



CERTIFICATION TEST REPORT

Report Number. : 13280103-E4V2

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

Model : A2454

FCC ID : BCGA2454

IC : 579C-A2454

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:
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Prepared by:
UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538 U.S.A.
TEL: (510) 319-4000
FAX: (510) 661-0888

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	3/27/2020	Initial Issue	Chin Pang
V2	3/31/2020	Address TCB's Questions	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: Totally Wireless High-Performance Earphones

MODEL: A2454

SERIAL NUMBER: CC2C9062PNCC (Conducted); CC2C902APNCC (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:



Chin Pang
Senior Engineer
Consumer Technology Division
UL Verification Services Inc.

Prepared By:



Jingang Li
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.
☐ Chamber A (IC:2324B-1)	☐ Chamber D (IC:22541-1)	☐ Chamber I (IC: 2324A-5)
☒ Chamber B (IC:2324B-2)	☒ Chamber E (IC:22541-2)	☐ Chamber J (IC: 2324A-6)
☐ Chamber C (IC:2324B-3)	☐ Chamber F (IC:22541-3)	☐ Chamber K (IC: 2324A-1)
	☒ Chamber G (IC:22541-4)	☐ Chamber L (IC: 2324A-3)
	☐ Chamber H (IC:22541-5)	☐ 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 A2454 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	BLE1M	5.01	3.17
2402 - 2480	BLE2M	5.03	3.18

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Band (GHz)	Antenna Gain (dBi)
2.4	-4.90

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	CC2C904GPNJH	
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						

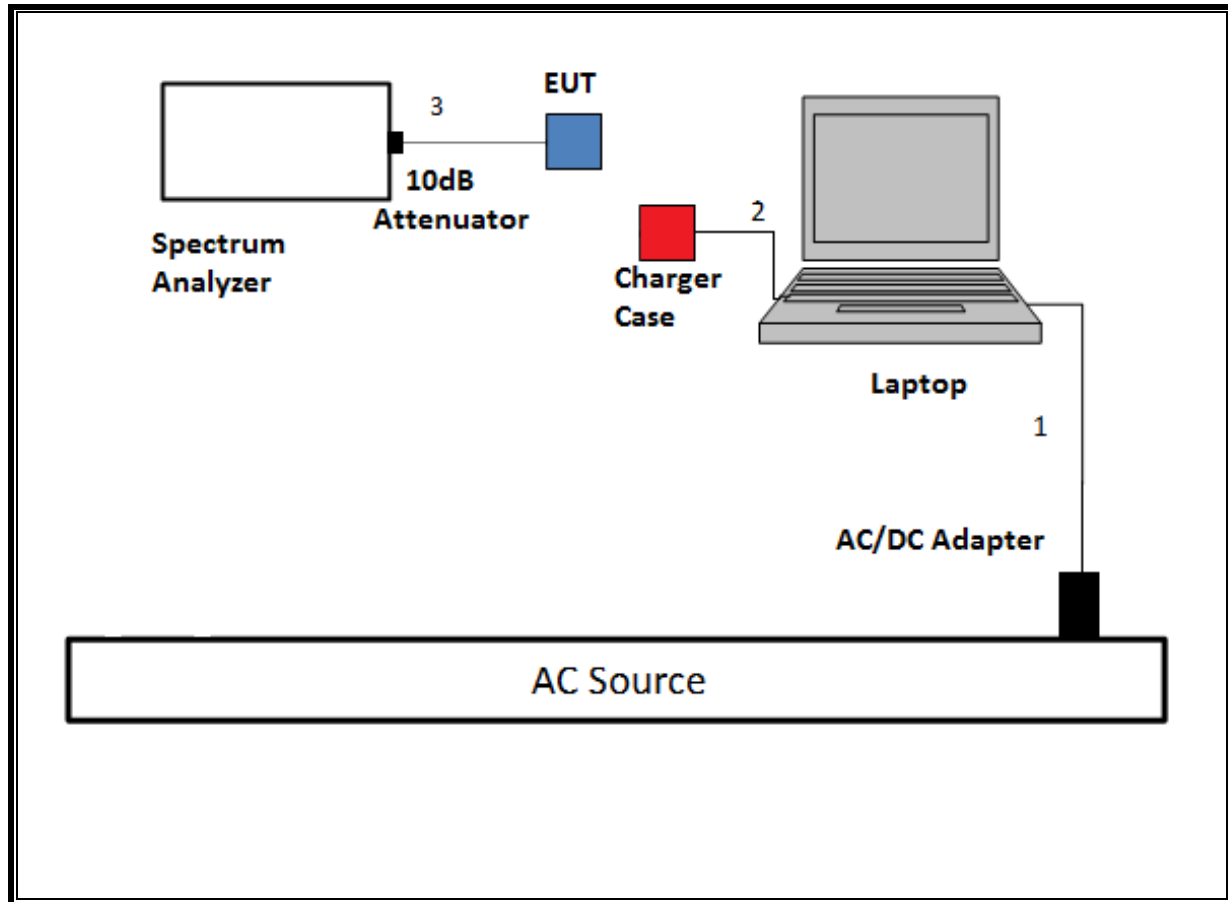
I/O CABLES (BELOW 1GHz AND AC POWER LINE TEST WITH ADAPTER AND LAPTOP)

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

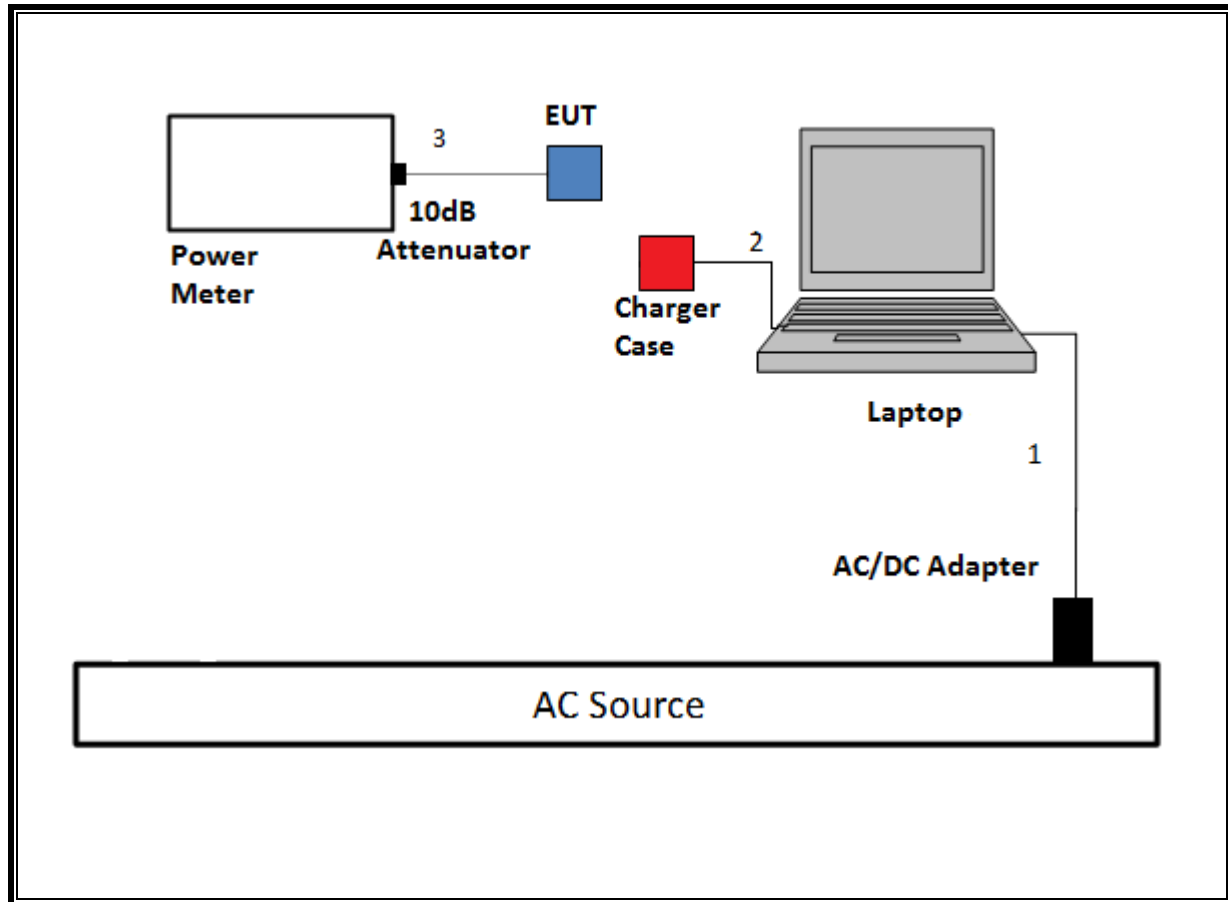
TEST SETUP

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

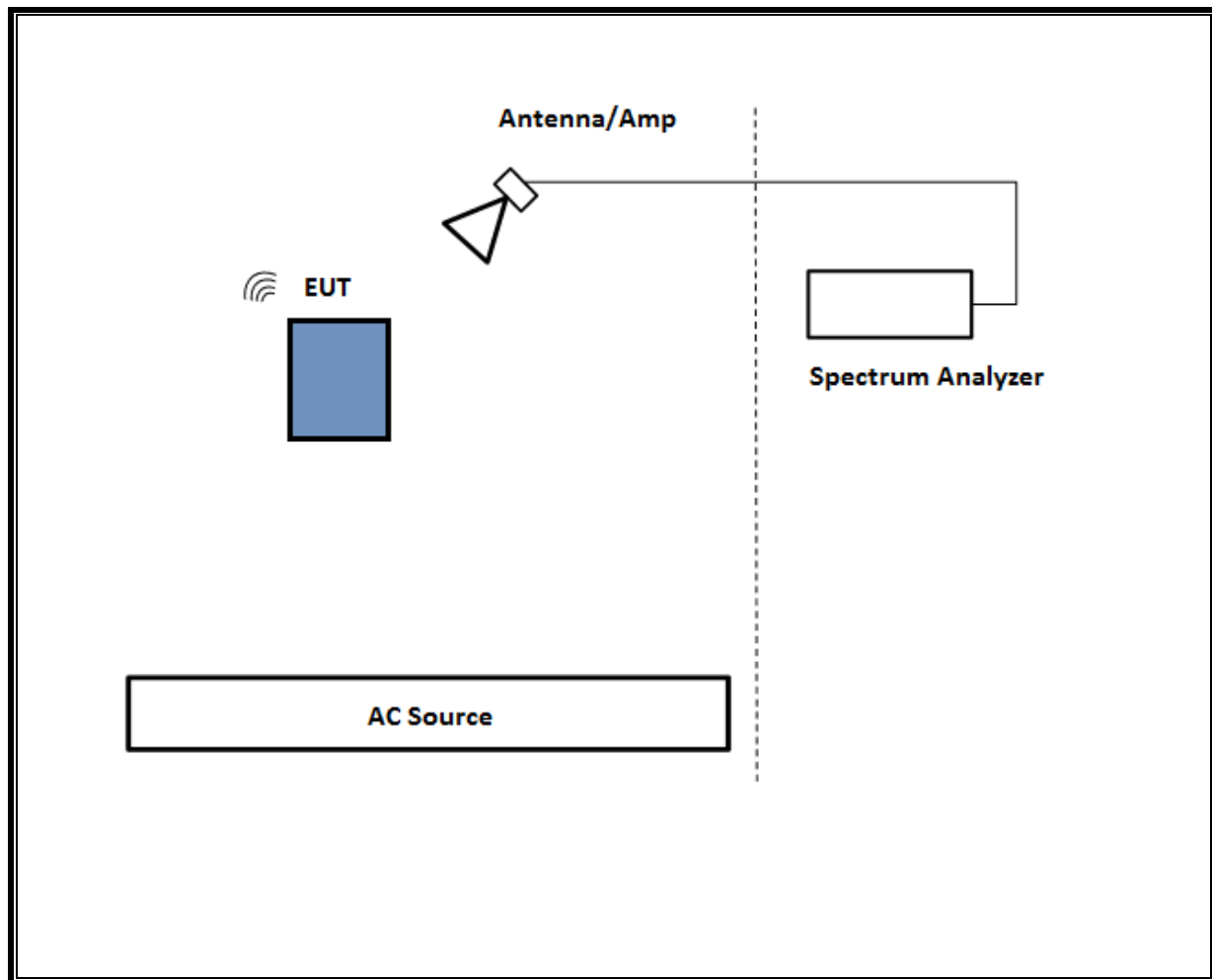
SETUP DIAGRAM FOR CONDUCTED TESTS

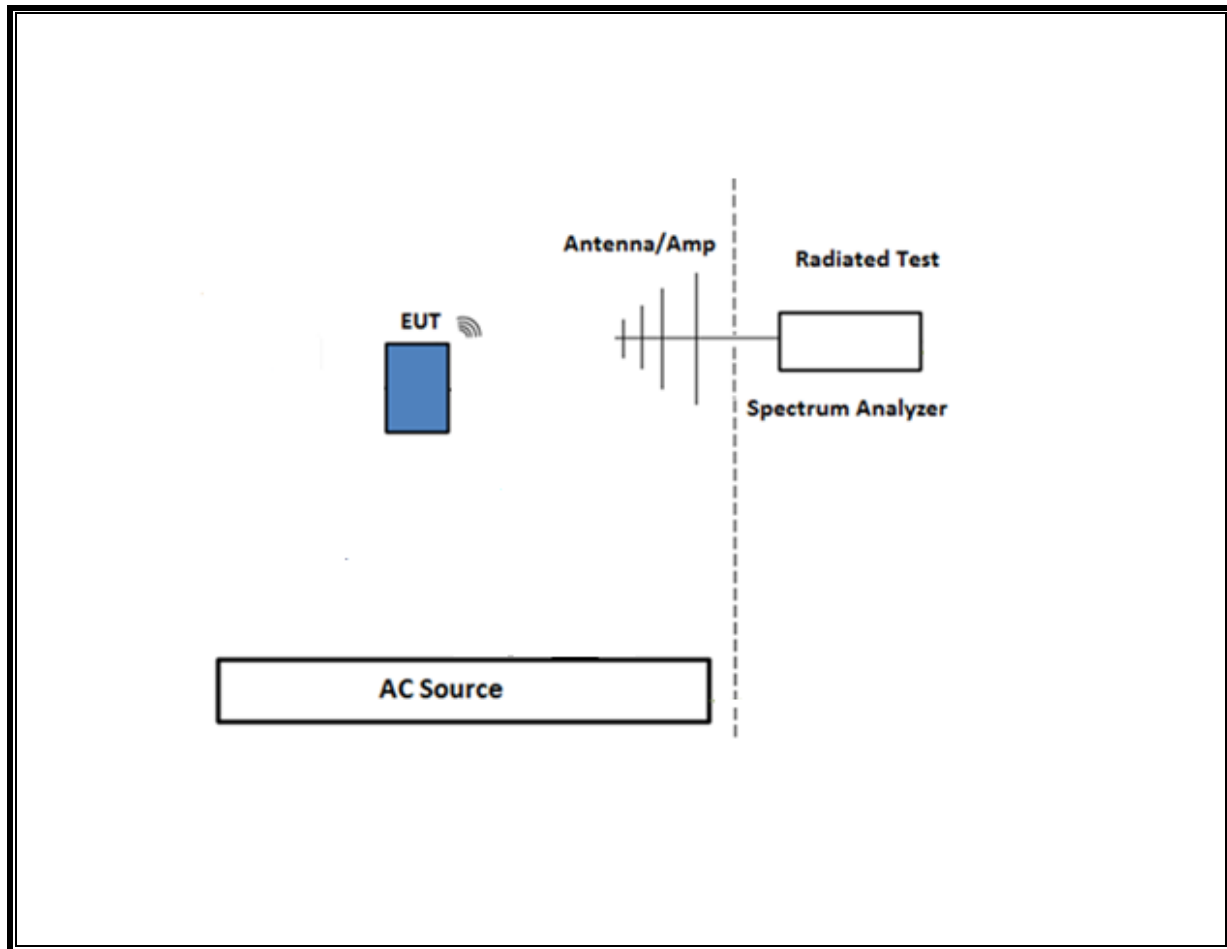


SETUP DIAGRAM FOR CONDUCTED TESTS: POWER METER CONFIGURATION

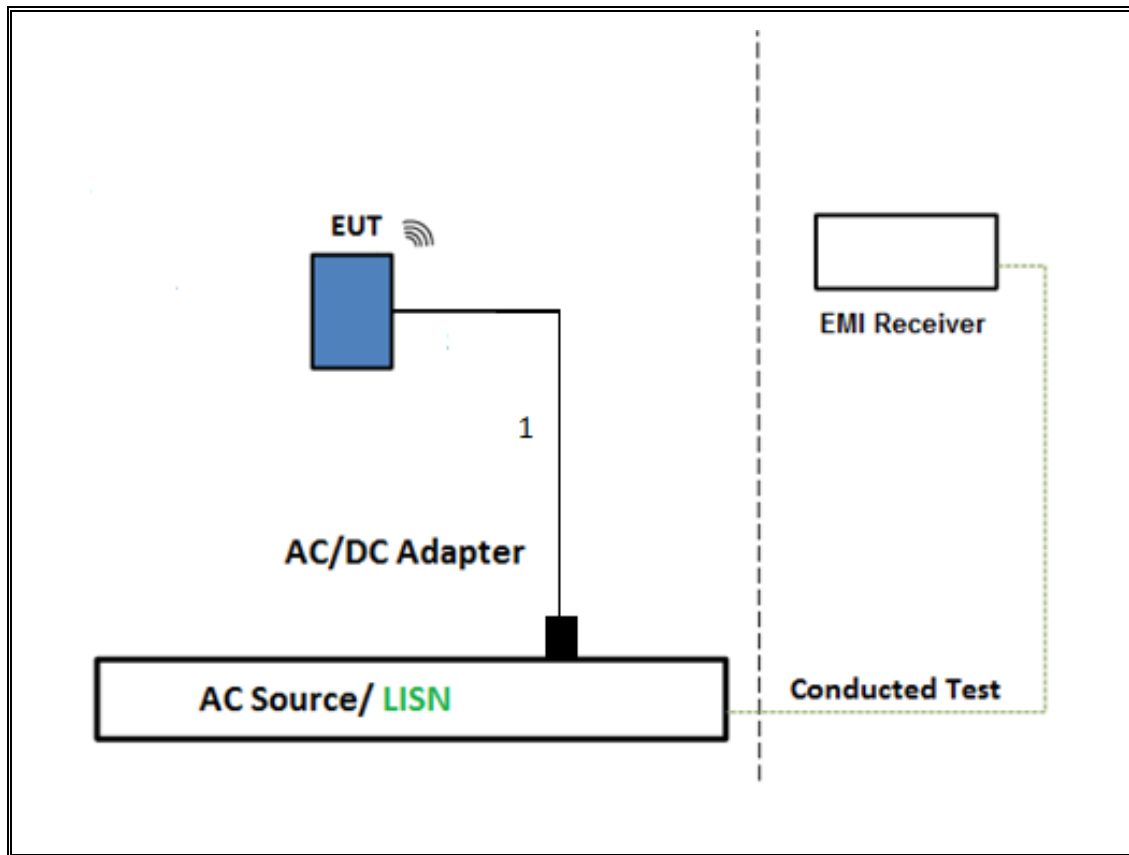


SETUP DIAGRAM FOR RADIATED TESTS ABOVE 1GHz

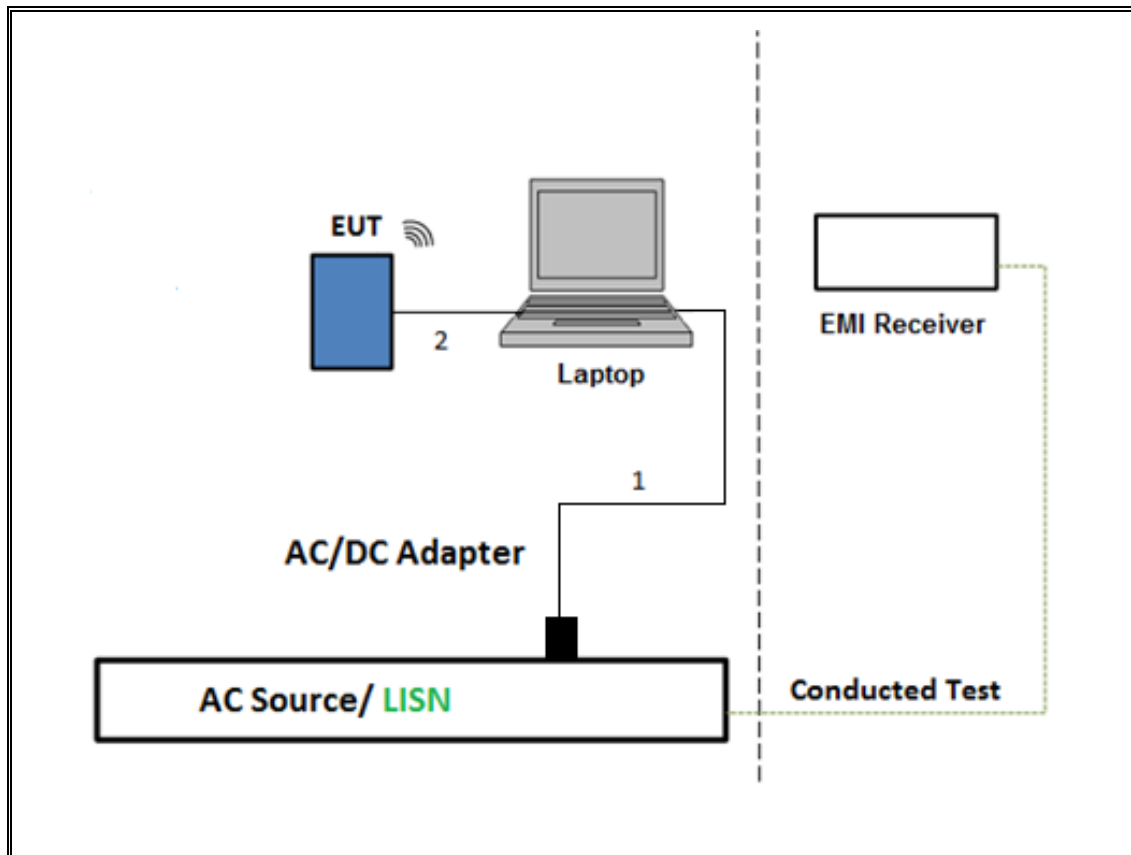


SETUP DIAGRAM FOR BELOW 1GHz

TEST SETUP- AC LINE CONDUCTED: CHARGER CONFIGURATION



TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION



7. MEASUREMENT METHOD

On Time and Duty Cycle: ANSI C63.10-2013 Section 11.6

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 -11.9.2.3.2 Measurement using gated average 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 -11.13.3.2 Integration method -Peak detection

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	T408	08/23/2020	08/23/2019
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
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T136	06/14/2020	06/14/2019
Amplifier, 1 to 8GHz, 35dB	Miteq Inc.	AMF-4D-01000800-30-29P	T1156	05/11/2020	06/11/2019
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	ESC17	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

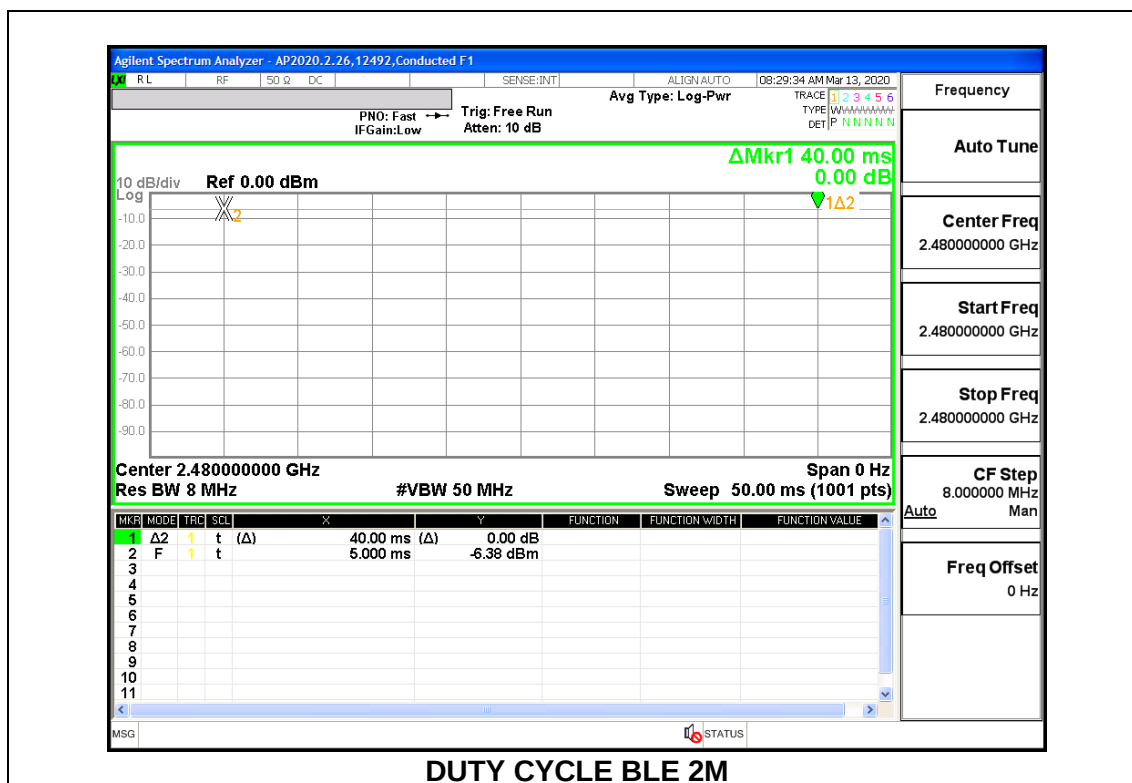
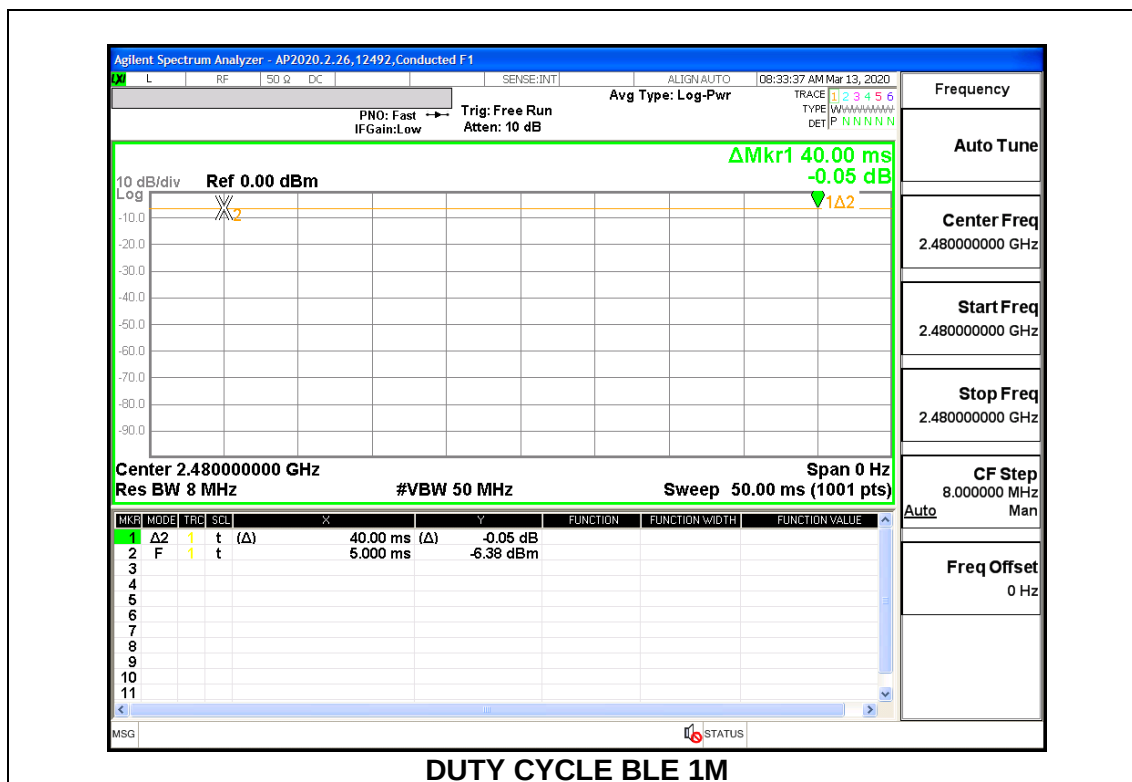
None; for reporting purposes only.

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)
2.4GHz Band						
BLE 1M	40.000	40.000	1.000	100.00%	0.00	0.010
BLE 2M	40.000	40.000	1.000	100.00%	0.00	0.010



9.2. 99% BANDWIDTH

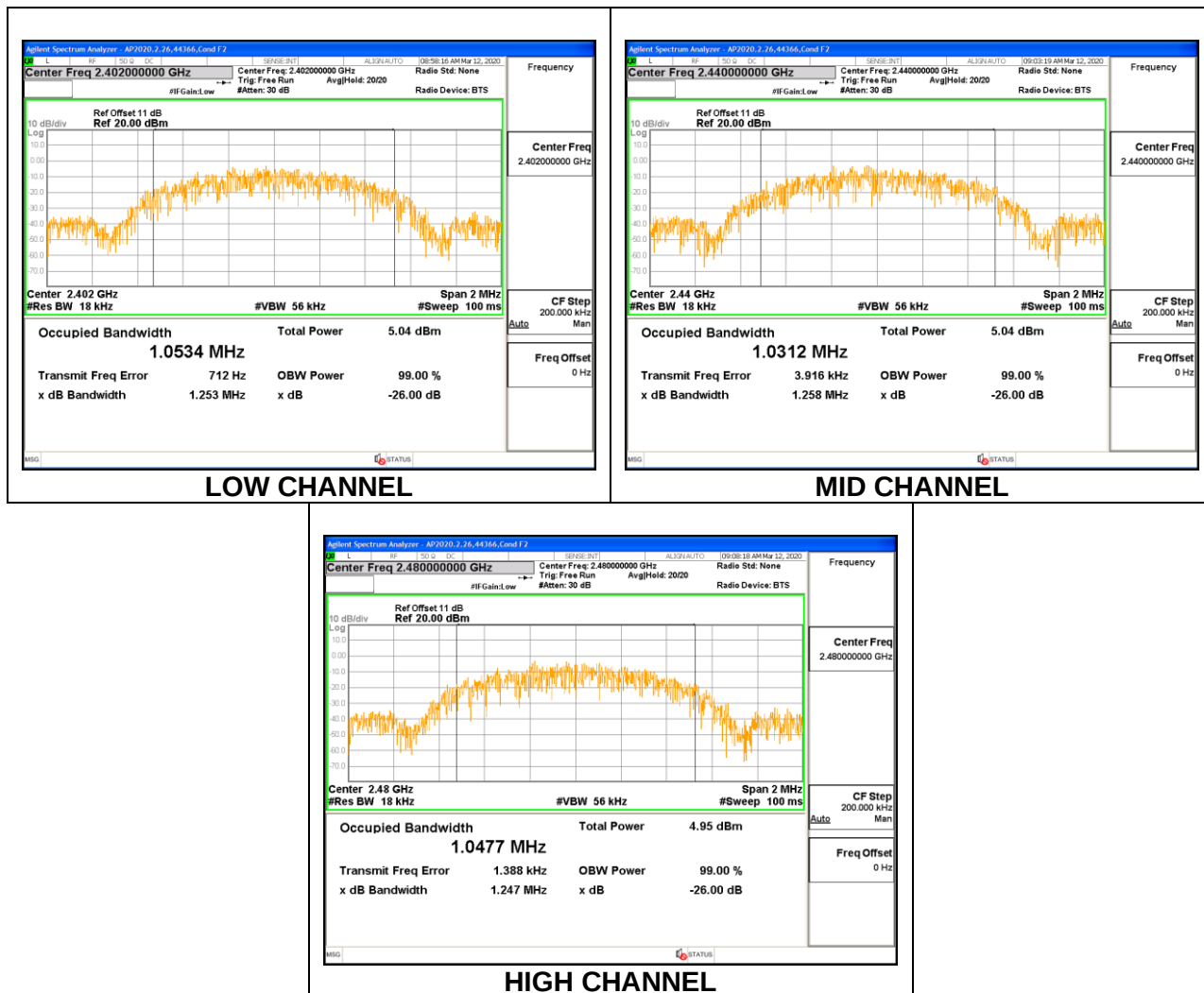
LIMITS

None; for reporting purposes only.

RESULTS

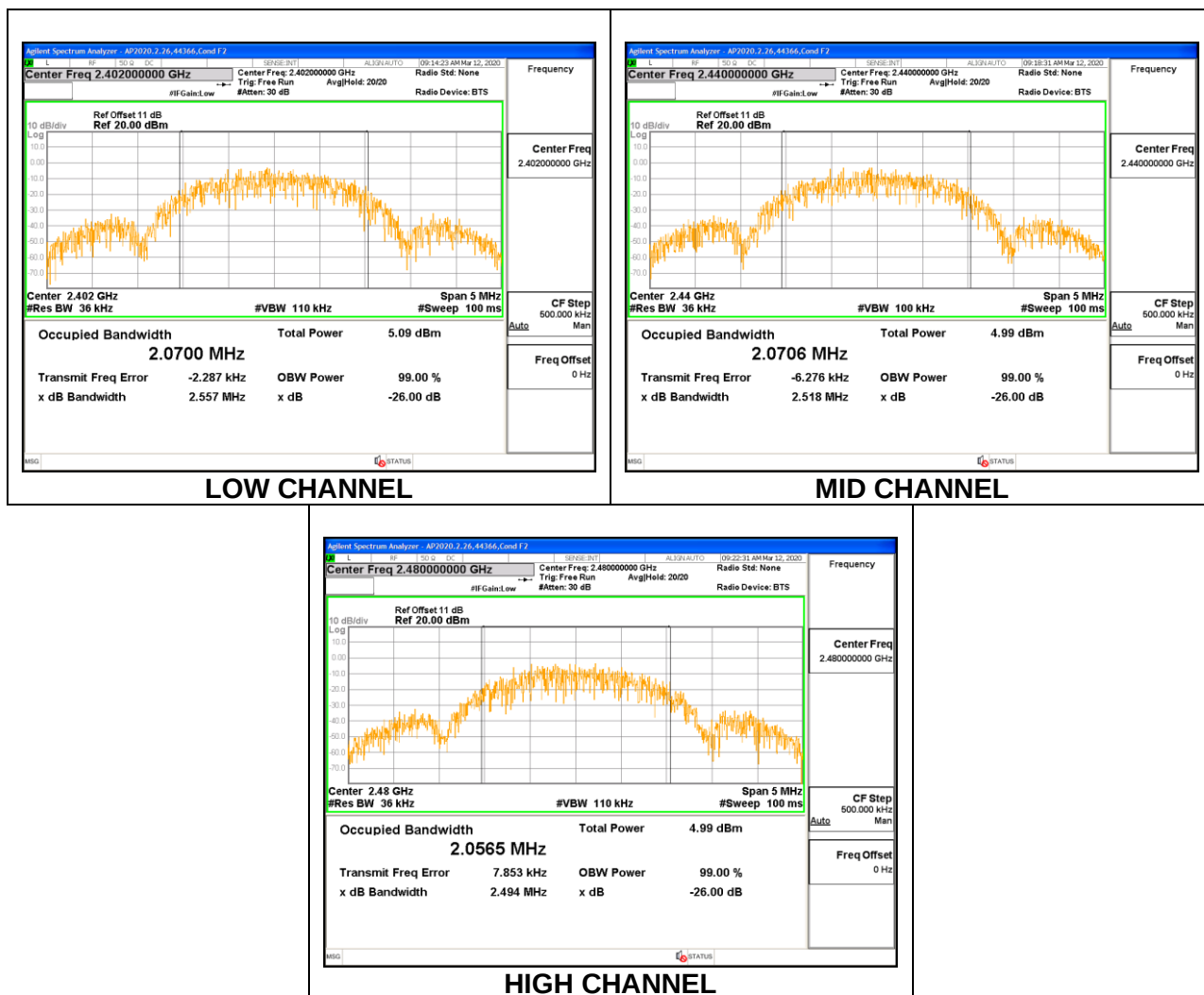
9.2.1. BLE (1Mbps)

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0534
Middle	2440	1.0312
High	2480	1.0477



9.2.2. BLE (2Mbps)

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	2.0700
Middle	2440	2.0706
High	2480	2.0565



9.3. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

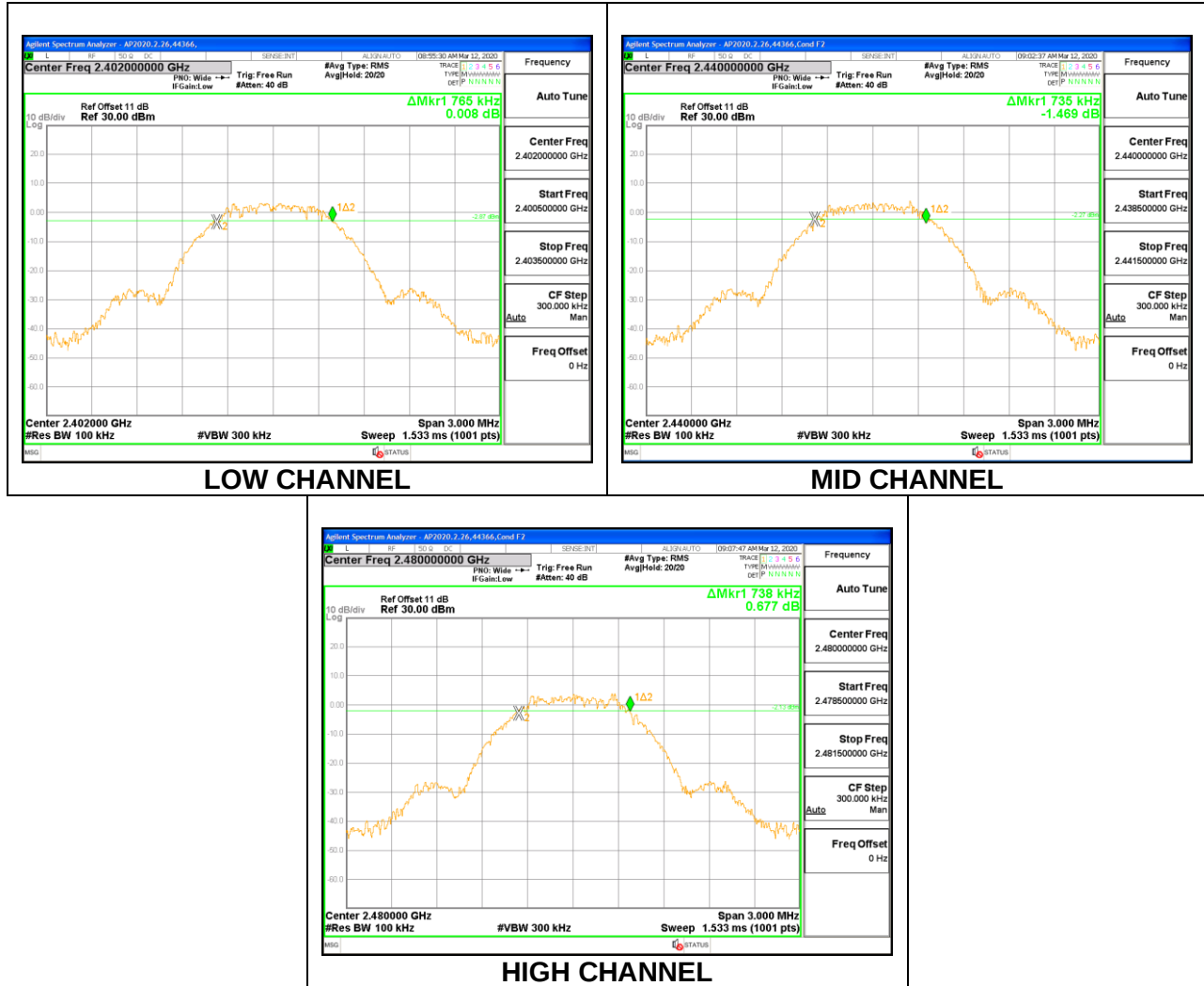
RSS-247 5.2 (a)

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

RESULTS

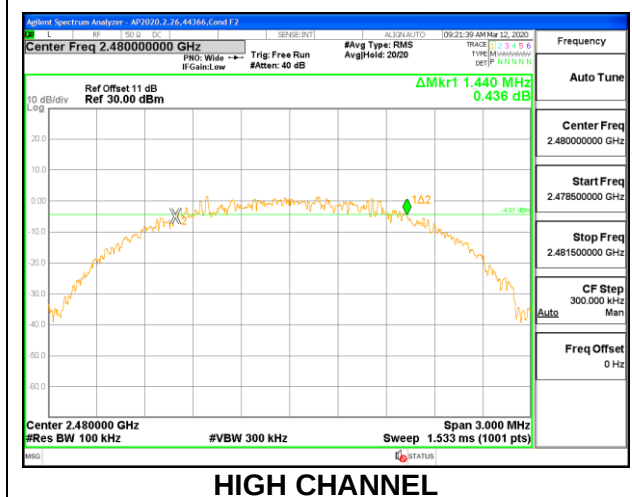
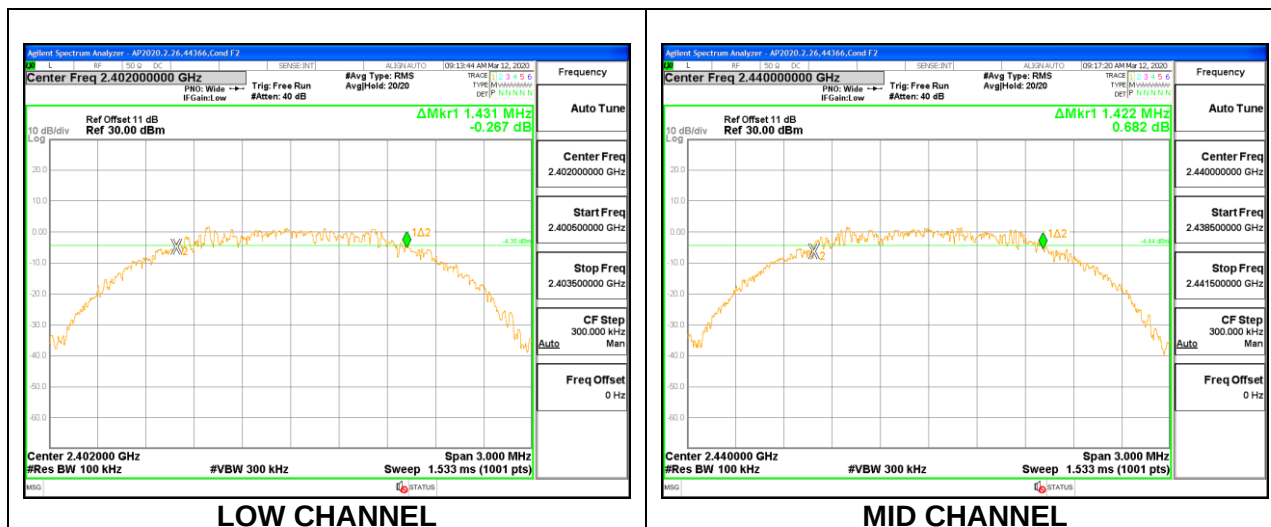
9.3.1. BLE (1Mbps)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.7650	0.5
Middle	2440	0.7350	0.5
High	2480	0.7380	0.5



9.3.2. BLE (2Mbps)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	1.4310	0.5
Middle	2440	1.4220	0.5
High	2480	1.4400	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.

RESULT

9.4.1. BLE (1Mbps)

Tested By:	44353
Date:	3/16/2020

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.01	30	-24.99
Middle	2440	4.95	30	-25.05
High	2480	4.95	30	-25.05

9.4.2. BLE (2Mbps)

Tested By:	44353
Date:	3/16/2020

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.03	30	-24.97
Middle	2440	4.86	30	-25.14
High	2480	4.88	30	-25.12

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:	44353
Date:	3/16/2020

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	4.93
Middle	2440	4.84
High	2480	4.83

9.5.2. BLE (2Mbps)

Tested By:	44353
Date:	3/16/2020

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	4.92
Middle	2440	4.74
High	2480	4.76

9.6. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

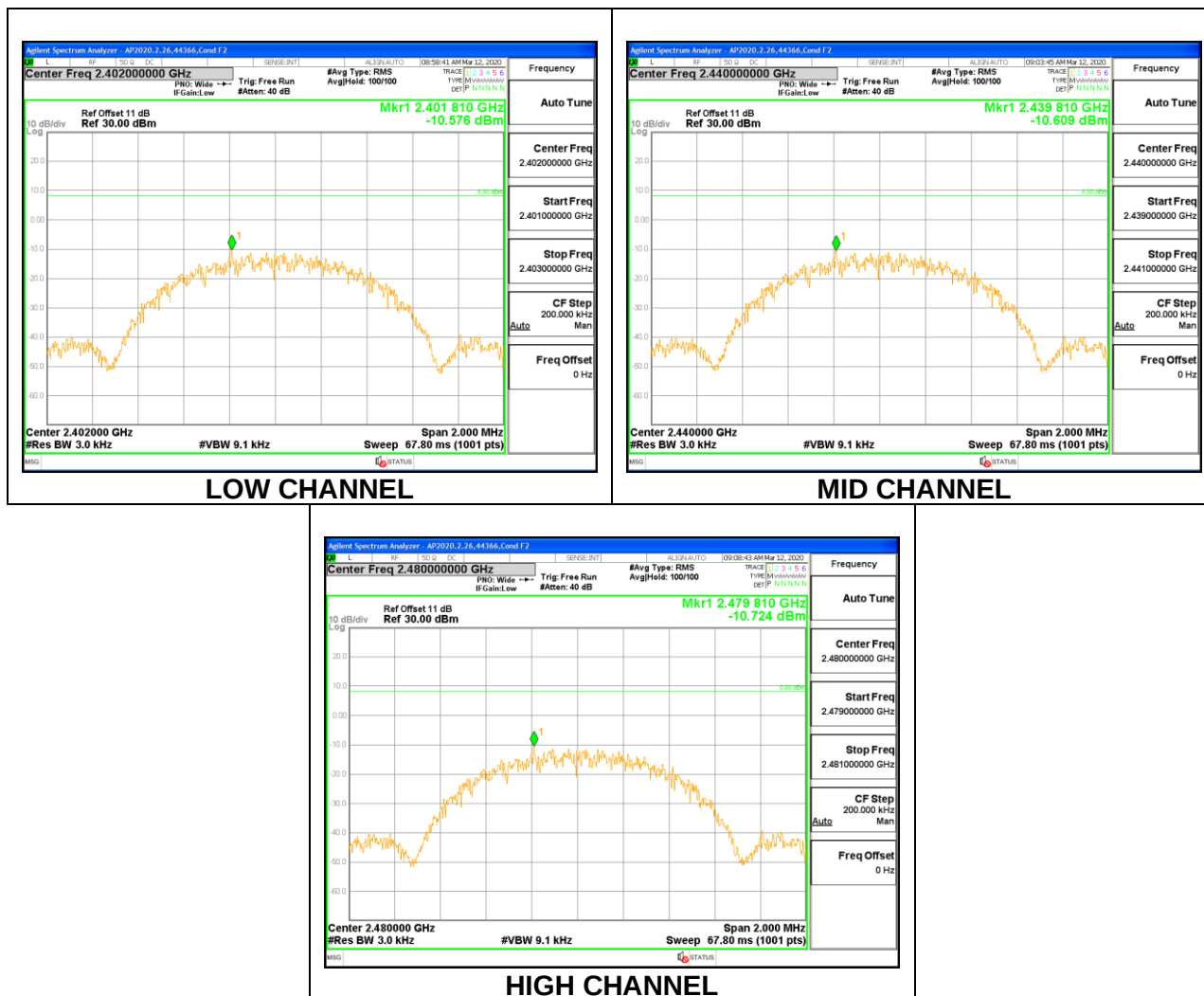
RSS-247 (5.2) (b)

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

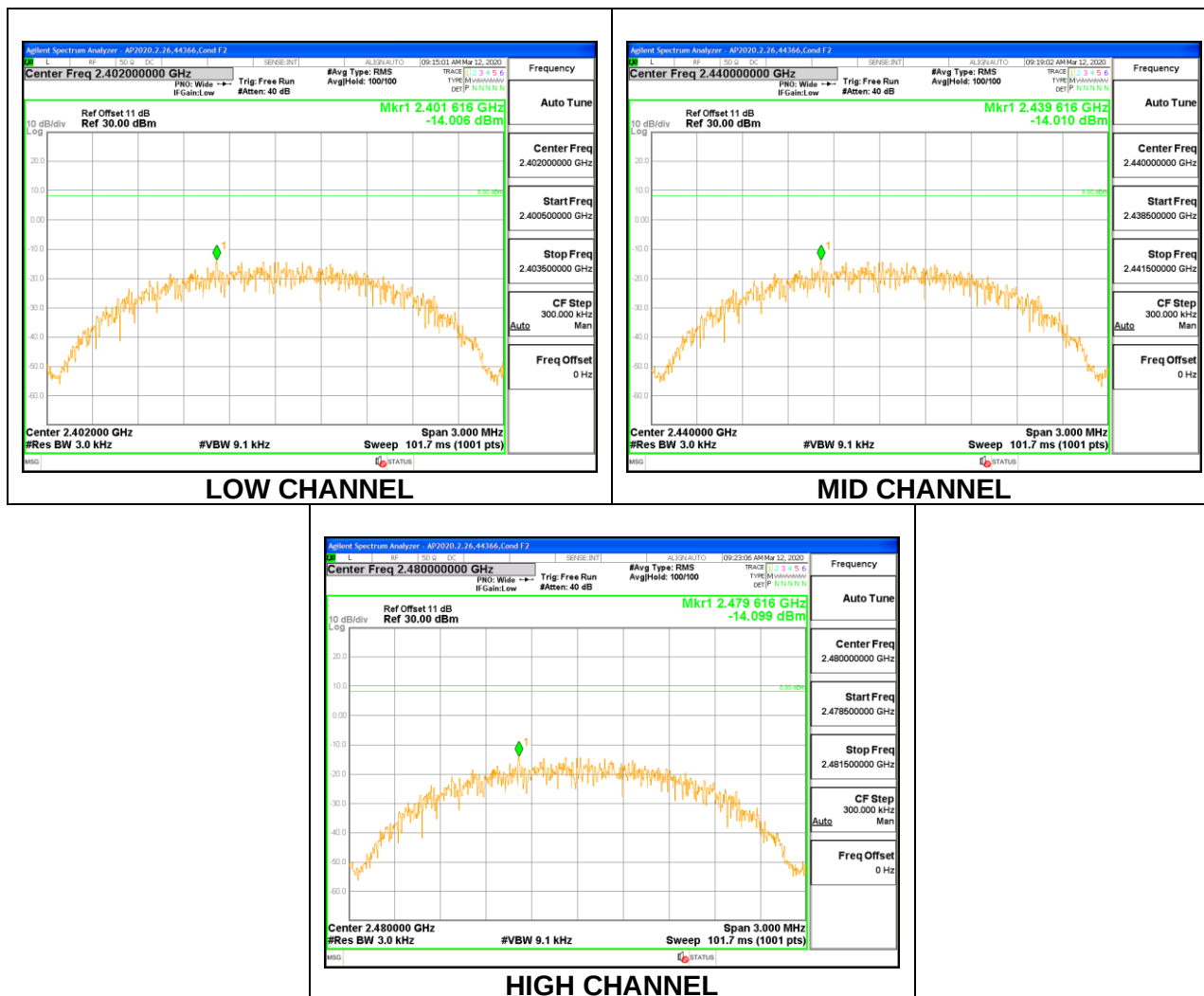
9.6.1. BLE (1Mbps)

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	-10.58	8	-18.58
Middle	2440	-10.61	8	-18.61
High	2480	-10.72	8	-18.72



9.6.2. BLE (2Mbps)

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	-14.07	8	-22.07
Middle	2440	-14.01	8	-22.01
High	2480	-14.10	8	-22.10



9.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

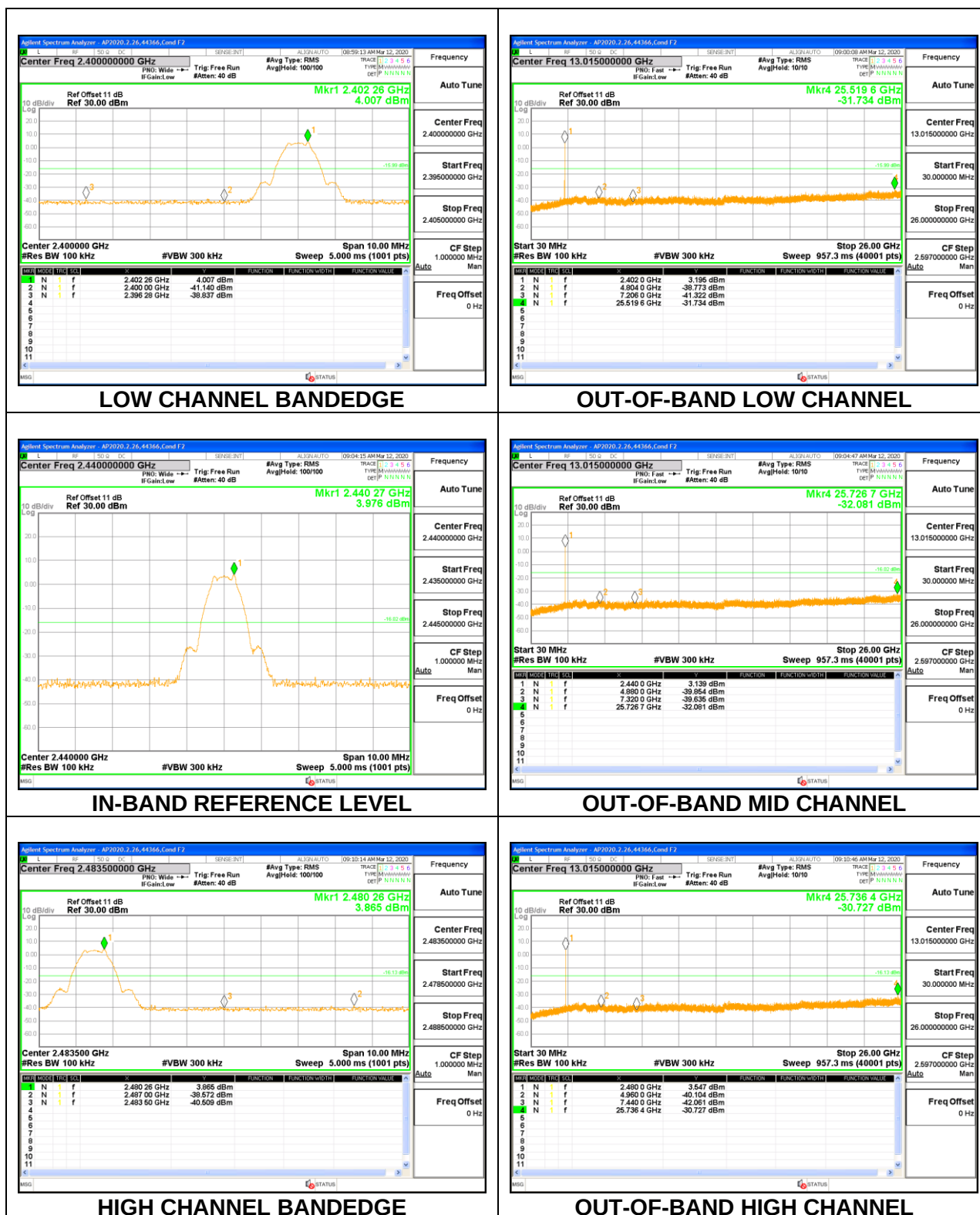
FCC §15.247 (d)

RSS-247 5.5

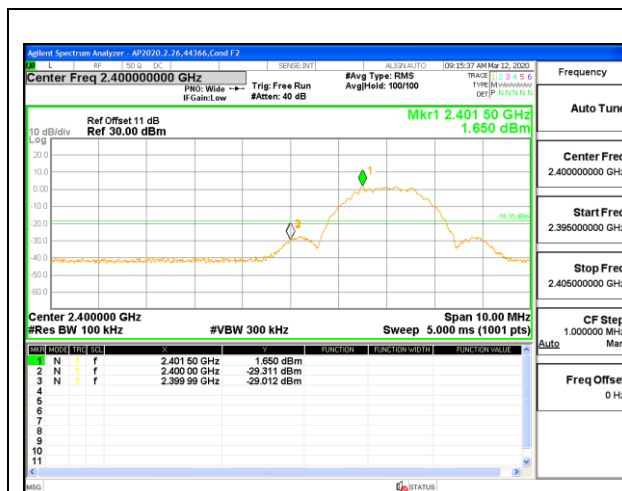
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

RESULTS

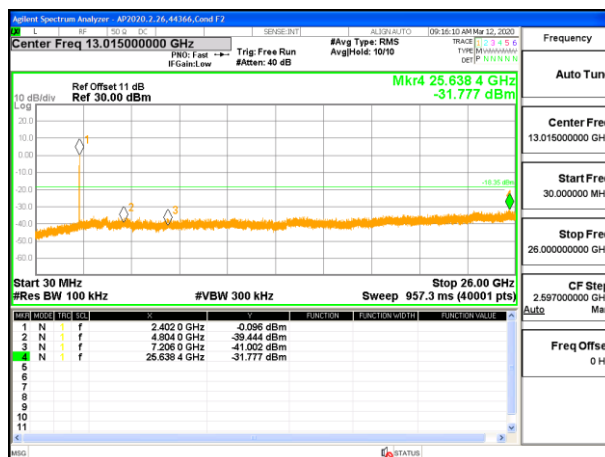
9.7.1. BLE (1Mbps)



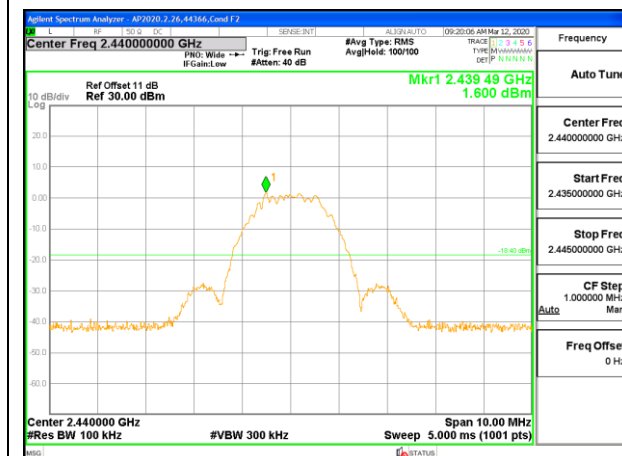
9.7.2. BLE (2Mbps)



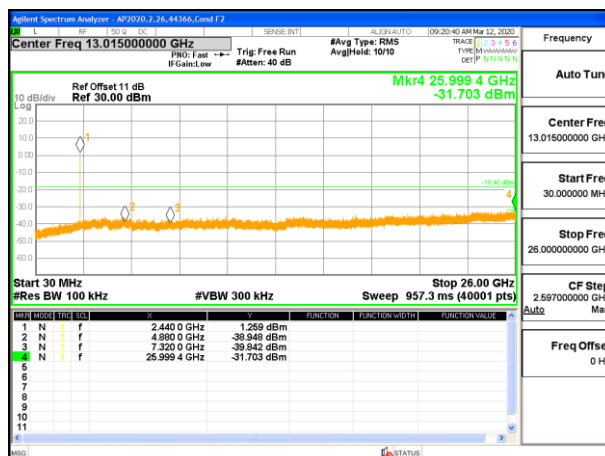
LOW CHANNEL BANDEDGE



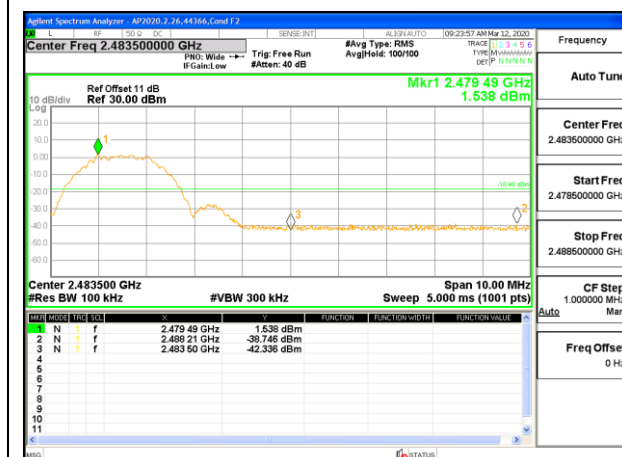
OUT-OF-BAND LOW CHANNEL



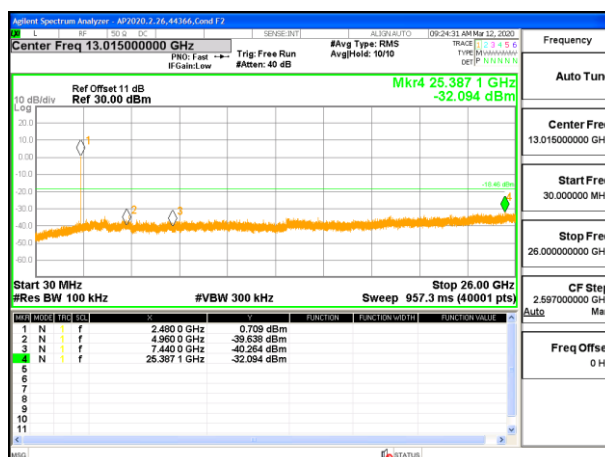
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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.

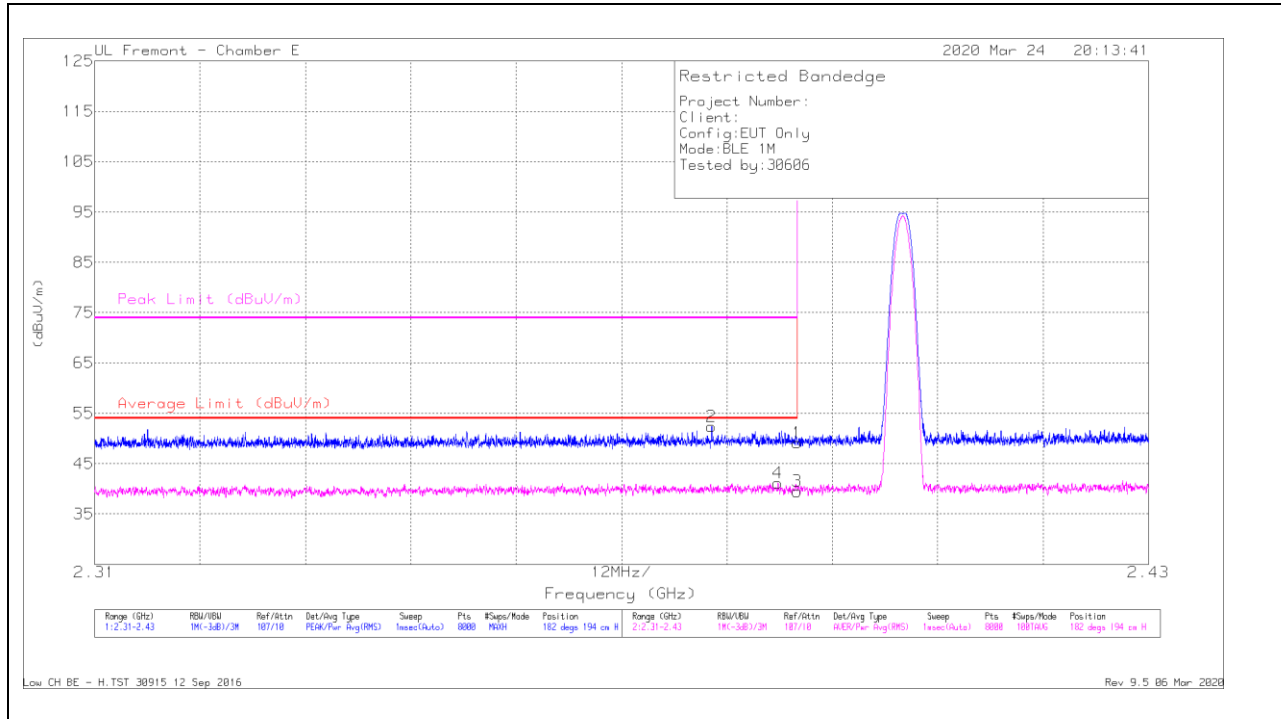
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. BLE (1Mbps)

BANDEDGE (LOW CHANNEL)

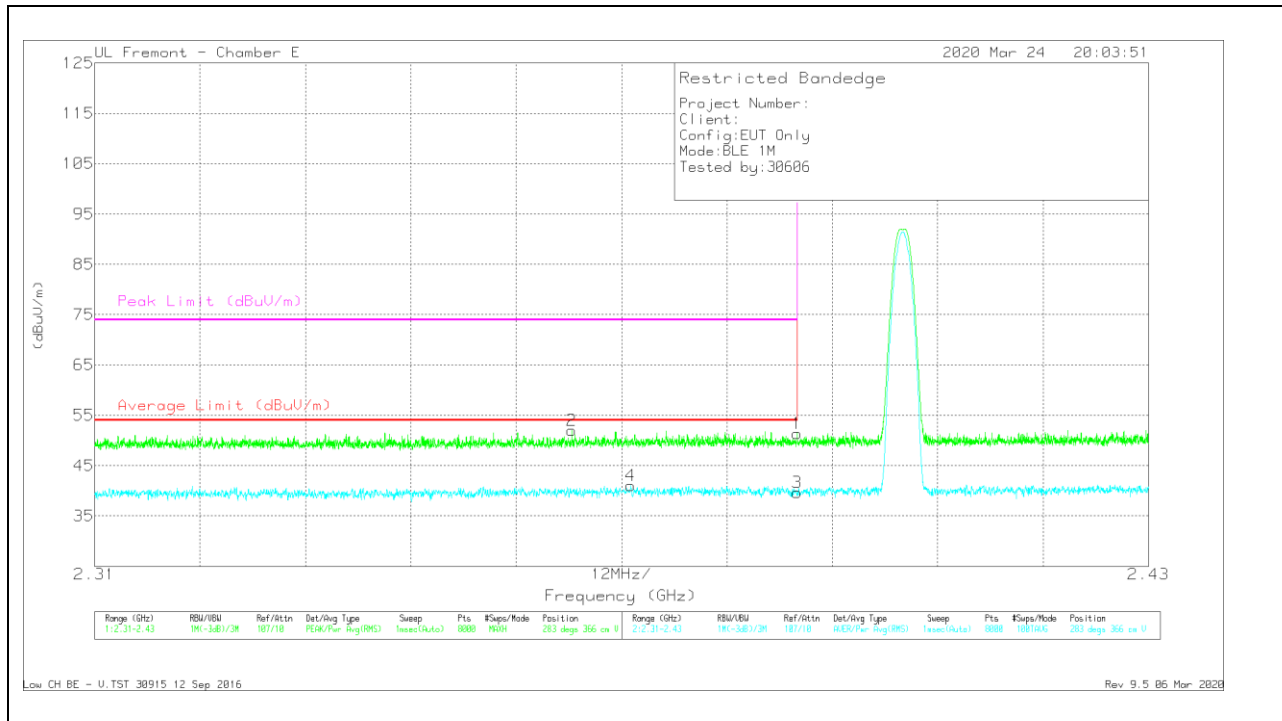
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Ftr/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	43.27	Pk	32.3	-26.4	49.17	-	-	74	-24.83	182	194	H
2	* 2.38025	46.57	Pk	32.3	-26.5	52.37	-	-	74	-21.63	182	194	H
3	* 2.38999	33.58	RMS	32.3	-26.4	39.48	54	-14.52	-	-	182	194	H
4	* 2.38782	35.21	RMS	32.3	-26.4	41.11	54	-12.89	-	-	182	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/Fitr/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	45.51	Pk	32.3	-26.4	51.41	-	-	74	-22.59	283	366	V
2	* 2.36432	46.38	Pk	32.1	-26.5	51.98	-	-	74	-22.02	283	366	V
3	* 2.38999	33.73	RMS	32.3	-26.4	39.63	54	-14.37	-	-	283	366	V
4	* 2.37103	35.34	RMS	32.2	-26.5	41.04	54	-12.96	-	-	283	366	V

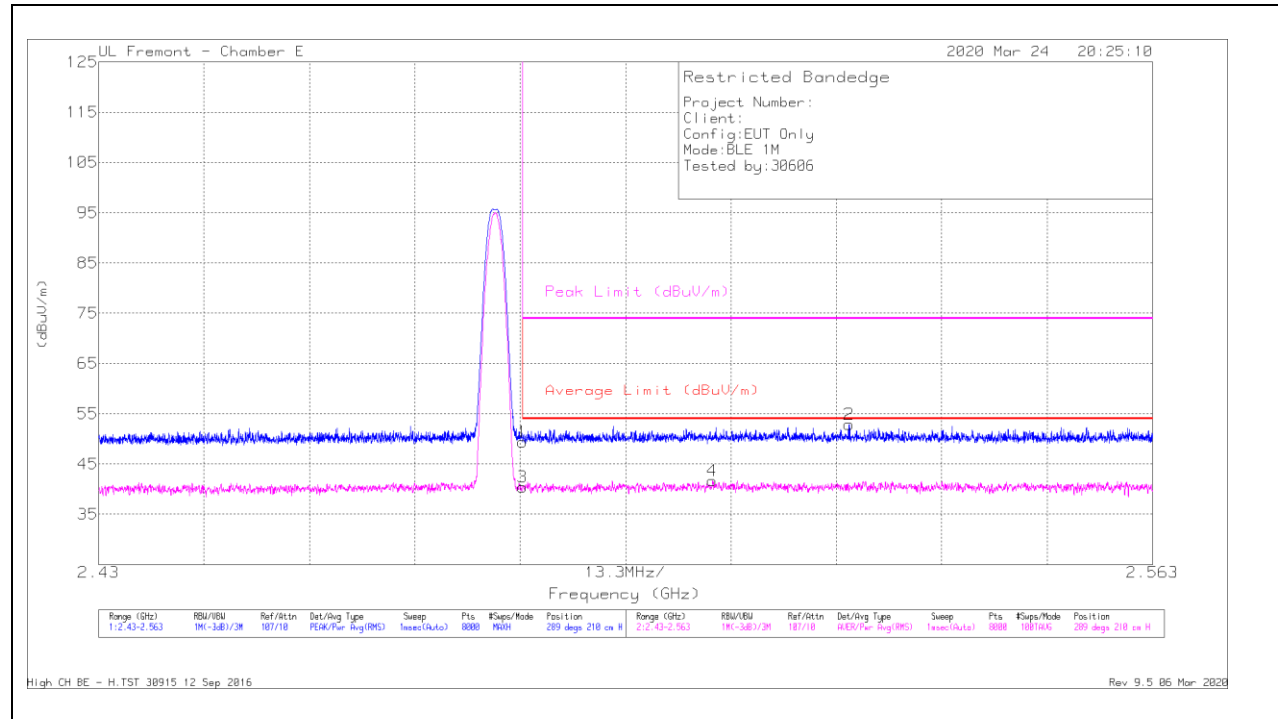
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL)

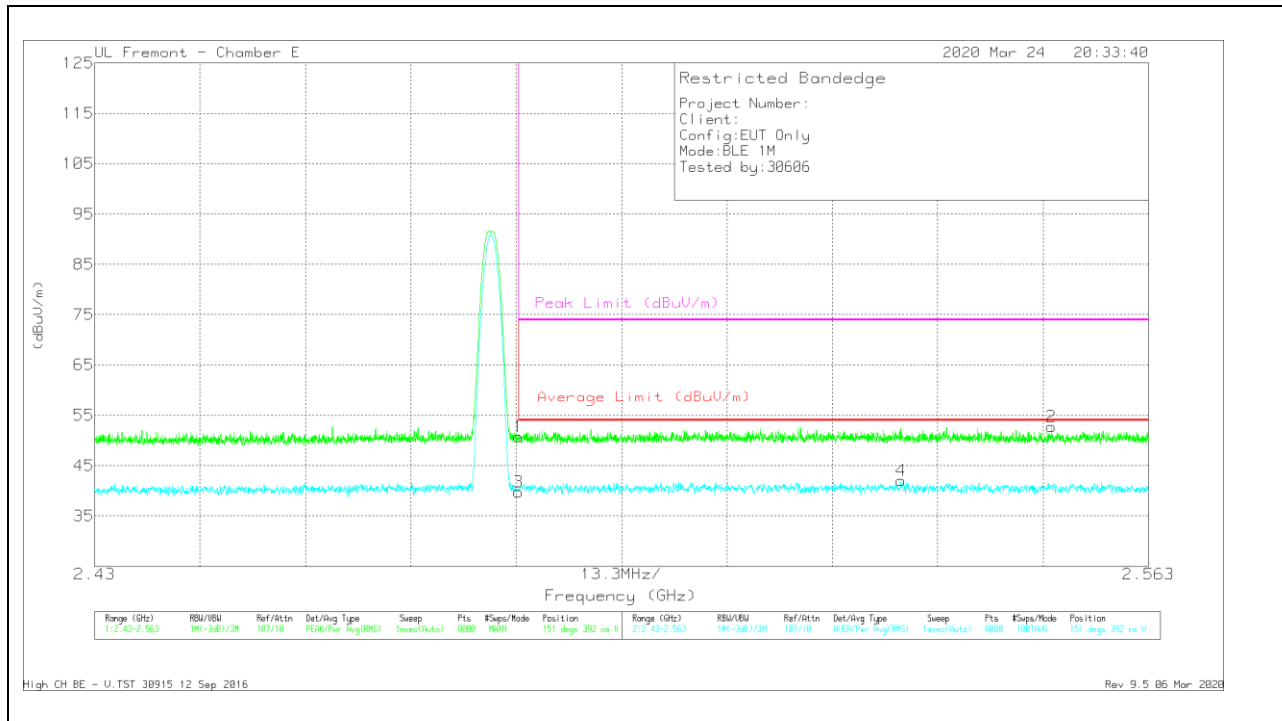
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Ampl/Cbtl/Filtr/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	* 2.48351	43.14	Pk	32.8	-26.5	49.44	-	-	74	-24.56	289	210	H
3	* 2.48351	34.13	RMS	32.8	-26.5	40.43	54	-13.57	-	-	289	210	H
4	2.50747	35.19	RMS	32.9	-26.4	41.69	54	-12.31	-	-	289	210	H
2	2.52471	46.49	Pk	32.9	-26.5	52.89	-	-	74	-21.11	289	210	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/Fitr/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	* 2.48351	44.45	Pk	32.8	-26.5	50.75	-	-	74	-23.25	151	392	V
3	* 2.48351	33.54	RMS	32.8	-26.5	39.84	54	-14.16	-	-	151	392	V
4	2.53176	35.59	RMS	32.9	-26.5	41.99	54	-12.01	-	-	151	392	V
2	2.55075	46.45	Pk	32.8	-26.5	52.75	-	-	74	-21.25	151	392	V

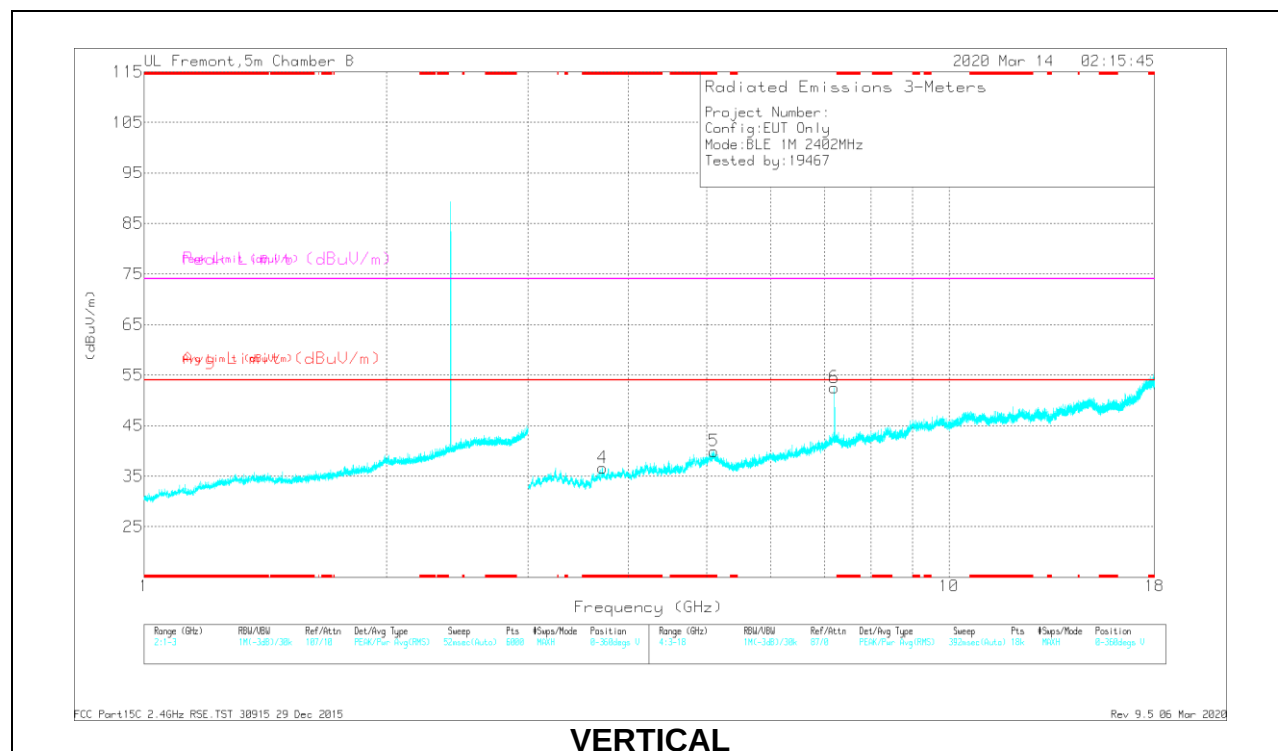
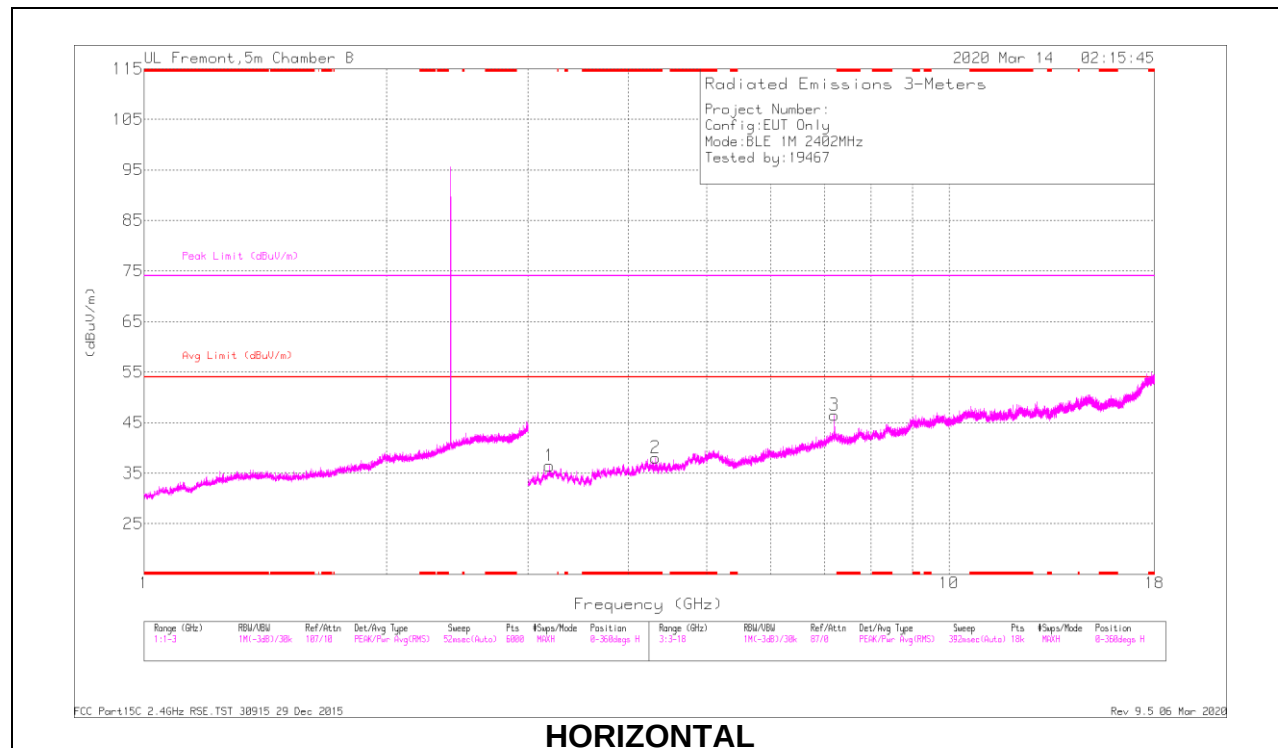
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

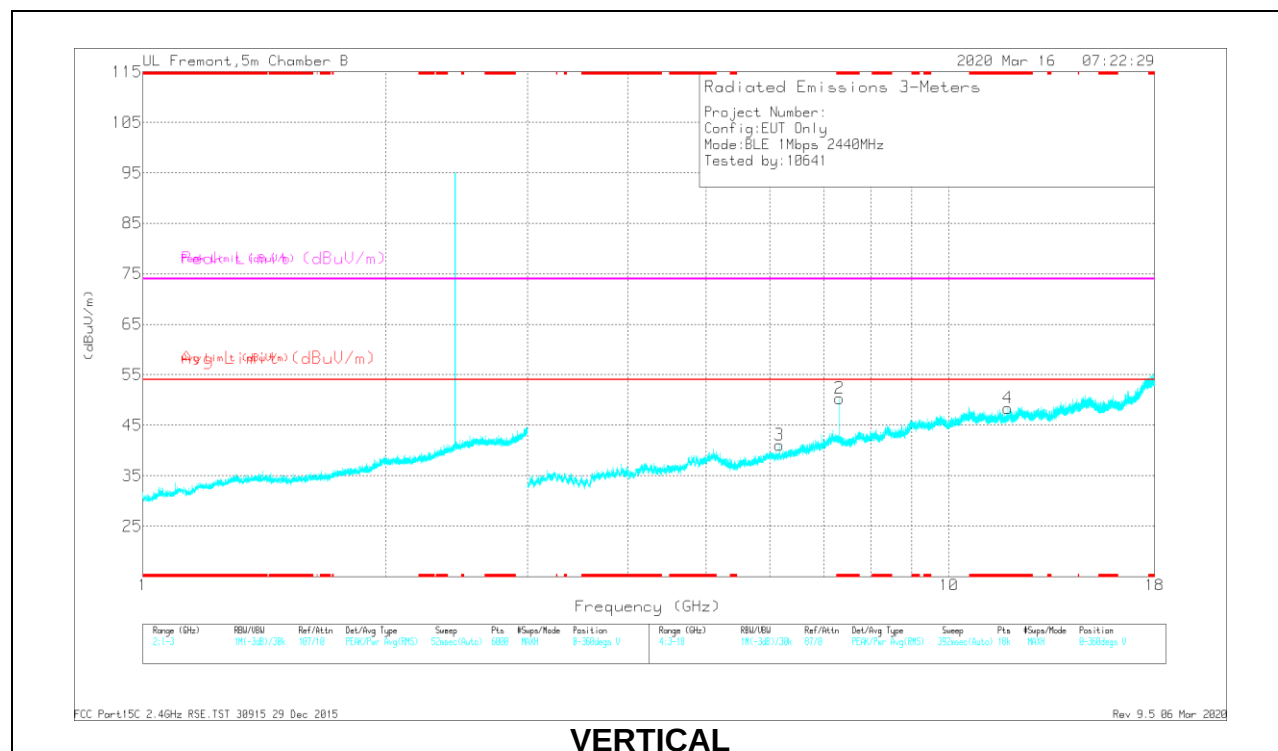
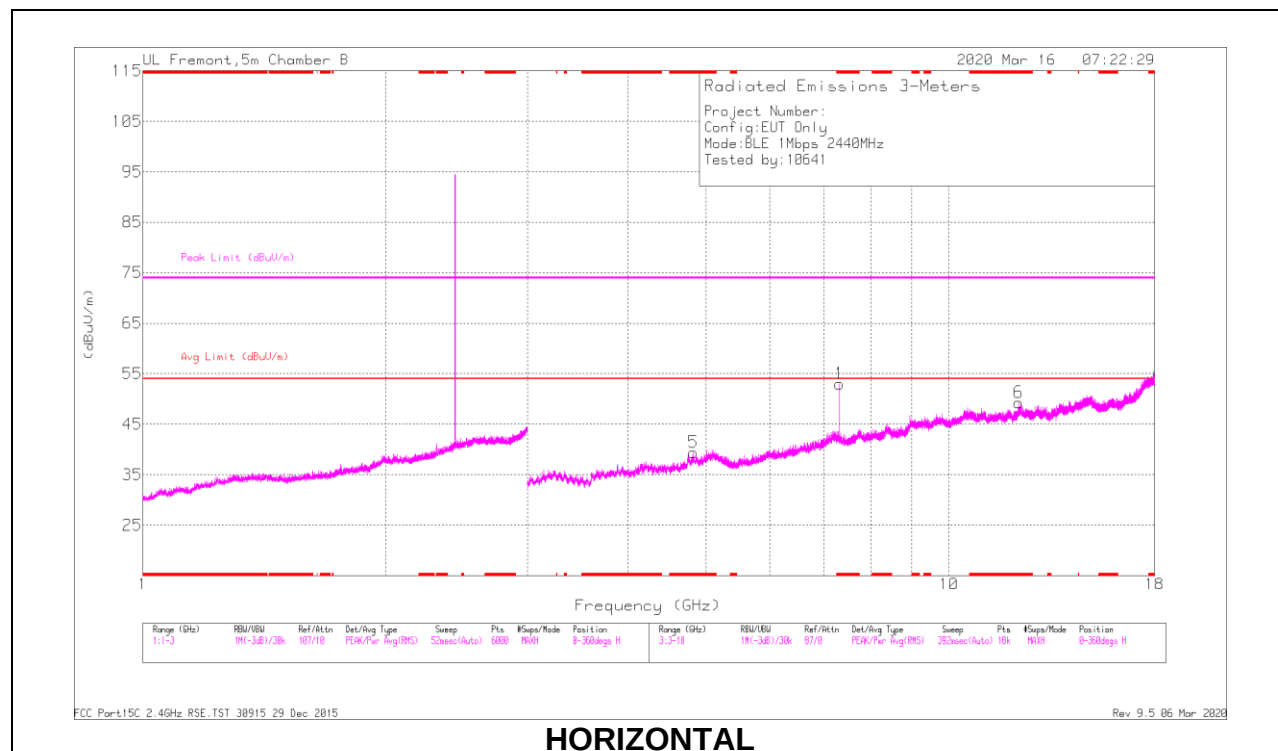
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl/Fitr/P ad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.31712	37.78	PK2	31.9	-25.9	43.78	-	-	74	-30.22	333	203	H
* 4.31836	25.91	MAV1	31.9	-25.9	31.91	54	-22.09	-	-	333	203	H
* 3.71172	37.81	PK2	30.4	-26.4	41.81	-	-	74	-32.19	156	304	V
* 3.71286	26.45	MAV1	30.4	-26.4	30.45	54	-23.55	-	-	156	304	V
* 5.10461	36.91	PK2	34	-23.8	47.11	-	-	74	-26.89	231	207	V
* 5.10343	24.99	MAV1	34	-23.8	35.19	54	-18.81	-	-	231	207	V
3.18559	26.58	MAV1	31.1	-26.6	31.08	-	-	-	-	159	234	H
3.18756	38.79	PK2	31.1	-26.5	43.39	-	-	-	-	159	234	H
7.20563	38.3	PK2	37	-21.7	53.6	-	-	-	-	77	365	H
7.20649	29.35	MAV1	37	-21.7	44.65	-	-	-	-	77	365	H
7.20662	35.07	MAV1	37	-21.7	50.37	-	-	-	-	337	271	V
7.20674	41.93	PK2	37	-21.7	57.23	-	-	-	-	337	271	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

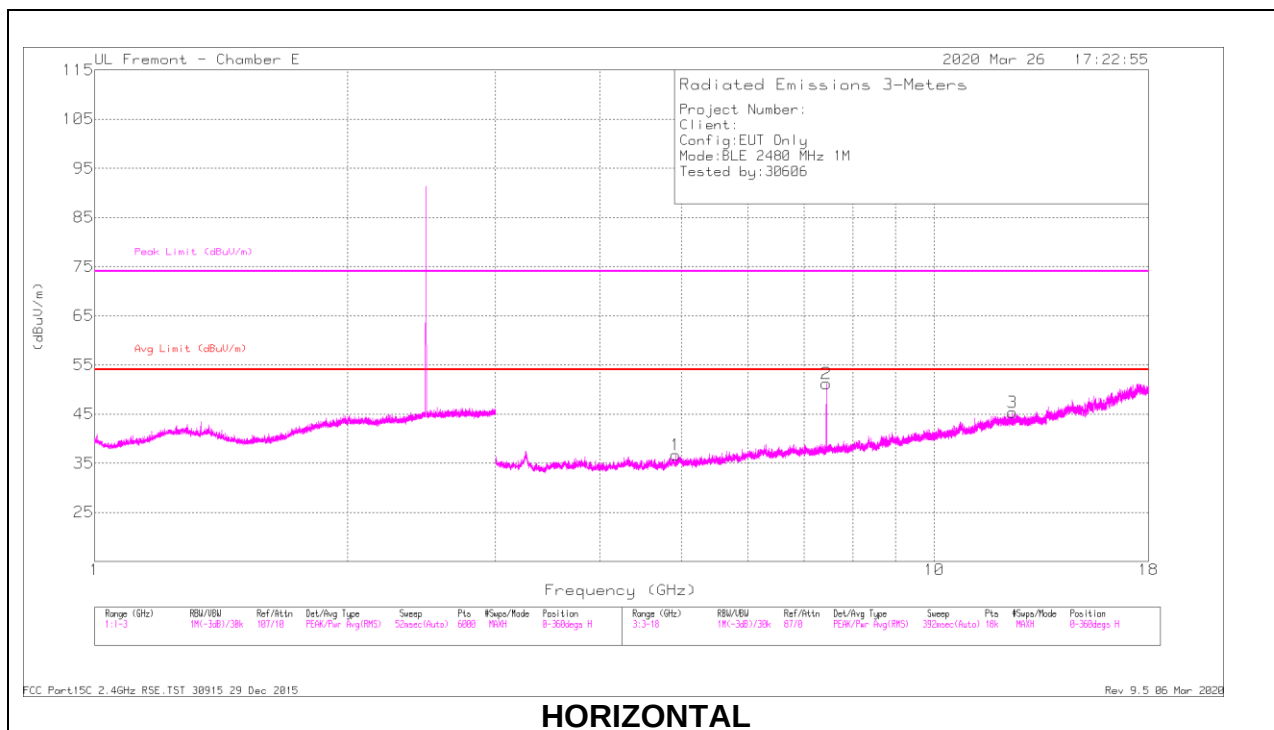
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl/Filt/P ad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 7.32067	41.97	PK2	37	-22.6	56.37	-	-	74	-17.63	126	115	H
	* 7.32057	35.27	MAv1	37	-22.6	49.67	54	-4.33	-	-	126	115	H
5	* 4.82041	37.02	PK2	33.1	-24.7	45.42	-	-	74	-28.58	125	135	H
	* 4.81823	25.8	MAv1	33.1	-24.7	34.2	54	-19.8	-	-	125	135	H
6	* 12.20085	33.63	PK2	40.2	-18	55.83	-	-	74	-18.17	111	157	H
	* 12.19873	23.07	MAv1	40.1	-18	45.17	54	-8.83	-	-	111	157	H
2	* 7.31901	40.38	PK2	37	-22.6	54.78	-	-	74	-19.22	90	101	V
	* 7.32065	33.23	MAv1	37	-22.6	47.63	54	-6.37	-	-	90	101	V
4	* 11.83839	33.23	PK2	39.4	-17.8	54.83	-	-	74	-19.17	135	266	V
	* 11.83834	22.05	MAv1	39.4	-17.8	43.65	54	-10.35	-	-	135	266	V
3	6.16609	25.17	MAv1	34.6	-24.2	35.57	-	-	-	-	124	233	V
	6.16702	36.58	PK2	34.6	-24.1	47.08	-	-	-	-	124	233	V

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

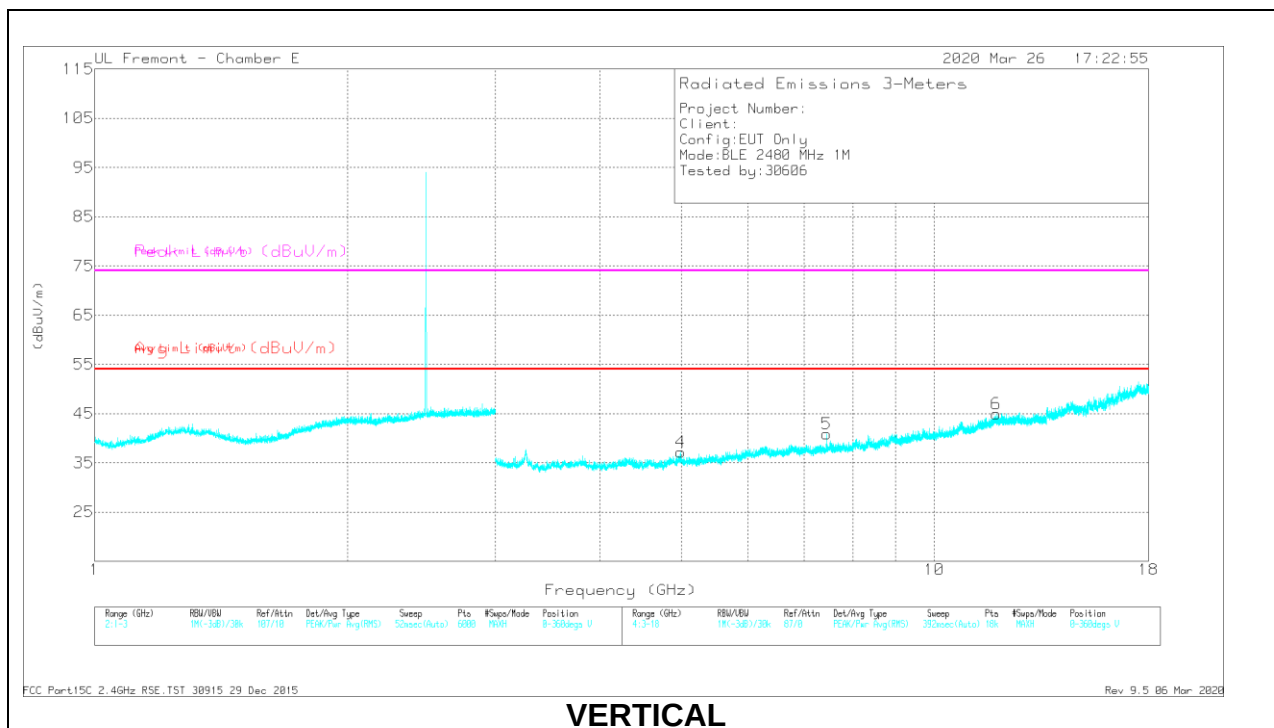
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Maker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/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
2	* 7.43905	47.1	PK2	35.7	-28.4	54.4	-	-	74	-19.6	235	198	H
	* 7.43941	41.5	MAv1	35.7	-28.4	48.8	54	-5.2	-	-	235	198	H
1	* 4.91867	40.86	PK2	33.9	-31.3	43.46	-	-	74	-30.54	123	329	H
	* 4.91773	28.62	MAv1	33.9	-31.3	31.22	54	-22.78	-	-	123	329	H
3	* 12.40134	36.91	PK2	39	-23.1	52.81	-	-	74	-21.19	230	144	H
	* 12.40127	25.45	MAv1	39	-23.1	41.35	54	-12.65	-	-	230	144	H
4	* 4.98792	41.34	PK2	34.1	-31.6	43.84	-	-	74	-30.16	79	330	V
	* 4.98667	29.7	MAv1	34.1	-31.6	32.2	54	-21.8	-	-	79	330	V
5	* 7.44071	41.7	PK2	35.7	-28.3	49.1	-	-	74	-24.9	285	373	V
	* 7.43942	32.29	MAv1	35.7	-28.4	39.59	54	-14.41	-	-	285	373	V
6	* 11.84797	35.66	PK2	38.9	-23	51.56	-	-	74	-22.44	65	241	V
	* 11.84889	23.82	MAv1	38.9	-23	39.72	54	-14.28	-	-	65	241	V

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

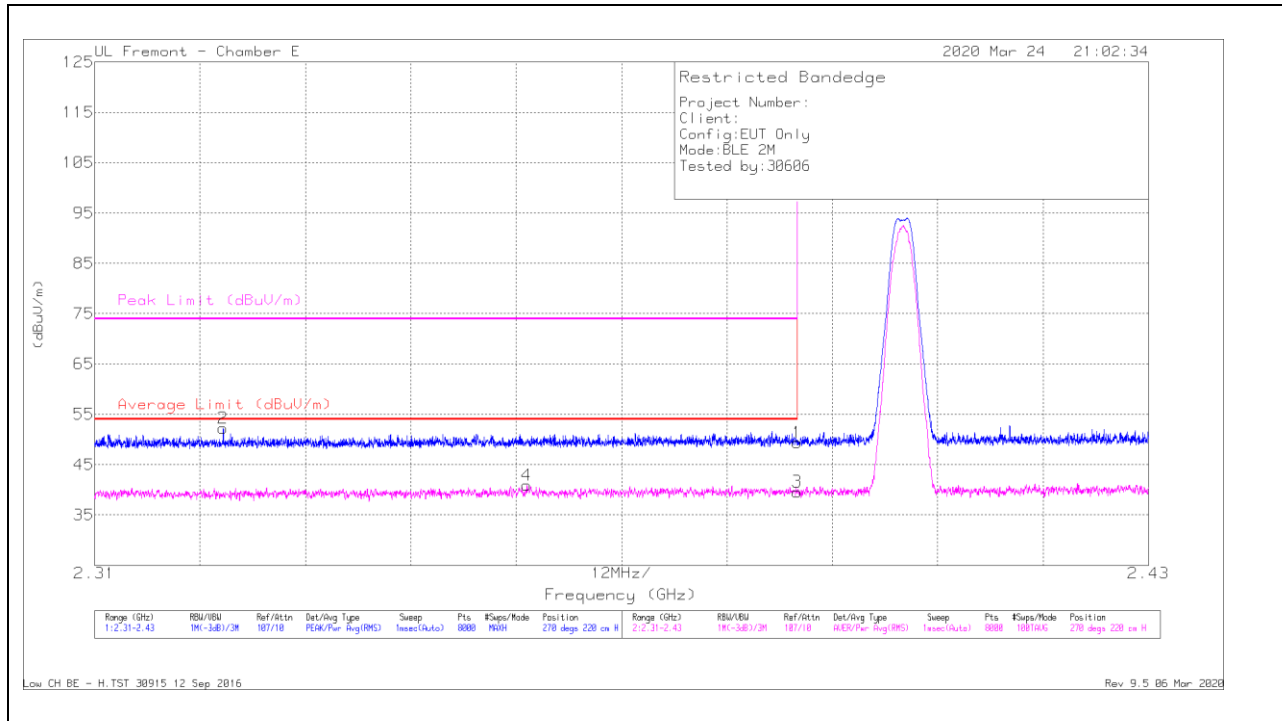
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

10.2.2. BLE (2Mbps)

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



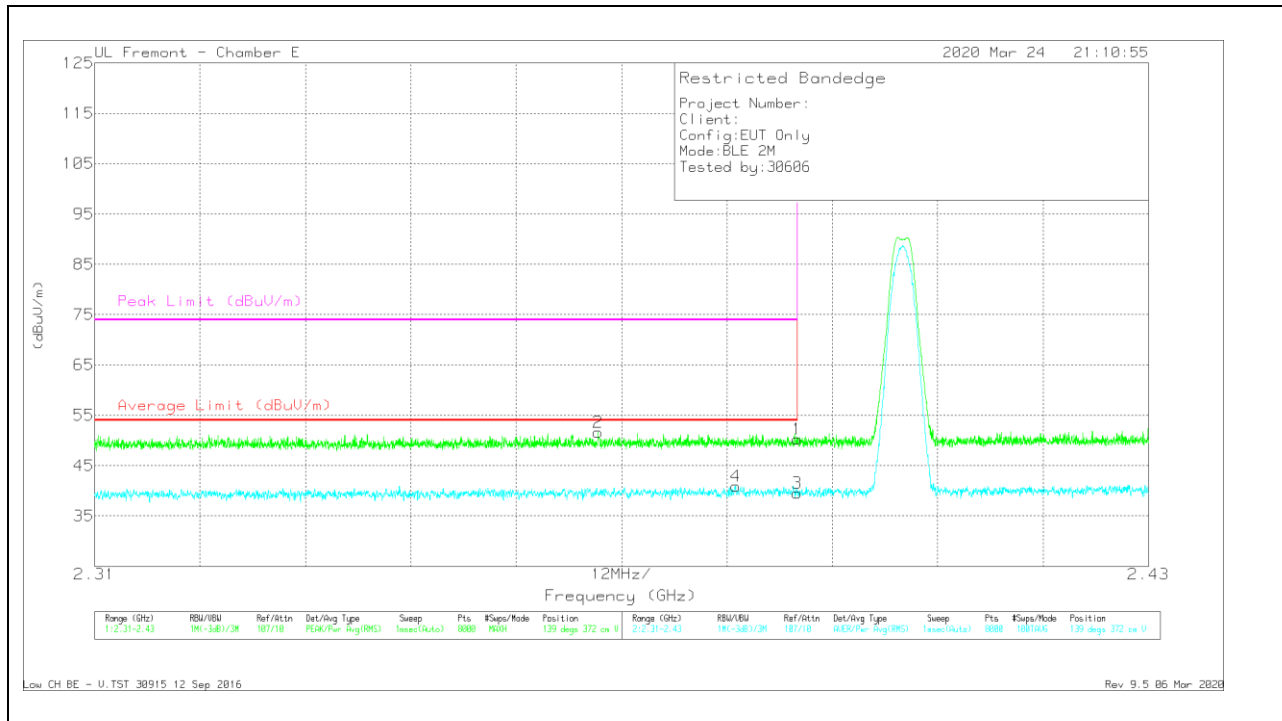
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Ampl/Cbl/Filtr/Pa d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	43.46	Pk	32.3	-26.4	49.36	-	-	74	-24.64	270	220	H
2	* 2.32464	46.73	Pk	32	-26.5	52.23	-	-	74	-21.77	270	220	H
3	* 2.38999	33.7	RMS	32.3	-26.4	39.6	54	-14.4	-	-	270	220	H
4	* 2.35921	35.35	RMS	32.1	-26.5	40.95	54	-13.05	-	-	270	220	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)	Ampl/Cbl/Filtr/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	44.39	Pk	32.3	-26.4	50.29	-	-	74	-23.71	139	372	V
2	* 2.36732	46.07	Pk	32.1	-26.5	51.67	-	-	74	-22.33	139	372	V
3	* 2.38999	33.69	RMS	32.3	-26.4	39.59	54	-14.41	-	-	139	372	V
4	* 2.38298	35.16	RMS	32.3	-26.5	40.96	54	-13.04	-	-	139	372	V

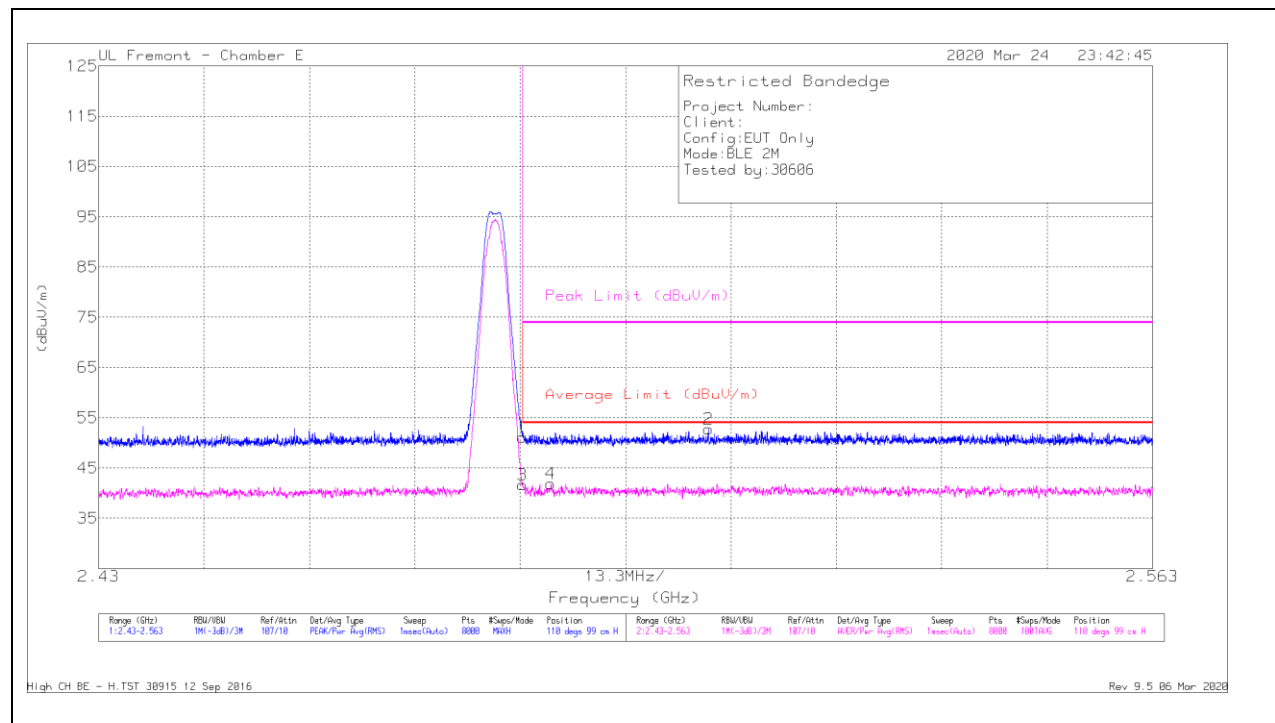
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL)

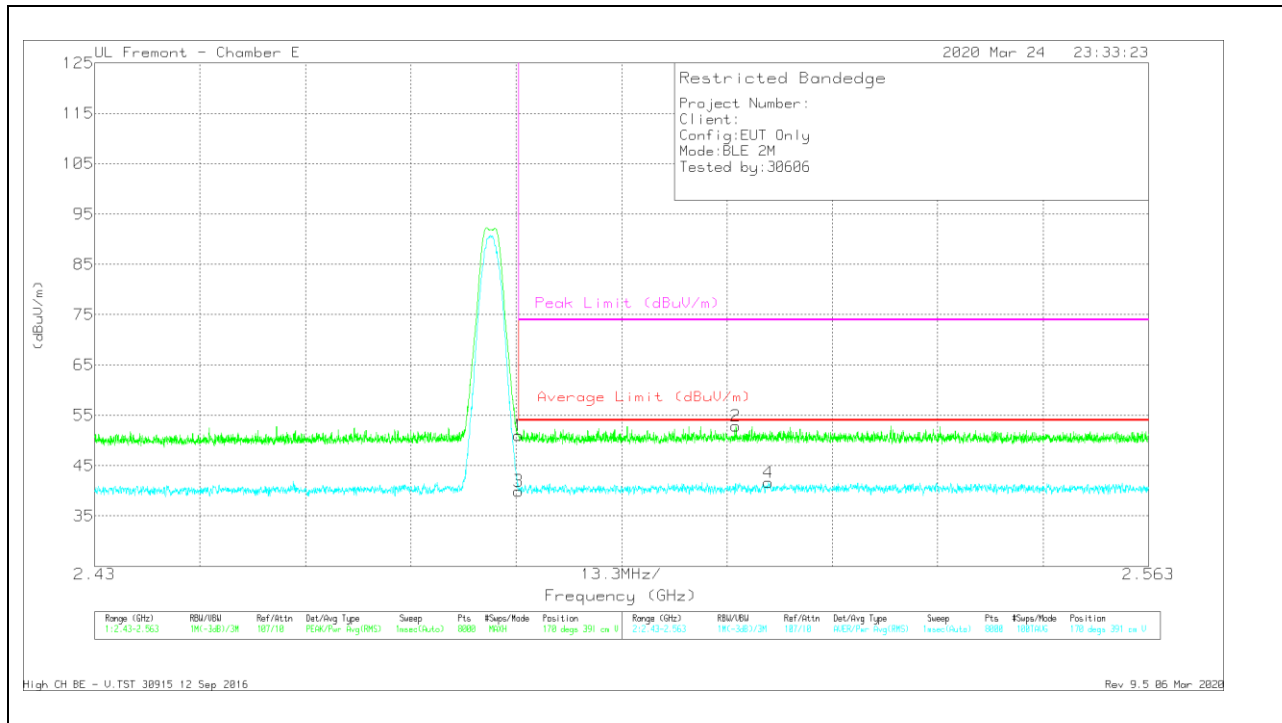
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Ampl/Cbl/Filtr/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	* 2.48351	44.81	PK	32.8	-26.5	51.11	-	-	74	-22.89	110	99	H
3	* 2.48351	35.41	RMS	32.8	-26.5	41.71	54	-12.29	-	-	110	99	H
4	* 2.48706	35.58	RMS	32.8	-26.5	41.88	54	-12.12	-	-	110	99	H
2	2.50695	46.23	PK	32.9	-26.4	52.73	-	-	74	-21.27	110	99	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/Fitr/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	* 2.48351	44.7	Pk	32.8	-26.5	51	-	-	74	-23	170	391	V
3	* 2.48351	33.67	RMS	32.8	-26.5	39.97	54	-14.03	-	-	170	391	V
2	2.51094	46.45	Pk	32.9	-26.5	52.85	-	-	74	-21.15	170	391	V
4	2.51505	35.19	RMS	32.9	-26.4	41.69	54	-12.31	-	-	170	391	V

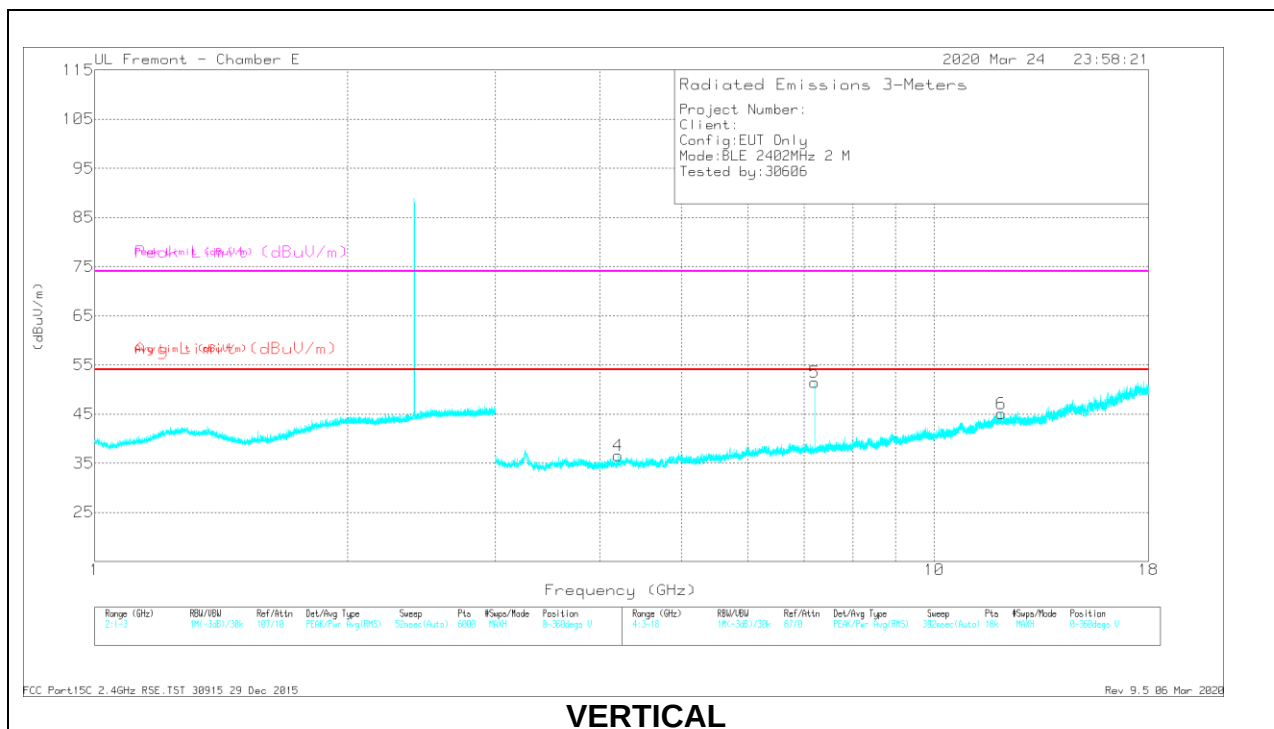
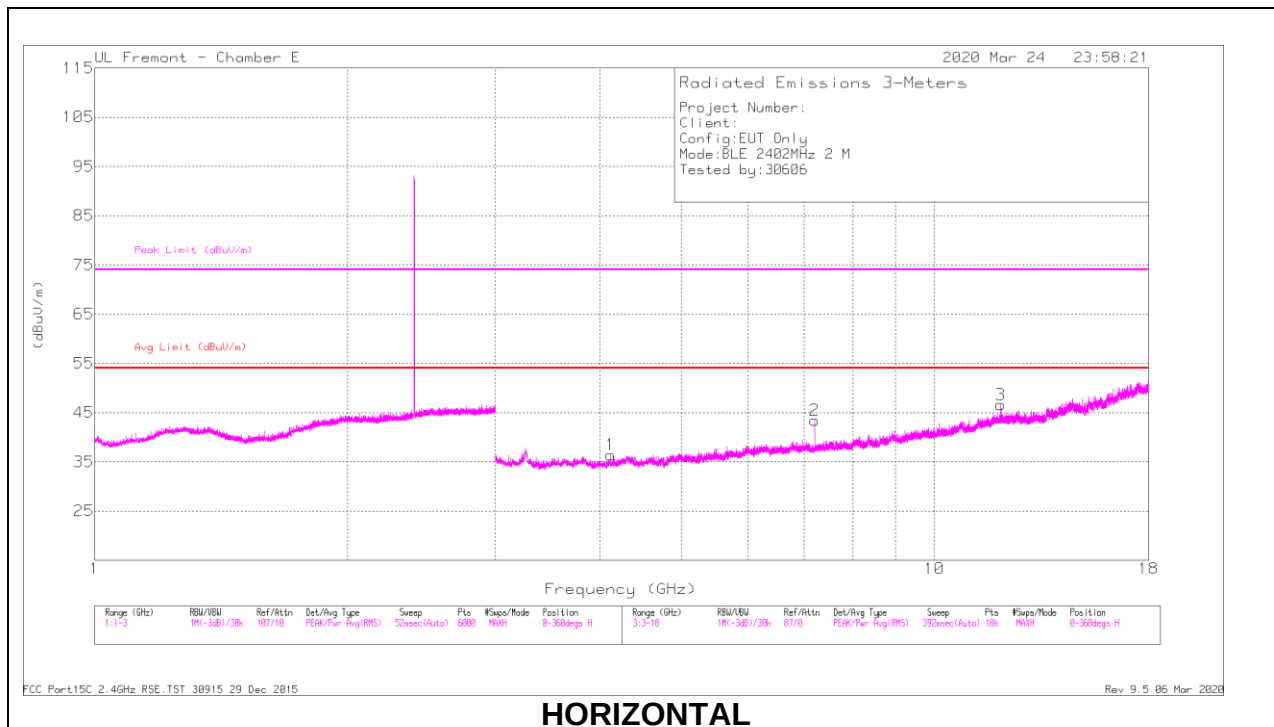
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

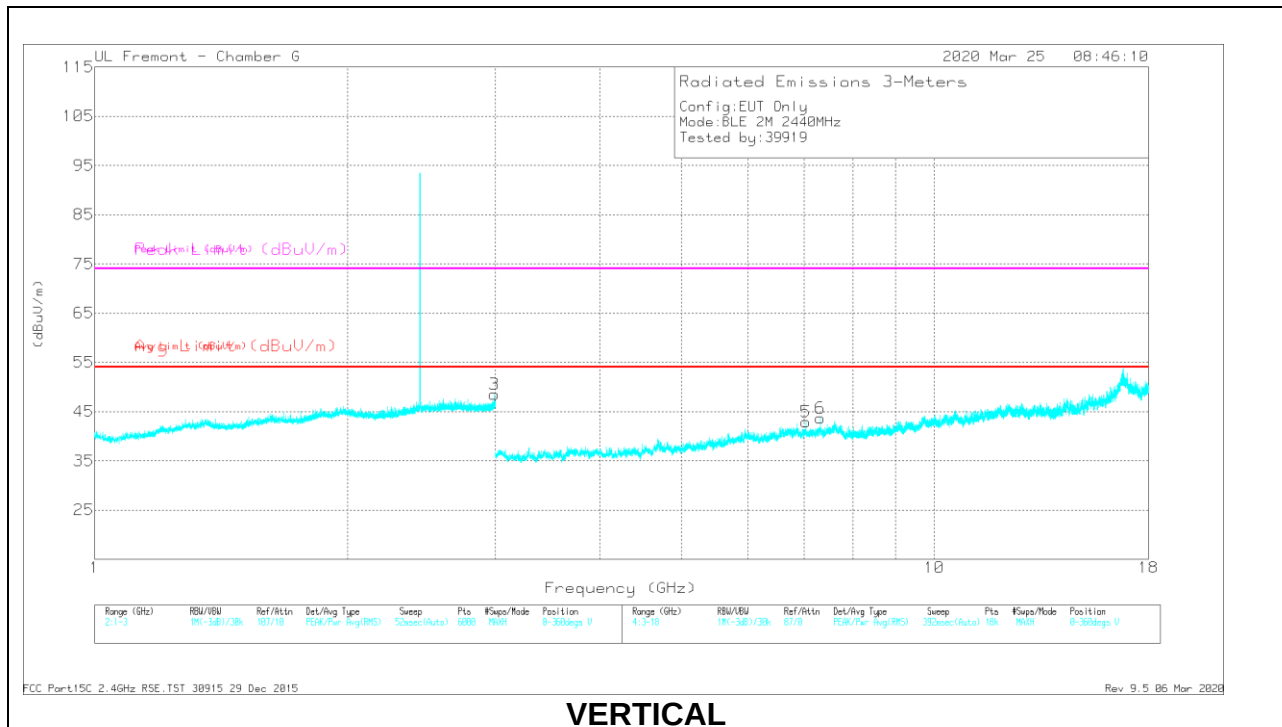
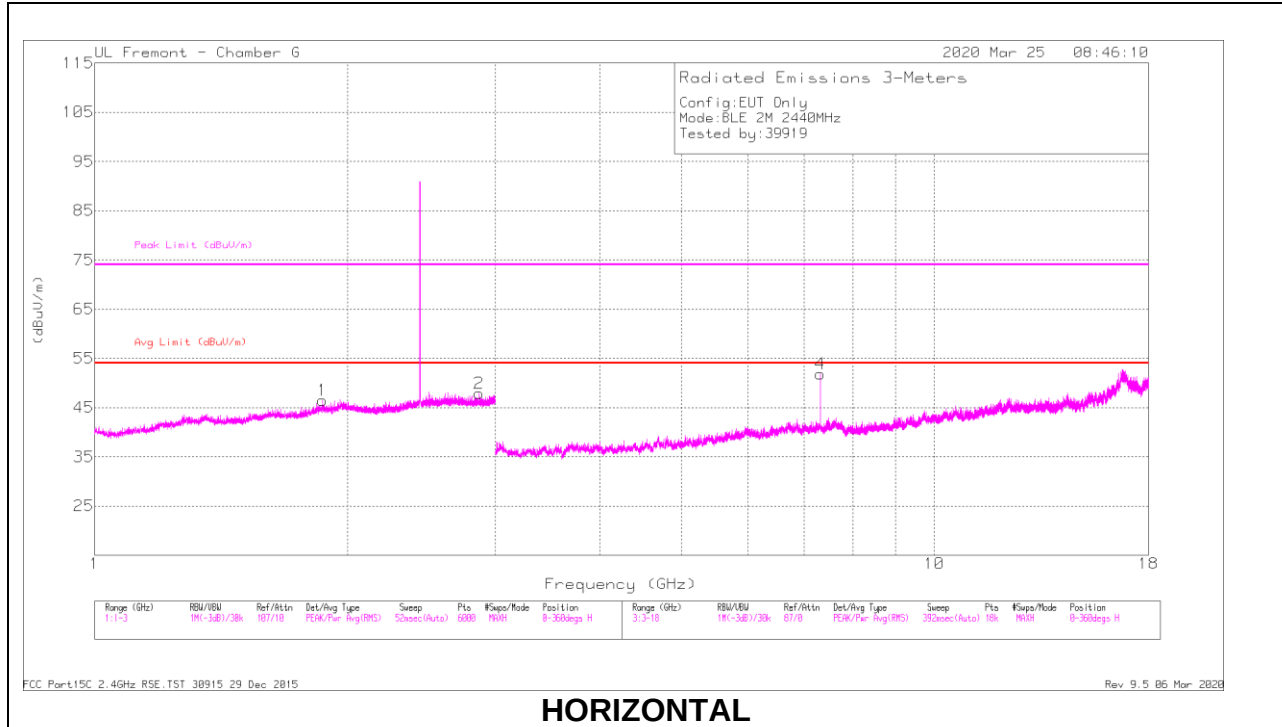
Maker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr/P ad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.11349	41.01	PK2	33.6	-32.1	42.51	-	-	74	-31.49	148	252	H
	* 4.11591	29.41	MAv1	33.6	-32.1	30.91	54	-23.09	-	-	148	252	H
3	* 12.00728	37.54	PK2	39	-23.1	53.44	-	-	74	-20.56	303	290	H
	* 12.00757	27.18	MAv1	39	-23.1	43.08	54	-10.92	-	-	303	290	H
4	* 4.2053	41.23	PK2	33.5	-32.4	42.33	-	-	74	-31.67	75	112	V
	* 4.20323	29.35	MAv1	33.4	-32.3	30.45	54	-23.55	-	-	75	112	V
6	* 12.01302	37.28	PK2	39	-23.1	53.18	-	-	74	-20.82	88	365	V
	* 12.01239	26.27	MAv1	39	-23.1	42.17	54	-11.83	-	-	88	365	V
5	7.20446	46.75	PK2	35.6	-28.4	53.95	-	-	-	-	331	181	V
	7.20459	39.9	MAv1	35.6	-28.4	47.1	-	-	-	-	331	181	V
2	7.20735	33.11	MAv1	35.6	-28.4	40.31	-	-	-	-	126	102	H
	7.20758	41.95	PK2	35.6	-28.4	49.15	-	-	-	-	126	102	H

* - 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

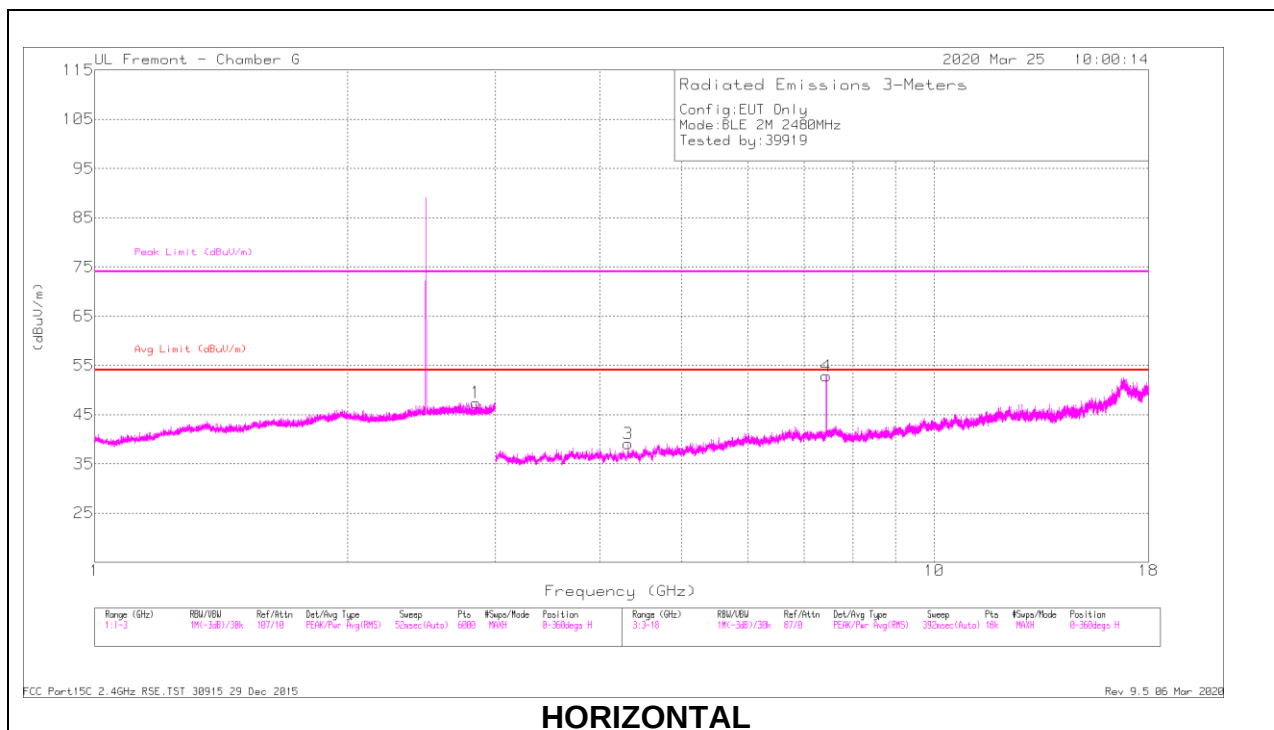
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Ampl/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.8677	43.28	PK2	32.4	-21.9	53.78	-	-	74	-20.22	222	179	H
	* 2.86889	30.25	MAv1	32.4	-21.9	40.75	54	-13.25	-	-	222	179	H
4	* 7.32158	46.55	PK2	36.3	-27.6	55.25	-	-	74	-18.75	98	221	H
	* 7.32133	39.01	MAv1	36.2	-27.6	47.61	54	-6.39	-	-	98	221	H
6	* 7.31888	41.23	PK2	36.2	-27.6	49.83	-	-	74	-24.17	124	114	V
	* 7.31857	30.51	MAv1	36.2	-27.6	39.11	54	-14.89	-	-	124	114	V
1	1.86725	43.69	PK2	31.5	-22.6	52.59	-	-	-	-	275	119	H
3	2.99169	43.76	PK2	32.6	-21.5	54.86	-	-	-	-	128	101	V
5	7.03875	40.61	PK2	36.4	-28.4	48.61	-	-	-	-	107	171	V

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

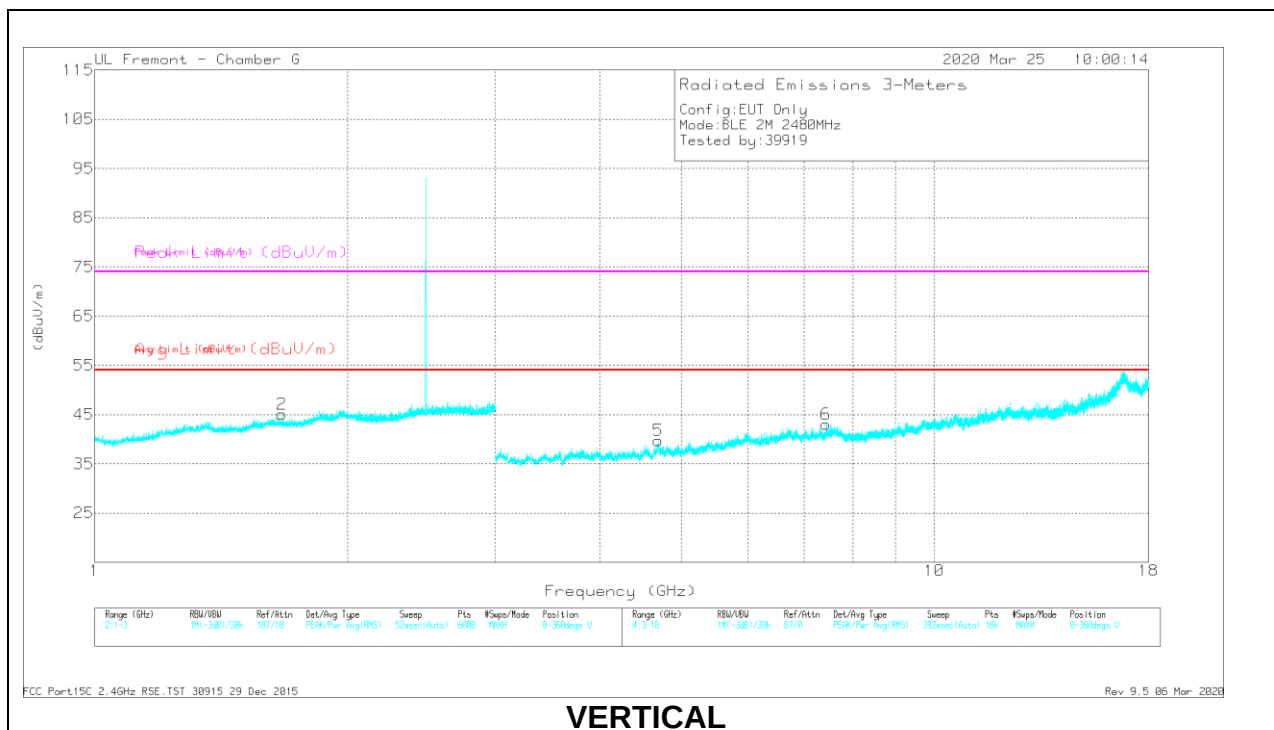
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.84468	43.26	PK2	32.3	-22	53.56	-	-	74	-20.44	114	122	H
* 2.84301	30.5	MAV1	32.3	-22	40.8	54	-13.2	-	-	114	122	H
* 1.66913	44.23	PK2	29	-21.5	51.73	-	-	74	-22.27	157	157	V
* 1.66972	31.75	MAV1	29	-21.5	39.25	54	-14.75	-	-	157	157	V
* 4.31979	40.23	PK2	33.5	-29.1	44.63	-	-	74	-29.37	187	131	H
* 4.3198	27.97	MAV1	33.5	-29.1	32.37	54	-21.63	-	-	187	131	H
* 7.44154	47.14	PK2	36.5	-27.8	55.84	-	-	74	-18.16	111	218	H
* 7.44138	39.6	MAV1	36.5	-27.8	48.3	54	-5.7	-	-	111	218	H
* 4.69163	40.82	PK2	34	-29.6	45.22	-	-	74	-28.78	122	167	V
* 4.68996	29.73	MAV1	34	-29.6	34.13	54	-19.87	-	-	122	167	V
* 7.43811	41.44	PK2	36.5	-27.8	50.14	-	-	74	-23.86	119	203	V
* 7.44124	30.37	MAV1	36.5	-27.8	39.07	54	-14.93	-	-	119	203	V

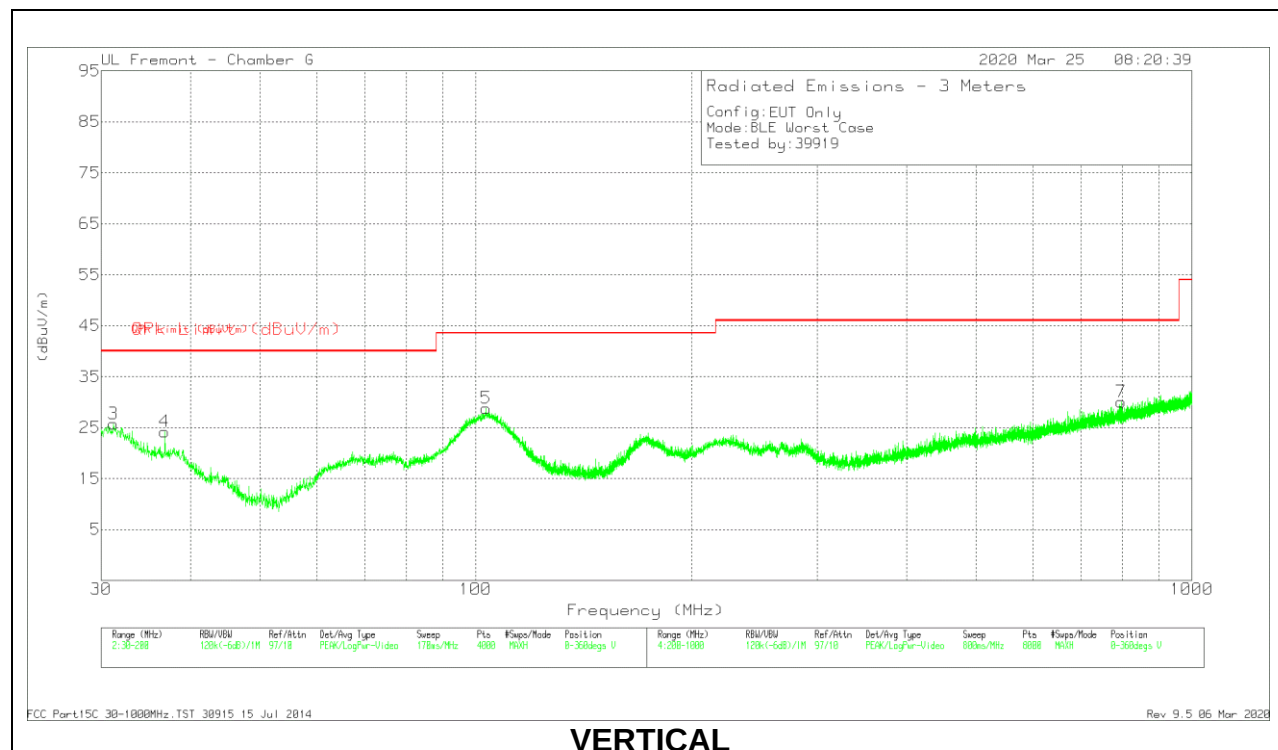
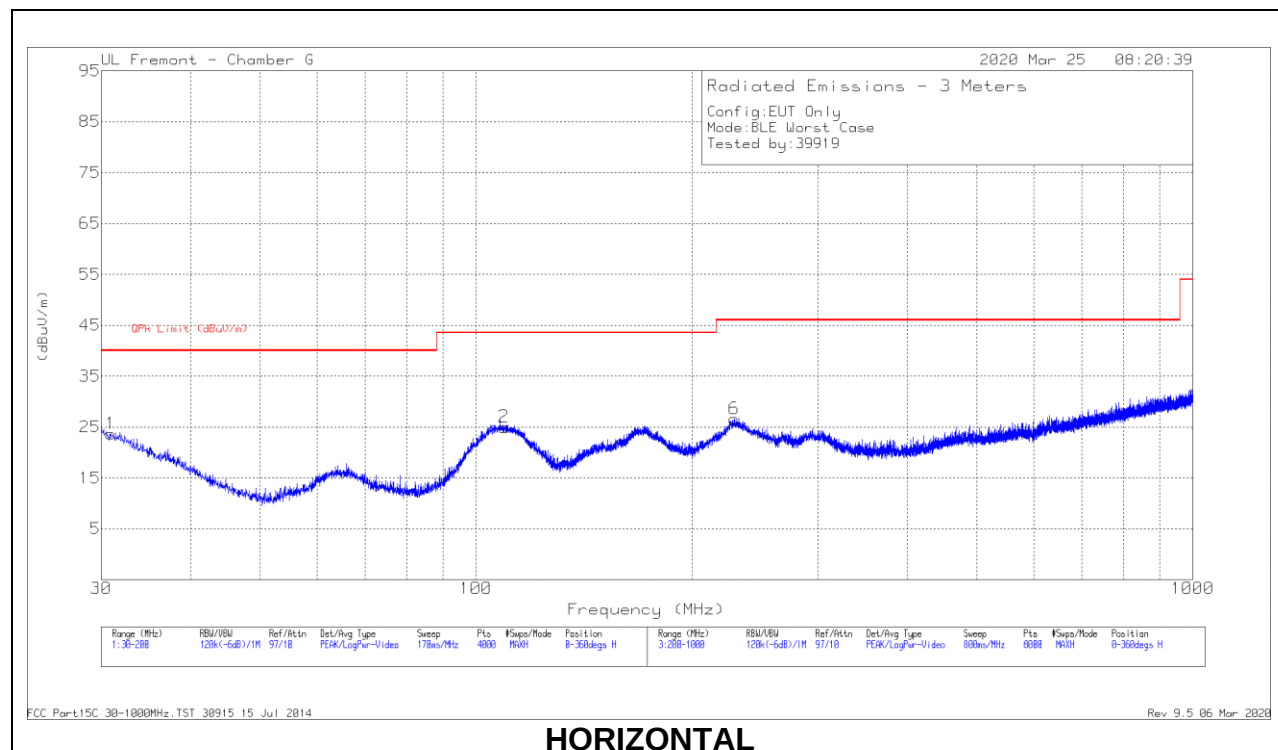
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

10.3. WORST CASE BELOW 1 GHZ

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



Below 1GHz Data

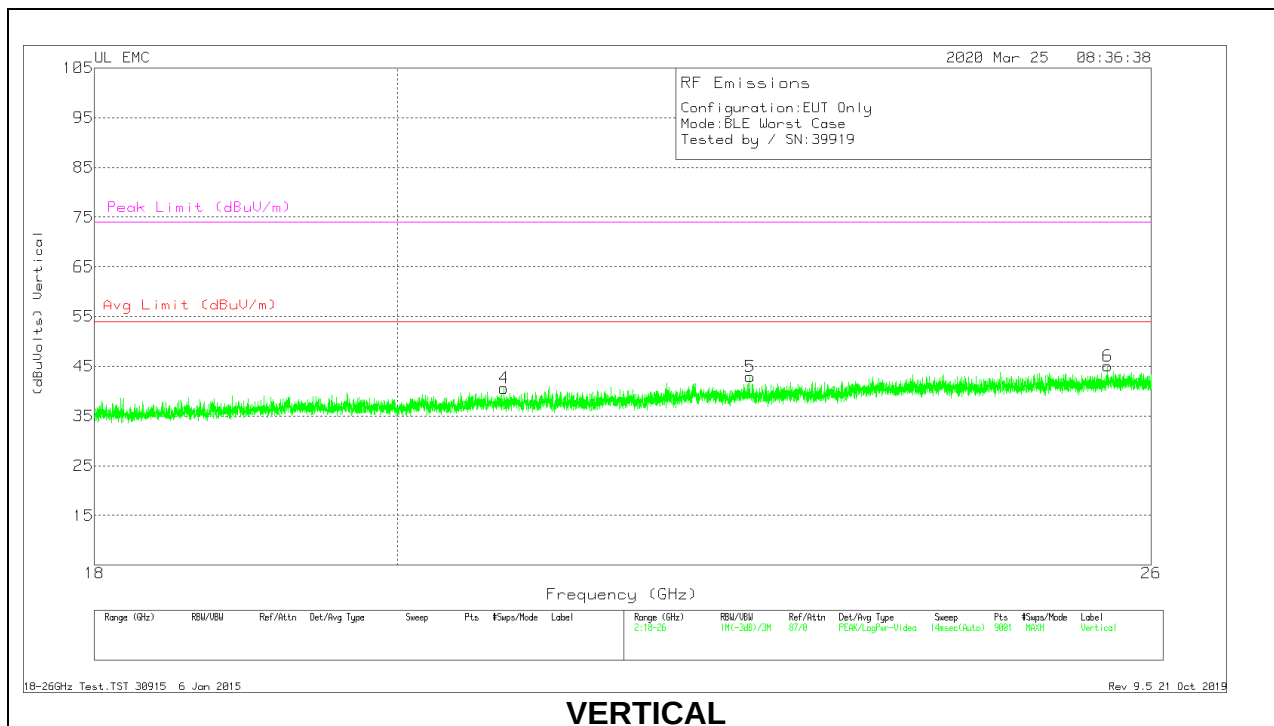
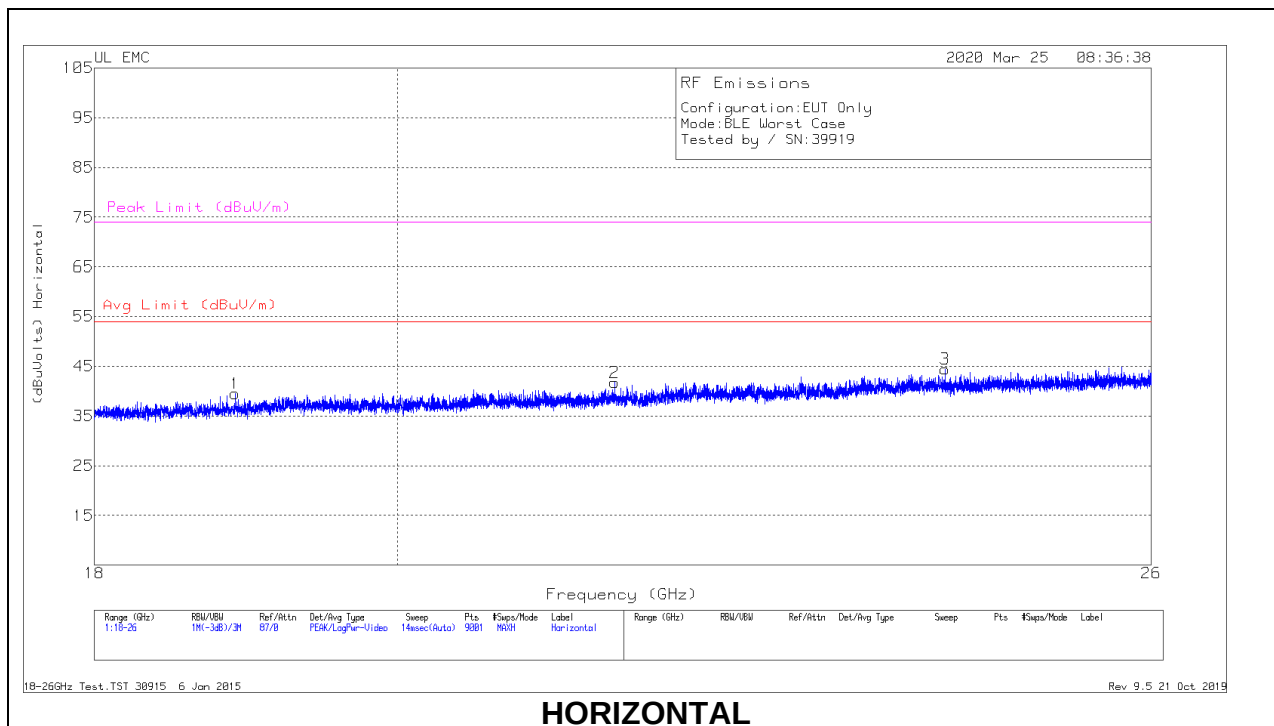
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T477 (dB/m)	Amp Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 109.3255	36.61	Pk	18.6	-30.2	25.01	43.52	-18.51	0-360	301	H
1	30.9352	27.99	Pk	26.7	-31	23.69	40	-16.31	0-360	301	H
3	31.2328	30.26	Pk	26.5	-31	25.76	40	-14.24	0-360	100	V
4	36.8018	32.87	Pk	22.3	-31	24.17	40	-15.83	0-360	100	V
5	103.5015	41.62	Pk	17.4	-30.2	28.82	43.52	-14.7	0-360	100	V
6	229.1038	38.86	Pk	17.1	-29.4	26.56	46.02	-19.46	0-360	99	H
7	795.9775	29.68	Pk	27.2	-26.8	30.08	46.02	-15.94	0-360	99	V

* - 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)



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	18.90311	38.3	Pk	32.5	-21.8	-9.5	39.5	54	-14.5	74	-34.5
2	21.57156	39.07	Pk	33.1	-20.9	-9.5	41.77	54	-12.23	74	-32.23
3	24.19911	39.15	Pk	34.2	-19.4	-9.5	44.45	54	-9.55	74	-29.55
4	20.75644	38.49	Pk	33	-21.4	-9.5	40.59	54	-13.41	74	-33.41
5	22.61156	39.13	Pk	33.5	-20.2	-9.5	42.93	54	-11.07	74	-31.07
6	25.60622	40.16	Pk	34.4	-20	-9.5	45.06	54	-8.94	74	-28.94

Pk - Peak detector

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*	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.

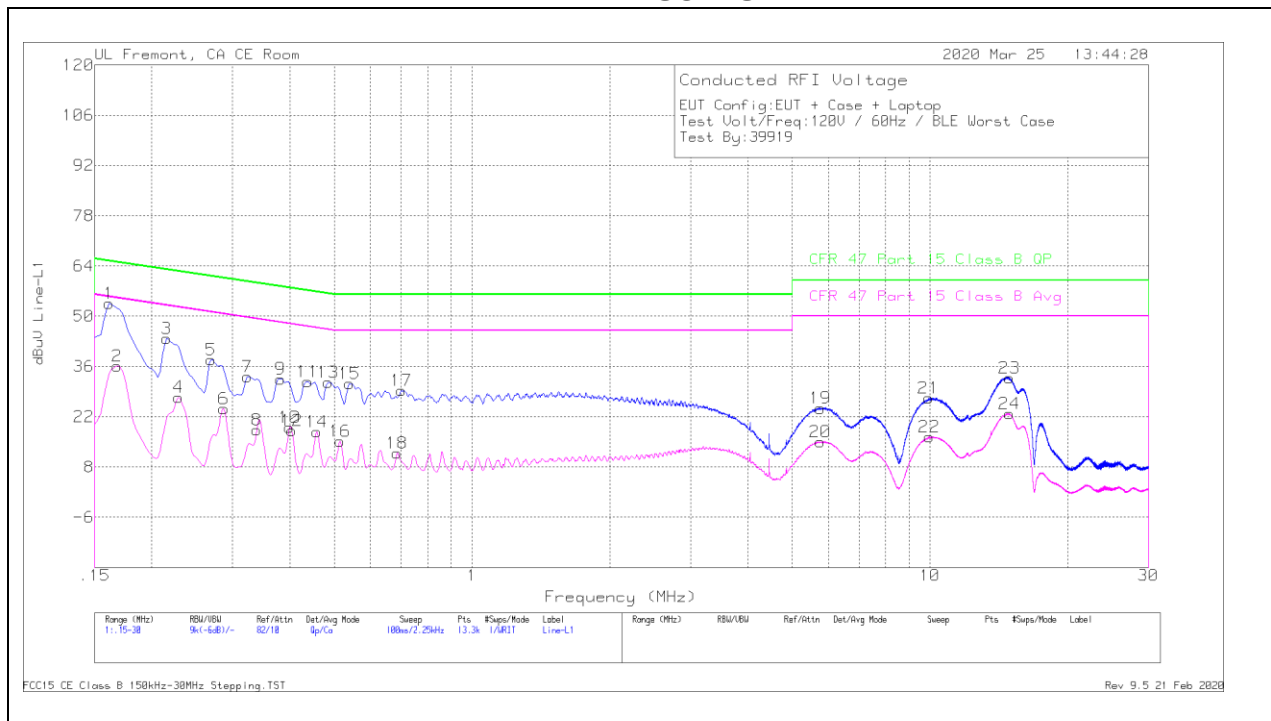
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

11.1.1. AC Power Line Host

LINE 1 RESULTS

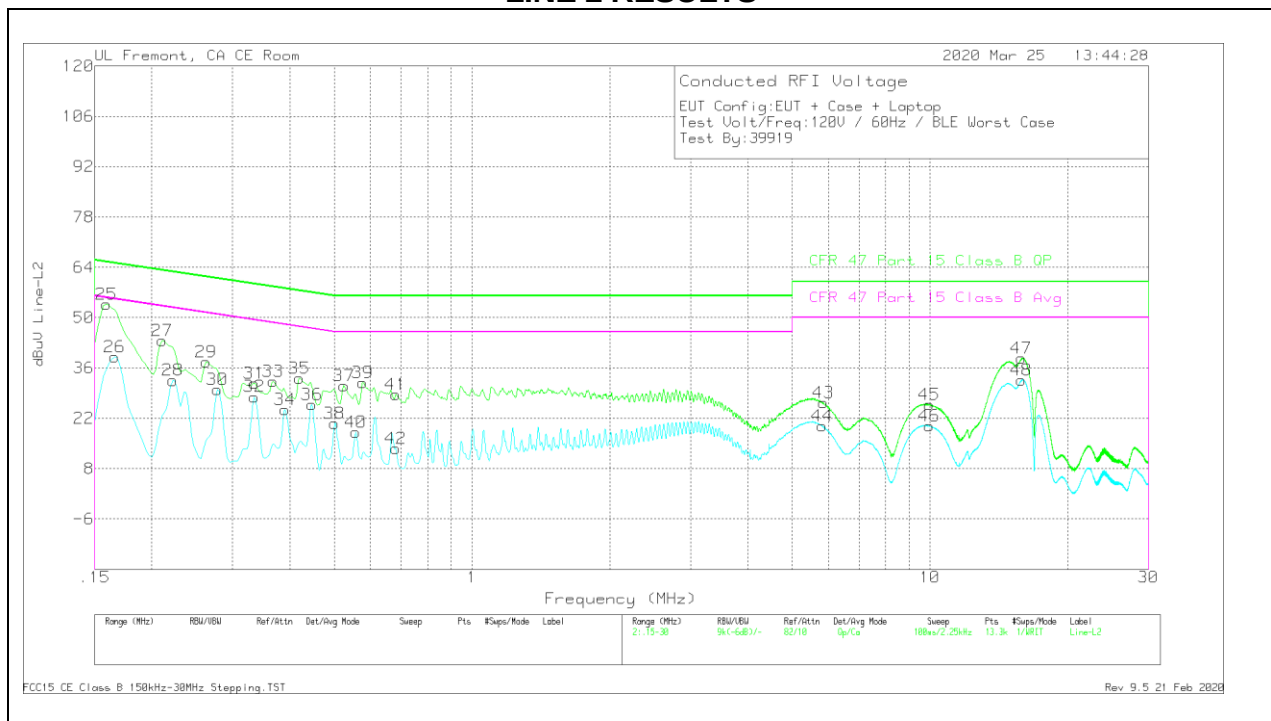


Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1 (dB)	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)M argin (dB)
1	.16125	43.42	Qp	.1	0	10	53.52	65.4	-11.88	-	-
2	.168	25.99	Ca	.1	0	10	36.09	-	-	55.06	-18.97
3	.21525	33.75	Qp	0	0	10	43.75	63	-19.25	-	-
4	.22875	17.48	Ca	0	0	10	27.48	-	-	52.49	-25.01
5	.26925	27.94	Qp	0	0	10	37.94	61.14	-23.2	-	-
6	.28725	14.29	Ca	0	0	10	24.29	-	-	50.6	-26.31
7	.32325	23.22	Qp	0	0	10	33.22	59.62	-26.4	-	-
8	.339	8.35	Ca	0	0	10	18.35	-	-	49.23	-30.88
9	.38175	22.54	Qp	0	0	10	32.54	58.24	-25.7	-	-
10	.39975	9.07	Ca	0	0	10	19.07	-	-	47.86	-28.79
11	.438	21.81	Qp	0	0	10	31.81	57.1	-25.29	-	-
12	.40425	8.16	Ca	0	0	10	18.16	-	-	47.77	-29.61
13	.48525	21.53	Qp	0	0	10	31.53	56.25	-24.72	-	-
14	.45825	7.87	Ca	0	0	10	17.87	-	-	46.72	-28.85
15	.53925	21.23	Qp	0	0	10	31.23	56	-24.77	-	-
16	.5145	5.2	Ca	0	0	10	15.2	-	-	46	-30.8
17	.70125	19.34	Qp	0	0	10	29.34	56	-26.66	-	-
18	.6855	1.8	Ca	0	0	10	11.8	-	-	46	-34.2
19	5.7615	14.05	Qp	0	.2	10.1	24.35	60	-35.65	-	-
20	5.7615	4.76	Ca	0	.2	10.1	15.06	-	-	50	-34.94
21	9.9465	16.86	Qp	0	.2	10.1	27.16	60	-32.84	-	-
22	9.95325	6.04	Ca	0	.2	10.1	16.34	-	-	50	-33.66
23	14.91	22.43	Qp	0	.3	10.1	32.83	60	-27.17	-	-
24	14.90325	12.4	Ca	0	.3	10.1	22.8	-	-	50	-27.2

Qp - Quasi-Peak detector

Ca - CISPR average detection

LINE 2 RESULTS



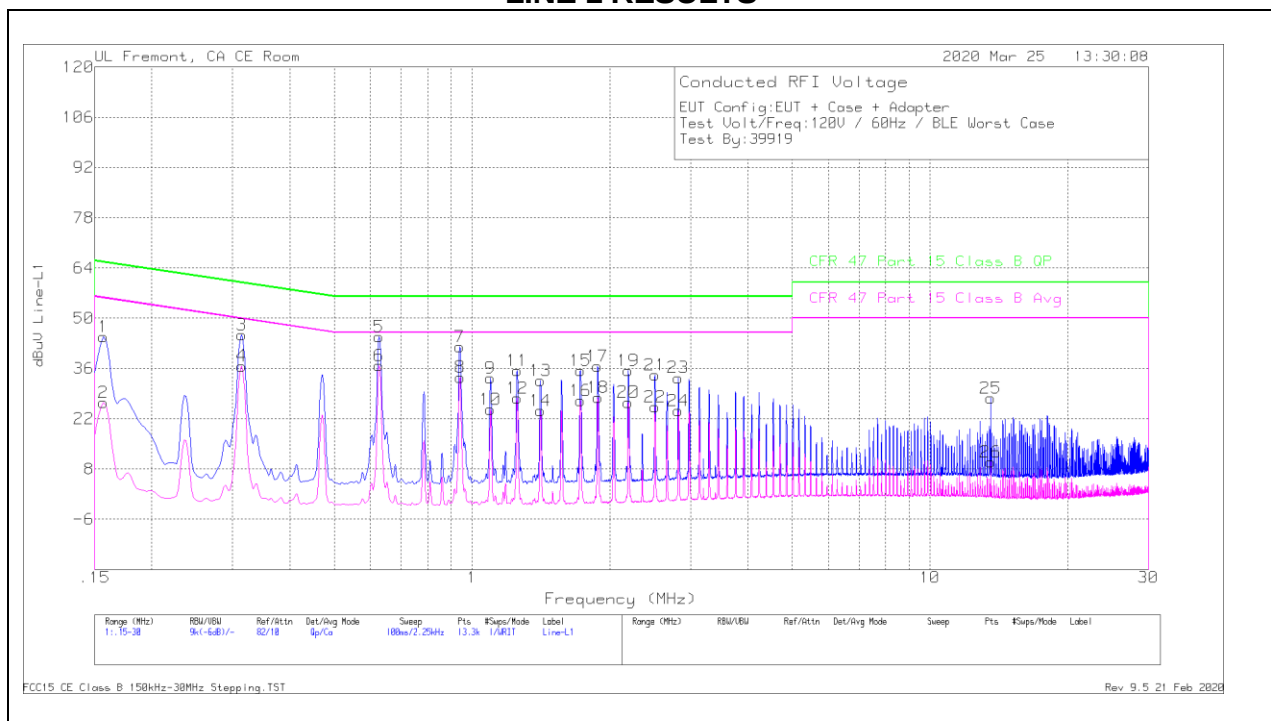
Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2 (dB)	LC Cables C2&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)M argin (dB)
25	.159	43.63	Qp	.1	0	10	53.73	65.52	-11.79	-	-
26	.16575	29.15	Ca	0	0	10	39.15	-	-	55.17	-16.02
27	.21075	33.65	Qp	0	0	10	43.65	63.18	-19.53	-	-
28	.222	22.55	Ca	0	0	10	32.55	-	-	52.74	-20.19
29	.2625	27.7	Qp	0	0	10	37.7	61.35	-23.65	-	-
30	.27825	20.04	Ca	0	0	10	30.04	-	-	50.87	-20.83
31	.3345	21.78	Qp	0	0	10	31.78	59.34	-27.56	-	-
32	.3345	18.01	Ca	0	0	10	28.01	-	-	49.34	-21.33
33	.36825	22.26	Qp	0	0	10	32.26	58.54	-26.28	-	-
34	.39075	14.5	Ca	0	0	10	24.5	-	-	48.05	-23.55
35	.42	23.11	Qp	0	0	10	33.11	57.45	-24.34	-	-
36	.447	15.82	Ca	0	0	10	25.82	-	-	46.93	-21.11
37	.52575	21.01	Qp	0	0	10	31.01	56	-24.99	-	-
38	.501	10.61	Ca	0	0	10	20.61	-	-	46	-25.39
39	.5775	21.95	Qp	0	0	10	31.95	56	-24.05	-	-
40	.55725	8.17	Ca	0	0	10	18.17	-	-	46	-27.83
41	.681	18.67	Qp	0	0	10	28.67	56	-27.33	-	-
42	.681	3.59	Ca	0	0	10	13.59	-	-	46	-32.41
43	5.84925	16.03	Qp	0	.2	10.1	26.33	60	-33.67	-	-
44	5.81325	9.53	Ca	0	.2	10.1	19.83	-	-	50	-30.17
45	9.9735	15.55	Qp	0	.2	10.1	25.85	60	-34.15	-	-
46	9.97125	9.58	Ca	0	.2	10.1	19.88	-	-	50	-30.12
47	15.85275	28.18	Qp	0	.3	10.2	38.68	60	-21.32	-	-
48	15.85275	22.15	Ca	0	.3	10.2	32.65	-	-	50	-17.35

Qp - Quasi-Peak detector

Ca - CISPR average detection

11.1.2. AC Power Line Norm

LINE 1 RESULTS



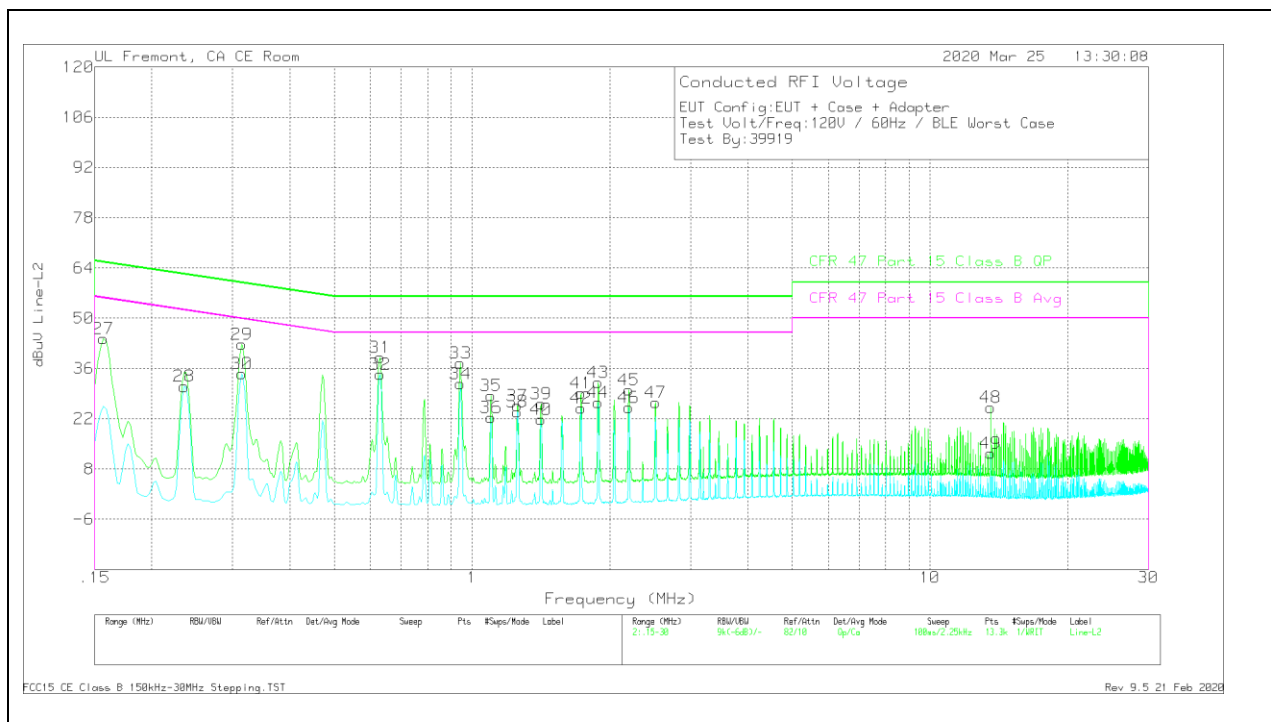
Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1 (dB)	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
1	.15675	34.68	Qp	.1	0	10	44.78	65.63	-20.85	-	-
2	.15675	16.46	Ca	.1	0	10	26.56	-	-	55.63	-29.07
3	.31425	35.44	Qp	0	0	10	45.44	59.86	-14.42	-	-
4	.31425	26.73	Ca	0	0	10	36.73	-	-	49.86	-13.13
5	.627	34.91	Qp	0	0	10	44.91	56	-11.09	-	-
6	.627	26.74	Ca	0	0	10	36.74	-	-	46	-9.26
7	.93975	31.98	Qp	0	.1	10	42.08	56	-13.92	-	-
8	.942	23.49	Ca	0	.1	10	33.59	-	-	46	-12.41
9	1.09725	23.24	Qp	0	.1	10	33.34	56	-22.66	-	-
10	1.09725	14.43	Ca	0	.1	10	24.53	-	-	46	-21.47
11	1.25475	25.38	Qp	0	.1	10	35.48	56	-20.52	-	-
12	1.25475	17.65	Ca	0	.1	10	27.75	-	-	46	-18.25
13	1.41	22.47	Qp	0	.1	10	32.57	56	-23.43	-	-
14	1.41225	14.14	Ca	0	.1	10	24.24	-	-	46	-21.76
15	1.725	25.35	Qp	0	.1	10	35.45	56	-20.55	-	-
16	1.725	16.97	Ca	0	.1	10	27.07	-	-	46	-18.93
17	1.88025	26.61	Qp	0	.1	10	36.71	56	-19.29	-	-
18	1.8825	17.89	Ca	0	.1	10	27.99	-	-	46	-18.01
19	2.19525	25.32	Qp	0	.1	10	35.42	56	-20.58	-	-
20	2.19525	16.51	Ca	0	.1	10	26.61	-	-	46	-19.39
21	2.508	24.15	Qp	0	.1	10	34.25	56	-21.75	-	-
22	2.51025	15.17	Ca	0	.1	10	25.27	-	-	46	-20.73
23	2.82075	23.32	Qp	0	.1	10	33.42	56	-22.58	-	-
24	2.823	14.21	Ca	0	.1	10	24.31	-	-	46	-21.69
25	*13.56	17.36	Qp	.1	.2	10.1	27.76	60	-32.24	-	-
26	*13.56	-38	Ca	.1	.2	10.1	10.02	-	-	50	-39.98

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	.15675	34.28	Qp	.1	0	10	44.38	65.63	-21.25	-	-
28	.2355	20.98	Ca	0	0	10	30.98	-	-	52.25	-21.27
29	.31425	32.7	Qp	0	0	10	42.7	59.86	-17.16	-	-
30	.31425	24.55	Ca	0	0	10	34.55	-	-	49.86	-15.31
31	.62925	29.01	Qp	0	0	10	39.01	56	-16.99	-	-
32	.62925	24.38	Ca	0	0	10	34.38	-	-	46	-11.62
33	.94425	27.48	Qp	0	.1	10	37.58	56	-18.42	-	-
34	.94425	21.61	Ca	0	.1	10	31.71	-	-	46	-14.29
35	1.0995	18.37	Qp	0	.1	10	28.47	56	-27.53	-	-
36	1.10175	12.19	Ca	0	.1	10	22.29	-	-	46	-23.71
37	1.257	15.54	Qp	0	.1	10	25.64	56	-30.36	-	-
38	1.257	13.89	Ca	0	.1	10	23.99	-	-	46	-22.01
39	1.4145	16.14	Qp	0	.1	10	26.24	56	-29.76	-	-
40	1.4145	11.79	Ca	0	.1	10	21.89	-	-	46	-24.11
41	1.7295	19.11	Qp	0	.1	10	29.21	56	-26.79	-	-
42	1.7295	14.83	Ca	0	.1	10	24.93	-	-	46	-21.07
43	1.887	21.94	Qp	0	.1	10	32.04	56	-23.96	-	-
44	1.887	16.48	Ca	0	.1	10	26.58	-	-	46	-19.42
45	2.202	19.88	Qp	0	.1	10	29.98	56	-26.02	-	-
46	2.202	15.02	Ca	0	.1	10	25.12	-	-	46	-20.88
47	2.51475	16.43	Qp	0	.1	10	26.53	56	-29.47	-	-
48	*13.56	14.81	Qp	.1	.2	10.1	25.21	60	-34.79	-	-
49	*13.56	2	Ca	.1	.2	10.1	12.4	-	-	50	-37.6

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