17.19	Qp	.1	.2	10.1	27.59	60	-32.41	-	-
26	*13.56	-.23	Ca	.1	.2	10.1	10.17	-	-	50	-39.83

Qp - Quasi-Peak detector

Ca - CISPR average detection

\*Indicates UL RFID signal. Not from device.

## LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2 (dB)	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)M argin (dB)
27	.1545	37.69	Qp	.1	0	10	47.79	65.75	-17.96	-	-
28	.1545	18.86	Ca	.1	0	10	28.96	-	-	55.75	-26.79
29	.30975	34.85	Qp	0	0	10	44.85	59.98	-15.13	-	-
30	.30975	24.99	Ca	0	0	10	34.99	-	-	49.98	-14.99
31	.46275	27.87	Qp	0	0	10	37.87	56.64	-18.77	-	-
32	.46275	14.02	Ca	0	0	10	24.02	-	-	46.64	-22.62
33	.618	29.71	Qp	0	0	10	39.71	56	-16.29	-	-
34	.618	24.42	Ca	0	0	10	34.42	-	-	46	-11.58
35	.771	21.79	Qp	0	0	10	31.79	56	-24.21	-	-
36	.771	7.18	Ca	0	0	10	17.18	-	-	46	-28.82
37	.92625	28.31	Qp	0	.1	10	38.41	56	-17.59	-	-
38	.92625	21.66	Ca	0	.1	10	31.76	-	-	46	-14.24
39	1.07925	19.37	Qp	0	.1	10	29.47	56	-26.53	-	-
40	1.0815	14.09	Ca	0	.1	10	24.19	-	-	46	-21.81
41	1.2345	16.67	Qp	0	.1	10	26.77	56	-29.23	-	-
42	1.2345	12.67	Ca	0	.1	10	22.77	-	-	46	-23.23
43	1.38975	20.07	Qp	0	.1	10	30.17	56	-25.83	-	-
44	1.38975	13.57	Ca	0	.1	10	23.67	-	-	46	-22.33
45	1.698	18.22	Qp	0	.1	10	28.32	56	-27.68	-	-
46	1.698	15.28	Ca	0	.1	10	25.38	-	-	46	-20.62
47	1.85325	21.23	Qp	0	.1	10	31.33	56	-24.67	-	-
48	*13.56	15.42	Qp	.1	.2	10.1	25.82	60	-34.18	-	-
49	*13.56	2.48	Ca	.1	.2	10.1	12.88	-	-	50	-37.12

Qp - Quasi-Peak detector

Ca - CISPR average detection

\*Indicates UL RFID signal. Not from device.

## 12. SETUP PHOTOS

Please refer to 13280103-EP1V1 for setup photos

**END OF TEST REPORT**