



CERTIFICATION TEST REPORT

Report Number. : 12886359-E1V2

Applicant : PLANTRONICS INC.
345 ENCINAL ST
SANTA CRUZ, CA 95060 U.S.A.

Model : CB4222 D, CB4222 CD, CB4222-M CD, CB5232 D, CB5232 CD,
CB5232-M CD

FCC ID : AL8-CBX2X2

IC : 457A-CBX2X2

EUT Description : BLUETOOTH BASE

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

Date Of Issue:

July 19, 2019

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	7/2/2019	Initial Issue	--
V2	7/19/2019	Updated worst case	Tri Pham

TABLE OF CONTENTS

REPORT REVISION HISTORY	2
TABLE OF CONTENTS	3
1. ATTESTATION OF TEST RESULTS	5
2. TEST METHODOLOGY	7
3. FACILITIES AND ACCREDITATION	7
4. CALIBRATION AND UNCERTAINTY	8
4.1. <i>MEASURING INSTRUMENT CALIBRATION</i>	<i>8</i>
4.2. <i>SAMPLE CALCULATION</i>	<i>8</i>
4.3. <i>MEASUREMENT UNCERTAINTY.....</i>	<i>8</i>
5. EQUIPMENT UNDER TEST.....	9
5.1. <i>EUT DESCRIPTION</i>	<i>9</i>
5.2. <i>DESCRIPTION OF MODELS DIFFERENCES.....</i>	<i>9</i>
5.3. <i>MAXIMUM OUTPUT POWER.....</i>	<i>9</i>
5.4. <i>DESCRIPTION OF AVAILABLE ANTENNAS</i>	<i>9</i>
5.5. <i>SOFTWARE AND FIRMWARE.....</i>	<i>9</i>
5.6. <i>WORST-CASE CONFIGURATION AND MODE.....</i>	<i>9</i>
5.7. <i>DESCRIPTION OF TEST SETUP.....</i>	<i>10</i>
6. MEASUREMENT METHOD.....	13
7. TEST AND MEASUREMENT EQUIPMENT	14
8. ANTENNA PORT TEST RESULTS (BLE).....	15
8.1. <i>ON TIME AND DUTY CYCLE.....</i>	<i>15</i>
8.2. <i>99% BANDWIDTH.....</i>	<i>17</i>
8.3. <i>6 dB BANDWIDTH.....</i>	<i>18</i>
8.4. <i>OUTPUT POWER.....</i>	<i>20</i>
8.5. <i>AVERAGE POWER.....</i>	<i>21</i>
8.6. <i>POWER SPECTRAL DENSITY</i>	<i>22</i>
8.7. <i>CONDUCTED SPURIOUS EMISSIONS.....</i>	<i>24</i>
9. RADIATED TEST RESULTS.....	26
9.1. <i>LIMITS AND PROCEDURE.....</i>	<i>26</i>
9.2. <i>TRANSMITTER ABOVE 1 GHz</i>	<i>27</i>
9.3. <i>WORST CASE BELOW 30MHZ</i>	<i>37</i>

9.4.	WORST CASE BELOW 1 GHZ.....	39
9.5.	WORST CASE 18-26 GHZ.....	41
10.	AC POWER LINE CONDUCTED EMISSIONS	43
11.	SETUP PHOTOS	46

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: PLANTRONICS INC.
345 ENCINAL ST
SANTA CRUZ, CA 95060 U.S.A.

EUT DESCRIPTION: BLUETOOTH BASE

MODEL: CB4222 D, CB4222 CD, CB4222-M CD, CB5232 D, CB5232 CD,
CB5232-M CD

SERIAL NUMBER: 143P29 (CB4222-CD conducted)
143PD5 (CB4222-CD Radiated)

DATE TESTED: Jun 5, 2019 – June 13, 2019

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:



Frank Ibrahim
Operations Leader
Consumer Technology Division
UL Verification Services Inc.

Prepared By:



Eric Yu
Test Engineer
Consumer Technology Division
UL Verification Services Inc.

Reviewed By:



Tri Pham
Project Engineer
Consumer Technology Division
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05, RSS-GEN Issue 5, and RSS-247 Issue 2.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street	47658 Kato Rd
<input type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D	<input checked="" type="checkbox"/> Chamber I
<input type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E	<input type="checkbox"/> Chamber J
<input type="checkbox"/> Chamber C	<input type="checkbox"/> Chamber F	<input type="checkbox"/> Chamber K
	<input type="checkbox"/> Chamber G	<input type="checkbox"/> Chamber L
	<input type="checkbox"/> Chamber H	<input type="checkbox"/> Chamber M

The above test sites and facilities are covered under FCC Test Firm Registration # 208313.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

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.

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	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. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

The EUT is a Bluetooth Base.

5.2. DESCRIPTION OF MODELS DIFFERENCES

Client specified all models in the product family are electrically identical. Power measurements were performed on both CB5200-CD and CB4222-CD and it was determined that the CB4222-CD was worst case. Therefore, testing was performed on the CB4222-CD to represent the family.

5.3. 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	6.95	4.95

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an omni directional monopole antenna, with a maximum gain of 2.85 dBi.

5.5. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was V204

The test utility software used during testing was HIDEWidler Version 1.0.0.1 and BlueSuite 2.6.8.

5.6. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 30MHz, 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.

Pretesting was performed for standalone and with accessories attached. It was found that standalone was worst case, therefore all tests were performed as standalone.

The fundamental of the EUT is a desktop device and was tested in normal operating conditions.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC/DC Adapter	Plantronics	SSC-090100	N/A	N/A
BT Headset	Plantronics	203-JN0508	163CTW	N/A
Laptop	Lenovo	TP000p6A	PF1H0N1K	N/A

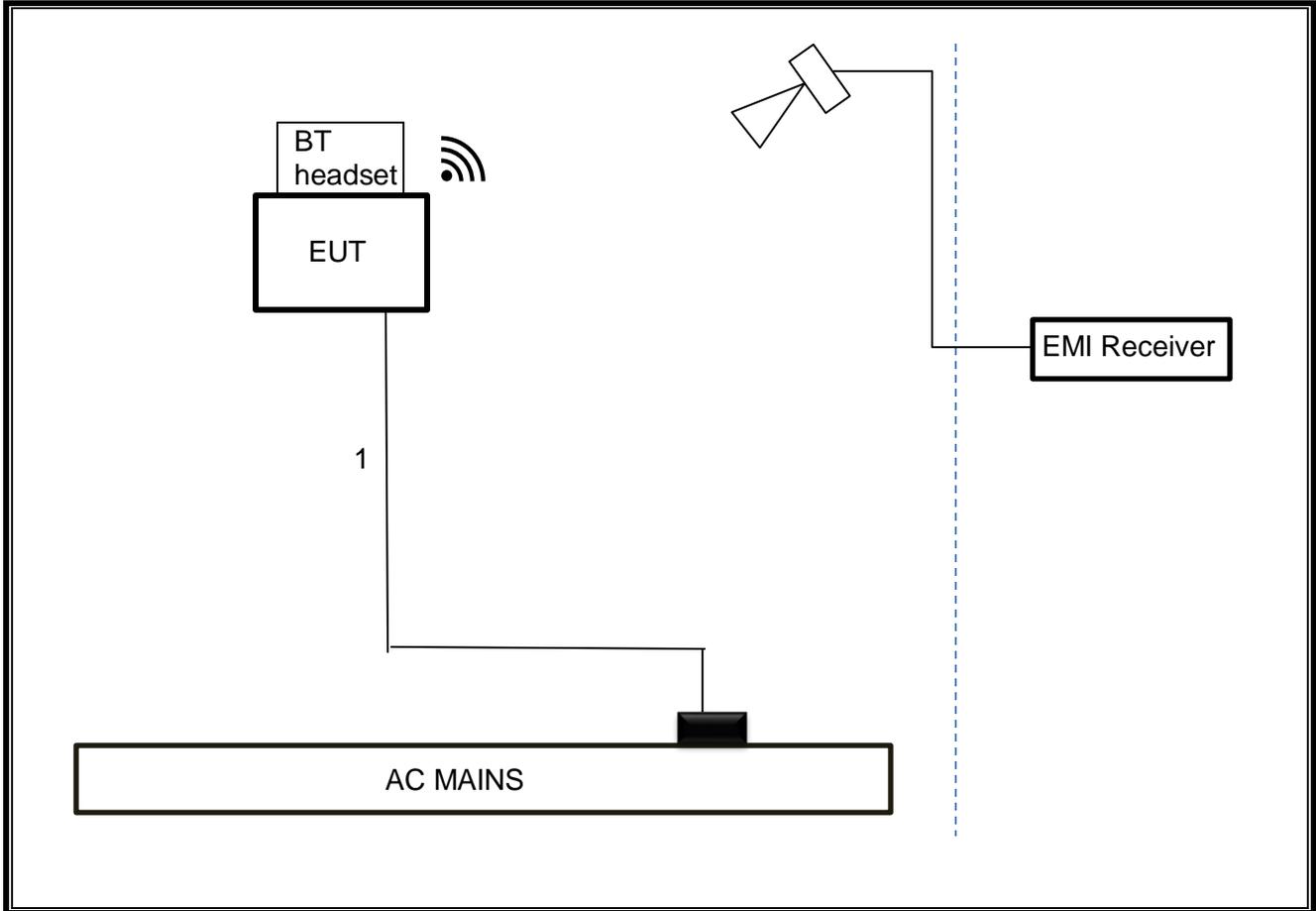
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	DC	Unshielded	1	AC/DC Adapter to Base Plug
2	Antenna	1	SMA	Unshielded	.08	To Spectrum Analyzer

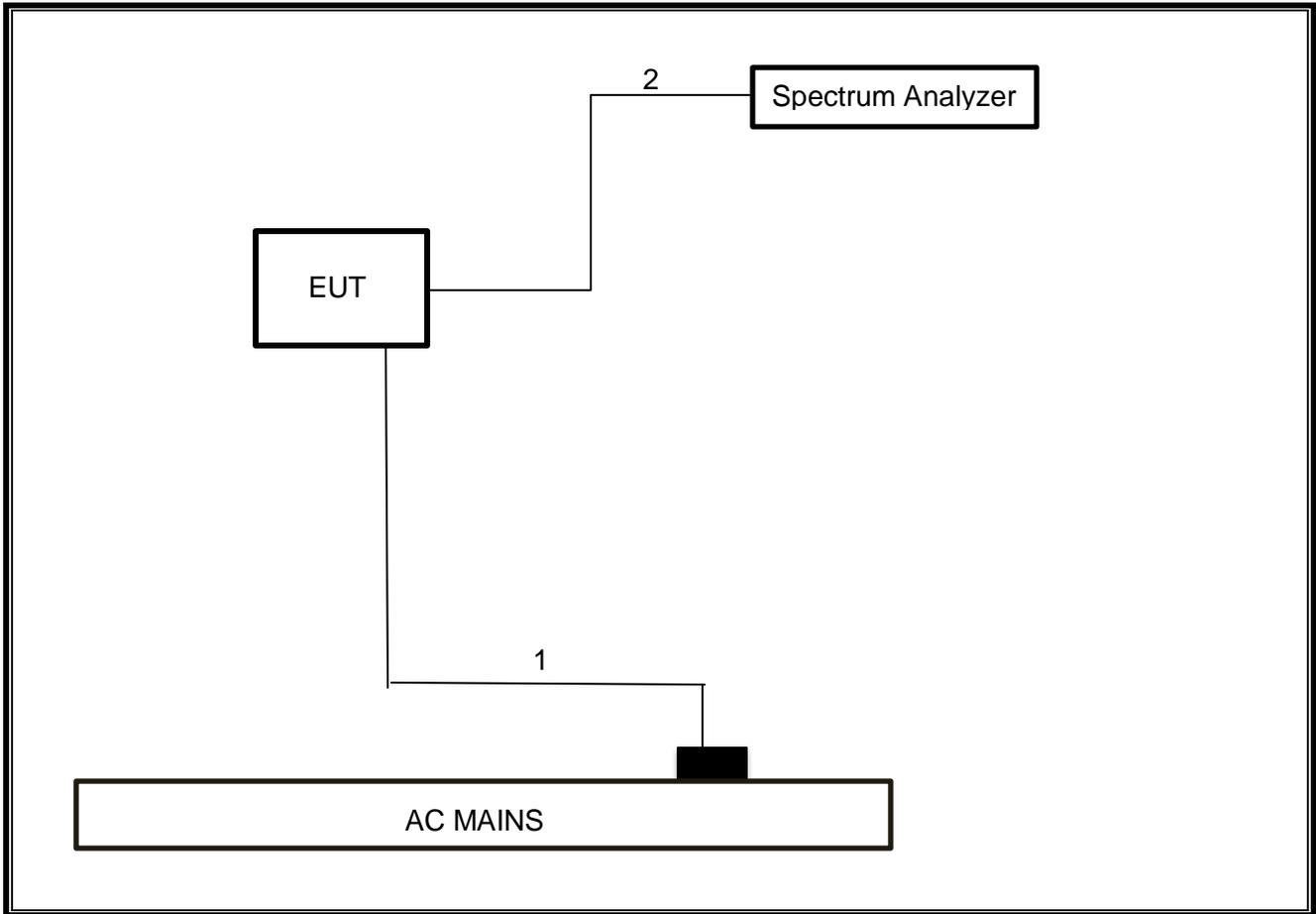
TEST SETUP

The EUT was tested as standalone. Test software exercised the radio card.

SETUP DIAGRAM: RADIATED TESTS



SETUP DIAGRAM: CONDUCTED TESTS



6. MEASUREMENT METHOD

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

6 dB BW: ANSI C63.10 Section 11.8.1

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

Output Power: ANSI C63.10 Section 11.9.1.3 PKPM1 Peak power meter method

Average Power: ANSI C63.10 Section 11.9.2.3.2 Method AVGPM-G (Measurement using a gated RF average-reading power meter)

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

Band-edge: ANSI C63.10 Section 11.13.3.4 Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction factor

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

Radiated emissions restricted frequency bands: ANSI C63.10 Section 11.12.1

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

Conducted emissions in restricted frequency bands: ANSI C63.10 Section 11.12.

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

7. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
Antenna, Passive Loop 30Hz to 1MHz	ELETRO METRICS	EM-6871	PRE0179465	05/31/2020	05/31/2019
Antenna, Passive Loop 100kHz to 30MHz	ELETRO METRICS	EM-6872	PRE0179467	05/31/2020	05/31/2019
Antenna, Double Ridge Guide Horn Antenna 700MHz to 18GHz	A.H. SYSTEMS, INC.	SAS-571	PRE0190810	07/10/2019	07/10/2017
RF Amplifier, 1-18GHz	MITEQ	AFS42-00101800-25-S-42	PRE0181078	08/01/2019	08/01/2018
Hybrid Antenna, 30MHz to 3GHz	SunAR rf motion	JB3	PRE0184971	11/13/2019	11/13/2018
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	PRE0180175	07/09/2019	07/09/2018
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826/B	PRE0182188	08/29/2019	08/29/2018
Rf Amplifier, 18-26.5GHz, 60dB gain	Ampical	AMP18G26.5-60	PRE0181238	05/01/2020	05/01/2019
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179376	02/14/2020	02/14/2019
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T908	01/23/2020	01/23/2019
AC Line Conducted					
EMI Receiver	Rohde & Schwarz	ESR	T1436	02/14/2020	02/14/2019
LISN for Conducted Emissions CISPR-16	FCC INC.	FCC LISN 50/250	T1310	01/24/2020	01/24/2019
Test Software List					
Radiated Software	UL	UL EMC		Ver 9.5, June 22, 2018	
Antenna Port Software	UL	UL RF		Ver 9.6, April 18, 2019	
AC Line Conducted Software	UL	UL EMC		Ver 9.5, May 26, 2015	

8. ANTENNA PORT TEST RESULTS (BLE)

8.1. 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	0.405	0.624	0.650	64.95%	1.87	2.467



8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0303
Middle	2440	1.0299
High	2480	1.0289



8.3. 6 dB BANDWIDTH

LIMITS

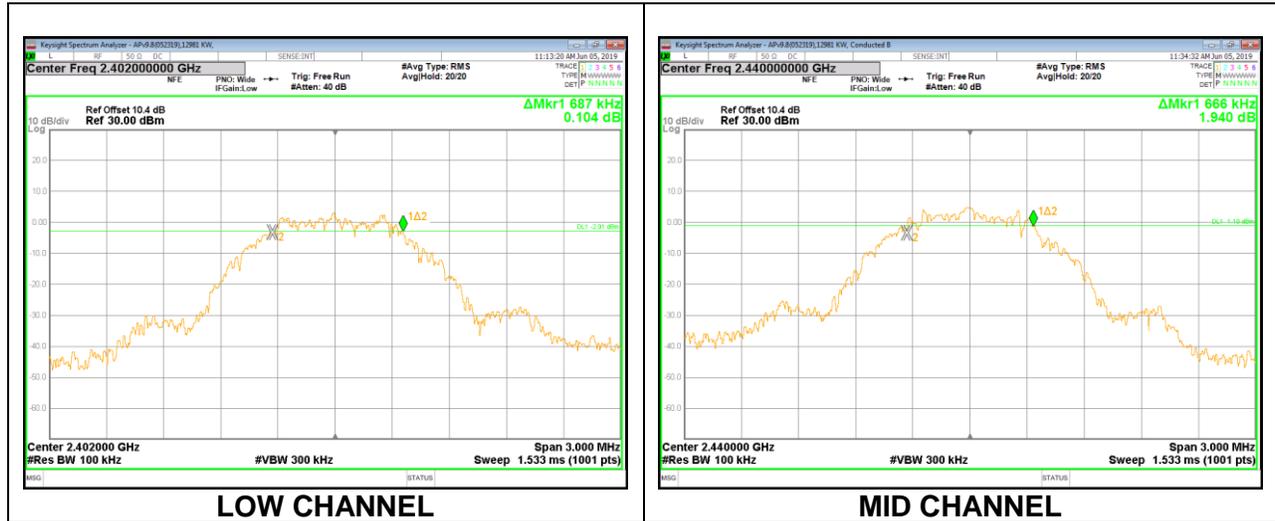
FCC §15.247 (a) (2)

RSS-247 5.2 (a)

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

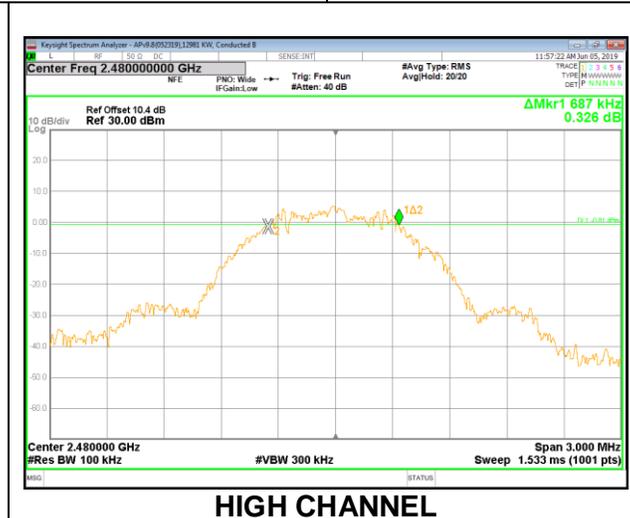
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.6870	0.5
Middle	2440	0.6660	0.5
High	2480	0.6870	0.5



LOW CHANNEL

MID CHANNEL



HIGH CHANNEL

8.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

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

RESULTS

Tested By:	KW 12981
Date:	6/5/2019

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	4.41	30	-25.59
Middle	2440	6.95	30	-23.05
High	2480	6.12	30	-23.88

8.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Tested By:	KW 12981
Date:	6/5/2019

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	3.87
Middle	2440	5.53
High	2480	5.68

8.6. POWER SPECTRAL DENSITY

LIMITS

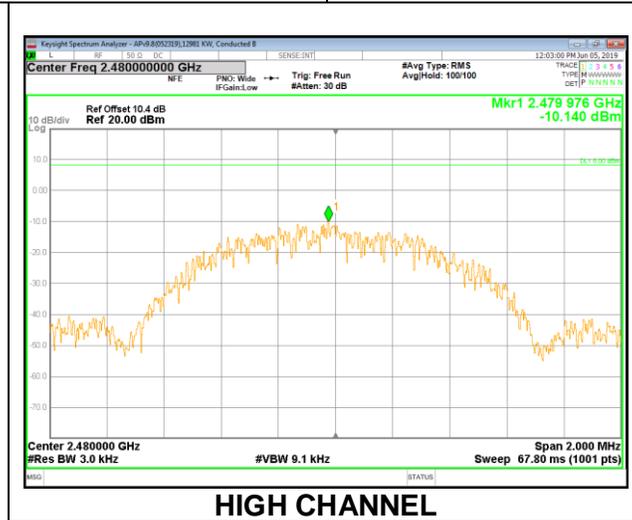
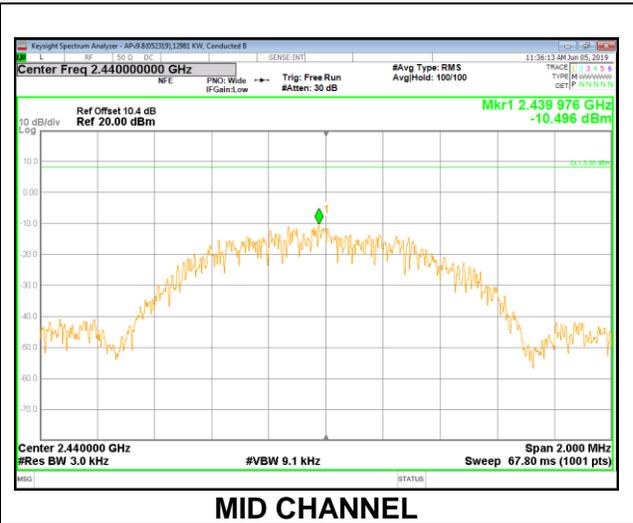
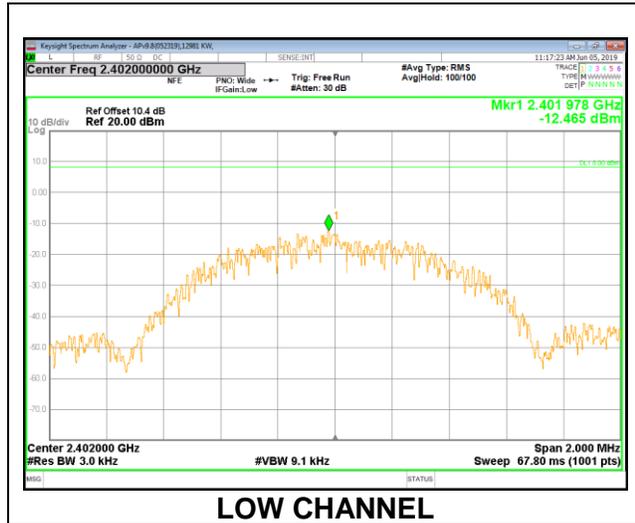
FCC §15.247 (e)

RSS-247 (5.2) (b)

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

RESULTS

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	-12.46	8	-20.46
Middle	2440	-10.50	8	-18.50
High	2480	-10.14	8	-18.14



8.7. CONDUCTED SPURIOUS EMISSIONS

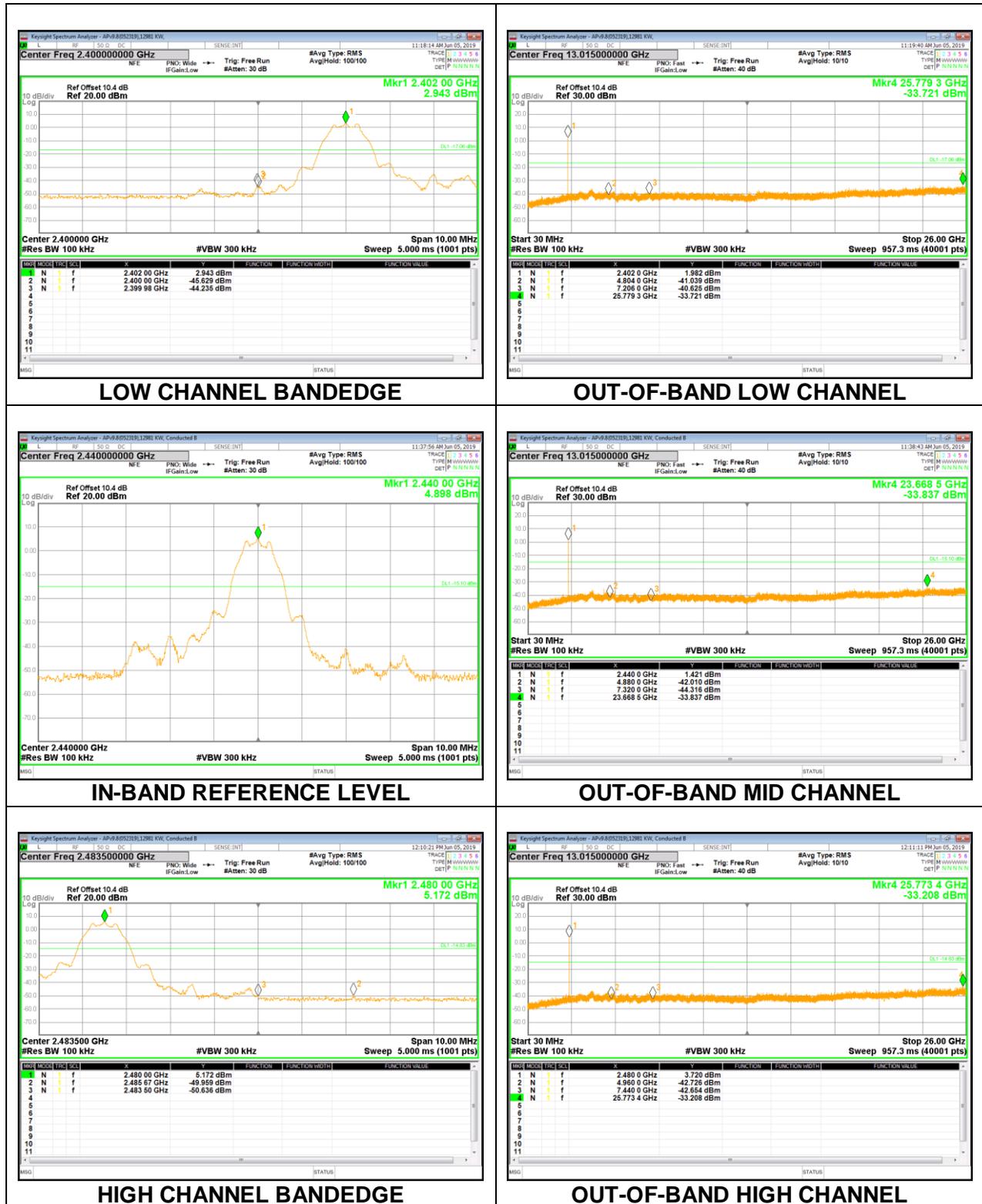
LIMITS

FCC §15.247 (d)

RSS-247 5.5

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

RESULTS



9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

RSS-GEN, Section 8.9 and 8.10.

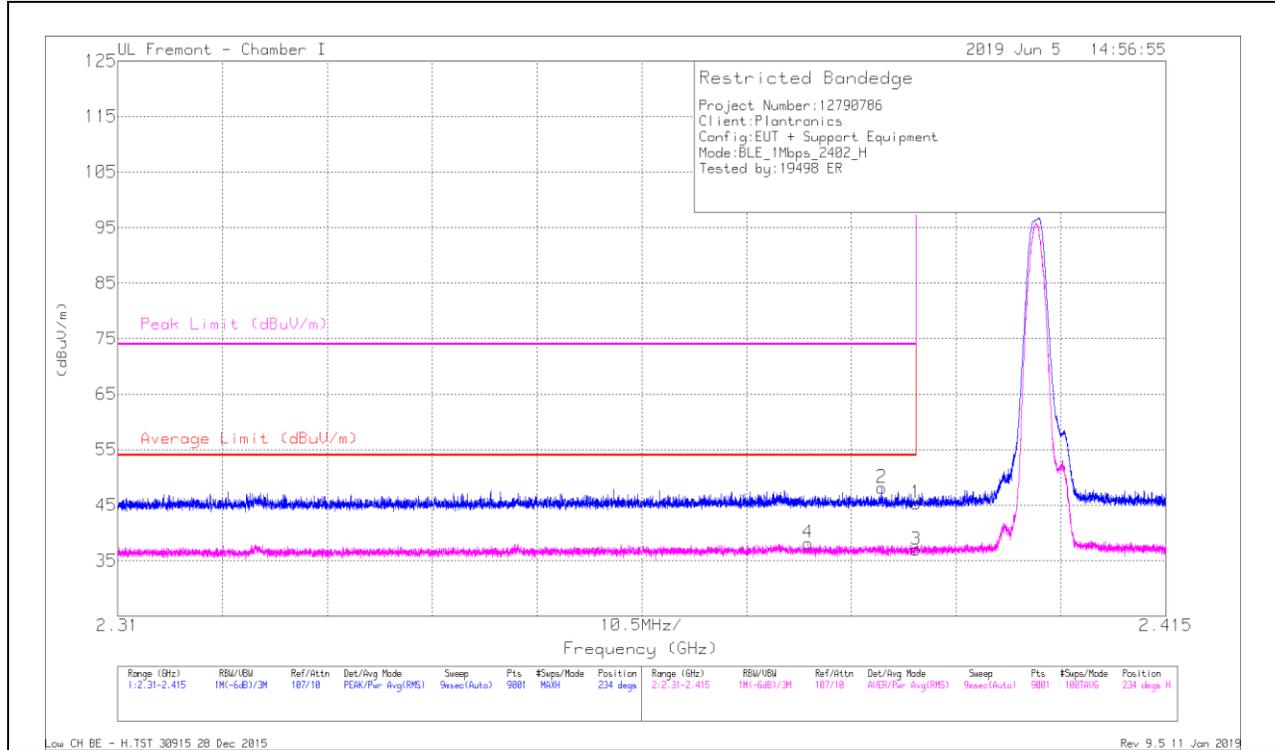
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

9.2. TRANSMITTER ABOVE 1 GHz

Antenna 1

BANDEDGE (LOW CHANNEL)

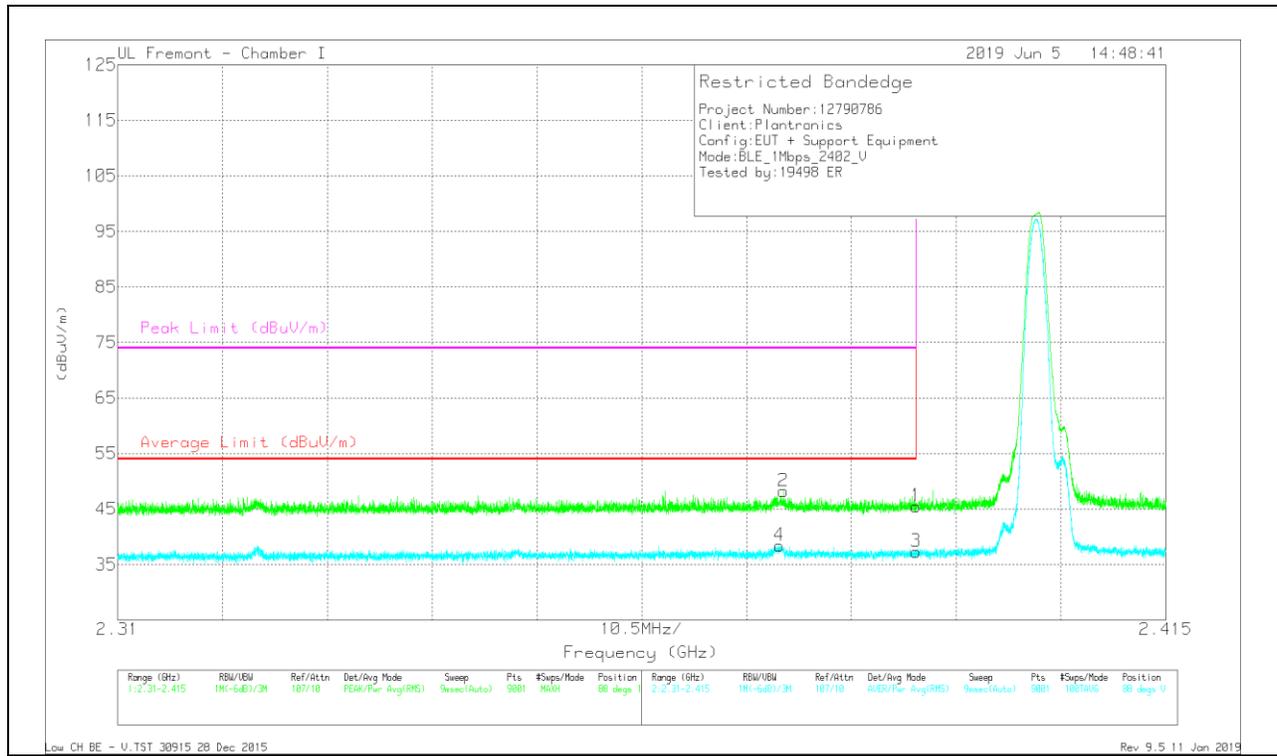
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE0190810 (dBm)	Amp/Cbl/Filtr/Pa d (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.39	38.04	PK	28.9	-21.6	0	45.34	-	-	74	-28.66	234	115	H
2	2.387	40.84	PK	28.9	-21.6	0	48.14	-	-	74	-25.86	234	115	H
3	2.39	27.69	RMS	28.9	-21.6	1.87	36.86	54	-17.14	-	-	234	115	H
4	2.379	28.77	RMS	28.9	-21.5	1.87	38.04	54	-15.96	-	-	234	115	H

Pk - Peak detector
 RMS - RMS detection

VERTICAL RESULT

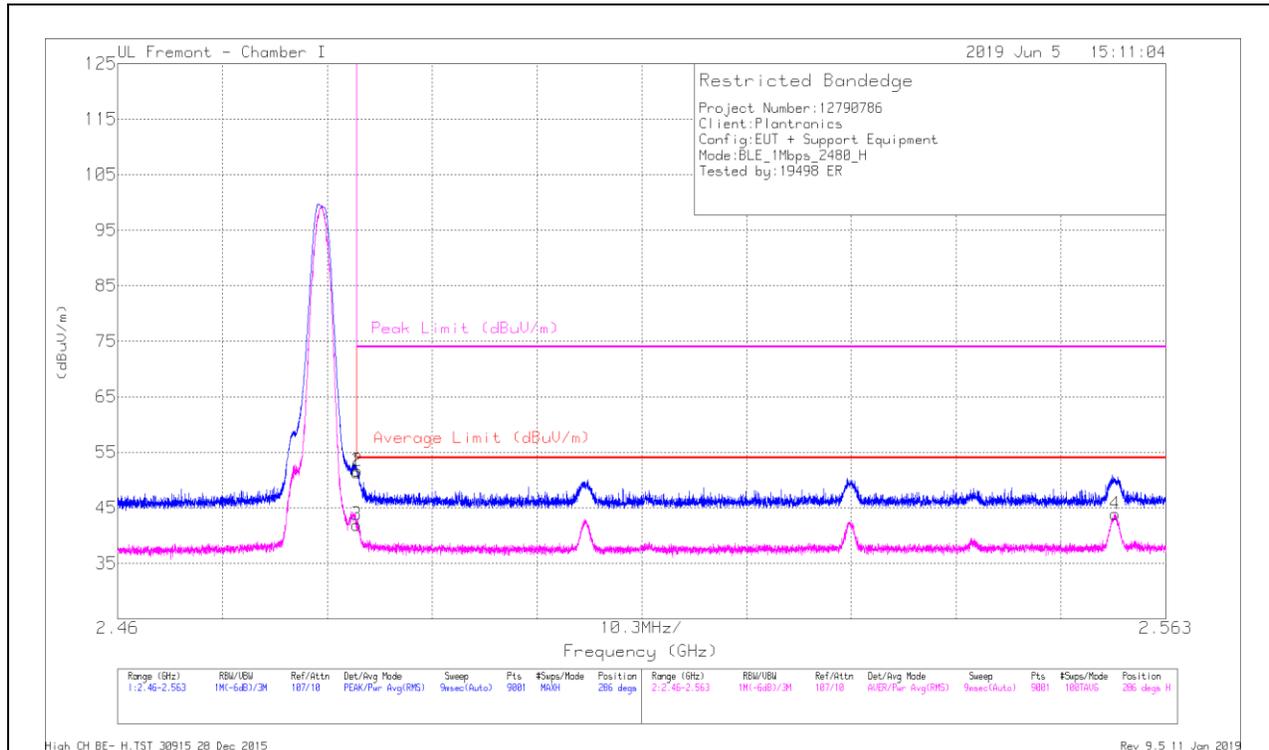


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE9190810 (dB/m)	Amp/CM/Ftr/Pa d (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.39	38.17	Pk	28.9	-21.6	0	45.47	-	-	74	-28.53	88	112	V
2	2.377	40.95	Pk	28.8	-21.5	0	48.25	-	-	74	-25.75	88	112	V
3	2.39	27.99	RMS	28.9	-21.6	1.87	37.16	54	-16.84	-	-	88	112	V
4	2.376	29.07	RMS	28.8	-21.5	1.87	38.24	54	-15.76	-	-	88	112	V

Pk - Peak detector
 RMS - RMS detection

BANEDGE (HIGH CHANNEL)

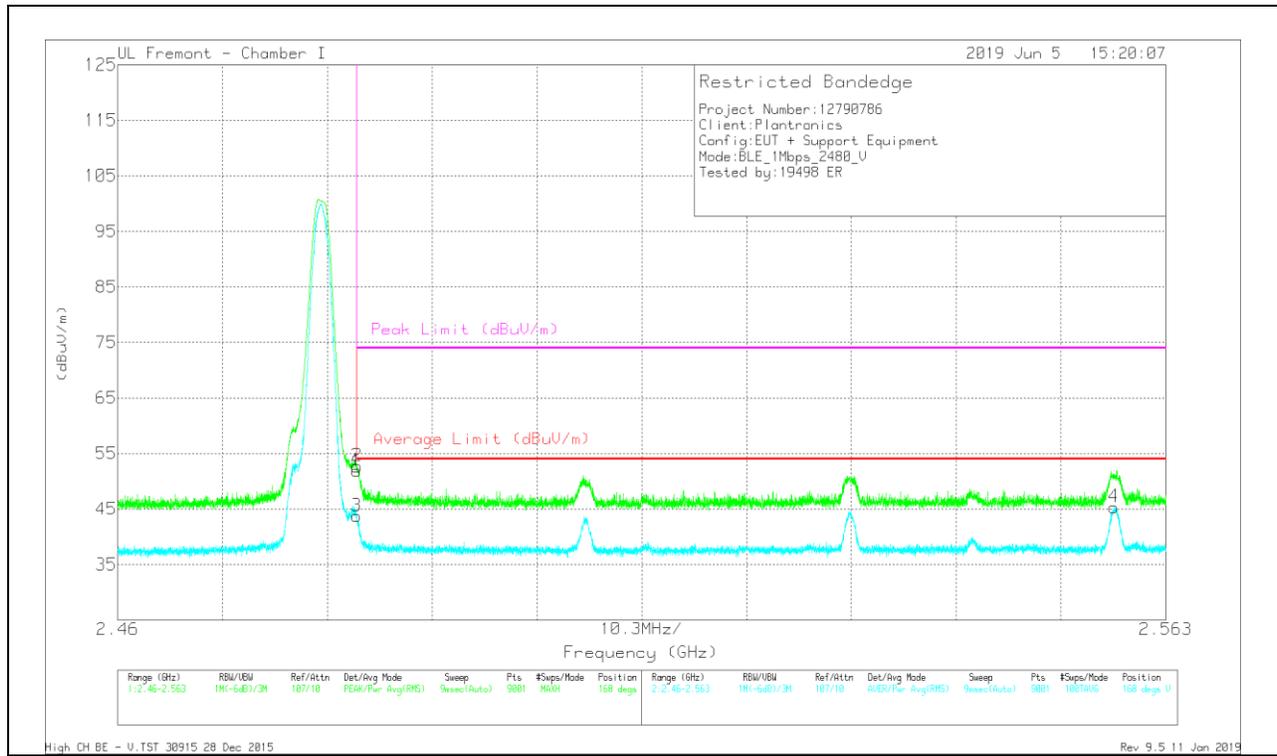
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE0190810 (dB/m)	Amp/Cdb/Filtr/Par d (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.484	43.73	Pk	29.4	-21.7	0	51.43	-	-	74	-22.57	286	105	H
2	2.484	43.93	Pk	29.4	-21.7	0	51.63	-	-	74	-22.37	286	105	H
3	2.484	32.2	RMS	29.4	-21.7	1.87	41.77	54	-12.23	-	-	286	105	H
4	2.558	33.81	RMS	29.6	-21.6	1.87	43.68	54	-10.32	-	-	286	105	H

Pk - Peak detector
 RMS - RMS detection

VERTICAL RESULT

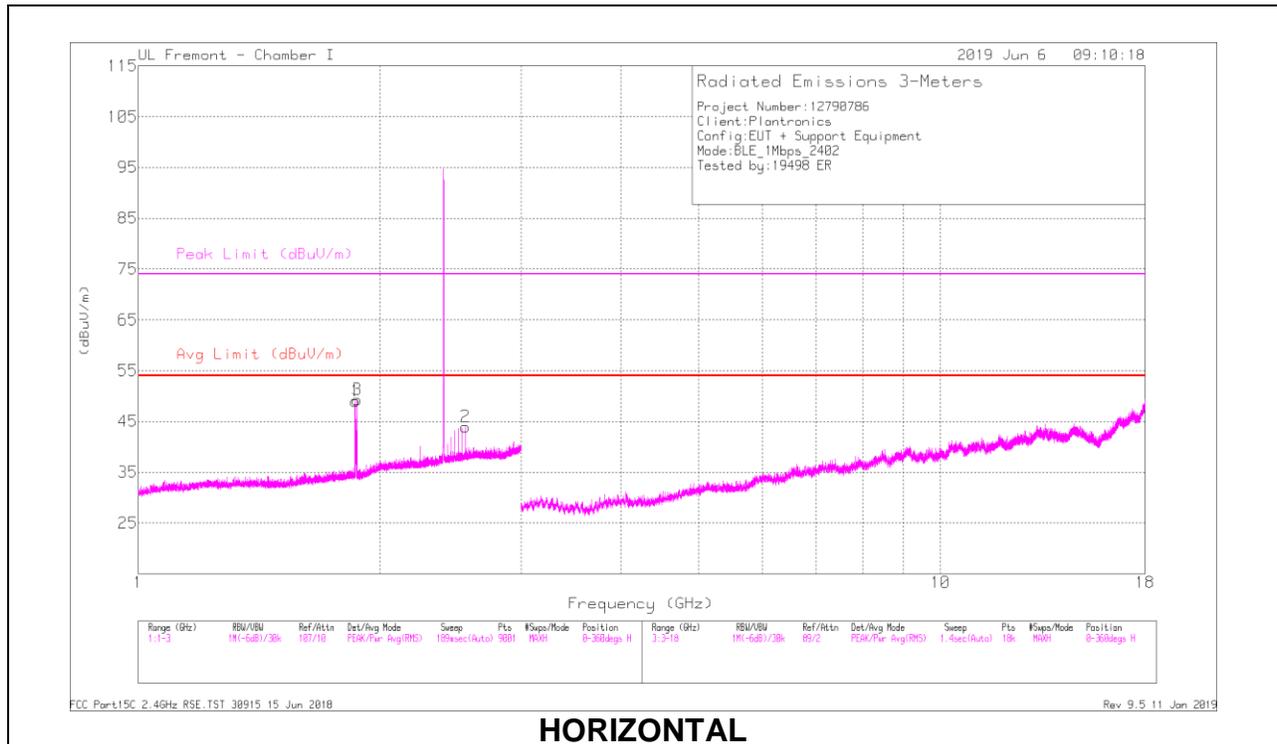


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE9190810 (dB/m)	Amp/Cal/Ftr/Pa d (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.484	44.2	Pk	29.4	-21.7	0	51.9	-	-	74	-22.1	168	194	V
2	2.484	45.01	Pk	29.4	-21.7	0	52.71	-	-	74	-21.29	168	194	V
3	2.484	33.99	RMS	29.4	-21.7	1.87	43.56	54	-10.44	-	-	168	194	V
4	2.558	35.32	RMS	29.6	-21.6	1.87	45.19	54	-8.81	-	-	168	194	V

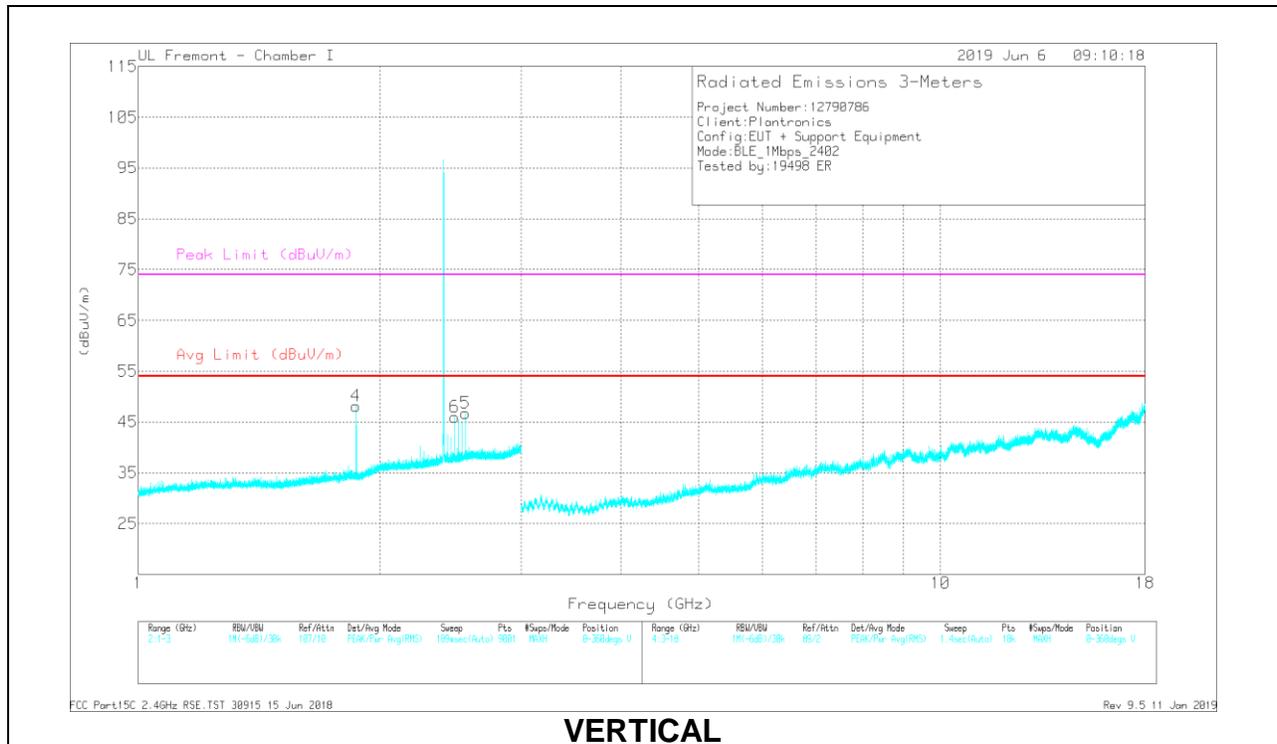
PK - Peak detector
 RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

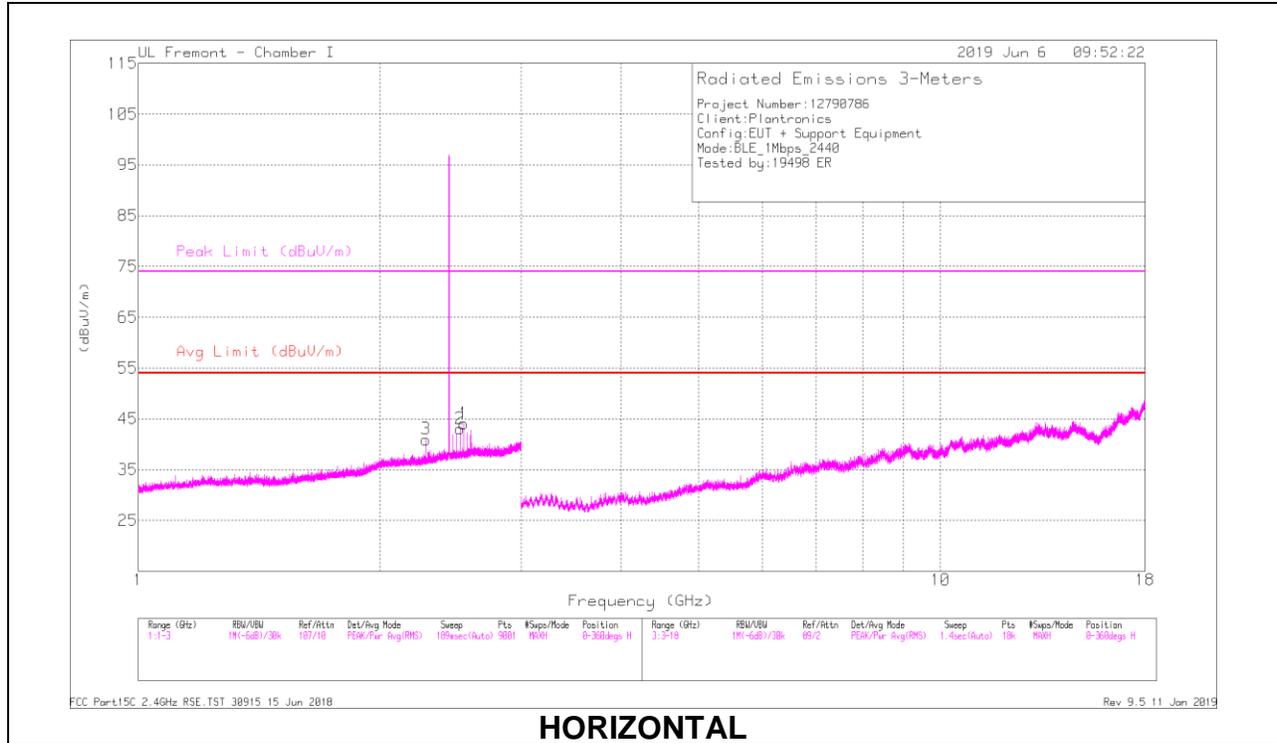
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE0190810 (dB/m)	Amp/Cb/FI tr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1.855	38.4	PK2	26.3	-22.3	0	42.4	-	-	-	-	190	164	H
2.558	41.1	PK2	29.6	-21.6	0	49.1	-	-	-	-	294	109	H
1.871	37.2	PK2	26.4	-22.3	0	41.3	-	-	-	-	123	233	H
1.867	38.45	PK2	26.4	-22.3	0	42.55	-	-	-	-	28	126	V
2.558	41.7	PK2	29.6	-21.6	0	49.7	-	-	-	-	51	101	V
2.48	42.47	PK2	29.4	-21.7	0	50.17	-	-	-	-	178	201	V

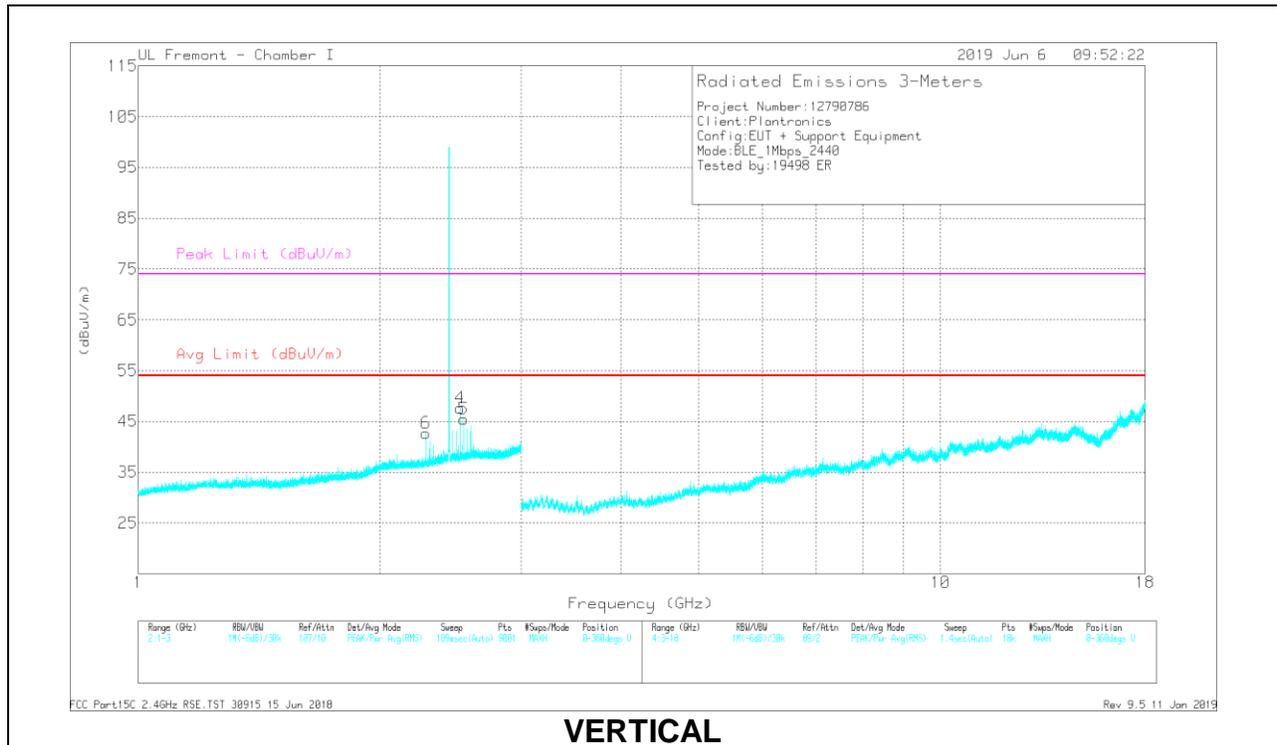
PK2 - KDB558074 Method: Maximum Peak

All points selected fell under non-restricted bands and are covered in RF conducted spurious testing.

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

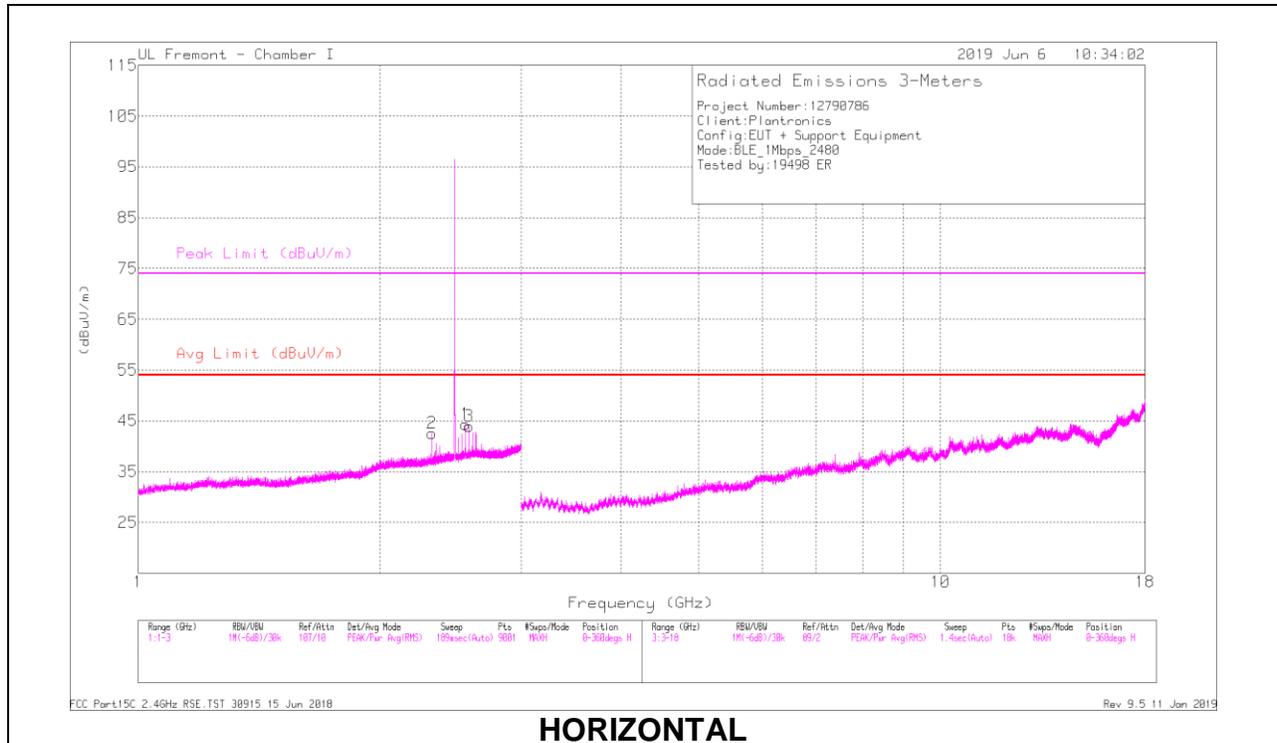
Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE01908 10 (dB/m)	Amp/Cbl/FI tr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.284	39.79	PK2	28.2	-21.5	0	46.49	-	-	74	-27.51	307	387	H
* 2.284	31.9	MAv1	28.2	-21.5	1.87	40.47	54	-13.53	-	-	307	387	H
2.544	40.18	PK2	29.6	-21.8	0	47.98	-	-	-	-	252	247	H
2.518	41.61	PK2	29.5	-21.7	0	49.41	-	-	-	-	158	327	H
* 2.284	41.09	PK2	28.2	-21.5	0	47.79	-	-	74	-26.21	173	200	V
* 2.284	34.14	MAv1	28.2	-21.5	1.87	42.71	54	-11.29	-	-	173	200	V
2.518	42.32	PK2	29.5	-21.7	0	50.12	-	-	-	-	179	108	V
2.544	41.45	PK2	29.6	-21.8	0	49.25	-	-	-	-	178	174	V

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

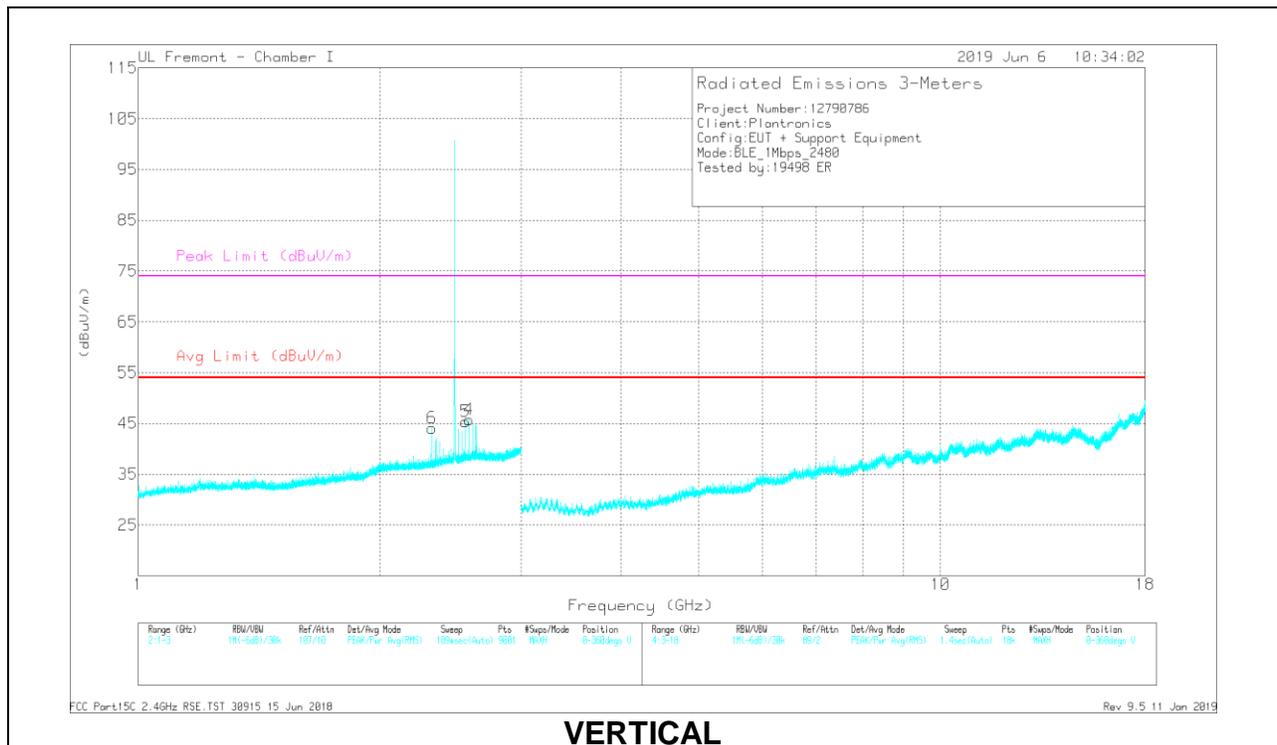
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE01908 10 (dB/m)	Amp/Cbl/FI tr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.324	39.68	PK2	28.4	-21.5	0	46.58	-	-	74	-27.42	247	207	H
* 2.324	32.54	MAv1	28.4	-21.5	1.87	41.31	54	-12.69	-	-	247	207	H
2.558	40.62	PK2	29.6	-21.6	0	48.62	-	-	-	-	243	199	H
2.584	40.05	PK2	29.8	-21.6	0	48.25	-	-	-	-	241	187	H
* 2.324	40.72	PK2	28.4	-21.5	0	47.62	-	-	74	-26.38	170	246	V
* 2.324	33.53	MAv1	28.4	-21.5	1.87	42.3	54	-11.7	-	-	170	246	V
2.584	41.72	PK2	29.8	-21.6	0	49.92	-	-	-	-	207	215	V
2.558	41.47	PK2	29.6	-21.6	0	49.47	-	-	-	-	192	131	V

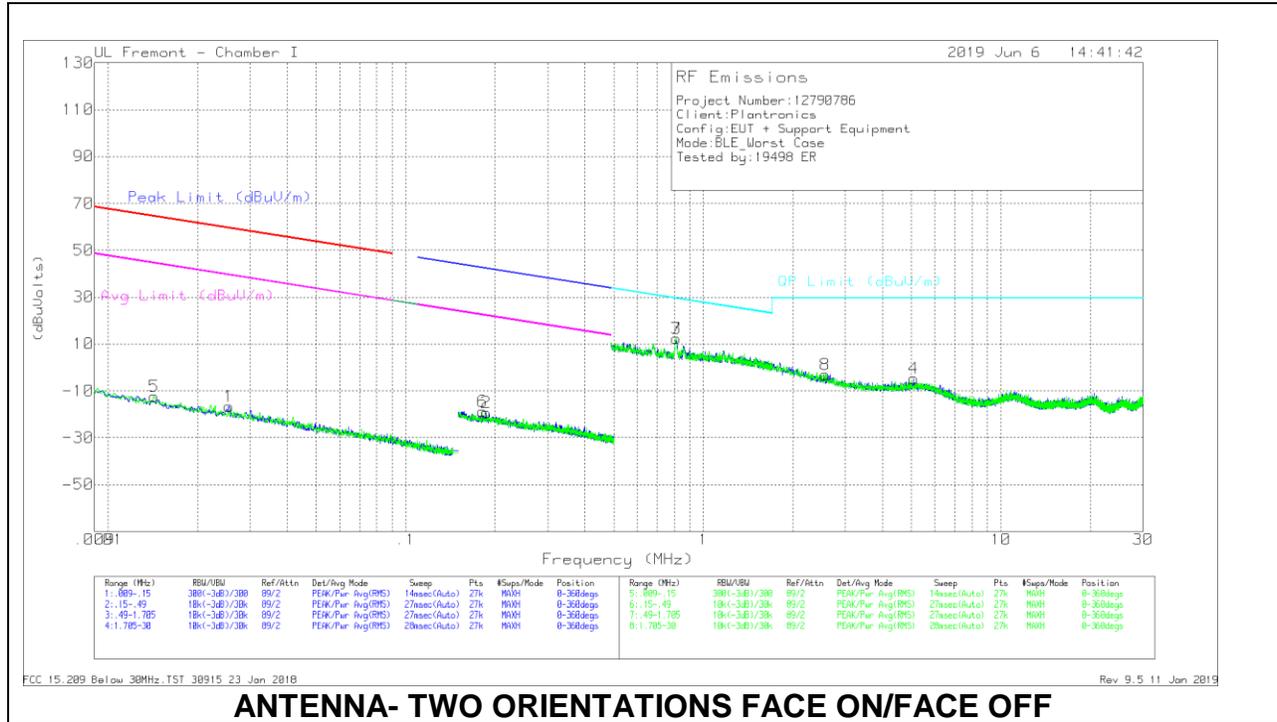
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

9.3. WORST CASE BELOW 30MHZ

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)



ANTENNA- TWO ORIENTATIONS FACE ON/FACE OFF

Below 30MHz Data

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.02547	48.54	Pk	14.9	0	-80	-16.56	59.46	-76.02	39.46	-56.02	0-360
2	.18643	46.8	Pk	13.8	.1	-80	-19.3	42.21	-61.51	22.21	-41.51	0-360
5	.01427	52.66	Pk	14.9	0	-80	-12.44	64.5	-76.94	44.5	-56.94	0-360
6	.18105	47.28	Pk	13.8	.1	-80	-18.82	42.46	-61.28	22.46	-41.28	0-360

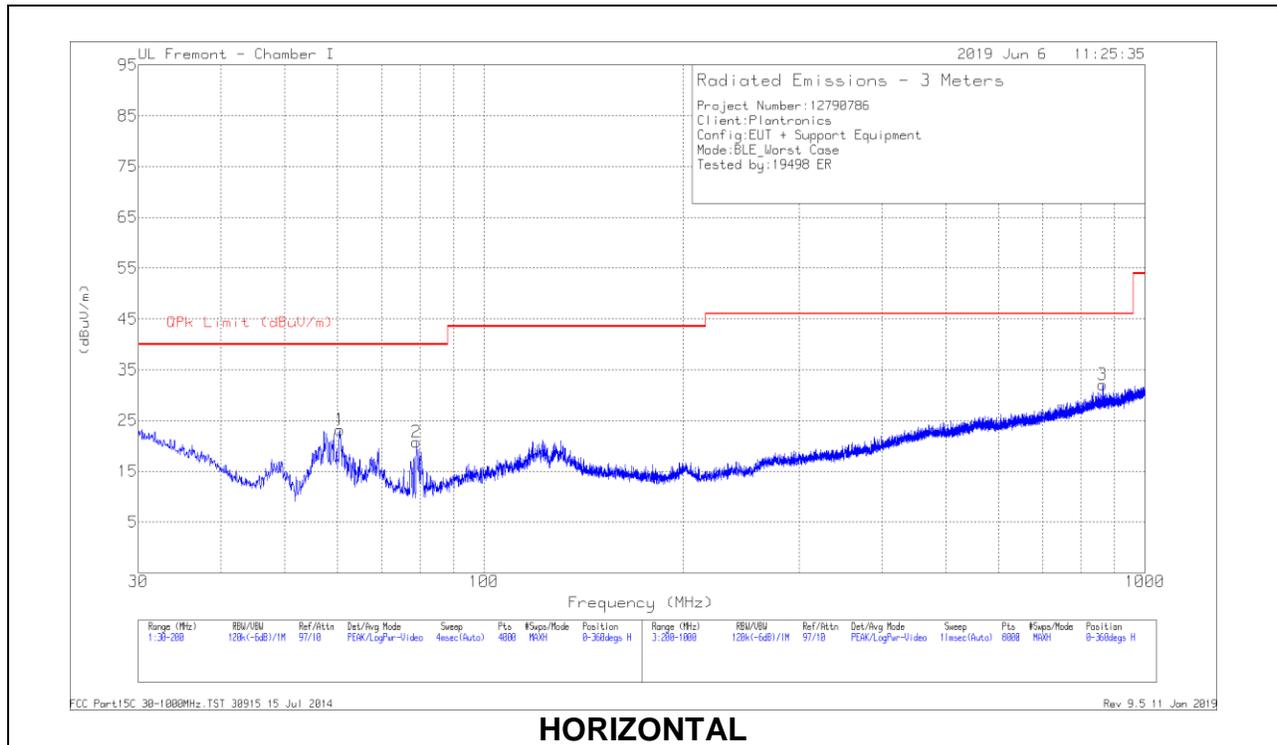
Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.80959	38.32	Pk	13.9	.1	-40	12.32	29.45	-17.13	0-360
4	5.08428	20.87	Pk	14.3	.2	-40	-4.63	29.5	-34.13	0-360
7	.81002	38.38	Pk	13.9	.1	-40	12.38	29.45	-17.07	0-360
8	2.56331	22.49	Pk	14.3	.2	-40	-3.01	29.5	-32.51	0-360

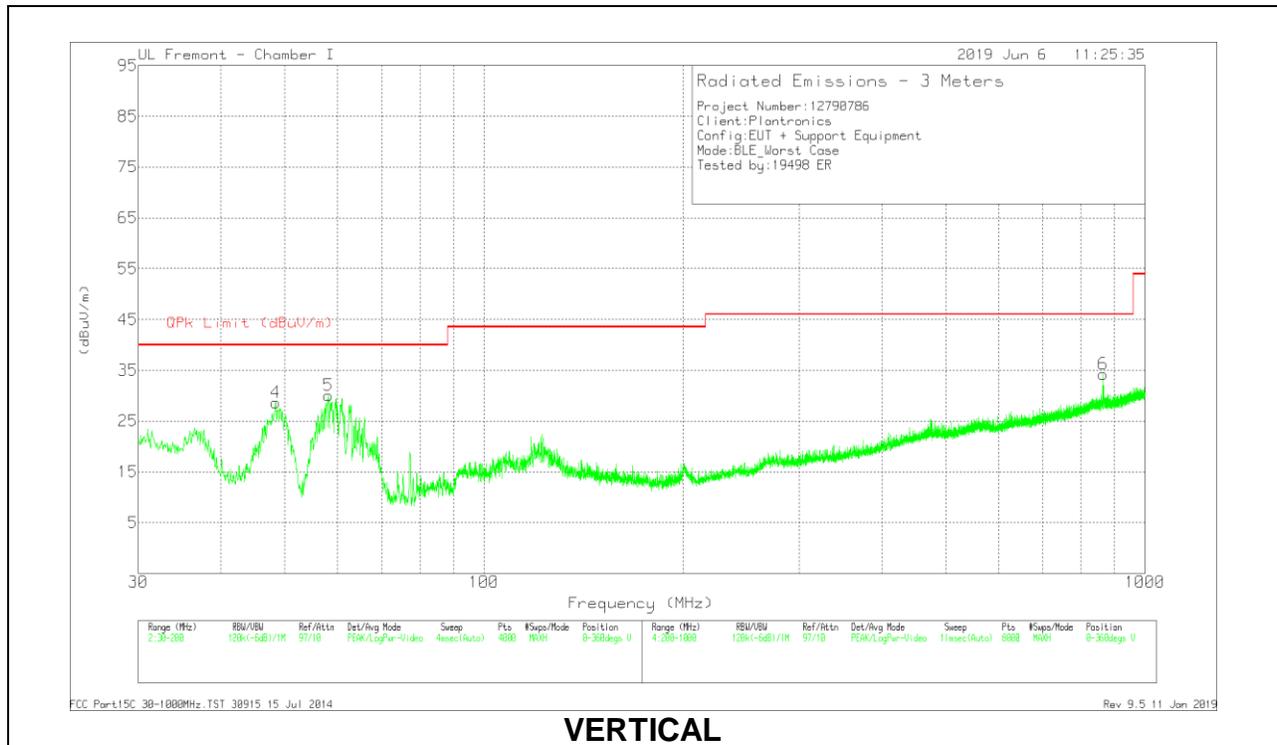
Pk - Peak detector

9.4. WORST CASE BELOW 1 GHZ

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



HORIZONTAL



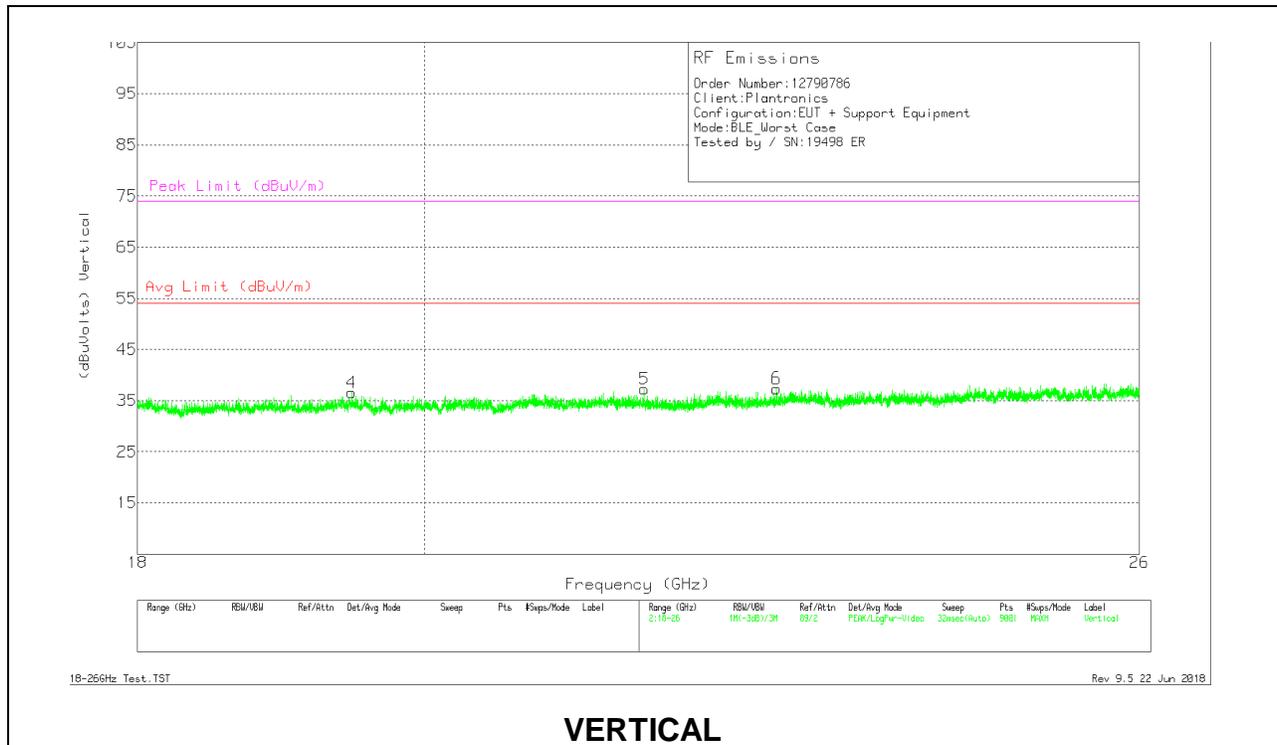
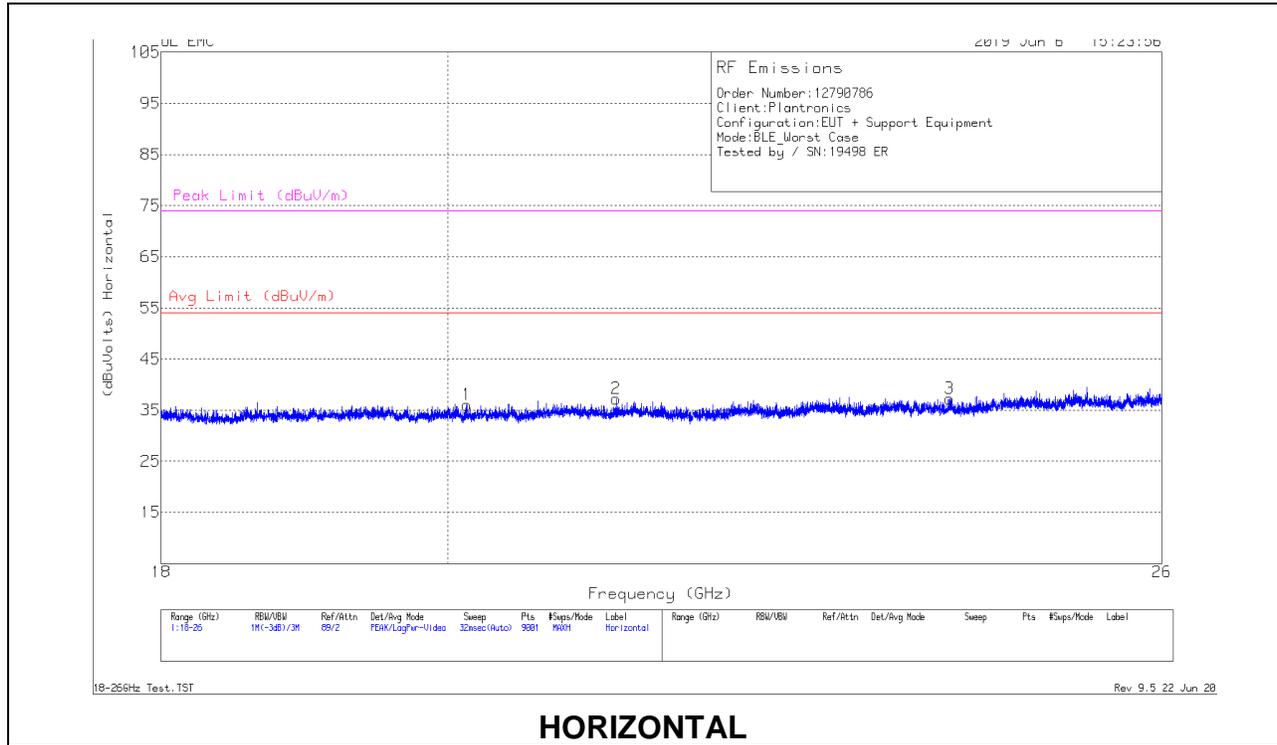
VERTICAL

Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF PRE0184971 (dB/m)	Amp Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	60.4804	40.94	Pk	13.2	-31	23.14	40	-16.86	0-360	300	H
2	79.0152	38.13	Pk	13.5	-30.9	20.73	40	-19.27	0-360	300	H
4	48.386	45.71	Pk	14.1	-31.2	28.61	40	-11.39	0-360	101	V
5	58.2273	47.96	Pk	13.1	-31	30.06	40	-9.94	0-360	101	V
3	862.6861	32.07	Pk	27.7	-27.7	32.07	46.02	-13.95	0-360	300	H
6	863.4862	34.18	Pk	27.7	-27.7	34.18	46.02	-11.84	0-360	102	V

9.5. WORST CASE 18-26 GHZ

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



18 – 26GHz DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE0182188 (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	20.14	68.85	Pk	33.5	-56.8	-9.5	36.05	54	-17.95	74	-37.95
2	21.275	70.52	Pk	33.5	-57.3	-9.5	37.22	54	-16.78	74	-36.78
3	24.048	68.65	Pk	34.6	-56.5	-9.5	37.25	54	-16.75	74	-36.75
4	19.472	69.86	Pk	33.4	-57.2	-9.5	36.56	54	-17.44	74	-37.44
5	21.678	70.46	Pk	33.9	-57.6	-9.5	37.26	54	-16.74	74	-36.74
6	22.757	70.34	Pk	34.2	-57.7	-9.5	37.34	54	-16.66	74	-36.66

Pk - Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

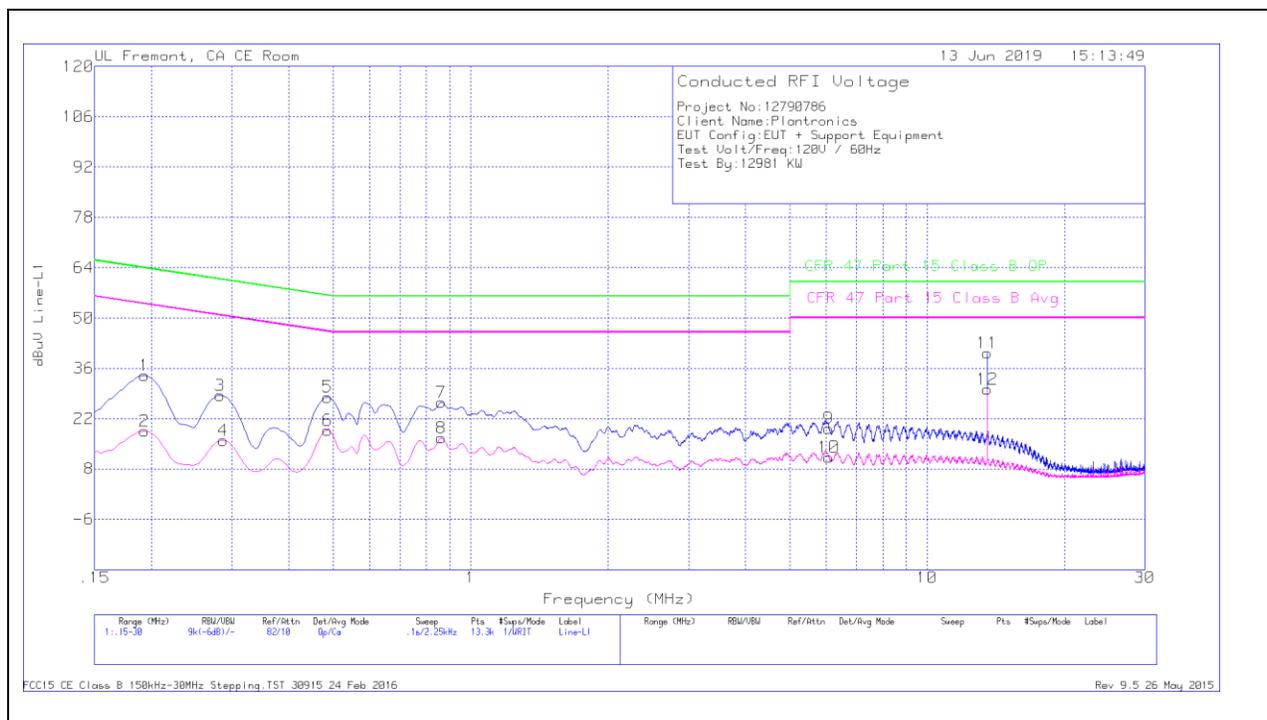
RSS-Gen 8.8

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

*Decreases with the logarithm of the frequency.

RESULTS

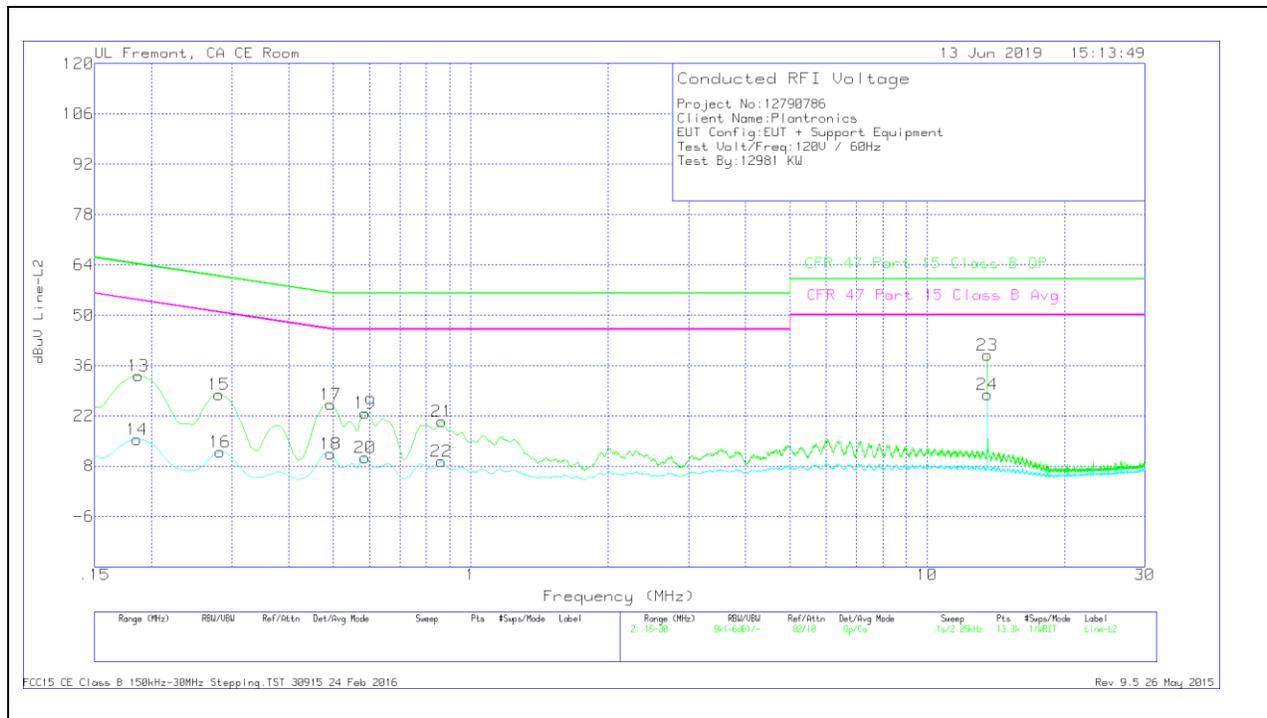
LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
1	.19275	23.83	Qp	0	0	10.1	33.93	63.92	-29.99	-	-
2	.19275	8.42	Ca	0	0	10.1	18.52	-	-	53.92	-35.4
3	.28275	18.39	Qp	0	0	10.1	28.49	60.73	-32.24	-	-
4	.28725	5.9	Ca	0	0	10.1	16	-	-	50.6	-34.6
5	.48525	17.91	Qp	0	0	10.1	28.01	56.25	-28.24	-	-
6	.48525	8.65	Ca	0	0	10.1	18.75	-	-	46.25	-27.5
7	.86325	16.51	Qp	0	0	10.1	26.61	56	-29.39	-	-
8	.86325	6.46	Ca	0	0	10.1	16.56	-	-	46	-29.44
9	6.0945	8.9	Qp	0	.2	10.2	19.3	60	-40.7	-	-
10	6.0945	.85	Ca	0	.2	10.2	11.25	-	-	50	-38.75
11	13.56225	29.74	Qp	.1	.2	10.2	40.24	60	-19.76	-	-
12	13.56	19.74	Ca	.1	.2	10.2	30.24	-	-	50	-19.76

Qp - Quasi-Peak detector
 Ca - CISPR average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables C2&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
13	.18713	23.06	Qp	0	0	10.1	33.16	64.16	-31	-	-
14	.186	5.38	Ca	0	0	10.1	15.48	-	-	54.21	-38.73
15	.2805	17.78	Qp	0	0	10.1	27.88	60.8	-32.92	-	-
16	.28275	1.86	Ca	0	0	10.1	11.96	-	-	50.73	-38.77
17	.49425	15.11	Qp	0	0	10.1	25.21	56.1	-30.89	-	-
18	.49425	1.34	Ca	0	0	10.1	11.44	-	-	46.1	-34.66
19	.5865	12.69	Qp	0	0	10.1	22.79	56	-33.21	-	-
20	.5865	.3	Ca	0	0	10.1	10.4	-	-	46	-35.6
21	.8655	10.29	Qp	0	0	10.1	20.39	56	-35.61	-	-
22	.861	-.8	Ca	0	0	10.1	9.3	-	-	46	-36.7
23	13.56225	28.39	Qp	.1	.2	10.2	38.89	60	-21.11	-	-
24	13.56	17.35	Ca	.1	.2	10.2	27.85	-	-	50	-22.15

Qp - Quasi-Peak detector
 Ca - CISPR average detection