



TEST REPORT

Report Number. : 12724643-E2V2

Applicant : Leviton Manufacturing Co., Inc.
10385 SW AVERY
TUALATIN, OR, 97062, U.S.A

Model : DL057-D0Z, DL057-30Z, and DL05S-D0Z
ZL057-D0Z, ZL057-30Z, and ZL05S-D0Z

FCC ID : 2ASLN-DL057

IC : 25037-DL057

EUT Description : Room Controller with Integrated Switching
and 0-10V

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

Date Of Issue:
October 08, 2019

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NVLAP Lab code: 200065-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	8/23/2019	Initial Issue	
	10/8/2019	Cover Page and Sec. 1: Updated EUT Description and additional model names Sec 2: Updated and corrected standards Sec. 5.3, 6, 7: Updated Sec. 8.4: Corrected table header	Kenneth Mak
V2			

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Leviton Manufacturing Co., Inc.
10385 SW AVERY
TUALATIN, OR, 97062, U.S.A

EUT DESCRIPTION: Room Controller with Integrated Switching
and 0-10V

MODEL: DL057-D0Z, DL057-30Z, and DL05S-D0Z
ZL057-D0Z, ZL057-30Z, and ZL05S-D0Z

SERIAL NUMBER: Radiated: 1DR-277, 2DR-347, 3SR-277
Conducted: 1DC-277, 2DC-347, 3SC-277

DATE TESTED: June 18 – July 9, 2019

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

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

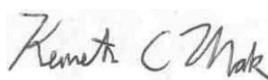
This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This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

Approved & Released For
UL Verification Services Inc. By:



Dan Corona
Operations Leader
Consumer Technology Division
UL Verification Services Inc.

Reviewed By:



Kenneth Mak
Test Engineer
Consumer Technology Division
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, 414788 D01 Radiated Test Site v01r01, 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	☐ Chamber D	☒ Chamber I
☐ Chamber B	☐ Chamber E	☐ Chamber J
☐ Chamber C	☐ Chamber F	☐ Chamber K
	☐ Chamber G	☐ Chamber L
	☐ Chamber H	

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code: 2324A.

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 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 dBuV + 0 dB + 10.1 dB + 0 dB = 46.6 dBuV

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.52 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	4.88 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.24 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.37 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.17 dB

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

5. EQUIPMENT UNDER TEST

5.1.EUT DESCRIPTION

The EUT is a LuminaRF Zigbee & Bluetooth Coordinator Wall Station with Dimming & Switch. The model DL05S-D0Z was used for final testing and is representative of the test results in this report.

5.2.MAXIMUM OUTPUT POWER

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

Model	Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
DL05S-D0Z	2405 - 2480	Zigbee	17.41	55.08

5.3.DESCRPTION OF AVAILABLE ANTENNAS

The radio utilizes a chip antenna, with a maximum gain of 1.5 dBi. Zigbee and Bluetooth LE radios cannot simultaneously transmit at the same time.

5.4.SOFTWARE AND FIRMWARE

The test utility software used during testing was Real Term, Commander tool, and Lumina Rf Coor FPT.

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 for each model was investigated in three orthogonal orientations X, Y, and Z, and it was determined that X-Axis for Model DL05S-D0Z was the worst-case.

AC Line Conduction: All 3 models (DL057-D0Z, DL057-30Z, and DL05S-D0Z) were tested. The differences among them are listed below:

Model	AC Power Requirement
DL057-D0Z	120 - 277 VAC
DL057-30Z	347 VAC
DL05S-D0Z	120 – 277 VAC

5.6.DESCRPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Toshiba	C55-B5242X	8F023077P	PPD-QCNFA335
Laptop AC Adapter	Toshiba	PA3822U-1ACA	G71C000DF410	N/A
Debug board	Leviton	B2529 Rev.4	N/A	N/A
WSTK development board	Silicon Labs	BRD4001A	183745344	N/A
Lightbulb fixture	Leviton	N/A	N/A	N/A

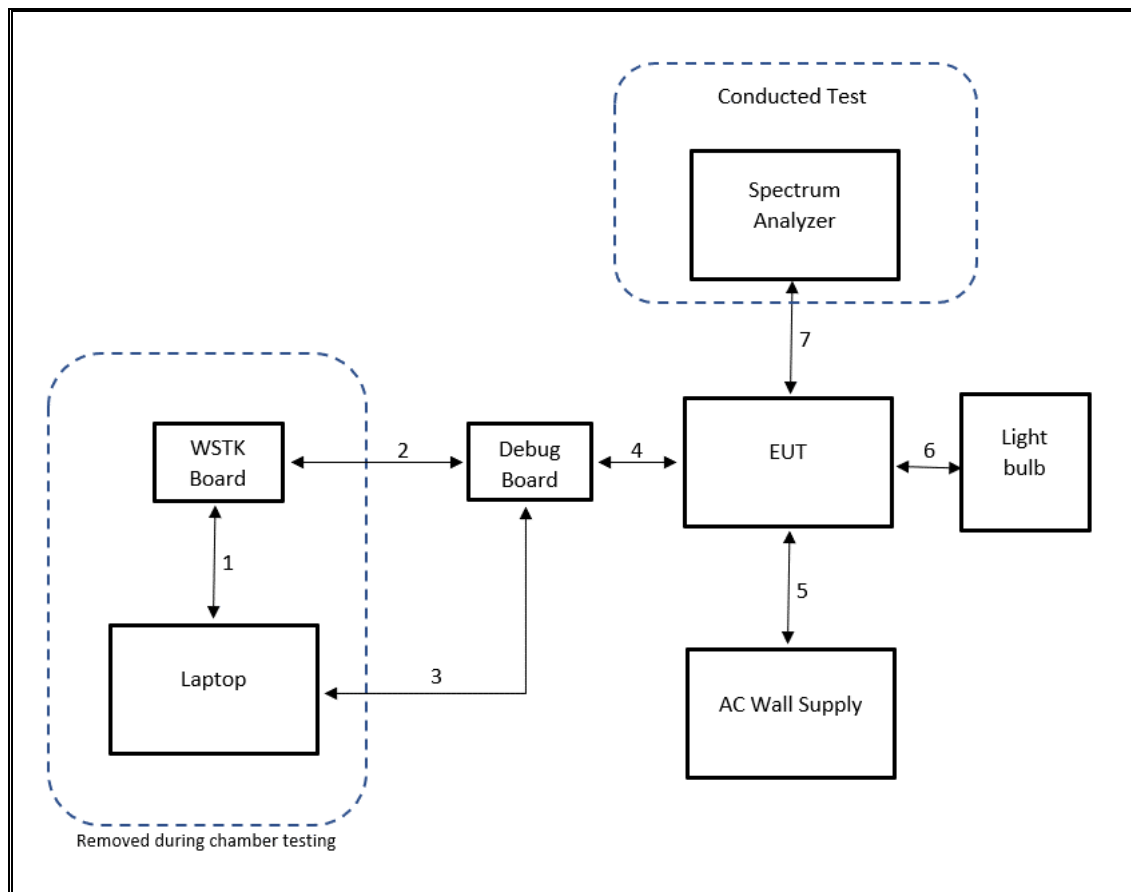
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB to USB Mini-B	1	USB	Unshielded	0.11	For programming
2	Packet Trace Cable	1	Ribbon	Unshielded	0.16	WSTK board to Debug board
3	USB to FTDI	1	USB to FTDI	Unshielded	1.6	Laptop to Debug board
4	Debug Ribbon cable	1	Ribbon	Unshielded	0.09	Debug board to EUT
5	AC Power	1	AC	Unshielded	1	AC Mains to EUT
6	Wire	1	AC	Unshielded	1.5	EUT to light bulb
7	UFL cable	1	UFL	Unshielded	0.1	EUT to spectrum analyzer

TEST SETUP

The test utility software on support laptop exercised the radio card.
For radiated testing, the support laptop was used to program EUT and removed after it was set in test mode.

SETUP DIAGRAM



6. MEASUREMENT METHOD

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

6 dB BW: ANSI C63.10 Section 11.8.1

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

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

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

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

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

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

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

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

7. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	ID Num	Cal Due
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	PRE0180175	5/29/2020
RF Filter Box, 1-18GHz	UL (IN HOUSE)		171389	8/1/2019
RF Amplifier, 1-18GHz	MITEQ	AFS42-00101800-25-S-42	171460	8/1/2019
Antenna, BroadBand Hybrid, 30MHz to 3GHz	SunAR rf motion	JB3	PRE0184971	11/13/2019
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T862	6/5/2020
Amplifier 1-8GHz 30dB gain	L3 Narda	AMF-4D-01000800-30-29P	167494	8/1/2019
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179376	2/14/2020
Pre-Amp 1-26.5 GHz	Agilent	8449B	T404	03/09/2020
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Agilent (Keysight) Technologies	E4440A	T200	1/28/2020
Power Meter, P-series single channel	Agilent (Keysight) Technologies	N1911A	T1265	1/29/2020
Power Meter, P-series single channel	Agilent (Keysight) Technologies	N1911A	T1268	1/31/2020
Power Meter, RF	Anritsu Corporation	ML2495A	T1414	1/23/2020
Thermometer - Digital	Control Company	14-650-118	PRE0177859	4/23/2020
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO METRICS	EM-6871	PRE0179465	5/31/2020
AC Line Conducted				
EMI Receiver	Rohde & Schwarz	ESR	T1436	02/14/2020
LISN for Conducted Emissions CISPR-16	FCC INC.	FCC LISN 50/250	T1310	01/24/2020

Test Software List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Ver 9.5, June 22, 2018
Antenna Port Software	UL	UL RF	Ver 9.5, Jan 07, 2019
AC Line Conducted Software	UL	UL EMC	Ver 9.5, May 26, 2015

8. ANTENNA PORT TEST RESULTS

8.1.ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

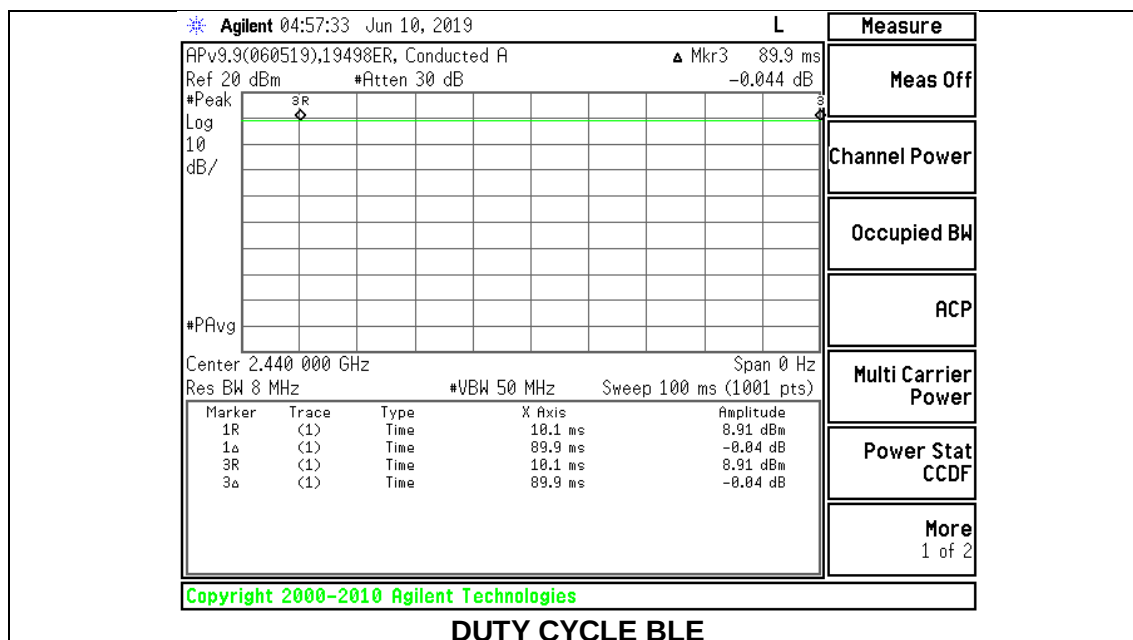
PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
Zigbee	89.9	89.9	1.000	100.00%	0.00	0.010

DUTY CYCLE PLOTS



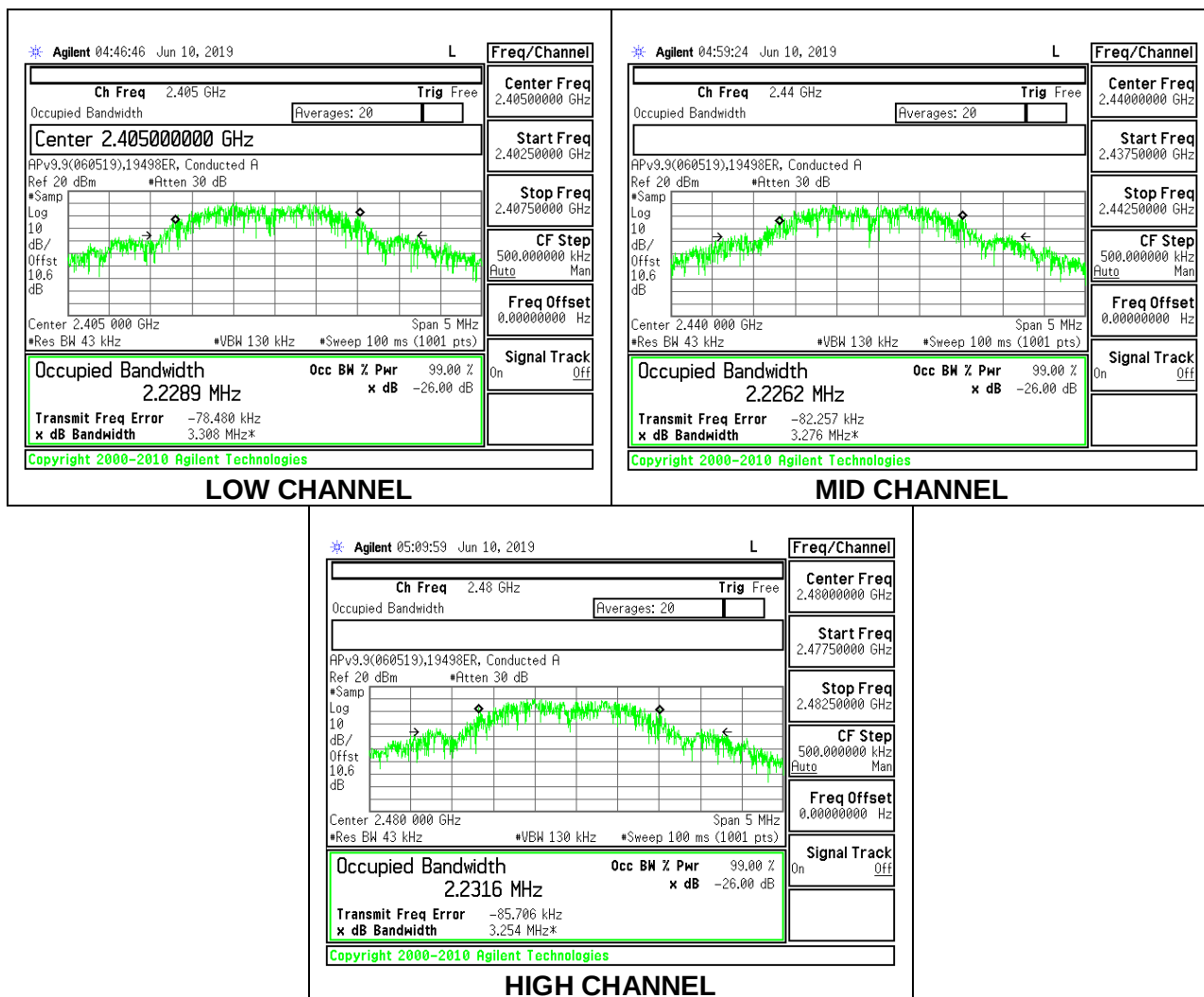
8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2405	2.2289
Middle	2440	2.2262
High	2480	2.2316



8.3. 6 dB BANDWIDTH

LIMITS

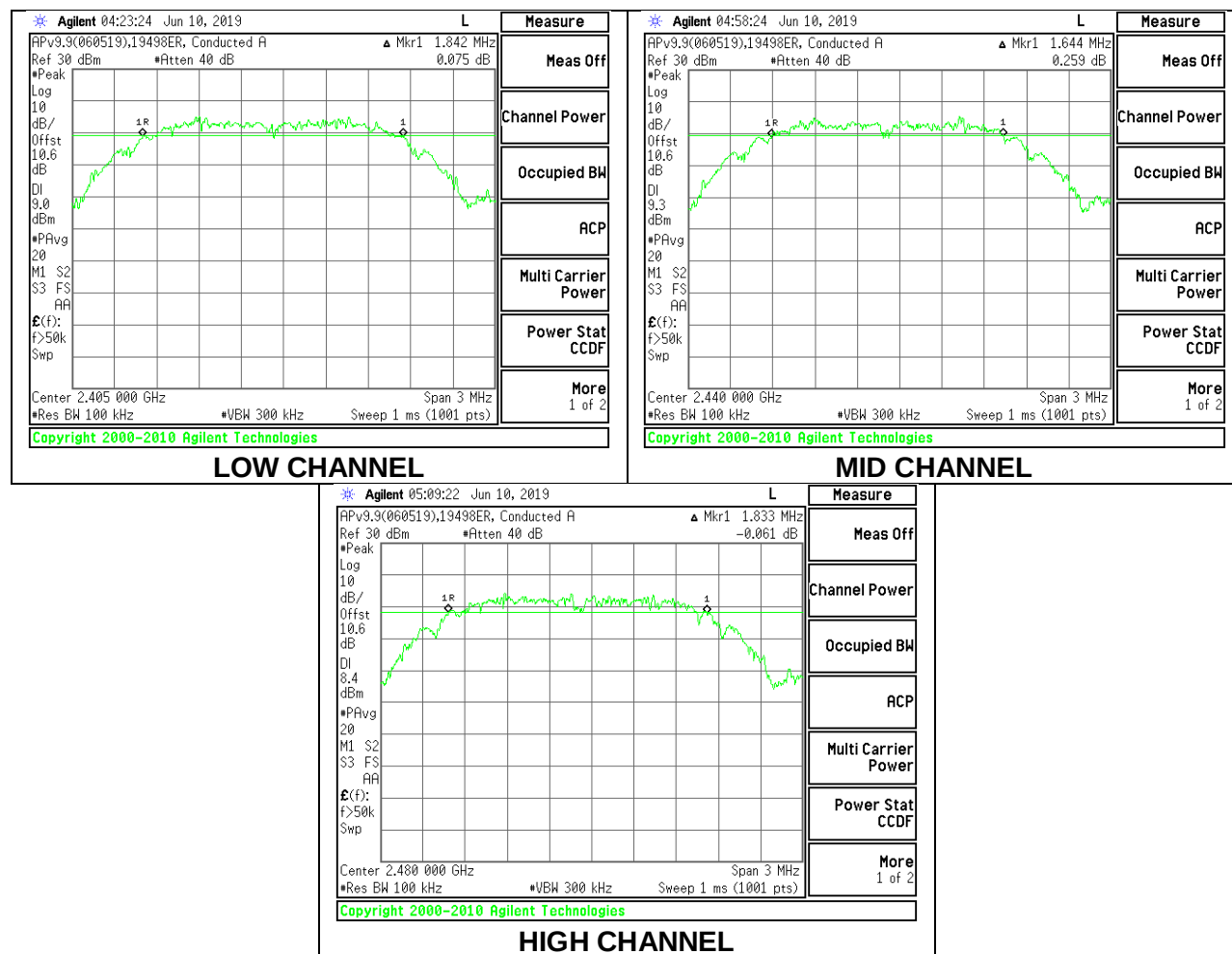
FCC §15.407 (e)

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	2405	1.8420	0.5
Middle	2440	1.6440	0.5
High	2480	1.8330	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 was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

Tested By:	ER 19498
Date:	6/26/2019

Channel	Frequency (MHz)	Average Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2405	17.41	30	-12.59
Middle	2440	17.22	30	-12.78
High	2480	17.06	30	-12.94

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 was entered as an offset in the power meter to allow for a gated average reading of power.

RESULTS

Tested By:	ER 19498
Date:	6/26/2019

Channel	Frequency (MHz)	AV power (dBm)
Low	2405	17.24
Middle	2440	17.05
High	2480	16.92

8.6. POWER SPECTRAL DENSITY

LIMITS

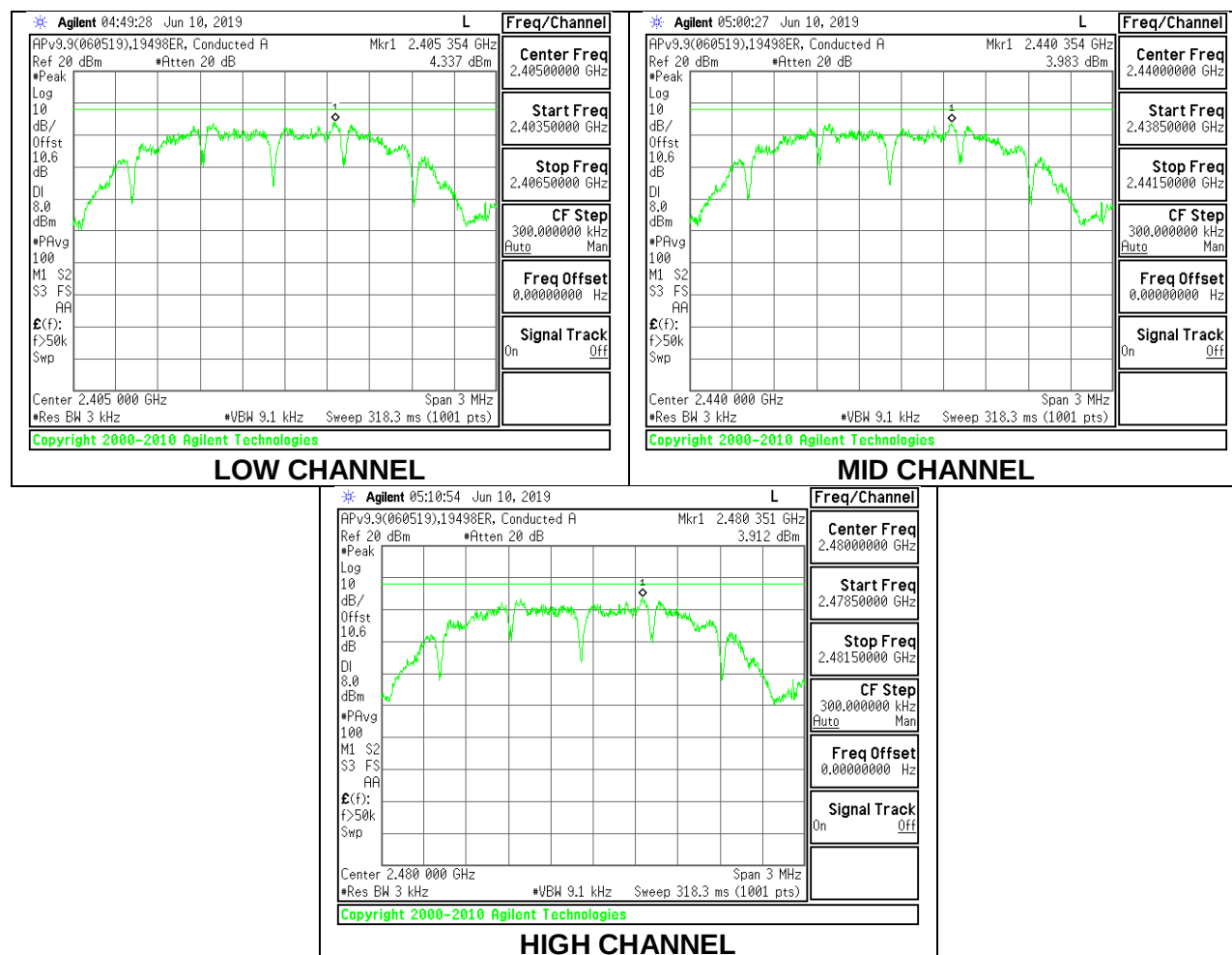
FCC §15.247 (e)

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	2405	4.34	8	-3.66
Middle	2440	3.98	8	-4.02
High	2480	3.91	8	-4.09



8.7.CONDUCTED SPURIOUS EMISSIONS

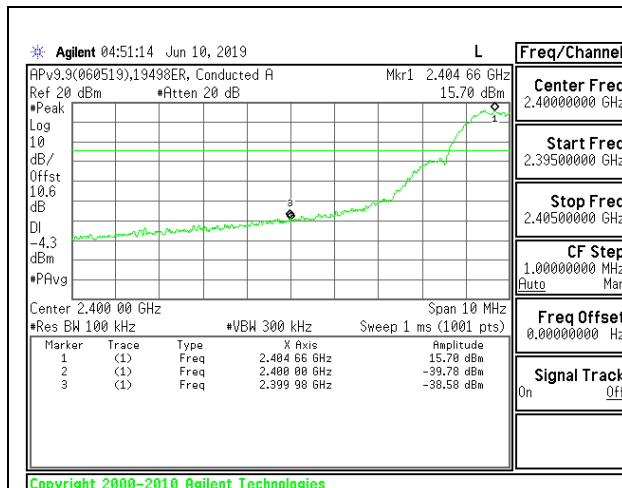
LIMITS

FCC §15.247 (d)

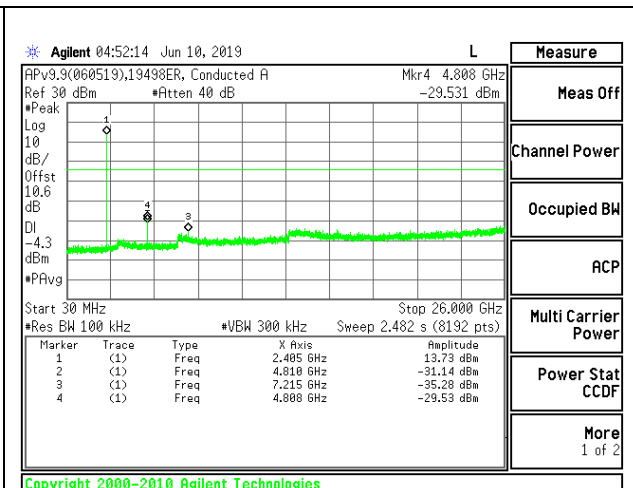
RSS-247 5.5

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

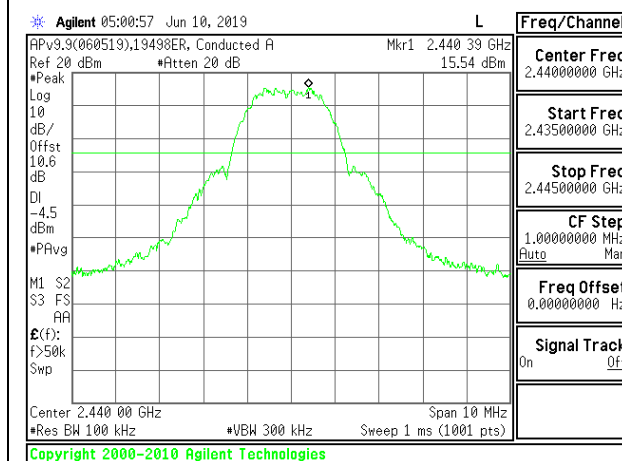
RESULTS



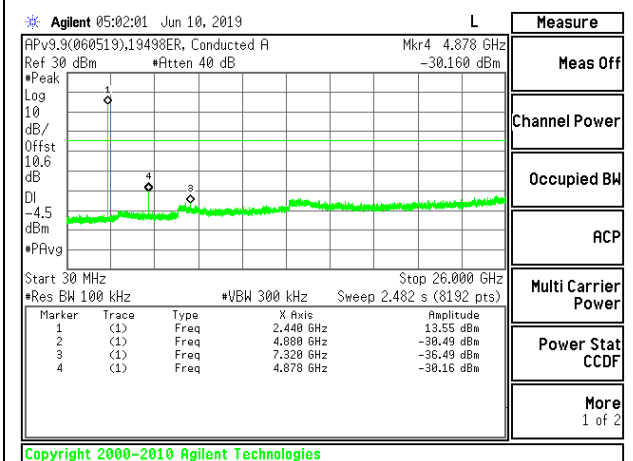
LOW CHANNEL BANDEDGE



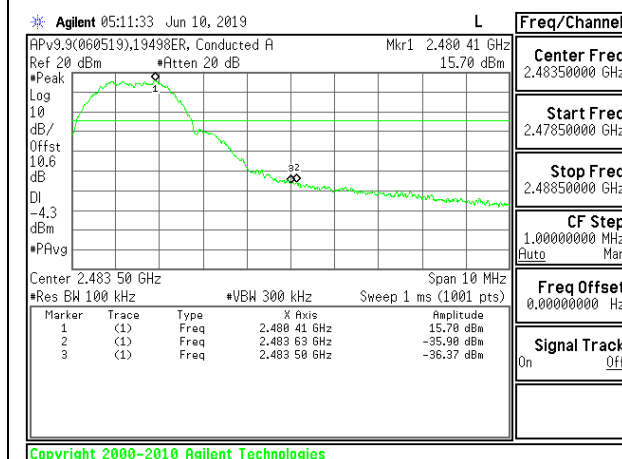
OUT-OF-BAND LOW CHANNEL



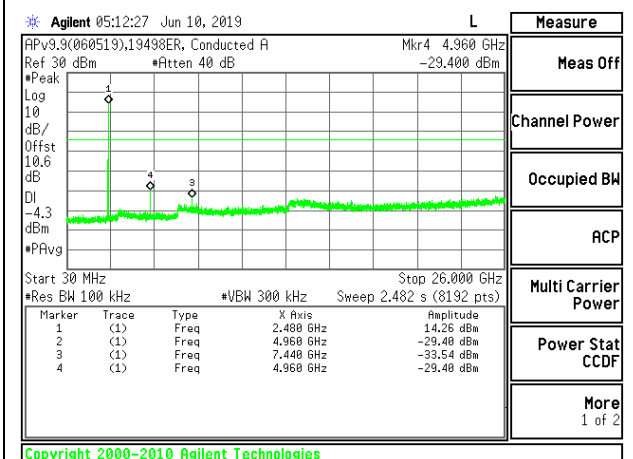
IN-BAND REFERENCE LEVEL



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.

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.

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

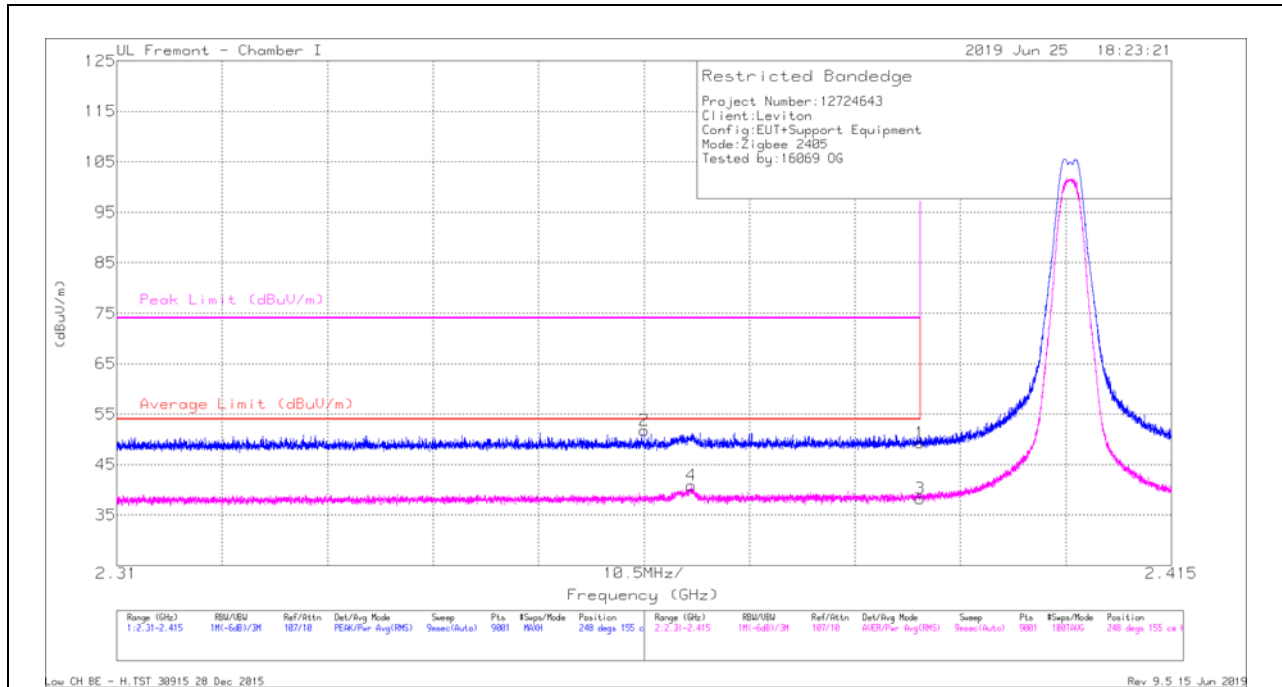
Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

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



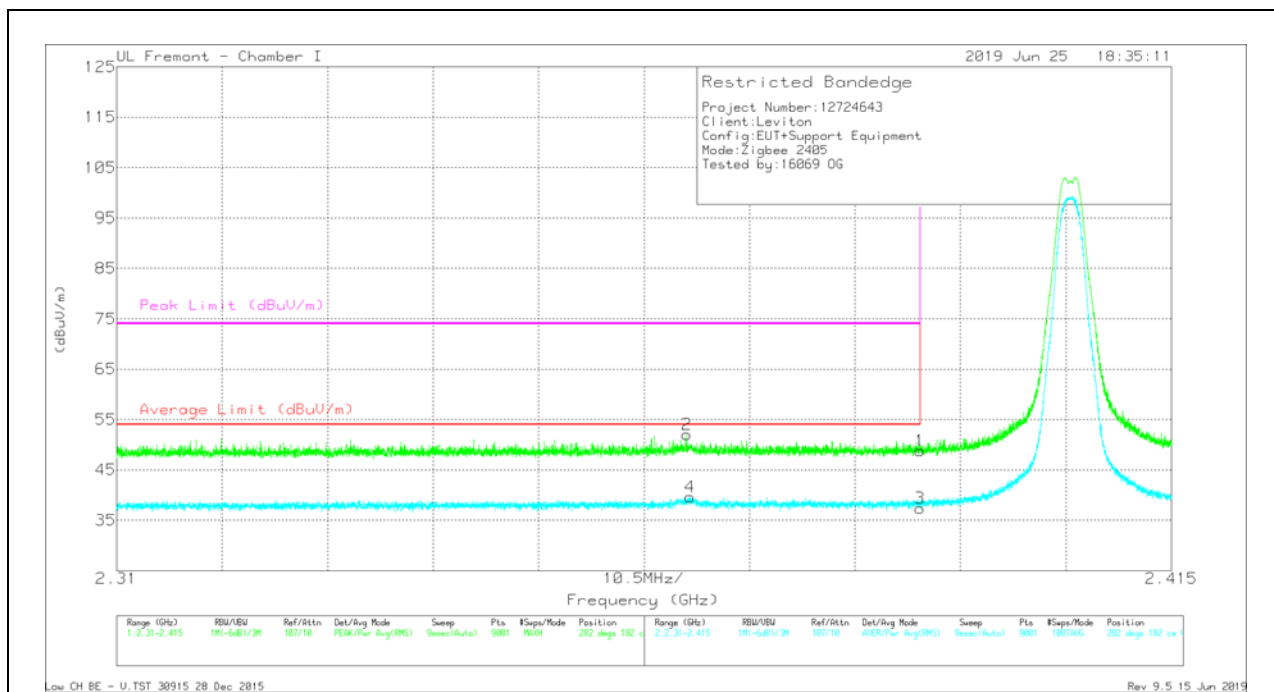
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/ChlFilt r/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	39.04	Pk	31.9	-21.6	49.34	-	-	74	-24.66	248	155	H
2	2.36251	41.44	Pk	31.8	-21.5	51.74	-	-	74	-22.26	248	155	H
3	2.38999	27.92	RMS	31.9	-21.6	38.22	54	-15.78	-	-	248	155	H
4	2.3672	30.41	RMS	31.9	-21.5	40.81	54	-13.19	-	-	248	155	H

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Trace Markers

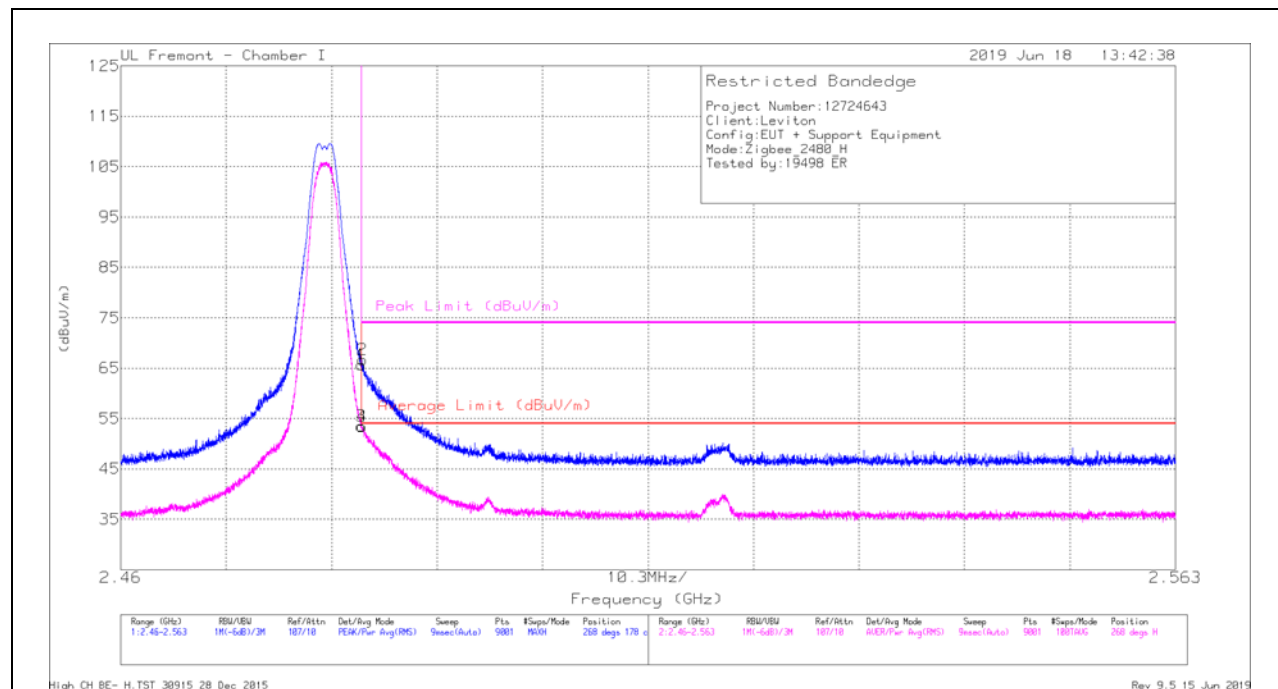
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/CbI/Filt r/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.38999	38.52	Pk	31.9	-21.6	48.82	-	-	74	-25.18	282	182	V
2	2.36678	41.61	Pk	31.9	-21.5	52.01	-	-	74	-21.99	282	182	V
3	2.38999	27.09	RMS	31.9	-21.6	37.39	54	-16.61	-	-	282	182	V
4	2.36705	29.34	RMS	31.9	-21.6	39.64	54	-14.36	-	-	282	182	V

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



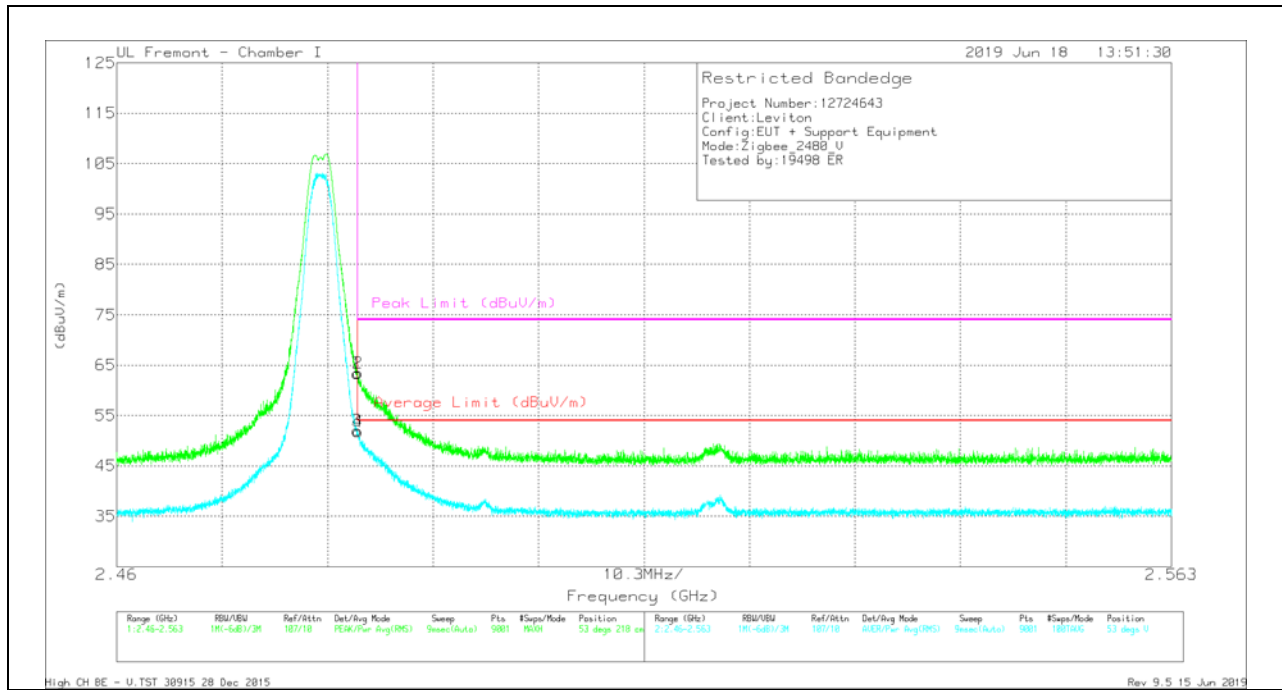
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE019081 0 (dB/m)	Amp/Cbl/Filt r/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	57.95	Pk	29.4	-21.7	65.65	-	-	74	-8.35	268	178	H
2	2.48362	59.02	Pk	29.4	-21.7	66.72	-	-	74	-7.28	268	178	H
3	2.48351	45.79	RMS	29.4	-21.7	53.49	54	-51	-	-	268	178	H
4	2.48354	45.68	RMS	29.4	-21.7	53.38	54	-62	-	-	268	178	H

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Trace Markers

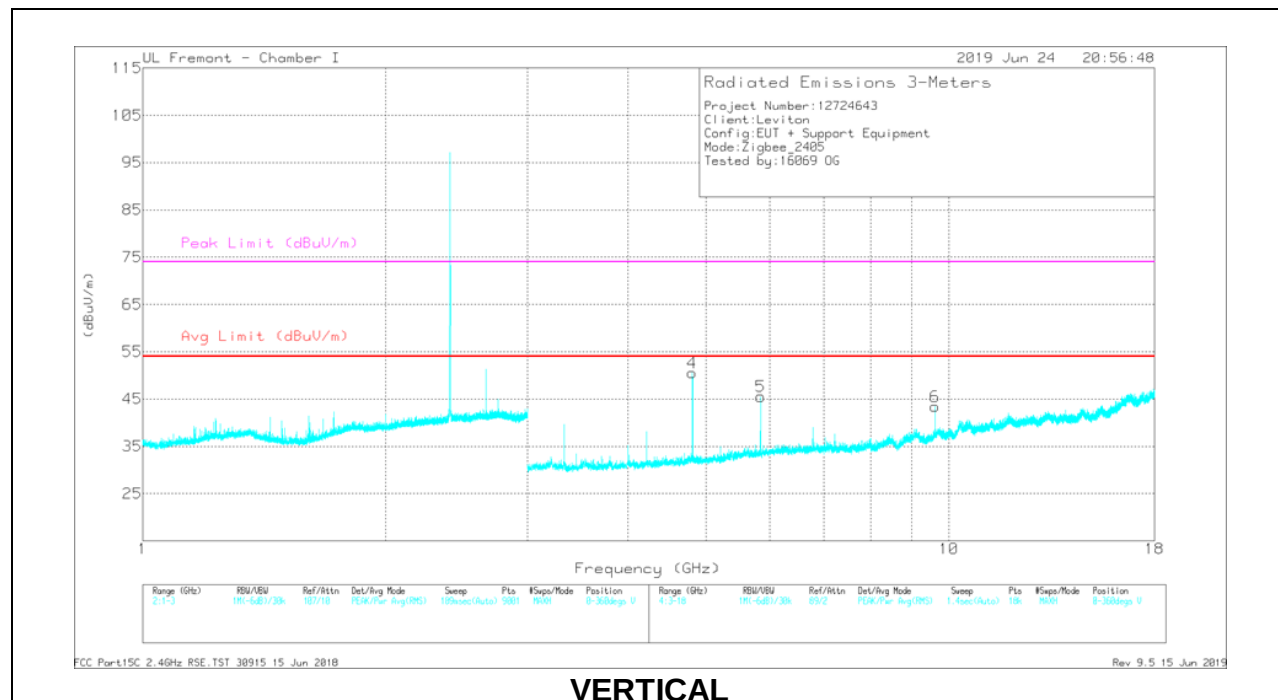
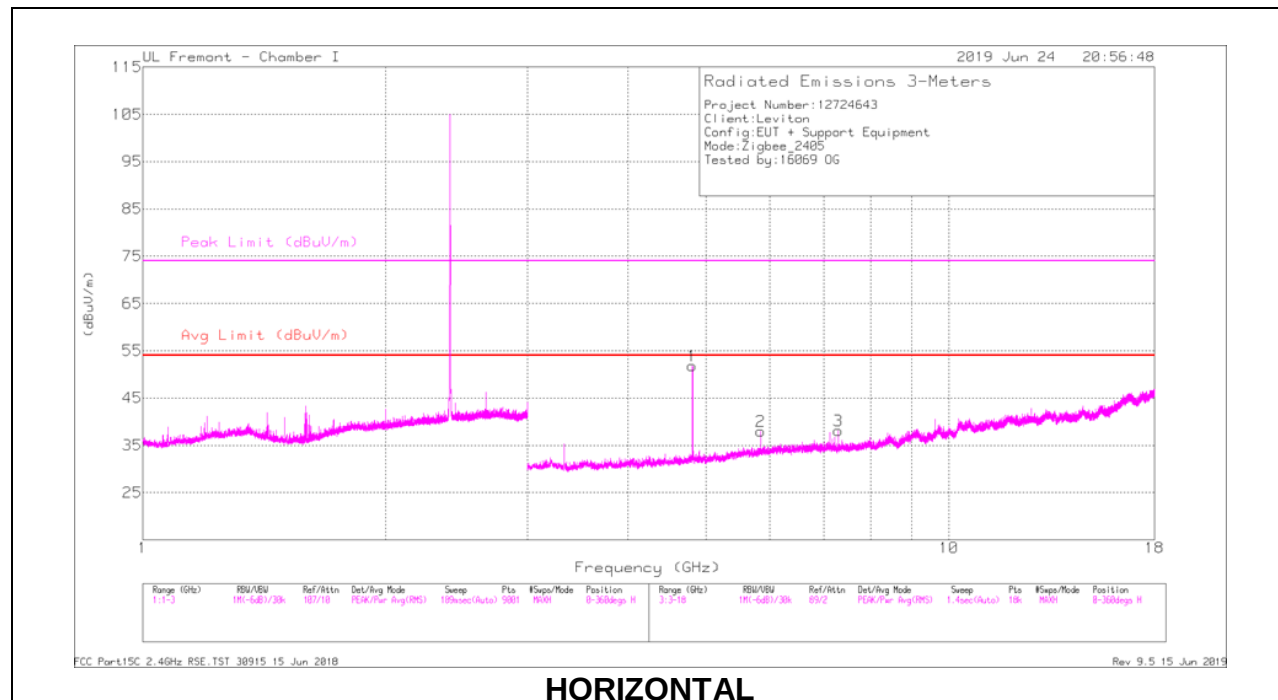
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE019081 0 (dB/m)	Amp/CbIF/r/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.48351	55.67	Pk	29.4	-21.7	63.37	-	-	74	-10.63	53	218	V
2	2.48353	55.73	Pk	29.4	-21.7	63.43	-	-	74	-10.57	53	218	V
3	2.48351	44.31	RMS	29.4	-21.7	52.01	54	-1.99	-	-	53	218	V
4	2.48356	44.06	RMS	29.4	-21.7	51.76	54	-2.24	-	-	53	218	V

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 T862 (dB/m)	Amp/Cbl/Filr /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	* 4.80844	45.71	Pk	34.2	-28.1	51.81	-	-	74	-22.19	0-360	198	H
2	5.84016	30.7	Pk	35.1	-27.8	38	-	-	-	-	0-360	198	H
3	* 7.29524	28.5	Pk	35.5	-25.9	38.1	-	-	74	-35.9	0-360	198	H
4	* 4.80844	44.44	Pk	34.2	-28.1	50.54	-	-	74	-23.46	0-360	102	V
5	5.84016	38.24	Pk	35.1	-27.8	45.54	-	-	-	-	0-360	199	V
6	9.62204	28.59	Pk	36.8	-22	43.39	-	-	-	-	0-360	102	V

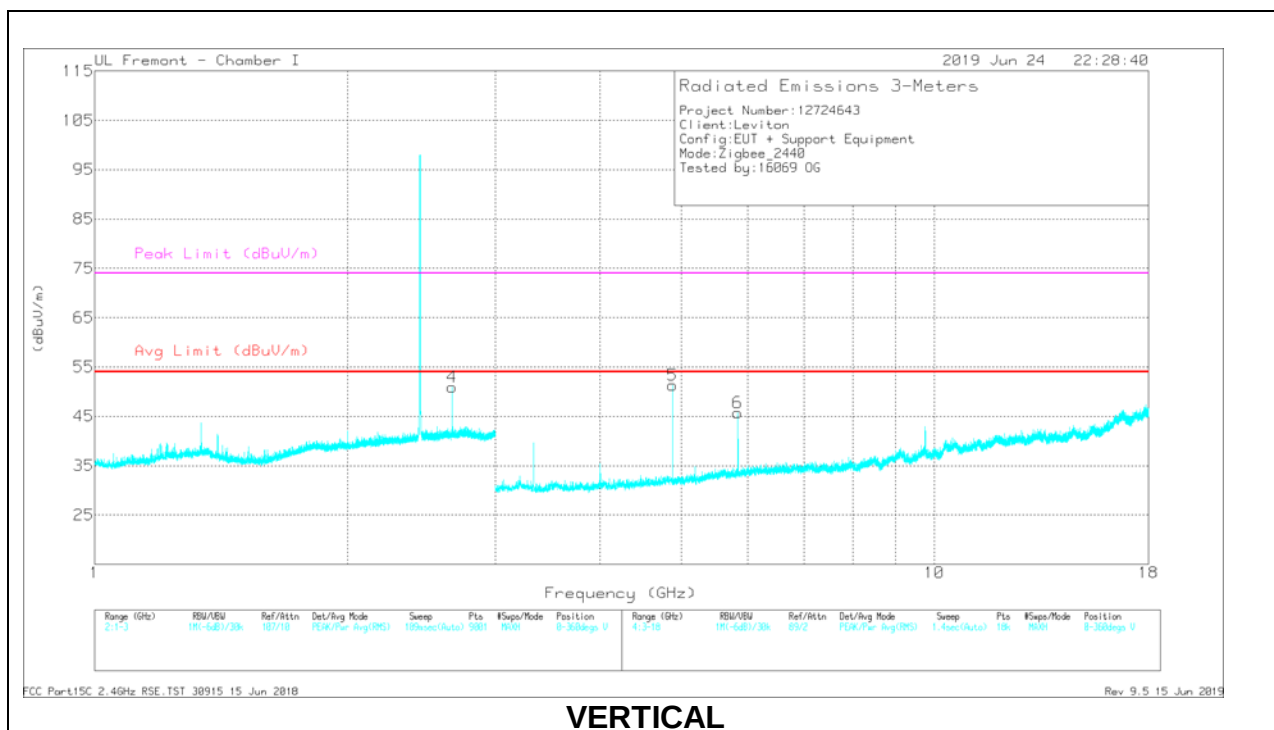
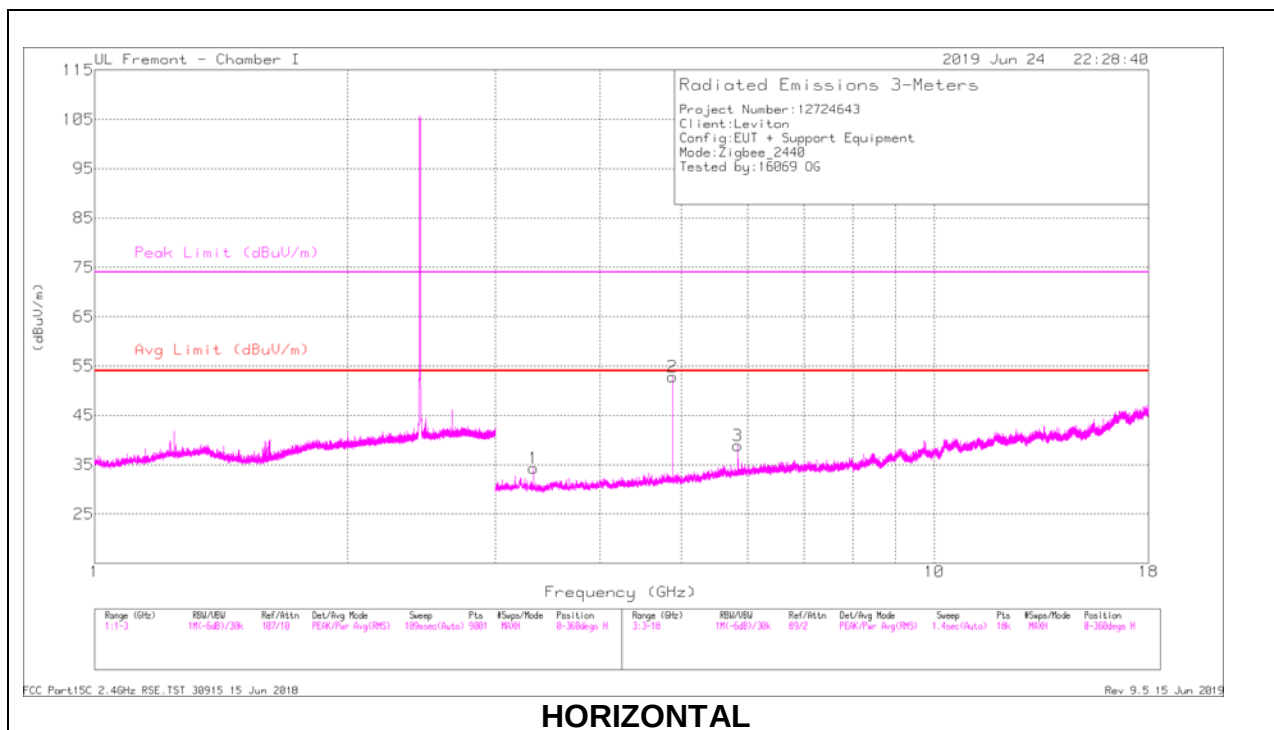
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filr /Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80879	52.15	PK2	34.2	-28.1	58.25	-	-	74	-15.75	39	196	H
* 4.80883	45.19	MAV1	34.2	-28.1	51.29	54	-2.71	-	-	39	196	H
* 7.2938	32.37	PK2	35.6	-25.9	42.07	-	-	74	-31.93	197	121	H
* 7.29393	22.68	MAV1	35.5	-25.9	32.28	54	-21.72	-	-	197	121	H
5.8395	36.52	PK2	35.1	-27.8	43.82	-	-	-	-	306	180	H
* 4.8087	50.44	PK2	34.2	-28.1	56.54	-	-	74	-17.46	314	111	V
* 4.80887	42.15	MAV1	34.2	-28.1	48.25	54	-5.75	-	-	314	111	V
5.83934	41.02	PK2	35.1	-27.8	48.32	-	-	-	-	192	122	V
9.62226	33.84	PK2	36.7	-22	48.54	-	-	-	-	276	222	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 T862 (dB/m)	Amp/Cbl/Ftr /Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 2.66667	39.88	Pk	32.3	-21.3	50.88	-	-	74	-23.12	0-360	199	V
1	* 3.33252	31.85	Pk	32.8	-30.3	34.35	-	-	74	-39.65	0-360	198	H
2	* 4.88094	47.52	Pk	34.1	-28.8	52.82	-	-	74	-21.18	0-360	198	H
3	5.83849	31.68	Pk	35.1	-27.9	38.88	-	-	-	-	0-360	102	H
5	* 4.88011	46.07	Pk	34.1	-28.8	51.37	-	-	74	-22.63	0-360	102	V
6	5.83849	38.47	Pk	35.1	-27.9	45.67	-	-	-	-	0-360	102	V

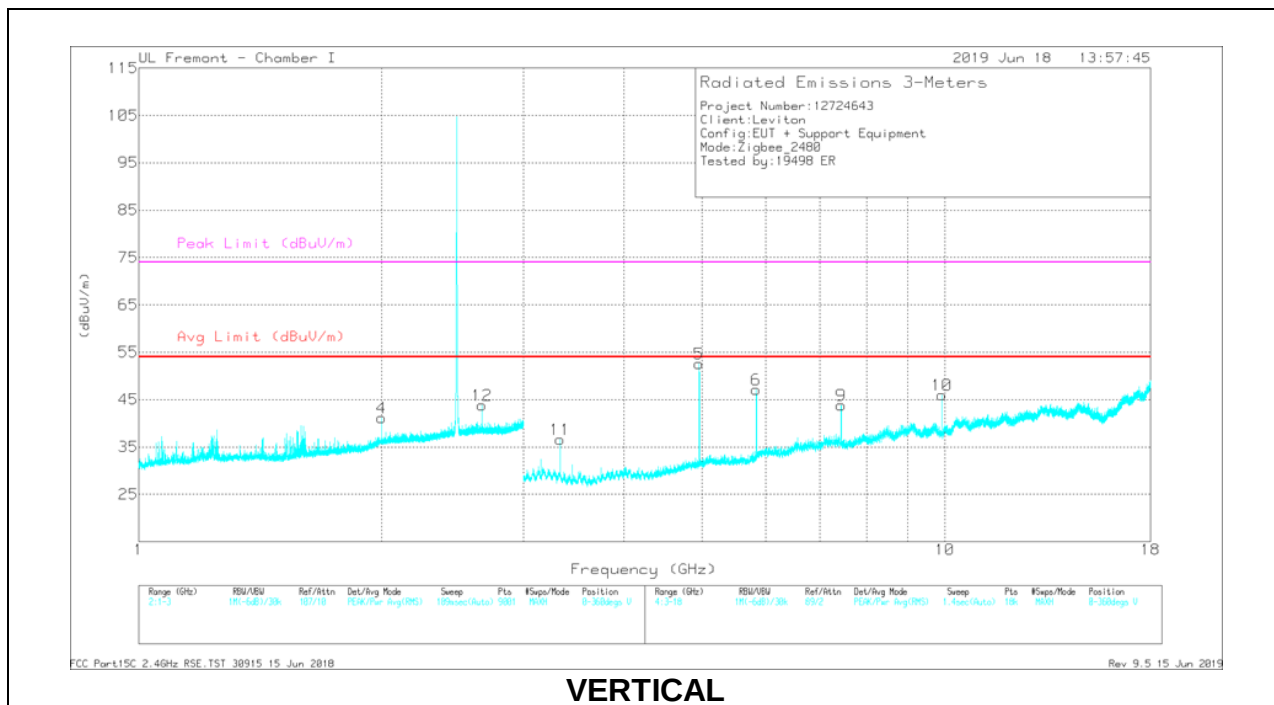
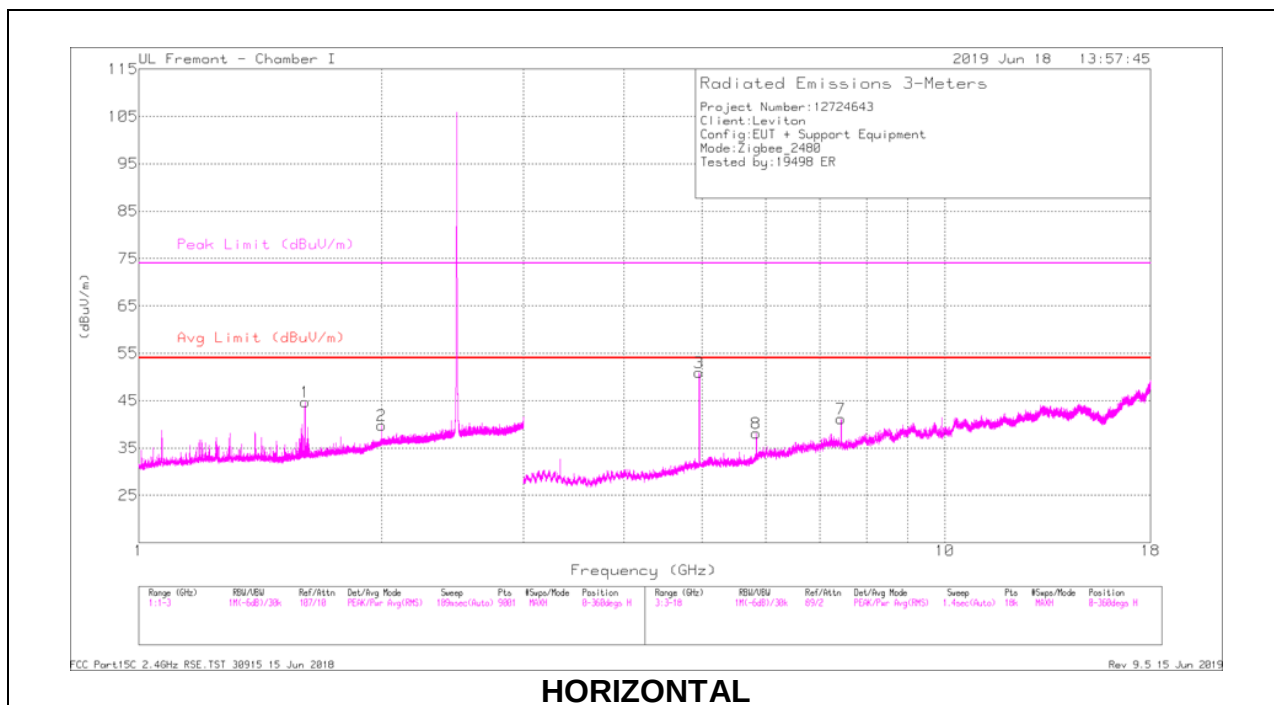
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Ftr /Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.66663	42.34	PK2	32.3	-21.3	53.34	-	-	74	-20.66	241	200	V
* 2.66663	36.97	MAV1	32.3	-21.3	47.97	54	-6.03	-	-	241	200	V
* 3.33323	41.43	PK2	32.8	-30.3	43.93	-	-	74	-30.07	307	371	H
* 3.3333	33.17	MAV1	32.8	-30.3	35.67	54	-18.33	-	-	307	371	H
* 4.88103	53.91	PK2	34.1	-28.8	59.21	-	-	74	-14.79	43	260	H
* 4.8808	47.12	MAV1	34.1	-28.8	52.42	54	-1.58	-	-	43	260	H
5.838	36.41	PK2	35.1	-27.9	43.61	-	-	-	-	265	111	H
* 4.88098	52.63	PK2	34.1	-28.8	57.93	-	-	74	-16.07	314	107	V
* 4.87881	44.99	MAV1	34.1	-28.8	50.29	54	-3.71	-	-	314	107	V
5.83808	40.77	PK2	35.1	-27.9	47.97	-	-	-	-	191	109	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 PRE0190810 (dB/m)	Amp/Cbl/Ftr /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	* 1.60778	42.49	Pk	25.2	-23	44.69	-	-	74	-29.31	0-360	100	H
2	2	34.3	Pk	28.1	-22.6	39.8	-	-	-	-	0-360	198	H
4	2	35.7	Pk	28.1	-22.6	41.2	-	-	-	-	0-360	199	V
12	* 2.66689	35.47	Pk	29.6	-21.3	43.77	-	-	74	-30.23	0-360	102	V
3	* 4.95844	46.47	Pk	33.5	-29	50.97	-	-	74	-23.03	0-360	198	H
7	* 7.43775	29.47	Pk	36.8	-25.1	41.17	-	-	74	-32.83	0-360	102	H
8	5.83849	31.63	Pk	34.4	-27.9	38.13	-	-	-	-	0-360	102	H
5	* 4.95844	48.1	Pk	33.5	-29	52.6	-	-	74	-21.4	0-360	199	V
6	5.83849	40.59	Pk	34.4	-27.9	47.09	-	-	-	-	0-360	100	V
9	* 7.43858	32.12	Pk	36.8	-25.1	43.82	-	-	74	-30.18	0-360	100	V
10	9.91789	30.28	Pk	37.7	-22	45.98	-	-	-	-	0-360	199	V
11	* 3.33335	35.98	Pk	30.9	-30.3	36.58	-	-	74	-37.42	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 PRE0190810 (dB/m)	Amp/Cbl/Ftr /tr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.60913	41.36	PK2	25.2	-22.9	43.66	-	-	74	-30.34	355	316	H
* 1.60882	29.29	MAV1	25.2	-22.9	31.59	54	-22.41	-	-	355	316	H
1.99993	42.38	PK2	28.1	-22.6	47.88	-	-	-	-	113	244	H
2.00002	40.84	PK2	28.1	-22.6	46.34	-	-	-	-	126	119	V
* 2.66655	42.15	PK2	29.6	-21.3	50.45	-	-	74	-23.55	65	233	V
* 2.66664	32.75	MAV1	29.6	-21.3	41.05	54	-12.95	-	-	65	233	V
* 4.95861	52.4	PK2	33.5	-29	56.9	-	-	74	-17.1	43	192	H
* 4.95883	44.16	MAV1	33.5	-29	48.66	54	-5.34	-	-	43	192	H
* 7.43807	36.17	PK2	36.8	-25.1	47.87	-	-	74	-26.13	278	219	H
* 7.43809	27.32	MAV1	36.8	-25.1	39.02	54	-14.98	-	-	278	219	H
5.83871	35.88	PK2	34.4	-27.9	42.38	-	-	-	-	89	197	H
* 4.95867	49.99	PK2	33.5	-29	54.49	-	-	74	-19.51	207	190	V
* 4.95884	42.65	MAV1	33.5	-29	47.15	54	-6.85	-	-	207	190	V
5.83884	41.74	PK2	34.4	-27.9	48.24	-	-	-	-	7	110	V
* 7.4381	39.5	PK2	36.8	-25.1	51.2	-	-	74	-22.8	222	105	V
* 7.43816	31.96	MAV1	36.8	-25.1	43.66	54	-10.34	-	-	222	105	V
* 3.33327	41.74	PK2	30.9	-30.3	42.34	-	-	74	-31.66	88	234	V
* 3.33325	29.37	MAV1	30.9	-30.3	29.97	54	-24.03	-	-	88	234	V
9.91728	36.22	PK2	37.7	-22	51.92	-	-	-	-	272	206	V

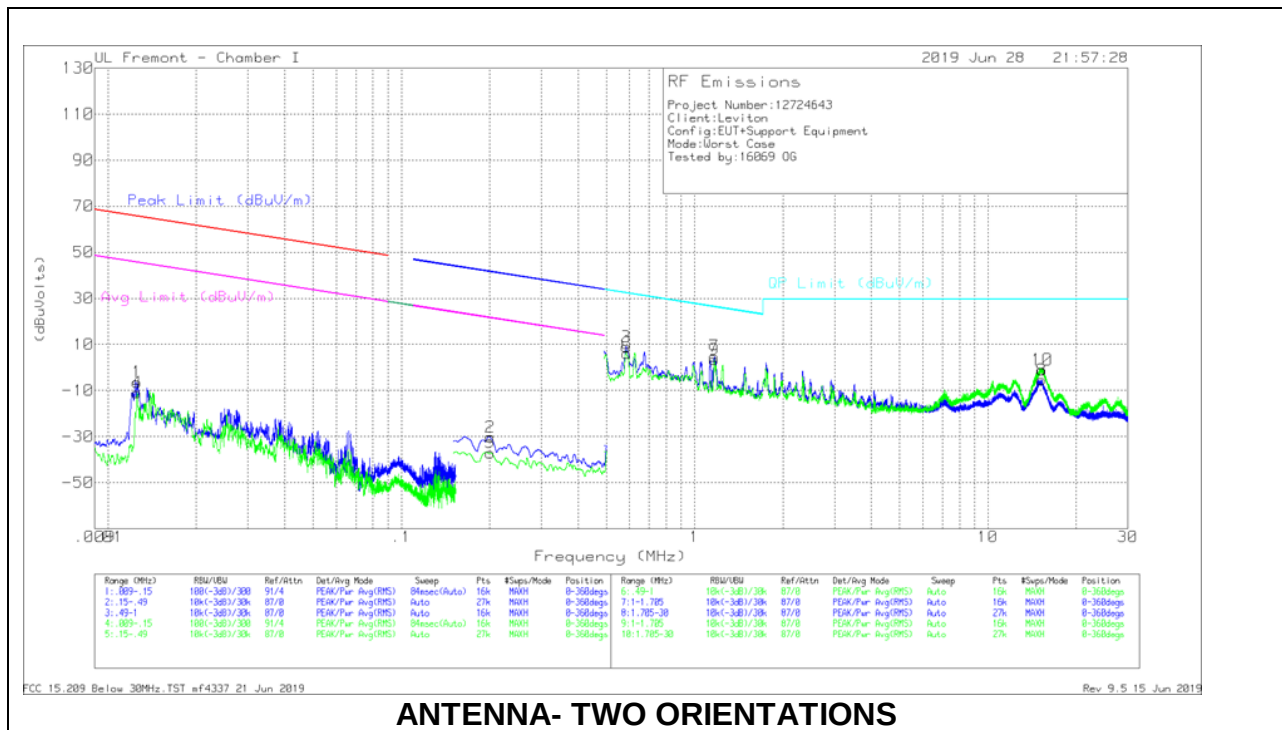
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

9.3.WORST CASE BELOW 30MHZ

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)



Below 30MHz Data

Trace Markers

Ma rke r	Freque ncy (MHz)	Meter Read ing (dBu V)	De t	Loop Antenna (ACF)	Cables w/ PRE01 80175 (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	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	.01254	46.22	Pk	59.8	-32.4	-80	-6.38	65.62	-72	45.62	-52	-	-	-	-	0-360
2	.20089	25.58	Pk	56.1	-31.9	-80	-30.22	-	-	-	-	41.56	-71.78	21.56	-51.78	0-360
4	.01256	41.64	Pk	59.8	-32.4	-80	-10.96	65.6	-76.56	45.6	-56.56	-	-	-	-	0-360
5	.20089	18.79	Pk	56.1	-31.9	-80	-37.01	-	-	-	-	41.56	-78.57	21.56	-58.57	0-360

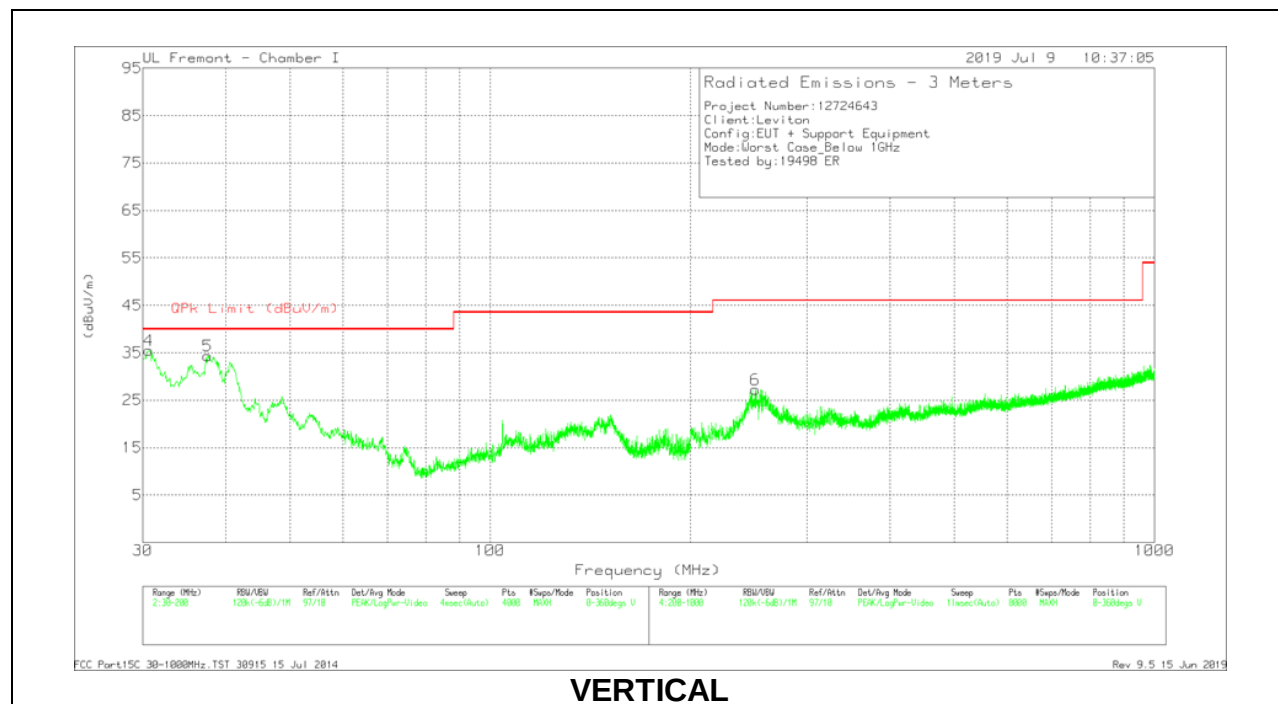
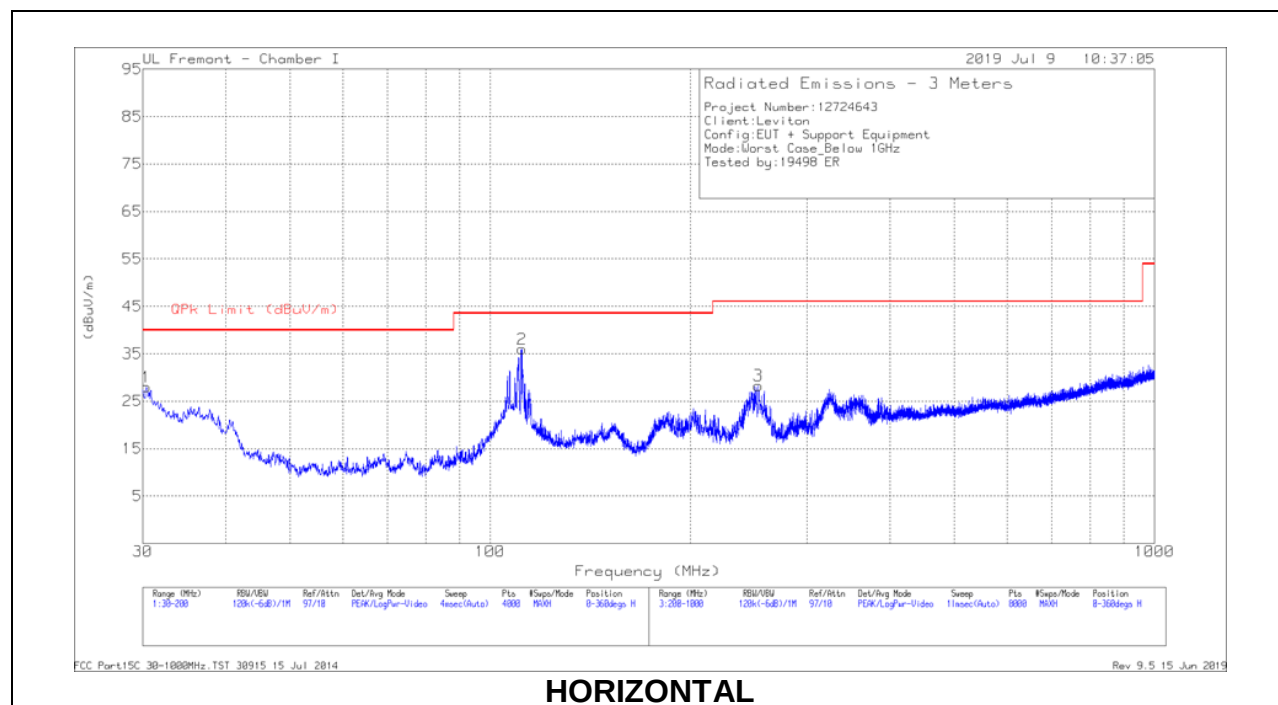
Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (ACF)	Cables w/ PRE0180175 (dB)	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.58435	24.82	Pk	56	-31.8	-40	9.02	32.27	-23.25	0-360
6	.58715	21.98	Pk	56	-31.8	-40	6.18	32.23	-26.05	0-360
7	1.16665	30.77	Pk	45.9	-31.8	-40	4.87	26.29	-21.42	0-360
8	15.23887	31.86	Pk	34.1	-31.4	-40	-5.44	29.5	-34.94	0-360
9	1.16654	29.27	Pk	45.9	-31.8	-40	3.37	26.29	-22.92	0-360
10	15.329	36.23	Pk	34.1	-31.4	-40	-1.07	29.5	-30.57	0-360

Pk - Peak detector

9.4. WORST CASE BELOW 1 GHz

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



Below 1GHz Data

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF PRE0184971 (dB/m)	Amp Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	30.3826	33.27	Pk	26	-31.3	27.97	40	-12.03	0-360	300	H
2	* 111.7061	47.96	Pk	18.7	-30.7	35.96	43.52	-7.56	0-360	400	H
4	30.6377	40.87	Pk	25.9	-31.3	35.47	40	-4.53	0-360	101	V
5	* 37.567	44.22	Pk	21.4	-31.3	34.32	40	-5.68	0-360	101	V
3	* 253.4069	41.03	Pk	17.4	-30.1	28.33	46.02	-17.69	0-360	101	H
6	* 250.6066	39.9	Pk	17.4	-30	27.3	46.02	-18.72	0-360	200	V

Pk - Peak detector

Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	AF PRE0184971 (dB/m)	Amp Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
30.5787	41.33	Pk	25.9	-31.3	35.93	40	-4.07	56	108	V
30.7274	37.34	Qp	25.9	-31.3	31.94	40	-8.06	56	108	V
40.804	45.83	Pk	19.1	-31.3	33.63	40	-6.37	292	104	V
40.764	42.56	Qp	19.1	-31.3	30.36	40	-9.64	292	104	V

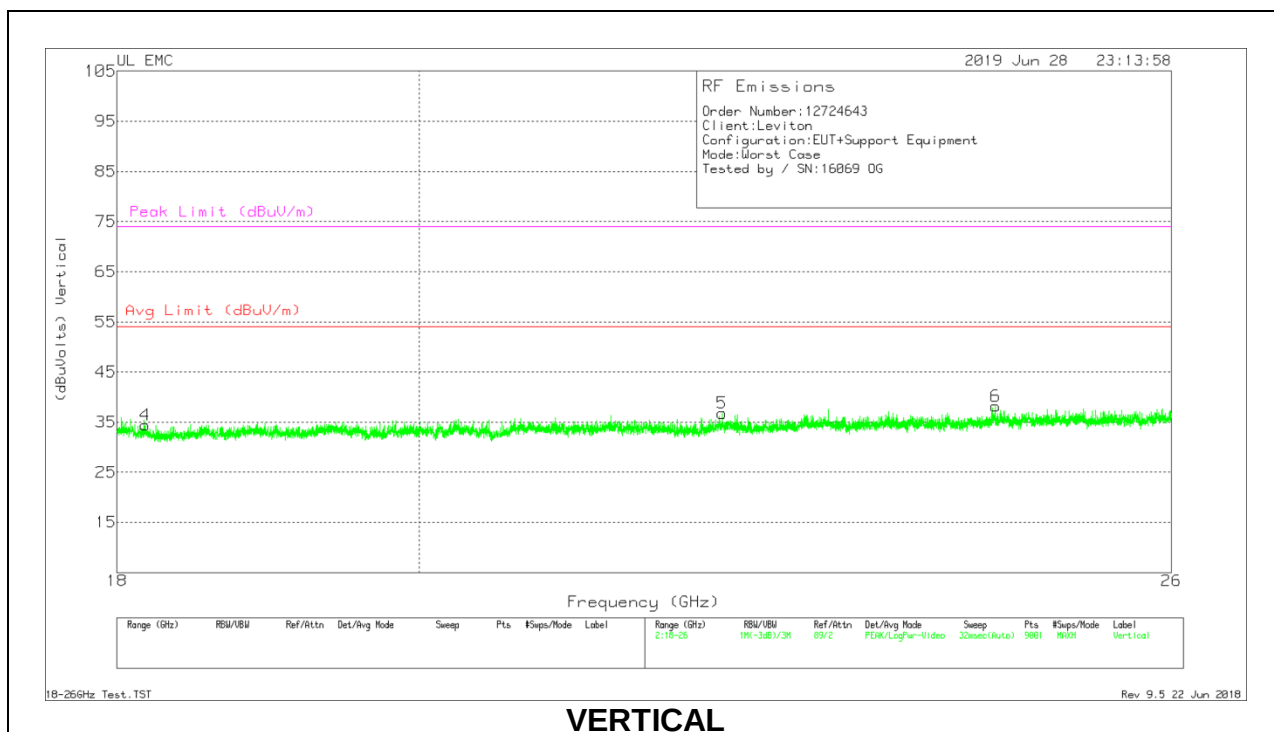
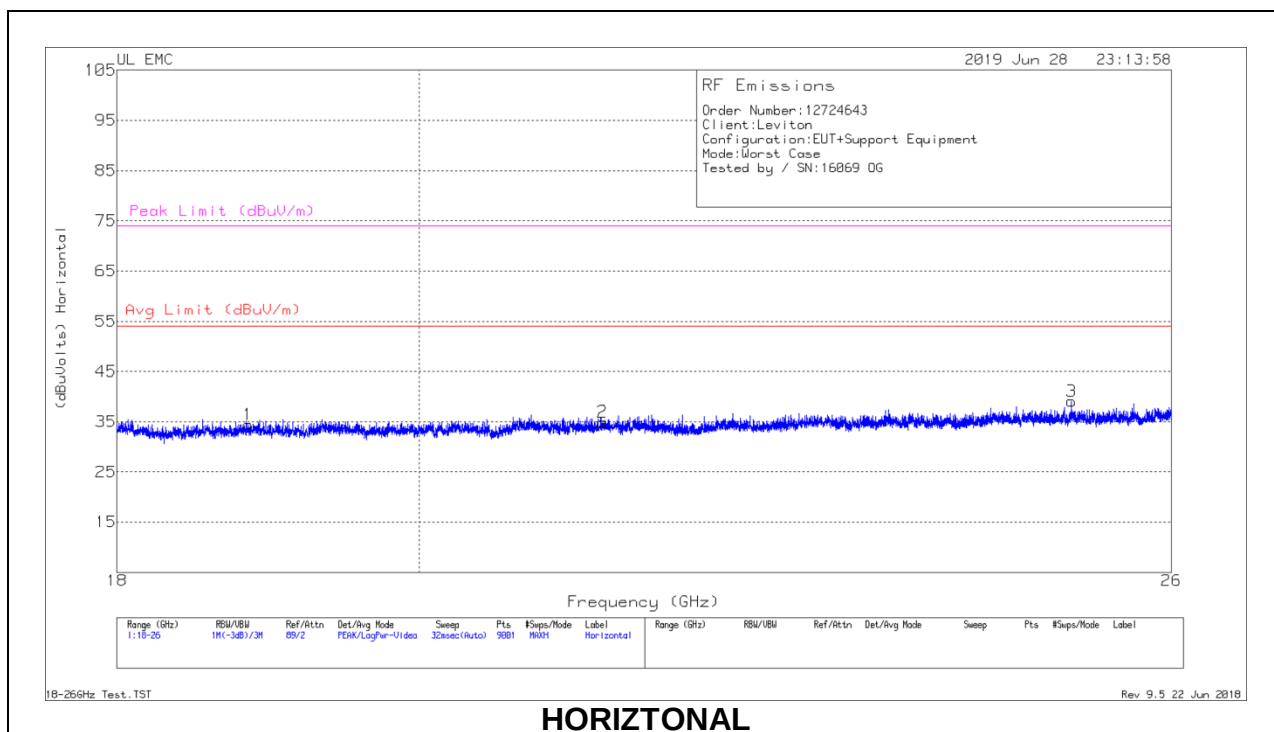
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

9.5. WORST CASE 18-26 GHz

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



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	18.843	69.01	Pk	33	-58.1	-9.5	34.41	54	-19.59	74	-39.59
2	21.321	68.14	Pk	33.6	-57.3	-9.5	34.94	54	-19.06	74	-39.06
3	25.109	68.67	Pk	35	-55.1	-9.5	39.07	54	-14.93	74	-34.93
4	18.179	70.91	Pk	32.9	-59.9	-9.5	34.41	54	-19.59	74	-39.59
5	22.229	69.75	Pk	34.1	-57.6	-9.5	36.75	54	-17.25	74	-37.25
6	24.452	69.28	Pk	34.6	-56.2	-9.5	38.18	54	-15.82	74	-35.82

Pk - Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

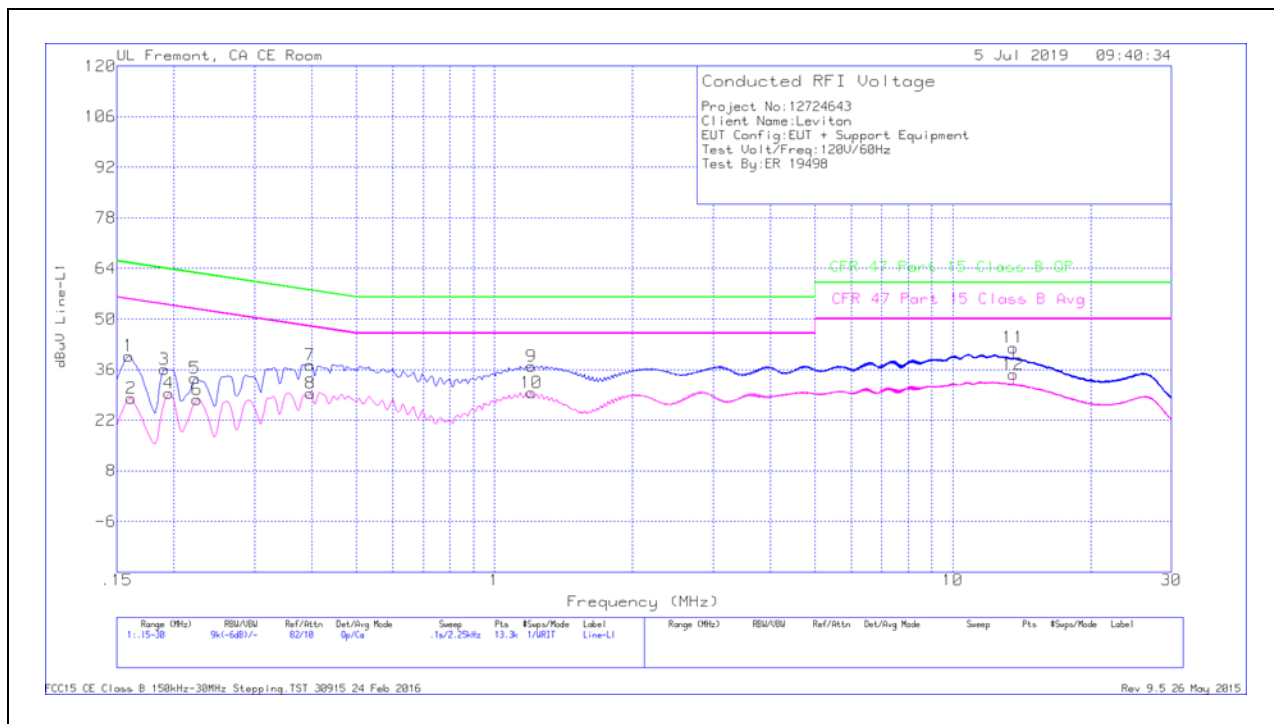
Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

RESULTS

DL05S-D0Z

LINE 1 RESULTS

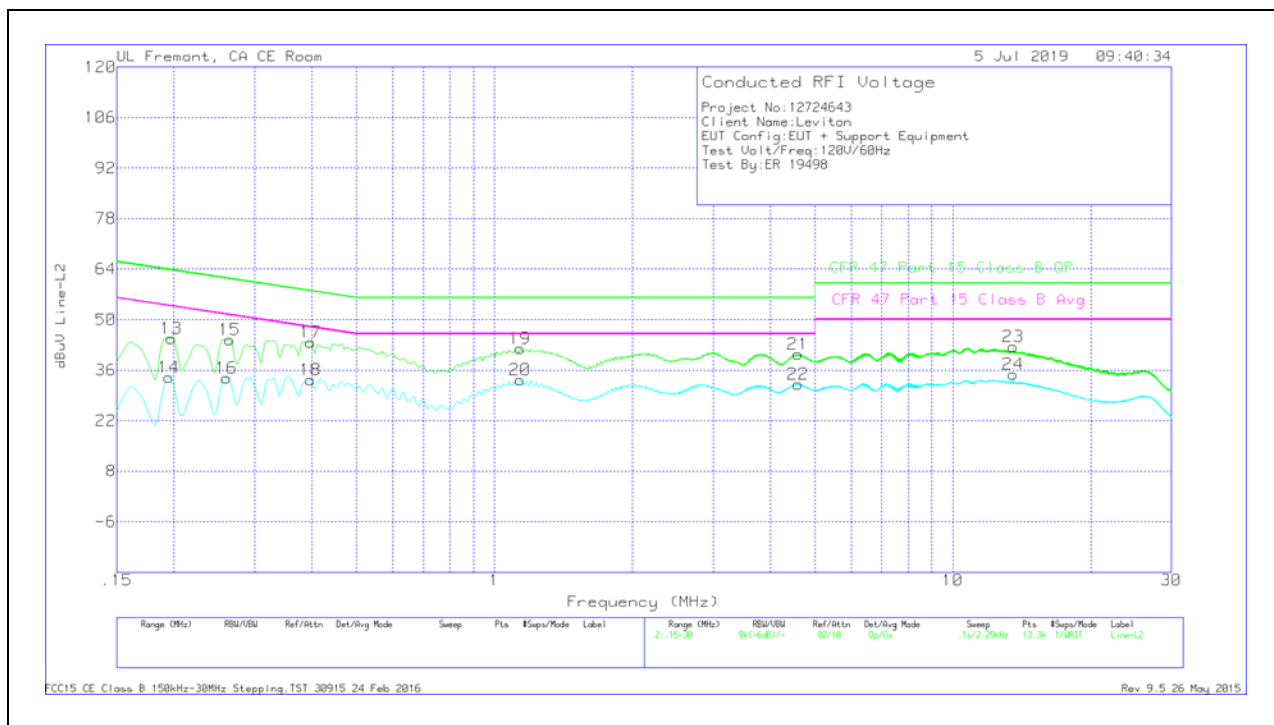


Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	.159	29.63	Qp	.1	0	10.1	39.83	65.52	-25.69	-	-
2	.16125	17.96	Ca	.1	0	10.1	28.16	-	-	55.4	-27.24
3	.1905	26.01	Qp	0	0	10.1	36.11	64.01	-27.9	-	-
4	.195	19.34	Ca	0	0	10.1	29.44	-	-	53.82	-24.38
5	.222	23.59	Qp	0	0	10.1	33.69	62.74	-29.05	-	-
6	.22425	17.68	Ca	0	0	10.1	27.78	-	-	52.66	-24.88
7	.39525	27.21	Qp	0	0	10.1	37.31	57.95	-20.64	-	-
8	.3975	19.37	Ca	0	0	10.1	29.47	-	-	47.91	-18.44
9	1.203	26.84	Qp	0	.1	10.1	37.04	56	-18.96	-	-
10	1.203	19.51	Ca	0	.1	10.1	29.71	-	-	46	-16.29
11	13.56225	31.59	Qp	.1	.2	10.2	42.09	60	-17.91	-	-
12	13.56	24.19	Ca	.1	.2	10.2	34.69	-	-	50	-15.31

Qp - Quasi-Peak detector

Ca - CISPR average detection

LINE 2 RESULTS



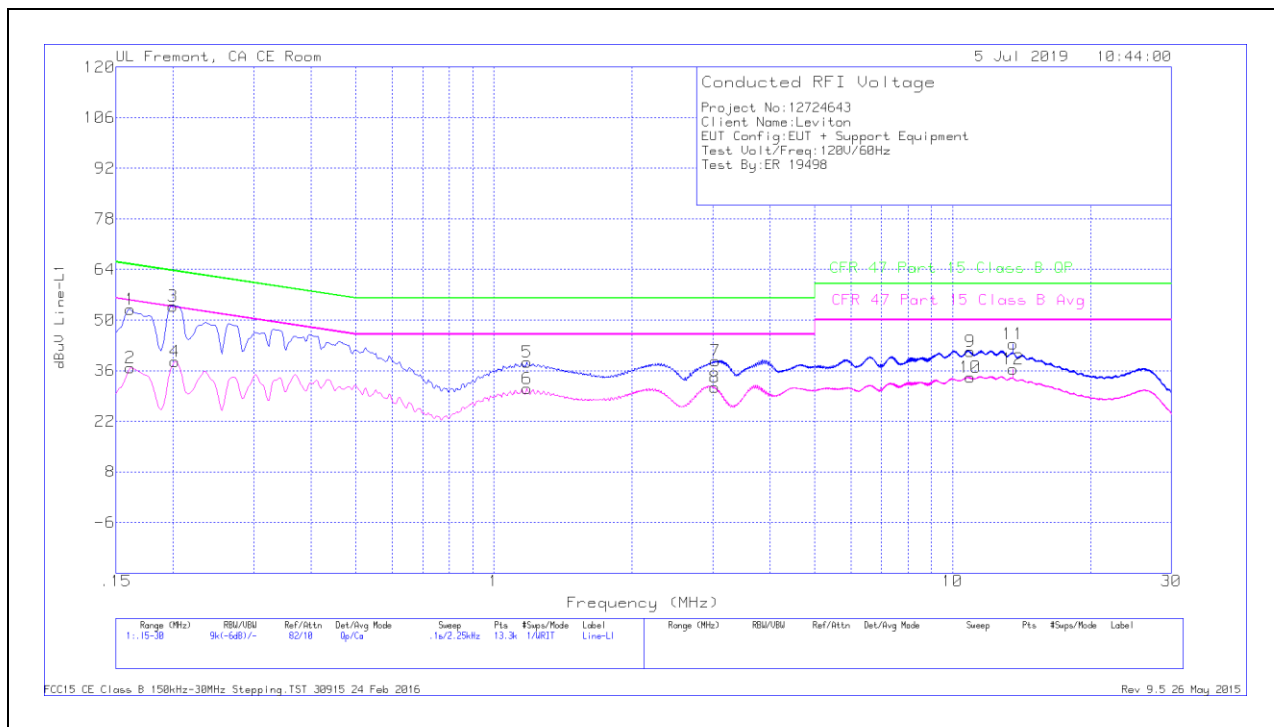
Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables C2&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	.19725	34.7	Qp	0	0	10.1	44.8	63.73	-18.93	-	-
14	.195	23.91	Ca	0	0	10.1	34.01	-	-	53.82	-19.81
15	.26475	34.28	Qp	0	0	10.1	44.38	61.28	-16.9	-	-
16	.26025	23.78	Ca	0	0	10.1	33.88	-	-	51.42	-17.54
17	.3975	33.58	Qp	0	0	10.1	43.68	57.91	-14.23	-	-
18	.3975	23.28	Ca	0	0	10.1	33.38	-	-	47.91	-14.53
19	1.13775	31.82	Qp	0	.1	10.1	42.02	56	-13.98	-	-
20	1.13775	23.1	Ca	0	.1	10.1	33.3	-	-	46	-12.7
21	4.596	30.22	Qp	0	.1	10.1	40.42	56	-15.58	-	-
22	4.59825	21.89	Ca	0	.1	10.1	32.09	-	-	46	-13.91
23	13.56225	32.01	Qp	.1	.2	10.2	42.51	60	-17.49	-	-
24	13.56	24.44	Ca	.1	.2	10.2	34.94	-	-	50	-15.06

Qp - Quasi-Peak detector

Ca - CISPR average detection

DL057-30Z

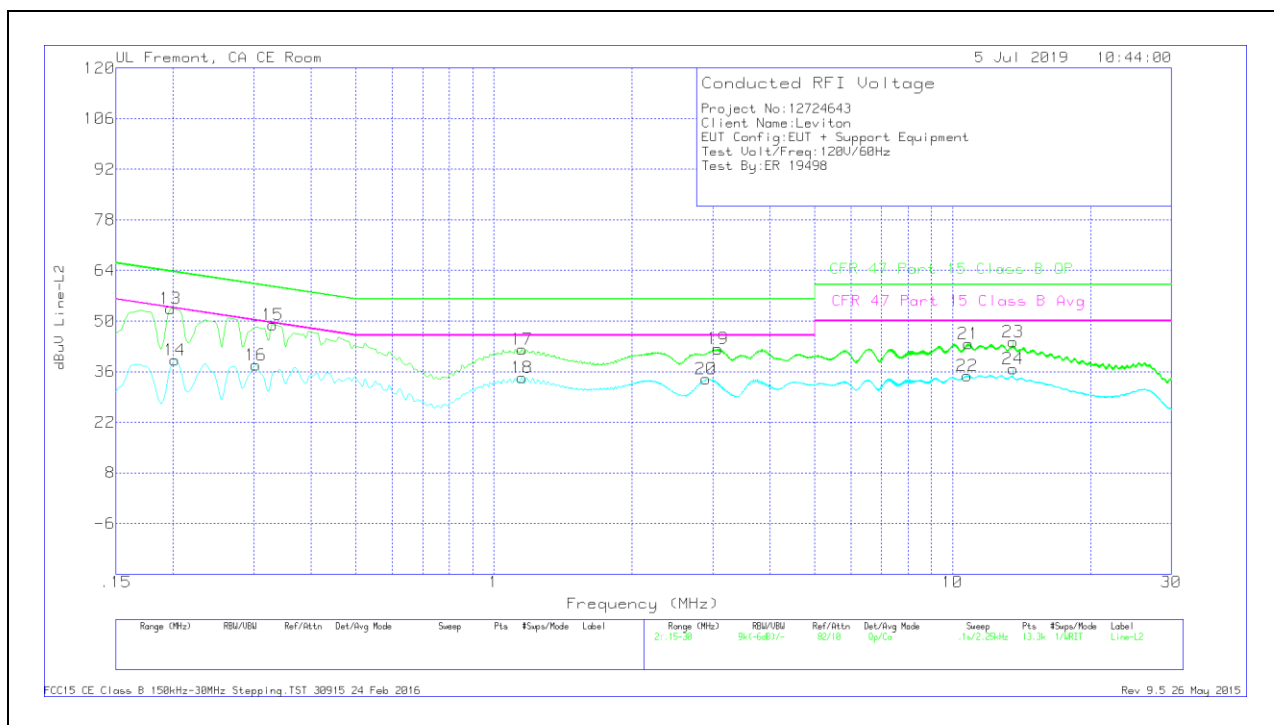
LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	.16125	42.79	Qp	.1	0	10.1	52.99	65.4	-12.41	-	-
2	.16125	26.59	Ca	.1	0	10.1	36.79	-	-	55.4	-18.61
3	.1995	43.78	Qp	0	0	10.1	53.88	63.63	-9.75	-	-
4	.20175	28.38	Ca	0	0	10.1	38.48	-	-	53.54	-15.06
5	1.1805	28.08	Qp	0	.1	10.1	38.28	56	-17.72	-	-
6	1.1805	20.79	Ca	0	.1	10.1	30.99	-	-	46	-15.01
7	3.0435	28.46	Qp	0	.1	10.1	38.66	56	-17.34	-	-
8	3.03	21.13	Ca	0	.1	10.1	31.33	-	-	46	-14.67
9	10.932	30.98	Qp	0	.2	10.2	41.38	60	-18.62	-	-
10	10.932	23.75	Ca	0	.2	10.2	34.15	-	-	50	-15.85
11	13.56	32.87	Qp	.1	.2	10.2	43.37	60	-16.63	-	-
12	13.56	25.9	Ca	.1	.2	10.2	36.4	-	-	50	-13.6

Qp - Quasi-Peak detector
Ca - CISPR average detection

LINE 2 RESULTS



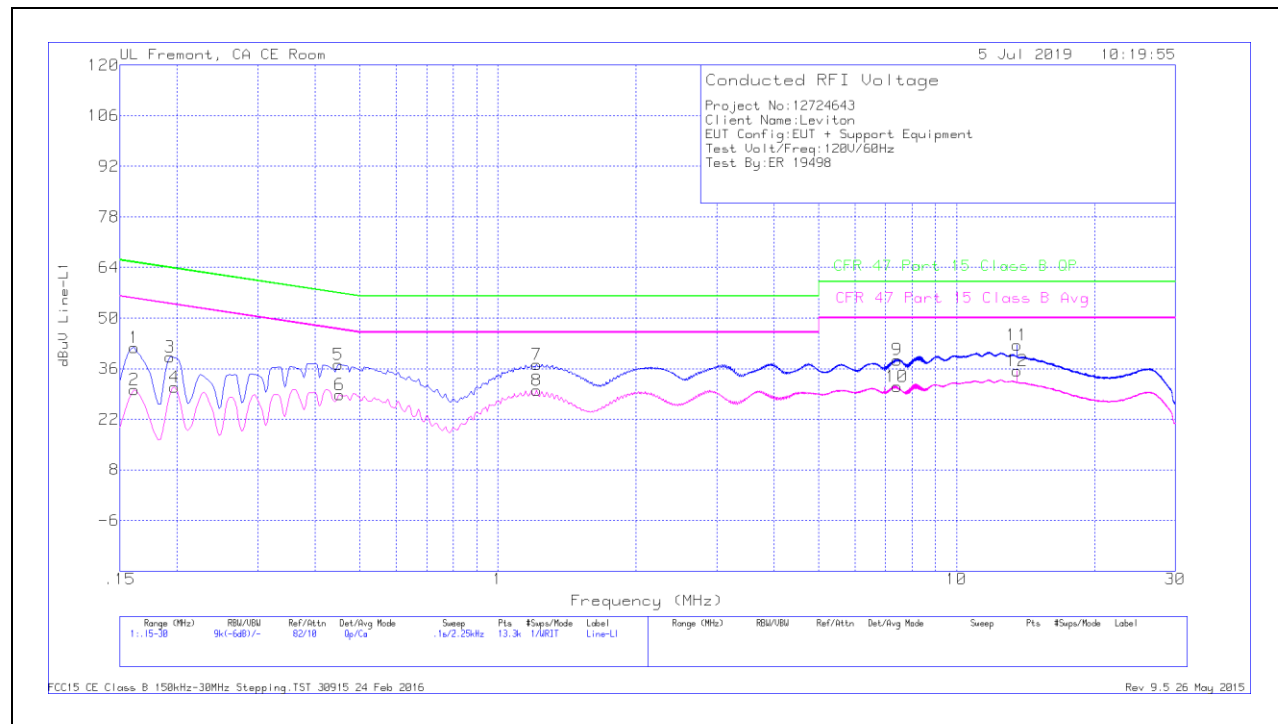
Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables C2&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	.19725	43.34	Qp	0	0	10.1	53.44	63.73	-10.29	-	-
14	.20175	29.09	Ca	0	0	10.1	39.19	-	-	53.54	-14.35
15	.33	38.89	Qp	0	0	10.1	48.99	59.45	-10.46	-	-
16	.303	27.79	Ca	0	0	10.1	37.89	-	-	50.16	-12.27
17	1.15125	31.93	Qp	0	.1	10.1	42.13	56	-13.87	-	-
18	1.15125	24.19	Ca	0	.1	10.1	34.39	-	-	46	-11.61
19	3.0795	32.07	Qp	0	.1	10.1	42.27	56	-13.73	-	-
20	2.8995	23.74	Ca	0	.1	10.1	33.94	-	-	46	-12.06
21	10.83075	33.38	Qp	0	.2	10.2	43.78	60	-16.22	-	-
22	10.7655	24.51	Ca	0	.2	10.2	34.91	-	-	50	-15.09
23	13.56	33.81	Qp	.1	.2	10.2	44.31	60	-15.69	-	-
24	13.56	26.29	Ca	.1	.2	10.2	36.79	-	-	50	-13.21

Qp - Quasi-Peak detector

Ca - CISPR average detection

DL057-D0Z

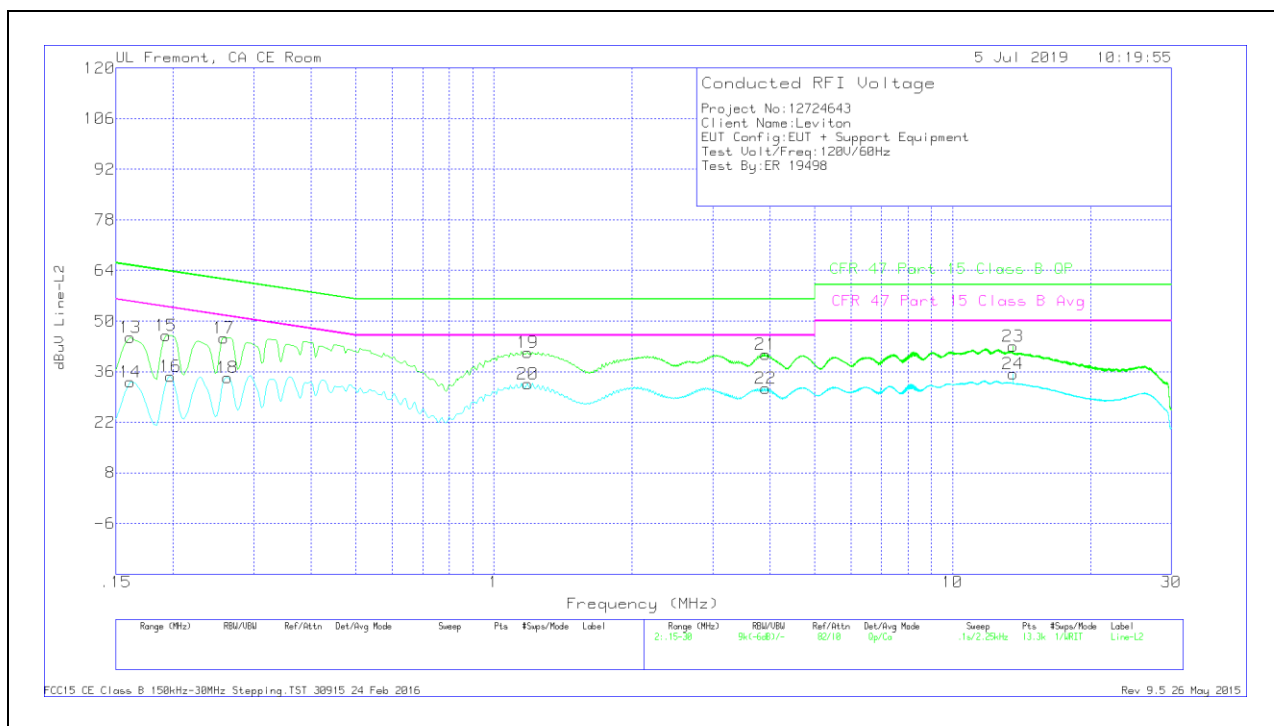
LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	.16125	31.7	Qp	.1	0	10.1	41.9	65.4	-23.5	-	-
2	.16125	20.01	Ca	.1	0	10.1	30.21	-	-	55.4	-25.19
3	.19275	29.09	Qp	0	0	10.1	39.19	63.92	-24.73	-	-
4	.19725	20.81	Ca	0	0	10.1	30.91	-	-	53.73	-22.82
5	.44925	27.06	Qp	0	0	10.1	37.16	56.89	-19.73	-	-
6	.4515	18.67	Ca	0	0	10.1	28.77	-	-	46.85	-18.08
7	1.21425	26.88	Qp	0	.1	10.1	37.08	56	-18.92	-	-
8	1.21425	19.81	Ca	0	.1	10.1	30.01	-	-	46	-15.99
9	7.41075	28.04	Qp	0	.2	10.2	38.44	60	-21.56	-	-
10	7.41075	20.61	Ca	0	.2	10.2	31.01	-	-	50	-18.99
11	13.56225	31.95	Qp	.1	.2	10.2	42.45	60	-17.55	-	-
12	13.56	24.84	Ca	.1	.2	10.2	35.34	-	-	50	-14.66

Qp - Quasi-Peak detector
Ca - CISPR average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables C2&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	.16125	35.28	Qp	.1	0	10.1	45.48	65.4	-19.92	-	-
14	.16125	23.01	Ca	.1	0	10.1	33.21	-	-	55.4	-22.19
15	.19275	35.96	Qp	0	0	10.1	46.06	63.92	-17.86	-	-
16	.19725	24.57	Ca	0	0	10.1	34.67	-	-	53.73	-19.06
17	.258	35.28	Qp	0	0	10.1	45.38	61.5	-16.12	-	-
18	.2625	24.28	Ca	0	0	10.1	34.38	-	-	51.35	-16.97
19	1.185	31.17	Qp	0	.1	10.1	41.37	56	-14.63	-	-
20	1.185	22.41	Ca	0	.1	10.1	32.61	-	-	46	-13.39
21	3.91425	30.57	Qp	0	.1	10.1	40.77	56	-15.23	-	-
22	3.912	21.15	Ca	0	.1	10.1	31.35	-	-	46	-14.65
23	13.56	32.6	Qp	.1	.2	10.2	43.1	60	-16.9	-	-
24	13.56	24.84	Ca	.1	.2	10.2	35.34	-	-	50	-14.66

Qp - Quasi-Peak detector

Ca - CISPR average detection