



CERTIFICATION TEST REPORT

Report Number. : 12934192-E1V2

Applicant : ORBIT IRRIGATION PRODUCTS LLC
845 NORTH OVERLAND ROAD
NORTH SALT LAKE, UT 84054-2123
U.S.A.

Model : FS1

FCC ID : ML6FS1

IC : 3330A-FS1

EUT Description : Battery Powered BLE Flood Sensor

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

Date Of Issue:
December 05, 2019

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



NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	12/4/2019	Initial Issue	
V2	12/5/2019	Report revised based on reviewer's feedback.	Bobby Bayani

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	4
2. TEST METHODOLOGY	6
3. FACILITIES AND ACCREDITATION	6
4. CALIBRATION AND UNCERTAINTY	7
4.1. MEASURING INSTRUMENT CALIBRATION	7
4.2. SAMPLE CALCULATION	7
4.3. MEASUREMENT UNCERTAINTY.....	7
5. EQUIPMENT UNDER TEST	8
5.1. DESCRIPTION OF EUT	8
5.2. MAXIMUM OUTPUT POWER.....	8
5.3. DESCRIPTION OF AVAILABLE ANTENNAS	8
5.4. SOFTWARE AND FIRMWARE.....	8
5.5. WORST-CASE CONFIGURATION AND MODE.....	8
5.6. DESCRIPTION OF TEST SETUP.....	9
6. MEASUREMENT METHOD.....	11
7. TEST AND MEASUREMENT EQUIPMENT	12
8. ANTENNA PORT TEST RESULTS.....	13
8.1. ON TIME AND DUTY CYCLE.....	13
8.2. 99% BANDWIDTH.....	14
8.3. 6 dB BANDWIDTH.....	15
8.4. OUTPUT POWER.....	16
8.5. AVERAGE POWER	17
8.6. POWER SPECTRAL DENSITY	18
8.7. CONDUCTED SPURIOUS EMISSIONS.....	19
9. RADIATED TEST RESULTS.....	21
9.1. LIMITS AND PROCEDURE	21
9.2. TRANSMITTER ABOVE 1 GHz	23
9.3. WORST CASE BELOW 30MHz.....	33
9.4. WORST CASE BELOW 1 GHz.....	34
9.5. WORST CASE 18-26 GHz.....	36
10. SETUP PHOTOS	38

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: ORBIT IRRIGATION PRODUCTS LLC
845 NORTH OVERLAND ROAD
NORTH SALT LAKE, UT 84054-2123 U.S.A.

EUT DESCRIPTION: Battery Powered BLE Flood Sensor

MODEL: FS1

SERIAL NUMBER: #2, #3

DATE TESTED: September 3rd – 23rd, 2019

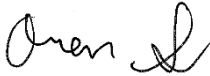
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies
ISED RSS-247 Issue 2	Complies
ISED RSS-GEN Issue 5	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Tested By:

Reviewer:



OREN STOELTING
Laboratory Engineer
Consumer Technology Division
UL Verification Services Inc.



BOBBY BAYANI
Lead Project Engineer
Consumer Technology Division
UL Verification Services Inc.

Approved & Released For
UL Verification Services Inc. By:



THU CHAN
Operations Leader
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, KDB 558074 D01 v05, ANSI C63.10-2013, RSS-GEN Issue 5, and RSS-247 Issue 2.

3. FACILITIES AND ACCREDITATION

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

47173 Benicia Street	47266 Benicia Street	47658 Kato Rd.
☐ Chamber A (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)	

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.

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

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.24 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Battery powered BLE enabled water and temperature detection device.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Peak	
		Output Power (dBm)	Output Power (mW)
2402-2480	BLE	3.00	2.00

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a Monopole PCB trace antenna, with a maximum gain of -2.5 dBi.

5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was Nordic Semiconductor: Radio Test Commands.

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz and above 18GHz 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, it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

5.6. DESCRIPTION OF TEST SETUP

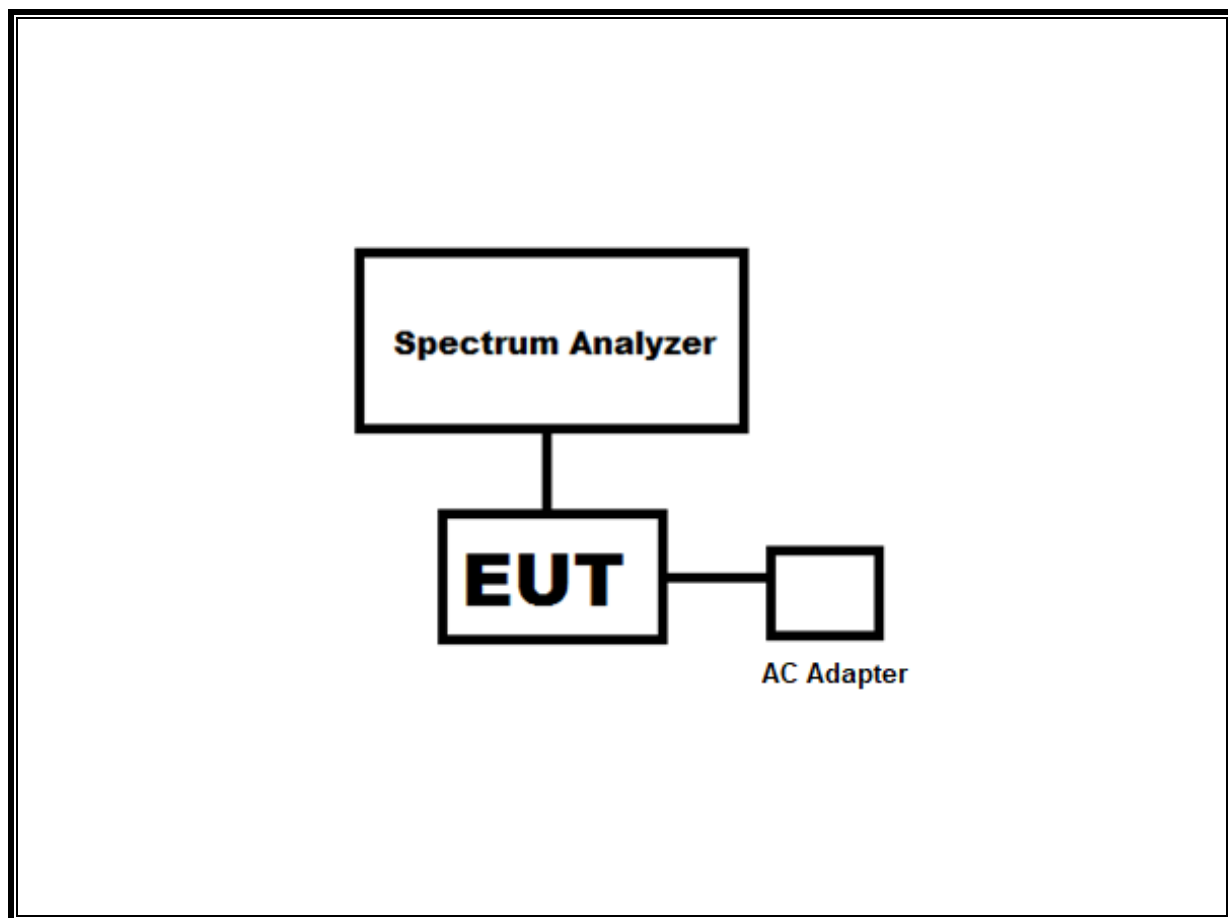
SUPPORT EQUIPMENT

Support Equipment List			
Description	Manufacturer	Model	Serial Number
Laptop	Lenovo	Thinkpad	PF1H0N0E
AC Adapter	CUI INC	SWI6-3.3-N	N/A

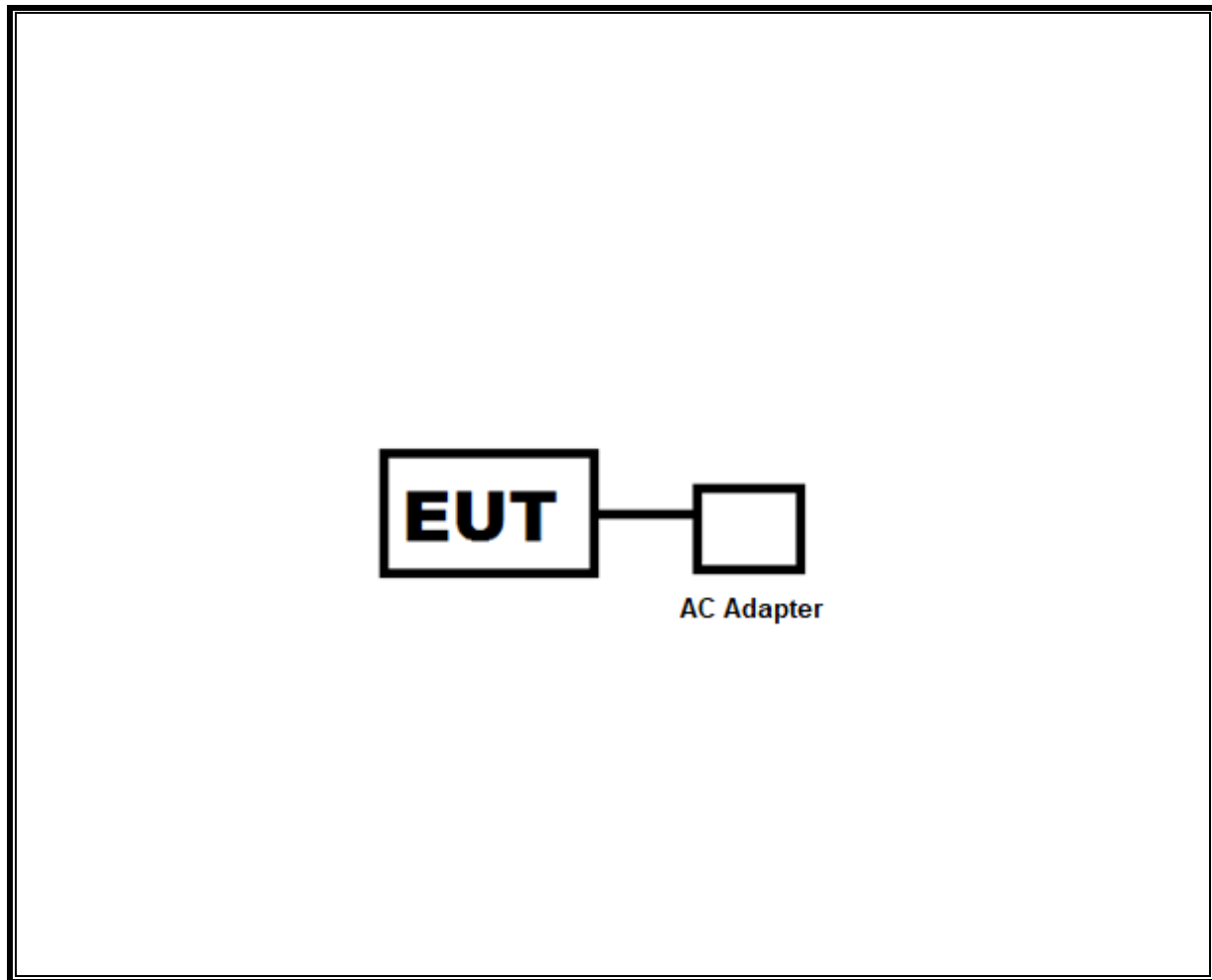
TEST SETUP

The EUT is normally powered by a 3V coin battery. For the purposes of testing, the EUT is powered by an AC Adapter. The laptop is used to transmit commands to the EUT, but is removed for testing.

SETUP DIAGRAM FOR CONDUCTED TESTS



SETUP DIAGRAM FOR RADIATED TESTS



6. 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 -11.9.2.3.2 Method AVGPM-G (Measurement using a gated 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 -11.13.3.4 Integration method -Trace averaging across ON and OFF times DC correction

7. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List					
Description	Manufacturer	Model	ID No.	Cal Date	Cal Due
Wideband Communication Test Set, Call Box	Rohde & Schwarz (Koeln) GmbH & Co. KG	CMW500	T703	2/20/2019	2/20/2020
Filter, HPF 3.0GHz	MICRO-TRONICS	HPM17543	T897	5/5/2019	5/4/2020
Amplifier, 1 to 18GHz, 35dB	AMPLICAL	AMP1G18-35	PRE0141167	5/5/2019	5/4/2020
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179367	5/17/2019	5/16/2020
Semianechoic Chamber K	TDK RF SOLUTIONS INC.	N/A	PRE0179817	5/27/2019	5/26/2020
RF Filter Box, 1-18GHz	FREMONT		PRE0180022	5/5/2019	5/4/2020
6 Port rf switch	Pasternack	PE7159	PRE0180024	5/5/2019	5/4/2020
3 Port rf switch	Pasternack	PE7141	PRE0180025	5/5/2019	5/4/2020
Antenna,Broadband Hybrid, 30MHz to 3GHz	Sunol Sciences Corp.	JB3	PRE0184052	10/24/2018	10/24/2019
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	PRE0186650	12/13/2018	12/13/2019

Test Software List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Ver 9.5, Dec 01, 2016
Antenna Port Software	UL	UL RF	Ver 7.8, Jan 10, 2018

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

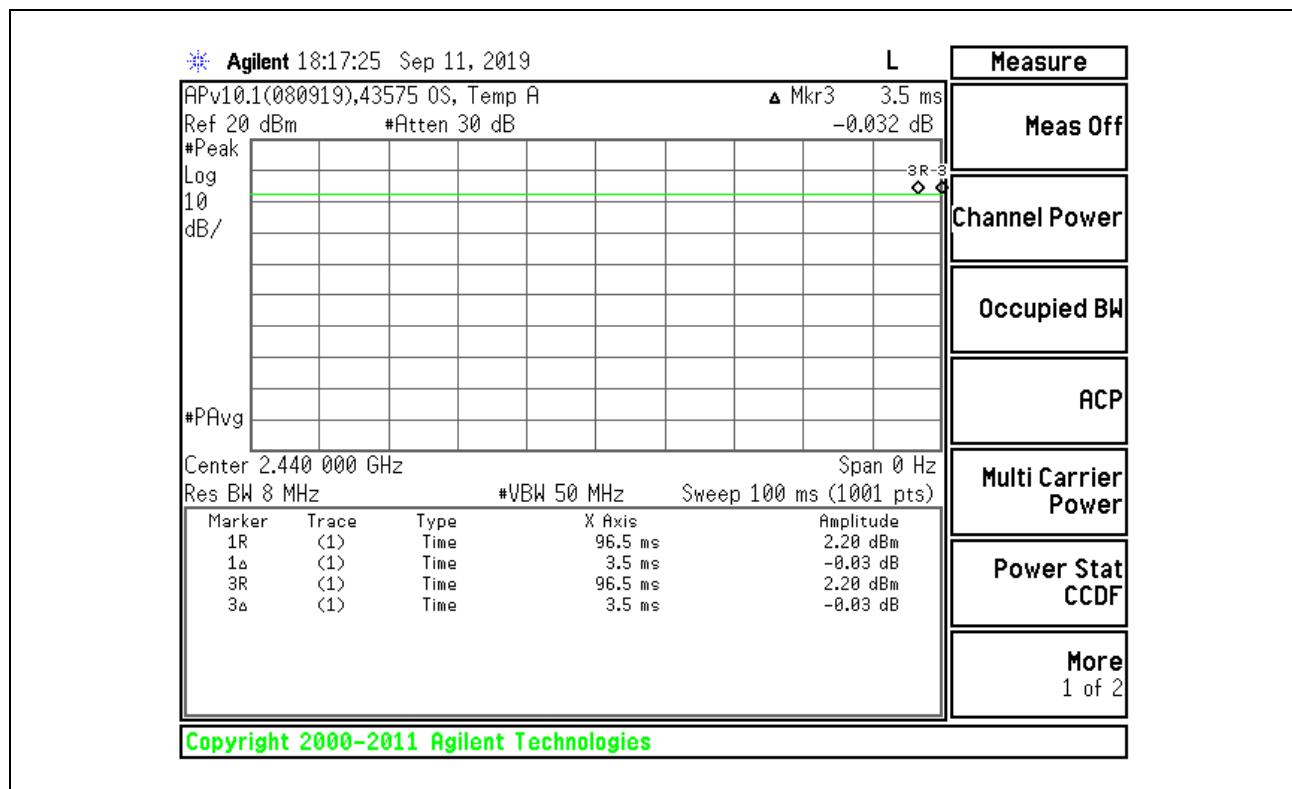
None; for reporting purposes only.

PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
BLE	100.0	100.0	1.000	100.00%	0.00	0.010



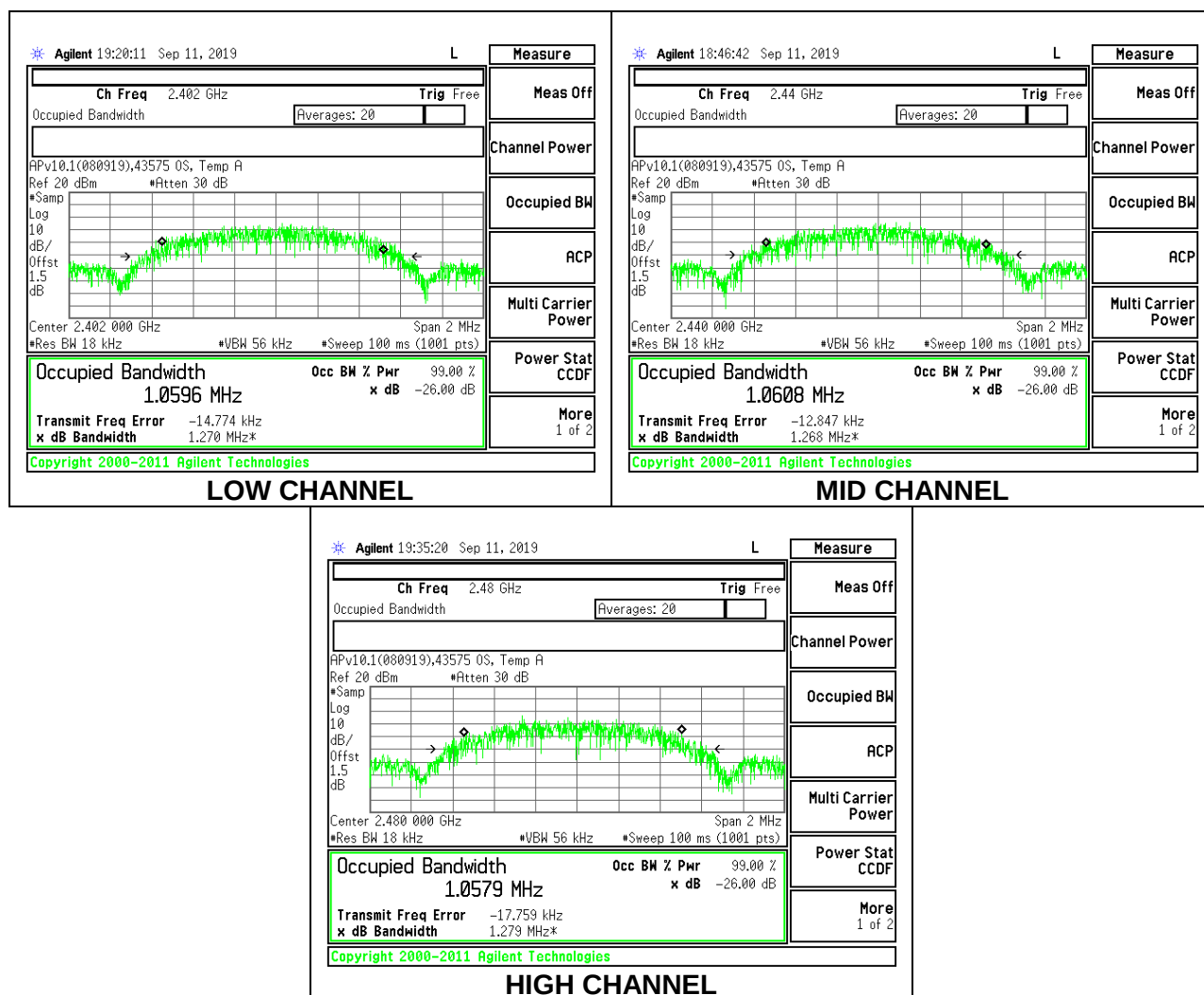
8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0596
Middle	2440	1.0608
High	2480	1.0579



8.3. 6 dB BANDWIDTH

LIMITS

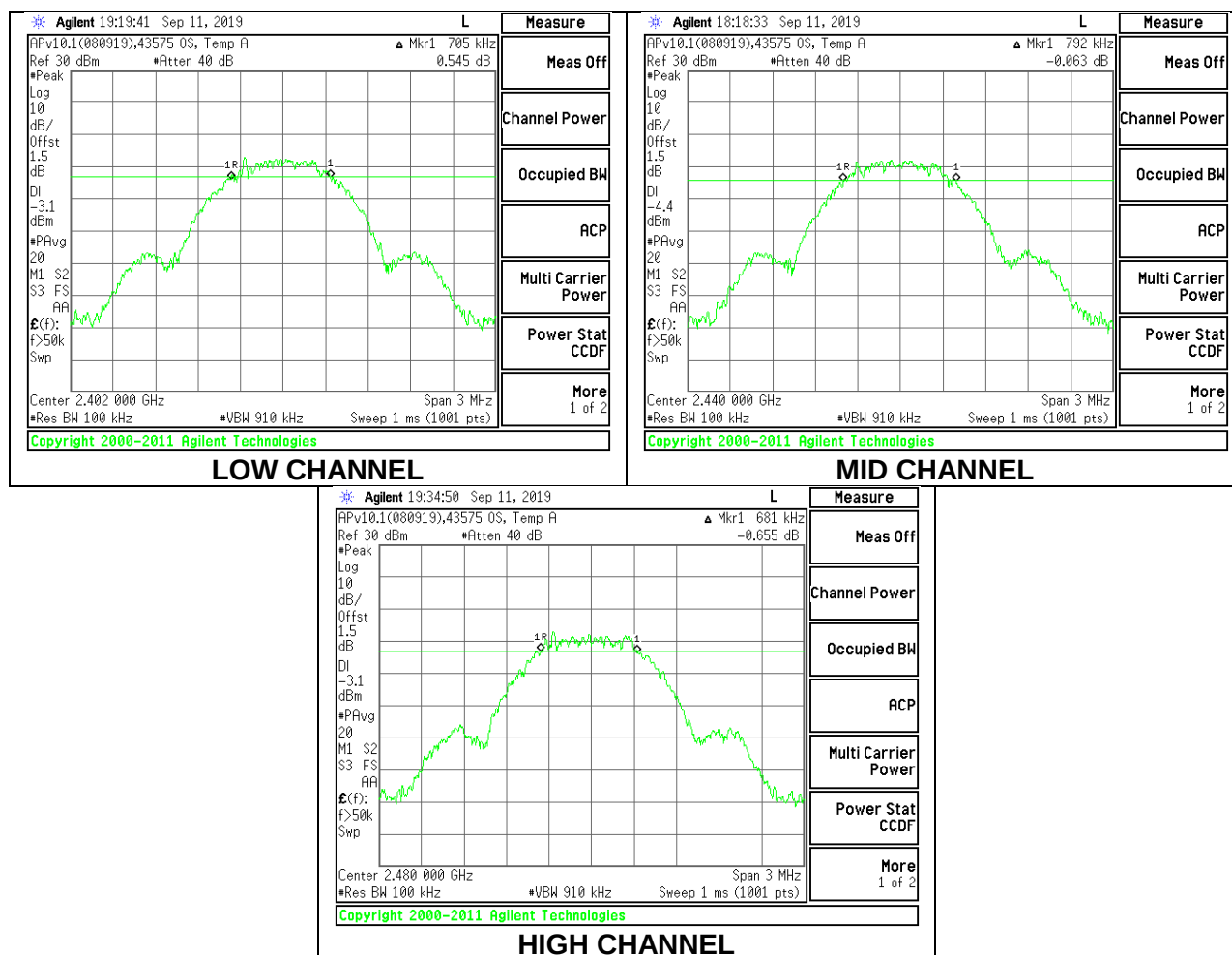
FCC §15.247 (a)(2)

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	0.705	0.5
Middle	2440	0.792	0.5
High	2480	0.681	0.5



8.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

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

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

Tested By:	43575
Date:	09/23/19

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	3.000	30	-27.000
Middle	2440	2.790	30	-27.210
High	2480	2.530	30	-27.470

8.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for a gated average reading of power.

RESULTS

Tested By:	43575
Date:	09/23/19

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	2.77
Middle	2440	2.54
High	2480	2.29

8.6. POWER SPECTRAL DENSITY

LIMITS

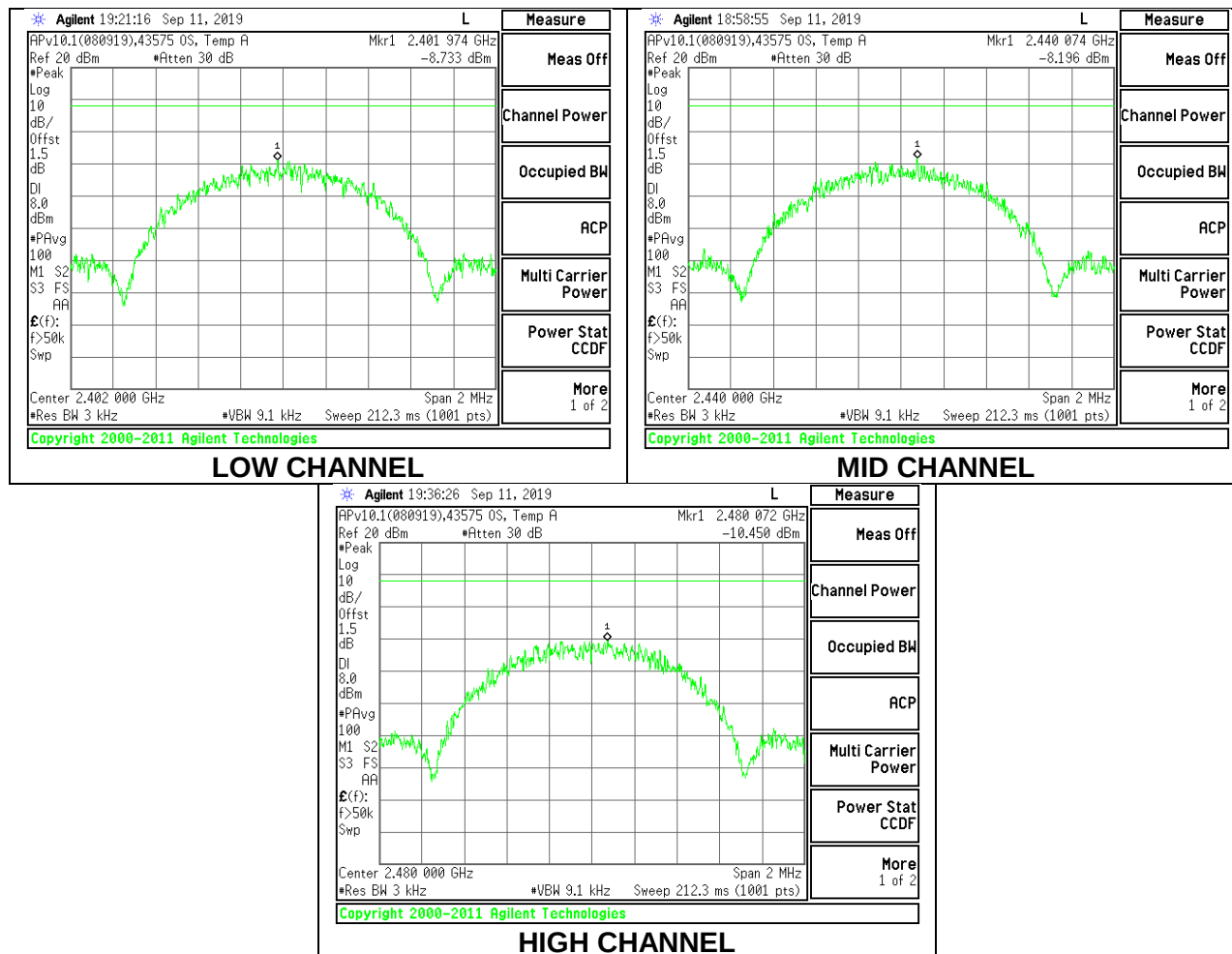
FCC §15.247 (e)

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	-8.73	8	-16.73
Middle	2440	-8.20	8	-16.20
High	2480	-10.45	8	-18.45



8.7. CONDUCTED SPURIOUS EMISSIONS

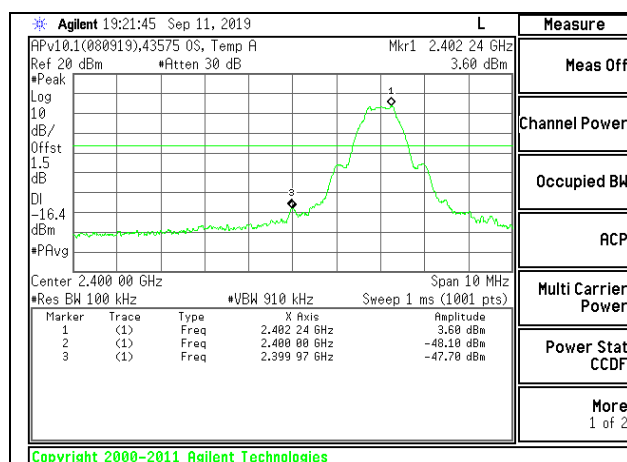
LIMITS

FCC §15.247 (d)

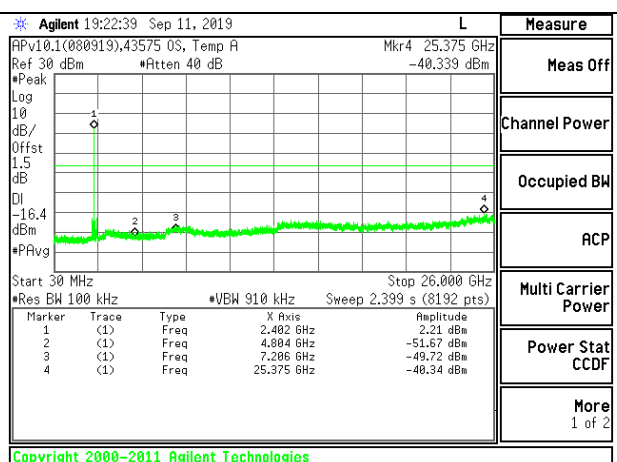
RSS-247 5.5

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

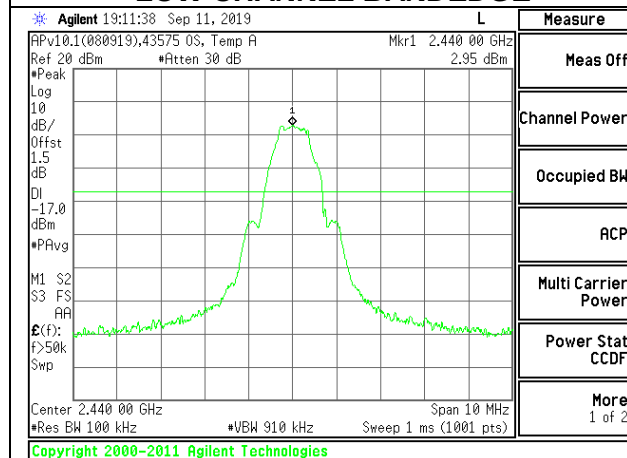
RESULTS



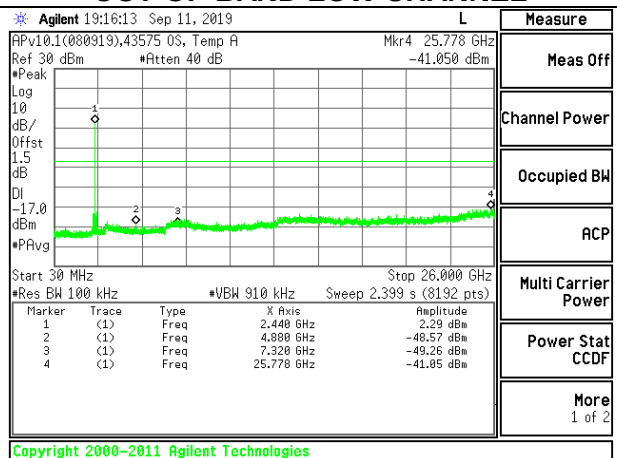
LOW CHANNEL BANDEDGE



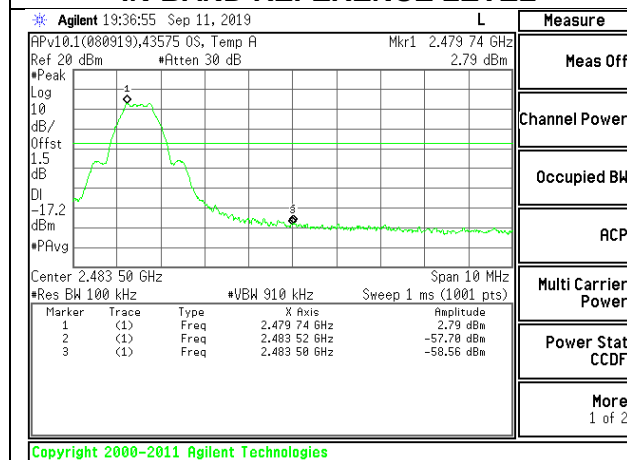
OUT-OF-BAND LOW CHANNEL



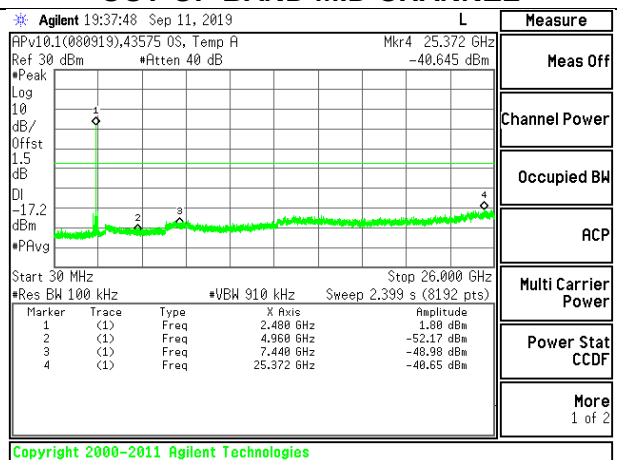
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

RSS-GEN, Section 8.9 and 8.10.

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

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest output power was tested.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

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

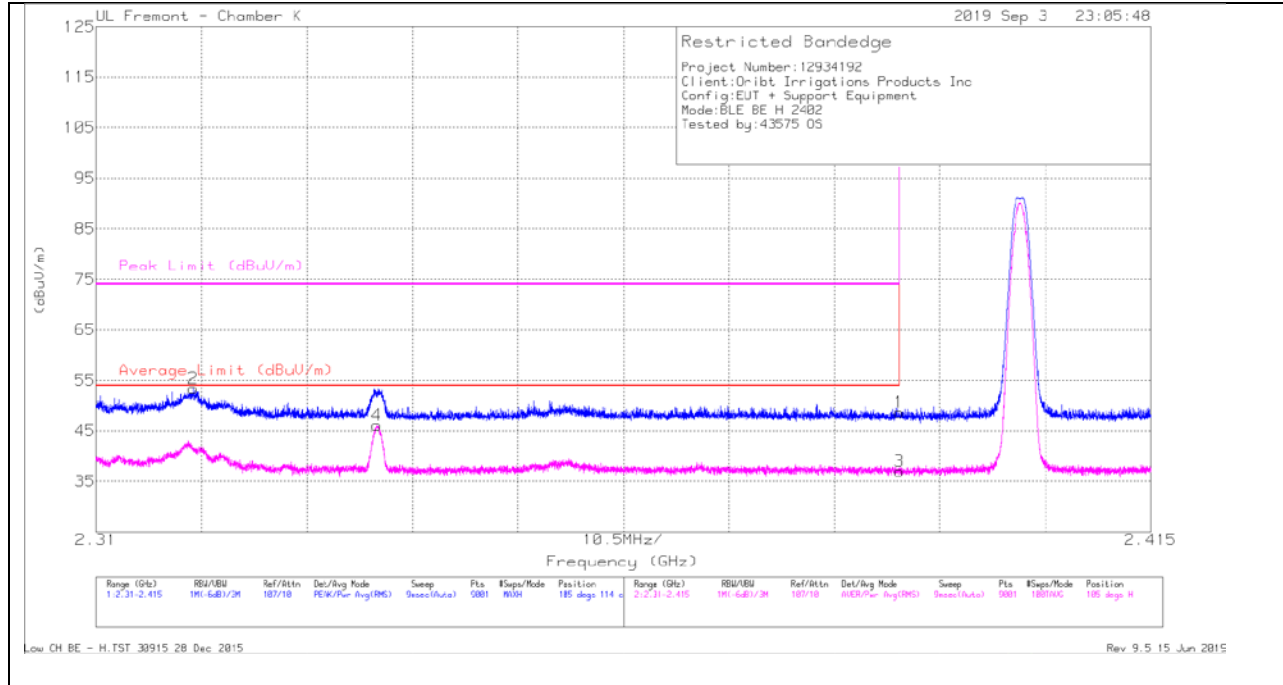
Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

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

9.2. TRANSMITTER ABOVE 1 GHz

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Trace Markers

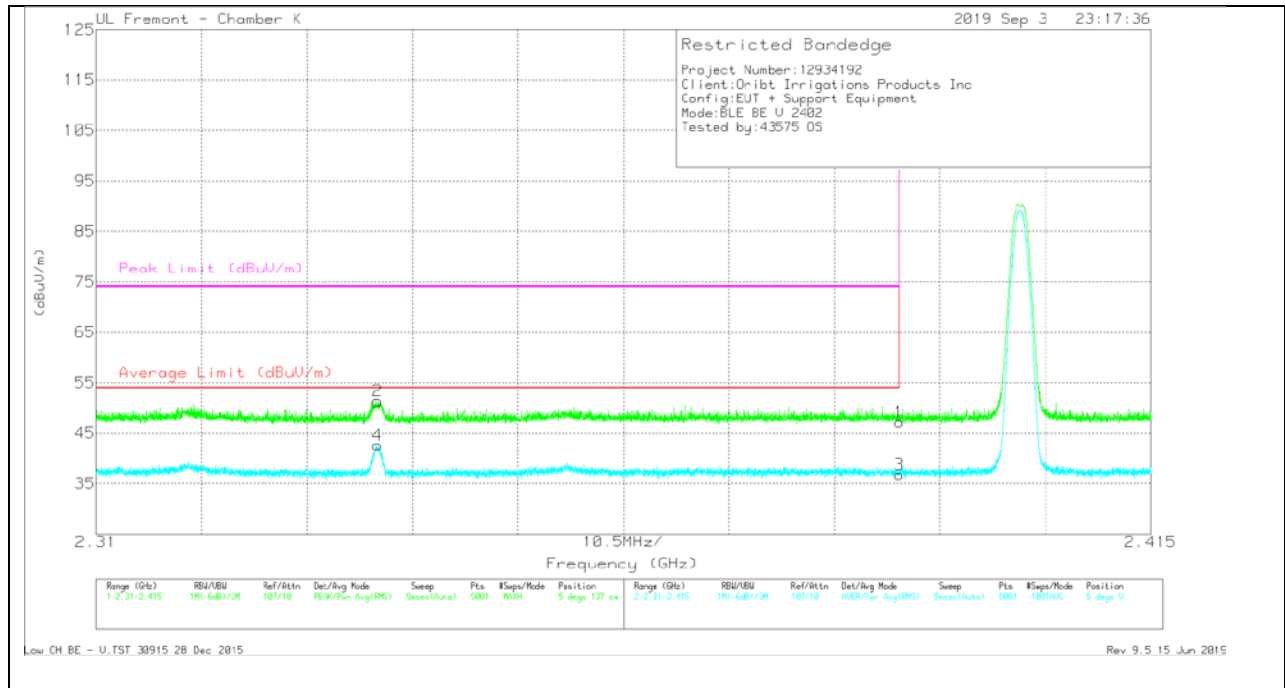
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF-EMC4294 (dB/m)	Amp/Cbl/Fitr /Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	41.46	Pk	31.9	-24.7	48.66	-	-	74	-25.34	105	114	H
2	* 2.31967	46.44	Pk	31.6	-24.6	53.44	-	-	74	-20.56	105	114	H
3	* 2.38999	29.85	RMS	31.9	-24.7	37.05	54	-16.95	-	-	105	114	H
4	* 2.33794	39.13	RMS	31.7	-24.7	46.13	54	-7.87	-	-	105	114	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	Ampl/Cbl/Fitr /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	39.95	Pk	31.9	-24.7	47.15	-	-	74	-26.85	5	137	V
2	* 2.33802	44.35	Pk	31.7	-24.7	51.35	-	-	74	-22.65	5	137	V
3	* 2.38999	29.55	RMS	31.9	-24.7	36.75	54	-17.25	-	-	5	137	V
4	* 2.33801	35.62	RMS	31.7	-24.7	42.62	54	-11.38	-	-	5	137	V

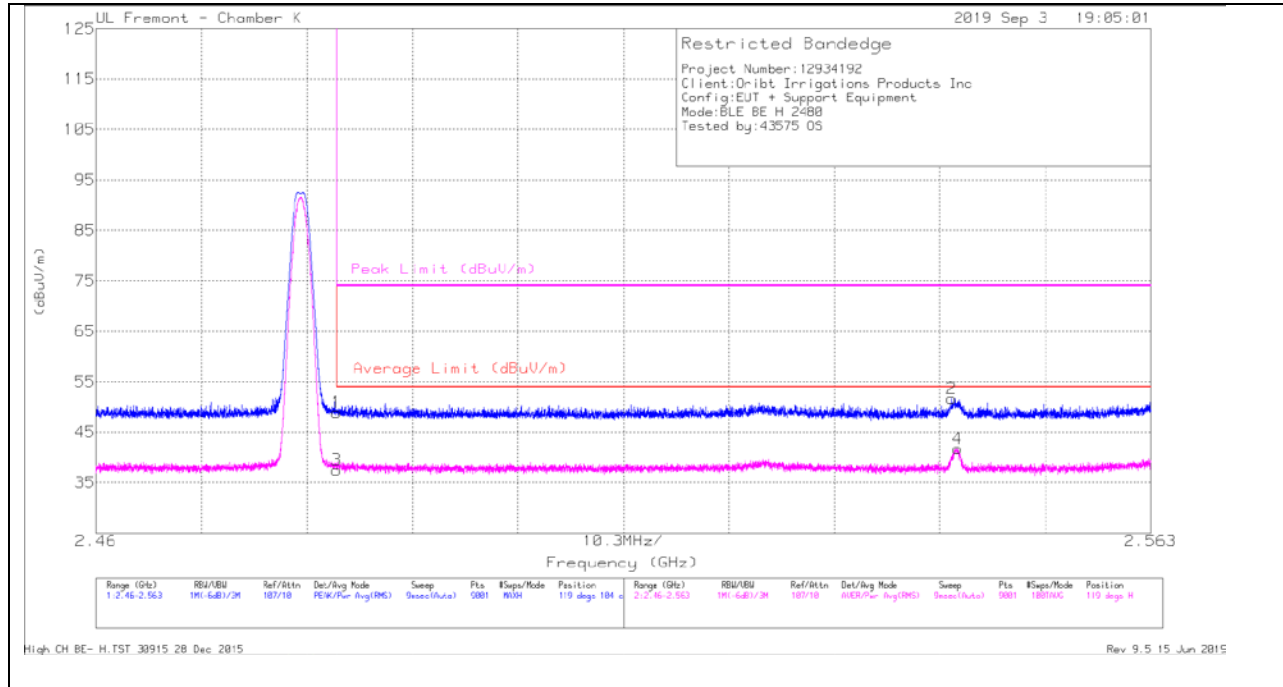
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Trace Markers

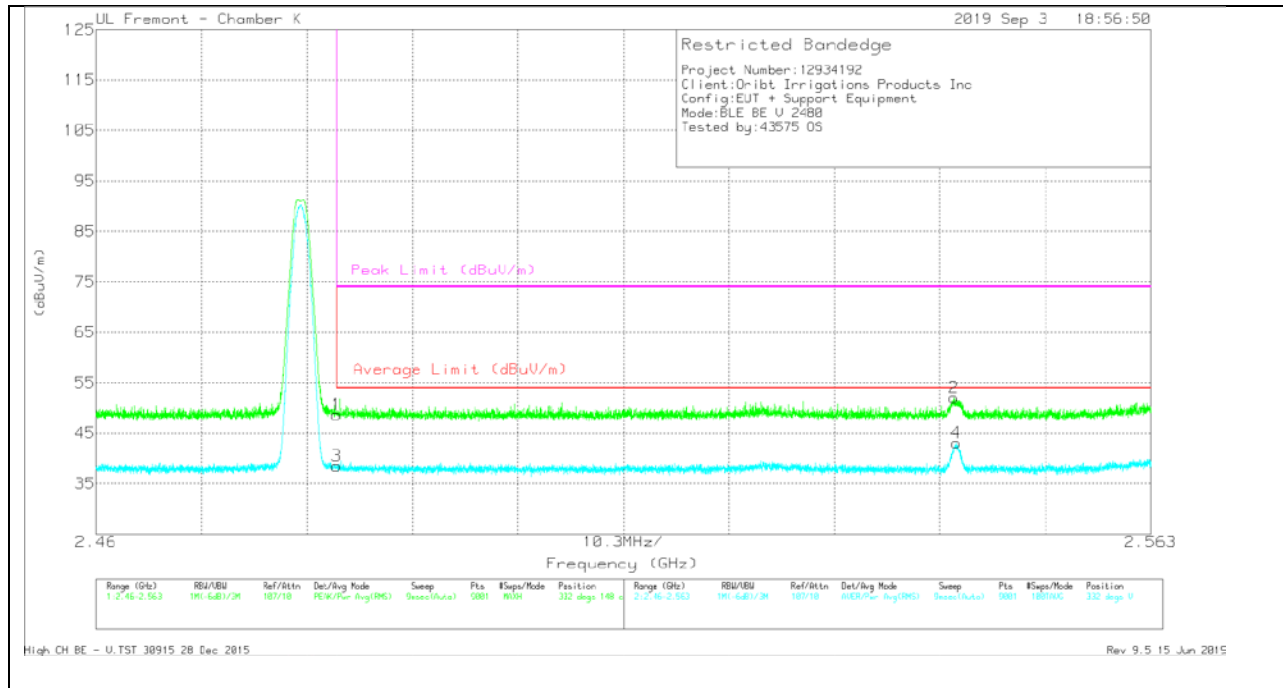
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	Ampl/Cbl/Ftr /Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	41.19	Pk	32.5	-24.8	48.89	-	-	74	-25.11	119	104	H
2	2.54352	44.07	Pk	32.4	-24.8	51.67	-	-	74	-22.33	119	104	H
3	* 2.48351	29.77	RMS	32.5	-24.8	37.47	54	-16.53	-	-	119	104	H
4	2.54414	34.1	RMS	32.4	-24.8	41.7	54	-12.3	-	-	119	104	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dBm)	Amp/Cbl/Fitr /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	40.98	Pk	32.5	-24.8	48.68	-	-	74	-25.32	332	148	V
2	2.5438	44.43	Pk	32.4	-24.8	52.03	-	-	74	-21.97	332	148	V
3	* 2.48351	30.77	RMS	32.5	-24.8	38.47	54	-15.53	-	-	332	148	V
4	2.54401	35.44	RMS	32.4	-24.8	43.04	54	-10.96	-	-	332	148	V

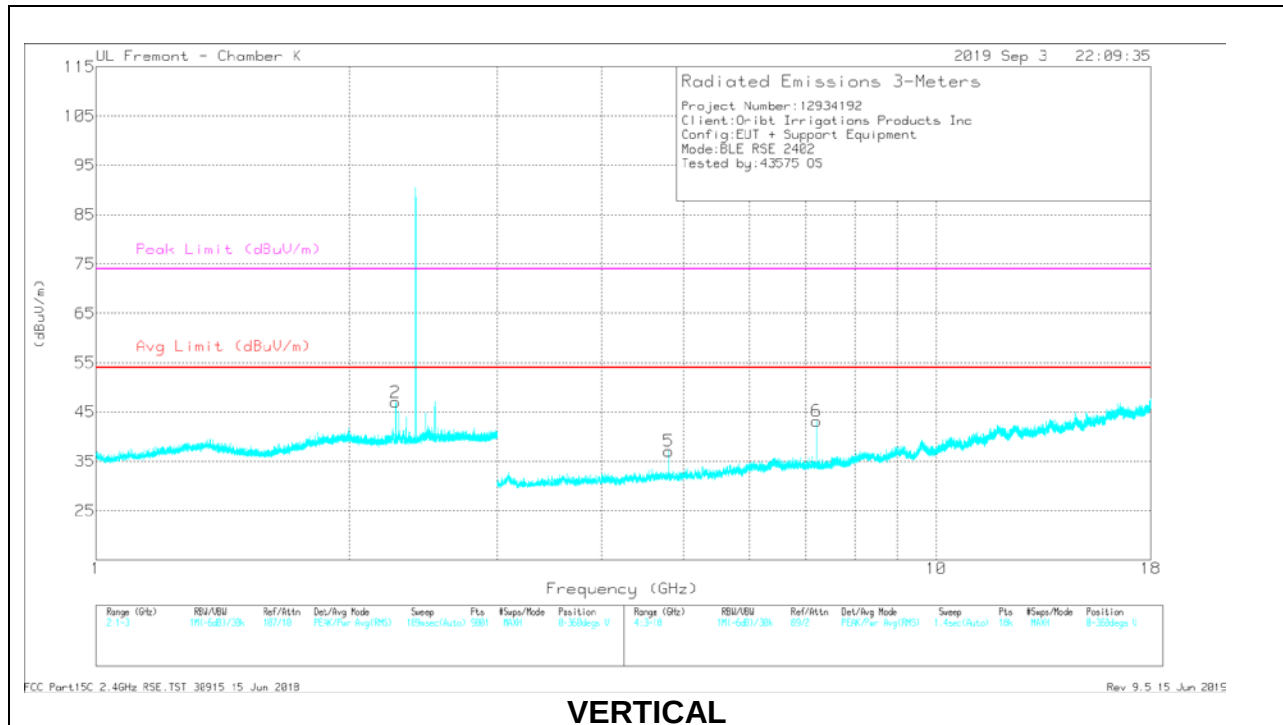
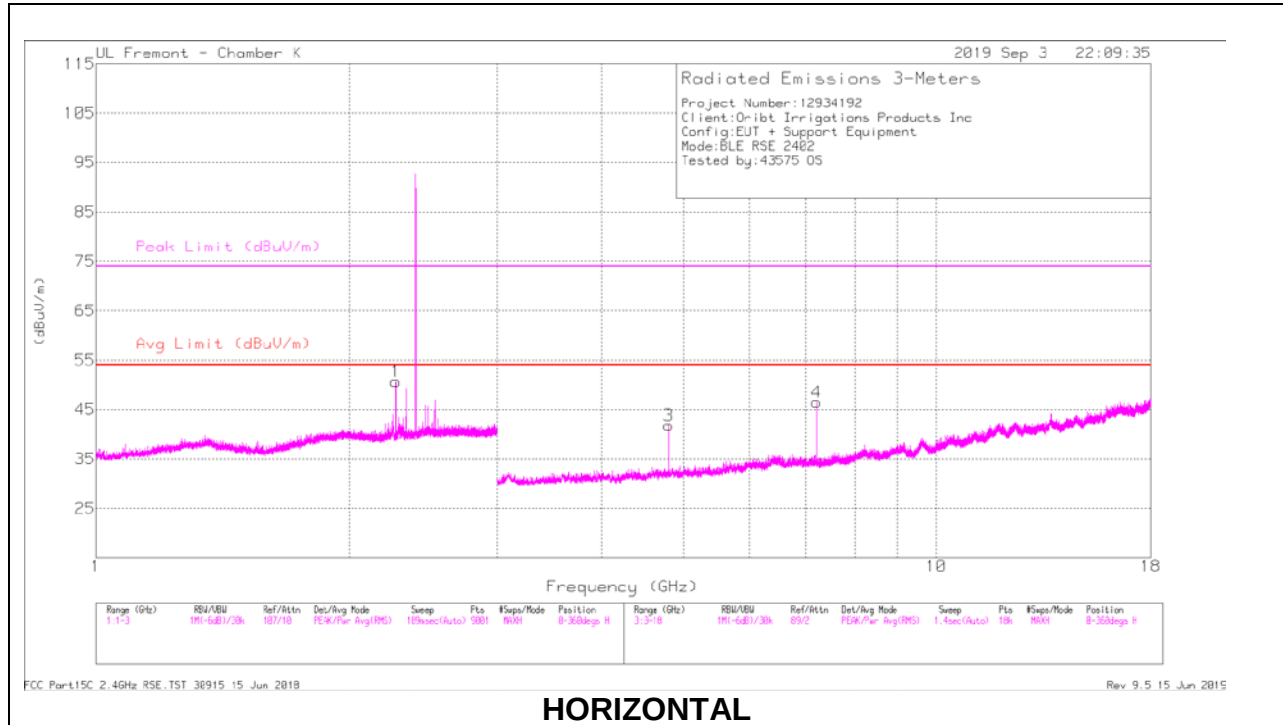
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	Amp/Cbl/Fit/r Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.27422	43.84	Pk	31.5	-24.7	50.64	-	-	74	-23.36	0-360	101	H
2	* 2.27378	40.24	Pk	31.5	-24.7	47.04	-	-	74	-26.96	0-360	200	V
3	* 4.80427	37.92	Pk	34.2	-30.3	41.82	-	-	74	-32.18	0-360	101	H
4	7.2069	37.05	Pk	35.6	-26.2	46.45	-	-	-	-	0-360	101	H
5	* 4.80427	33.16	Pk	34.2	-30.3	37.06	-	-	74	-36.94	0-360	101	V
6	7.20607	33.66	Pk	35.6	-26.1	43.16	-	-	-	-	0-360	101	V

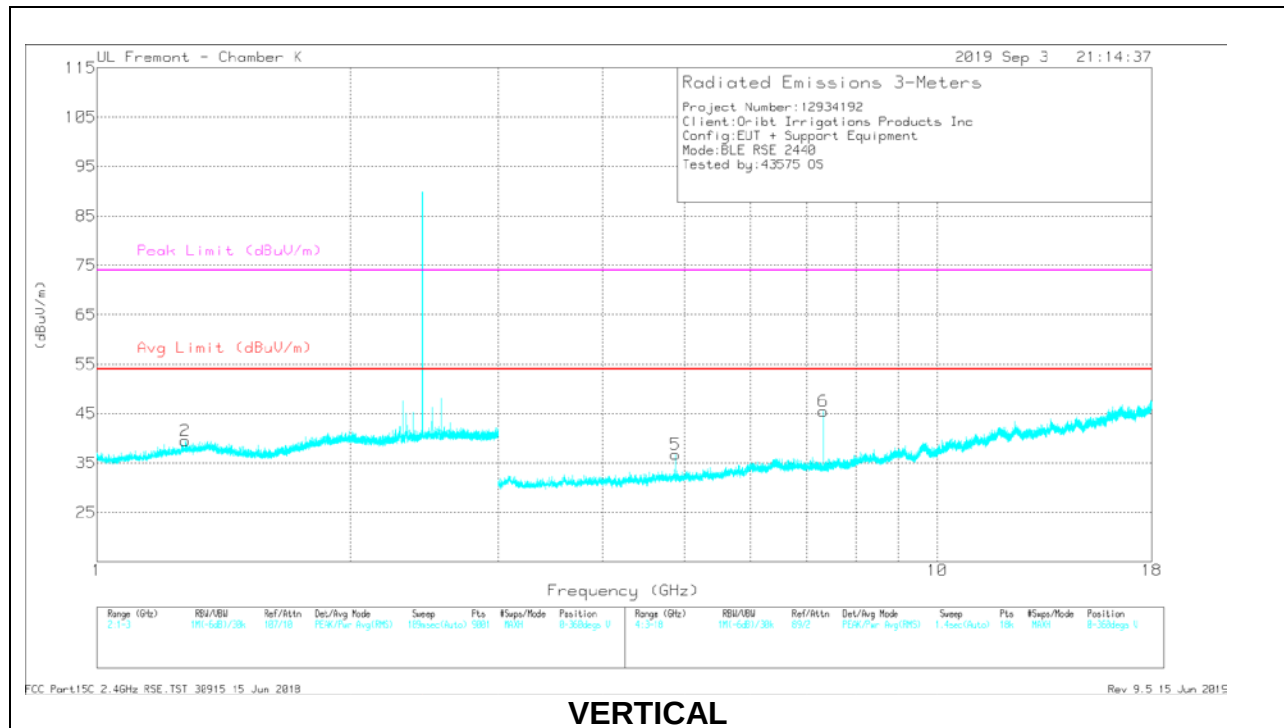
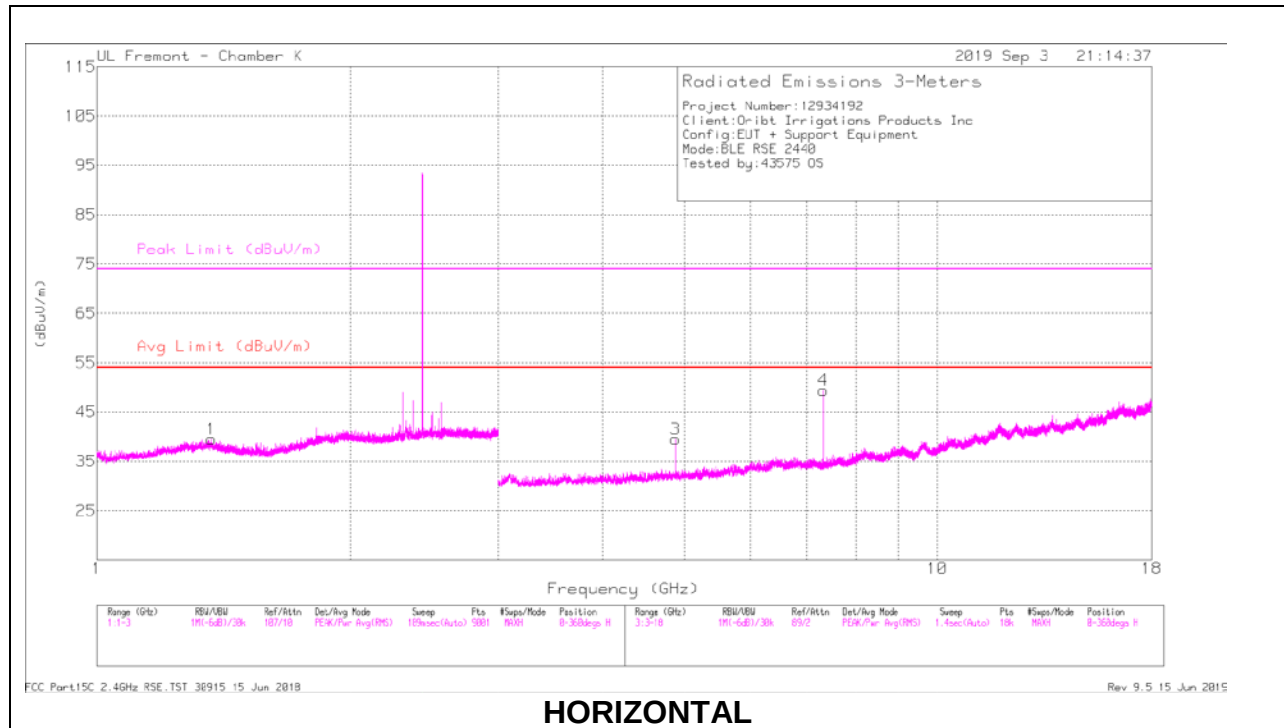
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	Amp/Cbl/Fit/r Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.27415	47.83	PK2	31.5	-24.7	54.63	-	-	74	-19.37	102	168	H
* 2.27399	44.03	MAV1	31.5	-24.7	50.83	54	-3.17	-	-	102	168	H
* 2.27424	44.64	PK2	31.5	-24.7	51.44	-	-	74	-22.56	286	120	V
* 2.27399	39.37	MAV1	31.5	-24.7	46.17	54	-7.83	-	-	286	120	V
* 4.80346	41.72	PK2	34.2	-30.3	45.62	-	-	74	-28.38	13	217	H
* 4.80409	34.95	MAV1	34.2	-30.3	38.85	54	-15.15	-	-	13	217	H
7.20681	42.47	PK2	35.6	-26.2	51.87	-	-	-	-	53	101	H
7.20542	34.97	MAV1	35.6	-26.1	44.47	-	-	-	-	53	101	H
* 4.80354	39.8	PK2	34.2	-30.3	43.7	-	-	74	-30.3	232	226	V
* 4.8044	32.14	MAV1	34.2	-30.3	36.04	54	-17.96	-	-	232	226	V
7.2052	39.85	PK2	35.6	-26.1	49.35	-	-	-	-	355	107	V
7.20649	31.69	MAV1	35.6	-26.1	41.19	-	-	-	-	355	107	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



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	Amp/Cbl/Fil/r Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.37	33.77	Pk	29.6	-23.9	39.47	-	-	74	-34.53	0-360	200	H
2	* 1.27333	34.23	Pk	29.3	-24	39.53	-	-	74	-34.47	0-360	100	V
3	* 4.88011	35.93	Pk	34.1	-30.5	39.53	-	-	74	-34.47	0-360	100	H
4	* 7.32024	40.22	Pk	35.6	-26.4	49.42	-	-	74	-24.58	0-360	100	H
5	* 4.88011	33.07	Pk	34.1	-30.5	36.67	-	-	74	-37.33	0-360	200	V
6	* 7.31858	36.33	Pk	35.6	-26.4	45.53	-	-	74	-28.47	0-360	100	V

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

Pk - Peak detector

Radiated Emissions

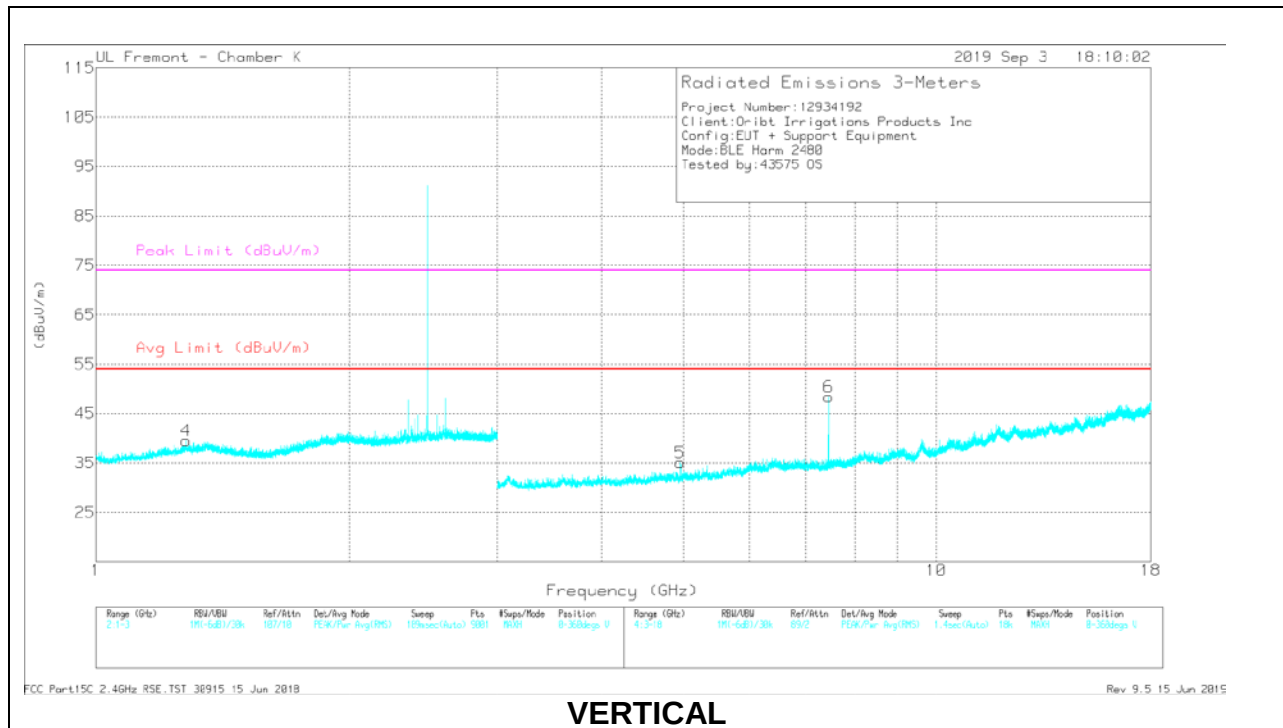
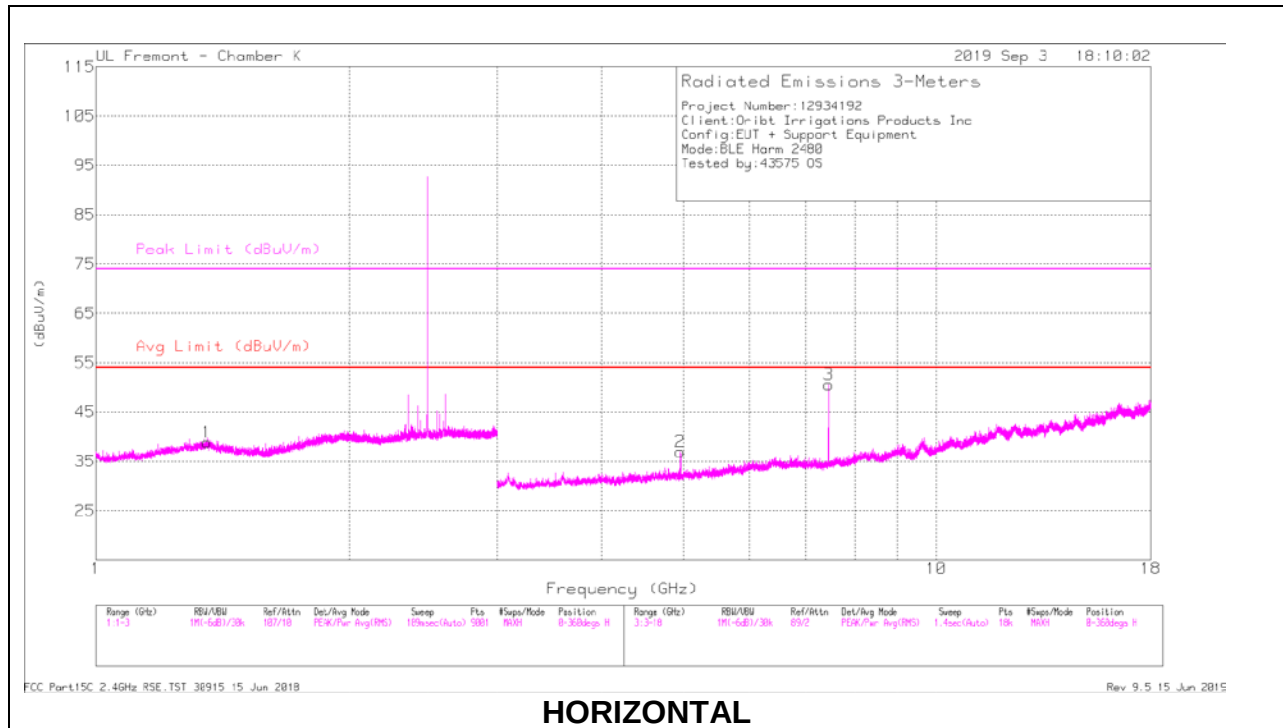
Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	Amp/Cbl/Fil/r Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.37098	40.68	PK2	29.5	-23.9	46.28	-	-	74	-27.72	290	385	H
* 1.37185	30.52	MAV1	29.5	-23.9	36.12	54	-17.88	-	-	290	385	H
* 1.27414	40.91	PK2	29.3	-24	46.21	-	-	74	-27.79	209	391	V
* 1.27146	30.81	MAV1	29.2	-23.9	36.11	54	-17.89	-	-	209	391	V
* 4.87929	41.04	PK2	34.1	-30.5	44.64	-	-	74	-29.36	27	137	H
* 4.8799	33.91	MAV1	34.1	-30.5	37.51	54	-16.49	-	-	27	137	H
* 7.31926	43.66	PK2	35.6	-26.4	52.86	-	-	74	-21.14	50	113	H
* 7.31937	35.25	MAV1	35.6	-26.4	44.45	54	-9.55	-	-	50	113	H
* 4.88058	39.93	PK2	34.1	-30.5	43.53	-	-	74	-30.47	227	392	V
* 4.88028	31.66	MAV1	34.1	-30.5	35.26	54	-18.74	-	-	227	392	V
* 7.31915	42.1	PK2	35.6	-26.4	51.3	-	-	74	-22.7	339	101	V
* 7.31949	33.68	MAV1	35.6	-26.4	42.88	54	-11.12	-	-	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

HIGH CHANNEL RESULTS



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	Amp/Cbl/Fil/r Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.35611	33.09	Pk	29.6	-23.8	38.89	-	-	74	-35.11	0-360	200	H
4	* 1.28089	34.12	Pk	29.4	-24	39.52	-	-	74	-34.48	0-360	200	V
2	* 4.95928	33.49	Pk	34.1	-30.6	36.99	-	-	74	-37.01	0-360	101	H
3	* 7.44108	41	Pk	35.7	-26.2	50.5	-	-	74	-23.5	0-360	101	H
5	* 4.95928	31.55	Pk	34.1	-30.6	35.05	-	-	74	-38.95	0-360	200	V
6	* 7.44025	38.89	Pk	35.7	-26.2	48.39	-	-	74	-25.61	0-360	100	V

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

Pk - Peak detector

Radiated Emissions

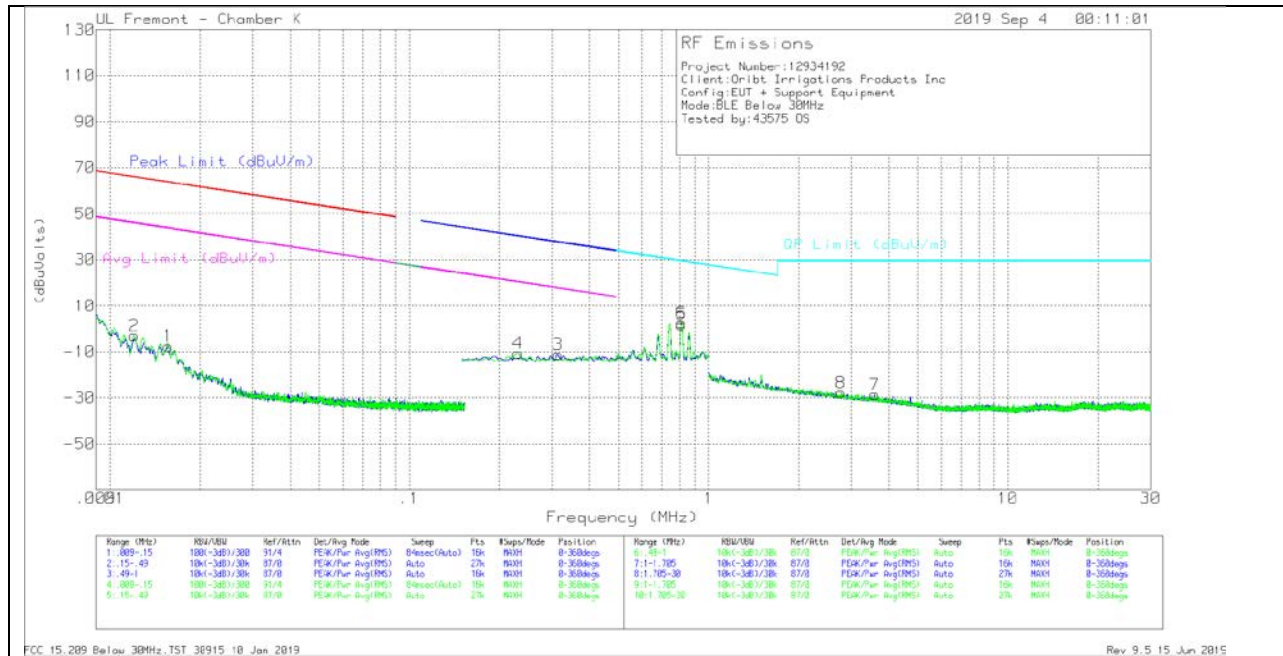
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	Amp/Cbl/Fil/r Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.35655	40.5	PK2	29.6	-23.8	46.3	-	-	74	-27.7	143	329	H
	* 1.35422	31.1	MAv1	29.6	-23.8	36.9	54	-17.1	-	-	143	329	H
2	* 1.28095	40.97	PK2	29.4	-24	46.37	-	-	74	-27.63	106	135	V
	* 1.28022	30.9	MAv1	29.4	-23.9	36.4	54	-17.6	-	-	106	135	V
3	* 4.96054	40.01	PK2	34.1	-30.6	43.51	-	-	74	-30.49	78	281	H
	* 4.96026	31.3	MAv1	34.1	-30.6	34.8	54	-19.2	-	-	78	281	H
4	* 7.44075	46.48	PK2	35.7	-26.2	55.98	-	-	74	-18.02	61	102	H
	* 7.43938	38.98	MAv1	35.7	-26.2	48.48	54	-5.52	-	-	61	102	H
5	* 4.96024	39.22	PK2	34.1	-30.6	42.72	-	-	74	-31.28	278	108	V
	* 4.95958	30.3	MAv1	34.1	-30.6	33.8	54	-20.2	-	-	278	108	V
6	* 7.44074	42.66	PK2	35.7	-26.2	52.16	-	-	74	-21.84	336	115	V
	* 7.44058	34.66	MAv1	35.7	-26.2	44.16	54	-9.84	-	-	336	115	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



Below 30MHz DATA

Trace Markers

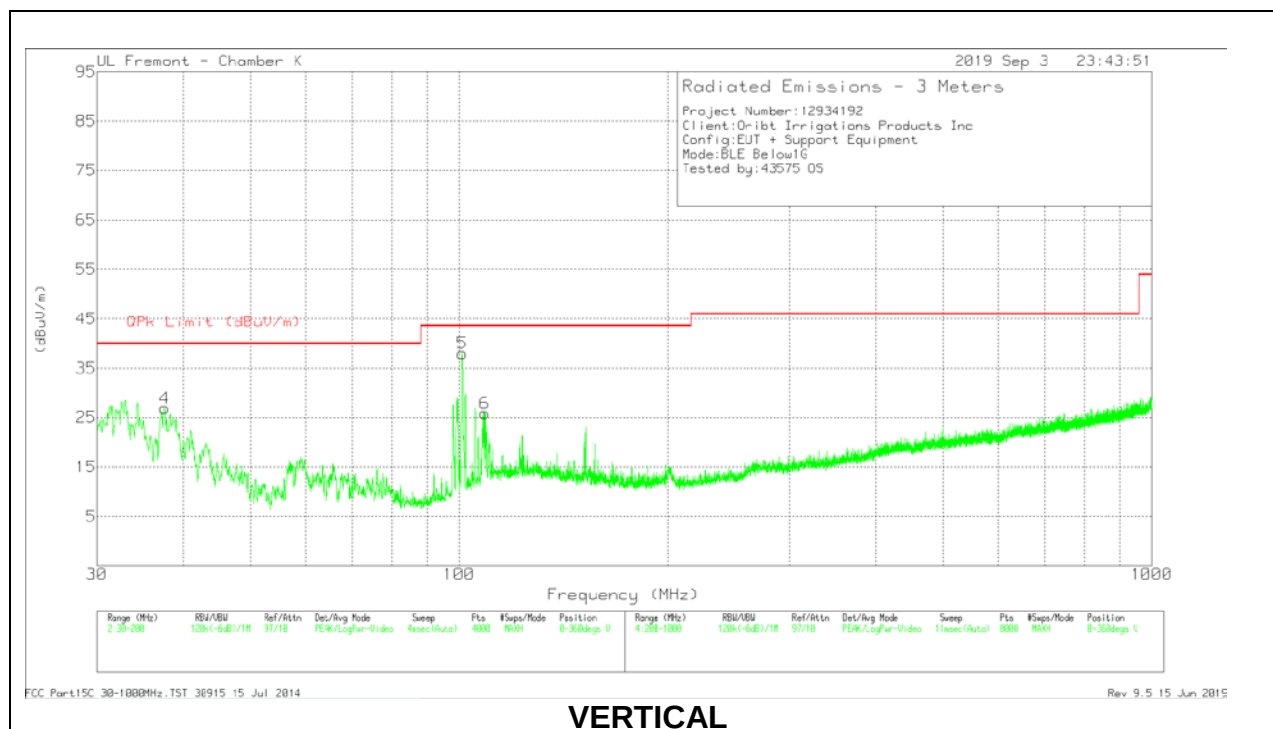
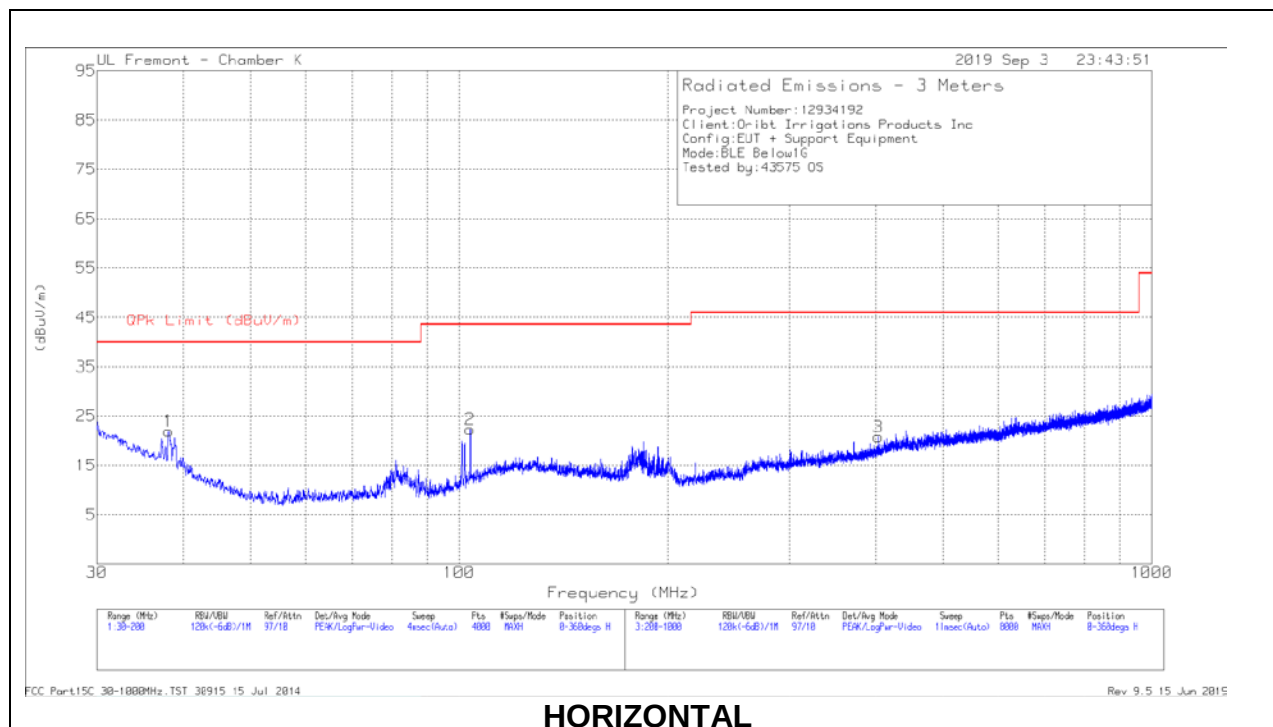
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (ACF)	Cables w/ PRE0186650	Dist Corr 300m	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.01566	5	Pk	56.4	-31.9	-40	-7.5	63.69	-71.19	43.69	-51.19	-	-	-	-	-
3	.31331	4.75	Pk	56.1	-32.1	-40	-11.25	-	-	-	-	37.69	-48.94	17.69	-28.94	0-360
2	.01204	8.91	Pk	59.9	-31.8	-40	-2.99	65.97	-68.96	45.97	-48.96	-	-	-	-	0-360
4	.23113	3.27	Pk	56.1	-32.1	-40	-10.73	-	-	-	-	40.34	-51.07	20.34	-31.07	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (ACF)	Cables w/ PRE0186650	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
5	.8131	17.8	Pk	56.1	-32.1	-40	1.8	29.41	-27.61	0-360
6	.8131	18.72	Pk	56.1	-32.1	-40	2.72	29.41	-26.69	0-360
7	3.59245	5.62	Pk	37.9	-32	-40	-29.48	29.5	-57.98	0-360
8	2.77658	4.75	Pk	39.4	-32	-40	-27.65	29.5	-57.35	0-360

Pk - Peak detector

9.4. WORST CASE BELOW 1 GHz



Below 1GHz Data

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF PRE0184052 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 38.0346	32.31	Pk	21.1	-31.5	21.91	40	-18.09	0-360	399	H
2	103.7141	36.01	Pk	17.2	-30.9	22.31	43.52	-21.21	0-360	299	H
4	* 37.5244	36.97	Pk	21.4	-31.5	26.87	40	-13.13	0-360	100	V
5	101.0359	52.48	Pk	16.4	-30.9	37.98	43.52	-5.54	0-360	100	V
6	* 109.0279	38.47	Pk	18.3	-30.9	25.87	43.52	-17.65	0-360	100	V
3	* 402.9264	28.61	Pk	21.7	-29.5	20.81	46.02	-25.21	0-360	100	H

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

Pk - Peak detector

Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	AF PRE0184052 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
101.2373	27.68	Pk	16.5	-30.9	13.28	43.52	-30.24	358	172	V
101.2373	21.46	Qp	16.5	-30.9	7.06	43.52	-36.46	358	172	V

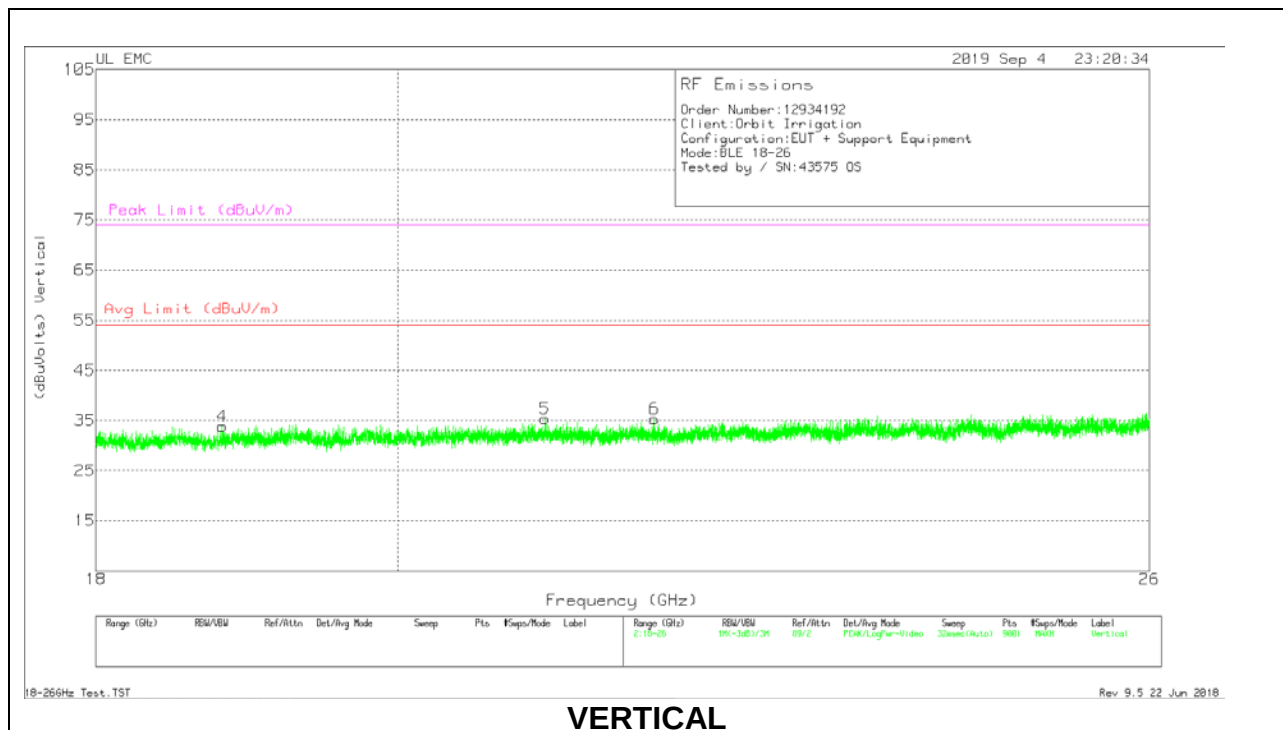
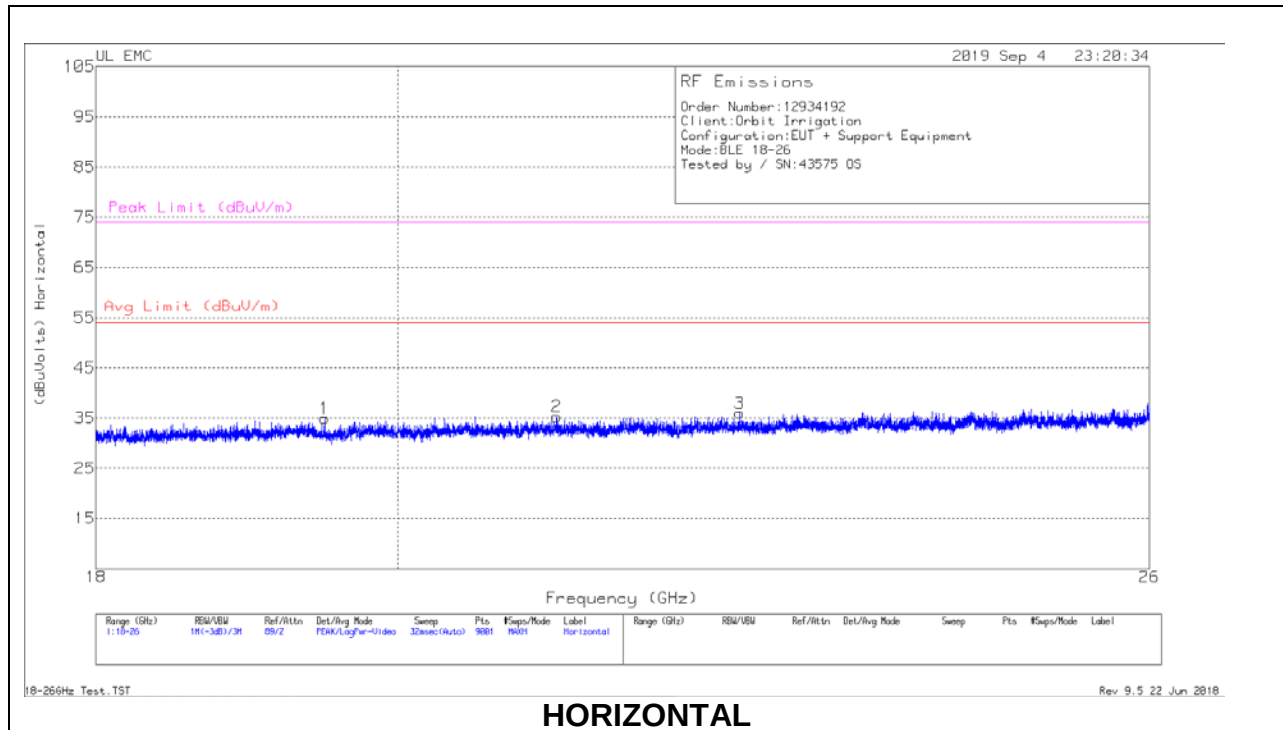
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

Pk - Peak detector

9.5. WORST CASE 18-26 GHz



18 – 26GHz DATA

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	19.496	68.23	Pk	33.3	-57.1	-9.5	34.93	54	-19.07	74	-39.07
2	21.14	68.1	Pk	33.6	-56.9	-9.5	35.3	54	-18.7	74	-38.7
3	22.535	68.96	Pk	34.2	-57.7	-9.5	35.96	54	-18.04	74	-38.04
4	18.811	68.47	Pk	33.2	-58.3	-9.5	33.87	54	-20.13	74	-40.13
5	21.053	68.26	Pk	33.6	-57	-9.5	35.36	54	-18.64	74	-38.64
6	21.874	68.24	Pk	34	-57.4	-9.5	35.34	54	-18.66	74	-38.66

Pk - Peak detector