



CERTIFICATION TEST REPORT

Report Number. : 12354639-E2V2

Applicant : RED ROVER TECHNOLOGIES, INC.
237 A ST #15467
SAN DIEGO, CA 92101-4003, U.S.A

Model : CID1014

FCC ID : 2AP8W-CID1014

IC : 24027- CID1014

EUT Description : WIRELESS HEADPHONE

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

Date Of Issue:

August 15, 2018

Prepared by:

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NVLAP Lab code: 200065-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	08/9/2018	Initial Issue	-
V2	08/15/2018	Added statement to Section 9.3	Steven Tran

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: RED ROVER TECHNOLOGIES, INC.
237 A ST #15467
SAN DIEGO, CA 92101-1003, U.S.A

EUT DESCRIPTION: WIRELESS HEADPHONE

MODEL: CID1014

SERIAL NUMBER: SA1632

DATE TESTED: July 09 to August 3, 2018

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

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. 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.

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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 v4, ANSI C63.10-2013, RSS-GEN Issue 5, and RSS-247 Issue 2.

3. FACILITIES AND ACCREDITATION

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

47173 Benicia Street	47266 Benicia Street	47658 Kato Rd
☐ Chamber A (ISED:2324B-1)	☐ Chamber D (ISED:22541-1)	☐ Chamber K (ISED:2324A-1)
☒ Chamber B (ISED:2324B-2)	☐ Chamber E (ISED:22541-2)	☐ Chamber L (ISED:2324A-3)
☐ Chamber C (ISED:2324B-3)	☐ Chamber F (ISED:22541-3)	
	☐ Chamber G (ISED:22541-4)	
	☐ Chamber H (ISED:22541-5)	

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

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

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. EUT DESCRIPTION

The EUT is a Wireless Headphone.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE	3.58	2.28

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a FPCB antenna, with a maximum gain of 2.2 dBi.

5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was 0.3.30.100025

5.5. 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 and Y, it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation. The EUT was also tested in one configuration with the dock.

Tests were also observed in two configurations, charging mode with USB in the XYZ and charging mode with a dock.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

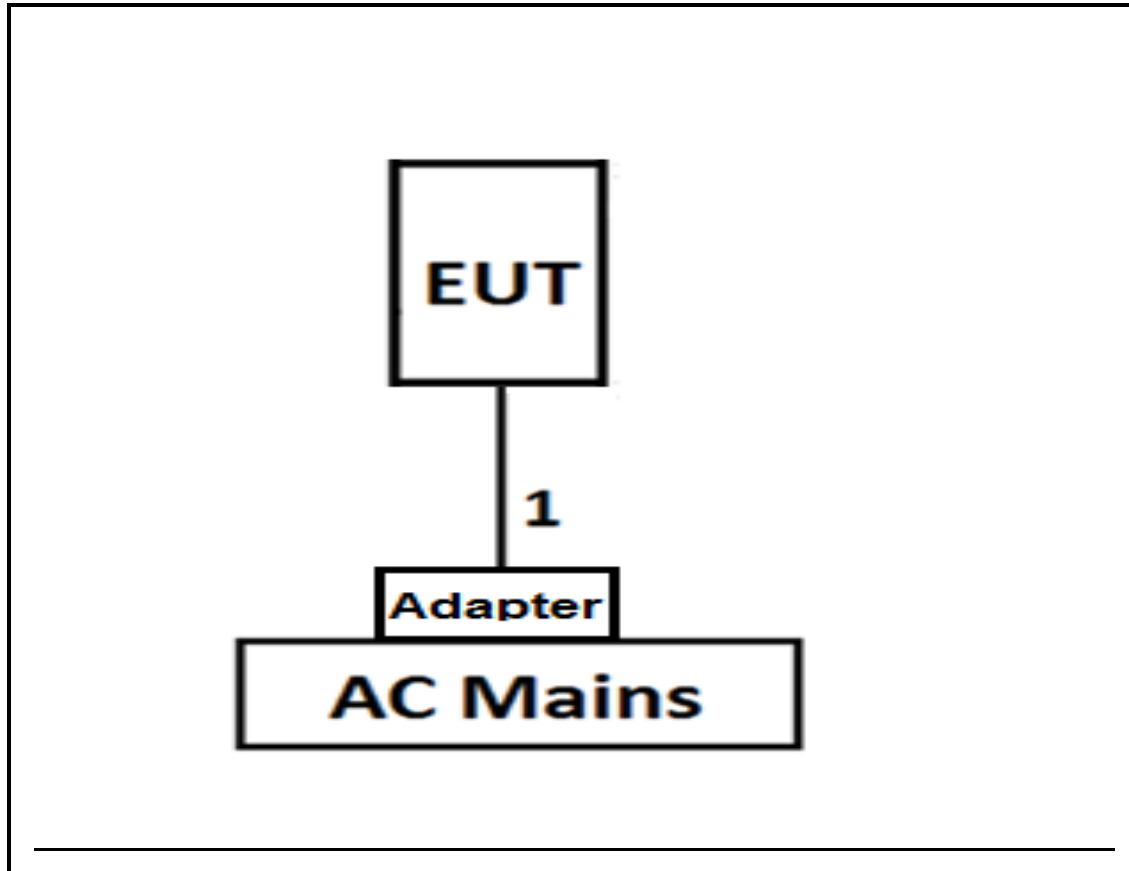
Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Ipad Bluetooth Source	Apple	A1489	F9FNF0FXFCM9	BCBGA1489
AC Wall Adapter	Keyu	KA1517-0501500USU	N/A	N/A
Charging Dock	Dolby Laboratorie	CID1015	N/A	N/A
USB Cable	Dolby Laboratorie	N/A	N/A	N/A

I/O CABLES

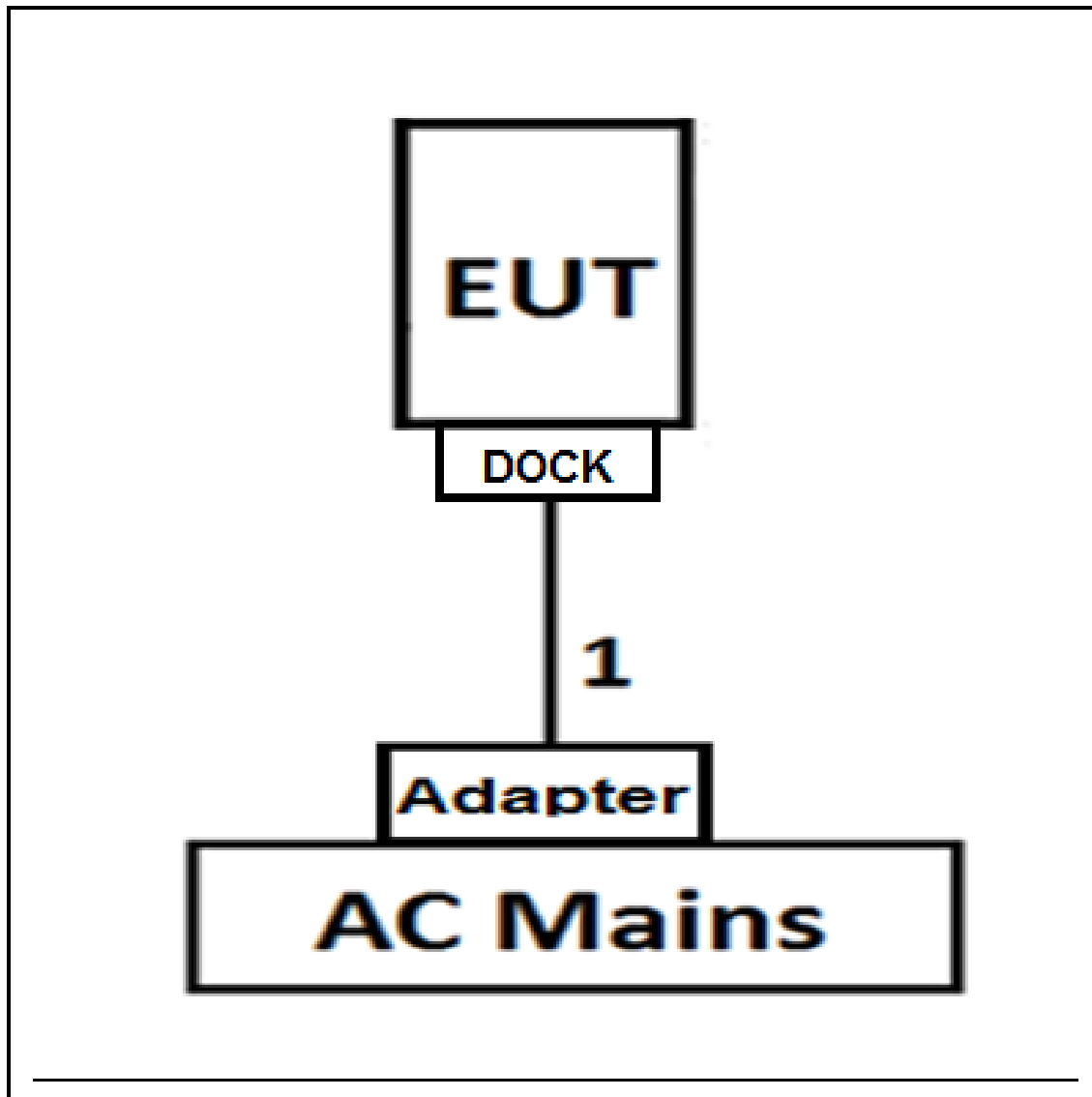
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
31	USB	1	Micro USB to USB A	USB	2	None

SETUP DIAGRAMS

RADIATED AND AC LINE CONDUCTED EMISSIONS SETUP DIAGRAM (WITHOUT DOCK)



RADIATED AND AC LINE CONDUCTED EMISSIONS SETUP DIAGRAM (WITH DOCK)



TEST SETUP

For conducted tests: the EUT was connected to a host laptop via an USB cable for parameter setting purpose such as channel, output power...etc. The test software exercises the radio.

6. MEASUREMENT METHOD

On Time and Duty Cycle: KDB 558074 D01 v04, Section 6.

6 dB BW: KDB 558074 D01 v04, Section 8.1.

Output Power: KDB 558074 D01 v04, Section 9.1.3.

Power Spectral Density: KDB 558074 D01 v04, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v04, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v04, Section 12.1.

Band-edge: KDB 558074 D01 v04, Section 12.1.

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

7. 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 Number	Cal Due	Last Cal
Amplifier, 10KHz to 1GHz, 32dB	Agilent (Keysight) Technologies	8447D	T10	02/14/2019	02/14/2018
Amplifier, 1 - 18GHz	MITEQ	AFS42-00101800-25-S-42	T931	09/20/2018	09/20/2017
RF Preamplifier, 1 - 26GHz	Agilent	8449B	T404	07/23/2018	07/23/2017
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB3	T407	05/10/2019	05/10/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T863	06/21/2019	06/21/2018
Antenna, Horn 18-26.5GHz	ARA	MWH-1826	T89	01/18/2019	01/18/2018
Antenna, Active Loop 9kHz-30MHz	Com-Power Corp.	AL-130R	T1866	10/10/2018	10/10/2017
Power Meter, P-series single channel	Agilent (Keysight) Technologies	N1911A	T1268	06/25/2019	06/25/2018
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Agilent (Keysight) Technologies	N1921A	T413	06/27/2019	06/27/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1454	01/08/2019	01/08/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1113	12/21/2018	12/21/2017
Test Receiver, EMI, 10Hz-7GHz	Rhode & Schwarz	ESR	T1436	01/06/2019	01/06/2018
LISN	FISCHER	FCC-LISN-50/250-25-2-01	T1310	01/17/2019	01/17/2018

Test Software List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Ver 9.5, December 1, 2016
Antenna Port Software	UL	UL RF	Ver 9.1, January 25, 2018

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

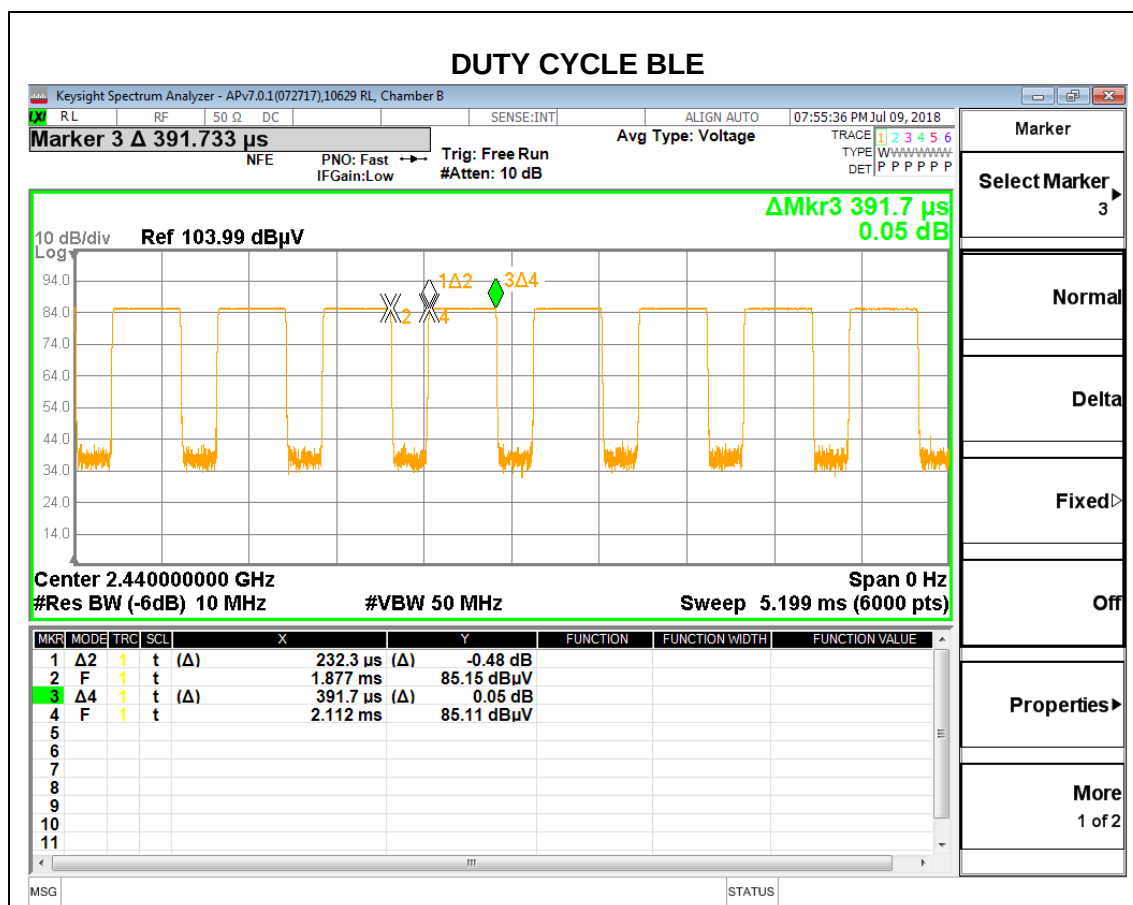
None; for reporting purposes only.

PROCEDURE

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
BLE	0.392	0.624	0.628	62.77%	2.02	2.553

DUTY CYCLE PLOTS



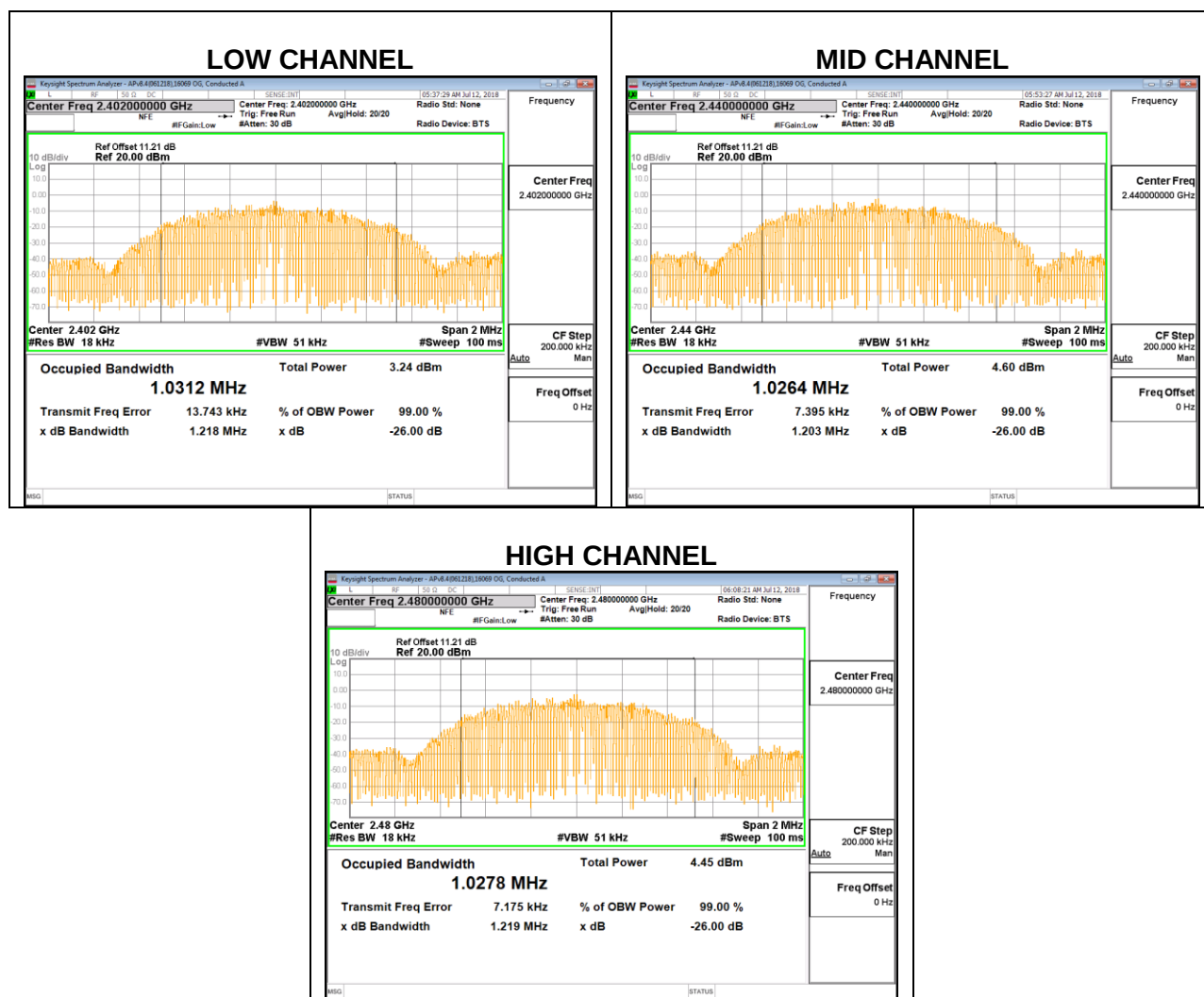
8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0312
Middle	2440	1.0264
High	2480	1.0278



8.3. 6 dB BANDWIDTH

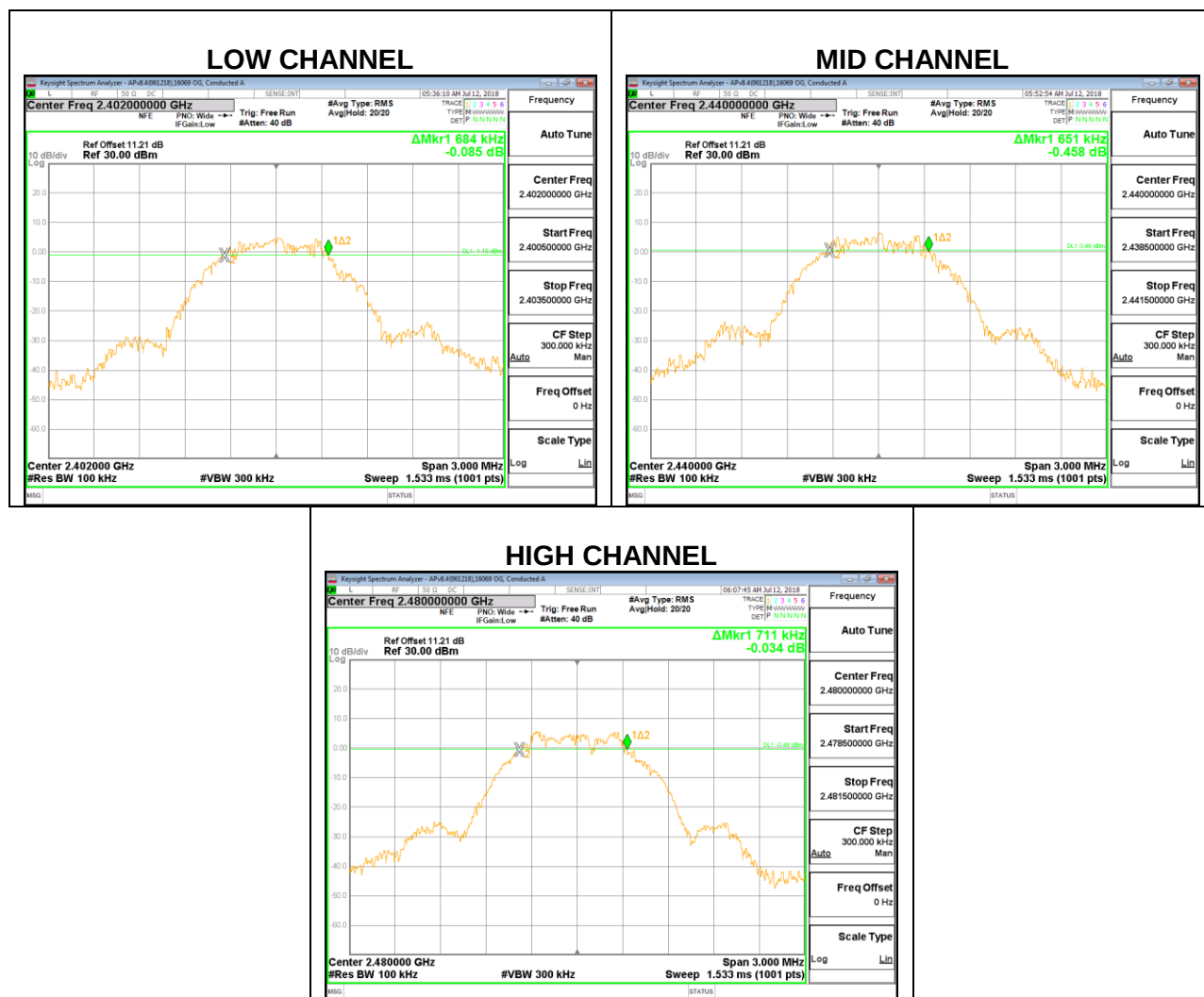
LIMITS

FCC §15.407 (e)
RSS-247 5.2 (a)

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

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.6840	0.5
Middle	2440	0.6510	0.5
High	2480	0.7110	0.5



8.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.2 dB (including 10 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

Tested By:	29435 TC
Date:	8/3/2018

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	1.71	30	-28.29
Middle	2440	3.58	30	-26.42
High	2480	3.24	30	-26.76

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 11.2 dB (including 10 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

Tested By:	29435 TC
Date:	8/3/2018

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	1.19
Middle	2440	3.04
High	2480	2.7

8.6. POWER SPECTRAL DENSITY

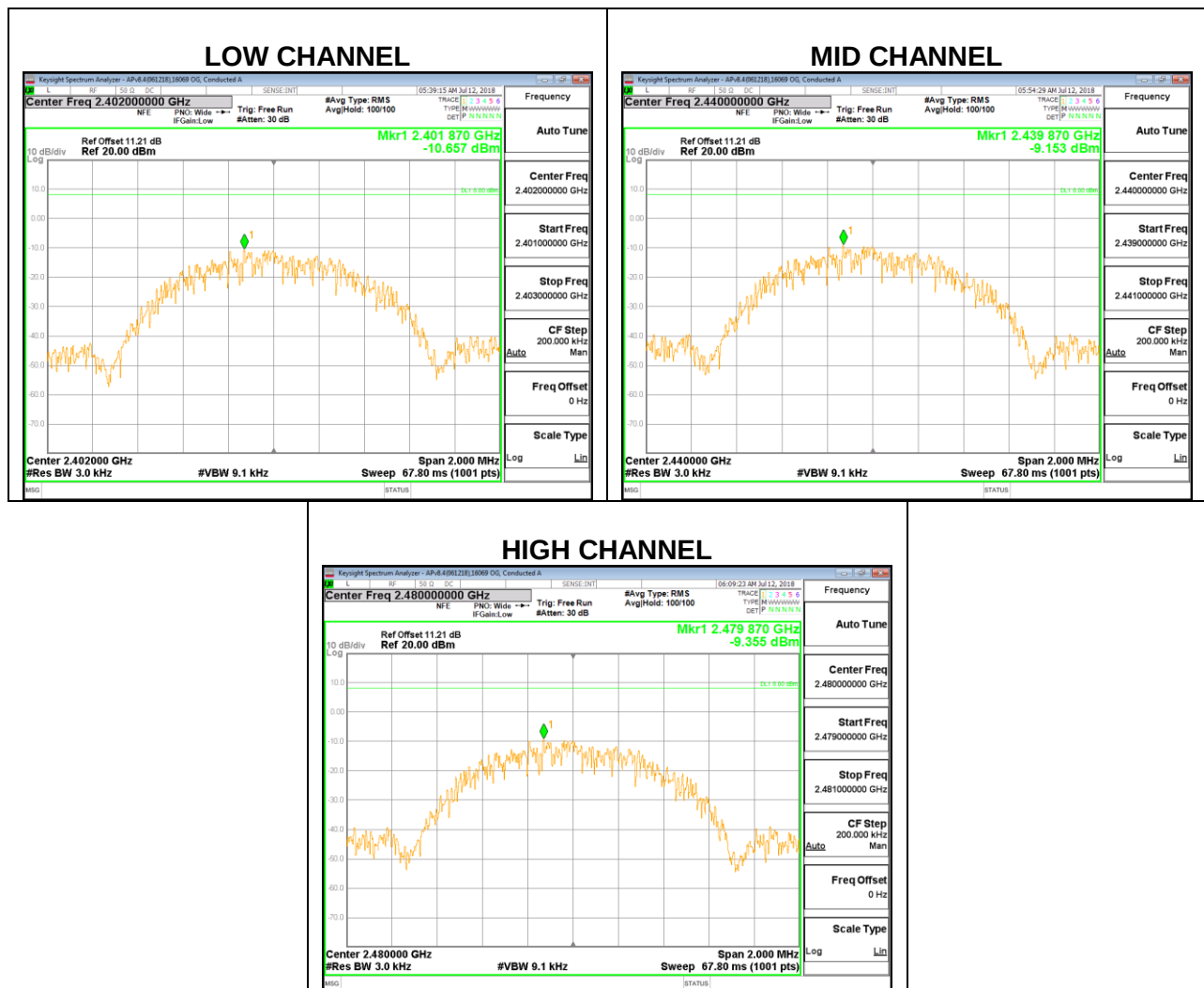
LIMITS

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	-10.66	8	-18.66
Middle	2440	-9.15	8	-17.15
High	2480	-9.36	8	-17.36



8.7. CONDUCTED SPURIOUS EMISSIONS

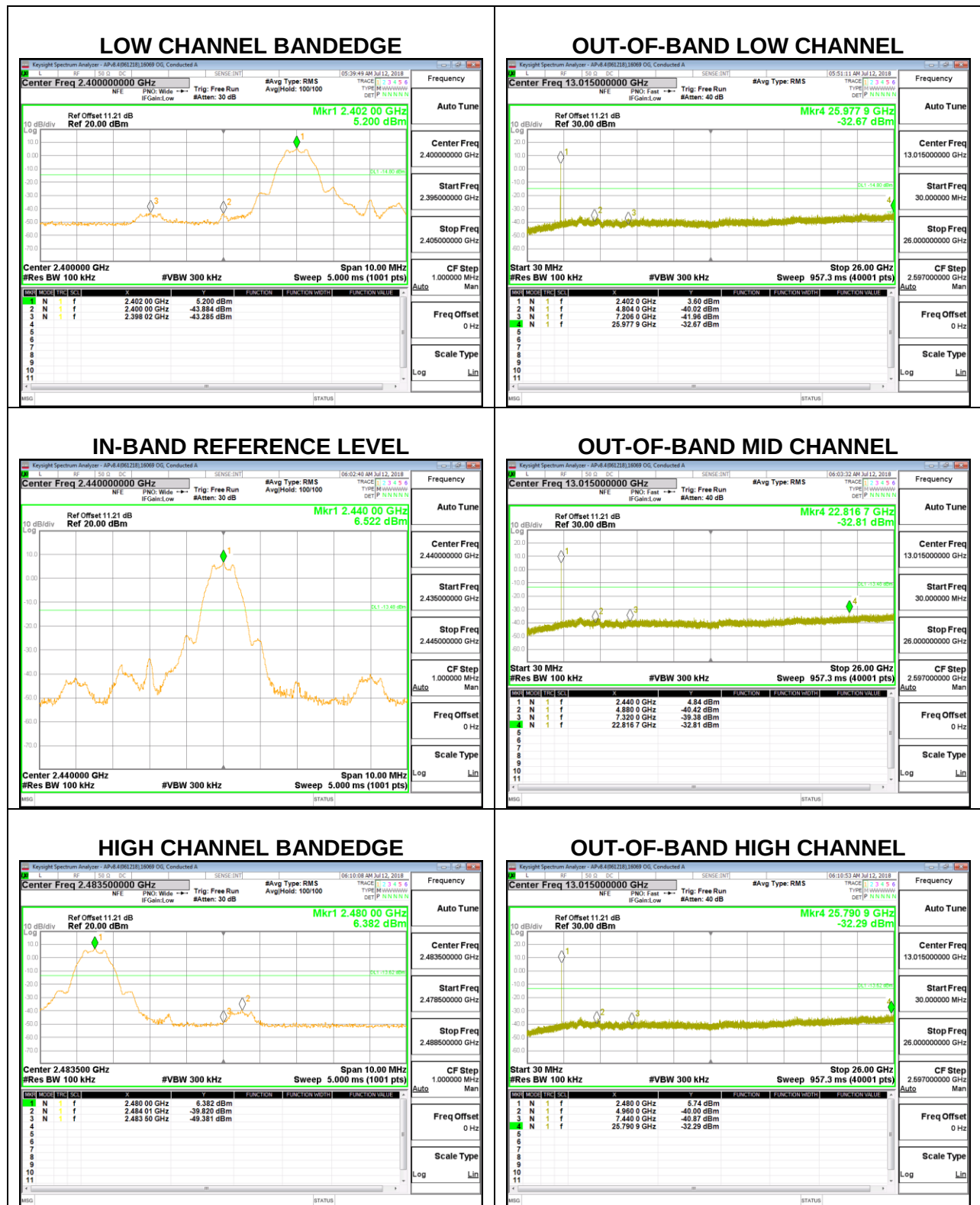
LIMITS

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

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.

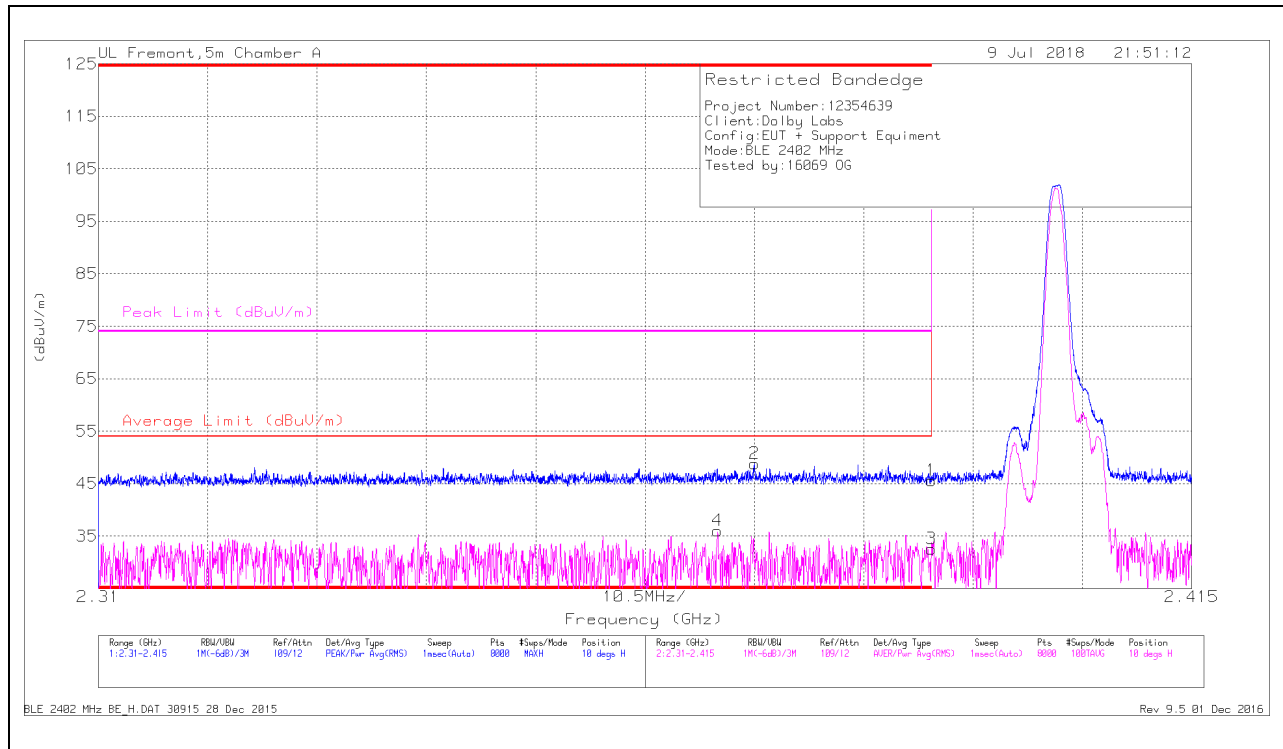
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

9.2. TRANSMITTER ABOVE 1 GHz

9.2.1. BLE (1Mbps) WITHOUT A DOCK

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Trace Markers

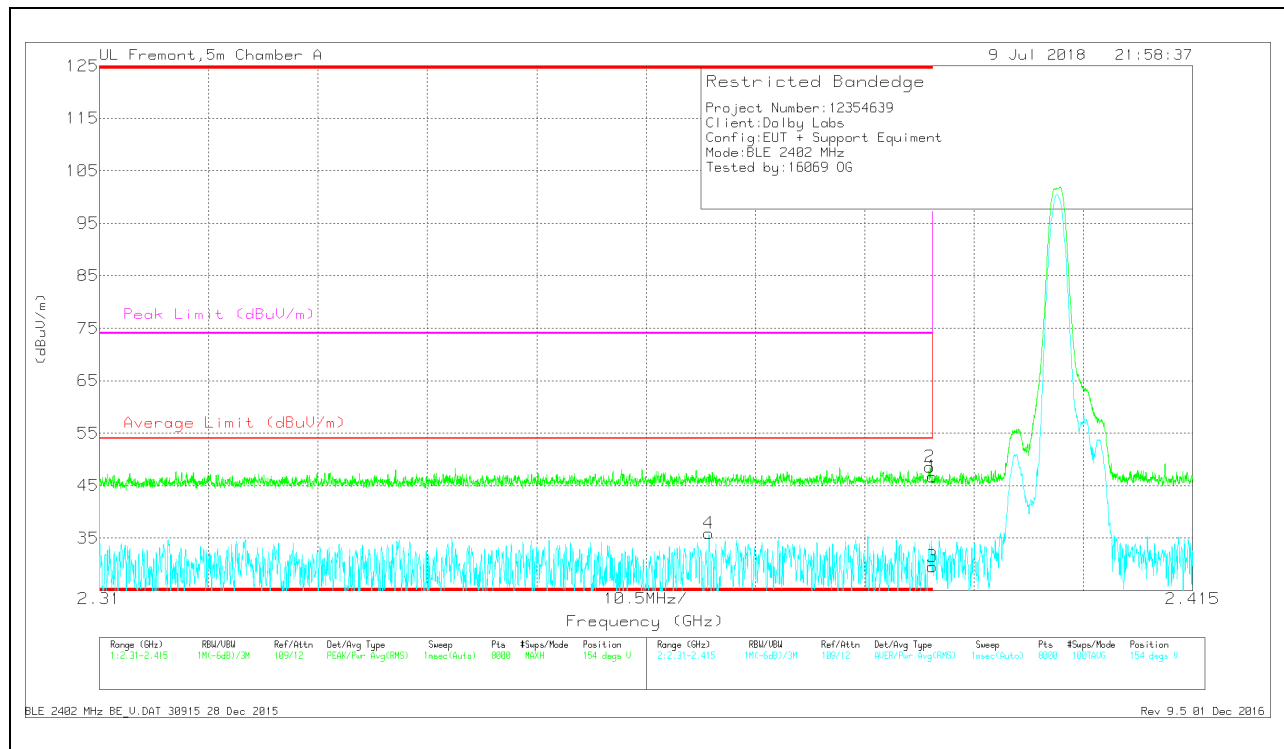
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Ampl/CbW/Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	34.72	Pk	32.3	-21.5	0	45.52	-	-	74	-28.48	10	102	H
2	* 2.373	37.85	Pk	32.3	-21.4	0	48.75	-	-	74	-25.25	10	102	H
3	* 2.39	19.52	RMS	32.3	-21.5	2.02	32.34	54	-21.66	-	-	10	102	H
4	* 2.369	22.79	RMS	32.3	-21.3	2.02	35.81	54	-18.19	-	-	10	102	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 YB63 (dBm)	Amp/Cmplr/Pwr (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	35.92	Pk	32.3	-21.5	0	46.72	-	-	74	-27.28	154	302	V
2	* 2.39	37.79	Pk	32.3	-21.5	0	48.59	-	-	74	-25.41	154	302	V
3	* 2.39	16.54	RMS	32.3	-21.5	2.02	29.36	54	-24.64	-	-	154	302	V
4	* 2.369	22.63	RMS	32.3	-21.3	2.02	35.65	54	-18.35	-	-	154	302	V

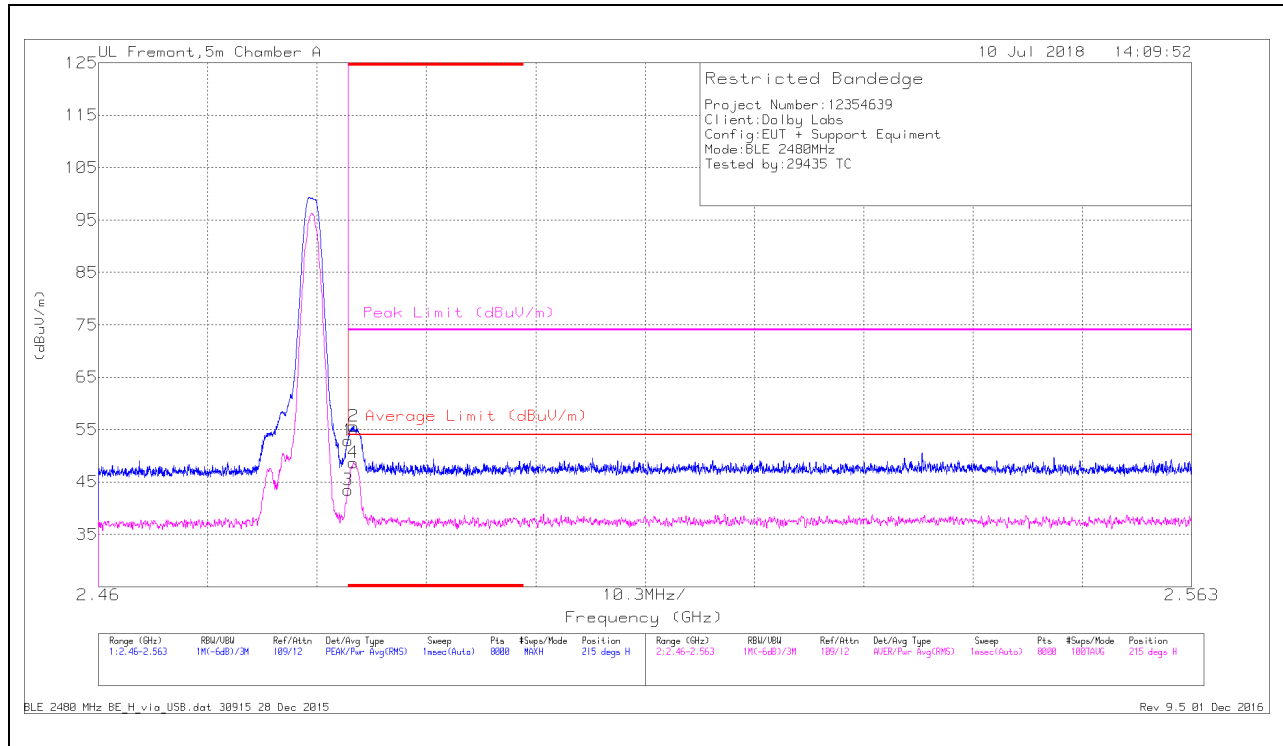
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Trace Markers:

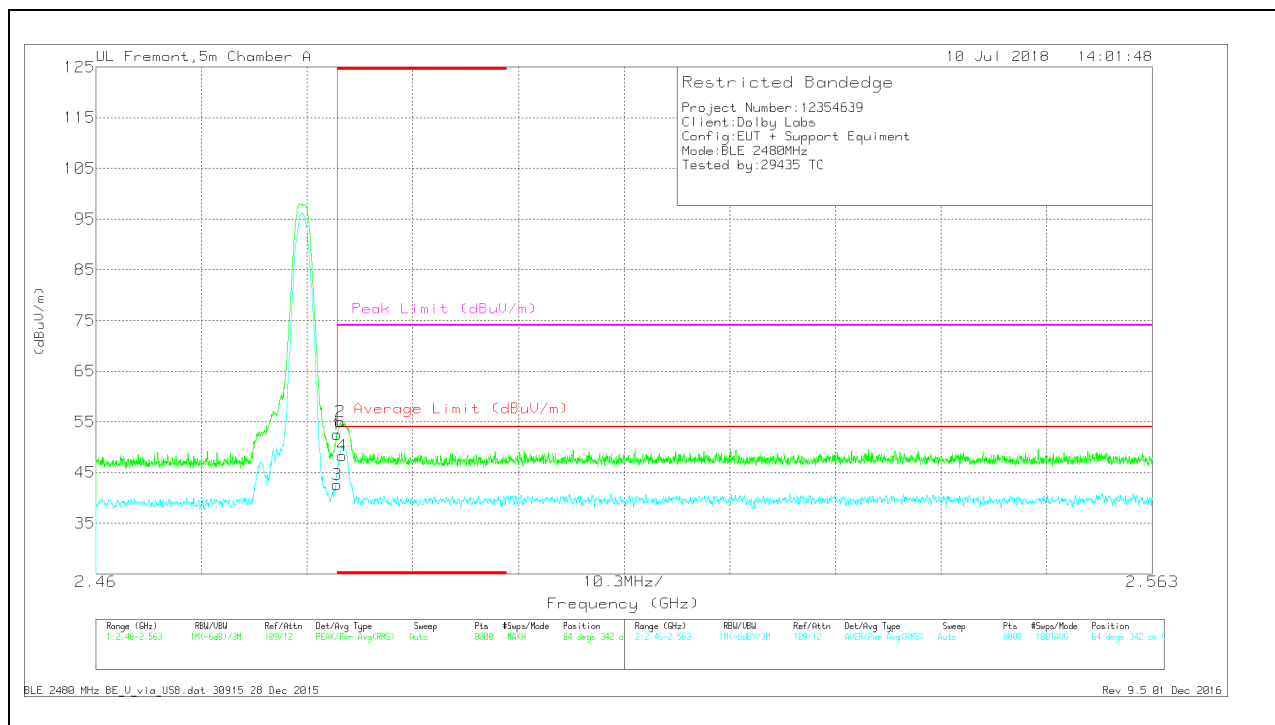
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Ampl/CbW/Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	41.82	Pk	32.6	-21.5	0	52.92	-	-	74	-21.08	215	390	H
2	* 2.484	44.54	Pk	32.6	-21.5	0	55.64	-	-	74	-18.36	215	390	H
3	* 2.484	32.33	RMS	32.6	-21.5	2.02	45.45	54	-8.55	-	-	215	390	H
4	* 2.484	37.57	RMS	32.6	-21.5	2.02	50.69	54	-3.31	-	-	215	390	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 T663 (dBm)	Amp/Cou/Fir/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	41.44	Pk	32.6	-21.5	0	52.54	-	-	74	-21.46	64	342	V
2	* 2.484	43.94	Pk	32.6	-21.5	0	55.04	-	-	74	-18.96	64	342	V
3	* 2.484	31.53	RMS	32.6	-21.5	2.02	44.65	54	-9.35	-	-	64	342	V
4	* 2.484	37.15	RMS	32.6	-21.5	2.02	50.27	54	-3.73	-	-	64	342	V

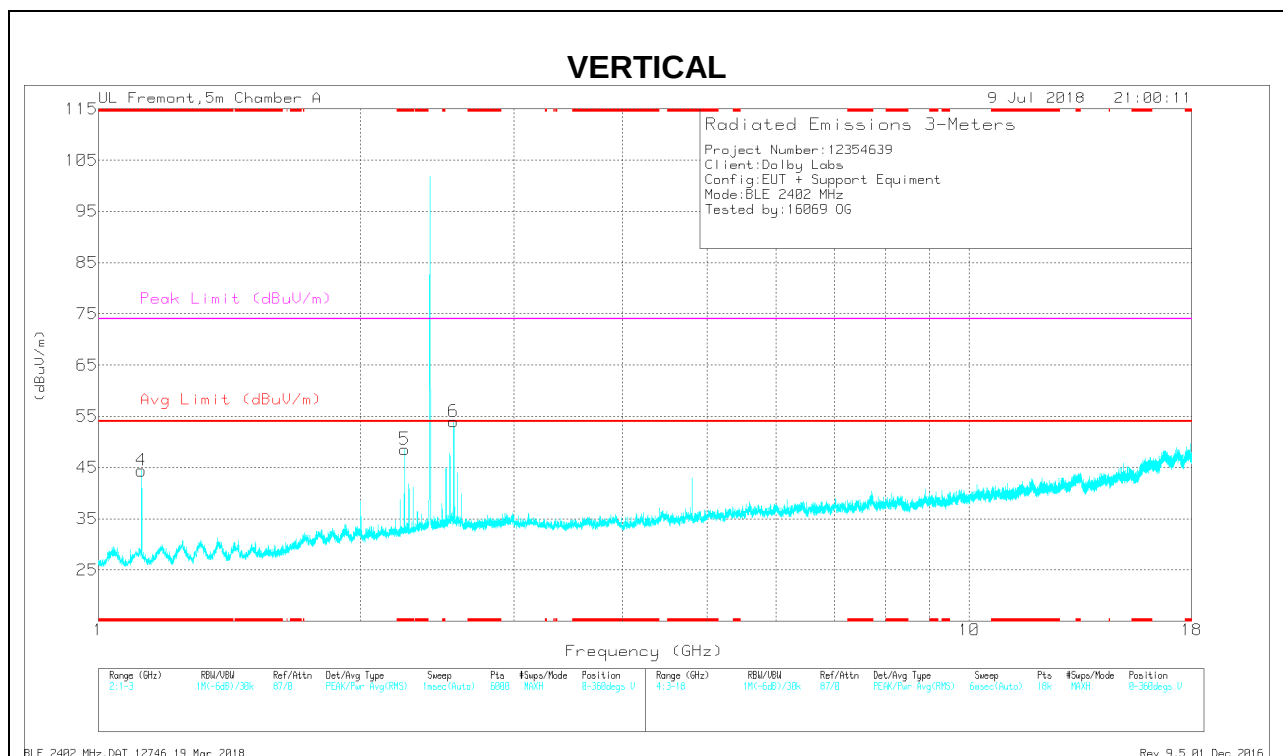
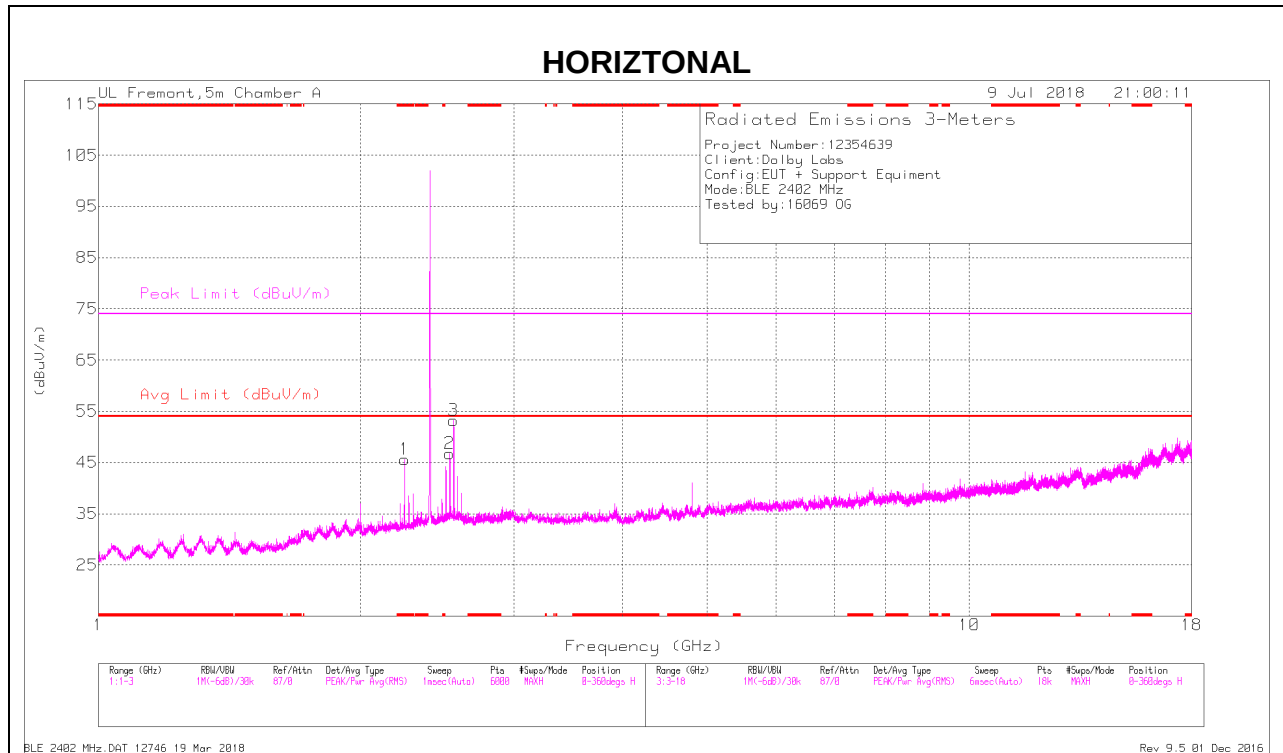
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.246	35.72	Pk	31.7	-21.8	0	45.62	-	-	74	-28.38	0-360	102	H
4	* 1.121	40	Pk	27.4	-23	0	44.4	-	-	74	-29.6	0-360	102	V
5	* 2.246	38.68	Pk	31.7	-21.8	0	48.58	-	-	74	-25.42	0-360	199	V
2	2.532	35.42	Pk	32.7	-21.4	0	46.72	-	-	-	-	0-360	102	H
3	2.558	41.81	Pk	32.7	-21.3	0	53.21	-	-	-	-	0-360	102	H
6	2.558	42.62	Pk	32.7	-21.3	0	54.02	-	-	-	-	0-360	102	V

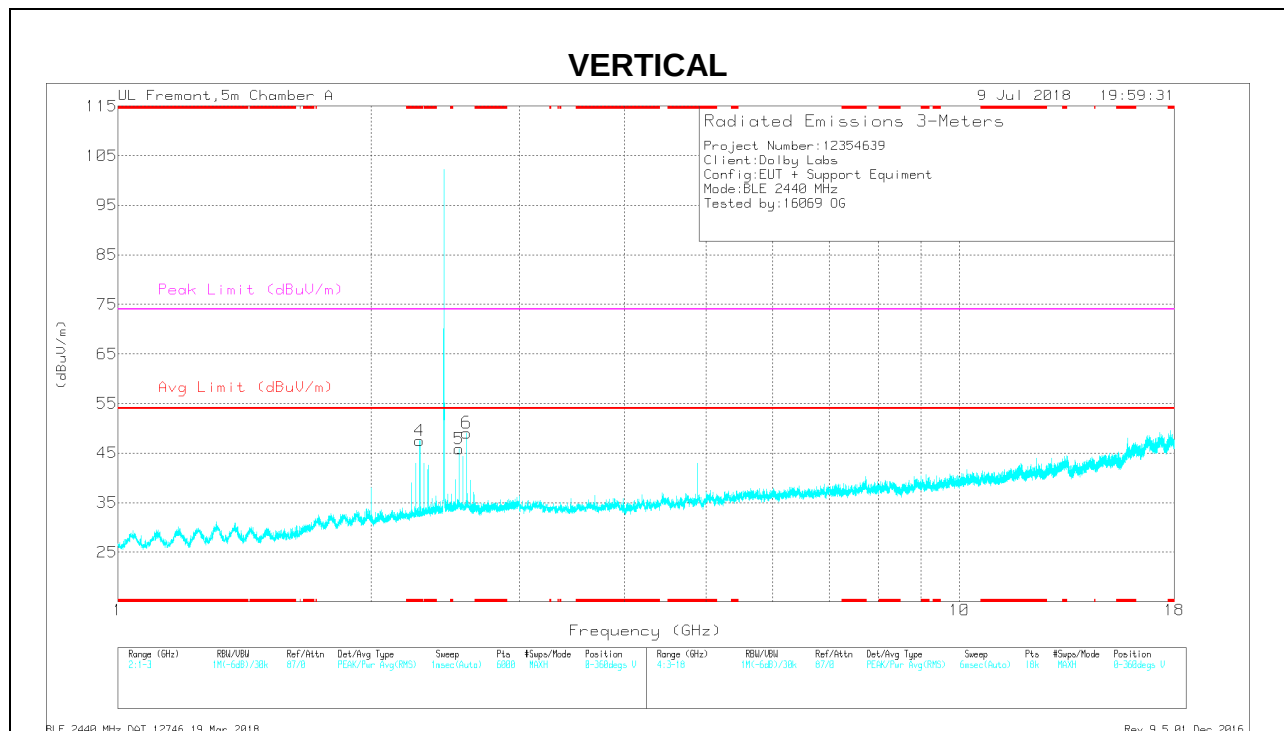
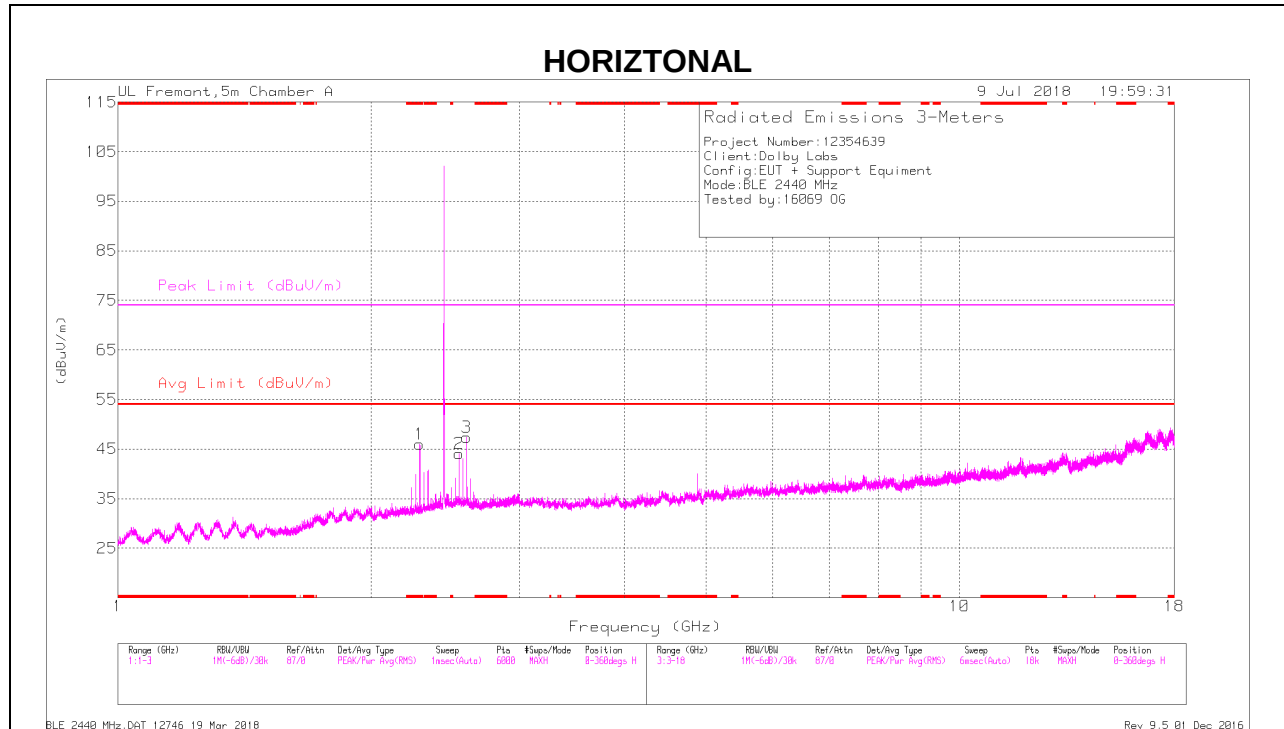
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cbl/Filtr/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
* 2.246	37.89	PK2	31.7	-21.8	0	47.79	-	-	74	-26.21	187	140	H
* 2.246	31.96	MAV1	31.7	-21.8	2.05	43.91	54	-10.09	-	-	187	140	H
* 1.12	31.2	PK2	27.4	-23	0	35.6	-	-	74	-38.4	204	287	V
* 1.119	18.58	MAV1	27.4	-23	2.05	25.03	54	-28.97	-	-	204	287	V
* 2.246	40.98	PK2	31.7	-21.8	0	50.88	-	-	74	-23.12	304	202	V
* 2.246	36.86	MAV1	31.7	-21.8	2.05	48.81	54	-5.19	-	-	304	202	V
2.532	38.22	PK2	32.7	-21.4	0	49.52	-	-	-	-	191	128	H
2.532	32.1	MAV1	32.7	-21.4	2.05	45.45	-	-	-	-	191	128	H
2.558	43.79	PK2	32.7	-21.3	0	55.19	-	-	-	-	190	125	H
2.558	41.19	MAV1	32.7	-21.3	2.05	54.64	-	-	-	-	190	125	H
2.558	43.68	PK2	32.7	-21.3	0	55.08	-	-	-	-	125	129	V
2.558	41.48	MAV1	32.7	-21.3	2.05	54.93	-	-	-	-	125	129	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

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cbl/Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.284	35.88	Pk	31.9	-21.8	0	45.98	-	-	74	-28.02	0-360	199	H
4	* 2.284	37.44	Pk	31.9	-21.8	0	47.54	-	-	74	-26.46	0-360	102	V
2	2.544	32.68	Pk	32.7	-21.3	0	44.08	-	-	-	-	0-360	102	H
5	2.544	34.44	Pk	32.7	-21.3	0	45.84	-	-	-	-	0-360	199	V
3	2.596	35.86	Pk	32.7	-21.2	0	47.36	-	-	-	-	0-360	102	H
6	2.596	37.59	Pk	32.7	-21.2	0	49.09	-	-	-	-	0-360	199	V

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

Pk - Peak detector

Radiated Emissions

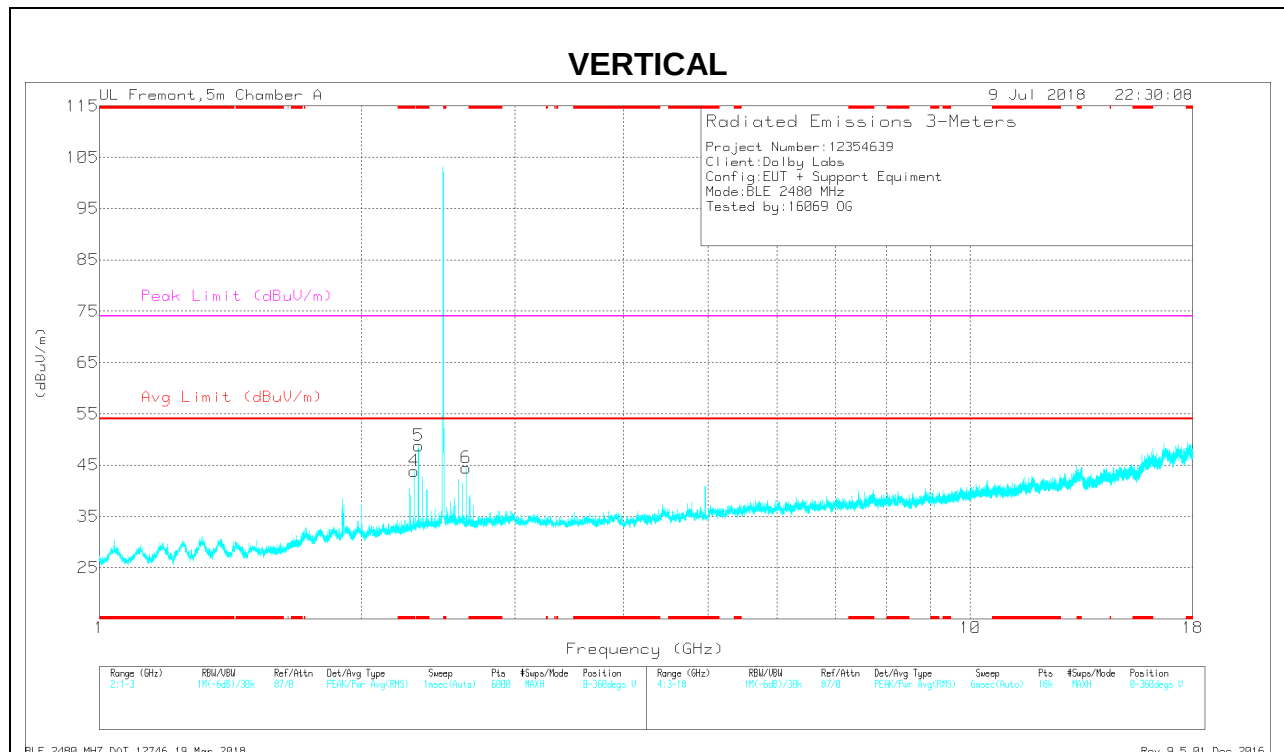
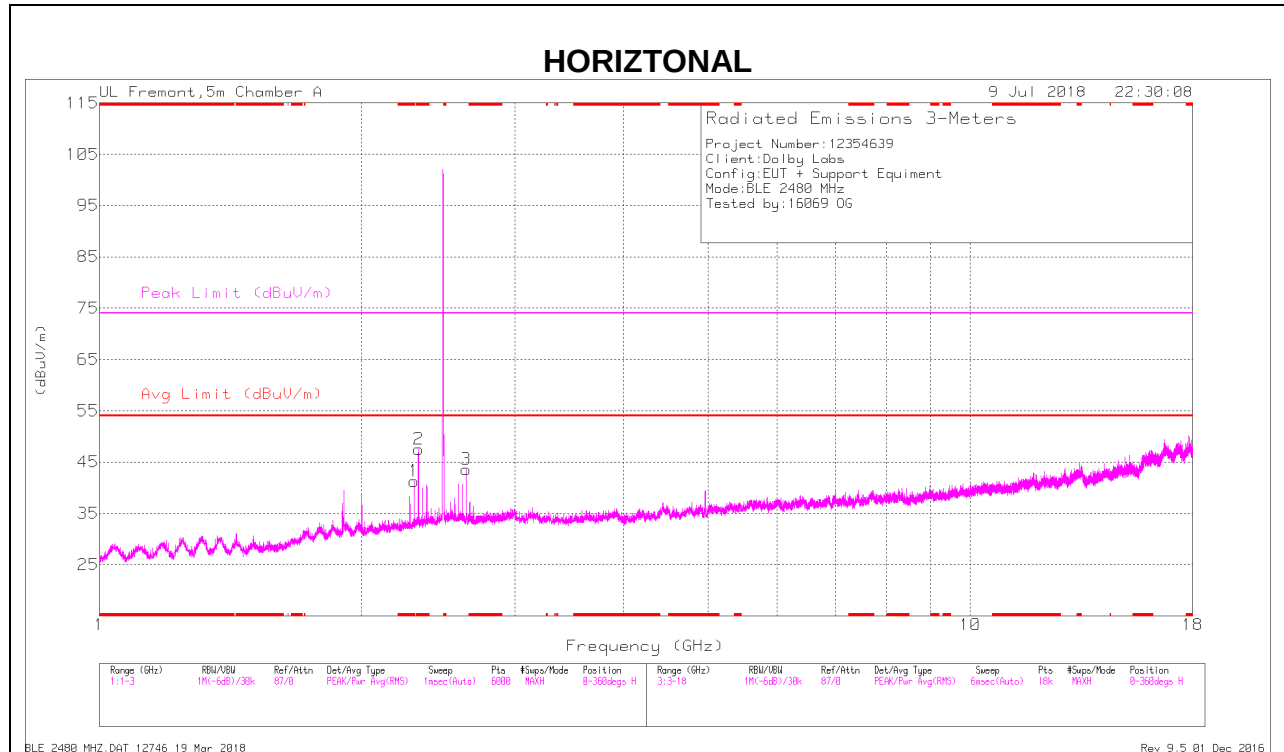
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cbl/Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.284	38.61	PK2	31.9	-21.8	0	48.71	-	-	74	-25.29	182	194	H
* 2.284	34.4	MAV1	31.9	-21.8	2.02	46.52	54	-7.48	-	-	182	194	H
* 2.284	40.1	PK2	31.9	-21.8	0	50.2	-	-	74	-23.8	97	103	V
* 2.284	36.83	MAV1	31.9	-21.8	2.02	48.95	54	-5.05	-	-	97	103	V
2.544	37.12	PK2	32.7	-21.3	0	48.52	-	-	-	-	191	109	H
2.544	30.59	MAV1	32.7	-21.3	2.02	44.01	-	-	-	-	191	109	H
2.544	38.12	PK2	32.7	-21.3	0	49.52	-	-	-	-	121	215	V
2.544	32.14	MAV1	32.7	-21.3	2.02	45.56	-	-	-	-	121	215	V
2.596	38.77	PK2	32.7	-21.2	0	50.27	-	-	-	-	202	109	H
2.596	33.53	MAV1	32.7	-21.2	2.02	47.05	-	-	-	-	202	109	H
2.596	40.2	PK2	32.7	-21.2	0	51.7	-	-	-	-	149	227	V
2.596	35.08	MAV1	32.7	-21.2	2.02	48.6	-	-	-	-	149	227	V

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

PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.298	31.02	Pk	32	-21.7	0	41.32	-	-	74	-32.68	0-360	102	H
2	* 2.324	37.06	Pk	32.1	-21.6	0	47.56	-	-	74	-26.44	0-360	199	H
4	* 2.298	33.56	Pk	32	-21.7	0	43.86	-	-	74	-30.14	0-360	200	V
5	* 2.324	38.29	Pk	32.1	-21.6	0	48.79	-	-	74	-25.21	0-360	200	V
3	2.636	32.42	Pk	32.5	-21.4	0	43.52	-	-	-	-	0-360	102	H
6	2.636	33.38	Pk	32.5	-21.4	0	44.48	-	-	-	-	0-360	200	V

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

Radiated Emissions

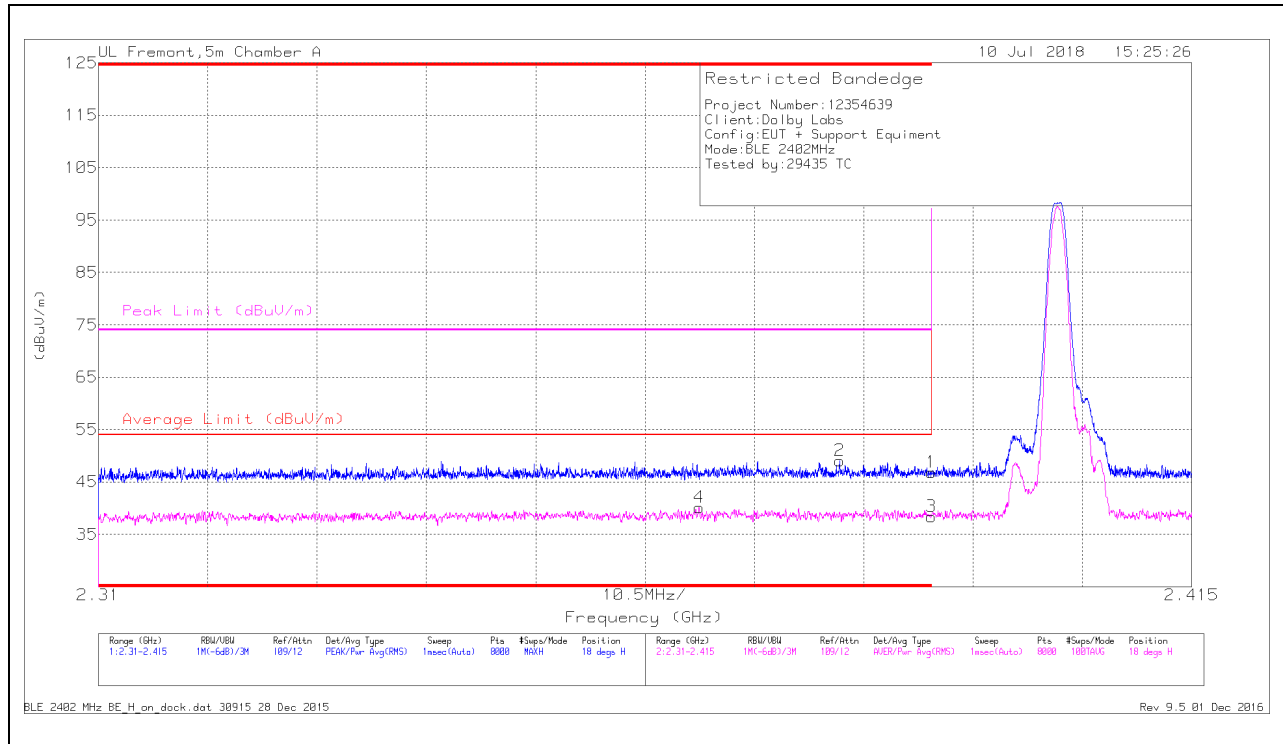
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.298	34.2	PK2	32	-21.7	0	44.5	-	-	74	-29.5	227	205	H
* 2.298	27	MAV1	32	-21.7	2.02	39.32	54	-14.68	-	-	227	205	H
* 2.324	39.95	PK2	32.1	-21.6	0	50.45	-	-	74	-23.55	177	183	H
* 2.324	34.75	MAV1	32.1	-21.6	2.02	47.27	54	-6.73	-	-	177	183	H
* 2.298	37.15	PK2	32	-21.8	0	47.35	-	-	74	-26.65	310	213	V
* 2.298	31.21	MAV1	32	-21.7	2.02	43.53	54	-10.47	-	-	310	213	V
* 2.324	40.53	PK2	32.1	-21.6	0	51.03	-	-	74	-22.97	283	197	V
* 2.324	36.46	MAV1	32.1	-21.6	2.02	48.98	54	-5.02	-	-	283	197	V
2.636	35.35	PK2	32.5	-21.4	0	46.45	-	-	-	-	199	234	H
2.636	30.15	MAV1	32.5	-21.4	2.02	43.27	-	-	-	-	199	234	H
2.636	36.84	PK2	32.5	-21.4	0	47.94	-	-	-	-	120	212	V
2.636	31.86	MAV1	32.5	-21.4	2.02	44.98	-	-	-	-	120	212	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAV1 - KDB558074 Option 1 Maximum RMS Average

9.2.2. BLE (1Mbps) WITH A DOCK

BANDEGE (LOW CHANNEL)

HORIZONTAL RESULT



Trace Markers

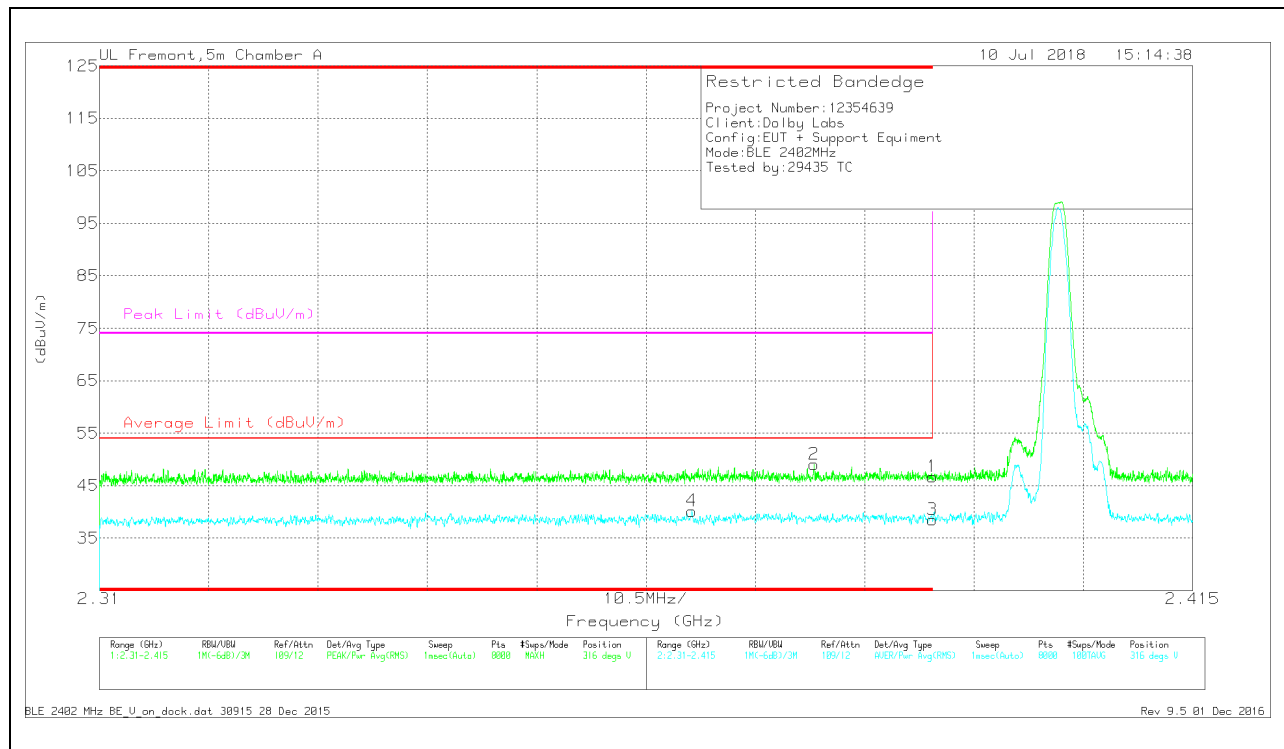
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1	* 2.39	36.02	Pk	32.3	-21.5	0	46.82	-	-	74	-27.18	18	154	H
2	* 2.381	38.21	Pk	32.3	-21.5	0	49.01	-	-	74	-24.99	18	154	H
3	* 2.39	25.59	RMS	32.3	-21.5	2.02	38.41	54	-15.59	-	-	18	154	H
4	* 2.368	27.25	RMS	32.3	-21.4	2.02	40.17	54	-13.83	-	-	18	154	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 T863 (dBm)	Ampl/CbW/Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	35.86	Pk	32.3	-21.5	0	46.66	-	-	74	-27.34	316	109	V
2	* 2.379	38.3	Pk	32.3	-21.5	0	49.1	-	-	74	-24.9	316	109	V
3	* 2.39	25.7	RMS	32.3	-21.5	2.02	38.52	54	-15.48	-	-	316	109	V
4	* 2.367	27.27	RMS	32.3	-21.4	2.02	40.19	54	-13.81	-	-	316	109	V

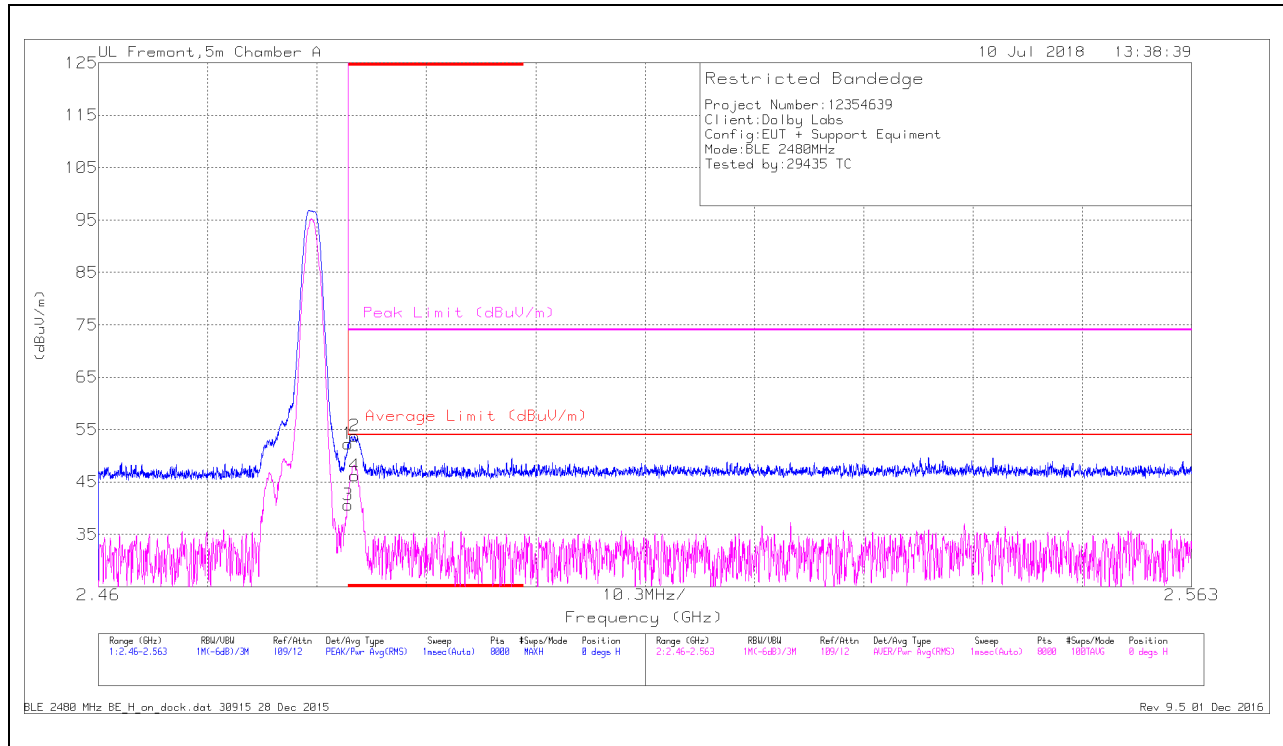
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Trace Markers

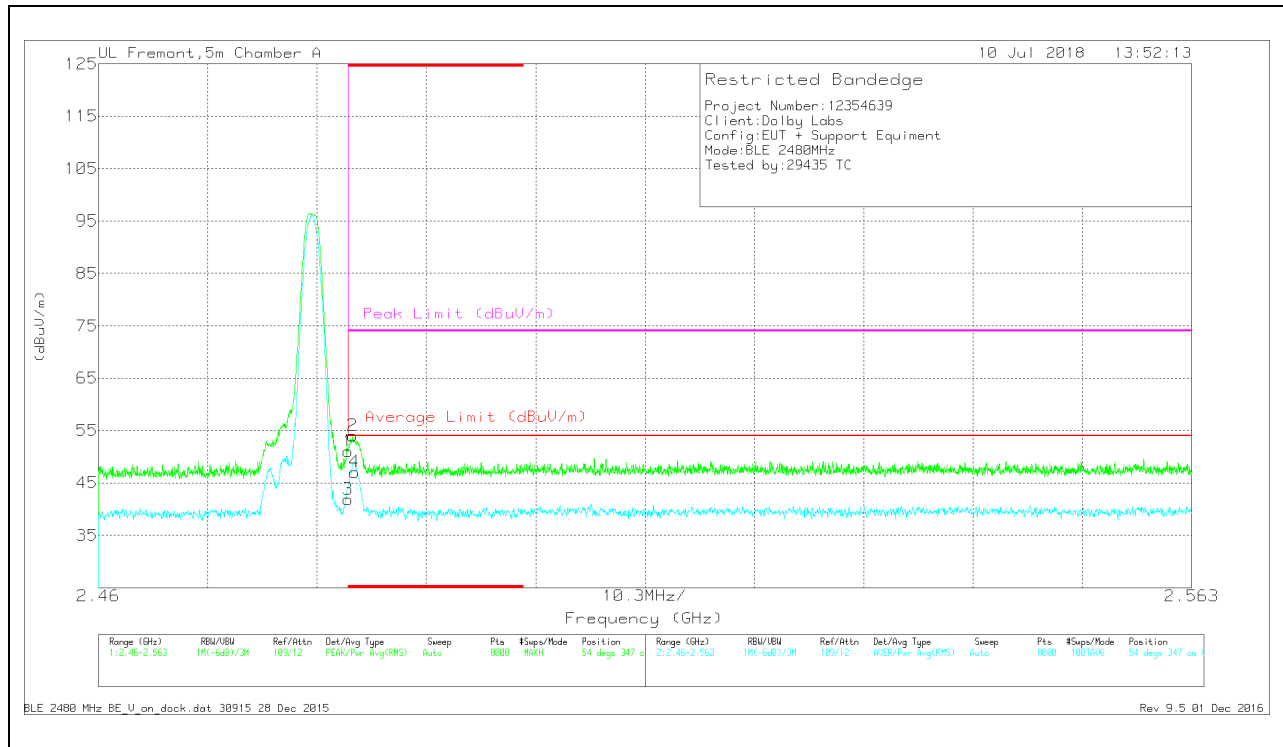
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 1863 (dBm)	Amp/Cb1Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	41.2	Pk	32.6	-21.5	0	52.3	-	-	74	-21.7	0	348	H
2	* 2.484	42.67	Pk	32.6	-21.5	0	53.77	-	-	74	-20.23	0	348	H
3	* 2.484	29.46	RMS	32.6	-21.5	2.02	42.58	54	-11.42	-	-	0	348	H
4	* 2.484	35.07	RMS	32.6	-21.5	2.02	48.19	54	-5.81	-	-	0	348	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 T863 (dBm)	Ampl/CbW/Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	39.99	Pk	32.6	-21.5	0	51.09	-	-	74	-22.91	54	347	V
2	* 2.484	42.91	Pk	32.6	-21.5	0	54.01	-	-	74	-19.99	54	347	V
3	* 2.484	30.79	RMS	32.6	-21.5	2.02	43.91	54	-10.09	-	-	54	347	V
4	* 2.484	35.95	RMS	32.6	-21.5	2.02	49.07	54	-4.93	-	-	54	347	V

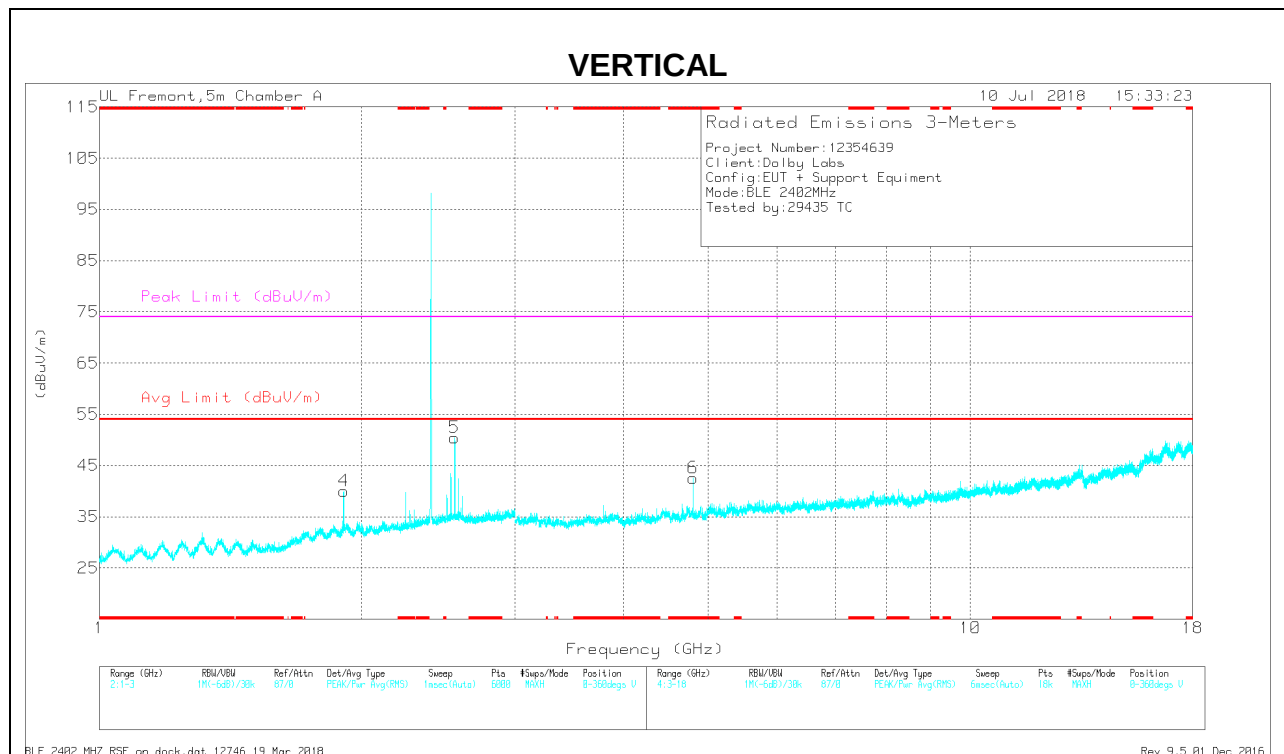
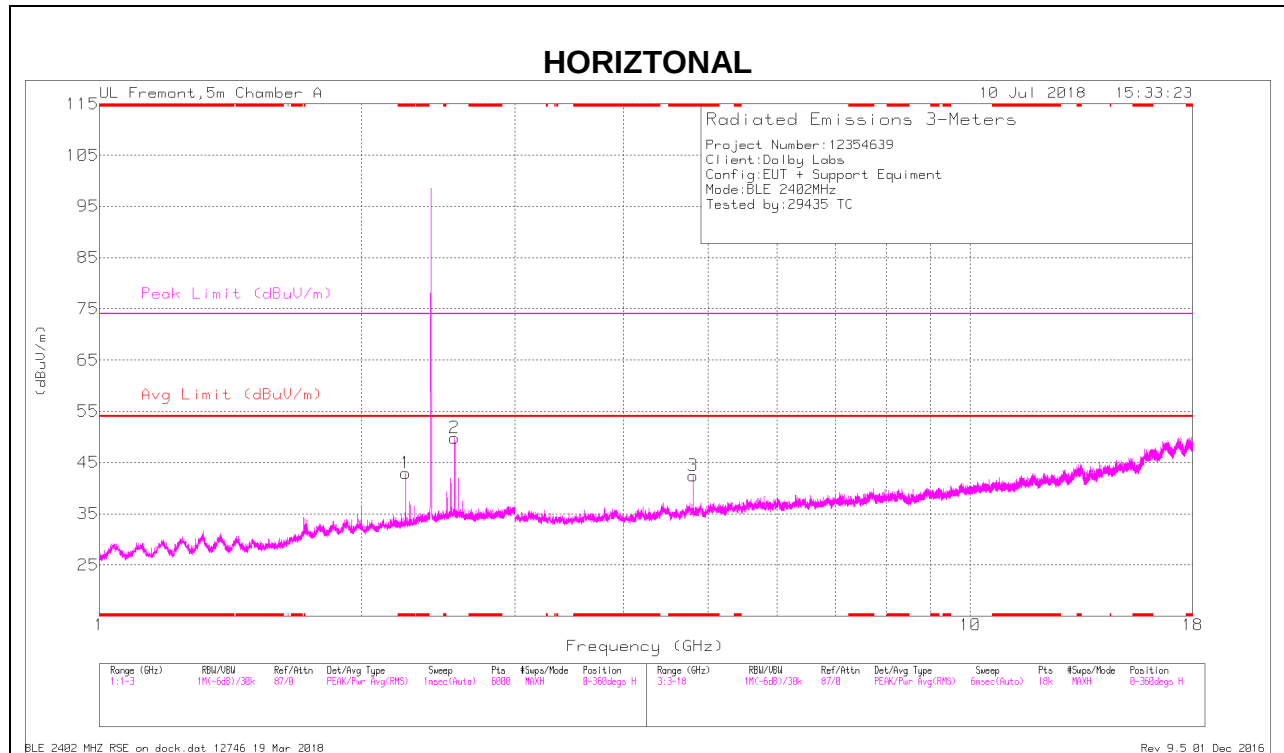
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cbl/Filt/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.246	33.06	Pk	31.7	-21.8	0	42.96	-	-	74	-31.04	0-360	199	H
3	* 4.803	38.53	Pk	34	-30.1	0	42.43	-	-	74	-31.57	0-360	199	H
6	* 4.804	38.78	Pk	34	-30.2	0	42.58	-	-	74	-31.42	0-360	200	V
4	1.909	30.22	Pk	31	-21.2	0	40.02	-	-	-	-	0-360	200	V
2	2.558	38.34	Pk	32.7	-21.3	0	49.74	-	-	-	-	0-360	102	H
5	2.558	39.08	Pk	32.7	-21.3	0	50.48	-	-	-	-	0-360	200	V

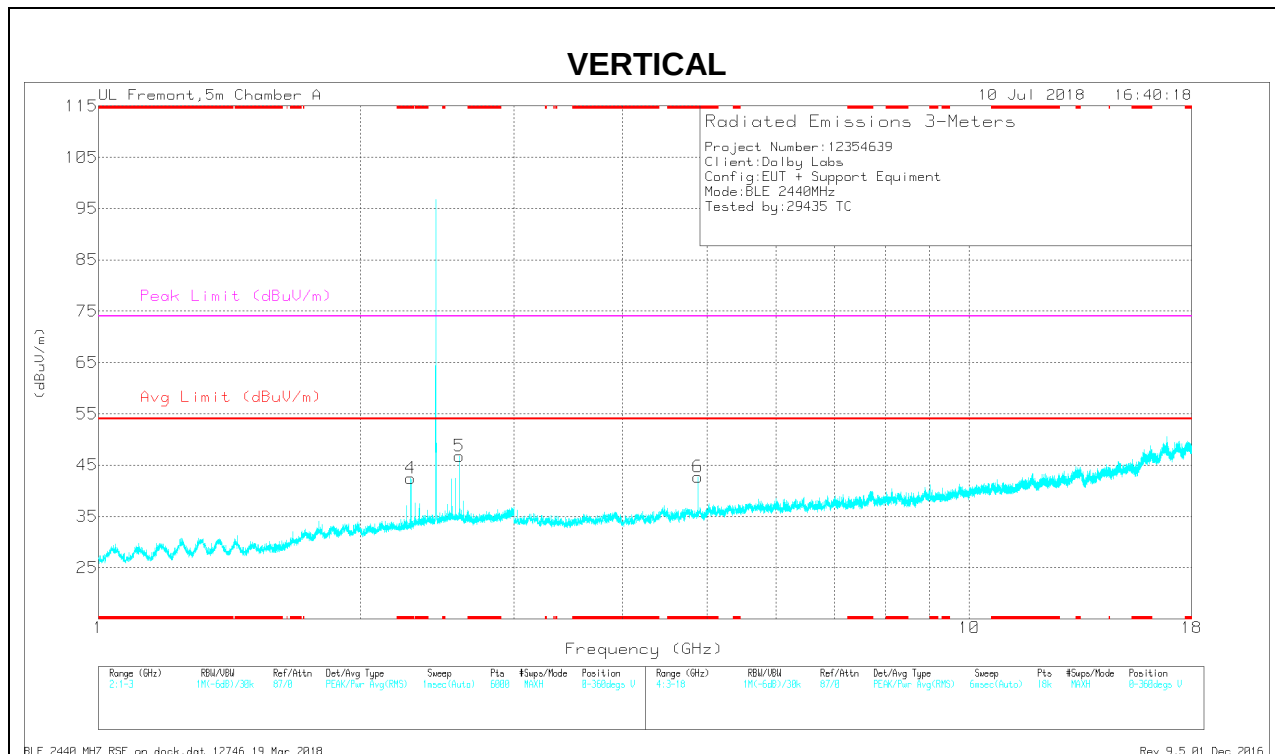
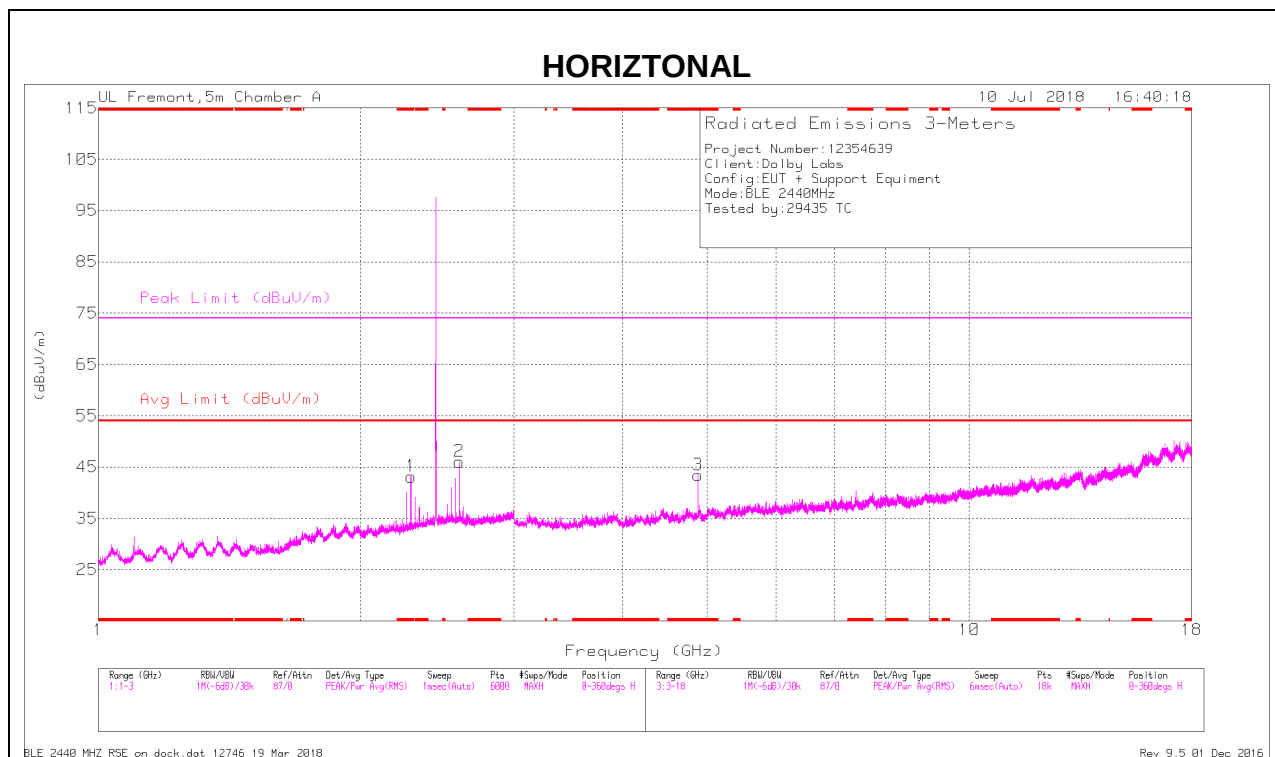
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filt/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
* 2.246	37.18	PK2	31.7	-21.8	0	47.08	-	-	74	-26.92	192	261	H
* 2.246	31.2	MAV1	31.7	-21.8	2.02	43.12	54	-10.88	-	-	192	261	H
* 4.804	44.33	PK2	34	-30.2	0	48.13	-	-	74	-25.87	100	179	H
* 4.804	34.64	MAV1	34	-30.2	2.02	40.46	54	-13.54	-	-	100	179	H
* 4.804	42.69	PK2	34	-30.1	0	46.59	-	-	74	-27.41	165	157	V
* 4.804	33.33	MAV1	34	-30.2	2.02	39.15	54	-14.85	-	-	165	157	V
1.911	30.14	PK2	31	-21.2	0	39.94	-	-	-	-	194	262	V
1.911	17.95	MAV1	31	-21.3	2.02	29.67	-	-	-	-	194	262	V
2.558	40.52	PK2	32.7	-21.3	0	51.92	-	-	-	-	228	102	H
2.558	37.34	MAV1	32.7	-21.3	2.02	50.76	-	-	-	-	228	102	H
2.558	41.79	PK2	32.7	-21.3	0	53.19	-	-	-	-	275	251	V
2.558	39.05	MAV1	32.7	-21.3	2.02	52.47	-	-	-	-	275	251	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

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.284	33.03	Pk	31.9	-21.8	0	43.13	-	-	74	-30.87	0-360	102	H
4	* 2.284	32.32	Pk	31.9	-21.8	0	42.42	-	-	74	-31.58	0-360	199	V
3	* 4.88	40.49	Pk	34.3	-31.4	0	43.39	-	-	74	-30.61	0-360	199	H
6	* 4.88	39.8	Pk	34.3	-31.4	0	42.7	-	-	74	-31.3	0-360	200	V
2	2.596	34.55	Pk	32.7	-21.2	0	46.05	-	-	-	-	0-360	199	H
5	2.596	35.22	Pk	32.7	-21.2	0	46.72	-	-	-	-	0-360	100	V

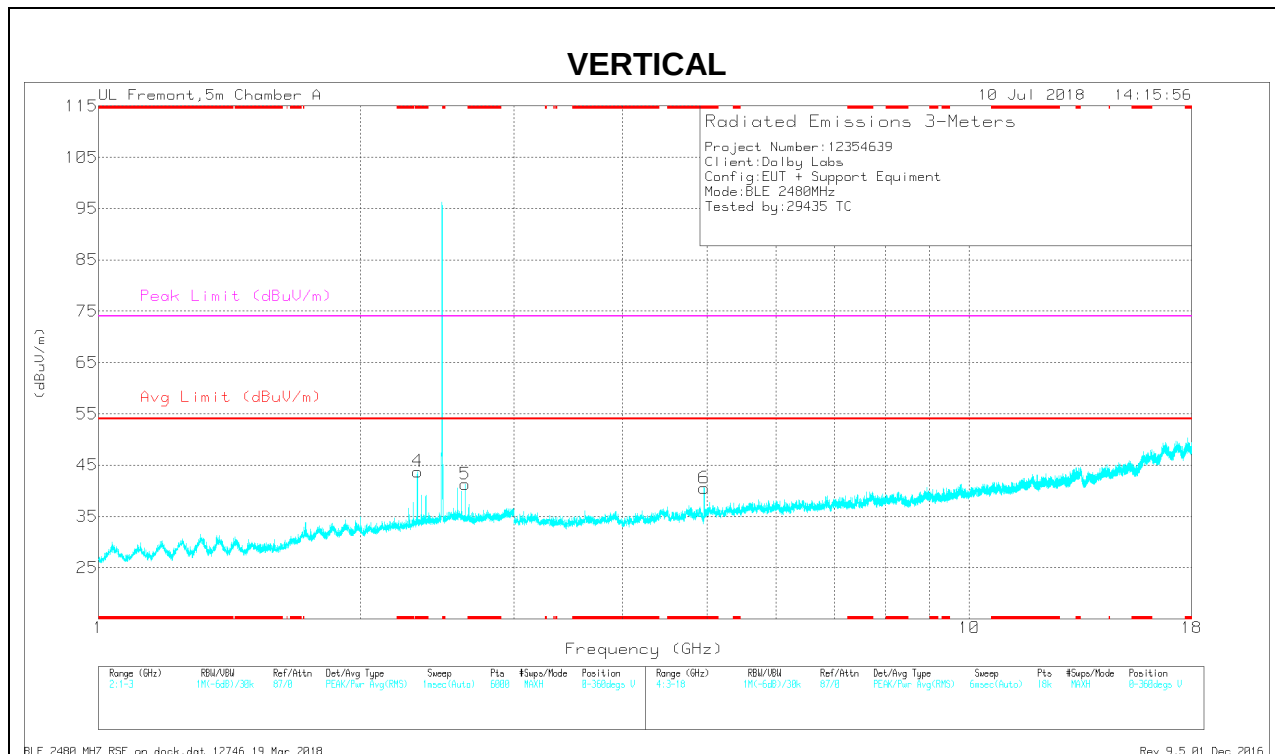
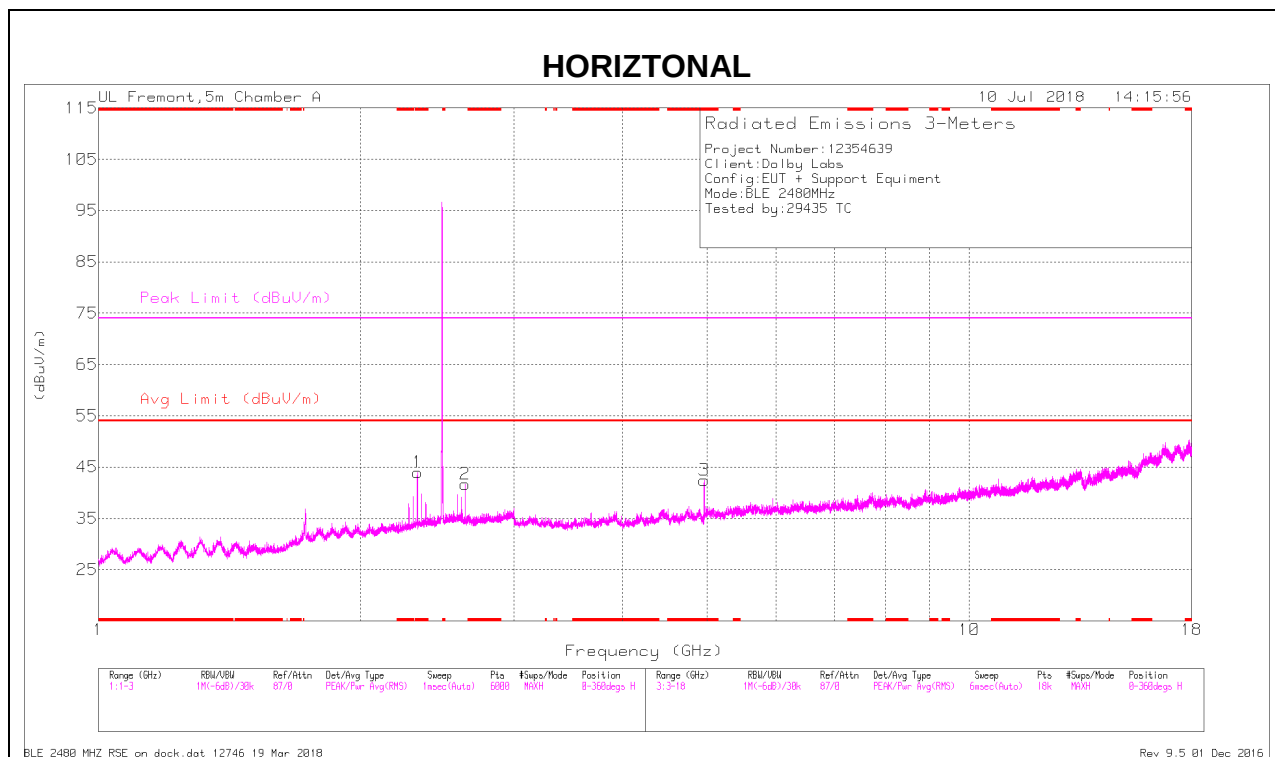
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cbl/Filtr/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	38.72	PK2	31.9	-21.8	0	48.82	-	-	74	-25.18	192	256	H
* 2.284	34.59	MAV1	31.9	-21.8	2.02	46.71	54	-7.29	-	-	192	256	H
* 2.284	36.98	PK2	31.9	-21.8	0	47.08	-	-	74	-26.92	260	211	V
* 2.284	31.66	MAV1	31.9	-21.8	2.02	43.78	54	-10.22	-	-	260	211	V
* 4.88	46.1	PK2	34.3	-31.4	0	49	-	-	74	-25	103	186	H
* 4.88	37.87	MAV1	34.3	-31.4	2.02	42.79	54	-11.21	-	-	103	186	H
* 4.88	45.32	PK2	34.3	-31.4	0	48.22	-	-	74	-25.78	163	212	V
* 4.88	36.26	MAV1	34.3	-31.4	2.02	41.18	54	-12.82	-	-	163	212	V
2.596	38.58	PK2	32.7	-21.2	0	50.08	-	-	-	-	33	179	H
2.596	32.95	MAV1	32.7	-21.2	2.02	46.47	-	-	-	-	33	179	H
2.596	38.3	PK2	32.7	-21.2	0	49.8	-	-	-	-	84	163	V
2.596	32.75	MAV1	32.7	-21.2	2.02	46.27	-	-	-	-	84	163	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAV1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.324	33.48	Pk	32.1	-21.6	0	43.98	-	-	74	-30.02	0-360	102	H
4	* 2.324	33.26	Pk	32.1	-21.6	0	43.76	-	-	74	-30.24	0-360	199	V
3	* 4.96	38.81	Pk	34.5	-30.9	0	42.41	-	-	74	-31.59	0-360	199	H
6	* 4.96	36.95	Pk	34.5	-30.9	0	40.55	-	-	74	-33.45	0-360	200	V
2	2.636	30.55	Pk	32.5	-21.4	0	41.65	-	-	-	-	0-360	199	H
5	2.636	30.23	Pk	32.5	-21.4	0	41.33	-	-	-	-	0-360	199	V

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

Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/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	36.69	PK2	32.1	-21.6	0	47.19	-	-	74	-26.81	261	105	H
* 2.324	30.01	MAV1	32.1	-21.6	2.02	42.53	54	-11.47	-	-	261	105	H
* 2.324	37.25	PK2	32.1	-21.6	0	47.75	-	-	74	-26.25	288	337	V
* 2.324	31.18	MAV1	32.1	-21.6	2.02	43.7	54	-10.3	-	-	288	337	V
* 4.959	44.77	PK2	34.5	-30.9	0	48.37	-	-	74	-25.63	112	229	H
* 4.96	35.66	MAV1	34.5	-30.9	2.02	41.28	54	-12.72	-	-	112	229	H
* 4.959	43.3	PK2	34.5	-30.9	0	46.9	-	-	74	-27.1	158	203	V
* 4.96	34.39	MAV1	34.5	-30.9	2.02	40.01	54	-13.99	-	-	158	203	V
2.636	34.53	PK2	32.5	-21.4	0	45.63	-	-	-	-	30	219	H
2.636	28.87	MAV1	32.5	-21.4	2.02	41.99	-	-	-	-	30	219	H
2.636	35.25	PK2	32.5	-21.4	0	46.35	-	-	-	-	281	213	V
2.636	29.96	MAV1	32.5	-21.4	2.02	43.08	-	-	-	-	281	213	V

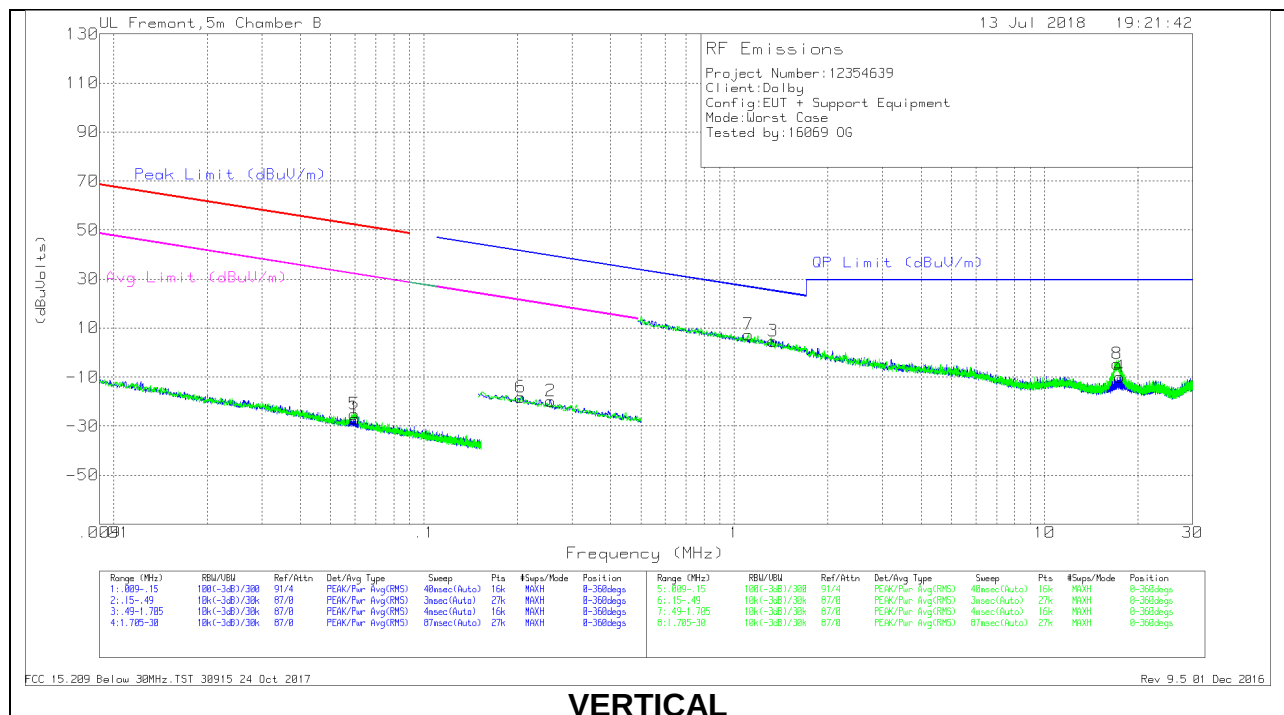
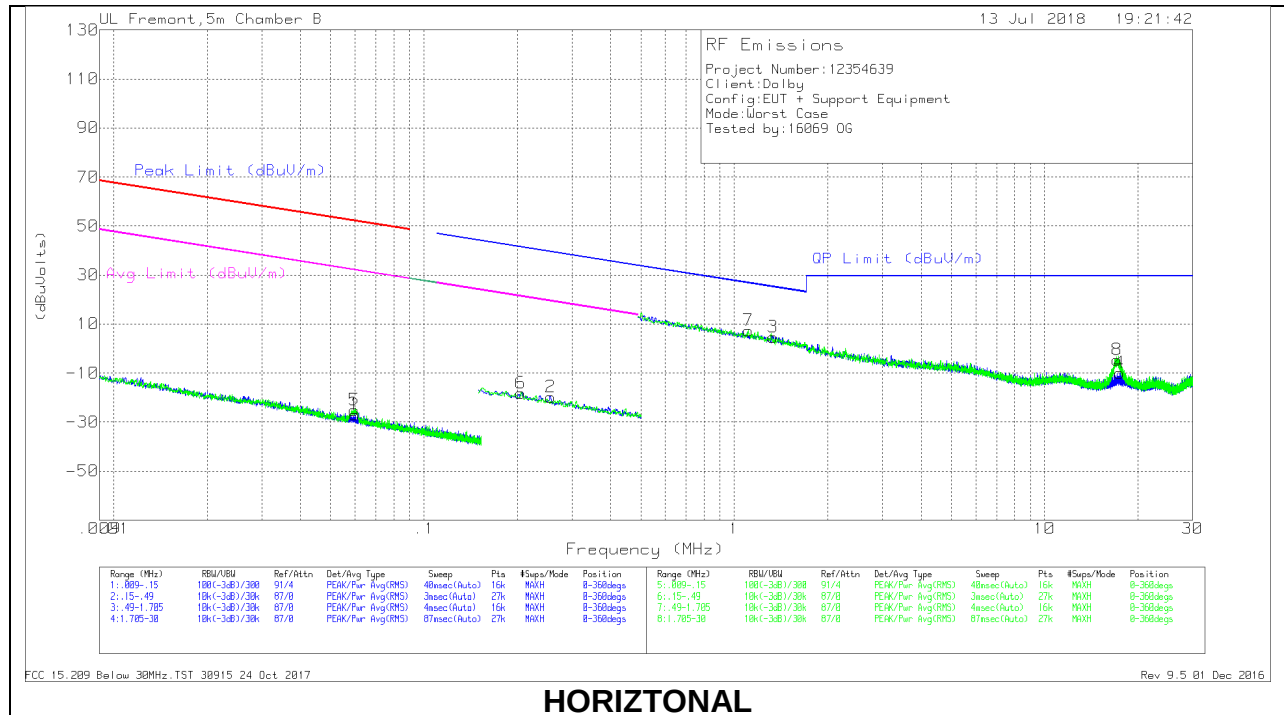
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

9.3. Worst Case Below 30 MHz

9.3.1. BLE (1Mbps) WITHOUT A DOCK



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Asimuth (Degs)
5	05966	38.93	Pk	14.5	1.4	-80	-25.17	52.07	-77.24	32.07	-57.24	-	-	-	-	-	-	-	-	0-360
1	05992	37.03	Pk	14.5	1.4	-80	-27.07	52.03	-79.1	32.03	-59.1	-	-	-	-	-	-	-	-	0-360
6	2052	46.37	Pk	13.9	1.5	-80	-18.23	-	-	-	-	-	-	-	-	41.37	-59.6	21.37	-39.6	0-360
2	25607	44.94	Pk	13.8	1.5	-80	-19.76	-	-	-	-	-	-	-	-	39.45	-59.21	19.45	-39.21	0-360

Pk - Peak detector

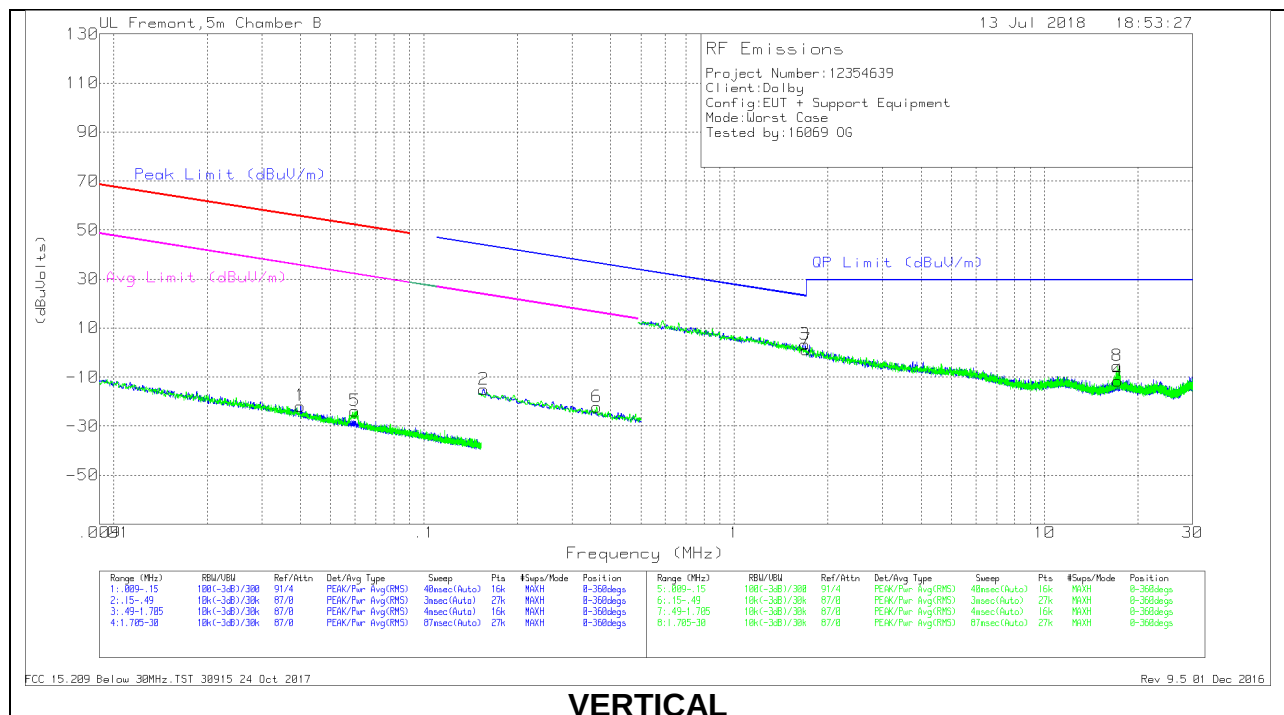
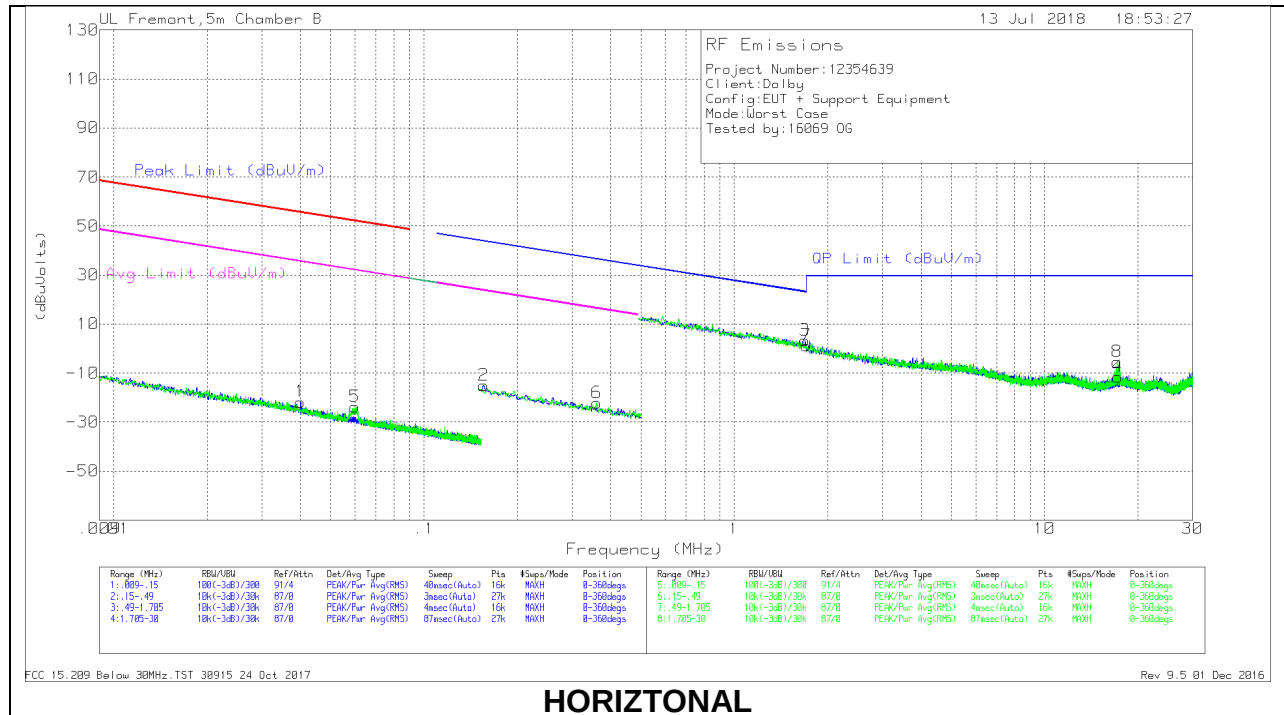
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Asimuth (Degs)
7	1.11001	31.59	Pk	14.3	1.5	-40	7.39	-	-	-	-	-	-	26.72	-19.33	-	-	-	-	0-360
3	1.33421	28.79	Pk	14.3	1.5	-40	4.59	-	-	-	-	-	-	25.12	-20.53	-	-	-	-	0-360
8	17.12999	19.22	Pk	14.5	1.6	-40	-4.68	-	-	-	-	-	-	29.5	-34.18	-	-	-	-	0-360
4	17.45749	13.98	Pk	14.5	1.6	-40	-9.92	-	-	-	-	-	-	29.5	-39.42	-	-	-	-	0-360

Pk - Peak detector

NOTE: KDB 414788 OATS and Chamber Correlation Justification

- Based 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.
- OATs and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

9.3.2. BLE (1Mbps) WITH A DOCK



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dBm)	Cbl (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	04003	41.89	Pk	14.9	1.4	-80	-21.81	55.54	-77.35	35.54	-57.35	-	-	-	-	-	-	-	-	0-360
5	06003	40.38	Pk	14.5	1.4	-80	-23.72	52.02	-75.74	32.02	-55.74	-	-	-	-	-	-	-	-	0-360
2	15601	49.45	Pk	13.9	1.5	-80	-15.15	-	-	-	-	-	-	-	-	43.76	-58.91	23.76	-38.91	0-360
6	36041	42.53	Pk	13.8	1.5	-80	-22.17	-	-	-	-	-	-	-	-	36.47	-58.64	16.47	-38.64	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dBm)	Cbl (dB)	Dist Corr 40Log	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	1.69137	27.5	Pk	14.4	1.5	-40	3.4	-	-	-	-	-	-	23.07	-19.57	-	-	-	-	0-360
7	1.705	25.24	Pk	14.4	1.5	-40	1.14	-	-	-	-	-	-	23	-21.86	-	-	-	-	0-360
8	17.15042	18.36	Pk	14.5	1.6	-40	-5.54	-	-	-	-	-	-	29.5	-35.04	-	-	-	-	0-360
4	17.22274	12.44	Pk	14.5	1.6	-40	-11.46	-	-	-	-	-	-	29.5	-40.96	-	-	-	-	0-360

Pk - Peak detector

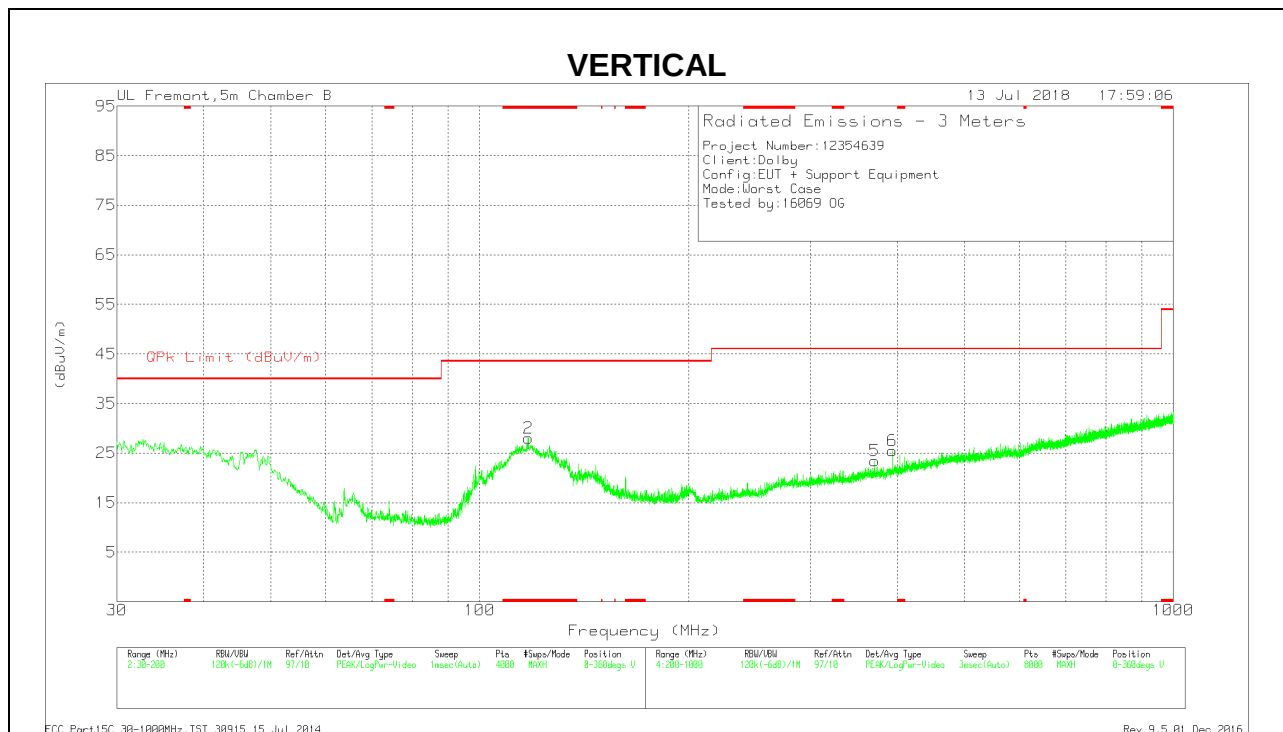
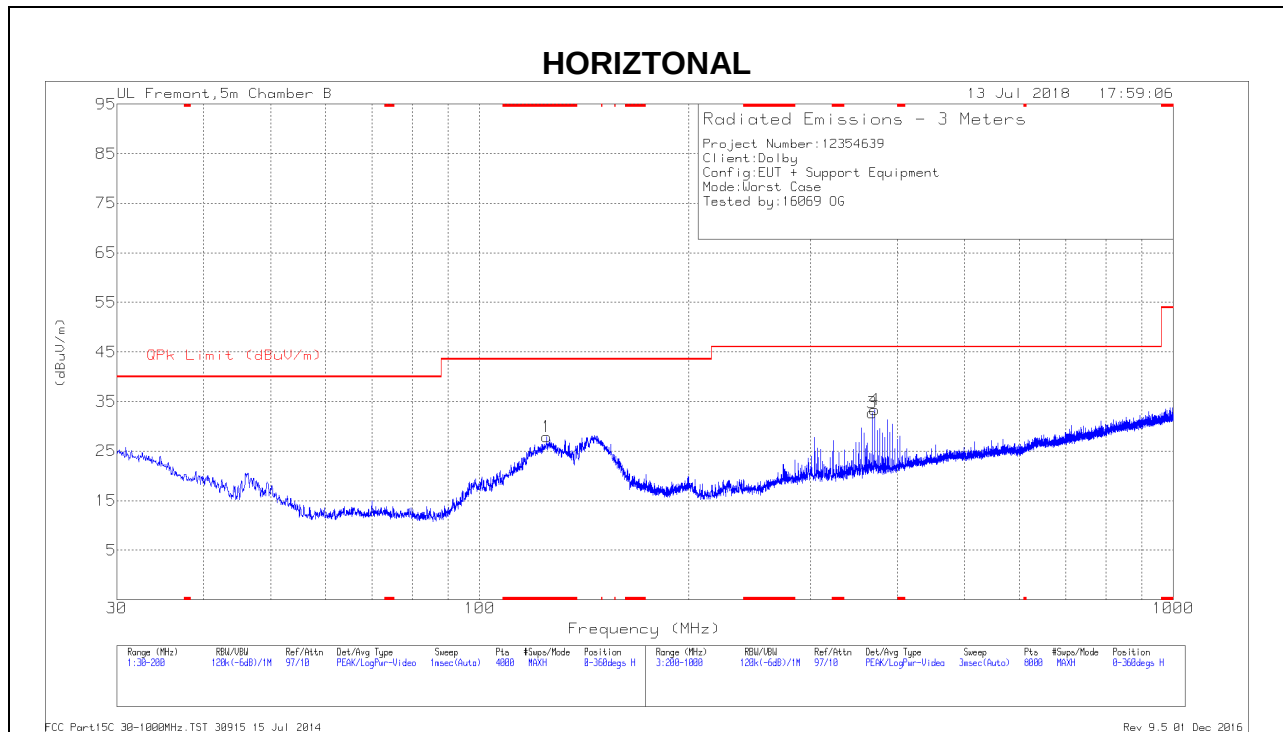
NOTE: KDB 414788 OATS and Chamber Correlation Justification

- Based 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.
- OATs and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

9.4. Worst Case Below 1 GHz

9.4.1. BLE (1Mbps) WITHOUT A DOCK

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



Below 1GHz Data

Trace Markers

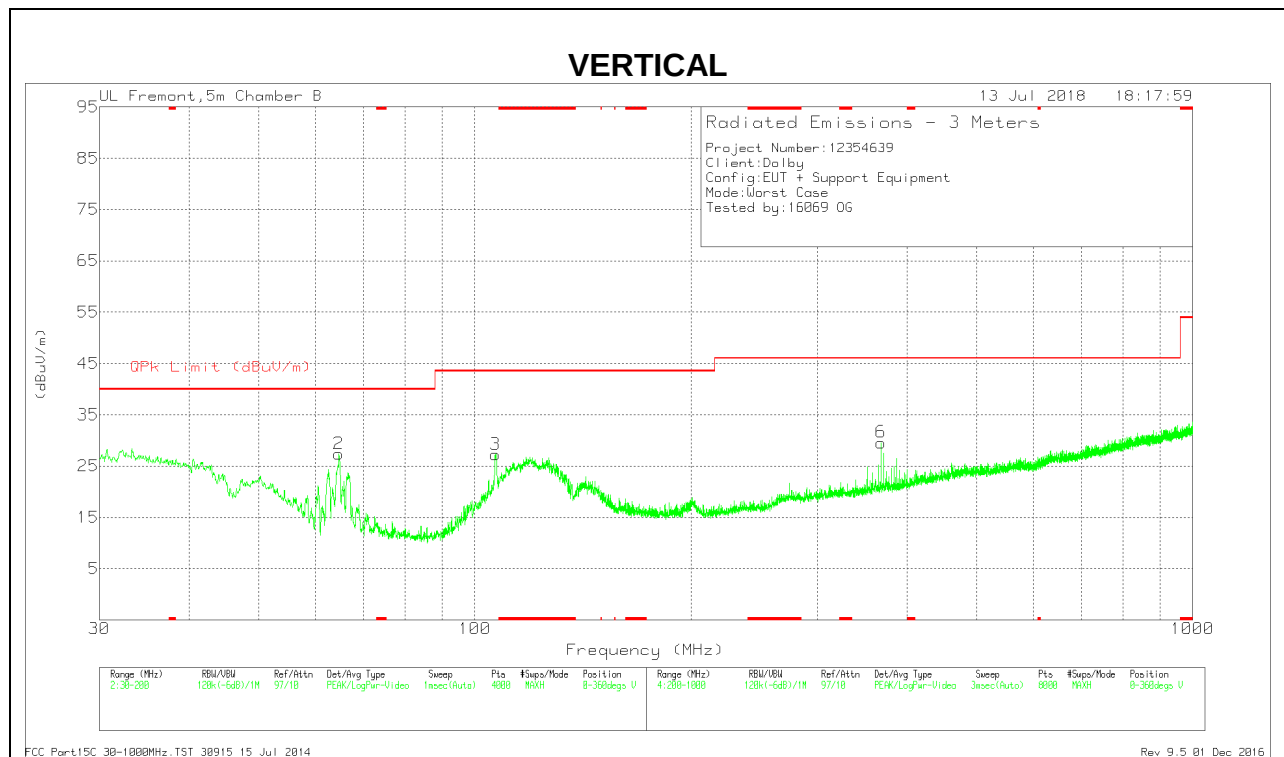
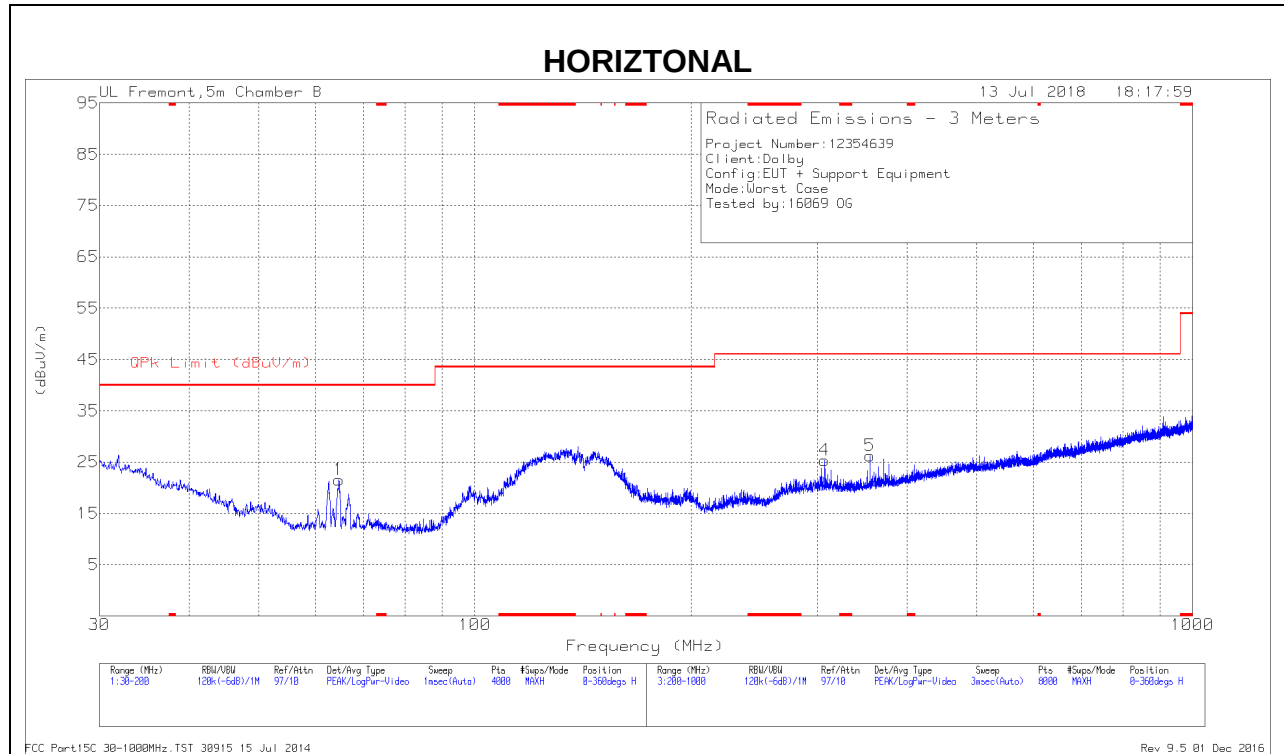
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T407 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 117.4876	38.23	Pk	17.6	-27.8	28.03	43.52	-15.49	0-360	100	V
1	* 124.9908	37.67	Pk	17.9	-27.7	27.87	43.52	-15.65	0-360	200	H
3	368.0218	39.72	Pk	18.9	-25.9	32.72	46.02	-13.3	0-360	100	H
4	371.2223	40.27	Pk	19	-25.9	33.37	46.02	-12.65	0-360	100	H
5	371.2223	30.35	Pk	19	-25.9	23.45	46.02	-22.57	0-360	100	V
6	393.6252	32.23	Pk	19.3	-26	25.53	46.02	-20.49	0-360	100	V

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

Pk - Peak detector

9.4.2. BLE (1Mbps) WITH A DOCK

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



Below 1GHz Data

Trace Markers

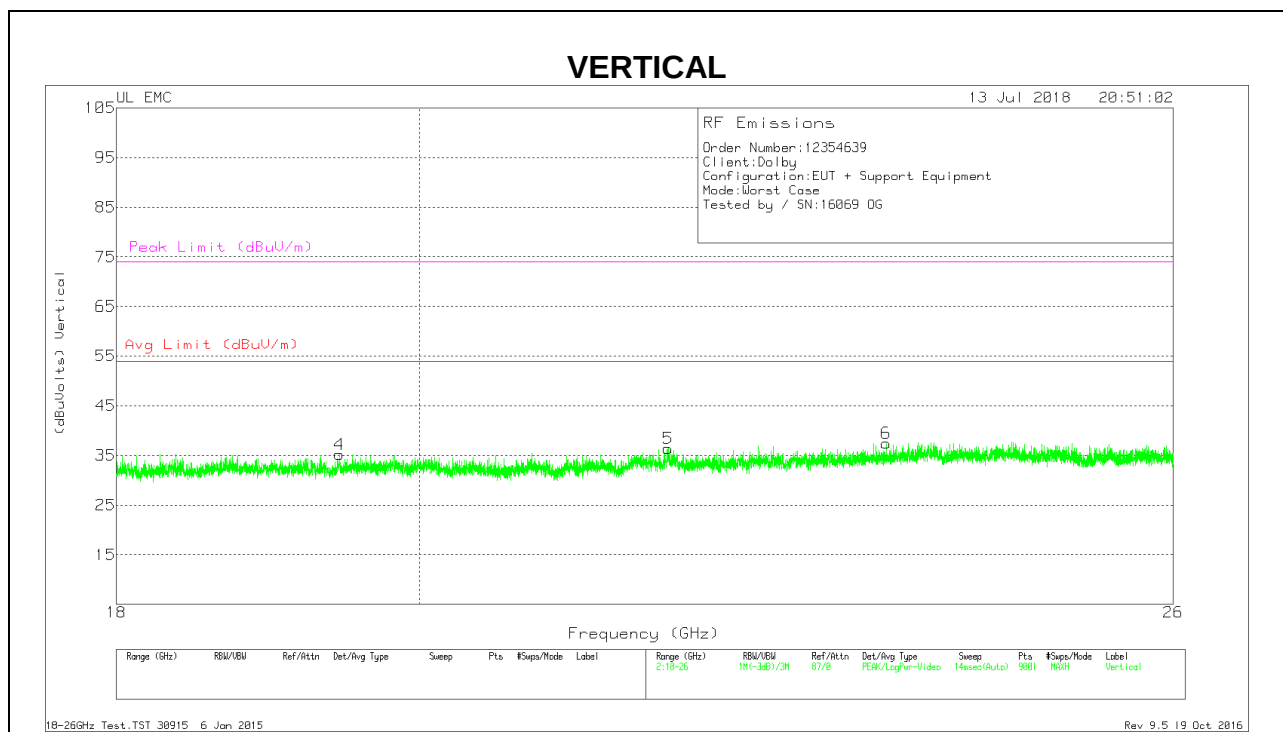
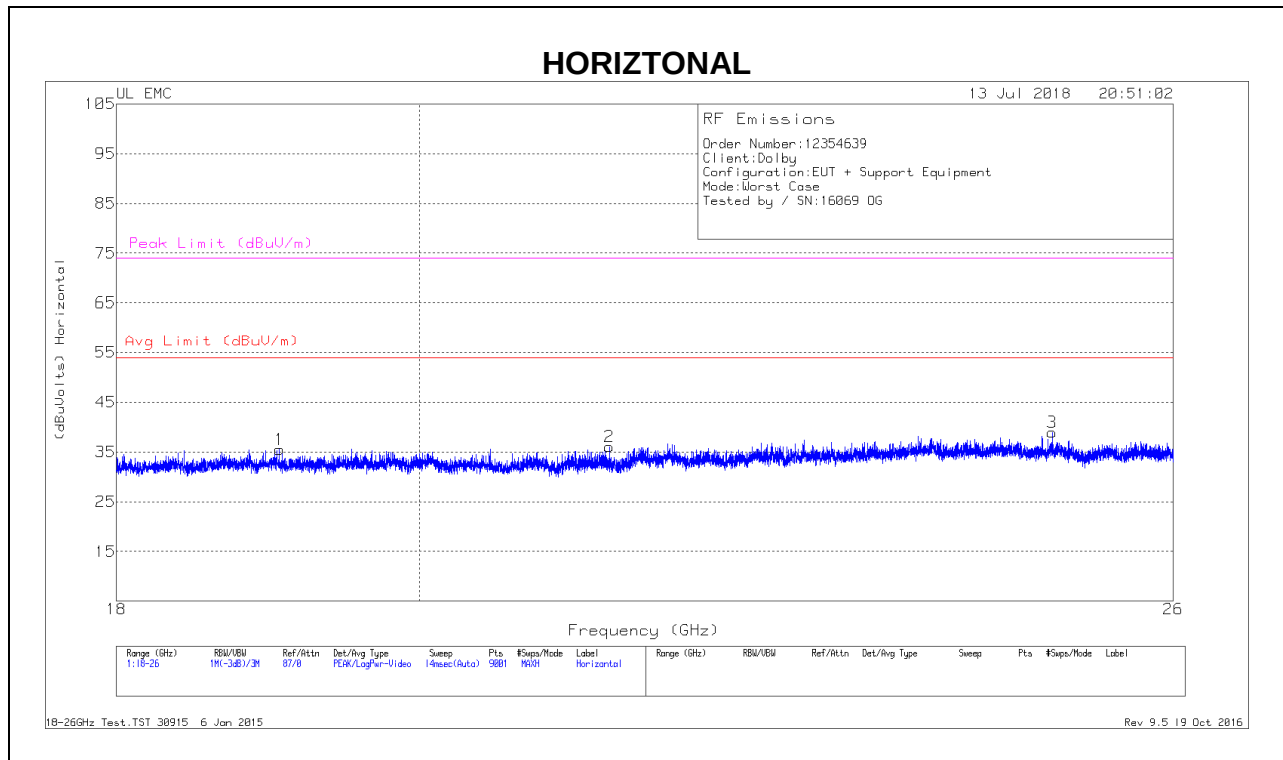
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T407 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	64.6465	43.76	Pk	12	-28.4	27.36	40	-12.64	0-360	100	V
1	64.689	37.96	Pk	12	-28.4	21.56	40	-18.44	0-360	200	H
3	106.7324	39.01	Pk	16.1	-27.9	27.21	43.52	-16.31	0-360	100	V
4	307.2139	33.52	Pk	17.6	-25.8	25.32	46.02	-20.7	0-360	100	H
5	355.2202	33.51	Pk	18.6	-25.9	26.21	46.02	-19.81	0-360	100	H
6	368.0218	36.6	Pk	18.9	-25.9	29.6	46.02	-16.42	0-360	200	V

Pk - Peak detector

9.5. Worst Case 18-26 GHz

9.5.1. BLE (1Mbps) WITHOUT A DOCK

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



18 – 26GHz DATA

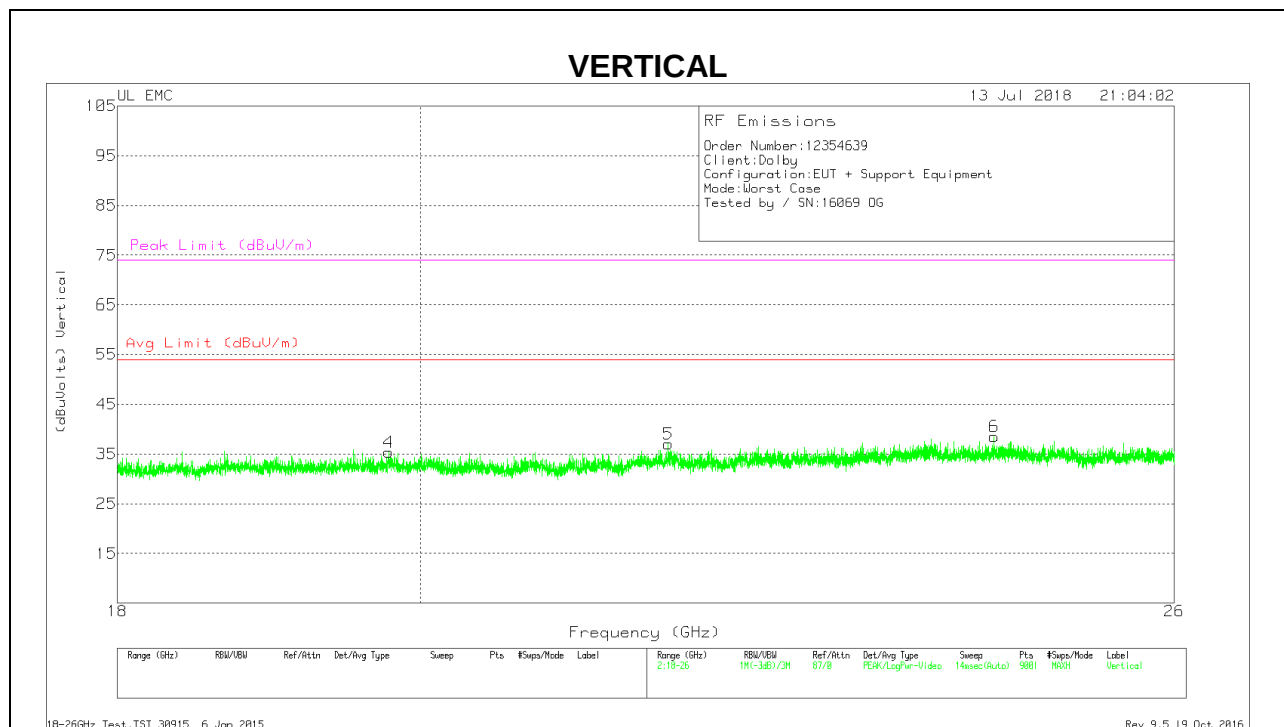
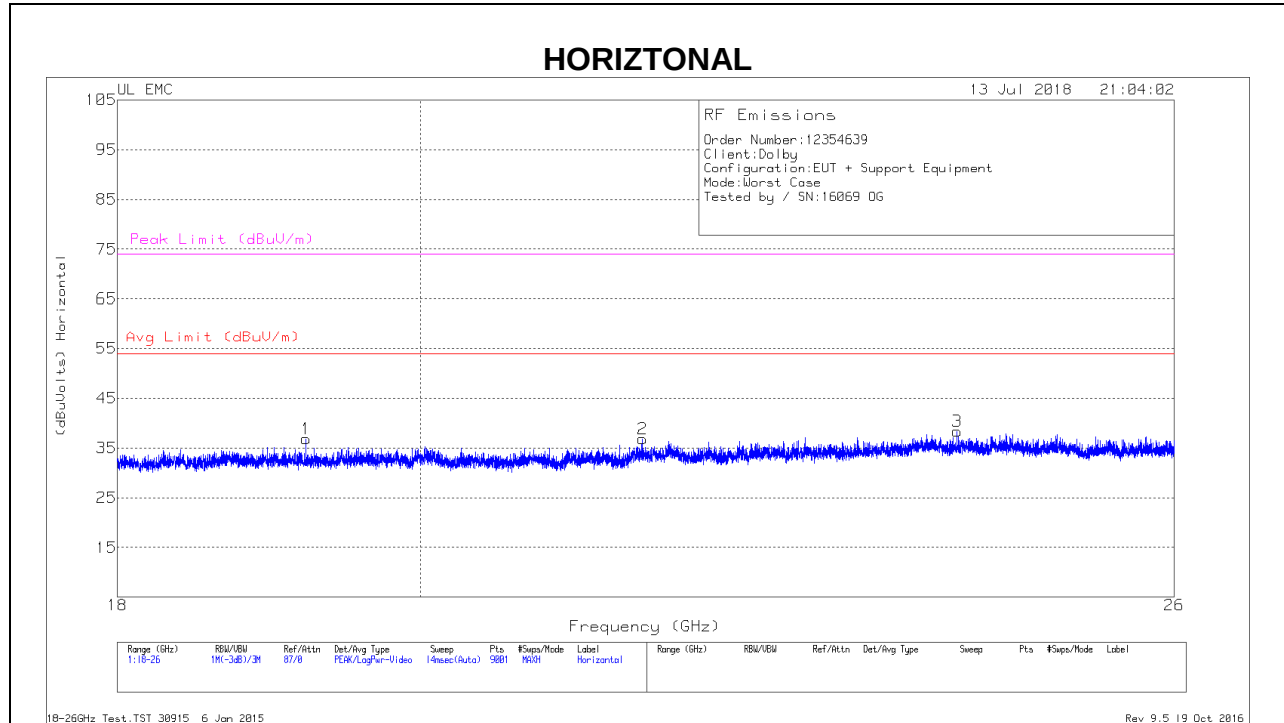
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T89 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.05	37.92	Pk	32.2	-25.1	-9.5	35.52	54	-18.48	74	-38.48
2	21.367	37.85	Pk	33.1	-25.4	-9.5	36.05	54	-17.95	74	-37.95
3	24.925	38.54	Pk	34.1	-24.2	-9.5	38.94	54	-15.06	74	-35.06
4	19.452	36.8	Pk	32.5	-24.6	-9.5	35.2	54	-18.8	74	-38.8
5	21.808	36.97	Pk	33.3	-24.4	-9.5	36.37	54	-17.63	74	-37.63
6	23.528	38.26	Pk	33.3	-24.6	-9.5	37.46	54	-16.54	74	-36.54

Pk - Peak detector

9.5.2. BLE (1Mbps) WITH A DOCK

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



18 – 26GHz DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T89 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.22	38.82	Pk	32.3	-24.8	-9.5	36.82	54	-17.18	74	-37.18
2	21.607	38.54	Pk	33.1	-25.3	-9.5	36.84	54	-17.16	74	-37.16
3	24.107	38.84	Pk	33.4	-24.4	-9.5	38.34	54	-15.66	74	-35.66
4	19.782	36.98	Pk	32.6	-24.7	-9.5	35.38	54	-18.62	74	-38.62
5	21.801	37.73	Pk	33.3	-24.5	-9.5	37.03	54	-16.97	74	-36.97
6	24.419	38.3	Pk	33.8	-24.1	-9.5	38.5	54	-15.5	74	-35.5

Pk - Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

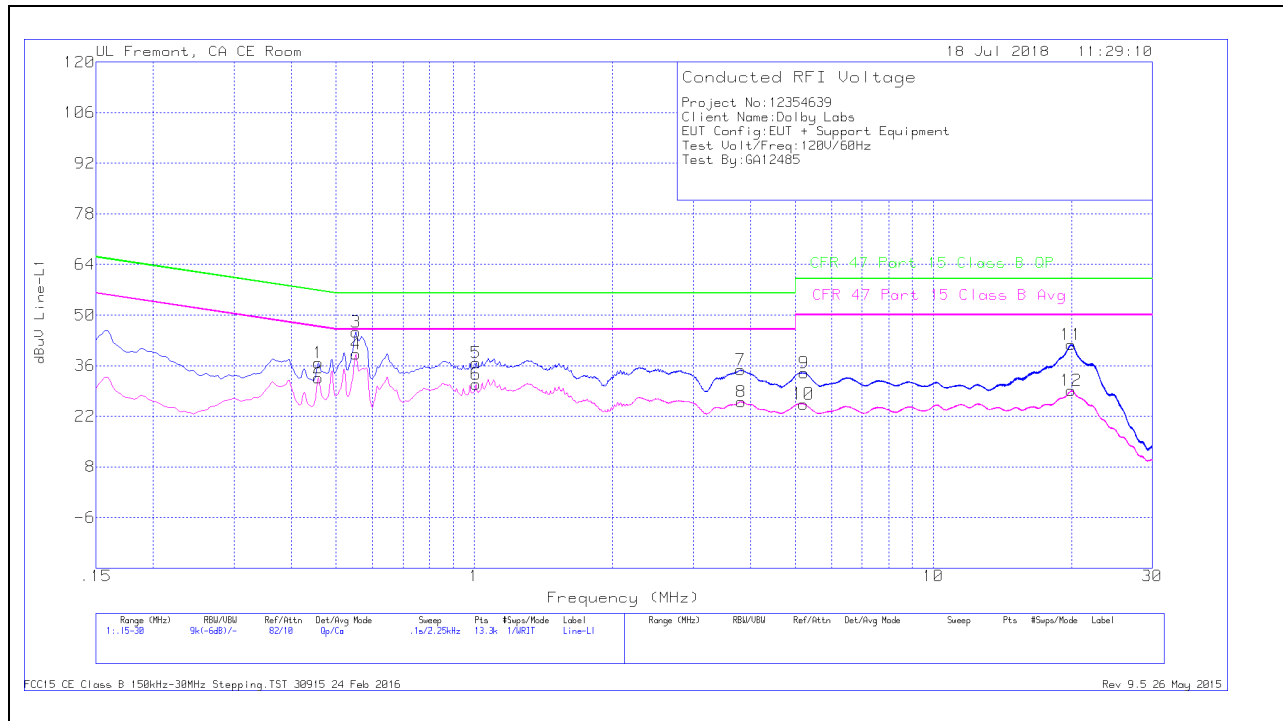
Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 [*]	56 to 46 [*]
0.5-5	56	46
5-30	60	50

^{*} Decreases with the logarithm of the frequency.

RESULTS

10.1.1. AC POWER LINE NORM WITHOUT A DOCK

LINE 1 RESULTS

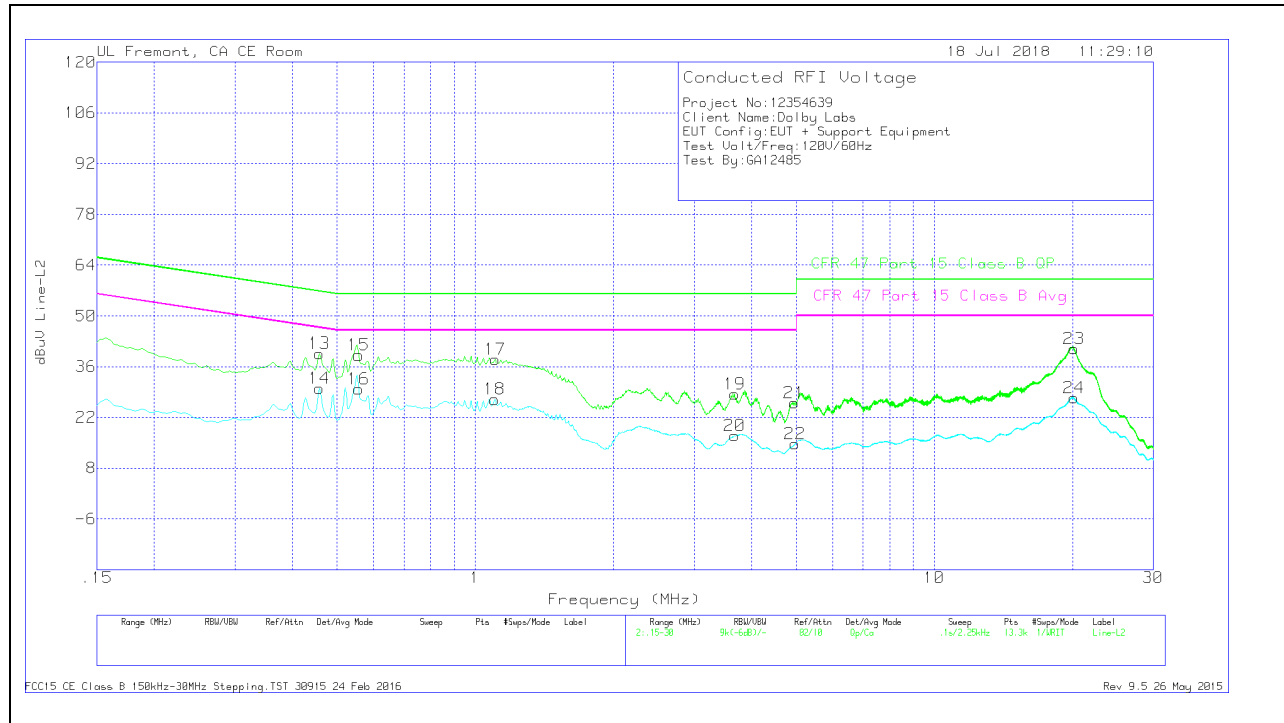


Trace Markers

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	.45825	26.62	Qp	0	0	10.1	36.72	56.72	-20	-	-
2	.45825	22.46	Ca	0	0	10.1	32.56	-	-	46.72	-14.16
3	.55275	35.25	Qp	0	0	10.1	45.35	56	-10.65	-	-
4	.55275	29.09	Ca	0	0	10.1	39.19	-	-	46	-6.81
5	1.0095	26.66	Qp	0	.1	10.1	36.86	56	-19.14	-	-
6	1.0095	20.67	Ca	0	.1	10.1	30.87	-	-	46	-15.13
7	3.8085	24.65	Qp	0	.1	10.1	34.85	56	-21.15	-	-
8	3.813	15.88	Ca	0	.1	10.1	26.08	-	-	46	-19.92
9	5.22825	23.85	Qp	0	.1	10.1	34.05	60	-25.95	-	-
10	5.21925	15.2	Ca	0	.1	10.1	25.4	-	-	50	-24.6
11	19.9748	31.15	Qp	.1	.3	10.3	41.85	60	-18.15	-	-
12	19.9759	18.38	Ca	.1	.3	10.3	29.08	-	-	50	-20.92

Qp - Quasi-Peak detector
Ca - CISPR average detection

LINE 2 RESULTS



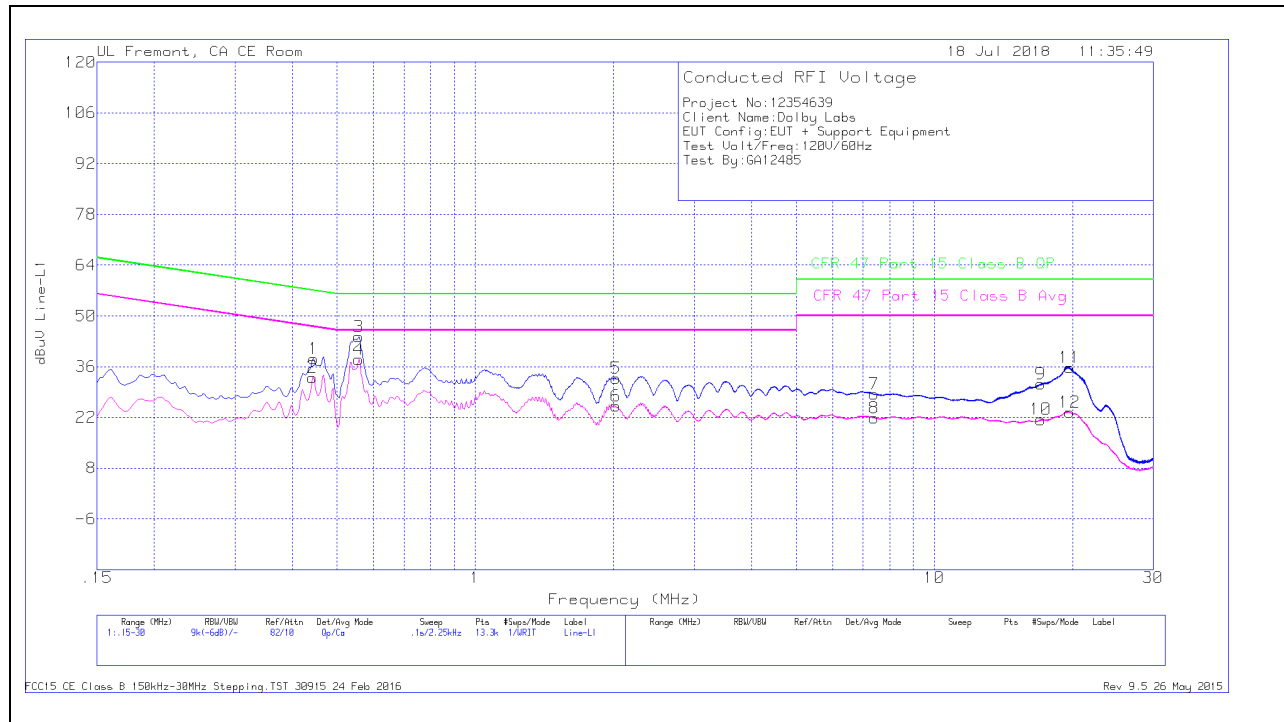
Trace Markers

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	.45825	29.55	Qp	0	0	10.1	39.65	56.72	-17.07	-	-
14	.45825	19.87	Ca	0	0	10.1	29.97	-	-	46.72	-16.75
15	.55725	29.04	Qp	0	0	10.1	39.14	56	-16.86	-	-
16	.55725	19.69	Ca	0	0	10.1	29.79	-	-	46	-16.21
17	1.10625	27.73	Qp	0	.1	10.1	37.93	56	-18.07	-	-
18	1.104	16.77	Ca	0	.1	10.1	26.97	-	-	46	-19.03
19	3.67125	18.2	Qp	0	.1	10.1	28.4	56	-27.6	-	-
20	3.67575	6.76	Ca	0	.1	10.1	16.96	-	-	46	-29.04
21	4.95825	15.85	Qp	0	.1	10.1	26.05	56	-29.95	-	-
22	4.9695	4.52	Ca	0	.1	10.1	14.72	-	-	46	-31.28
23	20.1615	30.29	Qp	.1	.3	10.3	40.99	60	-19.01	-	-
24	20.157	16.66	Ca	.1	.3	10.3	27.36	-	-	50	-22.64

Qp - Quasi-Peak detector
Ca - CISPR average detection

10.1.2. AC POWER LINE NORM WITH A DOCK

LINE 1 RESULTS

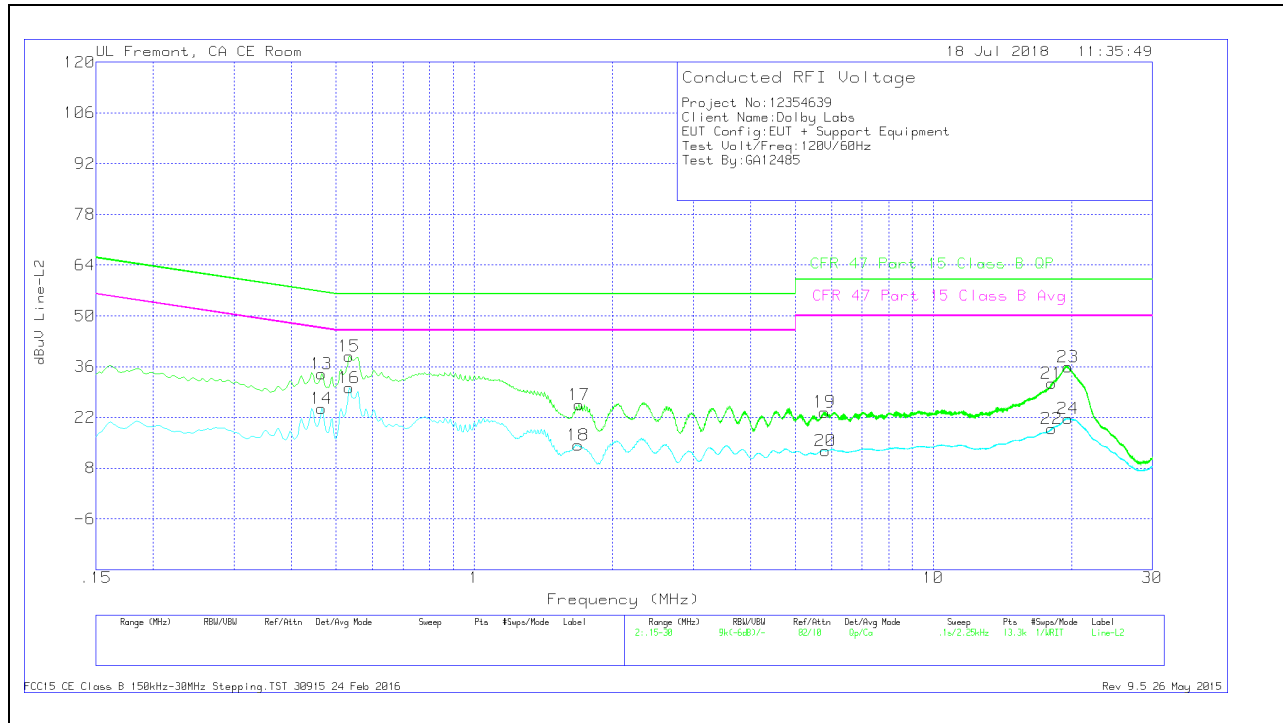


Trace Markers

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	.44475	28.06	Qp	0	0	10.1	38.16	56.97	-18.81	-	-
2	.4425	22.95	Ca	0	0	10.1	33.05	-	-	47.01	-13.96
3	.55725	34.22	Qp	0	0	10.1	44.32	56	-11.68	-	-
4	.55725	27.86	Ca	0	0	10.1	37.96	-	-	46	-8.04
5	2.02538	22.53	Qp	0	.1	10.1	32.73	56	-23.27	-	-
6	2.0265	14.9	Ca	0	.1	10.1	25.1	-	-	46	-20.9
7	7.4085	17.98	Qp	0	.2	10.2	28.38	60	-31.62	-	-
8	7.38825	11.47	Ca	0	.2	10.2	21.87	-	-	50	-28.13
9	17.0678	20.57	Qp	.1	.3	10.3	31.27	60	-28.73	-	-
10	17.0644	10.71	Ca	.1	.3	10.3	21.41	-	-	50	-28.59
11	19.7138	25.09	Qp	.1	.3	10.3	35.79	60	-24.21	-	-
12	19.7115	12.72	Ca	.1	.3	10.3	23.42	-	-	50	-26.58

Qp - Quasi-Peak detector
Ca - CISPR average detection

LINE 2 RESULTS



Trace Markers

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	.465	23.88	Qp	0	0	10.1	33.98	56.6	-22.62	-	-
14	.465	14.32	Ca	0	0	10.1	24.42	-	-	46.6	-22.18
15	.53475	28.82	Qp	0	0	10.1	38.92	56	-17.08	-	-
16	.53475	20.15	Ca	0	0	10.1	30.25	-	-	46	-15.75
17	1.69125	15.31	Qp	0	.1	10.1	25.51	56	-30.49	-	-
18	1.6845	4.09	Ca	0	.1	10.1	14.29	-	-	46	-31.71
19	5.79525	13.09	Qp	0	.2	10.2	23.49	60	-36.51	-	-
20	5.8155	2.43	Ca	0	.2	10.2	12.83	-	-	50	-37.17
21	18.1118	20.7	Qp	.1	.3	10.3	31.4	60	-28.6	-	-
22	18.1118	8.25	Ca	.1	.3	10.3	18.95	-	-	50	-31.05
23	19.6553	25.26	Qp	.1	.3	10.3	35.96	60	-24.04	-	-
24	19.6598	11.04	Ca	.1	.3	10.3	21.74	-	-	50	-28.26

Qp - Quasi-Peak detector

Ca - CISPR average detection