



TEST REPORT

Report Number. : 13850325-E2V1

Applicant : CATAPULT SPORTS PTY LTD
10 POST OFFICE SQUARE, FLOOR 9,
BOSTON, MA 02109, U.S.A.

Model : WPT1

Brand : CATAPULT

FCC ID : 2ADAL-WPT1

EUT Description : WIRELESS CHARGER

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C

Date Of Issue:

June 21, 2021

Prepared by:

UL VERIFICATION SERVICES

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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	6/21/2021	Initial Issue	--

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: CATAPULT SPORTS PTY LTD
10 POST OFFICE SQUARE, FLOOR 9,
BOSTON, MA 02109, U.S.A.

EUT DESCRIPTION: WIRELESS CHARGER

MODEL: WPT1

BRAND: CATAPULT

SERIAL NUMBER: 0002 (Radiated), 0005 (Conducted)

SAMPLE RECEIPT DATE: MAY 28, 2021

DATE TESTED: MAY 28, 2021 TO JUNE 17, 2021

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	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.

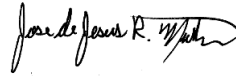
This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.

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2. TEST RESULTS SUMMARY

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.

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

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01.

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification #0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
<input type="checkbox"/>	Building 1: 47173 Benicia Street, Fremont, CA 94538, USA	US0104	2324A	208313
<input type="checkbox"/>	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA	US0104	22541	208313
<input checked="" type="checkbox"/>	Building 4: 47658 Kato Rd, Fremont, CA 94538, USA	US0104	2324B	208313

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

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

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U _{Lab}
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.84 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 dB

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

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

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

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
 $36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a Wireless Charger. Wireless power transfer is only transmitting a continuous carrier wave signal at 917.5MHz frequency single channel when a receiver is placed upon the center top surface of the EUT and requests for charge, only one receiver can be charged at a time at any angle rotation around a horizontal axis (Y-axis). The charger pad uses BLE to pair with the receiving device.

6.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE	-3.18	0.48

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna(s) gain and type, as provided by the manufacturer' are as follows:

The radio utilizes an PCB antenna, with a maximum gain of 2.28dBi.

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 5.0.1.24.

The test utility software used during testing was WattUp app v4.0.31.

6.5. WORST-CASE CONFIGURATION AND MODE

Radiated band edge, harmonics, and spurious emissions from 1 GHz to 18GHz were performed with the EUT was set to transmit at the Low/Middle/High channels.

Radiated emission below 30MHz, below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT was set to transmit at the channel with highest output power as worst-case scenario.

The EUT is a tabletop device and it has two ports, one is the USB type C port for power only, second port is for command line interface control, end user will not have access to it. Therefore, all final radiated testing was performed with the EUT in tabletop orientation powered by AC/DC adapter via USB cable.

There are three AC/DC power adapters, Model: PA-Y19, Model: 700-014340-0000 and Model: SWC45, investigation has been done and it was determined that AC/DC power adapter Model: 700-014340-0000 is the worse AC/DC power adapter and all radiated emissions test was performed on this AC/DC power adapter. AC power line conducted emissions test was performed on all three AC/DC power adapters.

Worst-case data rate as provided by the client was:
BLE: 1 Mbps.

BLE and WPT bands operate simultaneously, simultaneous operation results are documented in UL document 13850325-E1 WPT report.

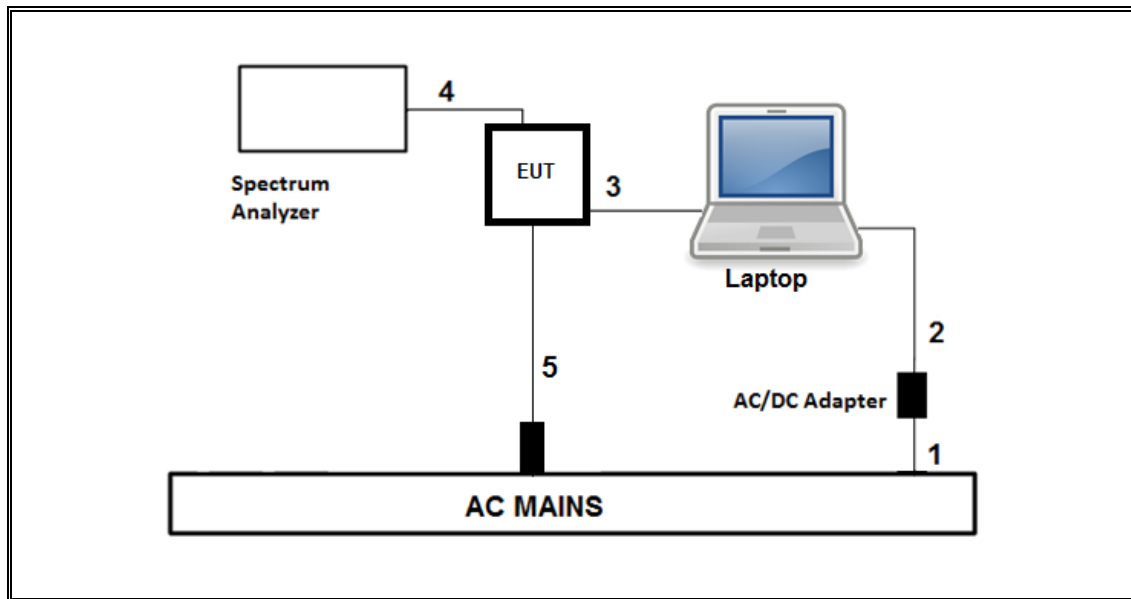
6.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description		Manufacturer	Model	Serial Number		FCC ID/ DoC
EUT AC/DC Adapter (45W)		Artesyn	700-014340-0000	M101V6006HBNL		DoC
EUT AC/DC Adapter (30W)		Aukey	PA-Y19	AQJ44		DoC
EUT AC/DC Adapter (45W)		CUI INC	SWC45	45PDA20061000001371		DoC
Laptop		Dell	Latitude E7470	3F94RC2		DoC
Laptop AC/DC adapter		Dell	LA65NM130	CN-03NKWD-72438-38D-0F54-A00		DoC
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Un-shielded	1	AC Mains to AC/DC Adapter
2	DC	1	DC	Un-shielded	1.5	AC/DC Adapter to Laptop
3	USB	1	UART	Un-shielded	1.5	EUT to Laptop
4	Antenna	1	SMA	Un-shielded	0.1	To spectrum analyzer
5	USB	1	USB Type C	Un-shielded	1	EUT to AC/DC adapter
I/O CABLES (RF RADIATED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	USB Type C	Un-shielded	1	

TEST SETUP-CONDUCTED TEST

The EUT was connected to the test laptop via USB cable. Test software exercised the EUT.

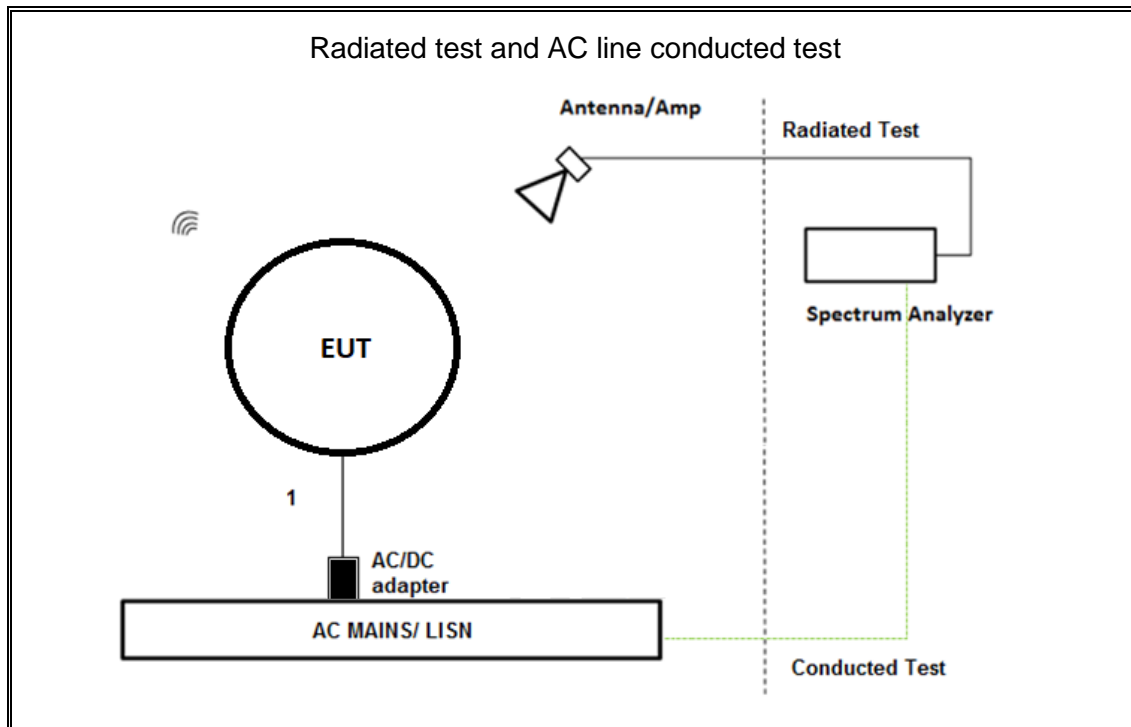
SETUP DIAGRAM



TEST SETUP- RADIATED TEST / AC LINE CONDUCTED TEST

The EUT was powered by an AC/DC adapter via USB cable. Test software exercised the EUT.

SETUP DIAGRAM



7. MEASUREMENT METHOD

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

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

Output Power: ANSI C63.10 Subclause -11.9.1.3 Method PKPM1 Peak-reading power meter
Output Power: ANSI C63.10 Subclause -11.9.2.3.2 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

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

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

8. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO METRICS	EM-6871	SC-8015	05/24/2022	05/24/2021
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO METRICS	EM-6872	SC-8014	05/24/2022	05/24/2021
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T863	08/31/2021	08/31/2020
Amplifier, 100MHz-18GHz	AMPLICAL	AMP0.1G18-47-20	PRE0197319	04/08/2022	04/08/2021
Antenna, Broadband Hybrid, 30MHz to 2GHz	Sunol Sciences Corp.	JB3	81560	09/24/2021	09/24/2020
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	175953	01/21/2022	01/21/2021
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179367	02/21/2022	02/21/2021
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Keysight Technologies Inc	E4440A	T198	05/25/2022	01/25/2021
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	T1227	03/16/2022	03/16/2021
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	T1262	01/27/2022	01/27/2021
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826/B	T447	09/24/2021	09/24/2020
Rf Amplifier, 18-26.5GHz, 60dB gain	AMPLICAL	AMP18G26.5-60	171590	05/21/2022	05/21/2021
AC Line Conducted					
LISN	Fischer Custom Communications, Inc	FCC-LISN-50/250- 25-2-01-480V	PRE0186446	01/20/2022	01/20/2021
EMI TEST RECEIVER	Rohde & Schwarz	ESR	T1436	02/19/2022	02/19/2021
Transient Limiter	COM-POWER	LIT-930A	PRE0213145	01/20/2022	01/20/2021
UL TEST SOFTWARE LIST					
Radiated Software	UL	UL EMC	Rev 9.5, 30 Apr, 2020		
Antenna Port Software	UL	UL RF	Ver 2021.05.12		
AC Line Conducted Software	UL	UL EMC	Rev 9.5, 07 Jul 2020		

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

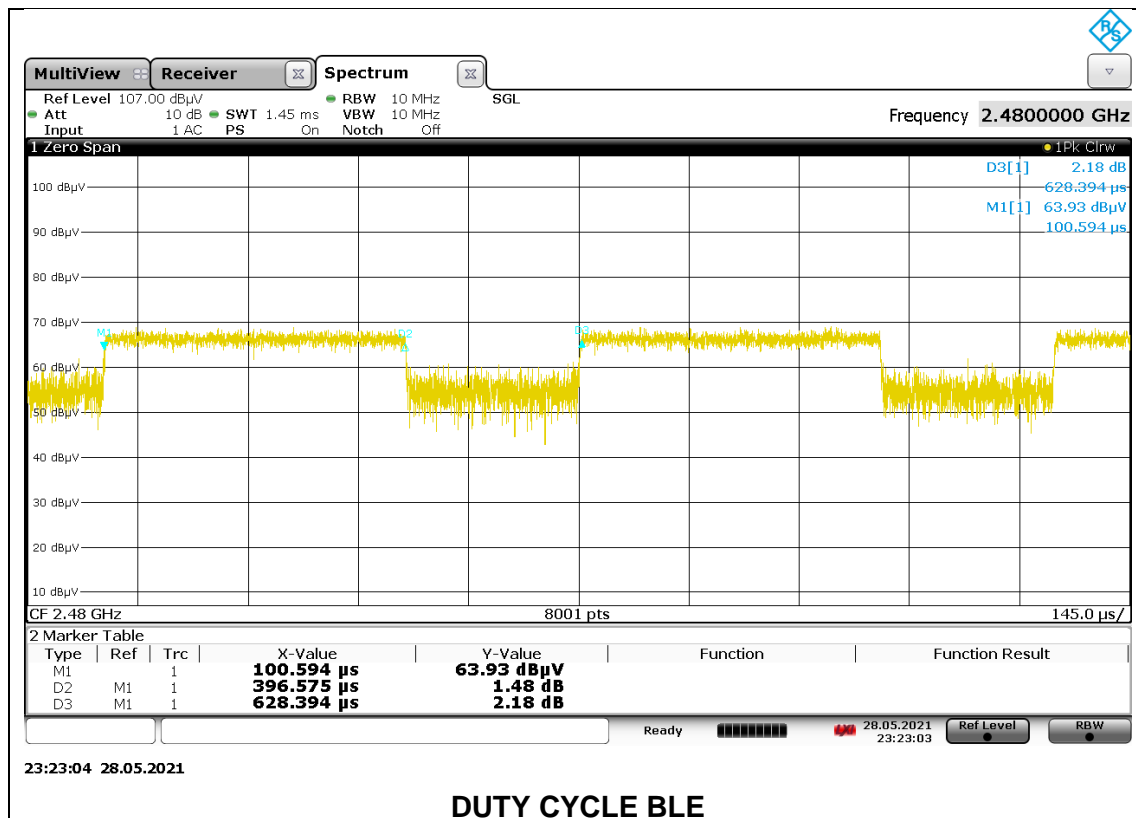
PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
BLE	0.397	0.628	0.631	63.11%	2.00	2.522

Test engineer: 19498 ER



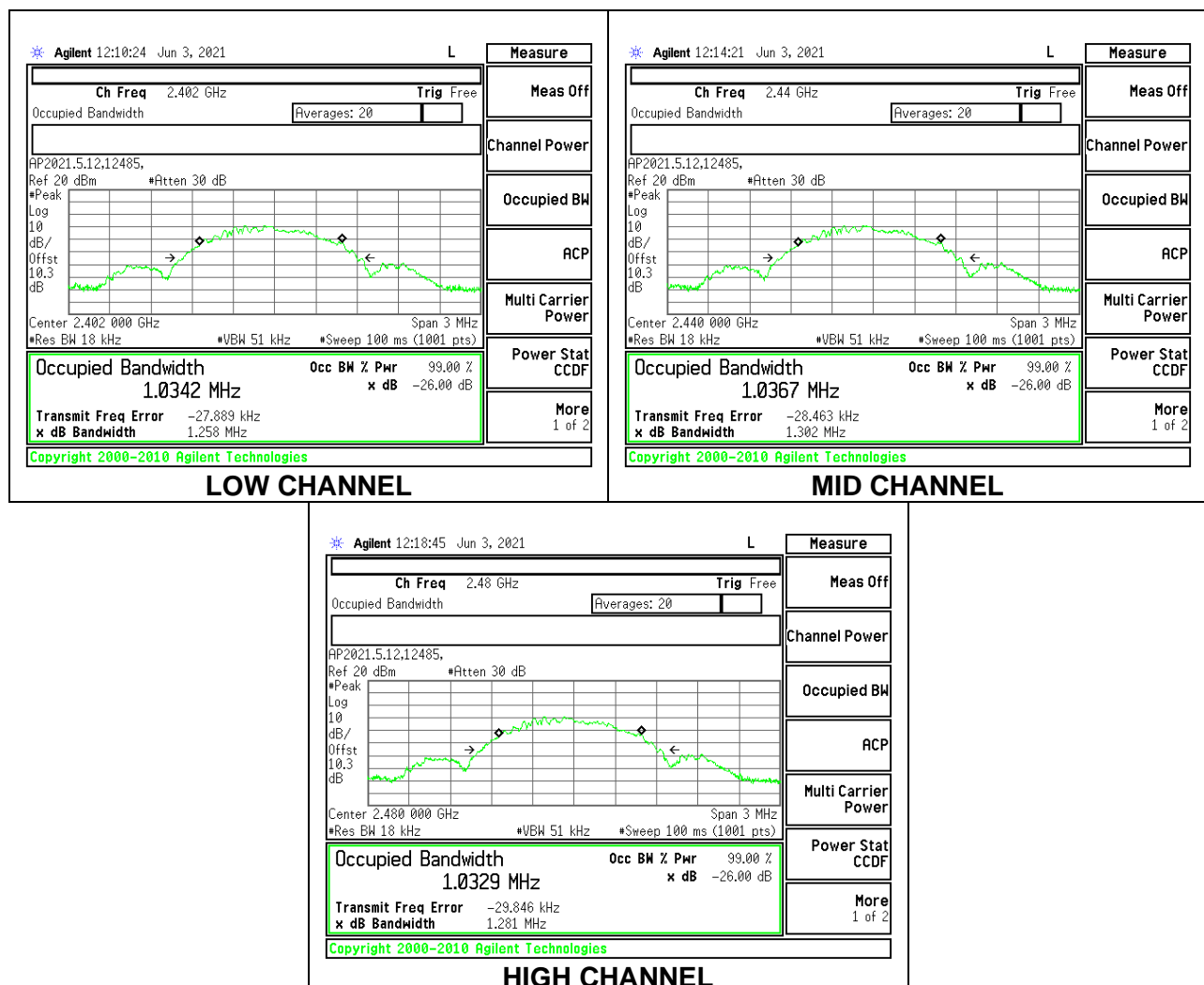
9.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0342
Middle	2440	1.0367
High	2480	1.0329



9.3. 6 dB BANDWIDTH

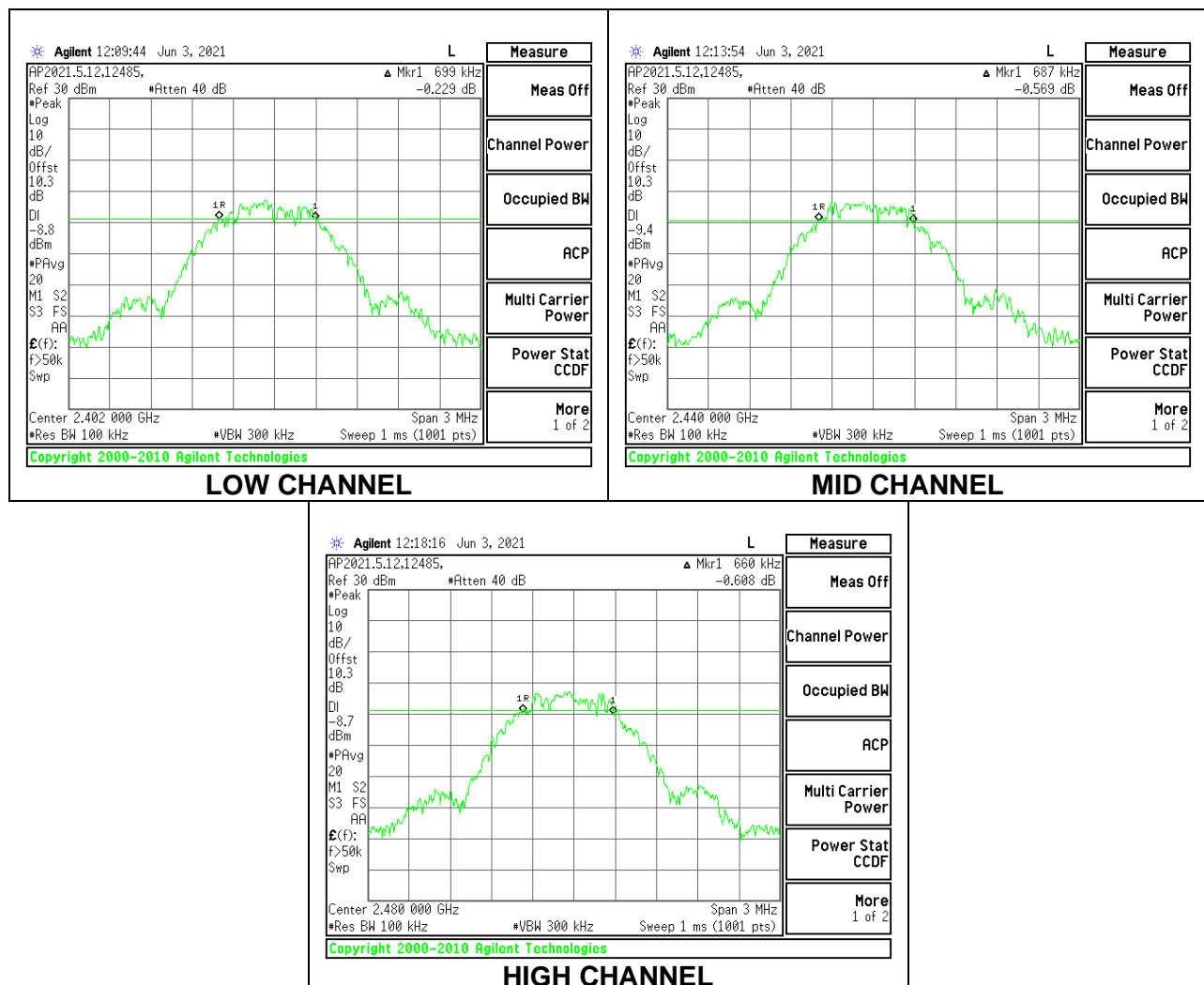
LIMITS

FCC §15.247 (a) (2)

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

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.6990	0.5
Middle	2440	0.6870	0.5
High	2480	0.6600	0.5



9.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

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 power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband peak power sensor. Peak output power was read directly from power meter.

RESULTS

Tested By:	12485 GA
Date:	6/3/2021

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-3.580	30	-33.580
Middle	2440	-3.320	30	-33.320
High	2480	-3.180	30	-33.180

9.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband average power sensor. Gated average output power was read directly from power meter.

RESULTS

Tested By:	12485 GA
Date:	6/3/2021

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	-3.92
Middle	2440	-3.79
High	2480	-3.63

9.6. POWER SPECTRAL DENSITY

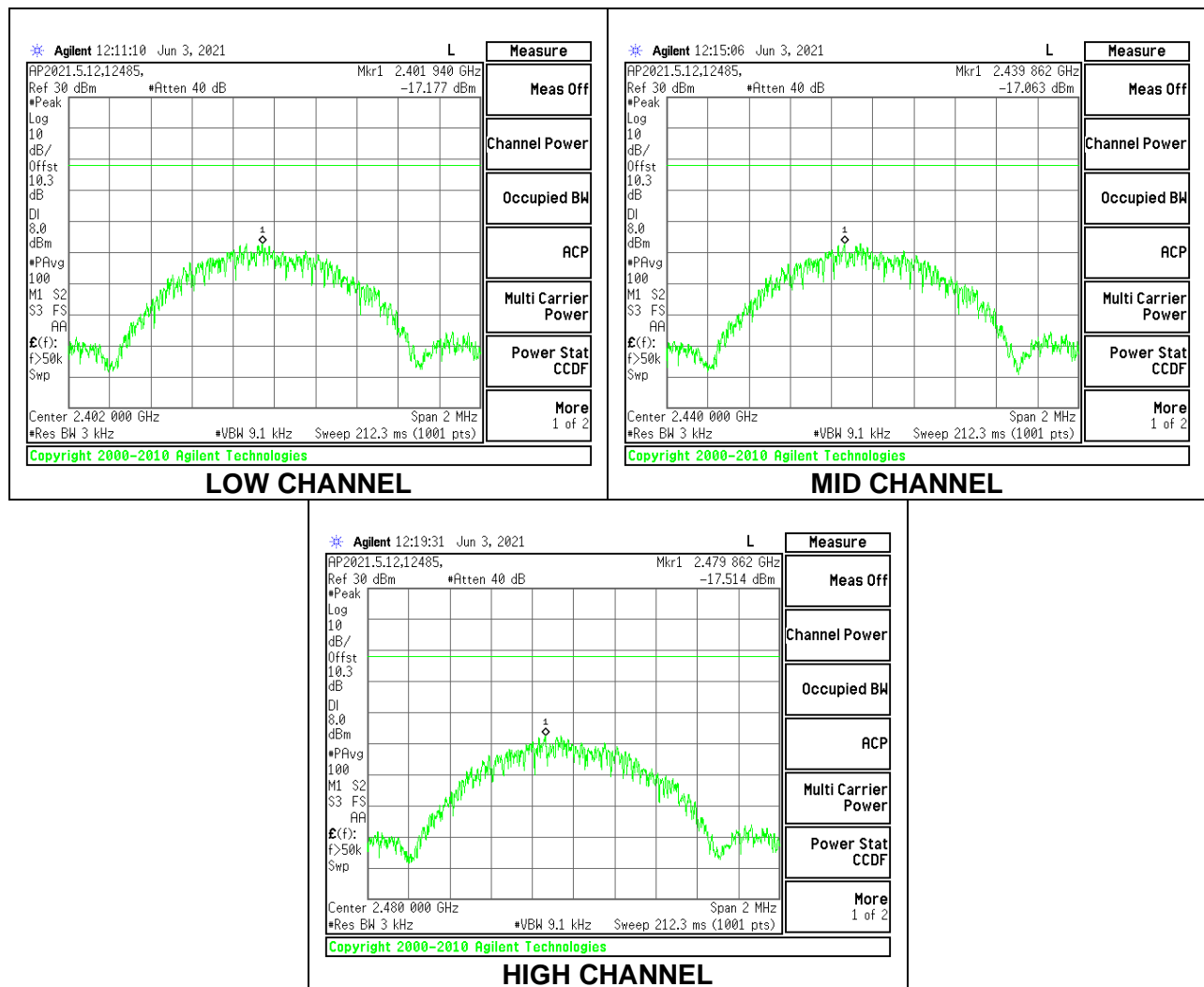
LIMITS

FCC §15.247 (e)

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	-17.18	8	-25.18
Middle	2440	-17.06	8	-25.06
High	2480	-17.51	8	-25.51



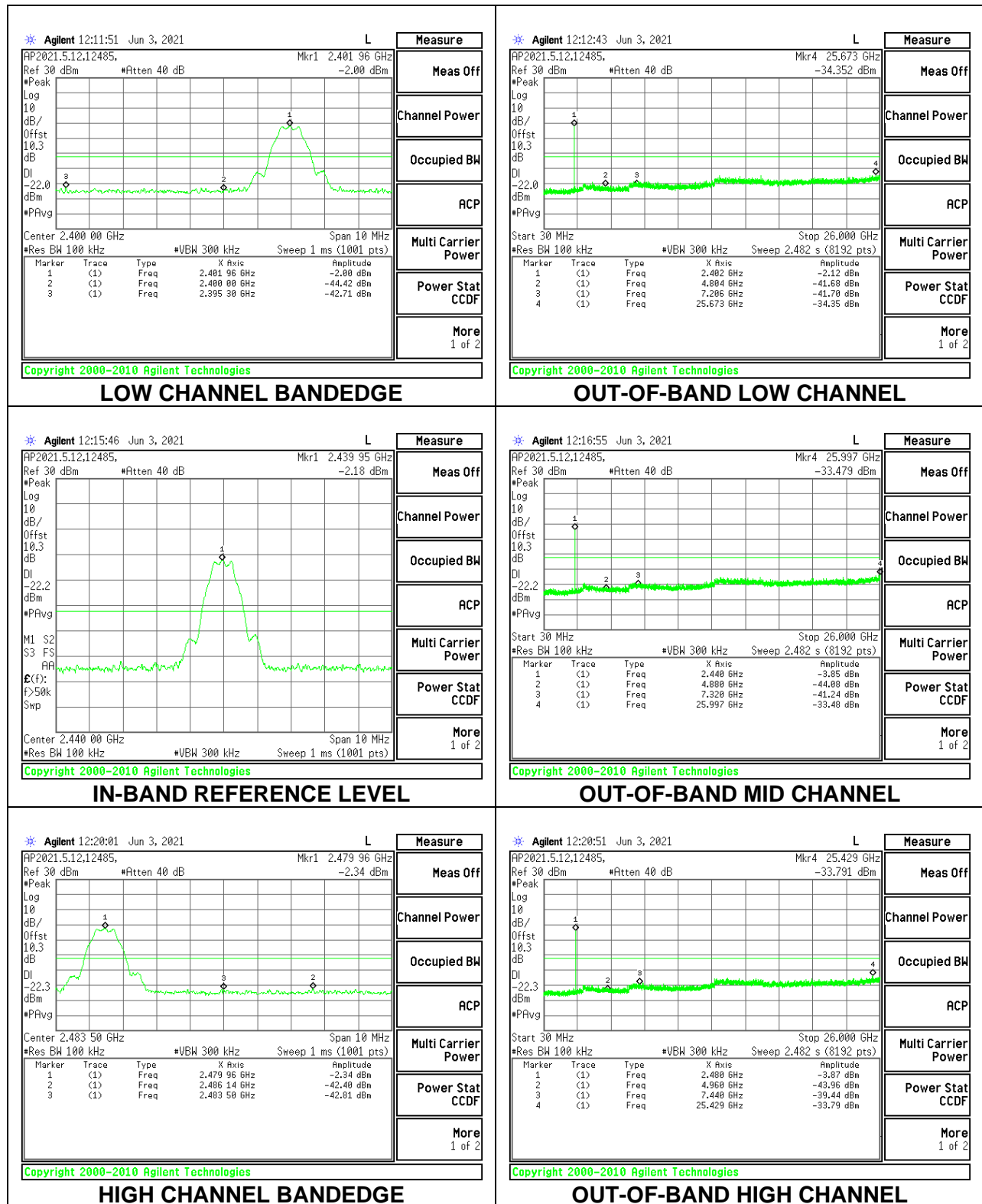
9.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

Output power was measured based on the use of a peak measurement, therefore, spurious emissions are required to be 20 dBc.

RESULTS



10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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 in the 30-1000MHz range, 9kHz for peak and/or quasi-peak detection measurements in the 0.15-30MHz range and 200Hz for peak and/or quasi-peak detection measurements in the 9 to 150kHz range. Peak detection is used unless otherwise noted as quasi-peak or average (9-90kHz and 110-490kHz).

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.

2D antenna use - 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. Blue color trace on plots: Parallel orientation. Green color trace on plots: Perpendicular orientation.

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.

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

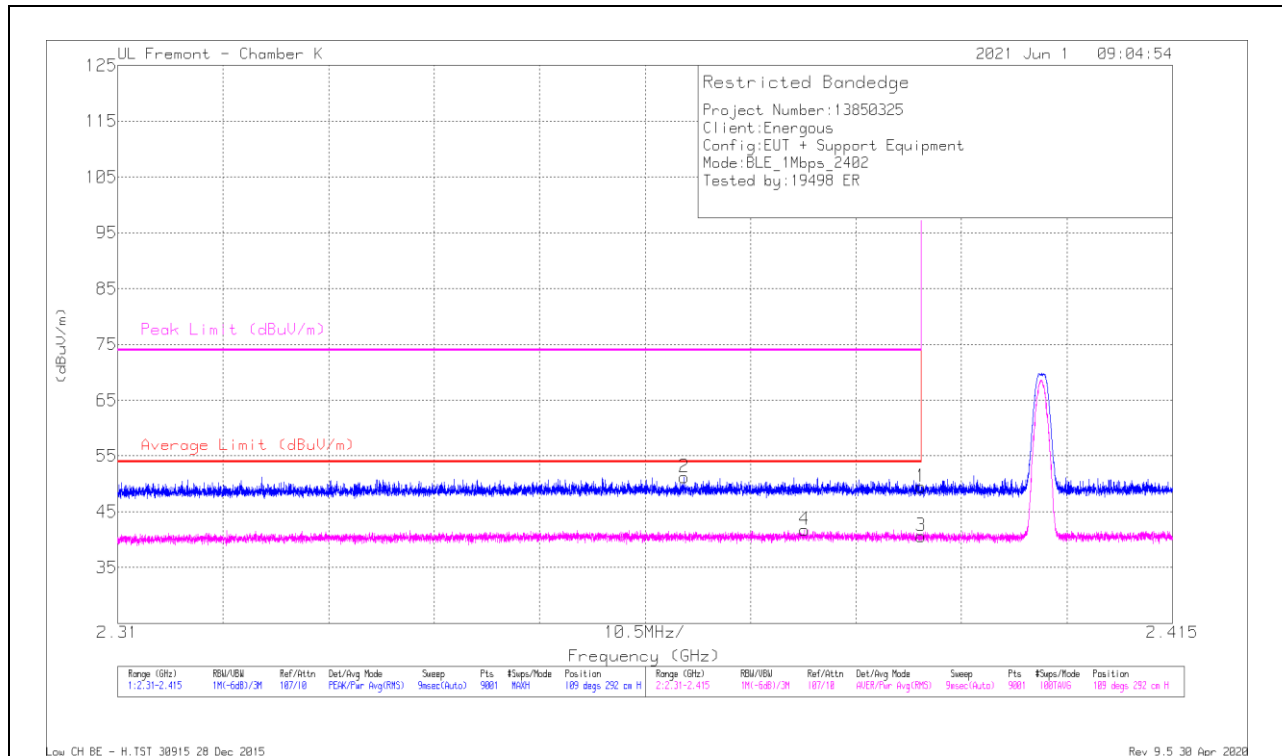
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

NOTE: The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table), using the free space impedance of 377 Ohms. For example the measurement at frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to $Y - 51.5 = Z$ dBuA/m, which has the same margin, W dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

10.2. TRANSMITTER ABOVE 1 GHz

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



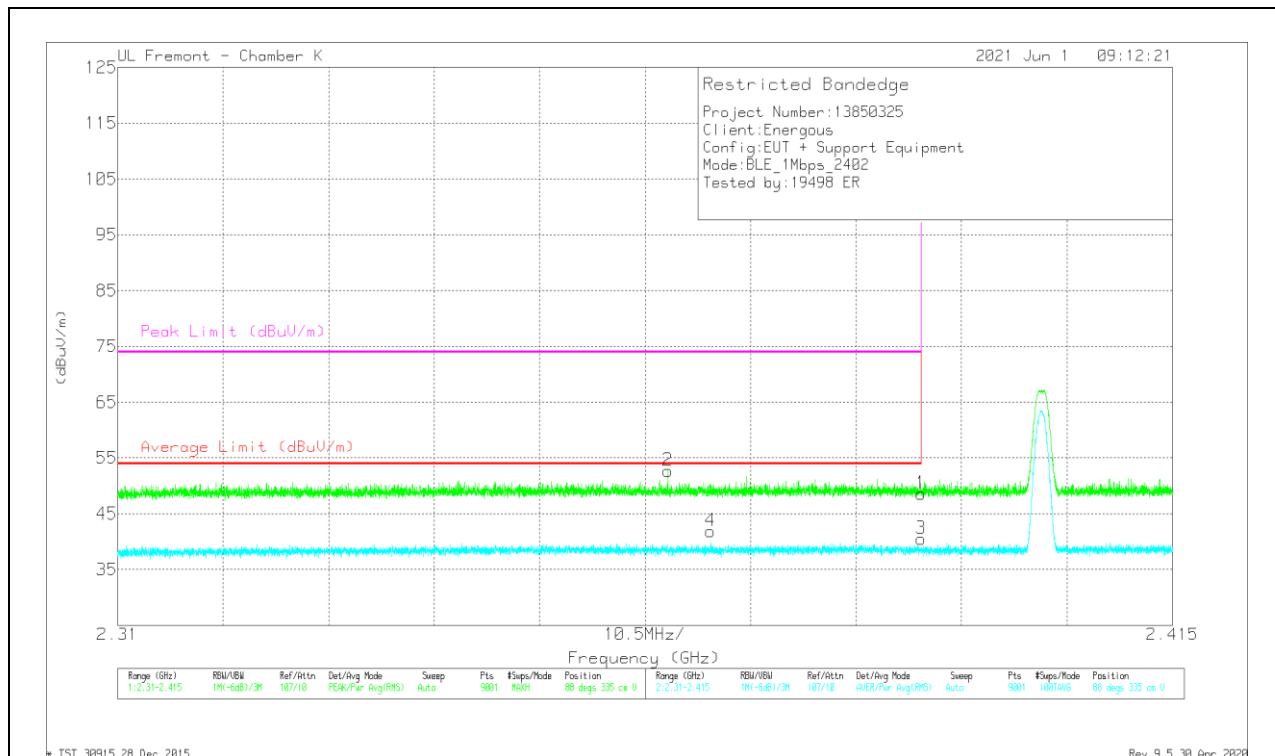
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	51.45	Pk	32.4	-34.4	0	49.45	-	-	74	-24.55	109	292	H
2	* 2.36639	53.32	Pk	32.4	-34.5	0	51.22	-	-	74	-22.78	109	292	H
3	* 2.38999	40.61	RMS	32.4	-34.4	2	40.61	54	-13.39	-	-	109	292	H
4	* 2.37839	41.85	RMS	32.4	-34.5	2	41.75	54	-12.25	-	-	109	292	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/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	* 2.38999	50.58	Pk	32.4	-34.4	0	48.58	-	-	74	-25.42	88	335	V
2	* 2.36476	54.85	Pk	32.4	-34.5	0	52.75	-	-	74	-21.25	88	335	V
3	* 2.38999	40.49	RMS	32.4	-34.4	2	40.49	54	-13.51	-	-	88	335	V
4	* 2.369	42	RMS	32.4	-34.5	2	41.9	54	-12.1	-	-	88	335	V

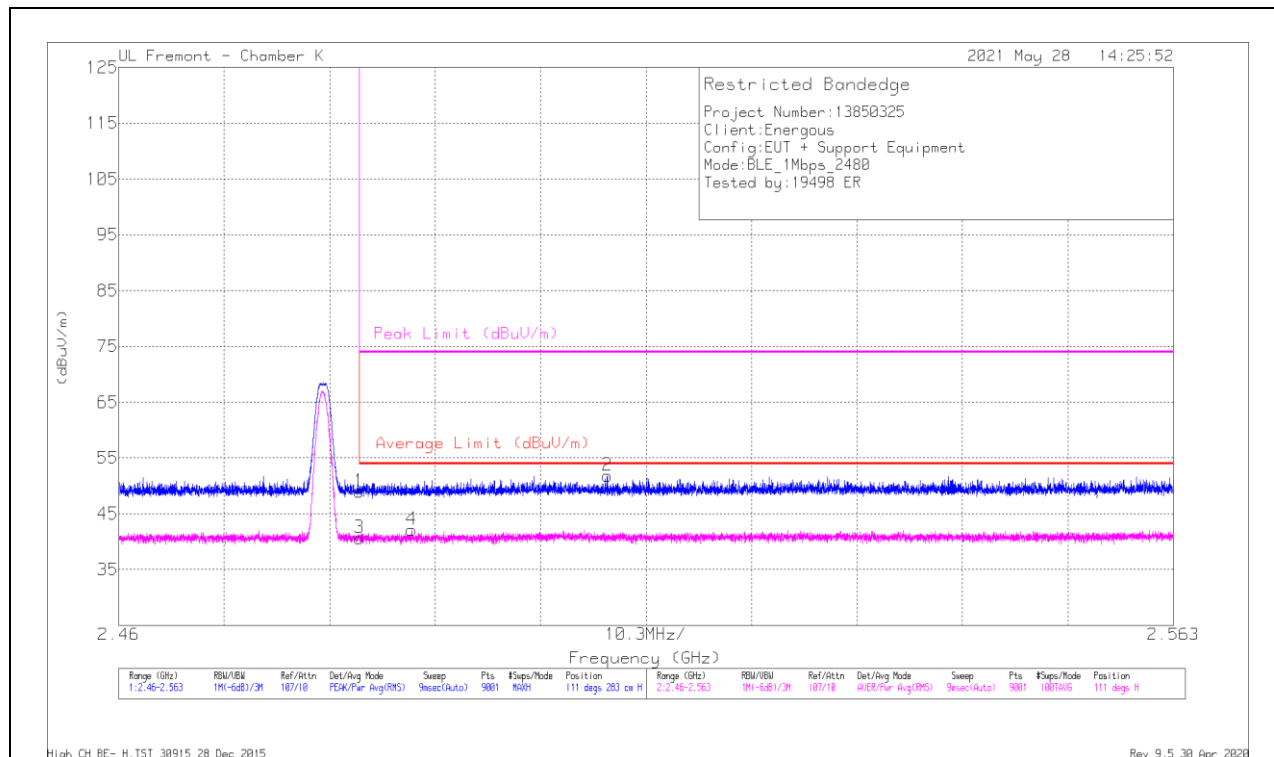
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



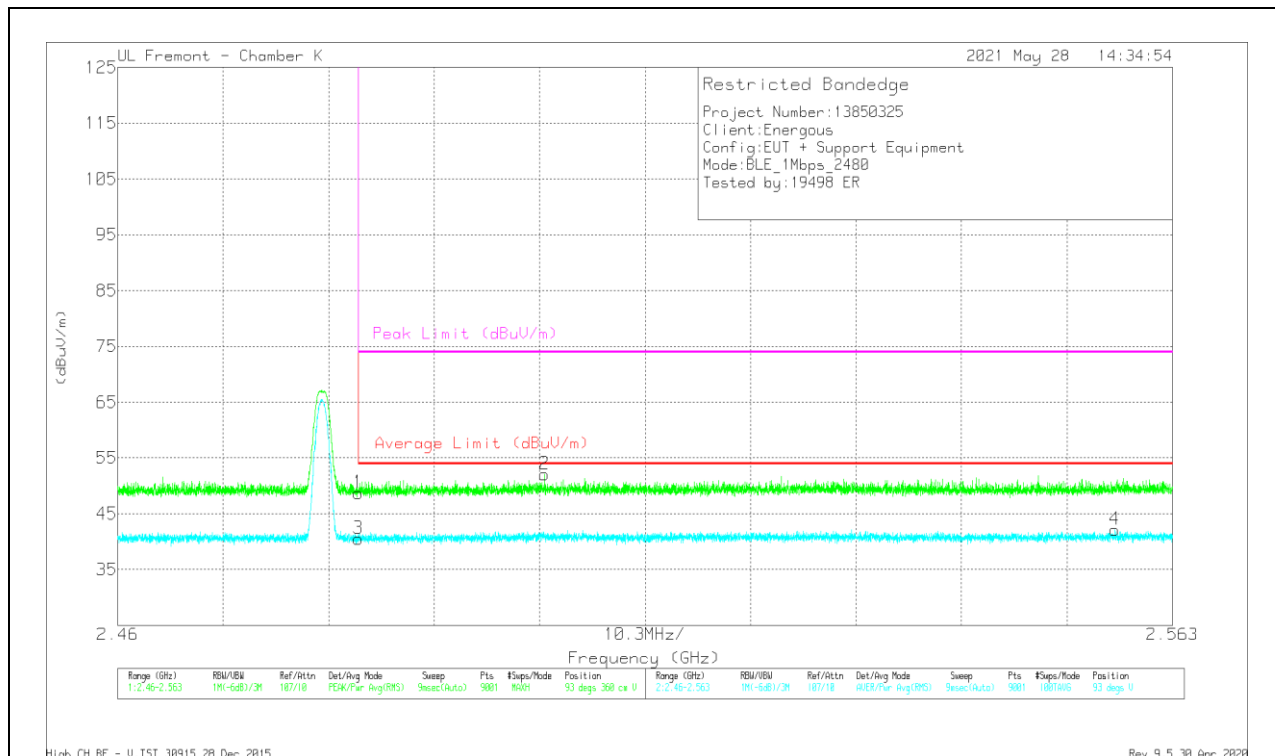
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	50.51	Pk	32.5	-34	0	49.01	-	-	74	-24.99	111	283	H
2	2.50771	53.2	Pk	32.6	-34	0	51.8	-	-	74	-22.2	111	283	H
3	* 2.48351	40.13	RMS	32.5	-34	2	40.63	54	-13.37	-	-	111	283	H
4	* 2.48861	41.65	RMS	32.5	-34	2	42.15	54	-11.85	-	-	111	283	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/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	* 2.48351	50.26	Pk	32.5	-34	0	48.76	-	-	74	-25.24	93	360	V
2	2.5017	53.42	Pk	32.6	-33.9	0	52.12	-	-	74	-21.88	93	360	V
3	* 2.48351	40.03	RMS	32.5	-34	2	40.53	54	-13.47	-	-	93	360	V
4	2.55737	41.28	RMS	32.7	-33.8	2	42.18	54	-11.82	-	-	93	360	V

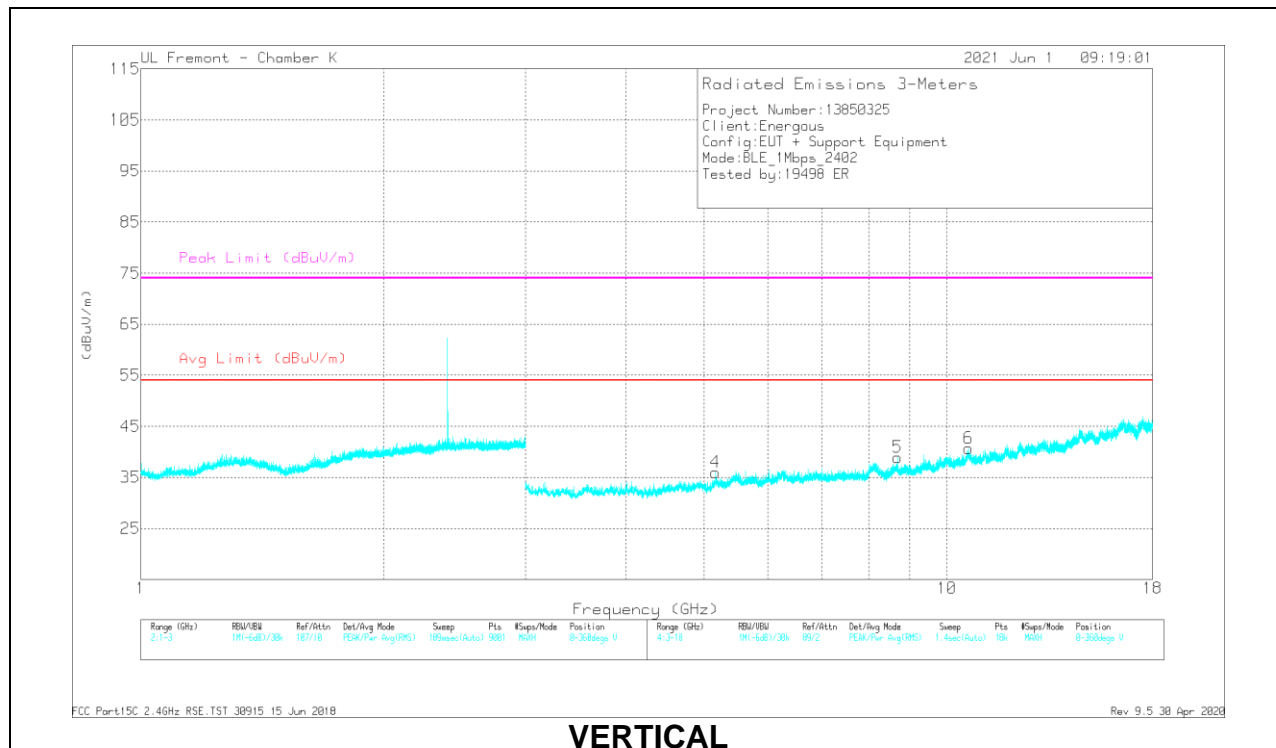
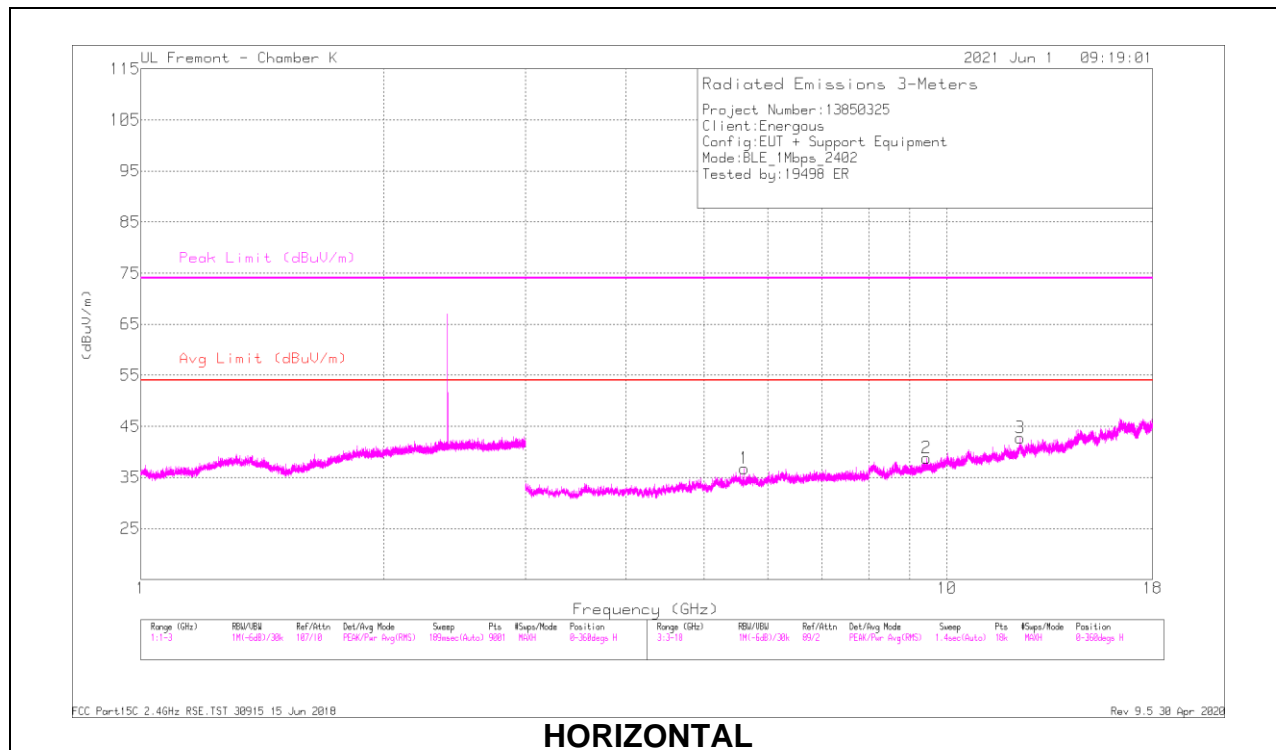
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

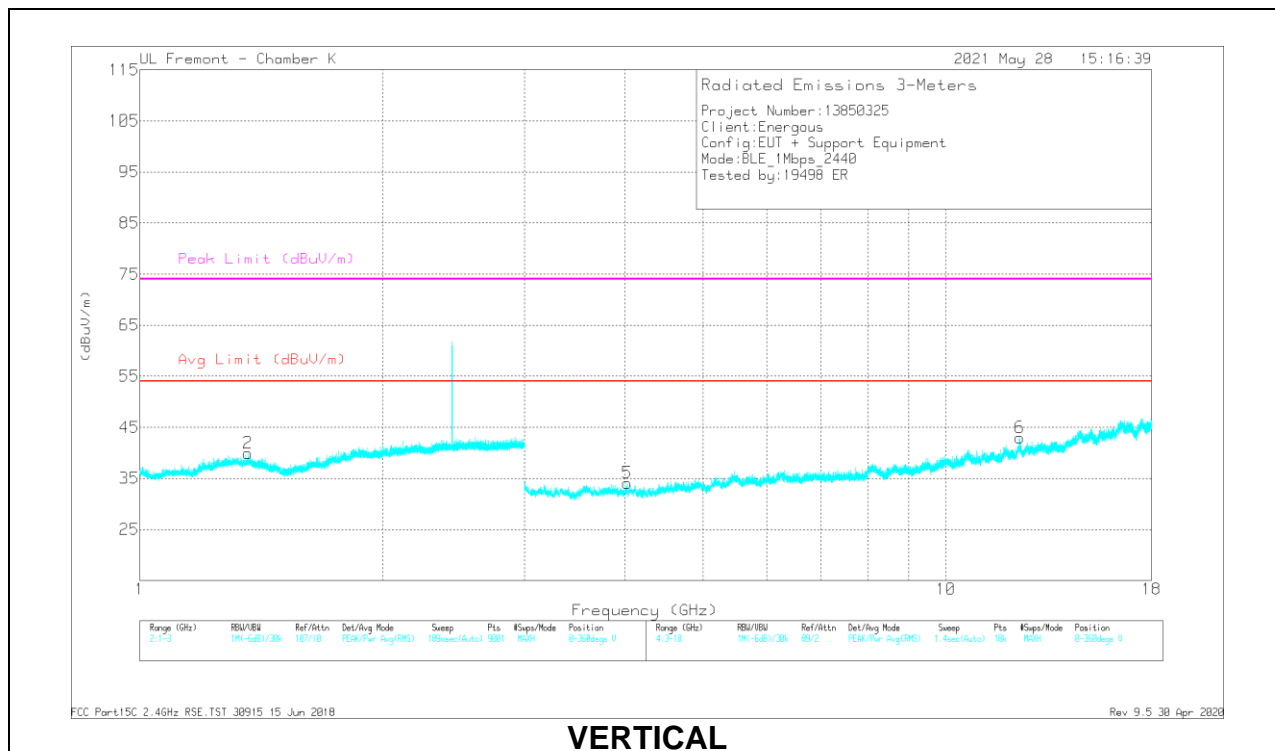
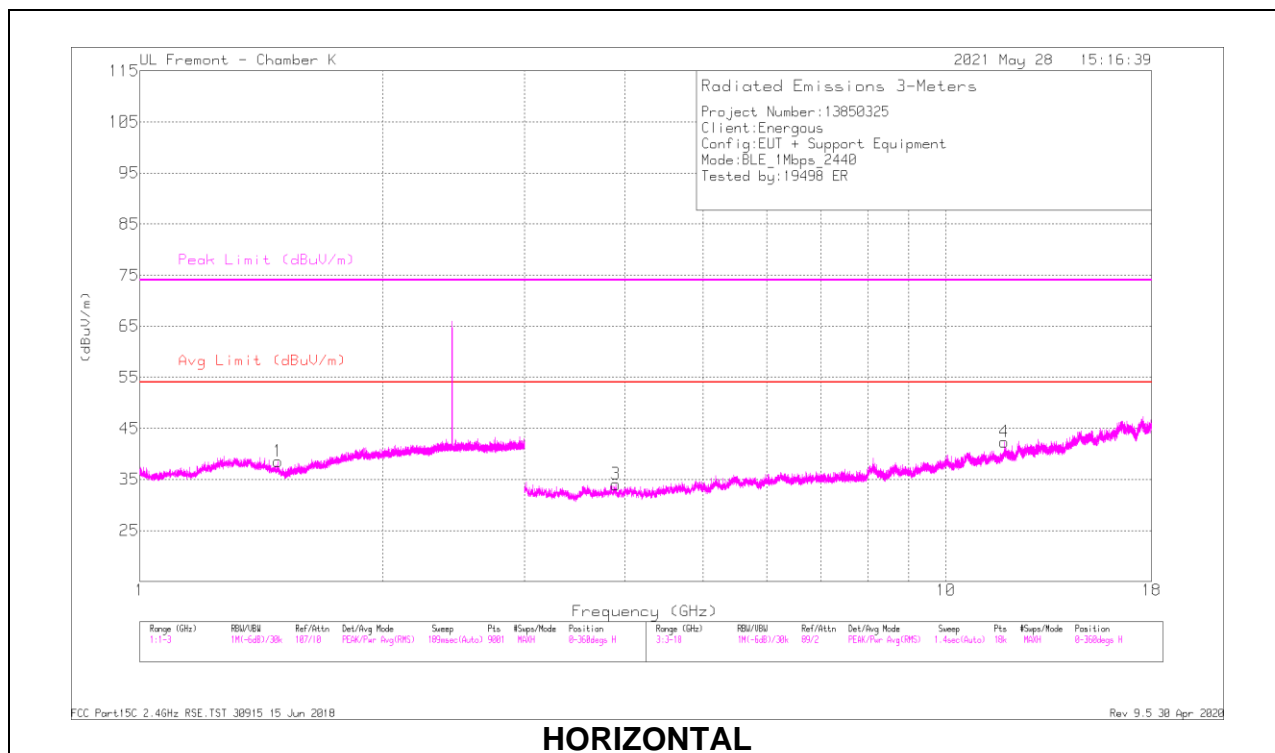
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.60823	48.21	PK2	35.4	-39.2	0	44.41	-	-	-	-	88	277	H
2	* 9.43849	46.25	PK2	36.7	-36	0	46.95	-	-	74	-27.05	77	114	H
	* 9.44603	34.79	MAv1	36.7	-36	2	37.49	54	-16.51	-	-	77	114	H
3	* 12.32874	42.57	PK2	39.3	-32.7	0	49.17	-	-	74	-24.83	335	198	H
	* 12.32963	31.45	MAv1	39.3	-32.7	2	40.05	54	-13.95	-	-	335	198	H
4	5.16312	47.01	PK2	34.6	-39.5	0	42.11	-	-	-	-	47	183	V
5	8.69815	44.89	PK2	36.3	-36.3	0	44.89	-	-	-	-	170	143	V
6	* 10.64626	44.98	PK2	37.9	-35.2	0	47.68	-	-	74	-26.32	207	250	V
	* 10.64594	34.11	MAv1	37.9	-35.3	2	38.71	54	-15.29	-	-	207	250	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

MID CHANNEL RESULTS



RADIATED EMISSIONS

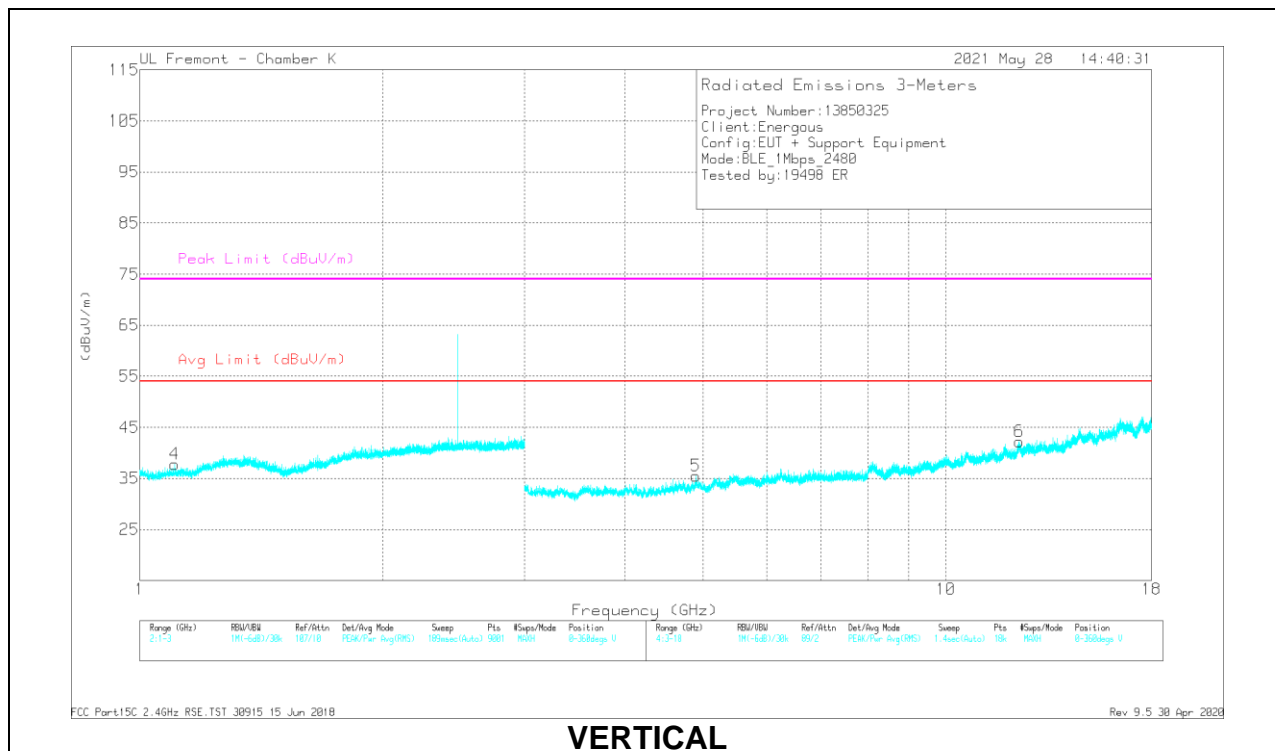
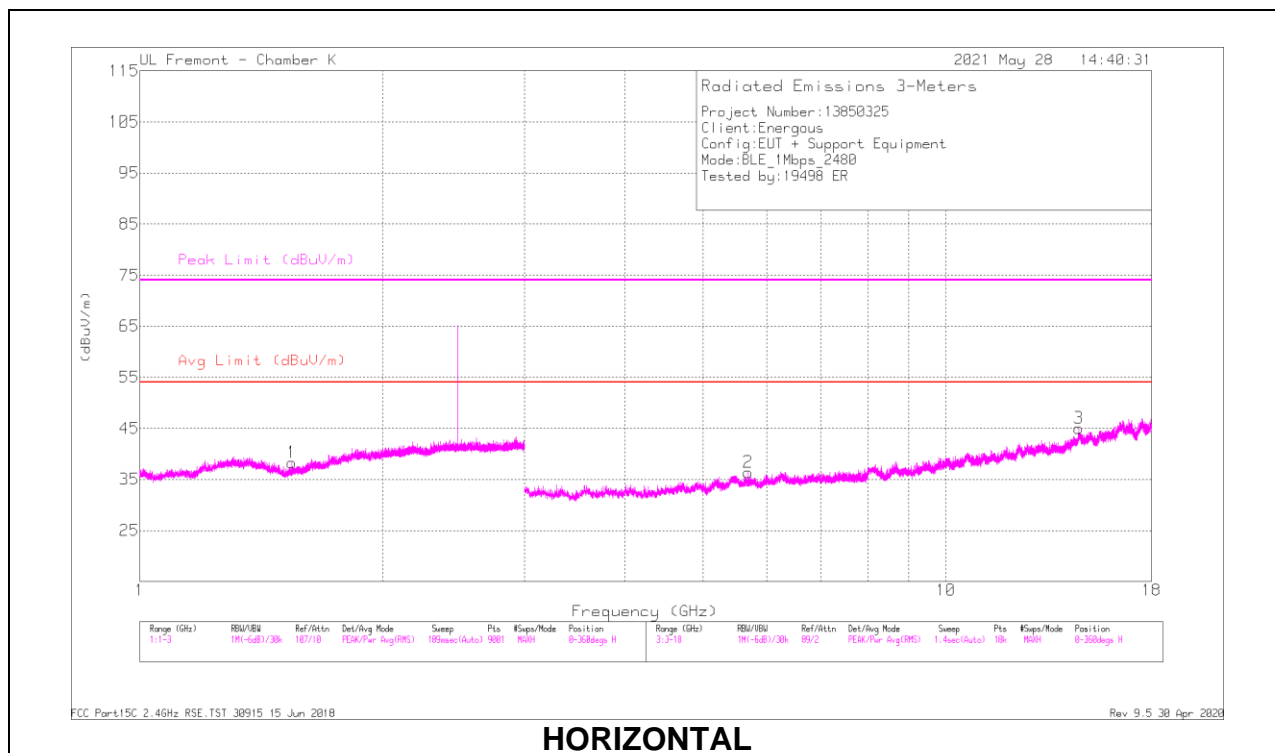
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.48362	53.15	PK2	27.9	-36	0	45.05	-	-	74	-28.95	315	263	H
	* 1.48585	41.84	MAv1	27.9	-36	2	35.74	54	-18.26	-	-	315	263	H
2	* 1.364	53.25	PK2	29.4	-35.9	0	46.75	-	-	74	-27.25	142	145	V
	* 1.36404	41.87	MAv1	29.4	-35.9	2	37.37	54	-16.63	-	-	142	145	V
3	* 3.89844	48.39	PK2	33.7	-41	0	41.09	-	-	74	-32.91	332	251	H
	* 3.8963	37.41	MAv1	33.7	-41	2	32.11	54	-21.89	-	-	332	251	H
4	* 11.81292	42.89	PK2	38.6	-33.5	0	47.99	-	-	74	-26.01	246	227	H
	* 11.81441	32.32	MAv1	38.6	-33.4	2	39.52	54	-14.48	-	-	246	227	H
5	* 4.02675	48.81	PK2	33.6	-41.3	0	41.11	-	-	74	-32.89	142	193	V
	* 4.02567	37.08	MAv1	33.6	-41.3	2	31.38	54	-22.62	-	-	142	193	V
6	* 12.36067	42.57	PK2	39.3	-33.1	0	48.77	-	-	74	-25.23	285	179	V
	* 12.35863	31.99	MAv1	39.3	-33.1	2	40.19	54	-13.81	-	-	285	179	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 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
1	* 1.54357	53.31	PK2	27.8	-36	0	45.11	-	-	74	-28.89	314	200	H
	* 1.54595	41.76	MAv1	27.8	-36	2	35.56	54	-18.44	-	-	314	200	H
4	* 1.10298	54.53	PK2	27.5	-36.8	0	45.23	-	-	74	-28.77	191	100	V
	* 1.10488	42.58	MAv1	27.5	-36.8	2	35.28	54	-18.72	-	-	191	100	V
2	5.6846	46.81	PK2	35.2	-39	0	43.01	-	-	-	-	72	180	H
3	14.62868	44.06	PK2	40.5	-32.5	0	52.06	-	-	-	-	355	393	H
5	* 4.89512	49.17	PK2	34.4	-39.9	0	43.67	-	-	74	-30.33	132	405	V
	* 4.89549	38.21	MAv1	34.4	-39.9	2	34.71	54	-19.29	-	-	132	405	V
6	* 12.33287	42.73	PK2	39.3	-32.7	0	49.33	-	-	74	-24.67	119	166	V
	* 12.33226	31.61	MAv1	39.3	-32.7	2	40.21	54	-13.79	-	-	119	166	V

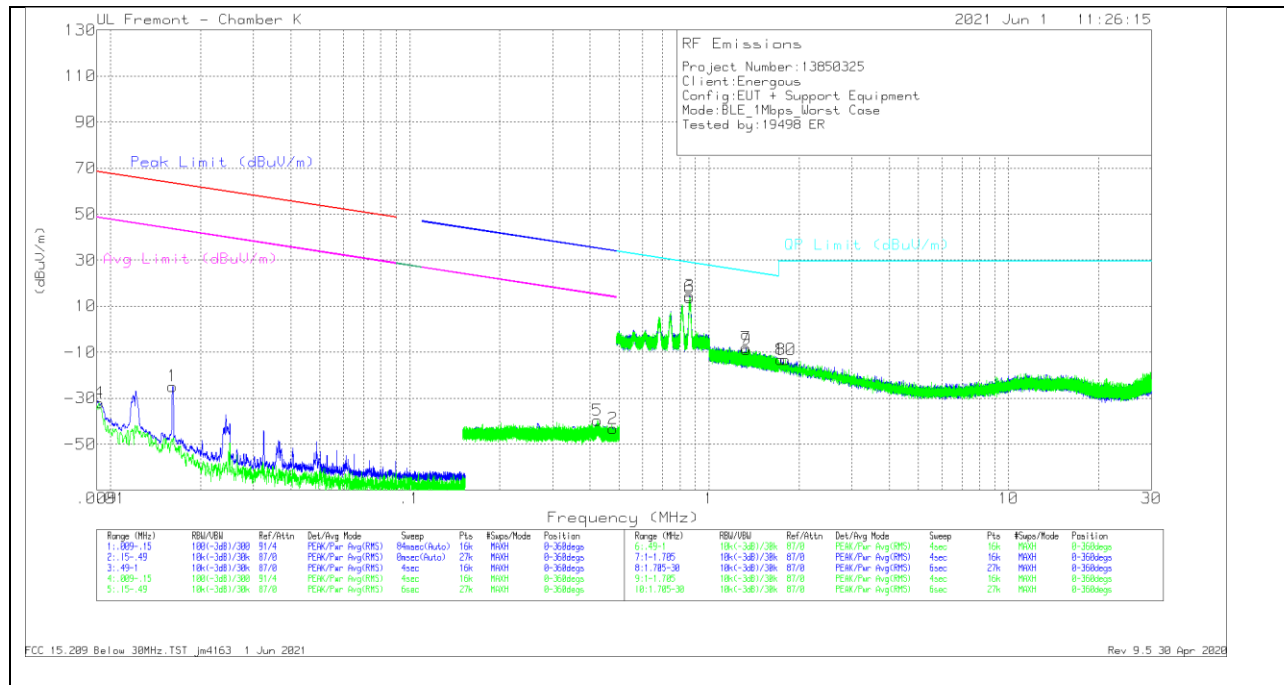
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

10.3. WORST CASE BELOW 30MHZ

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)



Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (E ACF)	Amp/Cbl (dB)	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	.01616	27.5	Pk	59.5	-31.8	-80	-24.8	63.42	-88.22	43.42	-68.22	-	-	-	-	0-360
2	.47844	12.9	Pk	56.2	-32.2	-80	-43.1	-	-	-	-	34.01	-77.11	14.01	-57.11	0-360
4	.00916	18.08	Pk	61.2	-31.3	-80	-32.02	68.35	-100.37	48.35	-80.37	-	-	-	-	0-360
5	.42291	16.33	Pk	56.2	-32.2	-80	-39.67	-	-	-	-	35.08	-74.75	15.08	-54.75	0-360

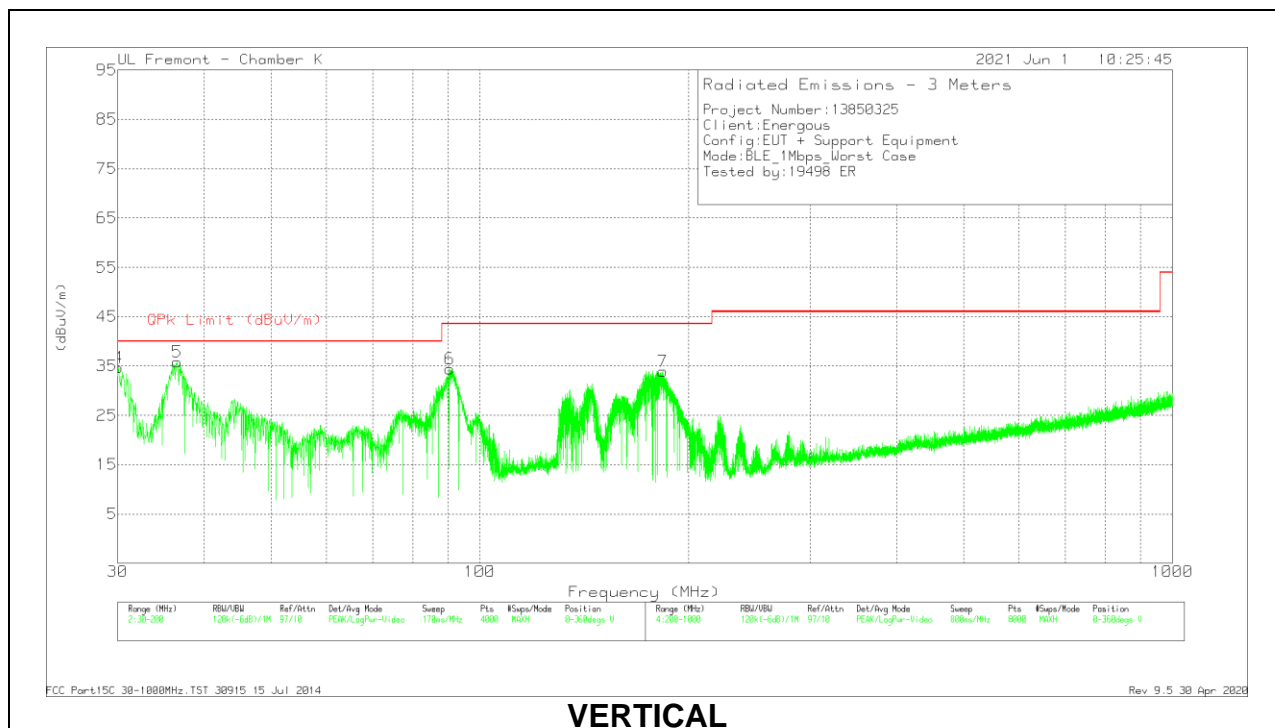
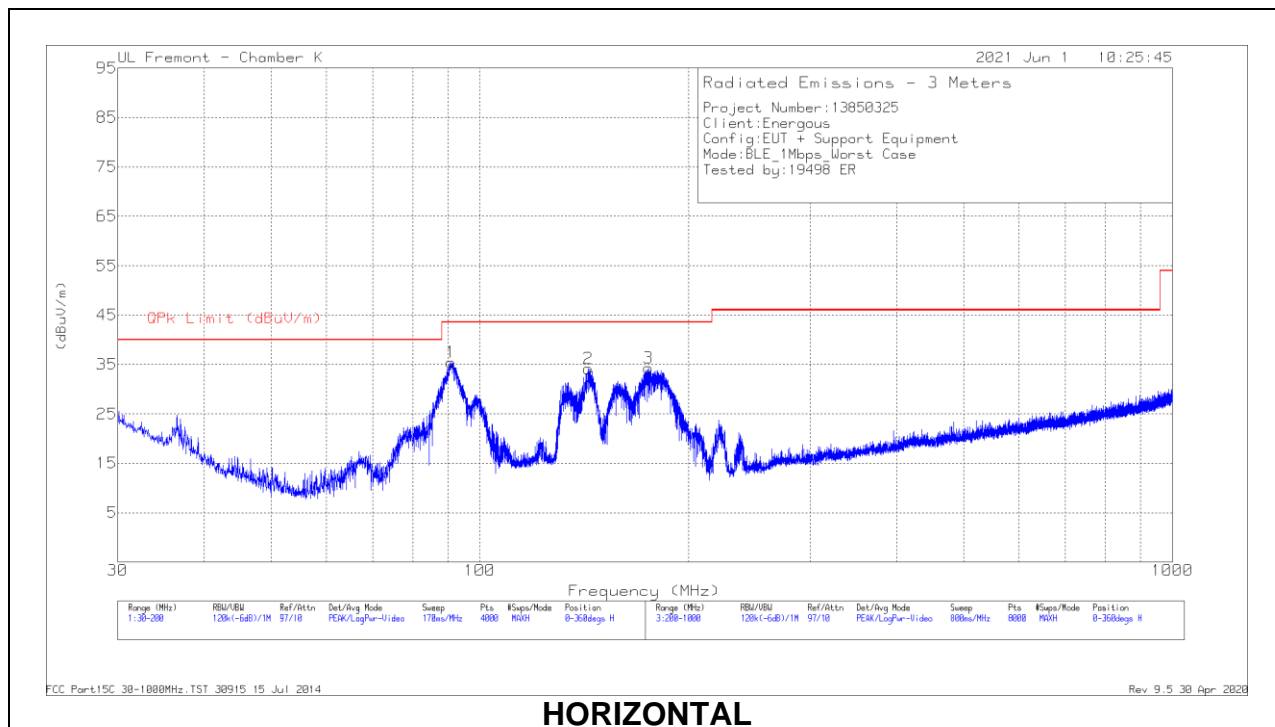
Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (E ACF)	Amp/Cbl (dB)	Dist Corr 30m (dB)	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.86152	30.46	Pk	56.2	-32.2	-40	14.46	28.91	-14.45	0-360
6	.86139	29.88	Pk	56.2	-32.2	-40	13.88	28.91	-15.03	0-360
7	1.32648	19.04	Pk	45	-32.1	-40	-8.06	25.17	-33.23	0-360
8	1.74168	15.97	Pk	42.8	-32.1	-40	-13.33	29.5	-42.83	0-360
9	1.3355	18.12	Pk	45	-32.1	-40	-8.98	25.12	-34.1	0-360
10	1.79408	16.4	Pk	42.6	-32.1	-40	-13.1	29.5	-42.6	0-360

Pk - Peak detector

10.4. WORST CASE BELOW 1 GHZ

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



Below 1GHz Data

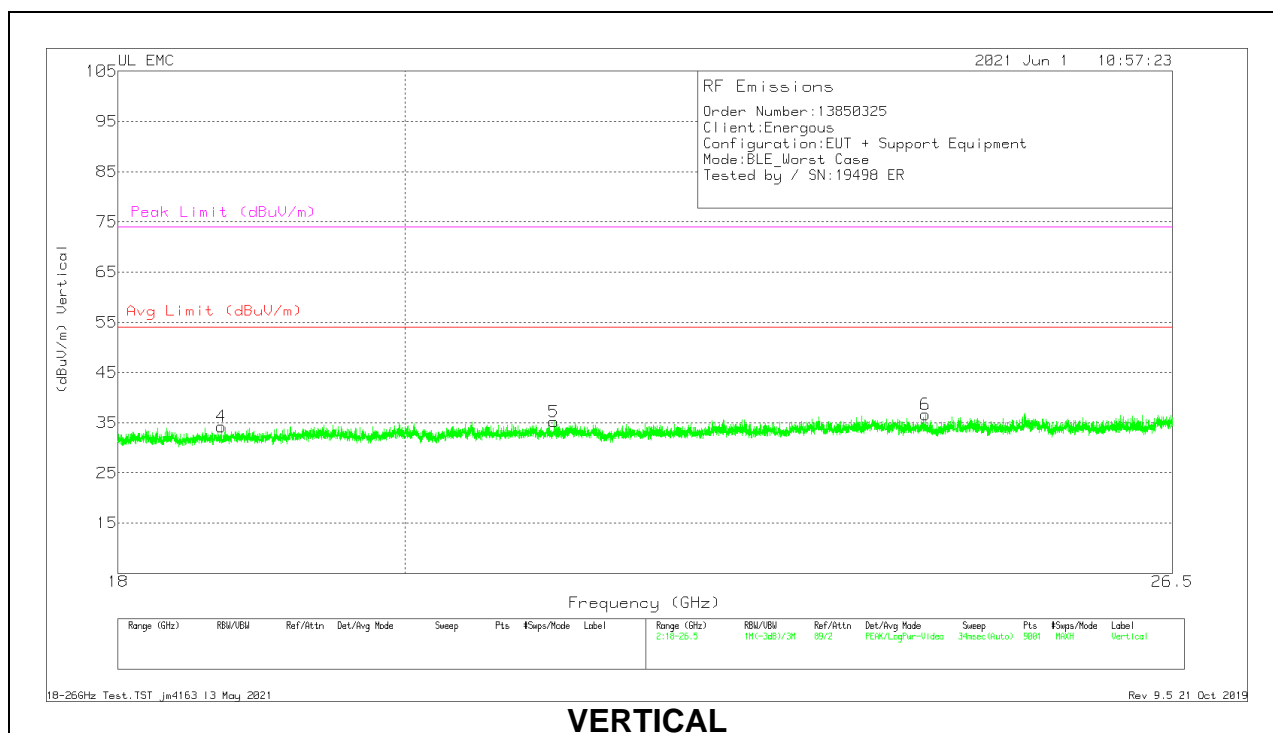
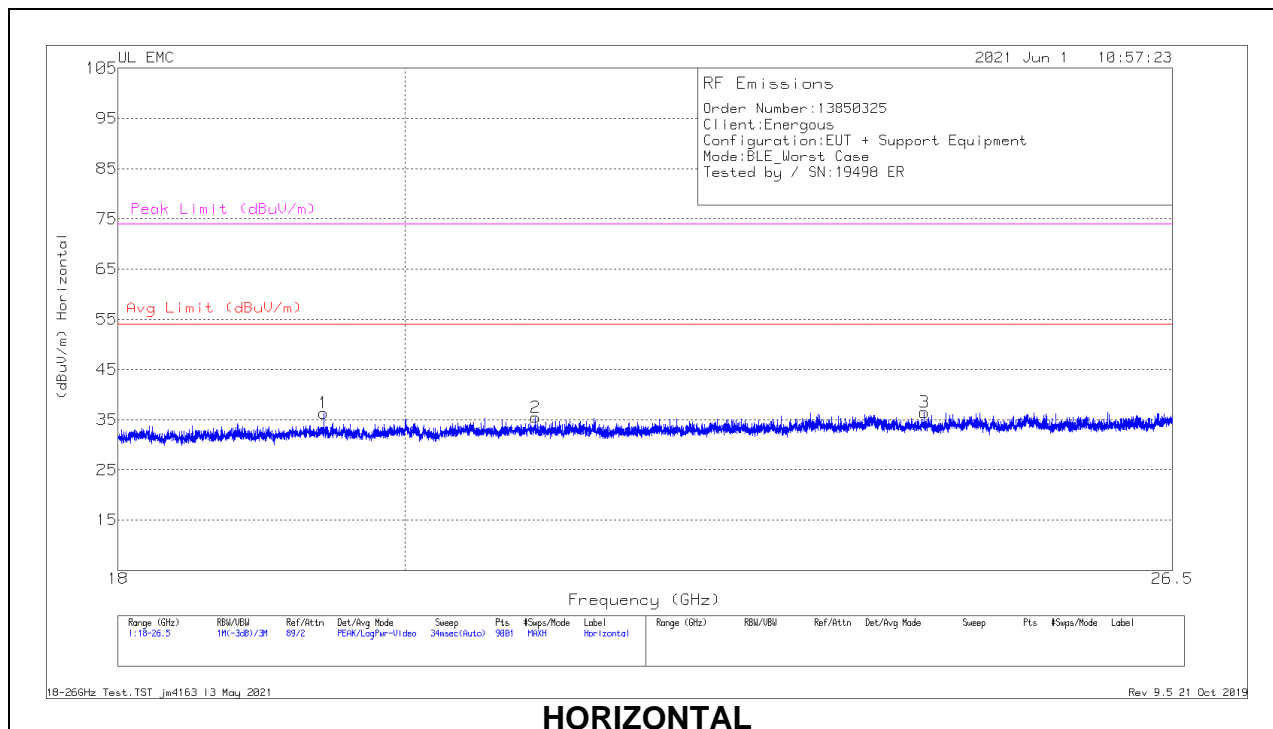
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF 81560 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	90.8332	52.64	Pk	13.8	-31	35.44	43.52	-8.08	0-360	200	H
2	143.2918	45.73	Pk	19	-30.6	34.13	43.52	-9.39	0-360	200	H
3	175.3026	47.06	Pk	17.6	-30.4	34.26	43.52	-9.26	0-360	200	H
4	30.085	38.32	Pk	27.9	-31.6	34.62	40	-5.38	0-360	95	V
	30.0971	32.88	Qp	27.9	-31.6	29.18	40	-10.82	268	99	V
5	36.5892	44.39	Pk	22.9	-31.5	35.79	40	-4.21	0-360	95	V
	36.024	35.06	Qp	23.4	-31.5	26.96	40	-13.04	2	134	V
6	90.4506	51.68	Pk	13.7	-31	34.38	43.52	-9.14	0-360	95	V
7	183.6773	46.9	Pk	17.4	-30.4	33.9	43.52	-9.62	0-360	95	V

Pk - Peak detector

Qp - Quasi-Peak detector

10.5. WORST CASE 18-26 GHZ

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



18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T447 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.41005	70.03	Pk	32.7	-56.9	-9.5	36.33	54	-17.67	74	-37.67
2	20.97878	68.87	Pk	33.3	-57.2	-9.5	35.47	54	-18.53	74	-38.53
3	24.19461	68.69	Pk	34.2	-56.9	-9.5	36.49	54	-17.51	74	-37.51
4	18.69511	69.9	Pk	32.4	-58.6	-9.5	34.2	54	-19.8	74	-39.8
5	21.12044	68.2	Pk	33.2	-56.7	-9.5	35.2	54	-18.8	74	-38.8
6	24.20405	69.02	Pk	34.2	-57.1	-9.5	36.62	54	-17.38	74	-37.38

Pk - Peak detector

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

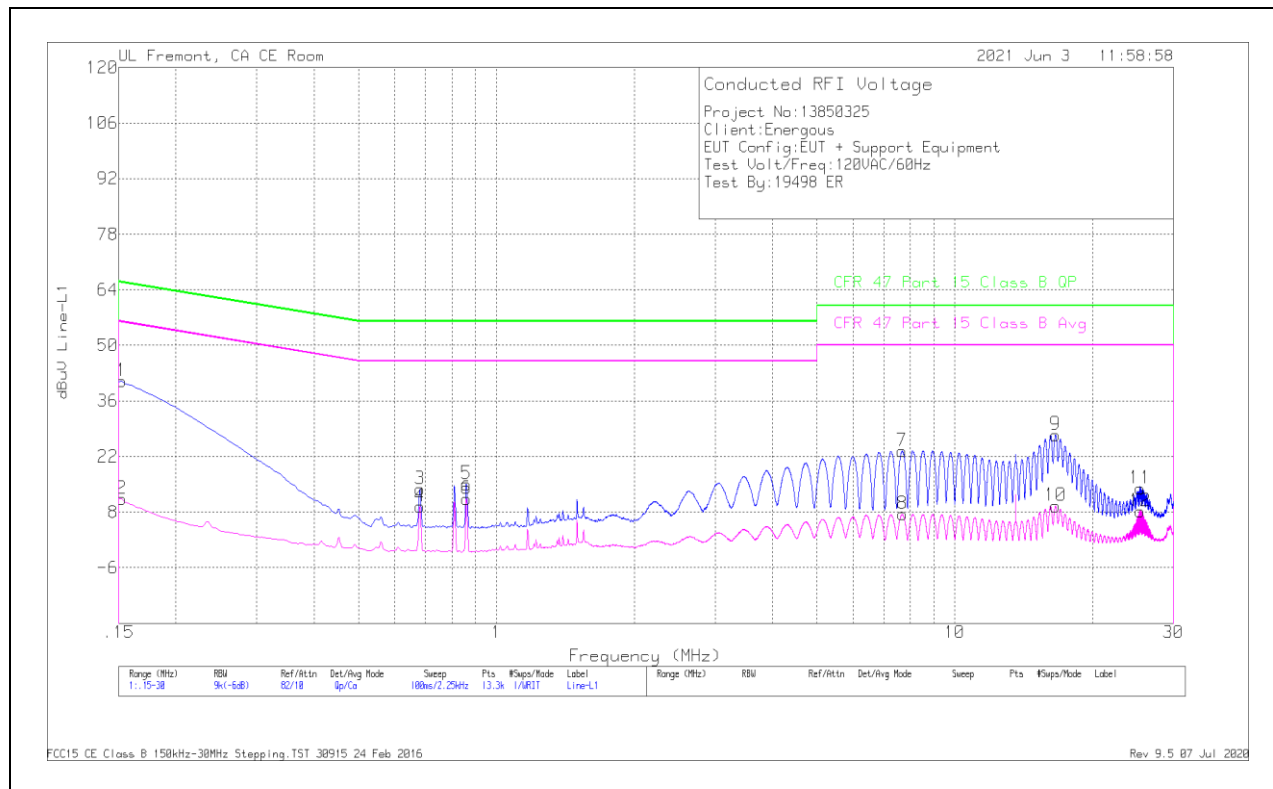
Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

RESULTS

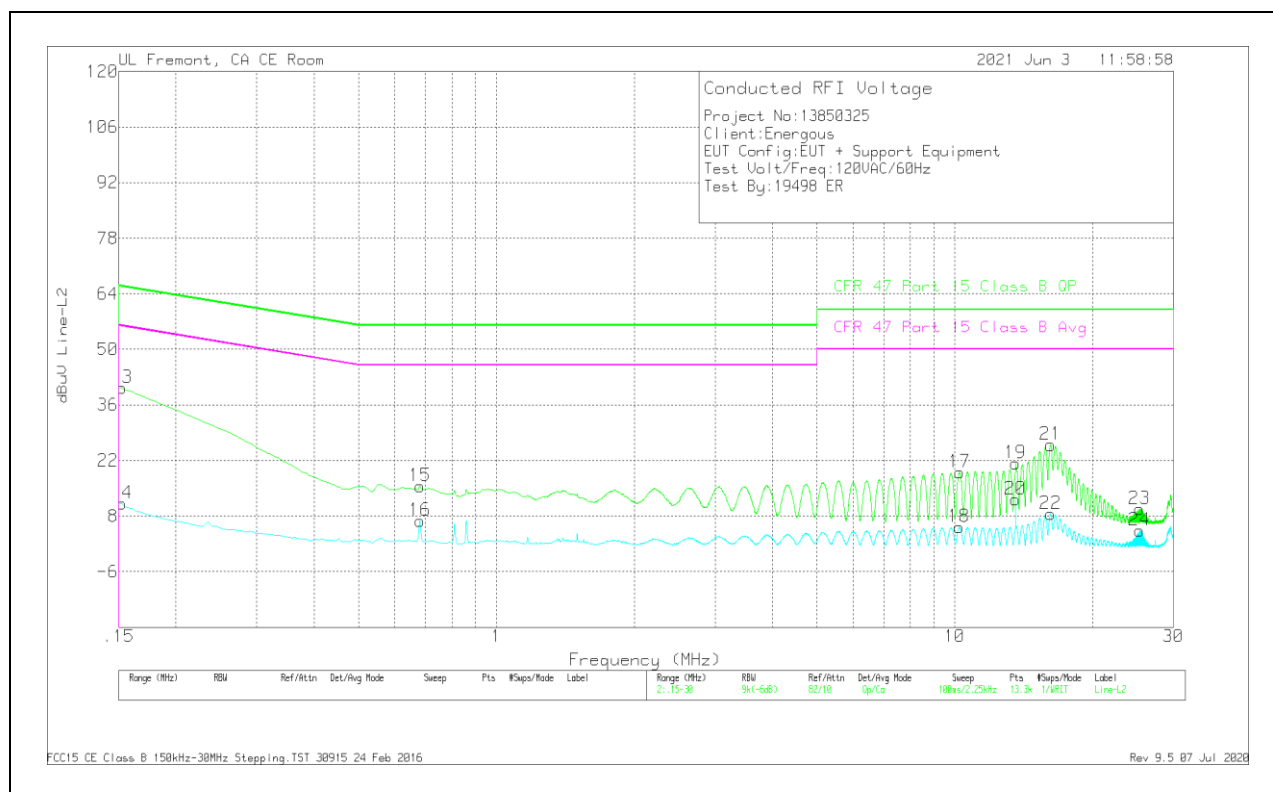
11.1.1. AC/DC ADAPTER MODEL: PA-Y19

LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE018644 6 L1	LC Cables C1&C3 dB	TekBox Limiter TBFL1 Model 207	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	.15225	31.57	Qp	.1	0	9.4	41.07	65.88	-24.81	-	-
2	.15225	1.86	Ca	.1	0	9.4	11.36	-	-	55.88	-44.52
3	.681	4.41	Qp	0	0	9.3	13.71	56	-42.29	-	-
4	.681	.06	Ca	0	0	9.3	9.36	-	-	46	-36.64
5	.861	5.69	Qp	0	.1	9.3	15.09	56	-40.91	-	-
6	.861	1.91	Ca	0	.1	9.3	11.31	-	-	46	-34.69
7	7.68188	13.95	Qp	0	.1	9.3	23.35	60	-36.65	-	-
8	7.69088	-1.97	Ca	0	.1	9.3	7.43	-	-	50	-42.57
9	16.593	17.98	Qp	0	.2	9.3	27.48	60	-32.52	-	-
10	16.5795	.02	Ca	0	.2	9.3	9.52	-	-	50	-40.48
11	25.3725	4.38	Qp	0	.3	9.3	13.98	60	-46.02	-	-
12	25.41075	-1.4	Ca	0	.3	9.3	8.2	-	-	50	-41.8

LINE 2 RESULTS

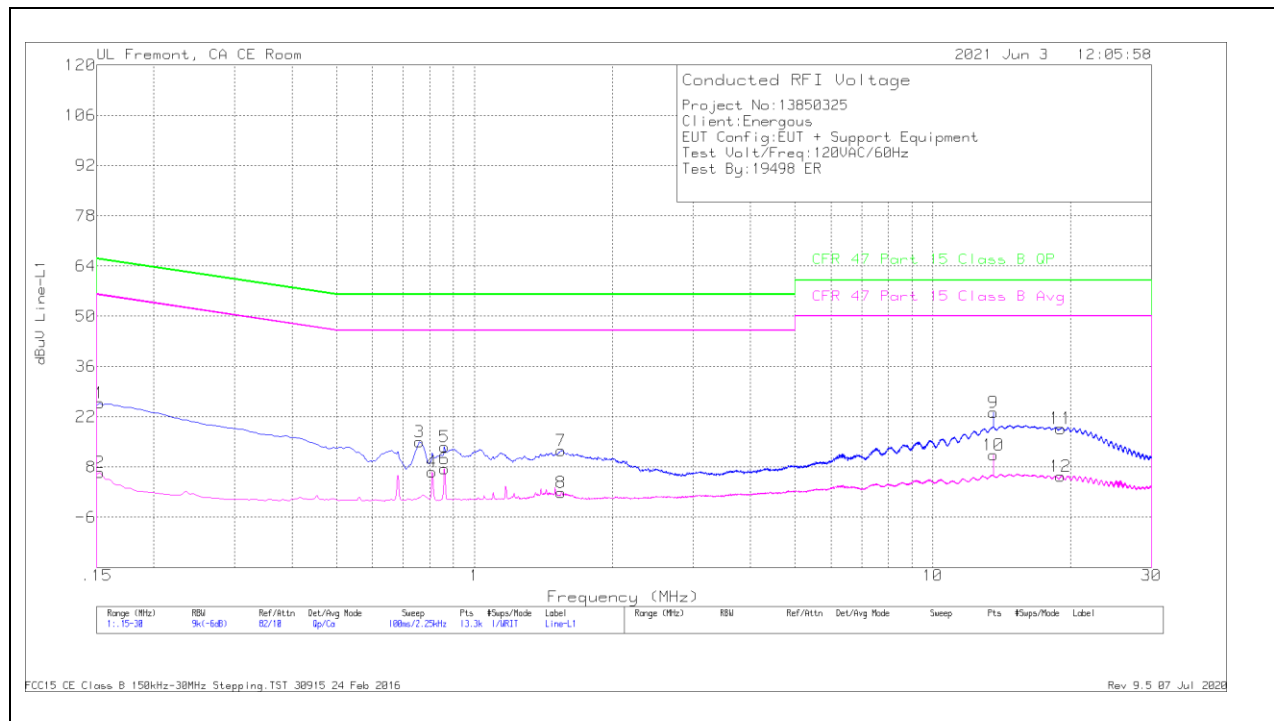


Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE018644 6 L2	LC Cables C2&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)M argin (dB)
13	.15225	30.95	Qp	0	0	9.4	40.35	65.88	-25.53	-	-
14	.15225	1.78	Ca	0	0	9.4	11.18	-	-	55.88	-44.7
15	.681	6.31	Qp	0	0	9.3	15.61	56	-40.39	-	-
16	.681	-2.57	Ca	0	0	9.3	6.73	-	-	46	-39.27
17	10.239	9.53	Qp	0	.2	9.3	19.03	60	-40.97	-	-
18	10.2345	-4.27	Ca	0	.2	9.3	5.23	-	-	50	-44.77
19	13.56	11.73	Qp	.1	.2	9.3	21.33	60	-38.67	-	-
20	13.56	2.59	Ca	.1	.2	9.3	12.19	-	-	50	-37.81
21	16.19025	16.42	Qp	0	.2	9.3	25.92	60	-34.08	-	-
22	16.19025	-.97	Ca	0	.2	9.3	8.53	-	-	50	-41.47
23	25.33425	-.14	Qp	.1	.3	9.3	9.84	60	-50.16	-	-
24	25.33425	-5.34	Ca	.1	.3	9.3	4.36	-	-	50	-45.64

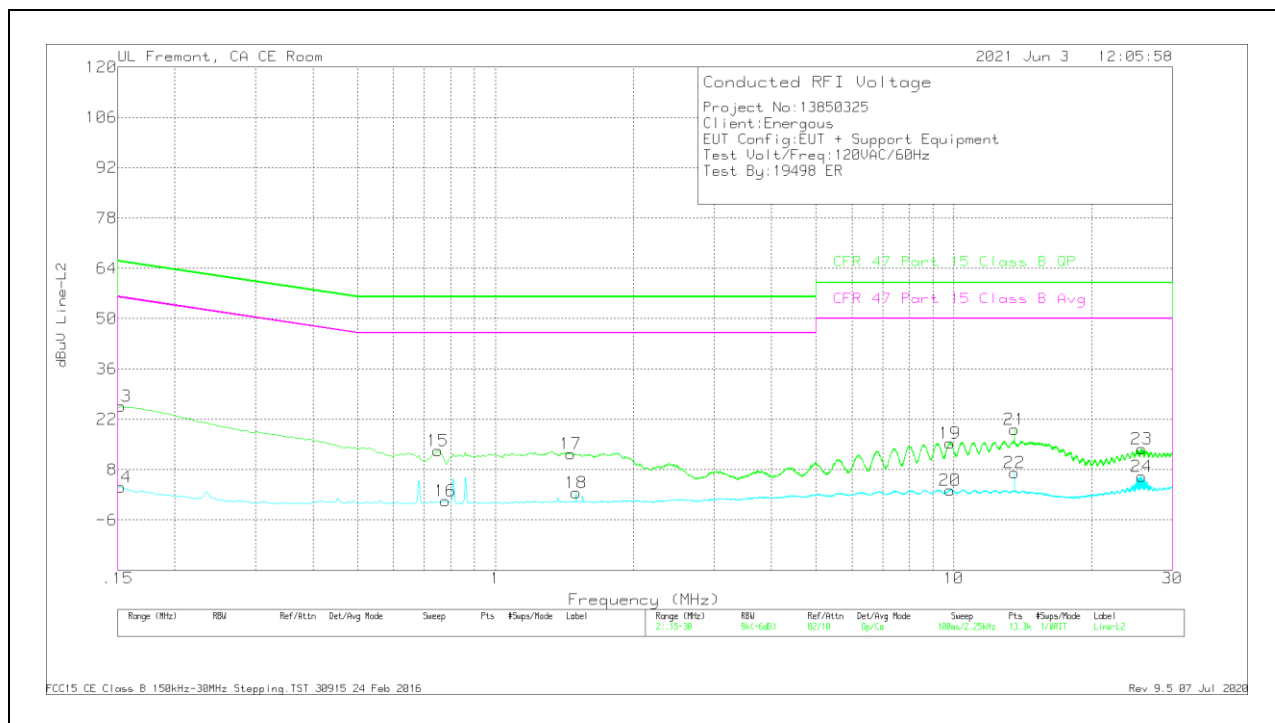
11.1.2. AC/DC ADAPTER MODEL: 700-014340-0000

LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE018644 6 L1	LC Cables C1&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)M argin (dB)
1	.15225	16.28	Qp	.1	0	9.4	25.78	65.88	-40.1	-	-
2	.15225	-3.03	Ca	.1	0	9.4	6.47	-	-	55.88	-49.41
3	.75975	5.6	Qp	0	.1	9.3	15	56	-41	-	-
4	.80925	-2.74	Ca	0	.1	9.3	6.66	-	-	46	-39.34
5	.861	4.15	Qp	0	.1	9.3	13.55	56	-42.45	-	-
6	.861	-1.85	Ca	0	.1	9.3	7.55	-	-	46	-38.45
7	1.545	3.22	Qp	0	.1	9.3	12.62	56	-43.38	-	-
8	1.54725	-8.53	Ca	0	.1	9.3	.87	-	-	46	-45.13
9	13.56	13.56	Qp	.1	.2	9.3	23.16	60	-36.84	-	-
10	13.56	1.79	Ca	.1	.2	9.3	11.39	-	-	50	-38.61
11	19.03313	9.26	Qp	0	.2	9.3	18.76	60	-41.24	-	-
12	19.0275	-4.16	Ca	0	.2	9.3	5.34	-	-	50	-44.66

LINE 2 RESULTS

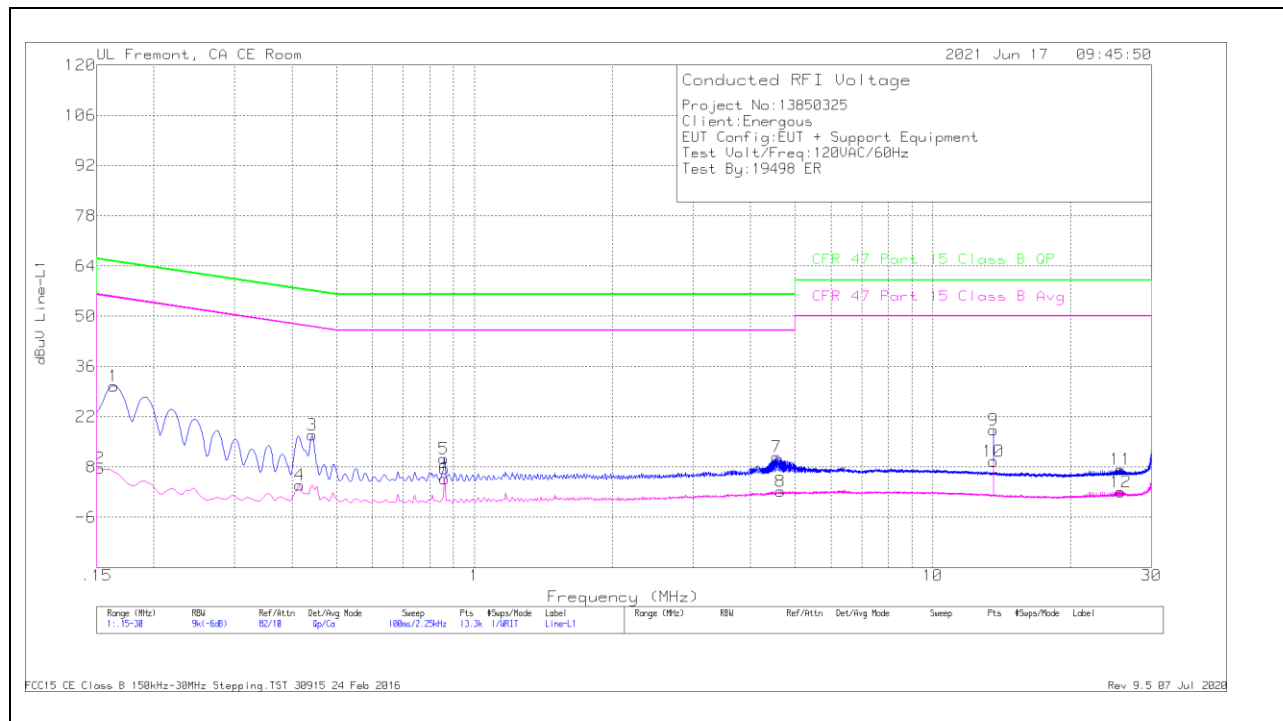


Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE018644 6 L2	LC Cables C2&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)M argin (dB)
13	.15225	16.28	Qp	0	0	9.4	25.68	65.88	-40.2	-	-
14	.15225	-6.19	Ca	0	0	9.4	3.21	-	-	55.88	-52.67
15	.7485	4	Qp	0	0	9.3	13.3	56	-42.7	-	-
16	.77775	-10.06	Ca	0	0	9.3	-76	-	-	46	-46.76
17	1.46175	3.06	Qp	0	.1	9.3	12.46	56	-43.54	-	-
18	1.5	-7.78	Ca	0	.1	9.3	1.62	-	-	46	-44.38
19	9.8025	5.92	Qp	0	.2	9.3	15.42	60	-44.58	-	-
20	9.798	-7.16	Ca	0	.2	9.3	2.34	-	-	50	-47.66
21	13.56	9.52	Qp	.1	.2	9.3	19.12	60	-40.88	-	-
22	13.56	-2.45	Ca	.1	.2	9.3	7.15	-	-	50	-42.85
23	25.71225	4.12	Qp	.1	.3	9.3	13.82	60	-46.18	-	-
24	25.674	-3.62	Ca	.1	.3	9.3	6.08	-	-	50	-43.92

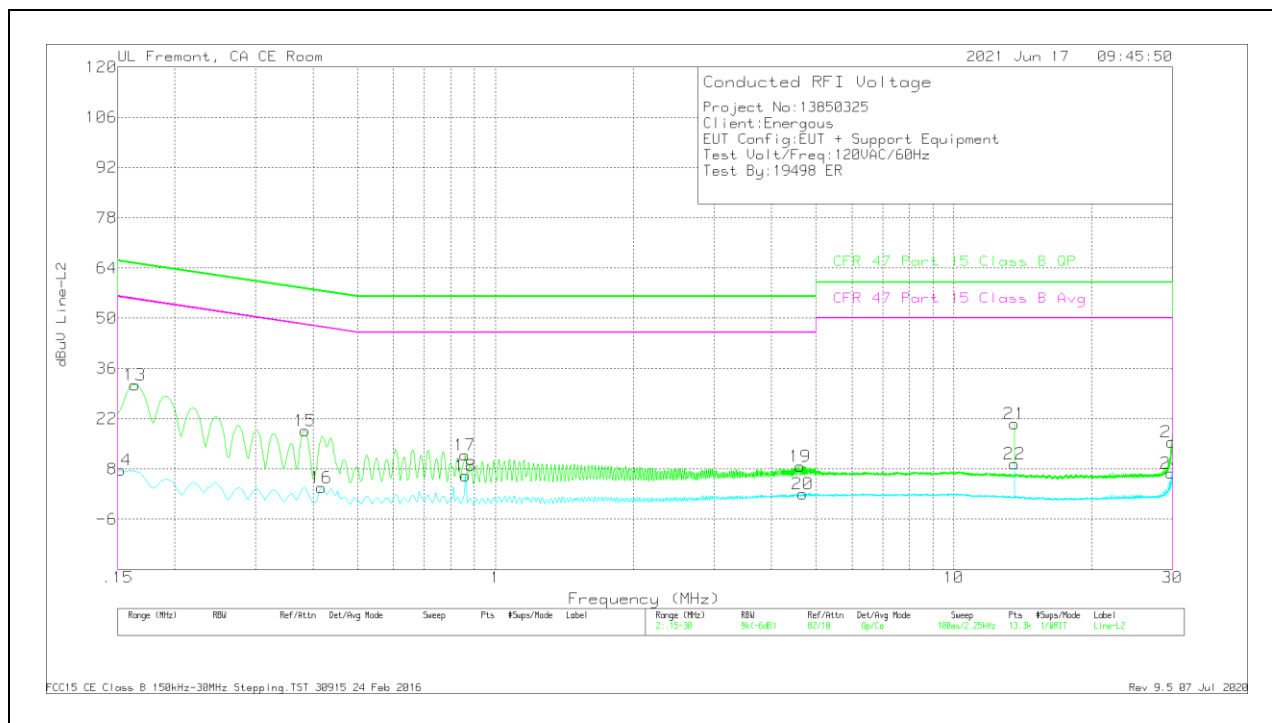
11.1.3. AC/DC ADAPTER MODEL: SWC45

LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE018644 6 L1	LC Cables C1&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)M argin (dB)
1	.1635	21.15	Qp	0	0	9.4	30.55	65.28	-34.73	-	-
2	.15225	-1.84	Ca	.1	0	9.4	7.66	-	-	55.88	-48.22
3	.4425	7.56	Qp	0	0	9.3	16.86	57.01	-40.15	-	-
4	.4155	-6.31	Ca	0	0	9.3	2.99	-	-	47.54	-44.55
5	.85875	.96	Qp	0	.1	9.3	10.36	56	-45.64	-	-
6	.861	-4.65	Ca	0	.1	9.3	4.75	-	-	46	-41.25
7	4.56675	1.4	Qp	0	.1	9.3	10.8	56	-45.2	-	-
8	4.65	-8.12	Ca	0	.1	9.3	1.28	-	-	46	-44.72
9	13.56	8.7	Qp	.1	.2	9.3	18.3	60	-41.7	-	-
10	13.56	-.05	Ca	.1	.2	9.3	9.55	-	-	50	-40.45
11	25.674	-2.25	Qp	0	.3	9.3	7.35	60	-52.65	-	-
12	25.67175	-8.48	Ca	0	.3	9.3	1.12	-	-	50	-48.88

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE018644 6 L2	LC Cables C2&C3 dB	TekBox Limiter TBFL1 Model 207	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	.1635	22.02	Qp	0	0	9.4	31.42	65.28	-33.86	-	-
14	.15225	-1.78	Ca	0	0	9.4	7.62	-	-	55.88	-48.26
15	.384	9.4	Qp	0	0	9.3	18.7	58.19	-39.49	-	-
16	.41775	-6.54	Ca	0	0	9.3	2.76	-	-	47.49	-44.73
17	.85875	2.51	Qp	0	.1	9.3	11.91	56	-44.09	-	-
18	.861	-3.24	Ca	0	.1	9.3	6.16	-	-	46	-39.84
19	4.62075	-.61	Qp	0	.1	9.3	8.79	56	-47.21	-	-
20	4.677	-8.42	Ca	0	.1	9.3	.98	-	-	46	-45.02
21	13.56	11.07	Qp	.1	.2	9.3	20.67	60	-39.33	-	-
22	13.56	-.2	Ca	.1	.2	9.3	9.4	-	-	50	-40.6
23	29.859	5.65	Qp	.1	.3	9.4	15.45	60	-44.55	-	-
24	29.8185	-2.93	Ca	.1	.3	9.4	6.87	-	-	50	-43.13