



TEST REPORT

Report Number. : 13714286-E1V2

Applicant : LEVITON MANUFACTURING CO., INC.
10385 SW AVERY
TUALATIN, OR 97062-2210
USA

Model : MSC-B9285

Brand : LEVITON

FCC ID : 2ASLN-ZL070

IC : 25037-ZL070

EUT Description : MSC Inline Logic Board B9285

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 2
ISED RSS-GEN ISSUE 5 + A1

Date Of Issue:

January 25, 2022

Prepared by:

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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	1/14/2022	Initial Issue	
V2	1/25/2022	Updated Section Cover Page,6.1,6.3 and 6.6	K.Kedida

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LEVITON MANUFACTURING CO., INC.
10385 SW AVERY
TUALATIN, OR 97062-2210
USA

EUT DESCRIPTION: MSC Inline Logic Board B9285

MODEL: MSC-B9285

BRAND: LEVITON

SERIAL NUMBER: 1MC (1MR), 1MC (1MRE) (Conducted)
1MR, 2MR, 3MR, 1MRE, 2MRE, 4MRE (Radiated)

DATE TESTED: MAY 20 – AUGUST 25, 2021

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies
ISED RSS-247 Issue 2	Complies
ISED RSS-GEN Issue 5 + A1	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.

Approved & Released For
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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	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6.
-	RSS-GEN 6.7	99% OBW	Reporting purposes only	ANSI C63.10 Section 6.9.3.
15.247 (a) (2)	RSS-247 5.2 (a)	6dB BW	Complies	None.
15.247 (b) (3)	RSS-247 5.4 (d)	Output Power	Complies	None.
See Comment		Average power	Reporting purposes only	Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (e)	RSS-247 5.2 (b)	PSD	Complies	None.
15.247 (d)	RSS-247 5.5	Conducted Spurious Emissions	Complies	None.
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions	Complies	None.
15.207	RSS-Gen 8.8	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, RSS-GEN Issue 5 + A1, and RSS-247 Issue 2.

4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. 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
☒	Building 1: 47173 Benicia Street Fremont, CA 94538, U.S.A	US0104	2324A	550739
☐	Building 2: 47266 Benicia Street Fremont, CA 94538, U.S.A	US0104	22541	550739
☒	Building 4: 47658 Kato Rd Fremont, CA 94538, U.S.A	US0104	2324B	550739

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	4.88 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 an MSC Inline Logic Board B9285. It is a limited module and tested in number of host models with internal and external antenna.

Internal antenna models# 0-10V: ZLD70-B20, ZLD70-B00 and DALI: ZLDD0-B00 containing BG21 are identical in terms of enclosure and PCB board and their configurations to internal antenna model# 0-10V: ZL070-B20, ZL070-B00 and DALI: ZL0D0-B00 containing MG21; the only difference is these are BLE-only and had other proprietary protocol features disabled by silicon manufacturer.

External antenna models# 0-10V: ZLD70-B2A , ZLD70-B0A and DALI: ZLDD0-B0A containing BG21 are identical in terms of enclosure and PCB board and their configurations to external antenna model# 0-10V: ZL070-B2A , ZL070-B0A and DALI: ZL0D0-B0A containing MG21; the only difference is these are BLE-only and had other proprietary protocol features disabled by silicon manufacturer. External antenna variants uses an interposer board with antenna tuning components to connect to the main board

6.2. MAXIMUM OUTPUT POWER

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

INTERNAL ANTENNA CONFIGURATION

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE	6.97	4.98

EXTERNAL ANTENNA CONFIGURATION

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE	3.50	2.24

Note: Conducted output power for Internal antenna configuration is measured before the antenna tuning components and for external antenna, it is measured after the antenna tuning components on the interposer board. The firmware setting (q settings) is almost equal but difference in measurement point. Only external antenna variants will be sold with this daughter tuning antenna component board and internal antenna variants will have main board only.

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

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

Antenna	Type	Peak Gain dBi
Internal	Chip	1.50
External	Wire	0.8

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was SiLabs Railtest firmware version # 2.8.6
The EUT firmware installed during testing was SiLabs Railtest_efr32mg21_inline.s37
The test utility software used during testing was RealTerm version 2.0.0.70

6.5. 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.

A metal plate(for end product installation purposes) was attached to the host per applicant's request. The fundamental of the internal antenna EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation.

A metal plate(for end product installation purposes) was attached to the host per applicant's request. The fundamental of the external antenna EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation.

Internal Antenna: Part number ZLD70-B20 with both BLE/Zigbee protocol was set for full testing and spot check verification has been done on models ZLD70-B00 and DALI: ZLDD0-B00 for radiated harmonic spurious.

External Antenna: Part number ZLD70-B2A with both BLE/Zigbee protocol was set for full testing and spot check verification has been done on models ZLD70-B0A and DALI: ZLDD0-B0A for radiated harmonic spurious.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Asus	EeePC1101HAB	-	DoC
FTDI to USB Cable	-	-	-	-
LED Electronics Driver	Signify	XI040C110V054PST2	-	-
LED Electronics Driver	Signify	XI040C110V054VPT2	-	-
24V Power Supply	Mass Power	SHF2400125U1BA	-	-

INTERNAL ANTENNA CONFIGURATION

I/O CABLES (CONDUCTED EMISSIONS)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	DC	Unshielded	3	AC Main to EUT
2	FTDI	1	USB	Unshielded	1.8	EUT to Laptop (maintenance cable)
3	Antenna Port	1	SMA	Unshielded	0.2	EUT to Analyzer

I/O CABLES (RADIATED EMISSIONS 1 to 26GHz)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Unshielded	3	AC Main to Driver
2	DC	1	DC	Unshielded	2.5	Driver to EUT
3	FTDI	1	USB	Unshielded	1.8	EUT to Laptop (maintenance cable)

I/O CABLES (RADIATED EMISSIONS 30MHz to 1GHz AND AC POWER LINE CONDUCTED EMISSIONS)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	DC	Unshielded	3	AC/DC Supply

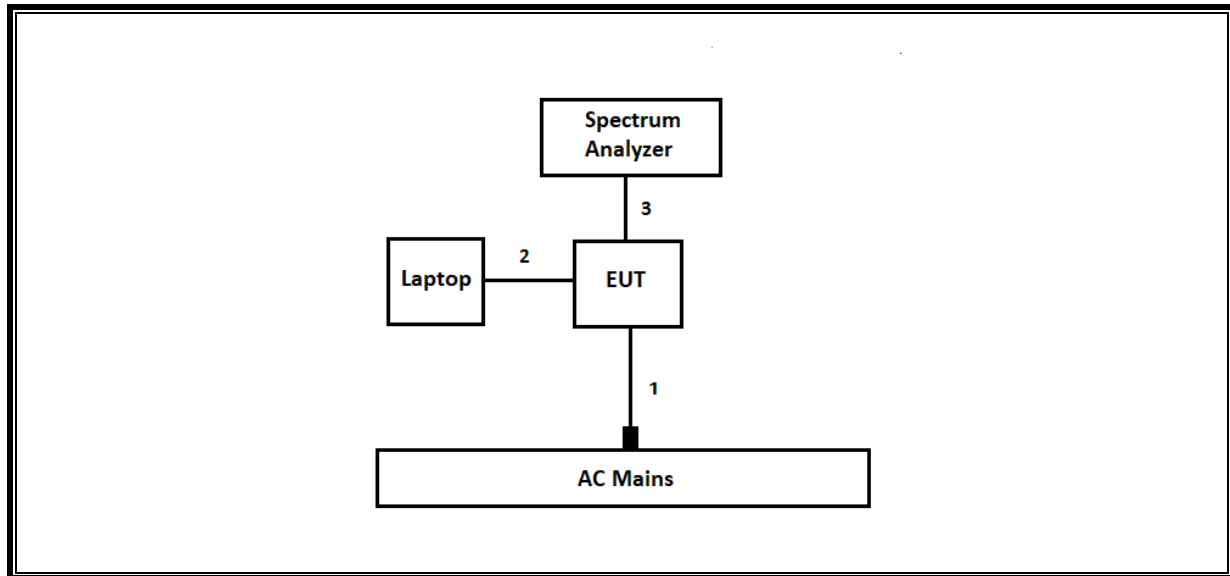
I/O CABLES (RADIATED EMISSIONS 9KHz to 30MHz)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Unshielded	3	AC Main to Driver
2	DC	1	DC	Unshielded	2.5	Driver to EUT

SETUP DIAGRAM FOR CONDUCTED TESTS

TEST SETUP

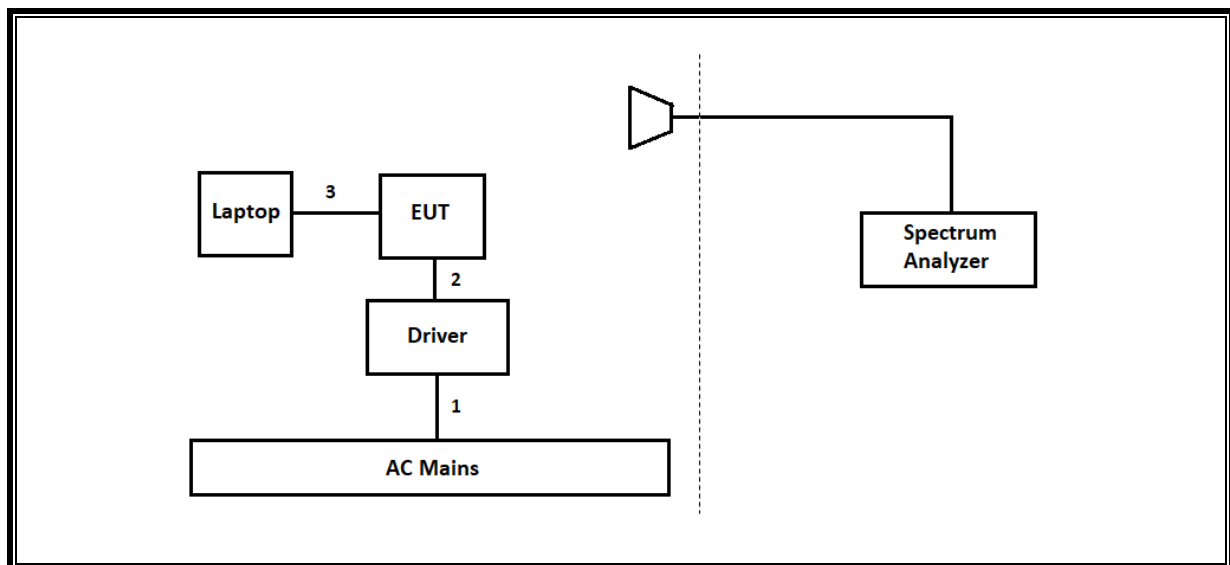
The EUT is powered by the AC/DC Adapter. Test software exercised the radio card.



SETUP DIAGRAM FOR RADIATED TESTS (1GHz to 26GHz)

TEST SETUP

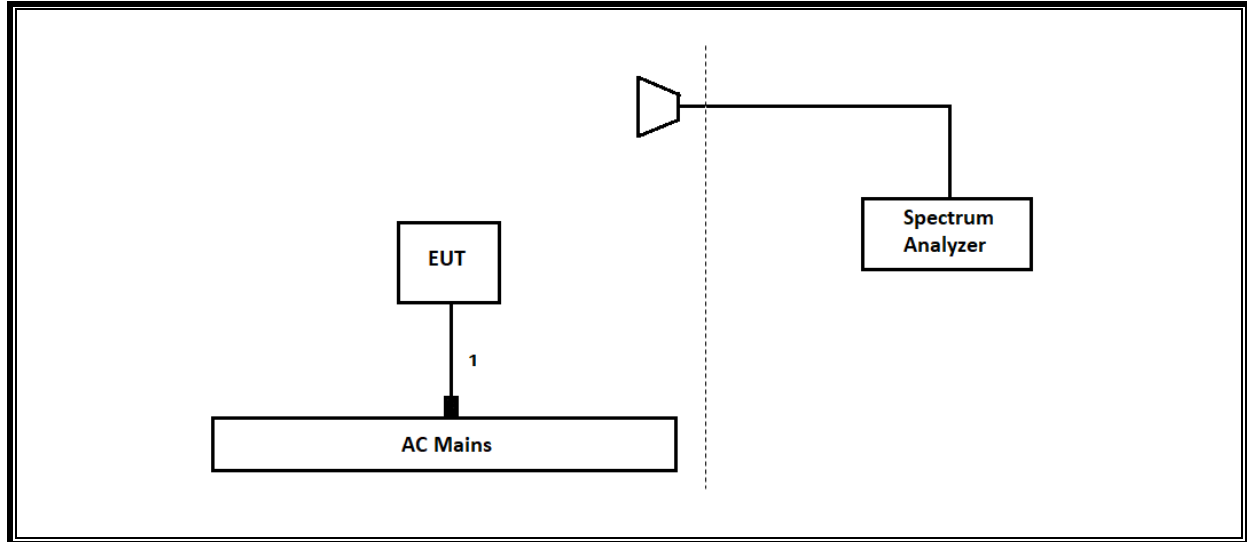
The EUT is powered by the Driver. Test software exercised the radio card.



SETUP DIAGRAM FOR RADIATED TESTS (30MHz to 1GHz) AND AC POWER LINE CONDUCTED EMISSIONS

TEST SETUP

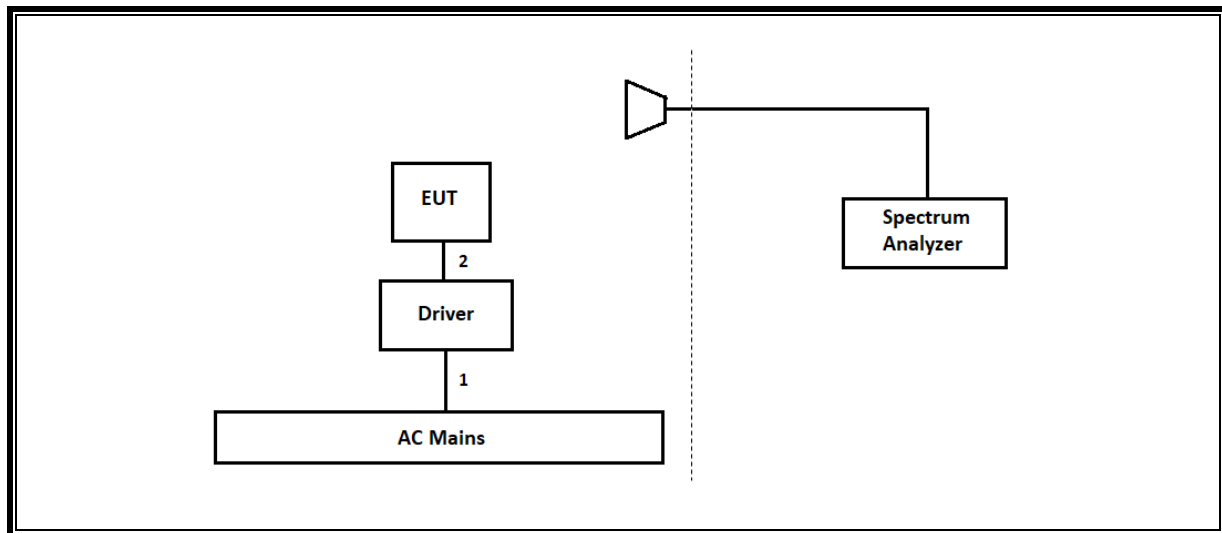
The EUT is powered by the AC/DC Adapter. Test software exercised the radio card. The laptop was used for setup and removed during testing.



SETUP DIAGRAM FOR RADIATED TESTS (9KHz to 30MHz)

TEST SETUP

The EUT is powered by the Driver. Test software exercised the radio card. The laptop was used for setup and removed during testing.



EXTERNAL ANTENNA CONFIGURATION

I/O CABLES (CONDUCTED EMISSIONS)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	DC	Unshielded	3	AC Main to EUT
2	FTDI	1	USB	Unshielded	1.8	EUT to Laptop (maintenance cable)
3	Antenna Port	1	SMA	Unshielded	0.2	EUT to Analyzer

I/O CABLES (RADIATED EMISSIONS 1 to 26GHz)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	DC	Unshielded	3	AC/DC Supply
2	FTDI	1	USB	Unshielded	1.8	EUT to Laptop (maintenance cable)

I/O CABLES (RADIATED EMISSIONS 9KHz to 30MHz, 30MHz to 1GHz AND AC POWER LINE CONDUCTED EMISSIONS)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	DC	Unshielded	3	AC/DC Supply

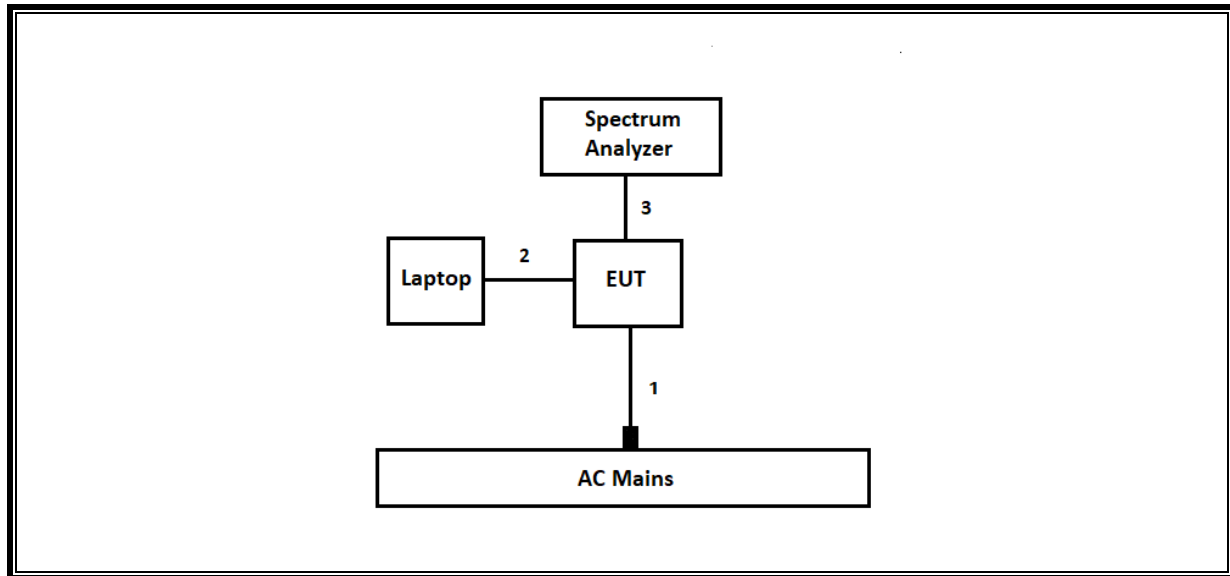
I/O CABLES (RADIATED EMISSIONS 9KHz to 30MHz)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Unshielded	3	AC Main to Driver
2	DC	1	DC	Unshielded	2.5	Driver to EUT

SETUP DIAGRAM FOR CONDUCTED TESTS

TEST SETUP

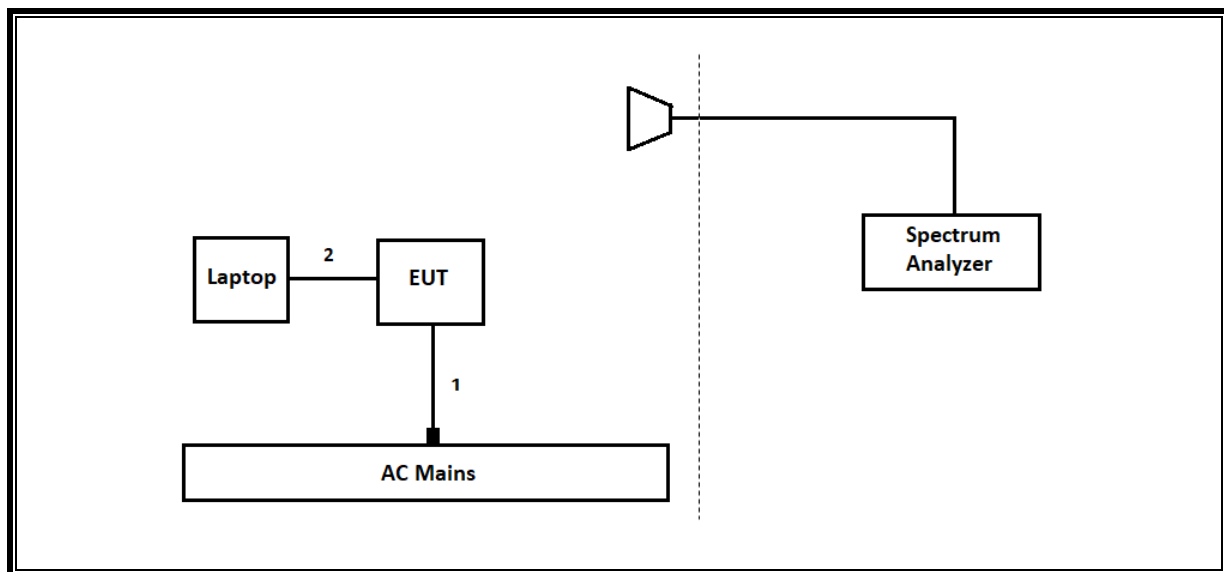
The EUT is powered by the AC/DC Adapter. Test software exercised the radio card.



SETUP DIAGRAM FOR RADIATED TESTS (1GHz to 26GHz)

TEST SETUP

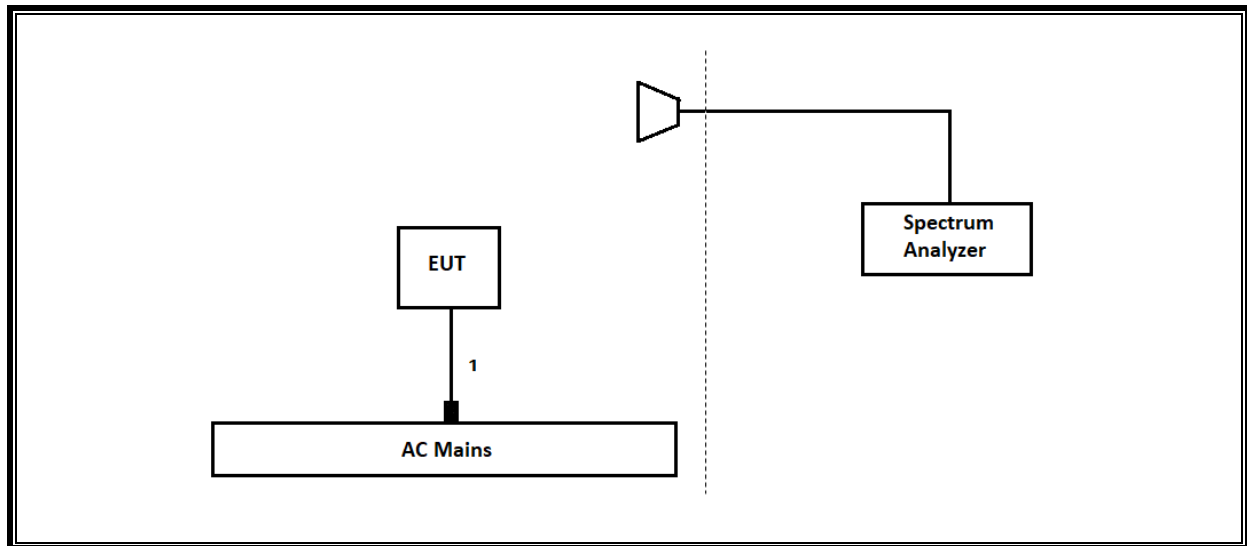
The EUT is powered by the AC/DC Adapter. Test software exercised the radio card.



**SETUP DIAGRAM FOR RADIATED TESTS (9KHz to 30MHz, 30MHz to 1GHz) AND AC POWER LINE
CONDUCTED EMISSIONS**

TEST SETUP

The EUT is powered by the AC/DC Adapter. Test software exercised the radio card. The laptop was used for setup and removed during testing.



7. MEASUREMENT METHOD

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

6 dB BW: ANSI C63.10 Section 11.8.1

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

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

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

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

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

Radiated emissions restricted frequency bands: ANSI C63.10 Section -11.12.1 and KDB558074 Section 11, Question 3 (a)

Conducted emissions in restricted frequency bands: ANSI C63.10 Section -11.12.2

Band-edge: ANSI C63.10 Section 6.10

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
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179367	2/21/2022	2/21/2021
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179377	2/23/2022	2/23/2022
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T863	8/31/2021	8/31/2020
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T344	*5/26/2021	5/26/2020
Amplifier, 100MHz-18GHz	AMPLICAL	AMP0.1G18-47-20	PRE0197319	4/8/2022	4/8/2021
Amplifier, 1 - 18GHz	MITEQ	AFS42-00101800-25-S-42	T1568	4/9/2022	4/9/2021
Antenna, Broadband Hybrid, 30MHz to 3GHz	Sunol Sciences Corp.	JB3	T477 (81560)	9/24/2021	9/24/2020
Antenna, Broadband Hybrid, 30MHz to 3GHz	Sunol Sciences Corp.	JB3	174373	12/2/2021	12/2/2020
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	175953	1/21/2022	1/21/2021
Amplifier, 10KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310N	T300	3/2/2022	3/2/2021
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO METRICS	EM-6871	SC-8015	5/24/2022	5/24/2021
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO METRICS	EM-6872	SC-8014	5/24/2022	5/24/2021
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	T340	1/28/2022	1/28/2021
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Keysight Technologies Inc	E4440A	T198	5/13/2022	5/13/2021
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	T1227	3/16/2022	3/16/2021
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	T1223	6/17/2022	6/17/2021
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	T1264	1/26/2022	1/26/2021
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826/B	T447	9/24/2021	9/24/2020
Rf Amplifier, 18-26.5GHz, 60dB gain	AMPLICAL	AMP18G26.5-60	171590	5/21/2022	5/21/2021
AC Line					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
LISN	FCC INC.	FCC-LISN-50/250-25-2-01-480V	PRE0186446	1/20/2022	1/20/2021
EMI TEST RECEIVER	Rohde & Schwarz	ESR	T1436	2/19/2022	2/19/2021
Transient Limiter	COM-TE	TBFL1	207996	6/1/2022	6/1/2020
Thermometer	Control Company	14-650-118	175736	8/26/2021	6/26/2020
Test Software List					
Description	Manufacturer	Model	Version		
Radiated Software	UL	UL EMC	Rev 9.5, April 30, 2020 (below 30MHz, below 1G, 1-18G radiated emissions), Oct 21, 2019 (above 18G radiated emissions)		
Antenna Port Software	UL	UL RF	AP 2021.5.12 & AP 2021.7.13		
AC Line Conducted Software	UL	UL EMC	Rev 9.5, July 07, 2020		

NOTES:

- * Testing is completed before equipment expiration date.
- Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

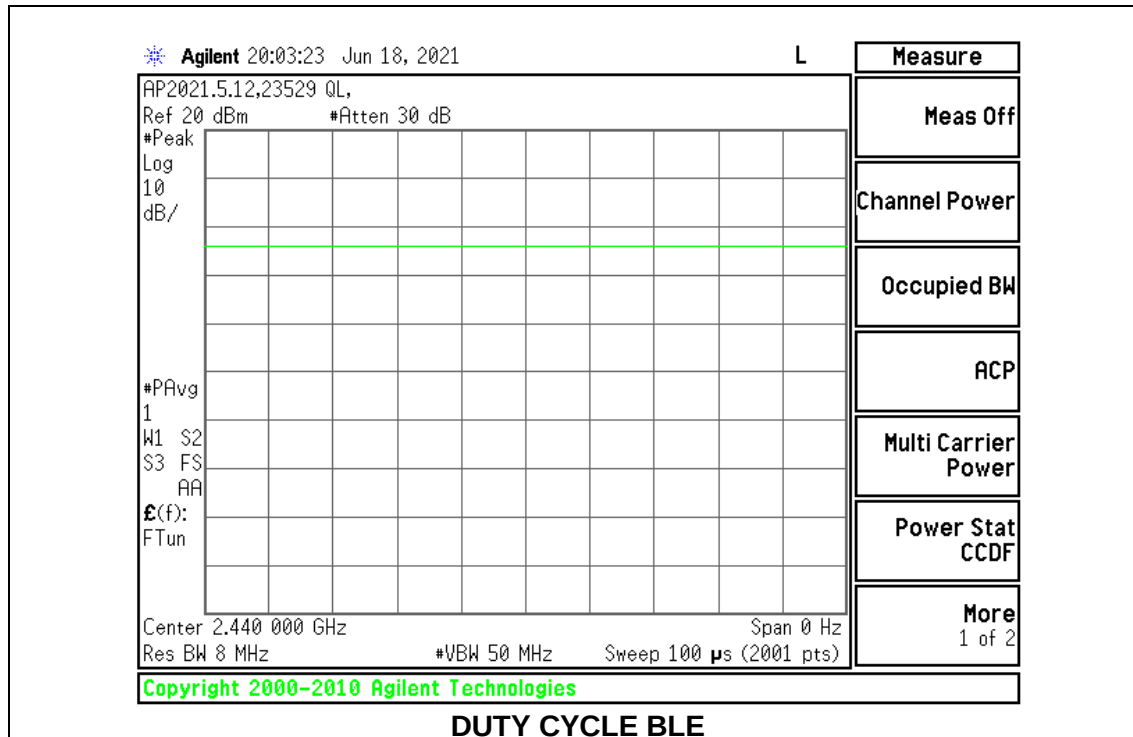
KDB 558074 Zero-Span Spectrum Analyzer Method.

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	0.100	0.100	1.000	100	0.00	0.010

Note: For testing purposes, the EUT is transmitting continuously
For DCCF used for radiated harmonic average measurements, DCCF is based on manufacturer's declared operational duty cycle of 28.28%
DCCF = $20 \cdot \log(0.2828) = -10.97$ dB

DUTY CYCLE PLOTS



9.2. 99% BANDWIDTH

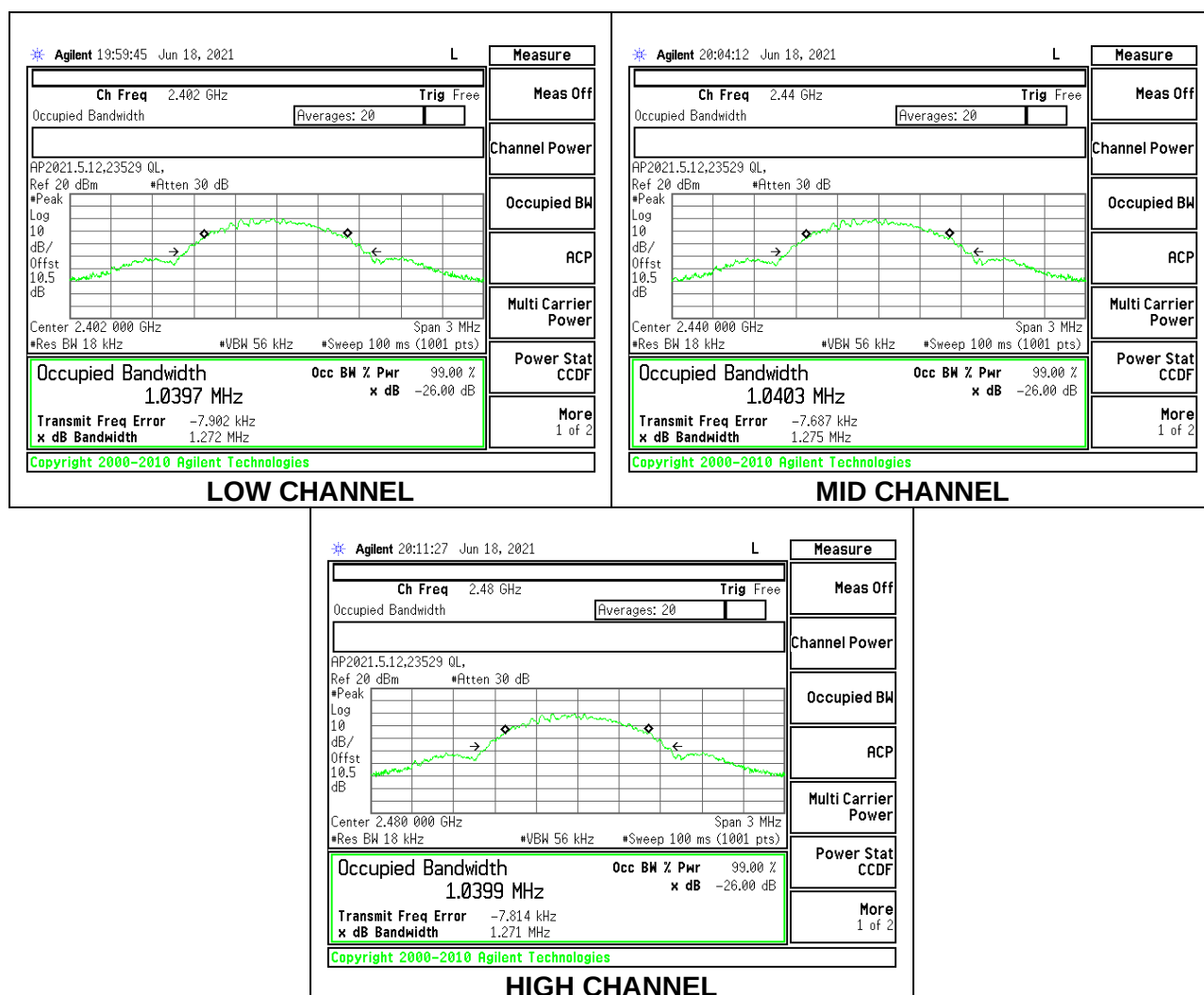
LIMITS

None; for reporting purposes only.

RESULTS

INTERNAL ANTENNA CONFIGURATION

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0397
Middle	2440	1.0403
High	2480	1.0399



EXTERNAL ANTENNA CONFIGURATION

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0397
Middle	2440	1.0408
High	2480	1.0424



9.3. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

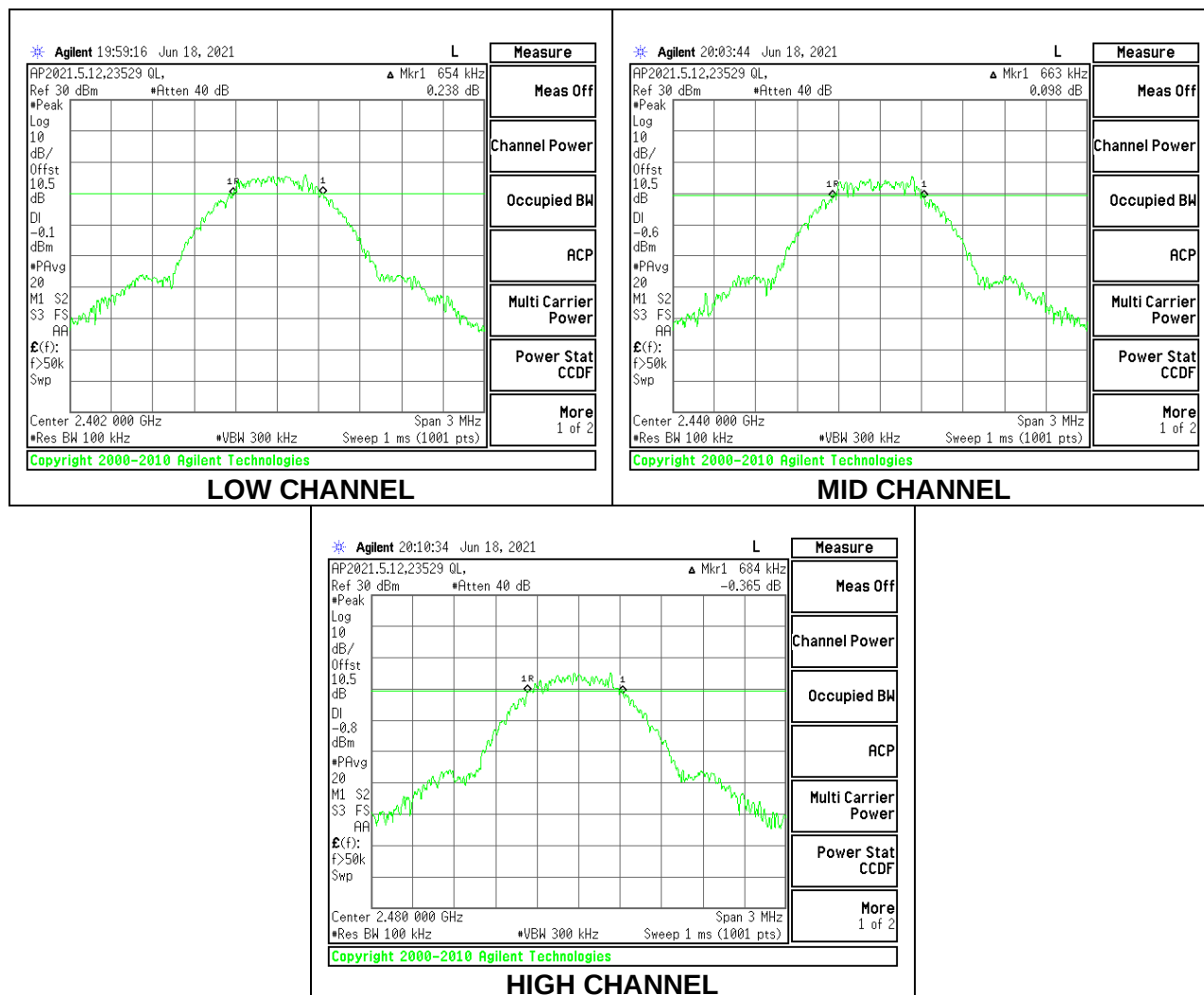
RSS-247 5.2 (a)

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

RESULTS

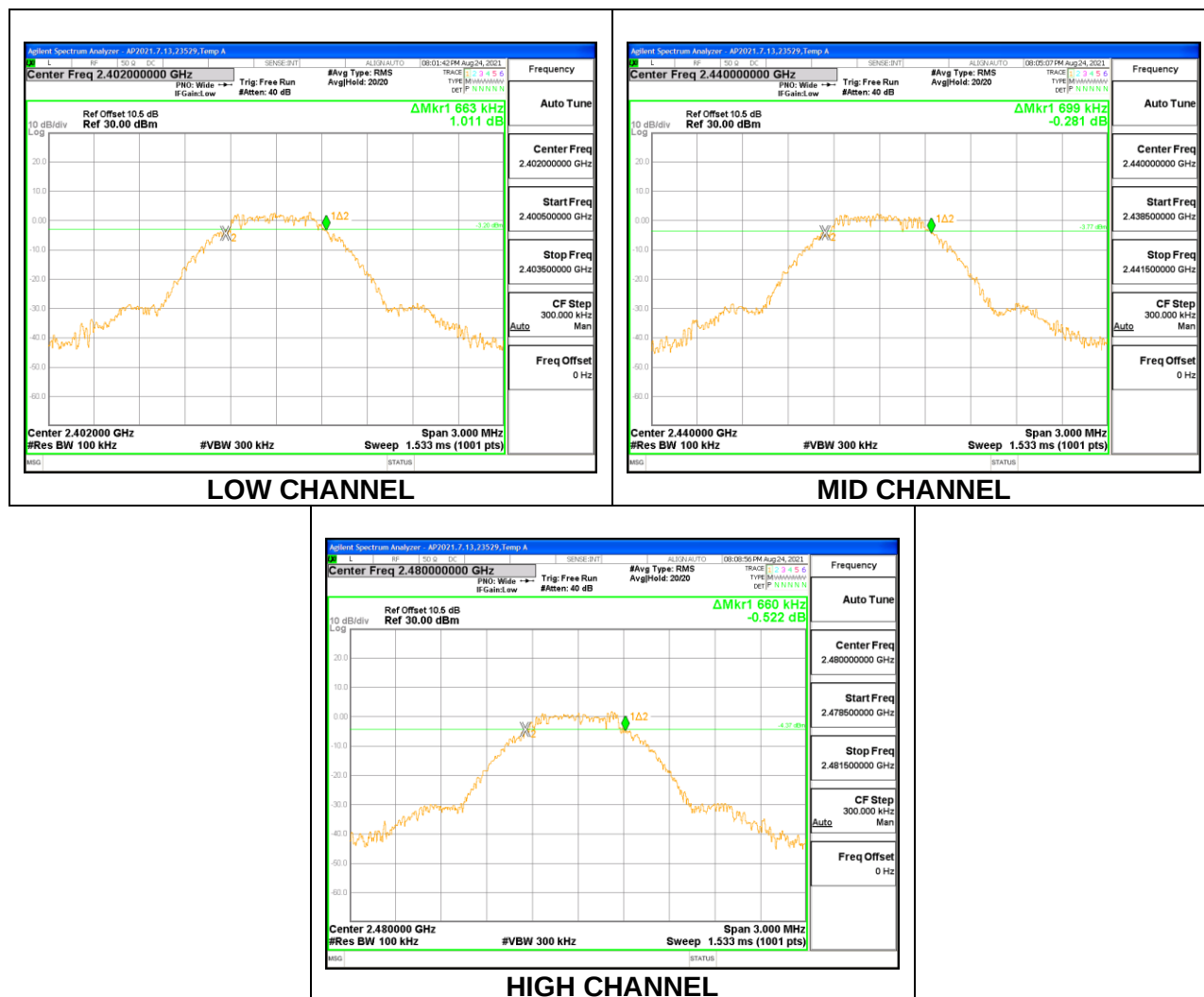
INTERNAL ANTENNA CONFIGURATION

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.654	0.5
Middle	2440	0.663	0.5
High	2480	0.684	0.5



EXTERNAL ANTENNA CONFIGURATION

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.663	0.5
Middle	2440	0.699	0.5
High	2480	0.660	0.5



9.4. 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 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

INTERNAL ANTENNA CONFIGURATION

Tested By:	23529 QL
Date:	6/18/2021

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	6.97	30	-23.03
Middle	2440	6.51	30	-23.49
High	2480	6.38	30	-23.62

EXTERNAL ANTENNA CONFIGURATION

Tested By:	23529 QL
Date:	8/24/2021

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	3.50	30	-26.50
Middle	2440	3.26	30	-26.74
High	2480	2.35	30	-27.65

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

INTERNAL ANTENNA CONFIGURATION

Tested By:	23549 QL
Date:	6/18/2021

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	6.86
Middle	2440	6.38
High	2480	6.24

EXTERNAL ANTENNA CONFIGURATION

Tested By:	23549 QL
Date:	8/24/2021

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	3.36
Middle	2440	3.10
High	2480	2.18

9.6. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

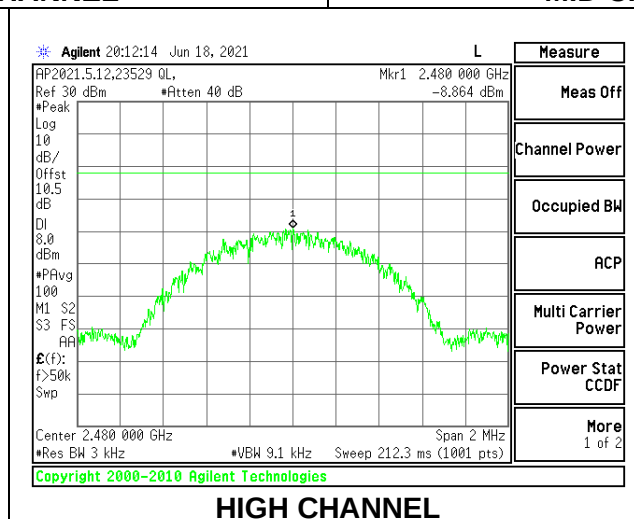
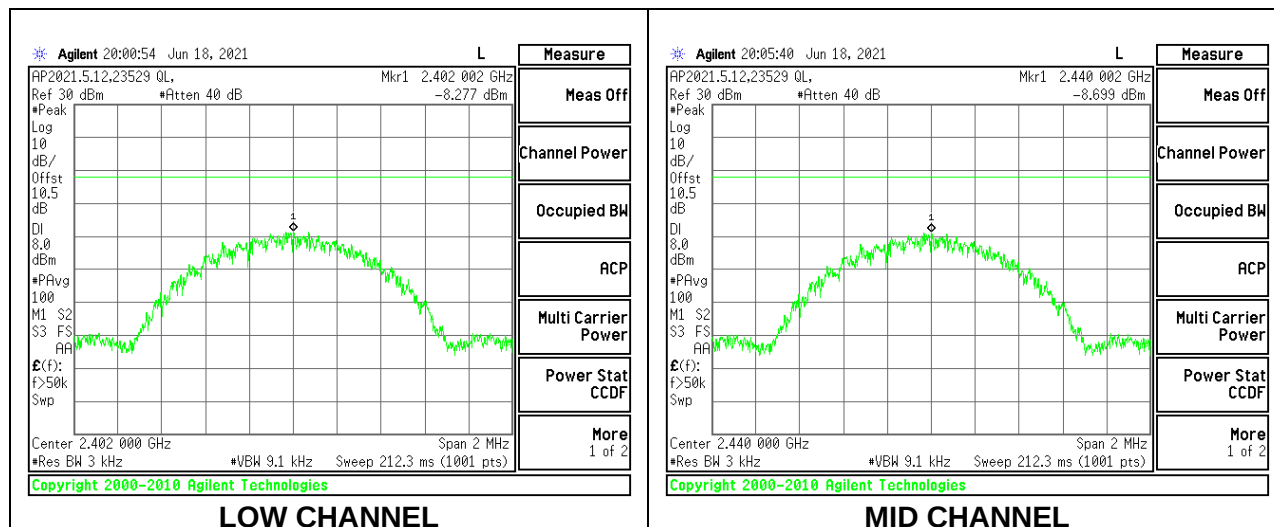
RSS-247 (5.2) (b)

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

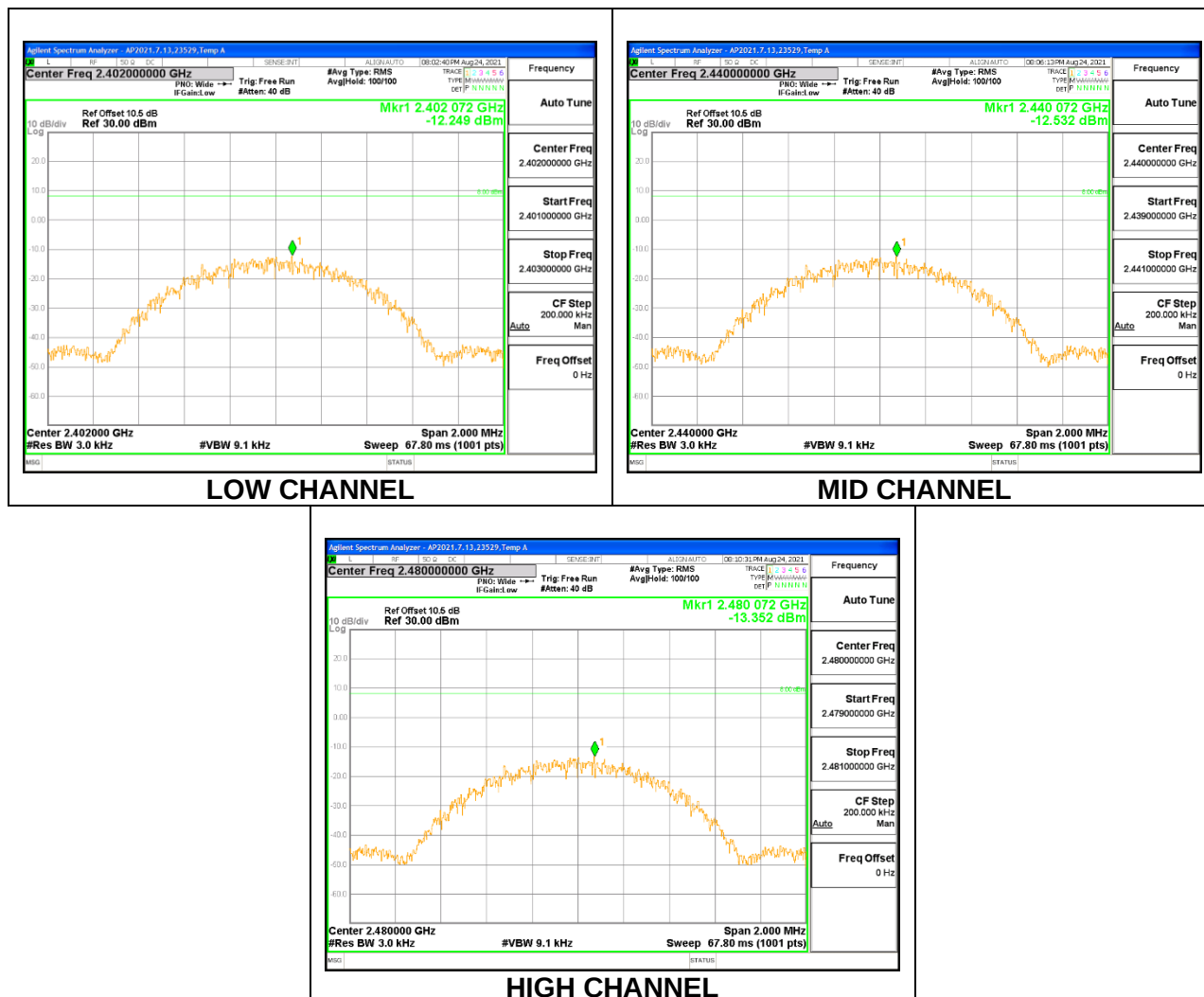
INTERNAL ANTENNA CONFIGURATION

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	-8.277	8	-16.28
Middle	2440	-8.699	8	-16.70
High	2480	-8.864	8	-16.86



EXTERNAL ANTENNA CONFIGURATION

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	-12.249	8	-20.25
Middle	2440	-12.532	8	-20.53
High	2480	-13.352	8	-21.35



9.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

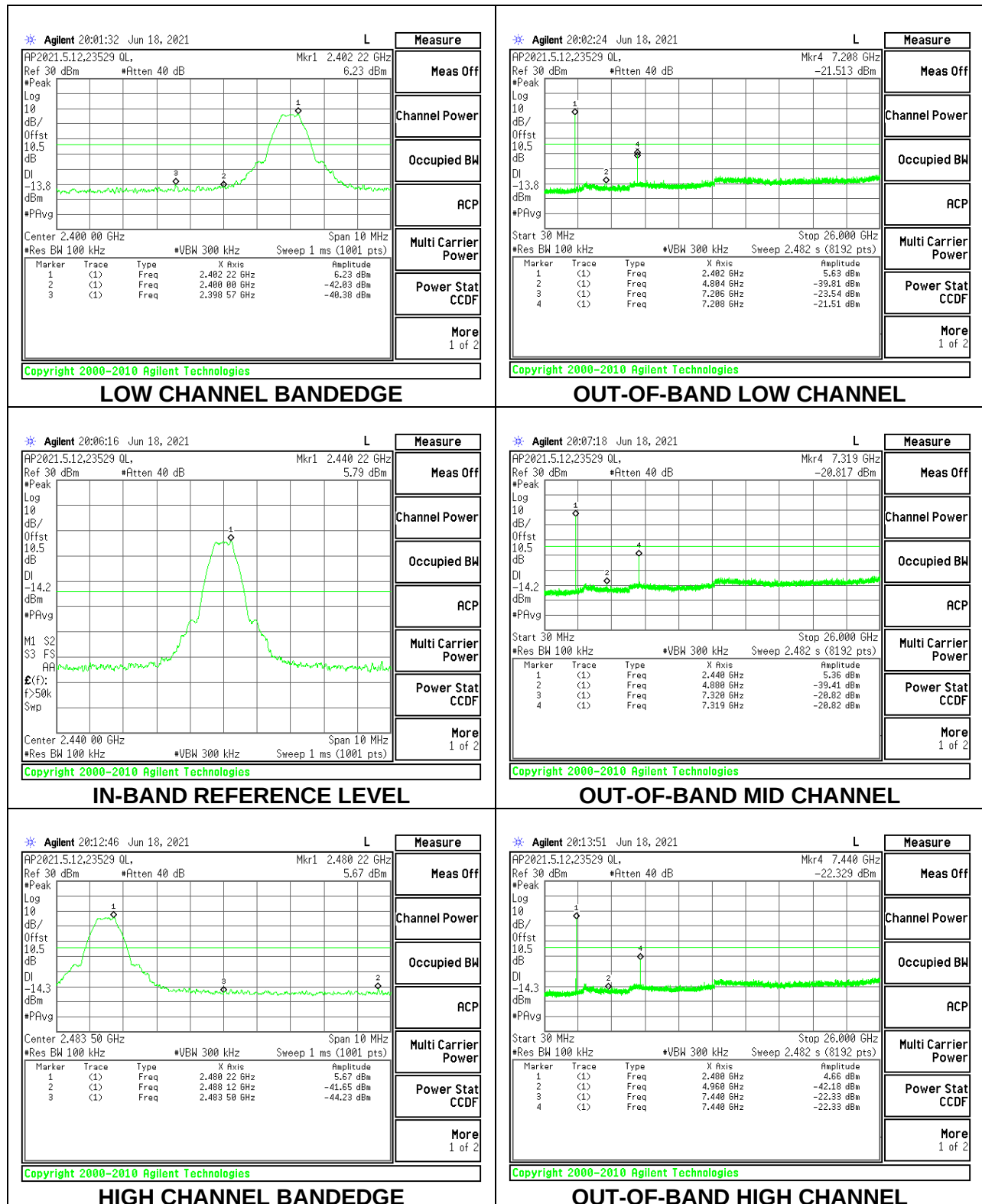
FCC §15.247 (d)

RSS-247 5.5

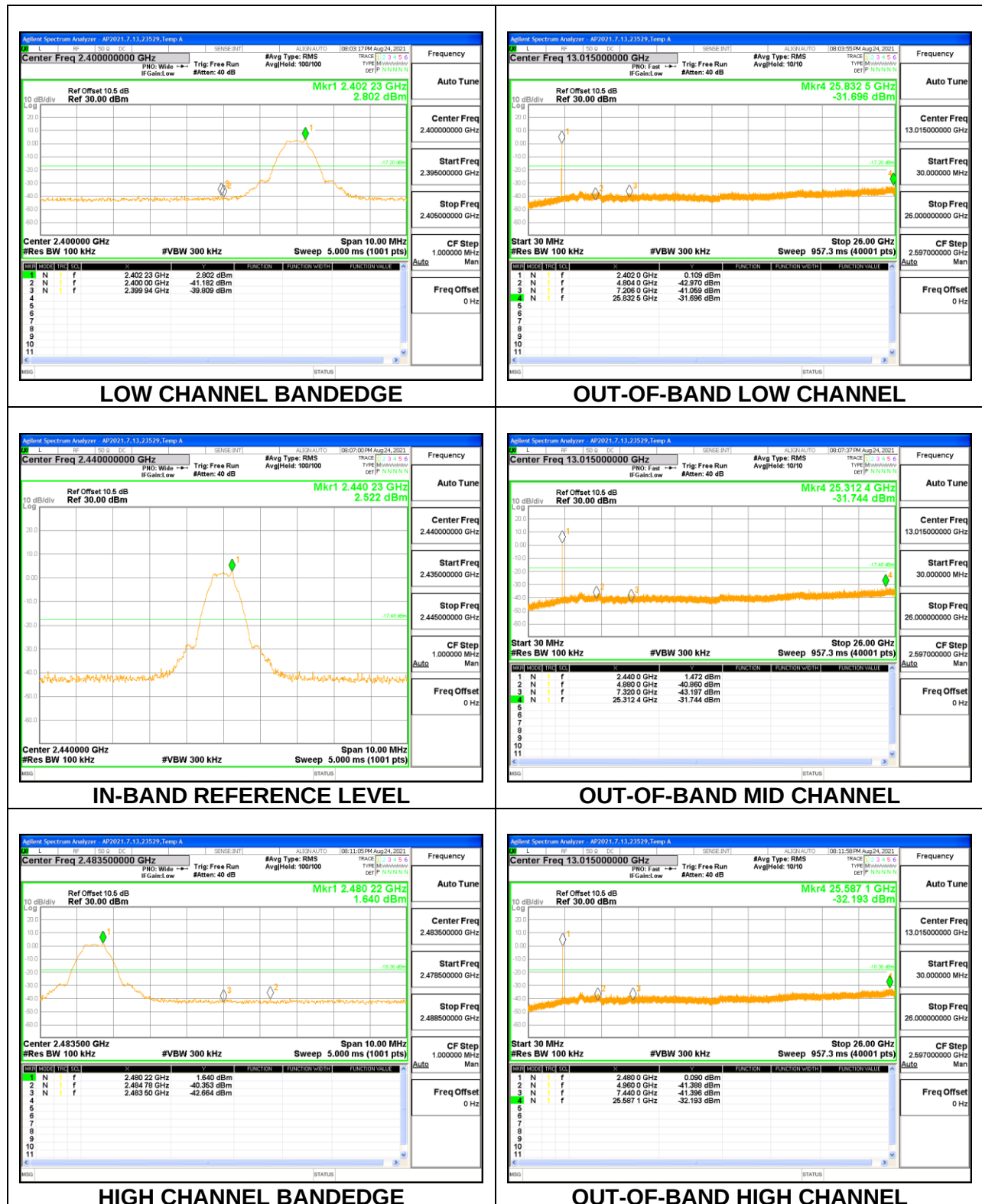
Output power was measured based on the use of a peak measurement, therefore, spurious emissions are required to be 20 dBc.

RESULTS

INTERNAL ANTENNA CONFIGURATION



EXTERNAL ANTENNA CONFIGURATION



10. RADIATED TEST RESULTS

10.1. 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 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.

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

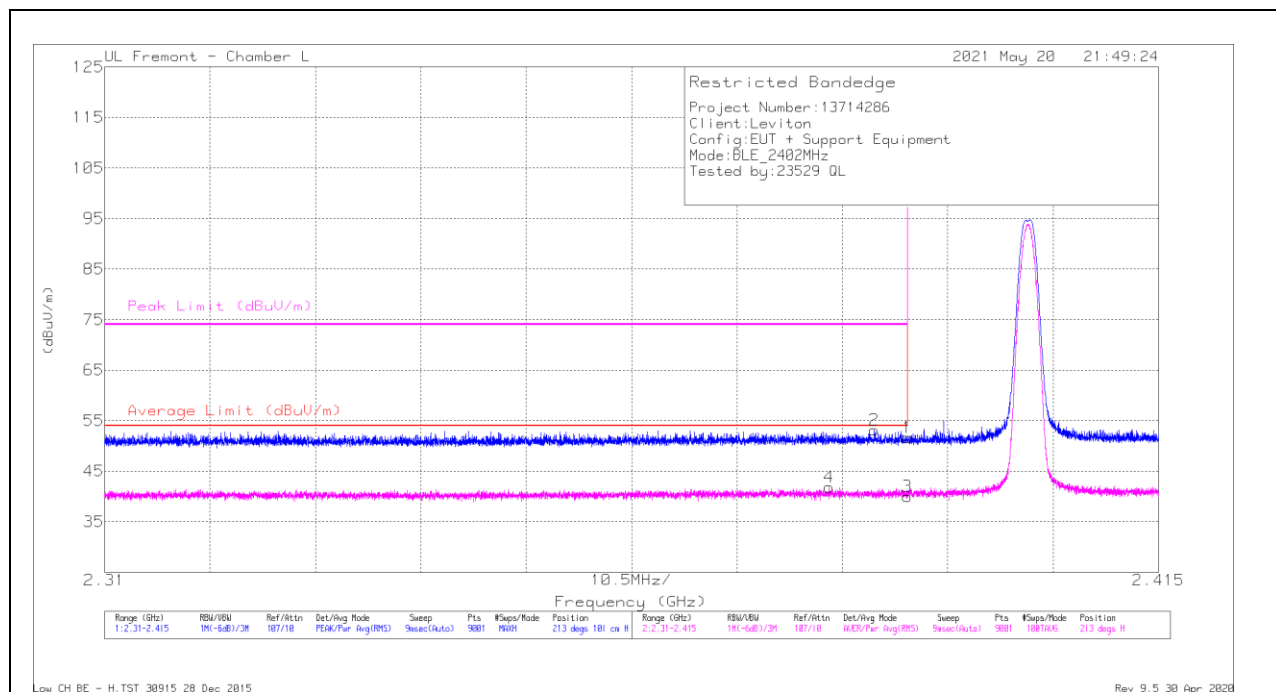
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

10.2. TRANSMITTER ABOVE 1 GHz

INTERNAL ANTENNA CONFIGURATION

BANDEDGE (LOW CHANNEL)

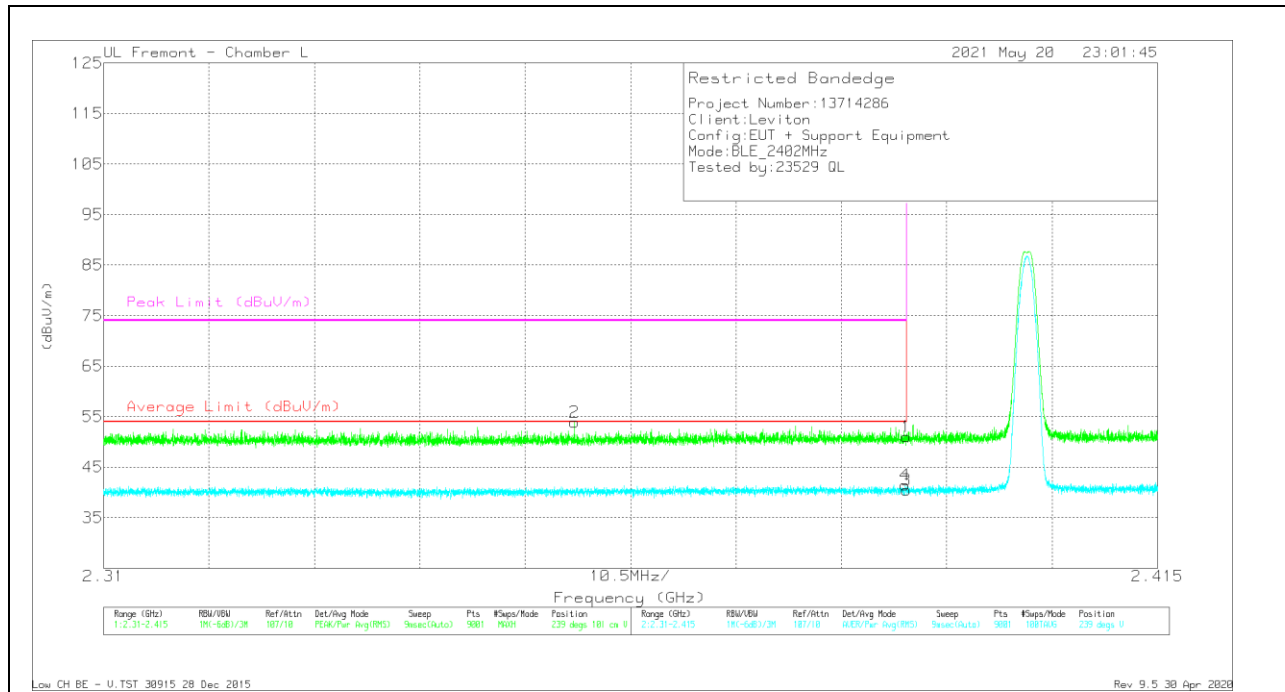
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 344 (dB/m)	Amp/Cbl/Filtr/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	39.01	Pk	31.9	-19.3	51.61	-	-	74	-22.39	213	101	H
2	* 2.3867	40.74	Pk	31.8	-19.4	53.14	-	-	74	-20.86	213	101	H
3	* 2.38999	27.43	RMS	31.9	-19.3	40.03	54	-13.97	-	-	213	101	H
4	* 2.38221	29.42	RMS	31.8	-19.4	41.82	54	-12.18	-	-	213	101	H

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

VERTICAL RESULT

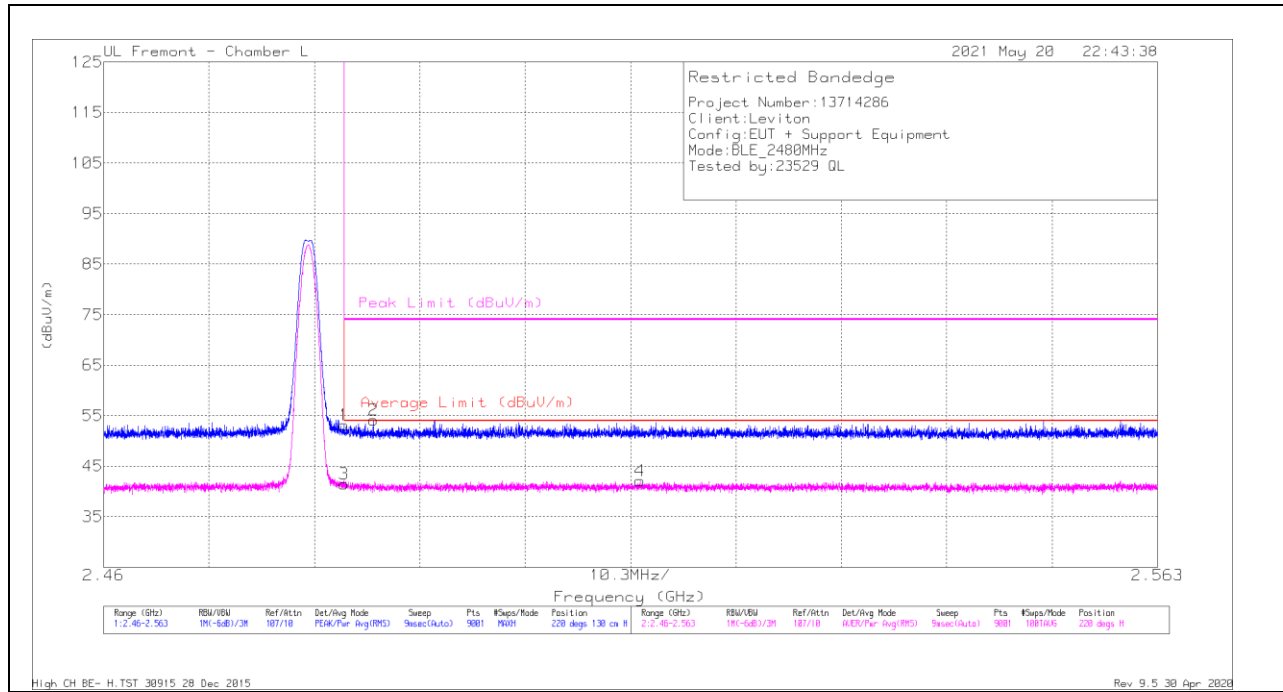


Marker	Frequency (GHz)	Meter Reading (dBUV)	Det	AF 344 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBUV/m)	Average Limit (dBUV/m)	Margin (dB)	Peak Limit (dBUV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	38.45	Pk	31.9	-19.3	51.05	-	-	74	-22.95	239	101	V
2	* 2.35692	41.54	Pk	31.7	-19.4	53.84	-	-	74	-20.16	239	101	V
3	* 2.38999	27.83	RMS	31.9	-19.3	40.43	54	-13.57	-	-	239	101	V
4	* 2.38988	28.91	RMS	31.9	-19.3	41.51	54	-12.49	-	-	239	101	V

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

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



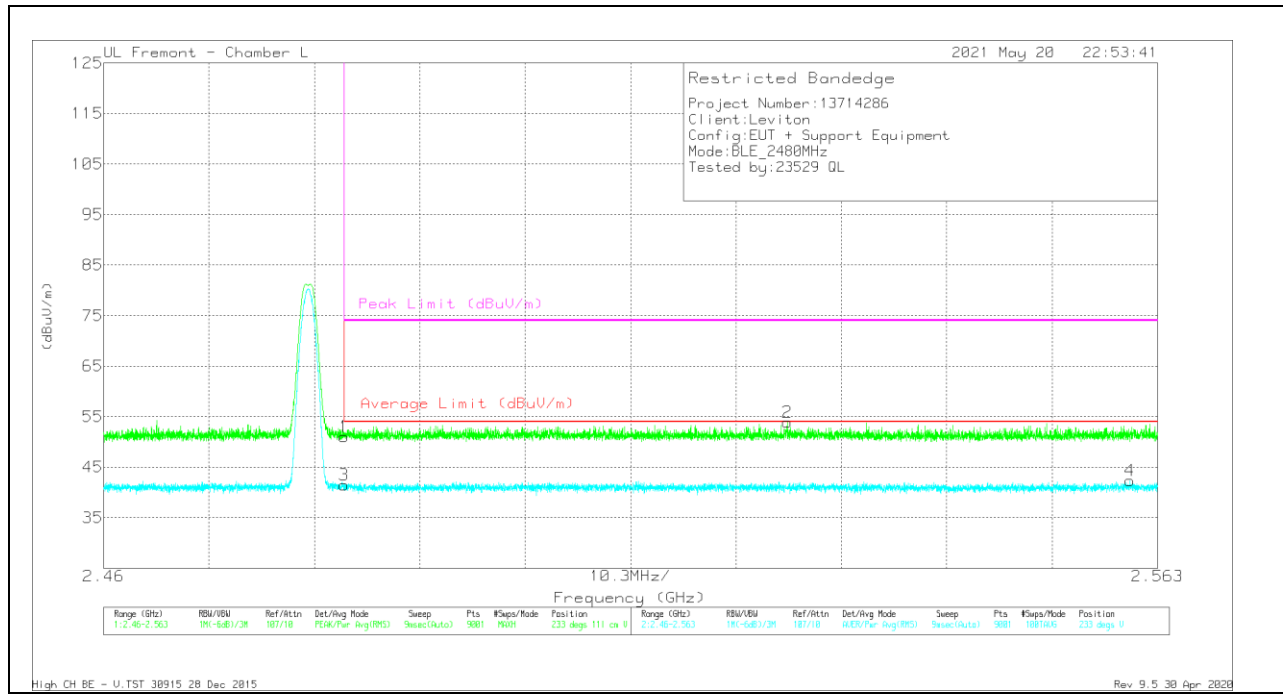
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 344 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	39.81	Pk	32.3	-19	53.11	-	-	74	-20.89	220	130	H
2	* 2.48637	40.97	Pk	32.3	-19.1	54.17	-	-	74	-19.83	220	130	H
3	* 2.48351	28.16	RMS	32.3	-19	41.46	54	-12.54	-	-	220	130	H
4	2.51241	28.69	RMS	32.4	-19	42.09	54	-11.91	-	-	220	130	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT

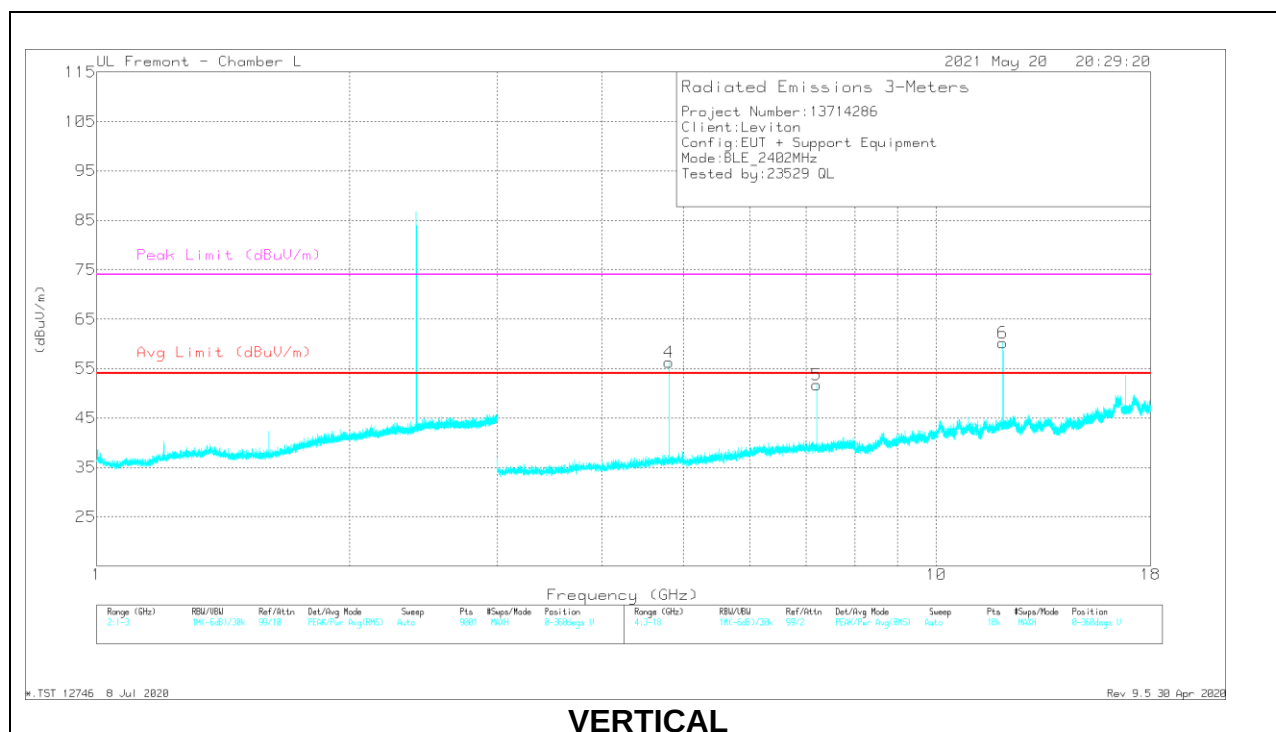
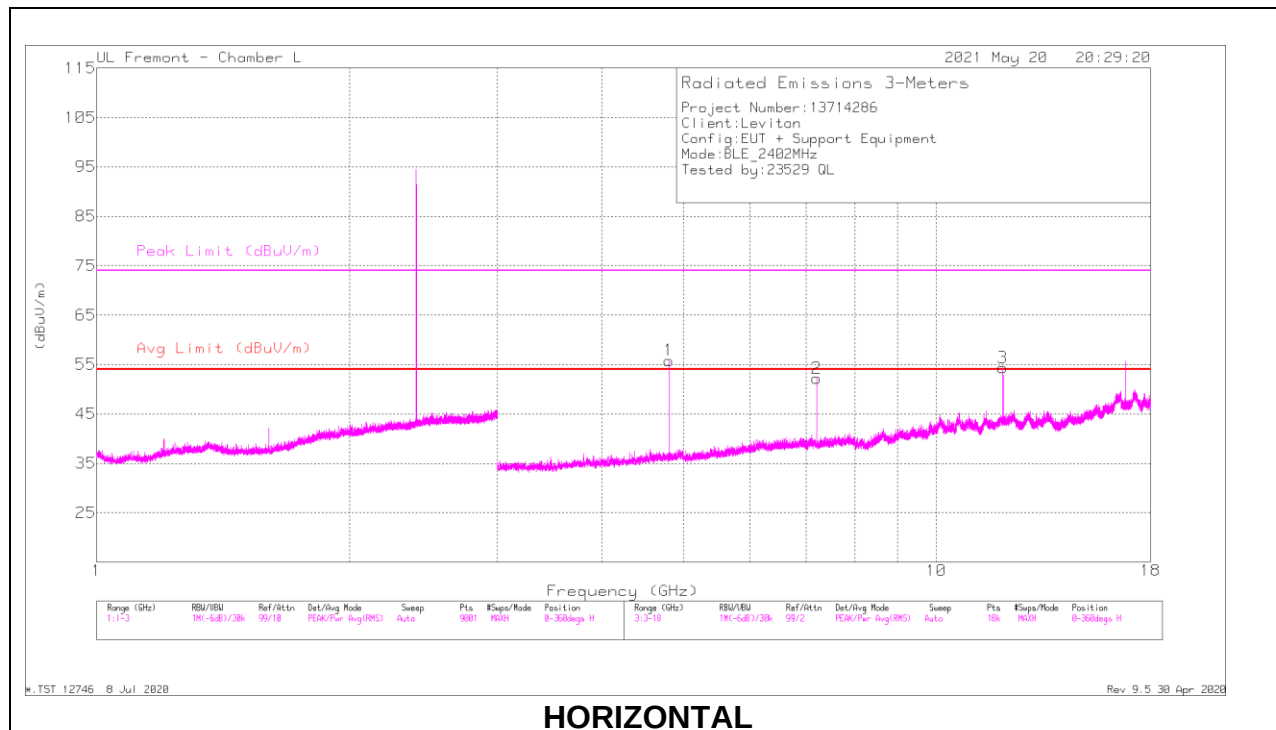


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 344 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	37.72	Pk	32.3	-19	51.02	-	-	74	-22.98	233	111	V
2	2.5268	40.58	Pk	32.4	-19.1	53.88	-	-	74	-20.12	233	111	V
3	* 2.48351	28.23	RMS	32.3	-19	41.53	54	-12.47	-	-	233	111	V
4	2.56031	28.85	RMS	32.4	-18.9	42.35	54	-11.65	-	-	233	111	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 344 (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	* 4.80349	50.87	PK2	34.2	-24.5	0	60.57	-	-	74	-13.43	195	193	H
	* 4.80349	50.87	AV	34.2	-24.5	-10.97	49.6	54	-4.4	-	-	195	193	H
2	7.20516	41.96	PK2	35.5	-20.1	0	57.36	-	-	74	-16.64	182	102	H
3	* 12.00873	37.77	PK2	38.7	-16.3	0	60.17	-	-	74	-13.83	286	147	H
	* 12.00873	37.77	AV	38.7	-16.3	-10.97	49.2	54	-4.8	-	-	286	147	H
4	* 4.80442	49.04	PK2	34.2	-24.5	0	58.74	-	-	74	-15.26	226	101	V
	* 4.80442	49.04	AV	34.2	-24.5	-10.97	47.77	54	-6.23	-	-	226	101	V
5	7.20526	42.4	PK2	35.5	-20.1	0	57.8	-	-	74	-16.2	179	187	V
6	* 12.00872	41.94	PK2	38.7	-16.3	0	64.34	-	-	74	-9.66	238	101	V
	* 12.00872	41.94	AV	38.7	-16.3	-10.97	53.37	54	-0.63	-	-	238	101	V

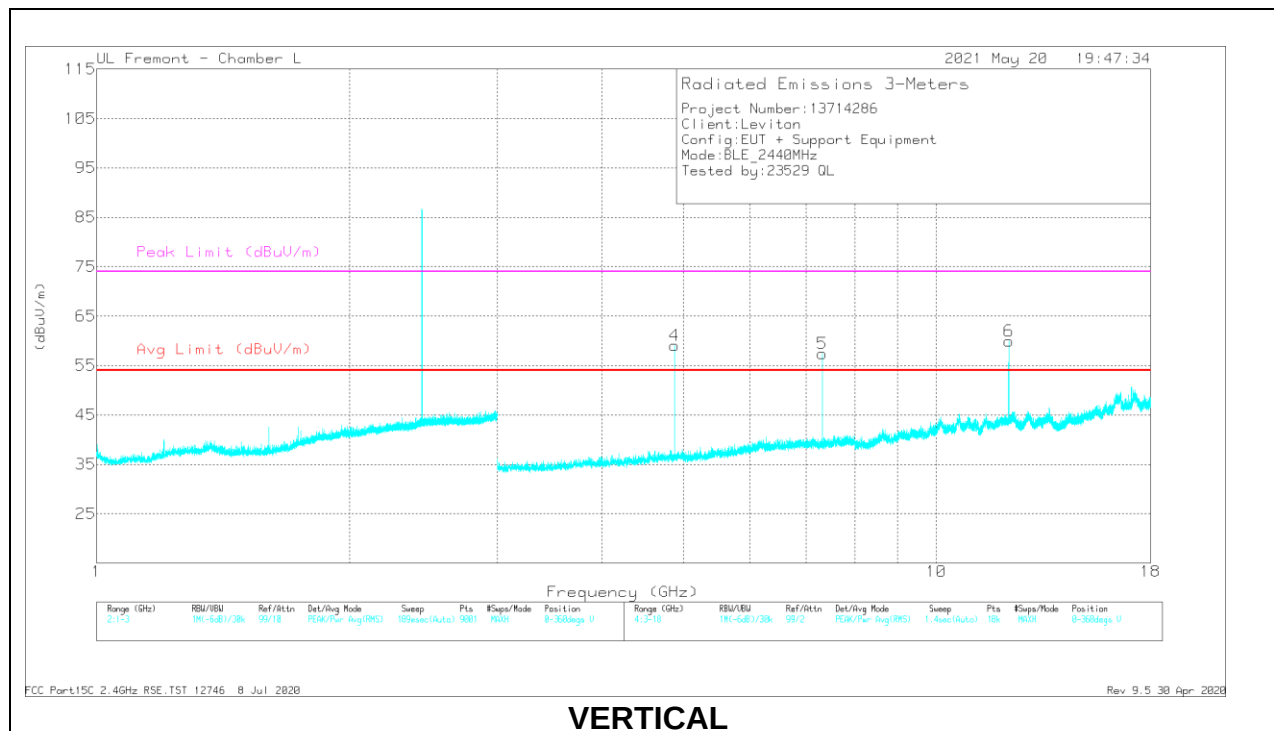
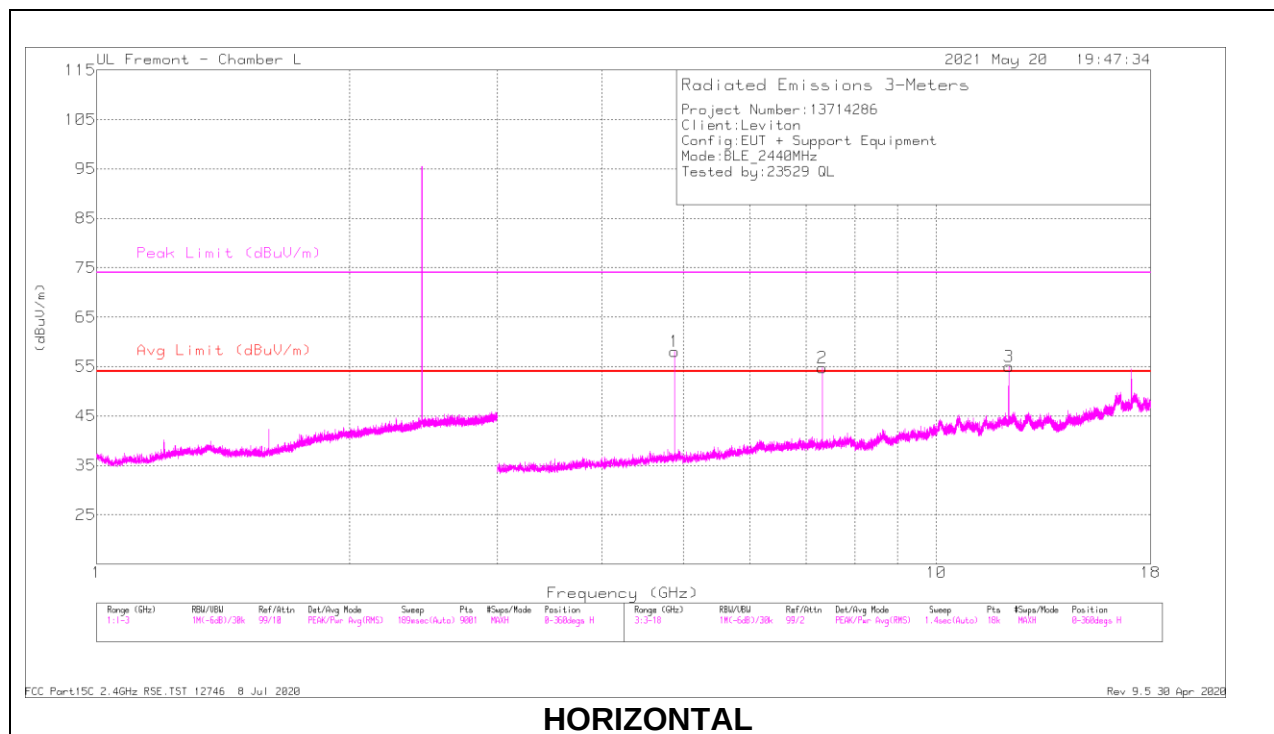
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

AV = Peak reading + Duty Cycle Correction Factor(KDB558074 Section 11, Question 3 (a))

Duty Cycle Correction Factor = -10.97 dB. Refer to Section 9.1

MID CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 344 (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	* 4.8795	51.83	PK2	34.1	-24.4	0	61.53	-	-	74	-12.47	242	104	H
	* 4.8795	51.83	AV	34.1	-24.4	-10.97	50.56	54	-3.44	-	-	242	104	H
2	* 7.32067	45.41	PK2	35.5	-20.1	0	60.81	-	-	74	-13.19	263	183	H
	* 7.32067	45.41	AV	35.5	-20.1	-10.97	49.84	54	-4.16	-	-	263	183	H
3	* 12.20109	37.67	PK2	38.9	-16.7	0	59.87	-	-	74	-14.13	176	256	H
	* 12.20109	37.67	AV	38.9	-16.7	-10.97	48.9	54	-5.1	-	-	176	256	H
4	* 4.87947	51.92	PK2	34.1	-24.4	0	61.62	-	-	74	-12.38	227	107	V
	* 4.87947	51.92	AV	34.1	-24.4	-10.97	50.65	54	-3.35	-	-	227	107	V
5	* 7.32071	47.19	PK2	35.5	-20.1	0	62.59	-	-	74	-11.41	180	187	V
	* 7.32071	47.19	AV	35.5	-20.1	-10.97	51.62	54	-2.38	-	-	180	187	V
6	* 12.20114	40.58	PK2	38.9	-16.7	0	62.78	-	-	74	-11.22	160	102	V
	* 12.20114	40.58	AV	38.9	-16.7	-10.97	51.81	54	-2.19	-	-	160	102	V

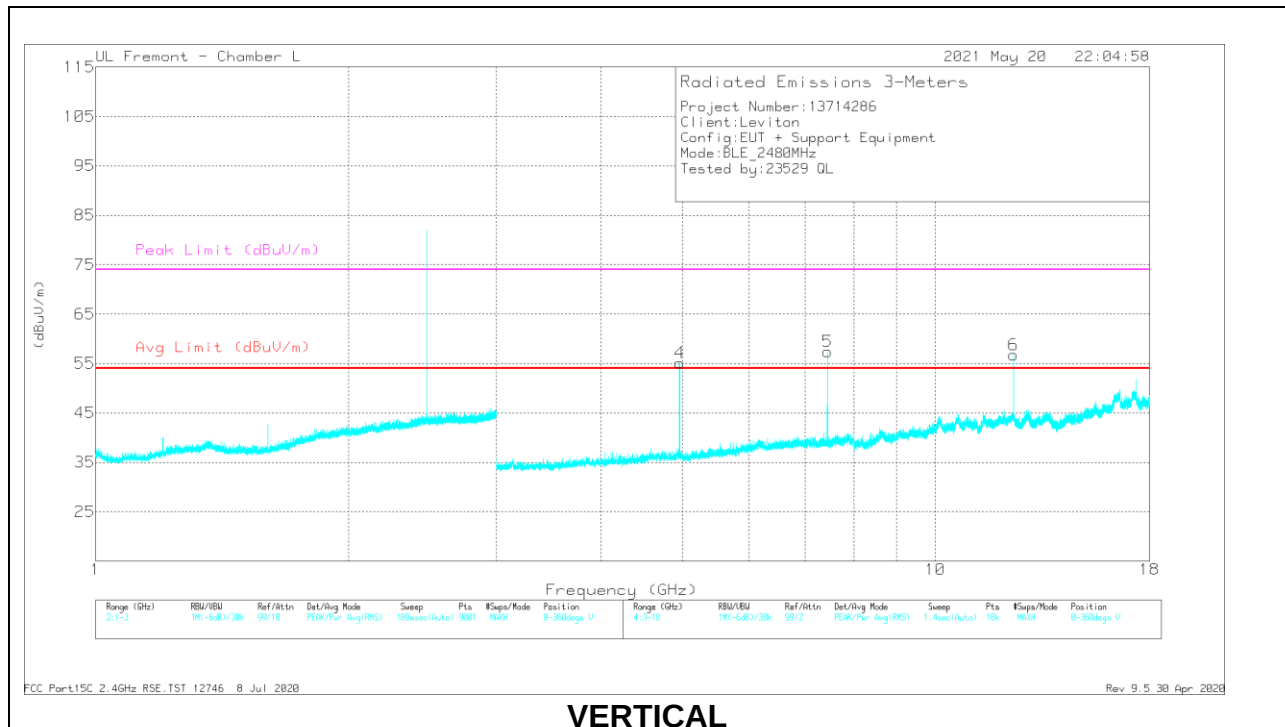
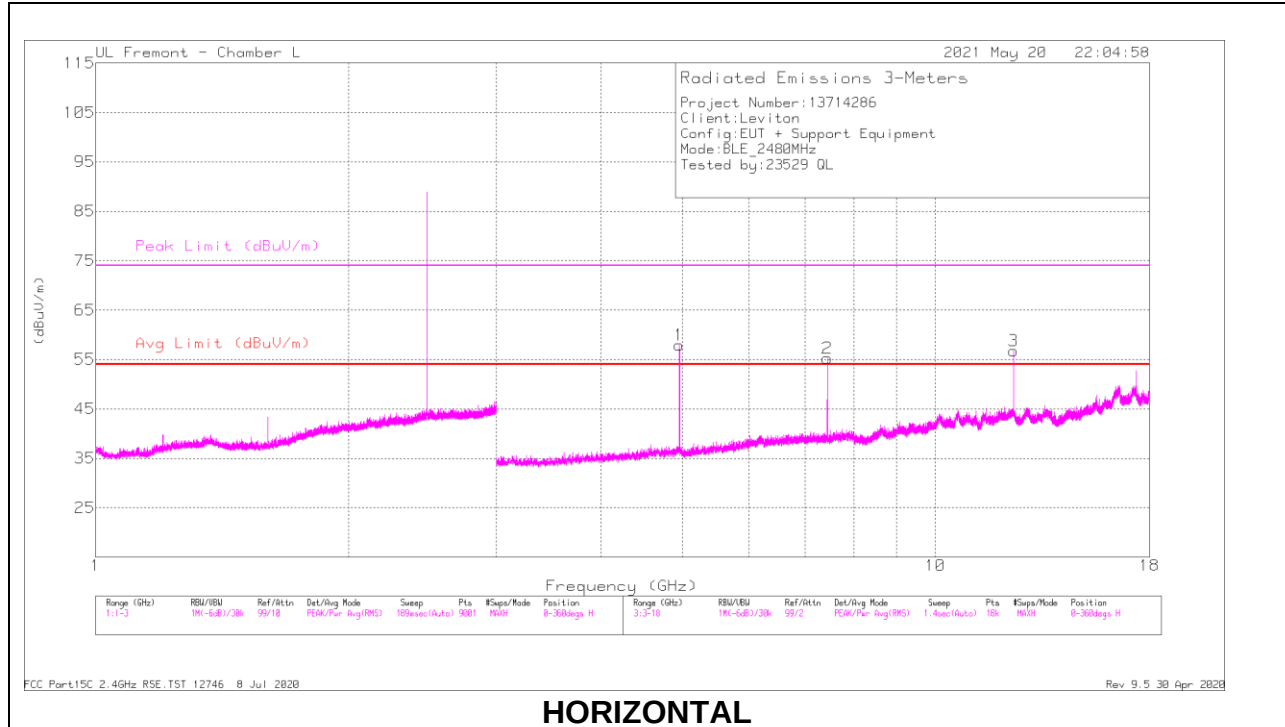
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

AV = Peak reading + Duty Cycle Correction Factor(KDB558074 Section 11, Question 3 (a))

Duty Cycle Correction Factor = -10.97 dB. Refer to Section 9.1

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 344 (dB/m)	Amp/Cbl/Fitr/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	* 4.96042	49.66	PK2	34.1	-23.2	0	60.56	-	-	74	-13.44	238	102	H
	* 4.96042	49.66	AV	34.1	-23.2	-10.97	49.59	54	-4.41	-	-	238	102	H
2	* 7.4392	43.42	PK2	35.6	-20	0	59.02	-	-	74	-14.98	184	101	H
	* 7.4392	43.42	AV	35.6	-20	-10.97	48.05	54	-5.95	-	-	184	101	H
3	* 12.40105	37.91	PK2	39	-16.3	0	60.61	-	-	74	-13.39	223	101	H
	* 12.40105	37.91	AV	39	-16.3	-10.97	49.64	54	-4.36	-	-	223	101	H
4	* 4.96045	47.53	PK2	34.1	-23.2	0	58.43	-	-	74	-15.57	229	101	V
	* 4.96045	47.53	AV	34.1	-23.2	-10.97	47.46	54	-6.54	-	-	229	101	V
5	* 7.43928	46.07	PK2	35.6	-20	0	61.67	-	-	74	-12.33	188	101	V
	* 7.43928	46.07	AV	35.6	-20	-10.97	50.7	54	-3.3	-	-	188	101	V
6	* 12.4011	40.14	PK2	39	-16.3	0	62.84	-	-	74	-11.16	233	101	V
	* 12.4011	40.14	AV	39	-16.3	-10.97	51.87	54	-2.13	-	-	233	101	V

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

PK2 - KDB558074 Method: Maximum Peak

AV = Peak reading + Duty Cycle Correction Factor(KDB558074 Section 11, Question 3 (a))

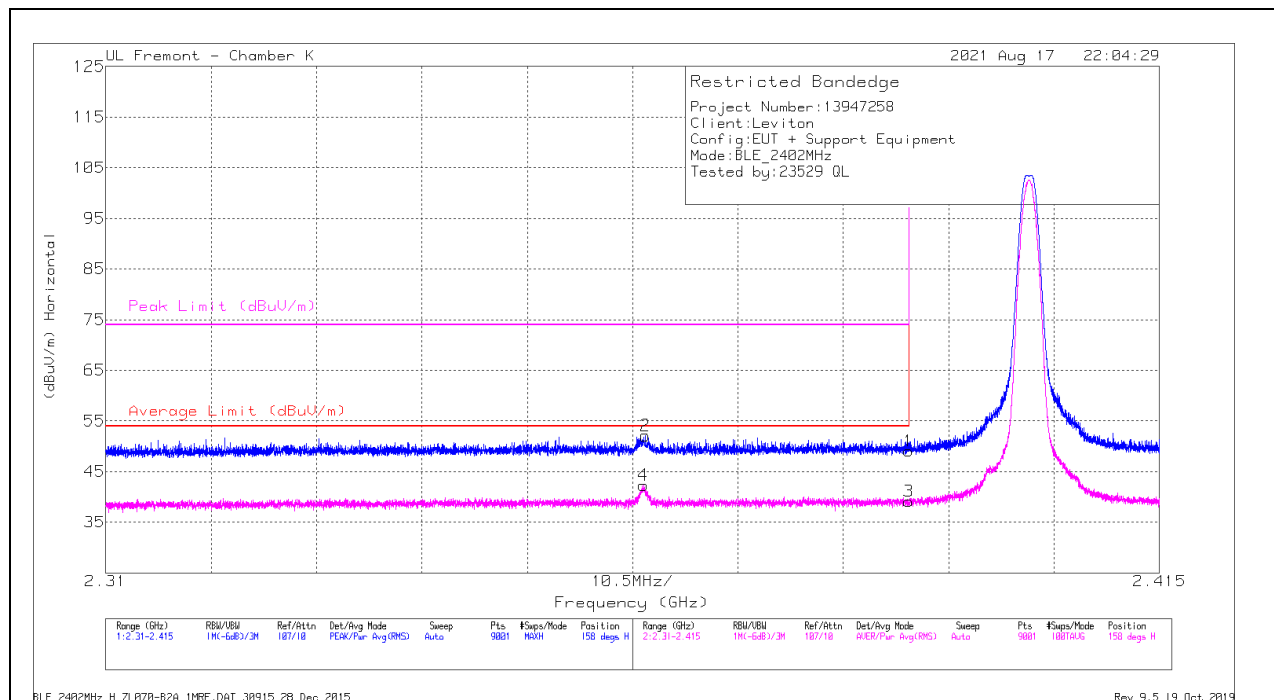
Duty Cycle Correction Factor = -10.97 dB. Refer to Section 9.1

EXTERNAL ANTENNA CONFIGURATION

Note: Project number 13947258 is the same project as 13714286

BANDEDGE (LOW CHANNEL)

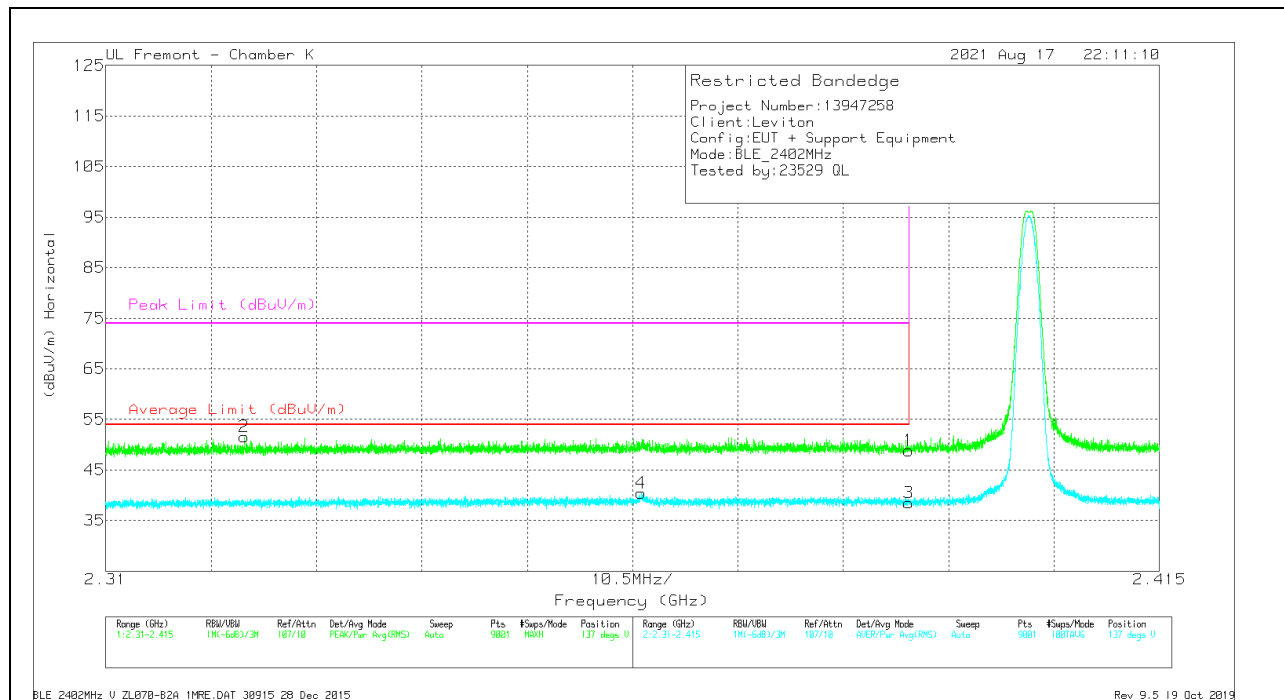
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/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	51.07	Pk	32.4	-34.4	49.07	-	-	74	-24.93	158	197	H
2	* 2.36377	54.21	Pk	32.4	-34.5	52.11	-	-	74	-21.89	158	197	H
3	* 2.38999	41.11	RMS	32.4	-34.4	39.11	54	-14.89	-	-	158	197	H
4	* 2.36359	44.39	RMS	32.4	-34.5	42.29	54	-11.71	-	-	158	197	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/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	50.85	Pk	32.4	-34.4	48.85	-	-	74	-25.15	137	107	V
2	* 2.3238	54.27	Pk	32	-34.7	51.57	-	-	74	-22.43	137	107	V
3	* 2.38999	40.5	RMS	32.4	-34.4	38.5	54	-15.5	-	-	137	107	V
4	* 2.36335	42.51	RMS	32.4	-34.5	40.41	54	-13.59	-	-	137	107	V

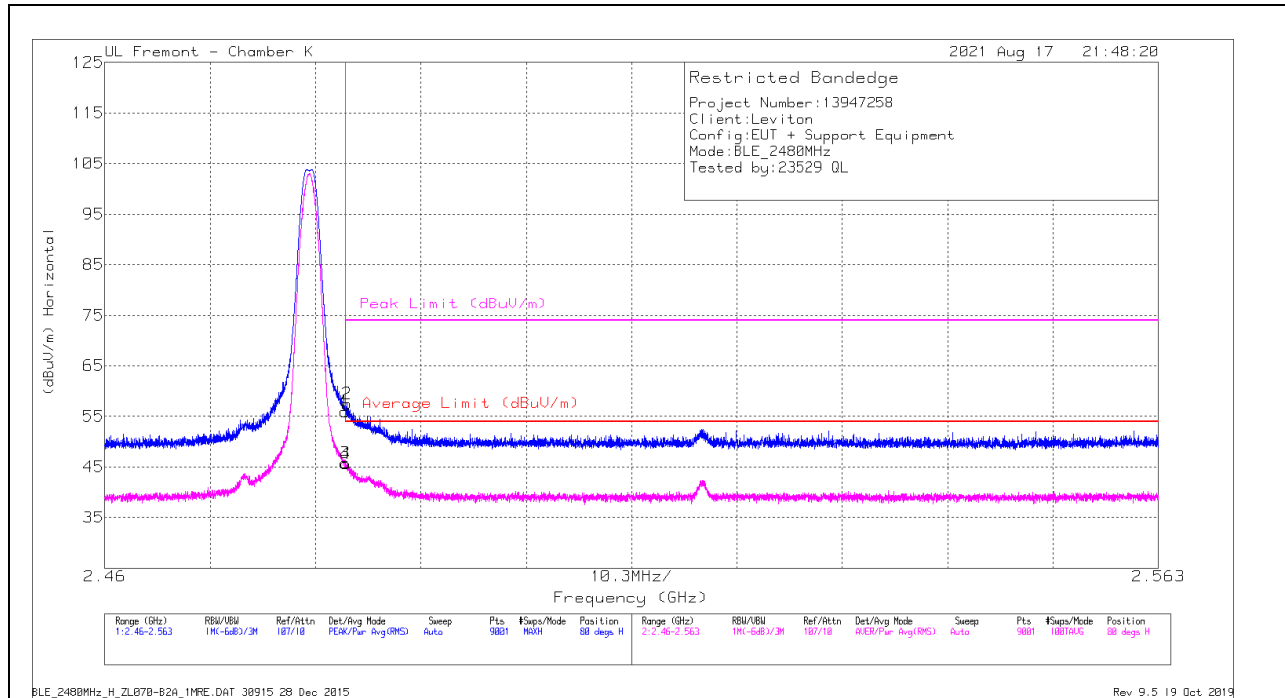
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL)

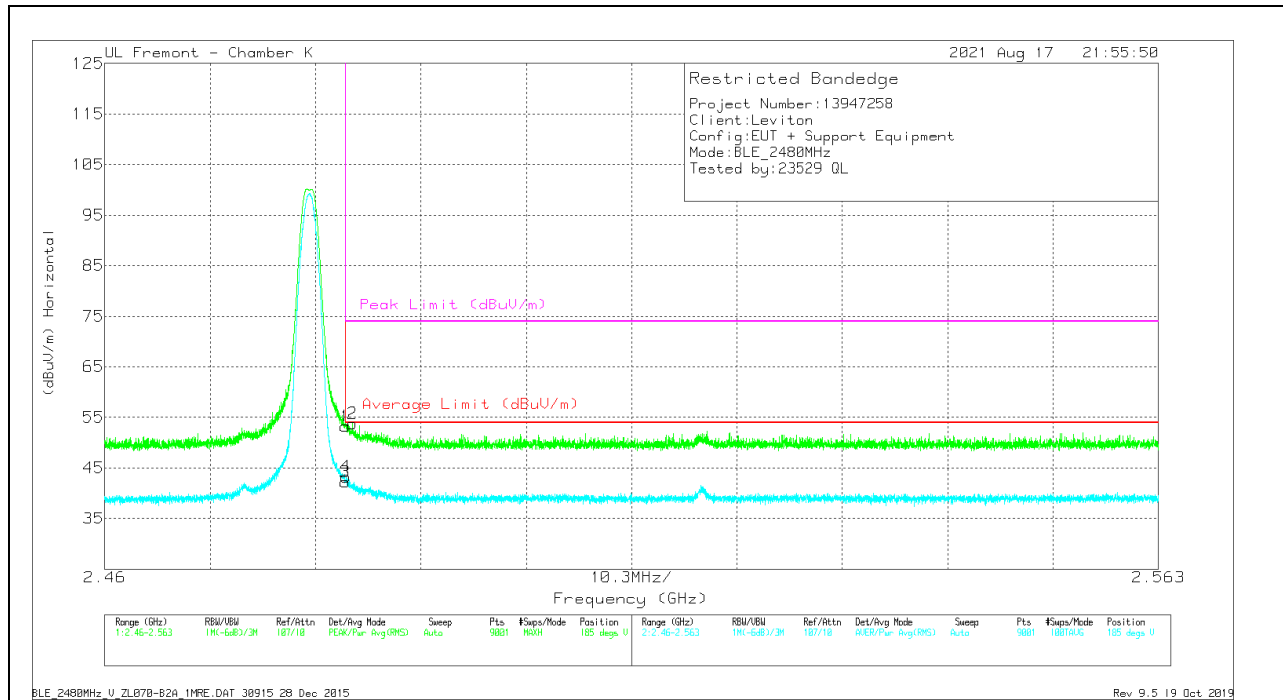
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	57.44	Pk	32.5	-34	55.94	-	-	74	-18.06	80	174	H
2	* 2.48367	59.02	Pk	32.5	-34	57.52	-	-	74	-16.48	80	174	H
3	* 2.48351	47.31	RMS	32.5	-34	45.81	54	-8.19	-	-	80	174	H
4	* 2.48356	47.1	RMS	32.5	-34	45.6	54	-8.4	-	-	80	174	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/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	54.73	Pk	32.5	-34	53.23	-	-	74	-20.77	185	136	V
2	* 2.4842	55.27	Pk	32.5	-34	53.77	-	-	74	-20.23	185	136	V
3	* 2.48351	43.7	RMS	32.5	-34	42.2	54	-11.8	-	-	185	136	V
4	* 2.48355	44.76	RMS	32.5	-34	43.26	54	-10.74	-	-	185	136	V

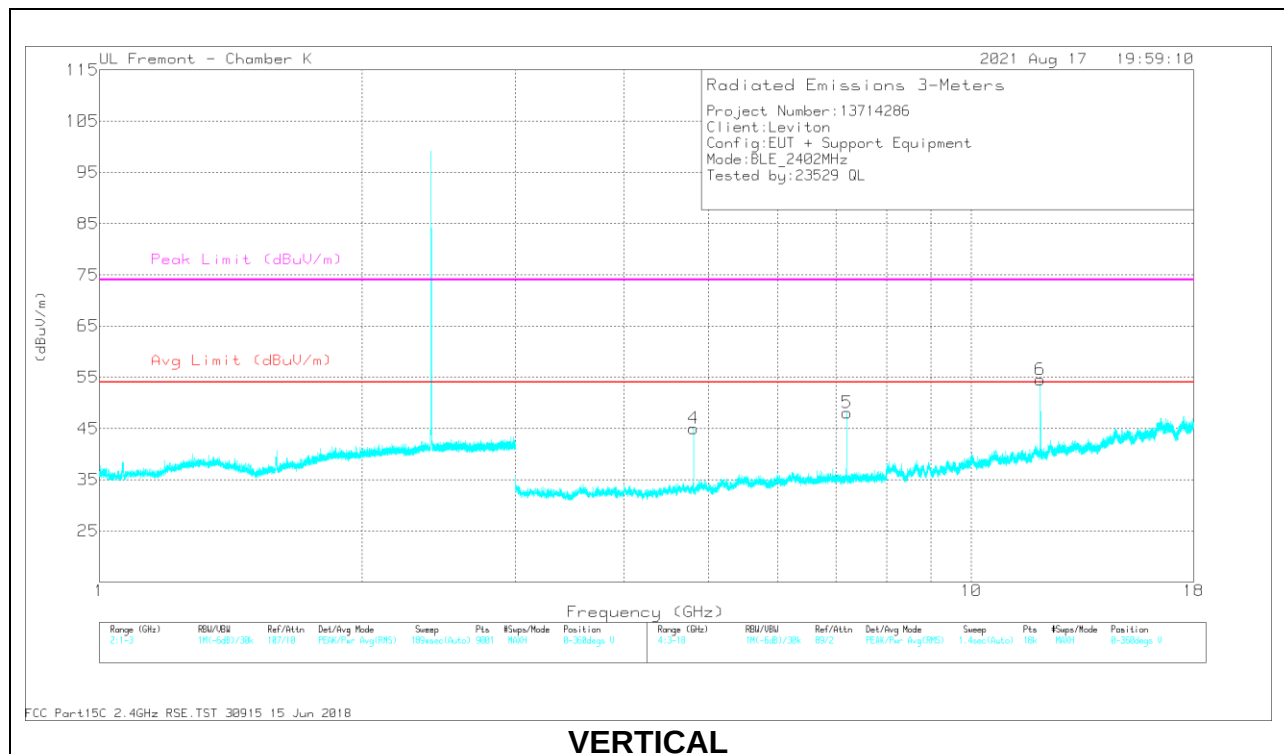
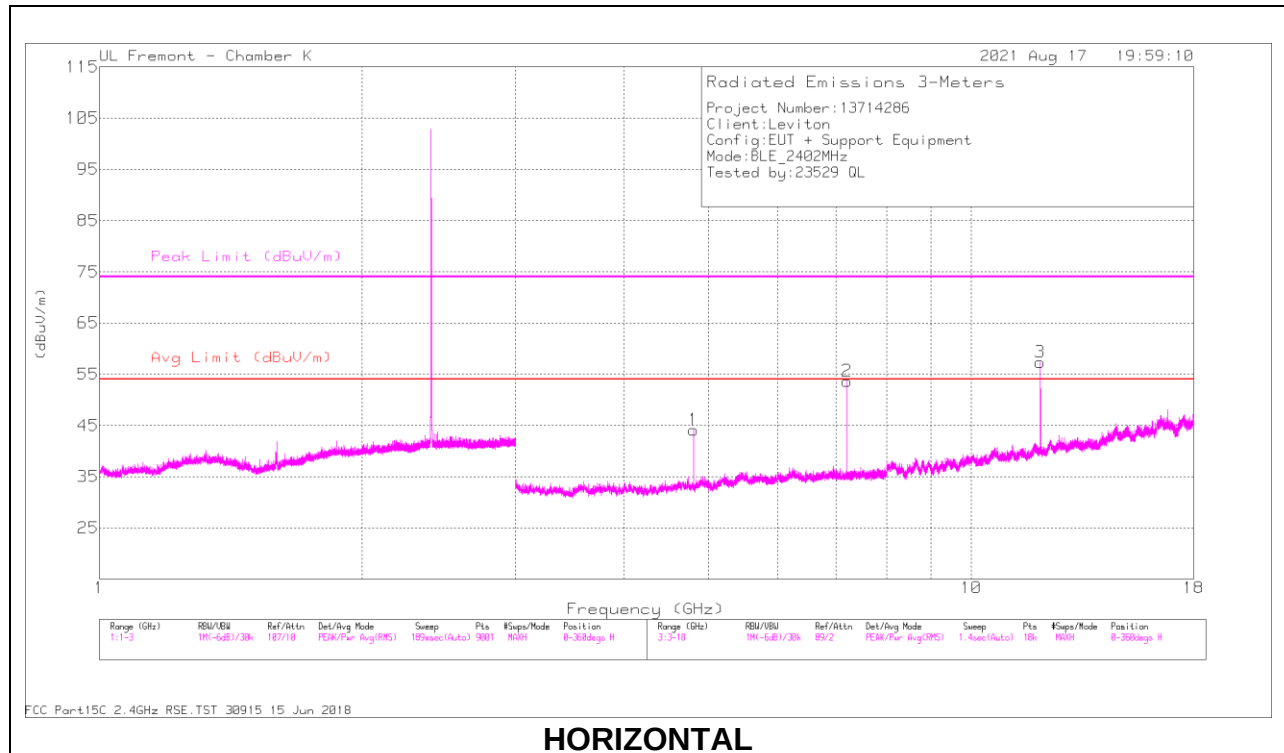
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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)	DCCF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.80361	57.12	PK2	34.4	-40	0	51.52	-	-	74	-22.48	239	280	H
	* 4.80361	57.12	AV	34.4	-40	-10.97	40.55	54	-13.45	-	-	239	280	H
2	7.20667	61.31	PK2	36	-37.8	0	59.51	-	-	-	-	279	129	H
3	* 12.0111	58.51	PK2	39	-33.8	0	63.71	-	-	74	-10.29	133	163	H
	* 12.0111	58.51	AV	39	-33.8	-10.97	52.74	54	-1.26	-	-	133	163	H
4	* 4.80446	56.57	PK2	34.4	-40	0	50.97	-	-	74	-23.03	214	101	V
	* 4.80446	56.57	AV	34.4	-40	-10.97	40	54	-14	-	-	214	101	V
5	7.20674	57.5	PK2	36	-37.8	0	55.7	-	-	-	-	261	103	V
6	* 12.01128	56.05	PK2	39	-33.7	0	61.35	-	-	74	-12.65	217	212	V
	* 12.01128	56.05	AV	39	-33.7	-10.97	50.38	54	-3.62	-	-	217	212	V

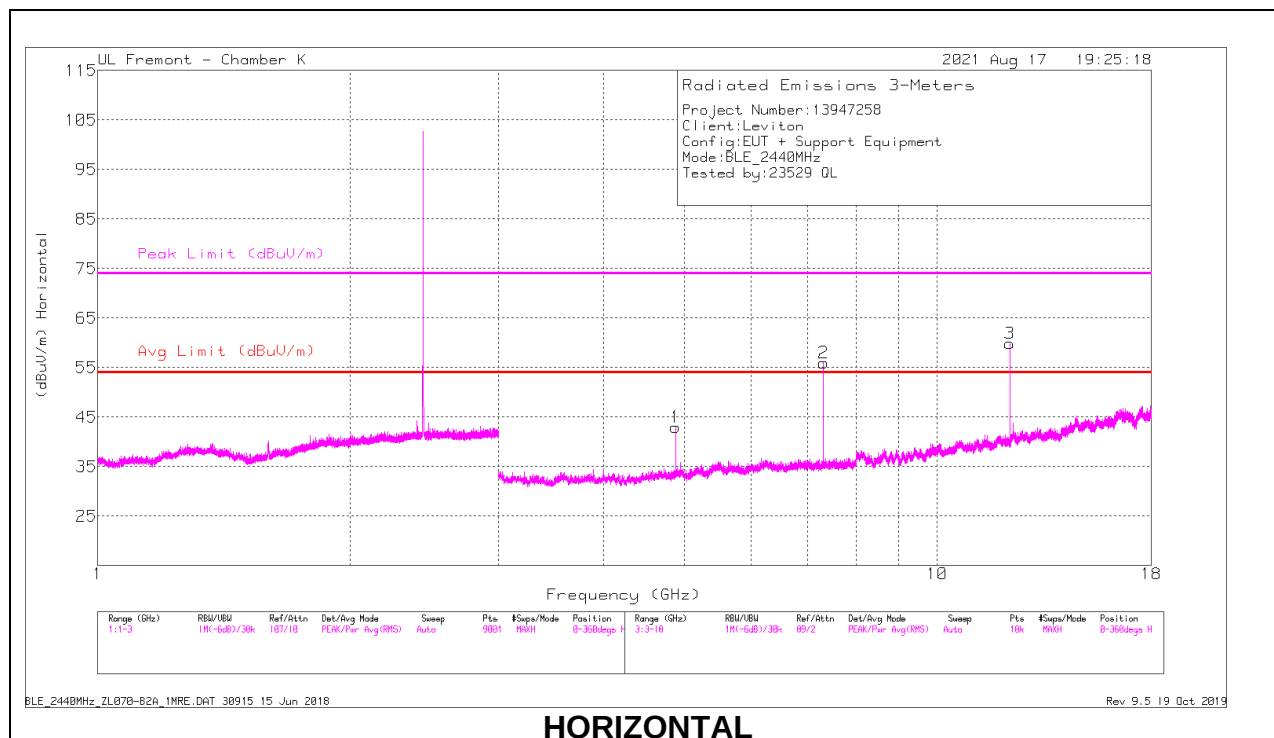
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

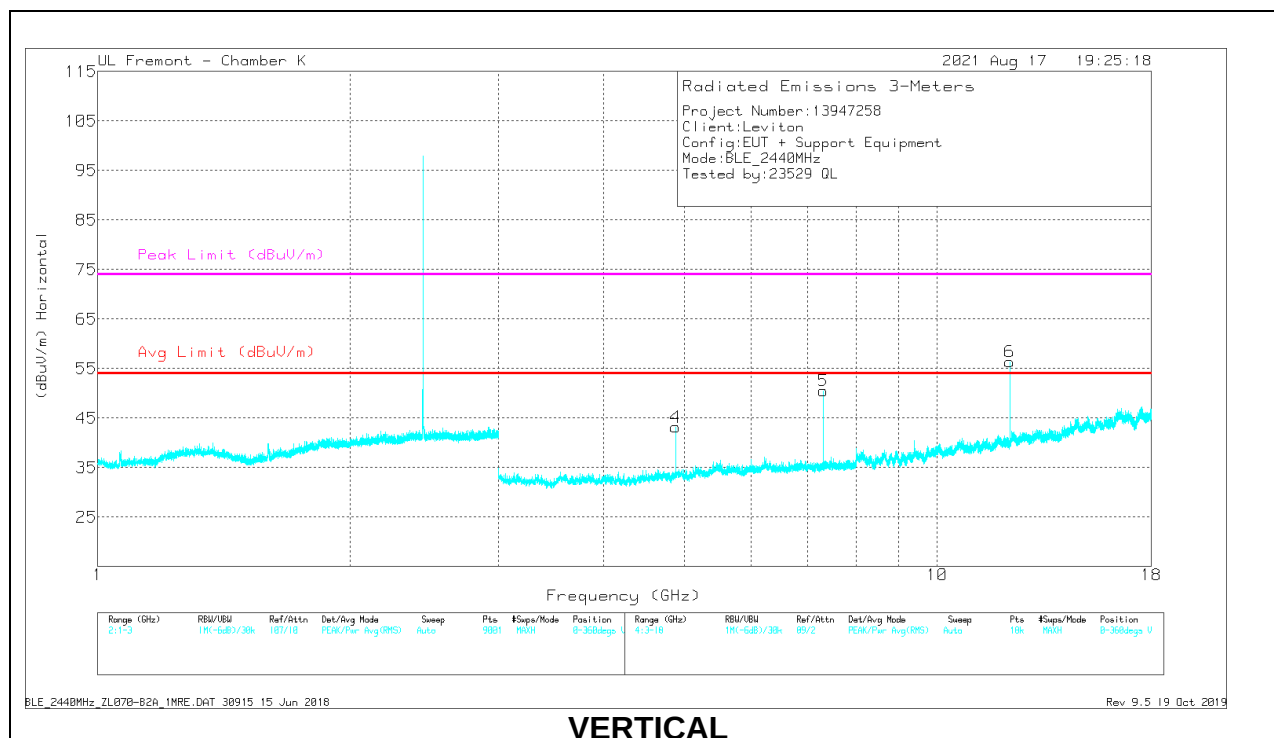
AV = Peak reading + Duty Cycle Correction Factor(KDB558074 Section 11, Question 3 (a))

Duty Cycle Correction Factor = -10.97 dB. Refer to Section 9.1

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DCCF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.88051	57	PK2	34.4	-39.8	0	51.6	-	-	74	-22.4	239	213	H
	* 4.88051	57	AV	34.4	-39.8	-10.97	40.63	54	-13.37	-	-	239	213	H
2	* 7.32066	61.77	PK2	36	-37.4	0	60.37	-	-	74	-13.63	287	100	H
	* 7.32066	61.77	AV	36	-37.4	-10.97	49.40	54	-4.6	-	-	287	100	H
3	* 12.2011	59.18	PK2	39.2	-33.9	0	64.48	-	-	74	-9.52	135	163	H
	* 12.2011	59.18	AV	39.2	-33.9	-10.97	53.51	54	-0.49	-	-	135	163	H
4	* 4.88042	56.17	PK2	34.4	-39.8	0	50.77	-	-	74	-23.23	179	104	V
	* 4.88042	56.17	AV	34.4	-39.8	-10.97	39.80	54	-14.2	-	-	179	104	V
5	* 7.3192	58.98	PK2	36	-37.4	0	57.58	-	-	74	-16.42	257	114	V
	* 7.3192	58.98	AV	36	-37.4	-10.97	46.61	54	-7.39	-	-	257	114	V
6	* 12.20111	57.16	PK2	39.2	-33.9	0	62.46	-	-	74	-11.54	219	201	V
	* 12.20111	57.16	AV	39.2	-33.9	-10.97	51.49	54	-2.51	-	-	219	201	V

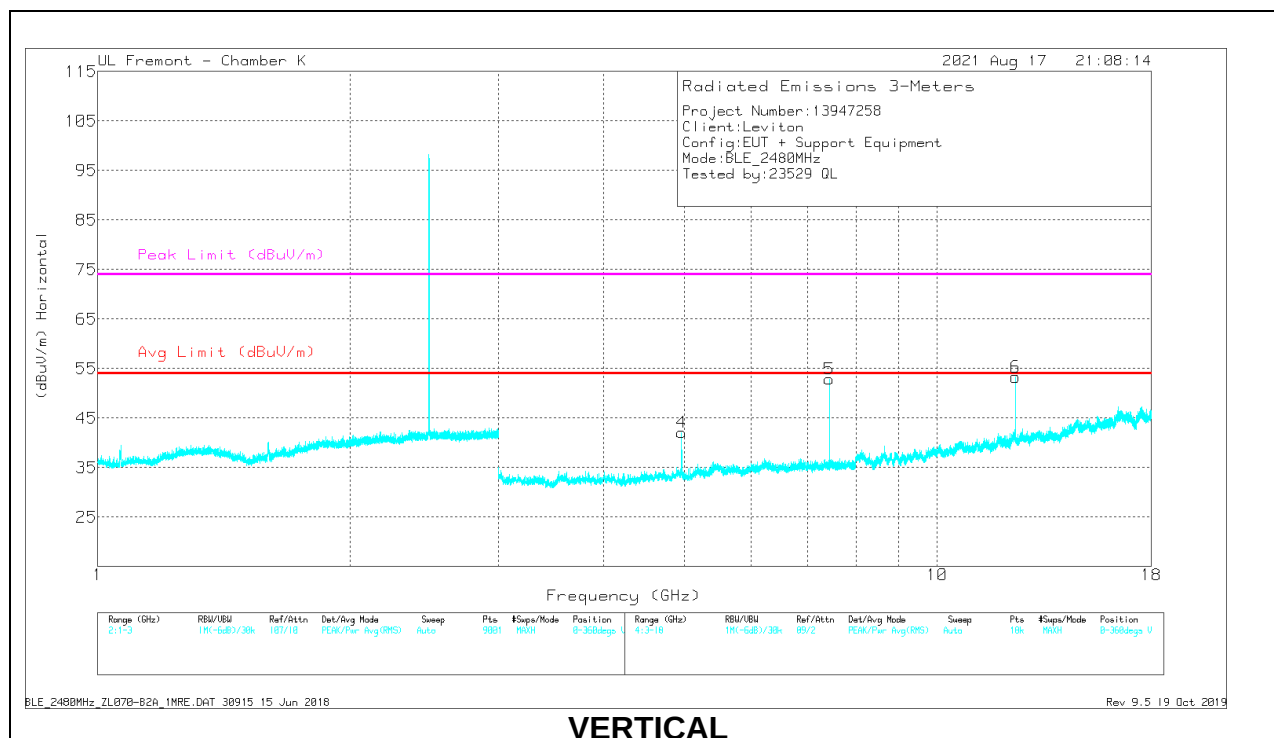
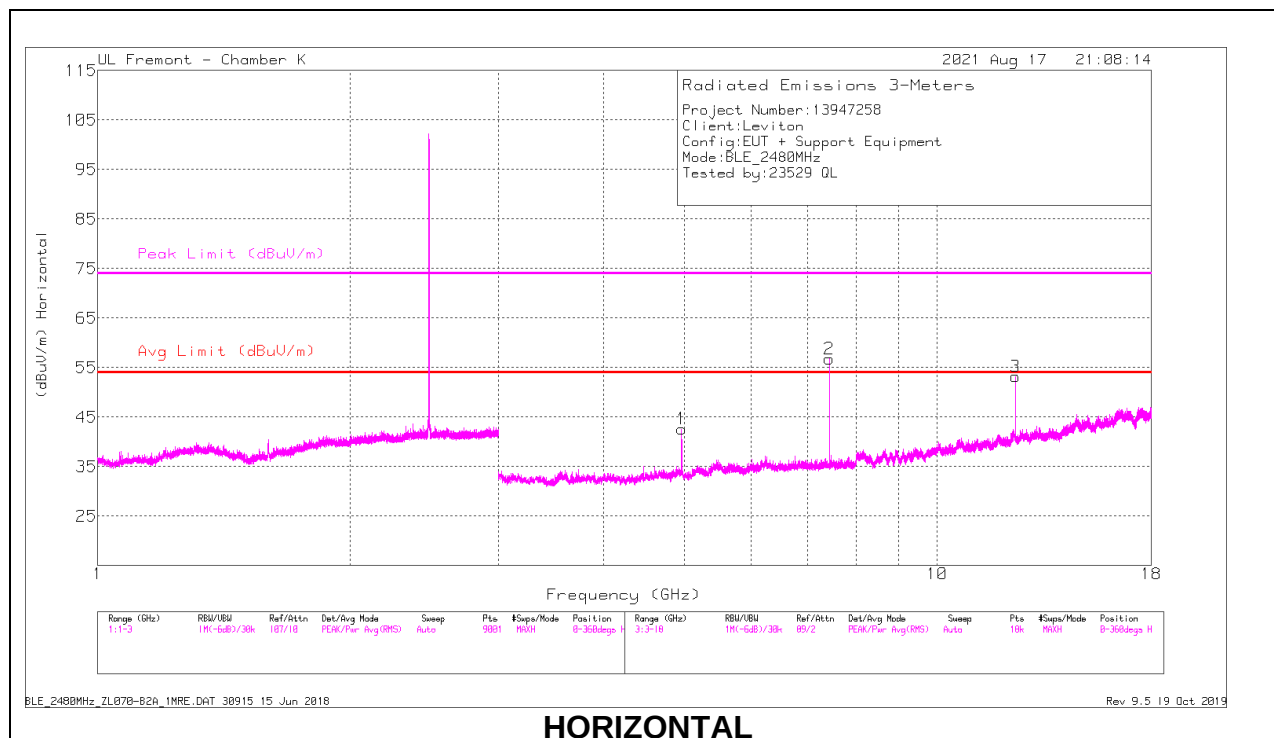
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

AV = Peak reading + Duty Cycle Correction Factor(KDB558074 Section 11, Question 3 (a))

Duty Cycle Correction Factor = -10.97 dB. Refer to Section 9.1

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DCCF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.95937	55.78	PK2	34.3	-39.9	0	50.18	-	-	74	-23.82	244	307	H
	* 4.95937	55.78	AV	34.3	-39.9	-10.97	39.21	54	-14.79	-	-23.82	244	307	H
2	* 7.43921	64.03	PK2	36.1	-37.2	0	62.93	-	-	74	-11.07	215	110	H
	* 7.43921	64.03	AV	36.1	-37.2	-10.97	51.96	54	-2.04	-	-11.07	215	110	H
3	* 12.39876	54.26	PK2	39.3	-33.4	0	60.16	-	-	74	-13.84	137	168	H
	* 12.39876	54.26	AV	39.3	-33.4	-10.97	49.19	54	-4.81	-	-13.84	137	168	H
4	* 4.95937	55.22	PK2	34.3	-39.9	0	49.62	-	-	74	-24.38	182	110	V
	* 4.95937	55.22	AV	34.3	-39.9	-10.97	38.65	54	-15.35	-	-24.38	182	110	V
5	* 7.43933	59.64	PK2	36.1	-37.2	0	58.54	-	-	74	-15.46	258	98	V
	* 7.43933	59.64	AV	36.1	-37.2	-10.97	47.57	54	-6.43	-	-15.46	258	98	V
6	* 12.40107	53.26	PK2	39.3	-33.4	0	59.16	-	-	74	-14.84	231	163	V
	* 12.40107	53.26	AV	39.3	-33.4	-10.97	48.19	54	-5.81	-	-14.84	231	163	V

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

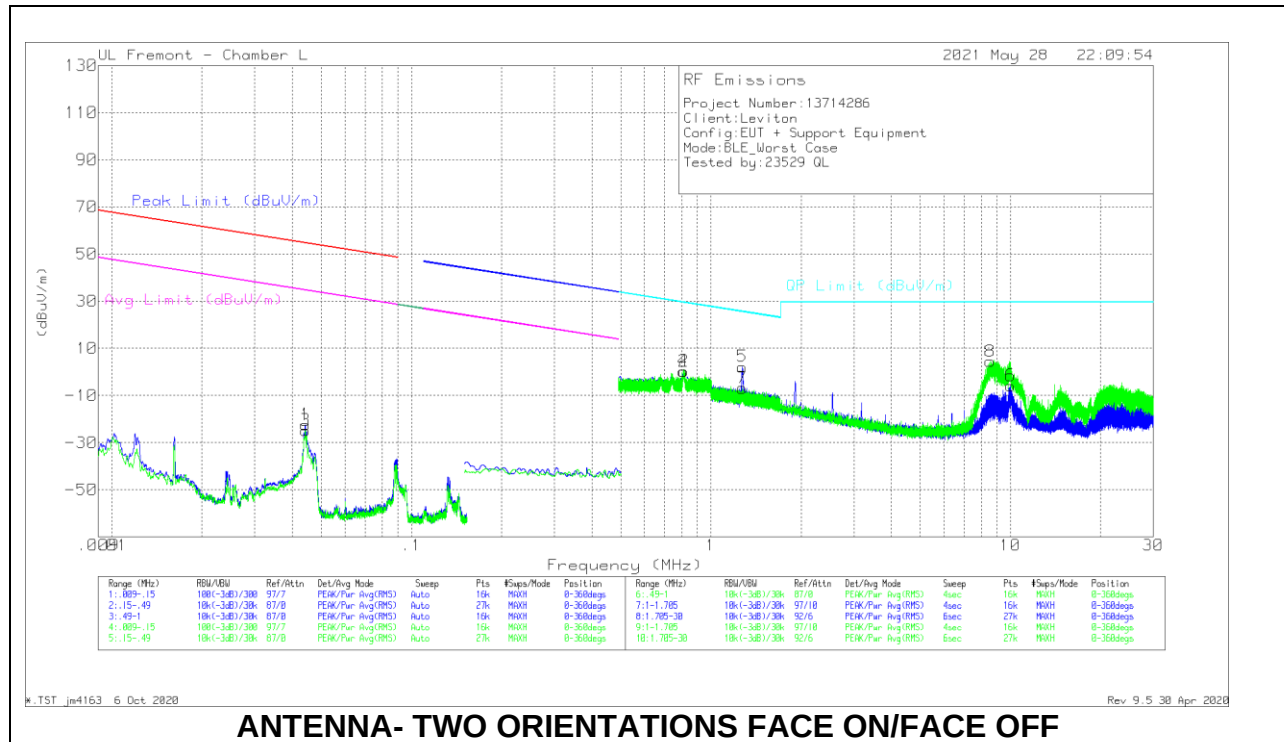
PK2 - KDB558074 Method: Maximum Peak

AV = Peak reading + Duty Cycle Correction Factor(KDB558074 Section 11, Question 3 (a))

Duty Cycle Correction Factor = -10.97 dB. Refer to Section 9.1

10.3. WORST CASE BELOW 30MHz

SPURIOUS EMISSIONS BELOW 30 MHz (INTERNAL ANTENNA WORST-CASE CONFIGURATION)



Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (ACF)	Amp/Cbl (dB)	Dist Corr 300m	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.04424	32.24	Pk	57.2	-31.8	-80	-22.36	54.67	-77.03	34.67	-57.03	0-360
3	.04424	29.82	Pk	57.2	-31.8	-80	-24.78	54.67	-79.45	34.67	-59.45	0-360

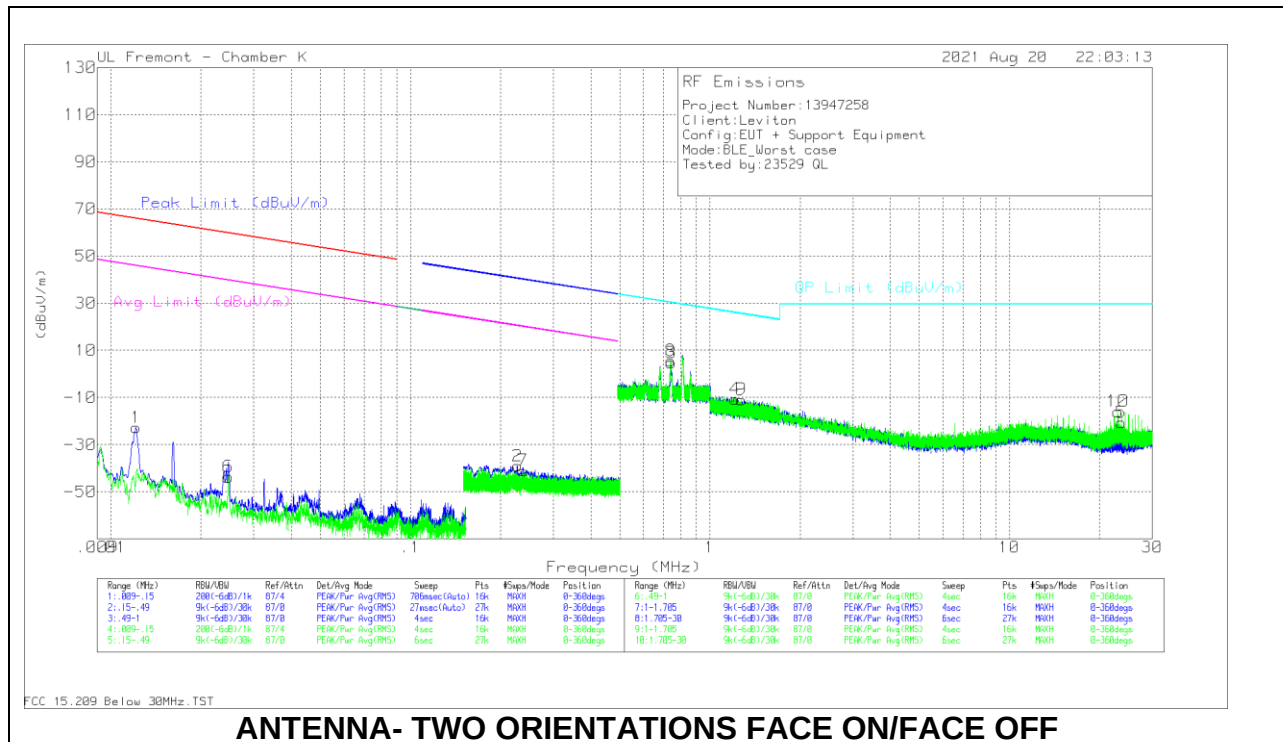
Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (ACF)	Amp/Cbl (dB)	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
2	.81134	15.92	Pk	56.3	-31.9	-40	.32	29.43	-29.11	0-360
4	.80811	15.95	Pk	56.3	-31.9	-40	.35	29.47	-29.12	0-360
5	1.2735	28.63	Pk	45.5	-31.9	-40	2.23	25.53	-23.3	0-360
6	10.00516	31.18	Pk	34.6	-31.6	-40	-5.82	29.5	-35.32	0-360
7	1.2717	19.56	Pk	45.5	-31.9	-40	-6.84	25.54	-32.38	0-360
8	8.56206	41.7	Pk	34.4	-31.6	-40	4.5	29.5	-25	0-360

Pk - Peak detector

SPURIOUS EMISSIONS BELOW 30 MHz (EXTERNAL ANTENNA WORST-CASE CONFIGURATION)

Note: Project number 13947258 is the same project as 13714286



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)	PK Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.01212	28.63	Pk	60.1	-31.5	-80	-22.77	65.91	-88.68	45.91	-68.68	-	-	-	-	0-360
2	.22756	16.99	Pk	56.2	-32.2	-80	-39.01	-	-	-	-	40.47	-79.48	20.47	-59.48	0-360
6	.02463	9.95	Pk	58.5	-32.1	-80	-43.65	59.76	-	39.76	-83.41	-	-	-	-	0-360
7	.23745	14.91	Pk	56.2	-32.2	-80	-41.09	-	-	-	-	40.1	-81.19	20.1	-61.19	0-360

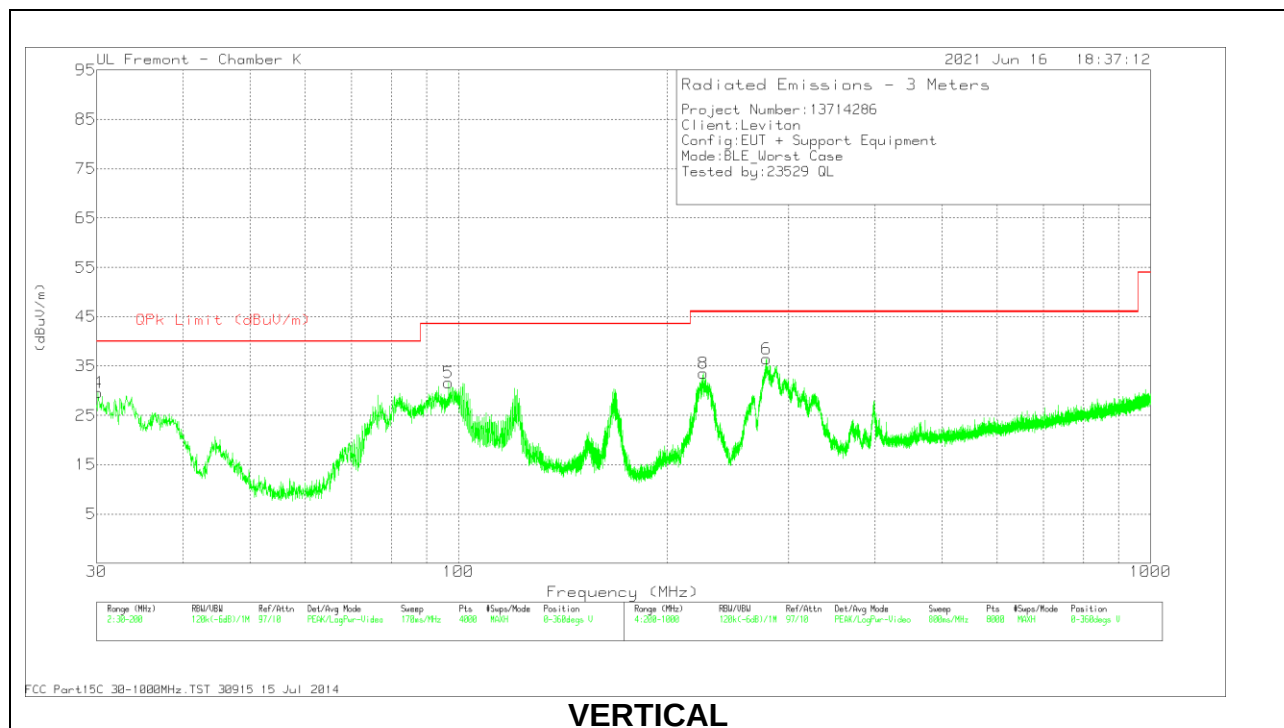
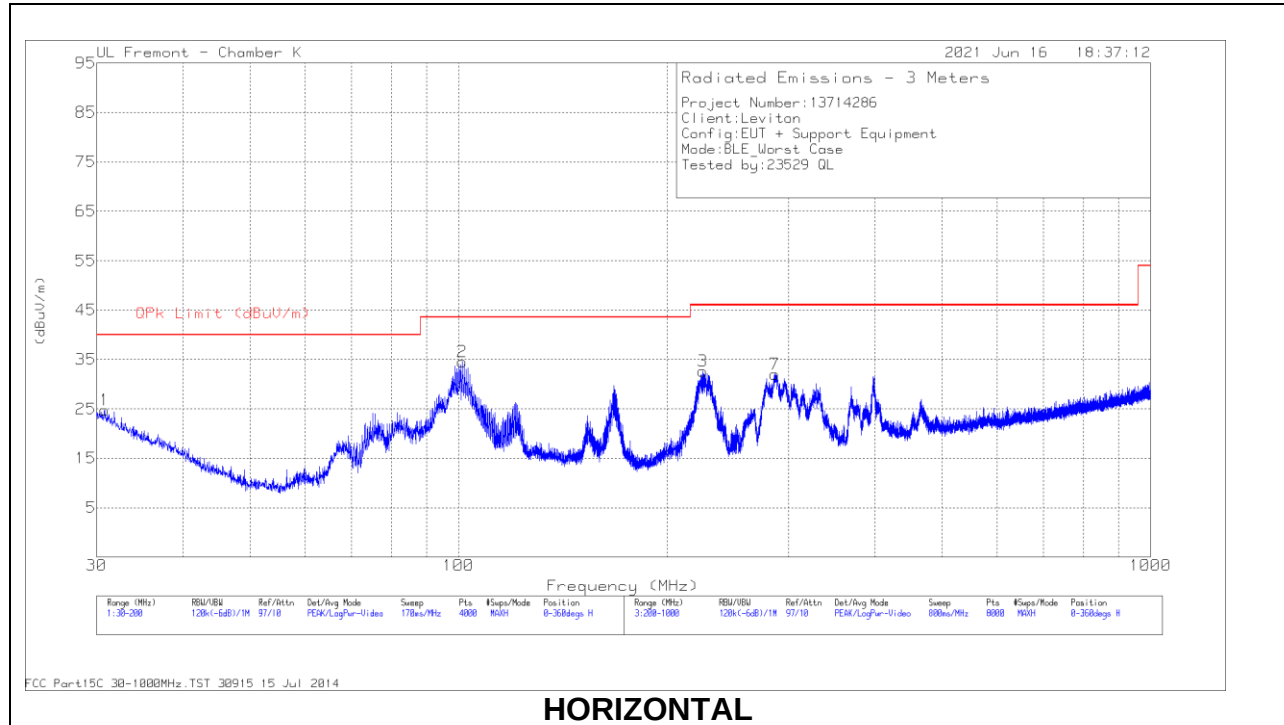
Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (E ACF)	Amp/Cbl (dB)	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.74221	20.73	Pk	56.2	-32.2	-40	4.73	30.2	-25.47	0-360
8	.74152	21.58	Pk	56.2	-32.2	-40	5.58	30.21	-24.63	0-360
4	1.21032	15.81	Pk	45.6	-32.1	-40	-10.69	25.97	-36.66	0-360
5	23.69623	17.7	Pk	33.3	-31.6	-40	-20.6	29.5	-50.1	0-360
9	1.27482	15.9	Pk	45.3	-32.1	-40	-10.9	25.52	-36.42	0-360
10	23.03599	22.26	Pk	33.4	-31.6	-40	-15.94	29.5	-45.44	0-360

Pk - Peak detector

10.4. WORST CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (INTERNAL ANTENNA 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	30.8502	29.1	Pk	27.3	-31.6	24.8	40	-15.2	0-360	101	H
2	102.0138	49.9	Pk	16.8	-30.9	35.8	43.52	-7.72	347	308	H
	102.0138	45.08	Qp	16.8	-30.9	30.98	43.52	-12.54	347	308	H
4	30.1275	33.32	Pk	27.9	-31.6	29.62	40	-10.38	0-360	100	V
5	96.7423	47.3	Pk	15.2	-30.9	31.6	43.52	-11.92	0-360	100	V
3	225.5033	45.29	Pk	17.5	-30.2	32.59	46.02	-13.43	0-360	100	H
7	286.3112	42.27	Pk	19.6	-29.9	31.97	46.02	-14.05	0-360	100	H
6	278.4955	47.03	Pk	19.6	-29.9	36.73	46.02	-9.29	91	178	V
	278.4955	43.01	Qp	19.6	-29.9	32.71	46.02	-13.31	91	178	V
8	226.0034	46.28	Pk	17.5	-30.2	33.58	46.02	-12.44	0-360	199	V

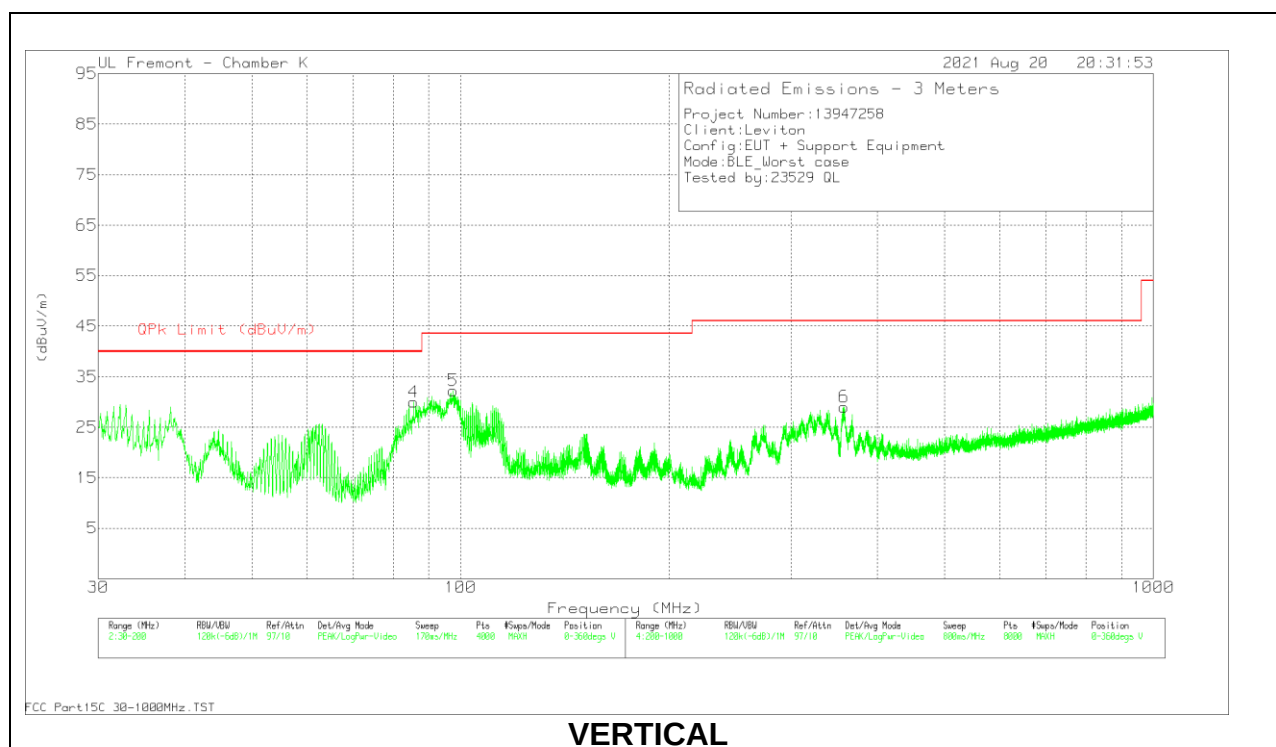
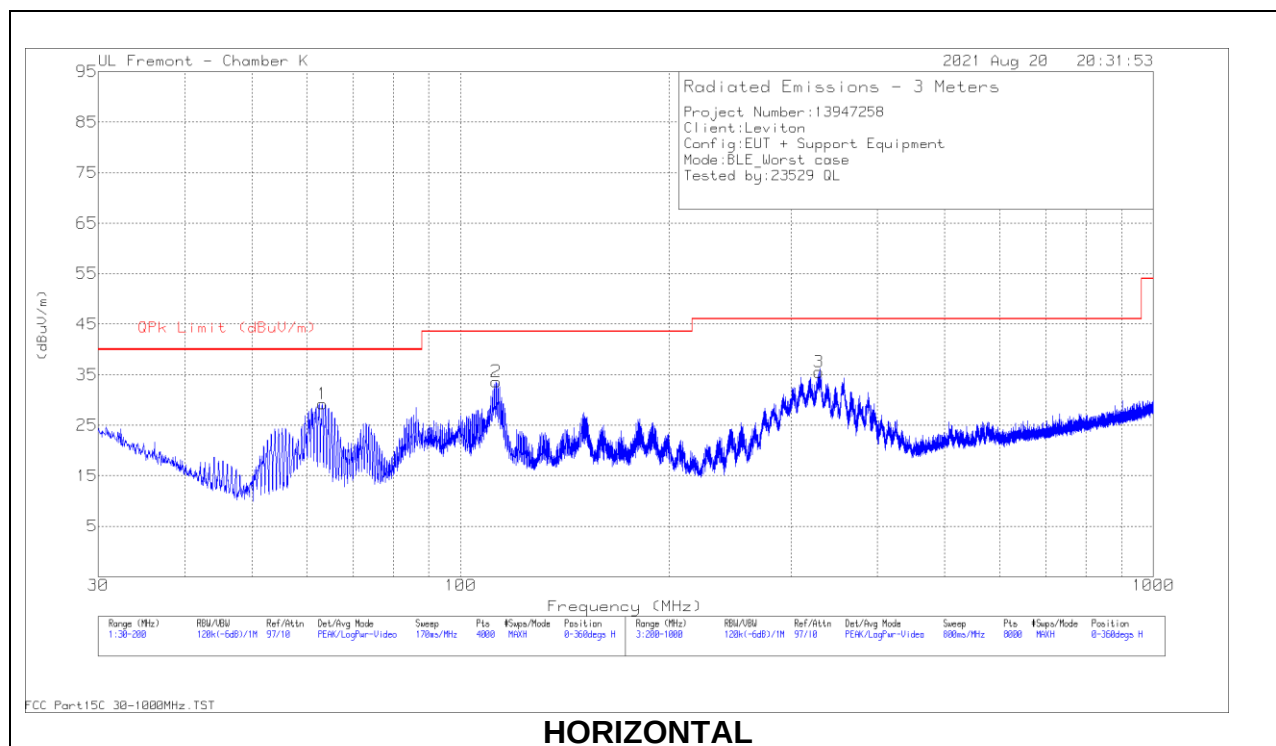
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

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

Note: Project number 13947258 is the same project as 13714286



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	63.2011	46.52	Pk	13.9	-31.2	29.22	40	-10.78	0-360	295	H
2	* 112.5509	46.95	Pk	19	-30.8	35.15	43.52	-8.37	23	321	H
	* 112.5509	43.55	Qp	19	-30.8	31.75	43.52	-11.77	23	321	H
4	85.5459	49.29	Pk	13.4	-31	31.69	40	-8.31	120	98	V
	85.5459	42.69	Qp	13.4	-31	25.09	40	-14.91	120	98	V
5	97.5925	47.63	Pk	15.5	-30.9	32.23	43.52	-11.29	0-360	97	V
3	* 329.1168	44.85	Pk	20.5	-29.8	35.55	46.02	-10.47	0-360	99	H
6	357.9205	37.32	Pk	21.3	-29.6	29.02	46.02	-17	0-360	199	V

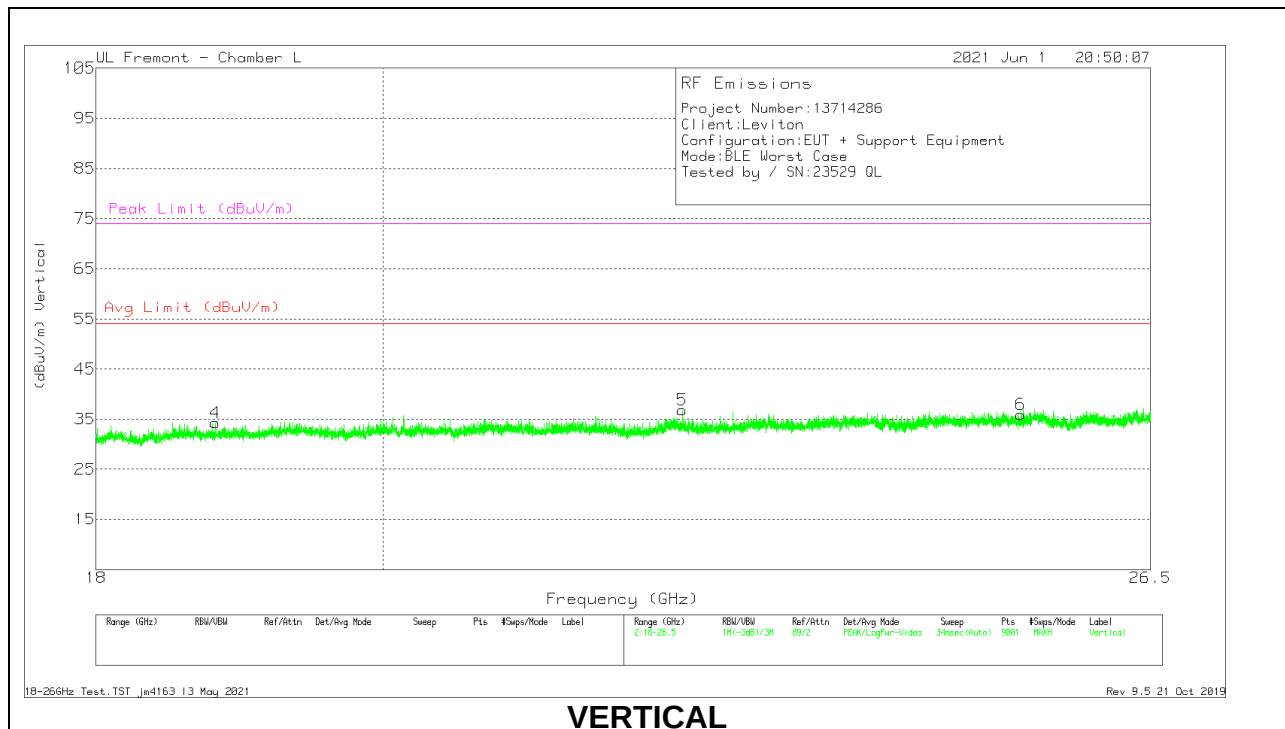
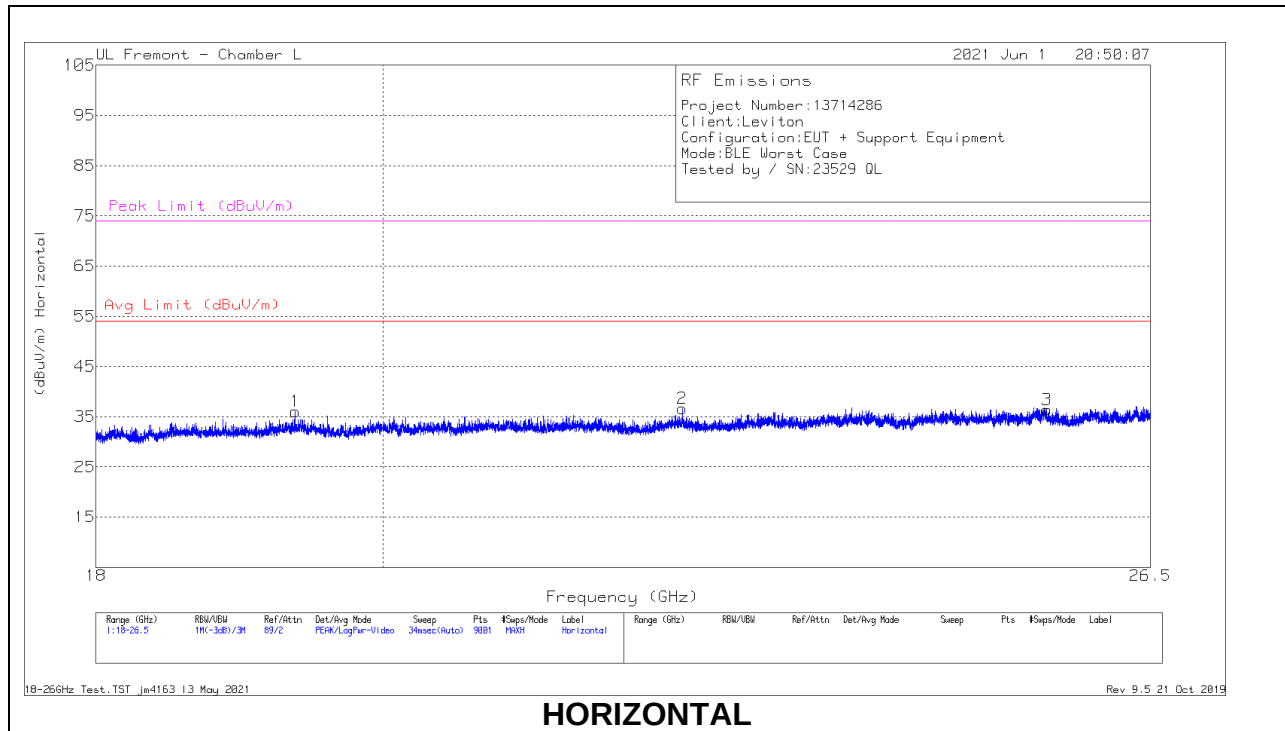
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

10.5. WORST CASE 18-26 GHz

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



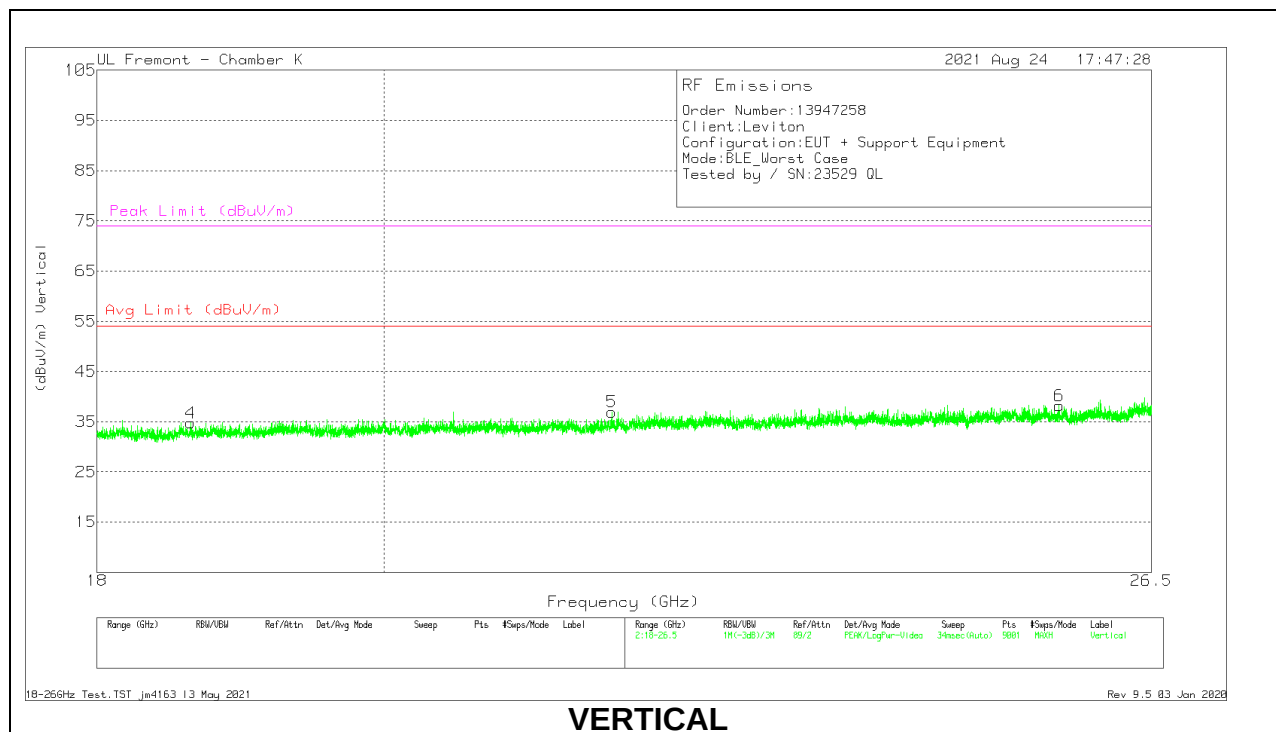
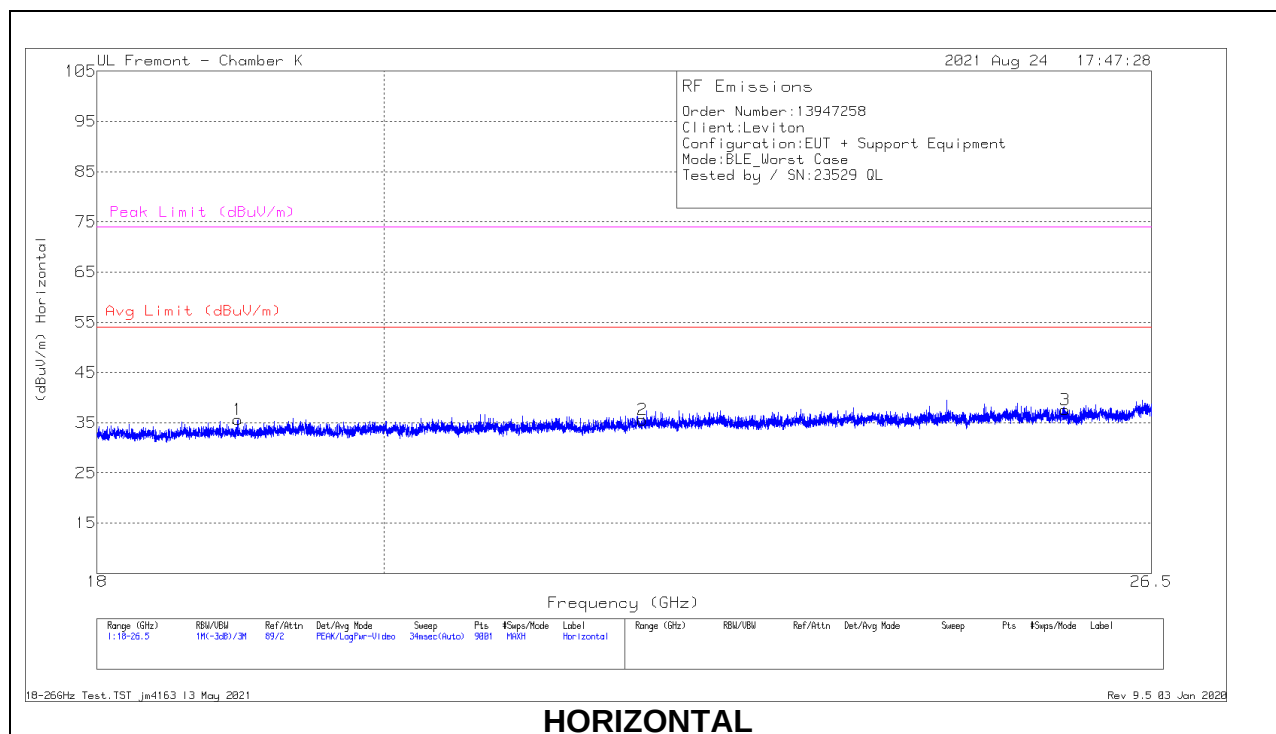
18 – 26 GHz Data

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T447 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.36472	70.05	Pk	32.7	-57.2	-9.5	36.05	54	-17.95	74	-37.95
2	22.31705	70.44	Pk	33.6	-57.9	-9.5	36.64	54	-17.36	74	-37.36
3	25.51022	66.9	Pk	34.5	-55.5	-9.5	36.4	54	-17.6	74	-37.6
4	18.80467	69.68	Pk	32.4	-58.3	-9.5	34.28	54	-19.72	74	-39.72
5	22.318	70.52	Pk	33.6	-57.8	-9.5	36.82	54	-17.18	74	-37.18
6	25.2675	66.24	Pk	34.6	-55.4	-9.5	35.94	54	-18.06	74	-38.06

Pk - Peak detector

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

Note: Project number 13947258 is the same project as 13714286



18 – 26 GHz Data

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	18-26GHz Horn	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	18.95389	70.02	Pk	32.9	-57.8	-9.5	35.62	54	-18.38	74	-38.38
2	21.98555	68.9	Pk	33.9	-57.7	-9.5	35.6	54	-18.4	74	-38.4
3	25.67266	66.26	Pk	35.5	-54.7	-9.5	37.56	54	-16.44	74	-36.44
4	18.62994	70.37	Pk	32.7	-58.8	-9.5	34.77	54	-19.23	74	-39.23
5	21.74094	69.95	Pk	33.9	-57.4	-9.5	36.95	54	-17.05	74	-37.05
6	25.61694	67.7	Pk	35.5	-55.5	-9.5	38.2	54	-15.8	74	-35.8

Pk - Peak detector

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

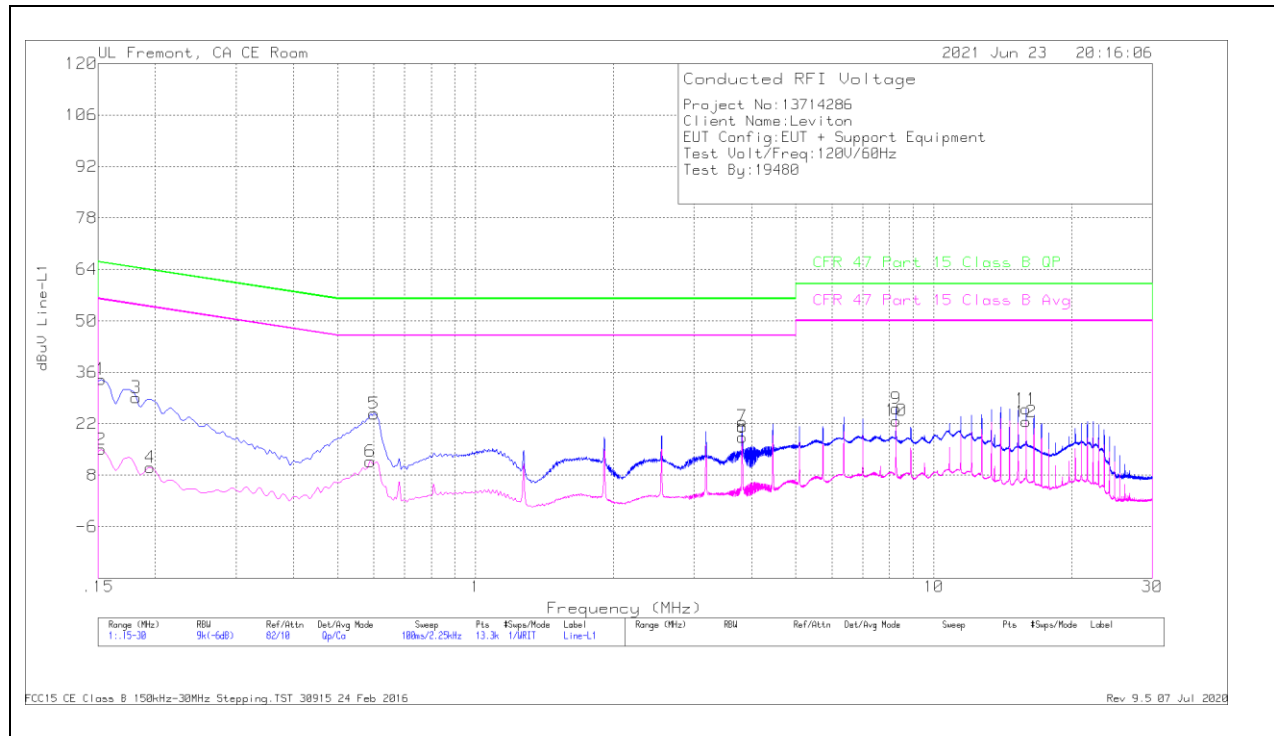
Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

RESULTS

INTERNAL ANTENNA CONFIGURATION

LINE 1 RESULTS

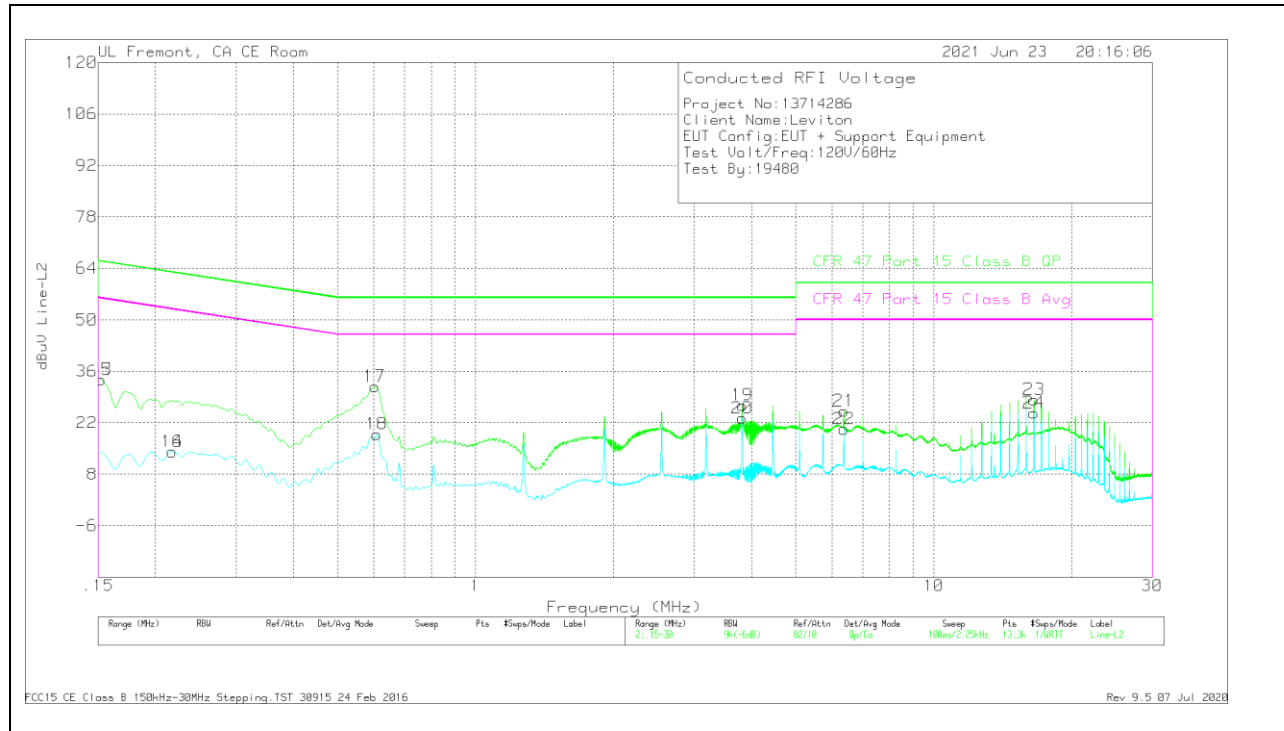


Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 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	24.62	Qp	.1	0	9.4	34.12	65.88	-31.76	-	-
2	.15225	5.56	Ca	.1	0	9.4	15.06	-	-	55.88	-40.82
3	.1815	19.71	Qp	0	0	9.4	29.11	64.42	-35.31	-	-
4	.195	.81	Ca	0	0	9.3	10.11	-	-	53.82	-43.71
5	.6	15.46	Qp	0	0	9.3	24.76	56	-31.24	-	-
6	.58875	2.44	Ca	0	0	9.3	11.74	-	-	46	-34.26
7	3.8175	11.93	Qp	0	.1	9.3	21.33	56	-34.67	-	-
8	3.8175	8.93	Ca	0	.1	9.3	18.33	-	-	46	-27.67
9	8.27475	16.62	Qp	0	.2	9.3	26.12	60	-33.88	-	-
10	8.27475	13.33	Ca	0	.2	9.3	22.83	-	-	50	-27.17
11	15.909	16.47	Qp	0	.2	9.3	25.97	60	-34.03	-	-
12	15.91125	13.05	Ca	0	.2	9.3	22.55	-	-	50	-27.45

Qp - Quasi-Peak detector
Ca - CISPR average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz

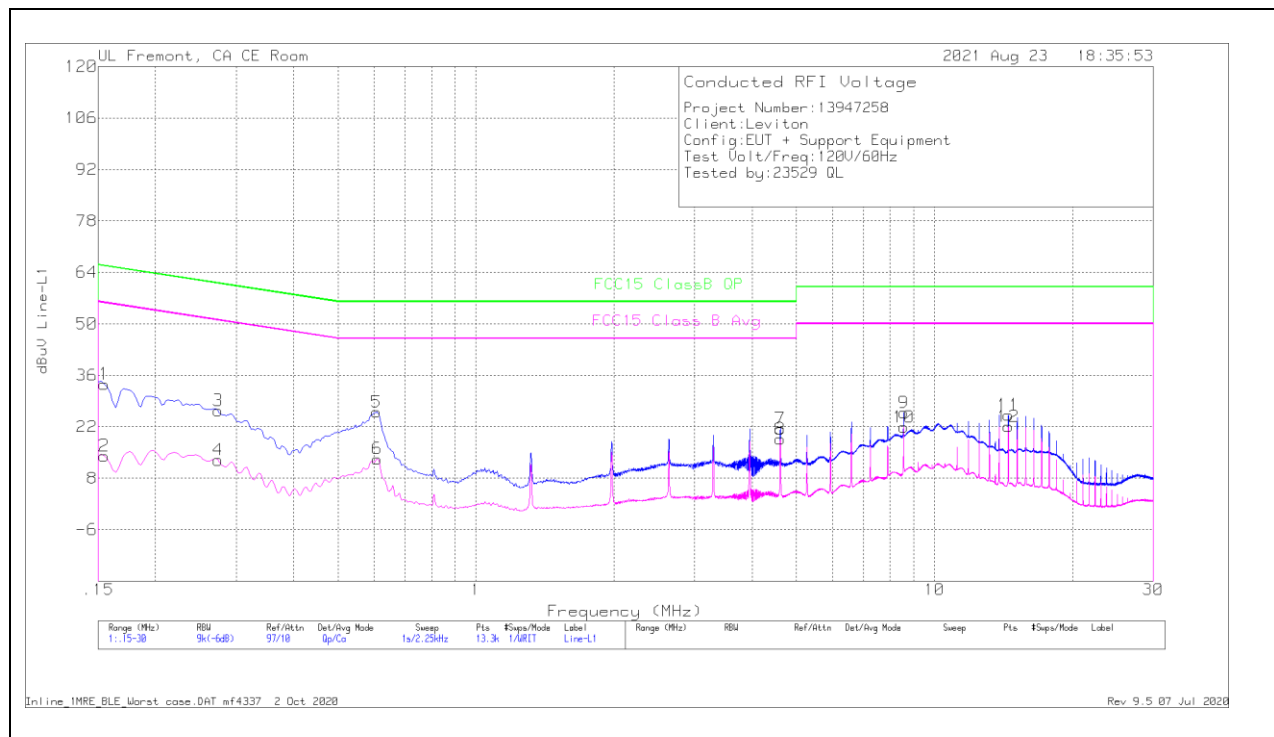
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE018644 6 L2	LC Cables C2&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
13	.15225	24.32	Qp	0	0	9.4	33.72	65.88	-32.16	-	-
14	.2175	4.85	Ca	0	0	9.3	14.15	-	-	52.91	-38.76
15	.15225	24.32	Qp	0	0	9.4	33.72	65.88	-32.16	-	-
16	.2175	4.85	Ca	0	0	9.3	14.15	-	-	52.91	-38.76
17	.60225	22.54	Qp	0	0	9.3	31.84	56	-24.16	-	-
18	.609	9.61	Ca	0	0	9.3	18.91	-	-	46	-27.09
19	3.81975	17.37	Qp	0	.1	9.3	26.77	56	-29.23	-	-
20	3.81975	13.83	Ca	0	.1	9.3	23.23	-	-	46	-22.77
21	6.3645	15.8	Qp	0	.1	9.3	25.2	60	-34.8	-	-
22	6.3645	10.91	Ca	0	.1	9.3	20.31	-	-	50	-29.69
23	16.55025	18.76	Qp	0	.2	9.3	28.26	60	-31.74	-	-
24	16.55025	15.21	Ca	0	.2	9.3	24.71	-	-	50	-25.29

Qp - Quasi-Peak detector
Ca - CISPR average detection

EXTERNAL ANTENNA CONFIGURATION

Note: Project number 13947258 is the same project as 13714286

LINE 1 RESULTS

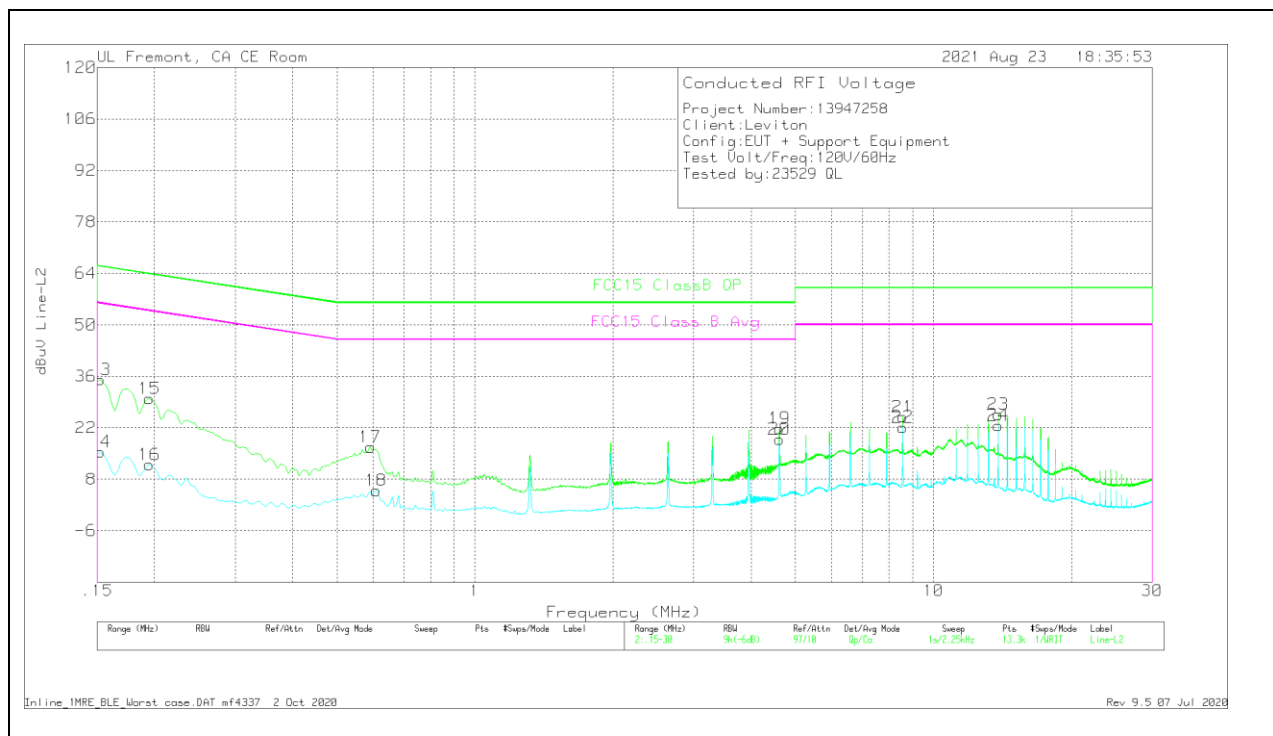


Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 L1	LC Cables C1&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading dBuV	FCC15 ClassB QP	Margin (dB)	FCC15 Class B Avg	Margin (dB)
2	.1545	4.55	Ca	.1	0	9.4	14.05	-	-	55.75	-41.7
4	.27375	3.63	Ca	0	0	9.3	12.93	-	-	51	-38.07
6	.609	3.96	Ca	0	0	9.3	13.26	-	-	46	-32.74
8	4.6095	9.26	Ca	0	.1	9.3	18.66	-	-	46	-27.34
10	8.56275	12.36	Ca	0	.2	9.3	21.86	-	-	50	-28.14
12	14.48925	12.56	Ca	0	.2	9.3	22.06	-	-	50	-27.94
1	.1545	24.1	Qp	.1	0	9.4	33.6	65.75	-32.15	-	-
3	.27375	17.07	Qp	0	0	9.3	26.37	61	-34.63	-	-
5	.60675	16.71	Qp	0	0	9.3	26.01	56	-29.99	-	-
7	4.6095	12.1	Qp	0	.1	9.3	21.5	56	-34.5	-	-
9	8.56275	16.34	Qp	0	.2	9.3	25.84	60	-34.16	-	-
11	14.48925	15.67	Qp	0	.2	9.3	25.17	60	-34.83	-	-

Qp - Quasi-Peak detector
Ca - CISPR average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 L2	LC Cables C2&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading dBuV	FCC15 Class B QP	Margin (dB)	FCC15 Class B Avg	Margin (dB)
14	.15225	6.02	Ca	0	0	9.4	15.42	-	-	55.88	-40.46
16	.195	2.65	Ca	0	0	9.3	11.95	-	-	53.82	-41.87
18	.609	-4.39	Ca	0	0	9.3	4.91	-	-	46	-41.09
20	4.61175	9.46	Ca	0	.1	9.3	18.86	-	-	46	-27.14
22	8.565	12.63	Ca	0	.2	9.3	22.13	-	-	50	-27.87
24	13.8345	13.05	Ca	.1	.2	9.3	22.65	-	-	50	-27.35
13	.15225	25.66	Qp	0	0	9.4	35.06	65.88	-30.82	-	-
15	.195	20.62	Qp	0	0	9.3	29.92	63.82	-33.9	-	-
17	.591	7.42	Qp	0	0	9.3	16.72	56	-39.28	-	-
19	4.61175	12.34	Qp	0	.1	9.3	21.74	56	-34.26	-	-
21	8.565	15.48	Qp	0	.2	9.3	24.98	60	-35.02	-	-
23	13.8345	16.02	Qp	.1	.2	9.3	25.62	60	-34.38	-	-

Qp - Quasi-Peak detector
Ca - CISPR average detection