



CERTIFICATION TEST REPORT

Report Number. : 4790379717-FR2V1

Applicant : Cresyn CO., Ltd.
5 Gangnam-daero 107-gil, Seocho-gu, Seoul, Korea

Model : TN0620

FCC ID : V2R-TN0620
IC : 10488A-TN0620

EUT Description : True Wireless Earphones

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-247 Issue 2
INDUSTRY CANADA RSS-GEN Issue 5

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	06/15/22	Initial issue	Myeongjun Kwon

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Cresyn CO., Ltd.
EUT DESCRIPTION: True Wireless Earphones
MODEL: TN0620
SERIAL NUMBER: Proto type
DATE TESTED: 2022-04-27 ~ 2022-06-02;

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

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

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. 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 IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Korea, Ltd. By:



Anthony Kim
Senior Laboratory Engineer
UL Korea, Ltd.

Tested By:



Myeongjun Kwon
Laboratory Engineer
UL Korea, Ltd.

2. TEST METHODOLOGY

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 558074 D01 15.247 Meas Guidance v05r02.
4. ANSI C63.10-2013.
5. IC RSS-GEN Issue 5.
6. IC RSS-247 Issue 2.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 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.

218 Maeyeong-ro	
<input checked="" type="checkbox"/>	Chamber 1
<input type="checkbox"/>	Chamber 2
<input checked="" type="checkbox"/>	Chamber 3

Used ISED Test Site Reg.(company number): 2324L
CAB Identifier: KR0161

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf>.

4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	2.87 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.05 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.78 dB
Radiated Disturbance, 18 GHz to 40 GHz	5.58 dB

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

4.1. DECISION RULES

Decision rule for statement(s) of conformity is based on Procedure 1, Clause 4.4.2 in IEC Guide 115:2007.

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

The EUT are Bluetooth Earphones.
 This test report addresses the BLE (DTS) operational mode.

5.2. MAXIMUM OUTPUT POWER

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

- **Left**

Frequency Range [MHz]	Mode	Power Mode	Output Power [dBm]	Output Power [mW]
2 402 ~ 2 480	1Mbps (255 pkt)	Peak	7.070	5.09
		Average	6.845	4.84

- **Right**

Frequency Range [MHz]	Mode	Power Mode	Output Power [dBm]	Output Power [mW]
2 402 ~ 2 480	1Mbps (255 pkt)	Peak	7.950	6.24
		Average	7.774	5.99

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

**The internal antenna was Permanently attached.
 Therefore this E.U.T Complies with the requirement of §15.203.**

Left earphone,
 The radio utilizes an internal antennas, with maximum gain of -1.00 dBi.

Right earphone,
 The radio utilizes an internal antennas, with maximum gain of -0.57 dBi.

5.4. WORST-CASE CONFIGURATION AND MODE

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

Radiated emission above 1GHz was performed with the EUT set to transmit low/mid/high channels.

The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

Power verification

The Output Power of two packet lengths(37 pkt, 255 pkt) are all investigated, the 1 Mbps(255 pkt) power is the worst case. All tests were performed in this mode.

- Left

Mode	Frequency [MHz]	Conducted Burst Avg [dBm]
1Mbps (37 pkt)	2402	6.406
	2440	6.821
	2480	6.602
1Mbps (255 pkt)	2402	6.435
	2440	6.845
	2480	6.790

- Right

Mode	Frequency [MHz]	Conducted Burst Avg [dBm]
1Mbps (37 pkt)	2402	7.196
	2440	7.557
	2480	7.344
1Mbps (255 pkt)	2402	7.436
	2440	7.774
	2480	7.586

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Notebook	LG	15UD490	MEZ66836767	N/A
Adaptor (for Notebook)	Chicony Power Technology (SuZhou) Co.,Ltd.	A12-065N2A	AG19034C140	N/A
Test Jig Board	CRESYN	N/A	N/A	N/A

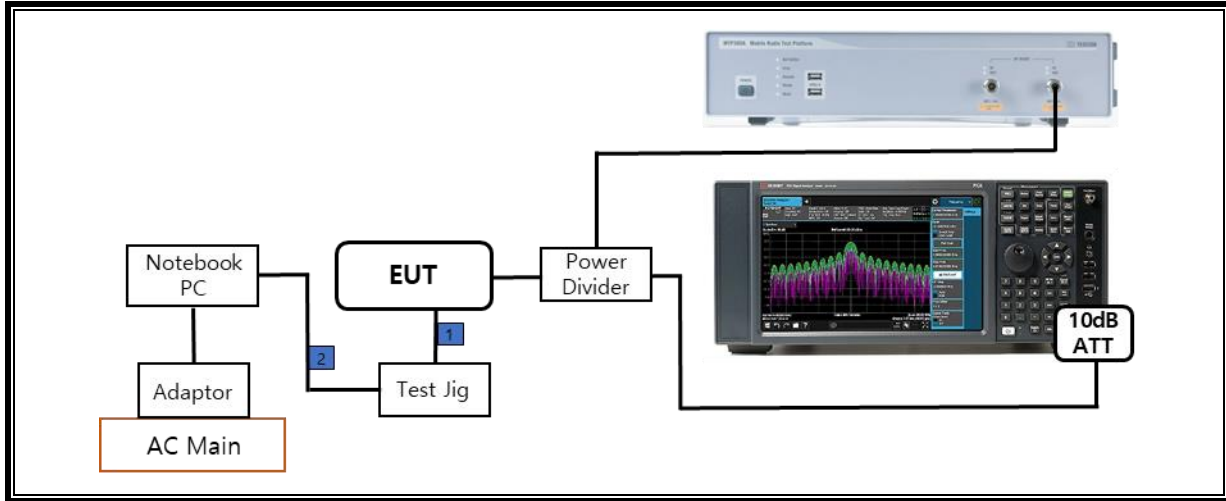
I/O CABLE

I/O Cable List						
Cable No.	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power & Data	2	4 Pin to USB C	Unshielded	0.25 m	N/A
2	DC Power & Data	1	USB A to C	Shielded	1.8 m	N/A

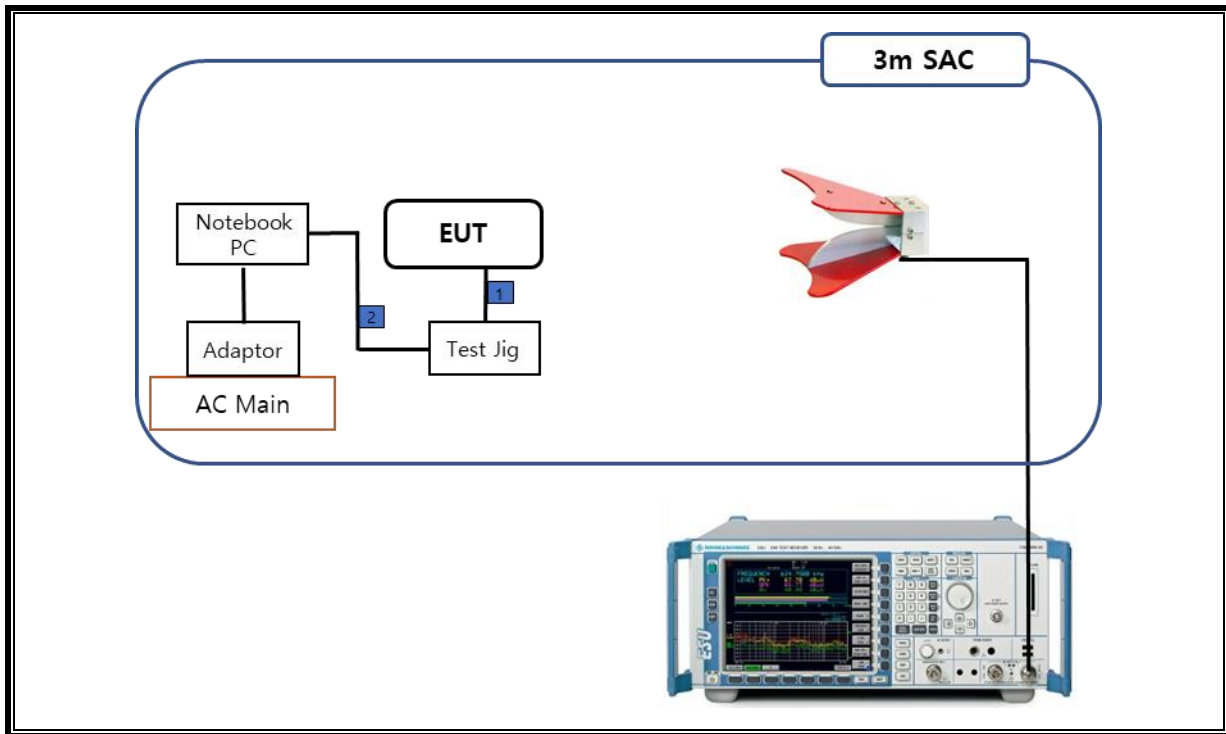
TEST SETUP

The EUT is a unit with test jig board during the tests.
 It was controlled by entering the test mode using a Notebook.

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



6. MEASUREMENT METHOD

6 dB BW : KDB 558074 D01 v05r02, Section 8.2.

OUTPUT POWER : KDB 558074 D01 v05r02, Section 8.3.1.1

POWER SPECTRAL DENSITY : KDB 558074 D01 v05r02, Section 8.4.

Out-of-band Emissions (Conducted) : KDB 558074 D01 v05r02, Section 8.5.

Out-of-band Emissions in Non-restricted Bands: KDB 558074 D01 v05r02, Section 8.5.

Out-of-band Emissions in Restricted Bands : KDB 558074 D01 v05r02, Section 8.6.

AC Power Line Conducted Emission : 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	S/N	Cal Due
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	2022-08-19
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2022-08-13
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	2022-08-13
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2023-10-06
Antenna, Horn, 18 GHz	ETS	3115	00167211	2022-07-27
Antenna, Horn, 18 GHz	ETS	3115	00161451	2022-08-15
Antenna, Horn, 18 GHz	ETS	3117	00168724	2022-07-27
Antenna, Horn, 18 GHz	ETS	3117	00168717	2022-08-15
Antenna, Horn, 40 GHz	ETS	3116C	00166155	2022-08-04
Preamplifier	ETS	3116C-PA	00168841	2022-08-04
Preamplifier, 1000 MHz	Sonoma	310N	341282	2022-08-02
Preamplifier, 1000 MHz	Sonoma	310N	351741	2022-08-02
Preamplifier, 1000 MHz	Sonoma	310N	370599	2022-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	2022-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2022-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029168	2022-08-02
Power Sensor	R&S	NRP-Z91	102681	2022-08-04
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9030B	MY57143652	2023-01-11
Bluetooth Tester	TESCOM	MTP300A	MTP300A010266	2022-08-04
Power Divider	WEINSCHEL	1580	SQ373	2022-08-04
10dB ATTENUATOR	MINI-CIRCUITS	BW-K10-2W44+	2117	2022-10-22
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2022-08-02
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2022-08-02
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	2022-08-02
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	2022-08-02
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	019	2022-08-02
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	2022-08-02
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	2022-08-02
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	2022-08-02
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	2022-08-02
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	2022-08-02
High Pass Filter 6GHz	Micro-Tronics	HPS17542	020	2022-08-02
UL Software				
Description	Manufacturer	Model	Version	
Radiated software	UL	UL EMC	Ver 9.5	

8. TEST RESULTS SUMMARY

FCC Part Section	IC Section	Test Description	Test Limit	Test Condition	Test Result
15.247 (a)(2)	RSS-247 5.2(a)	Occupied Bandwidth(6dB)	> 500kHz	Conducted	PASS
2.1051, 15.247(d)	RSS-247 5.5	Band Edge / Conducted Spurious Emission	-20 dBc		PASS
15.247 (b)(3)	RSS-247 5.4(d)	TX conducted output power	< 30 dBm		PASS
15.247(e)	RSS-247 5.4(b)	PSD	< 8 dBm/3kHz		PASS
15.205, 15.209	RSS-GEN Clause 8.9 & 8.10	Radiated Spurious Emission	< 54dBuV/m(Av)	Radiated	PASS
15.207 (a)	RSS-GEN (8.8)	AC Power Line Conducted Emission	Section 11	Power Line Conducted	N/P

Note. The AC power line test was not performed because the EUT does not operate Bluetooth mode while charging.

9. ANTENNA PORT TEST RESULTS

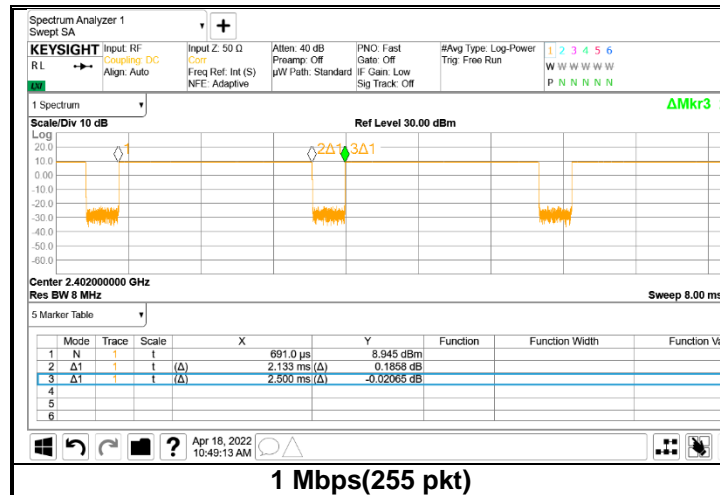
9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

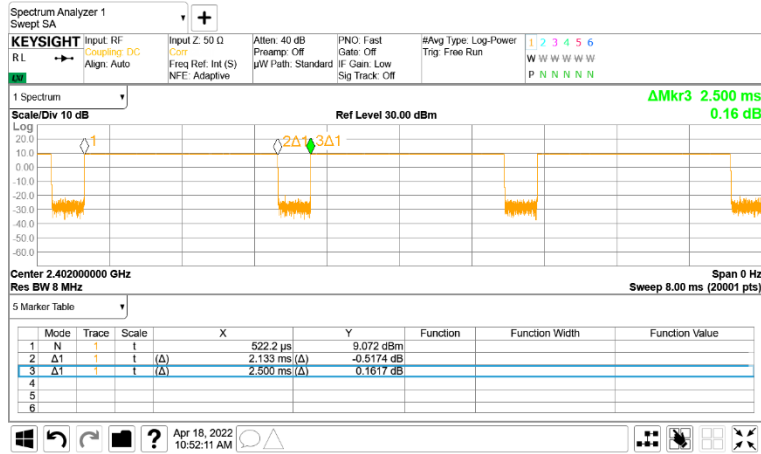
- Left

Mode	On time [msec]	Period [msec]	Duty cycle x [Linear]	Duty Cycle [%]	Duty Cycle Correction Factor [dB]	1/T Minimum CBW [kHz]
2 400 ~ 2 483.5 MHz Bands						
1 Mbps [255pkt]	2.133	2.500	0.8532	85.32	0.69	0.469



- Right

Mode	On time [msec]	Period [msec]	Duty cycle x [Linear]	Duty Cycle [%]	Duty Cycle Correction Factor [dB]	1/T Minimum CBW [kHz]
2 400 ~ 2 483.5 MHz Bands						
1 Mbps [255pkt]	2.133	2.500	0.8532	85.32	0.69	0.469



1 Mbps(255 pkt)

9.2. 6 dB & 99% BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

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

RESULTS

9.2.1. Left_1 Mbps

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]	99% Bandwidth [kHz]
Low	2 402	711.3	500.0	1045.2
Mid	2 440	715.3	500.0	1043.2
High	2 480	706.7	500.0	1042.2

9.2.2. Right_1 Mbps

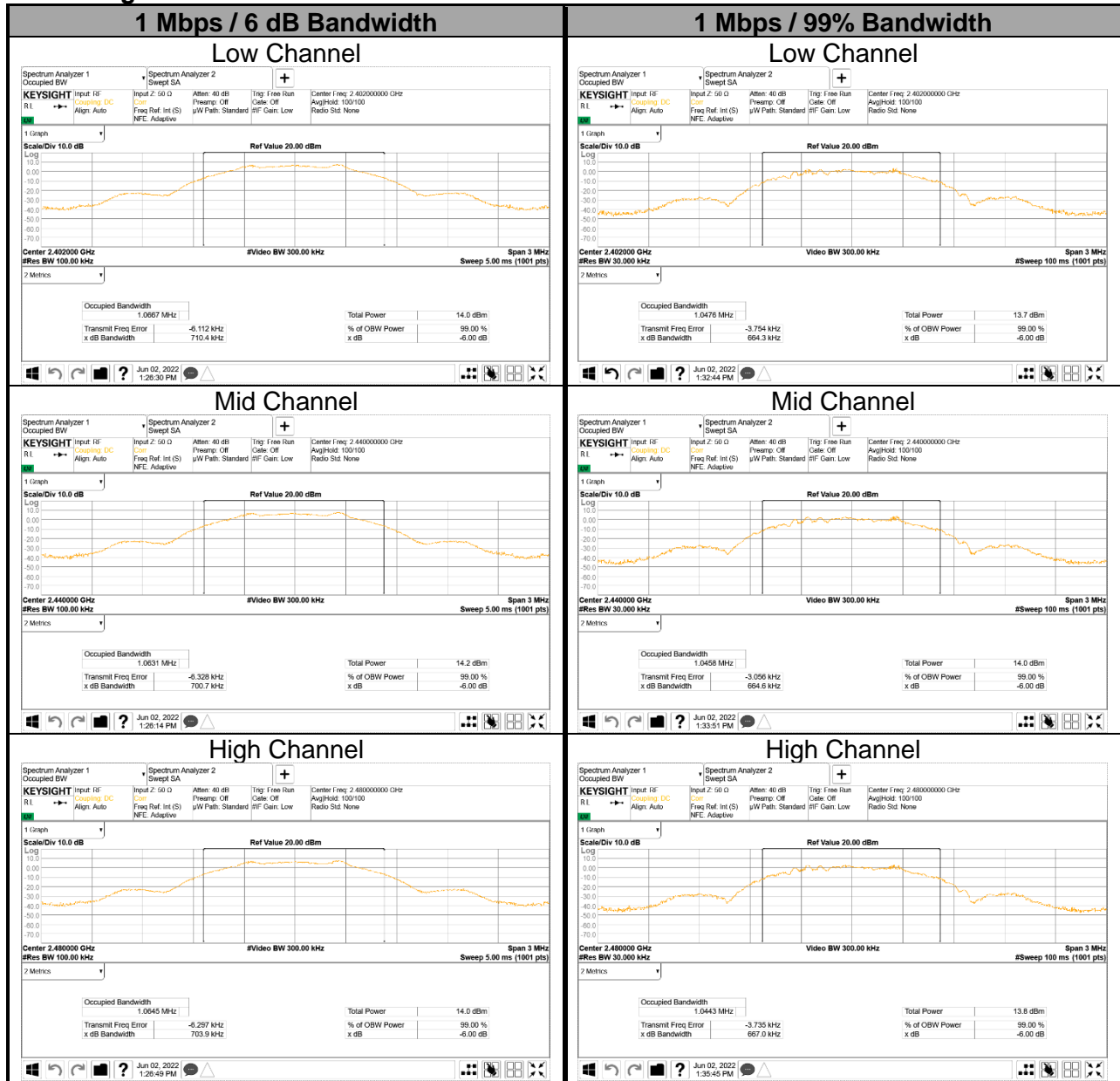
Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]	99% Bandwidth [kHz]
Low	2 402	710.4	500.0	1047.6
Mid	2 440	700.7	500.0	1045.8
High	2 480	703.9	500.0	1044.3

9.2.3. 6 dB & 99% BANDWIDTH PLOTS

- Left



- Right



9.3. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

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

TEST PROCEDURE

Peak power is measured using ANSI C63.10(2013) under section 11.9.1.1 utilizing spectrum analyzer(RBW \geq DTS bandwidth).

RESULTS

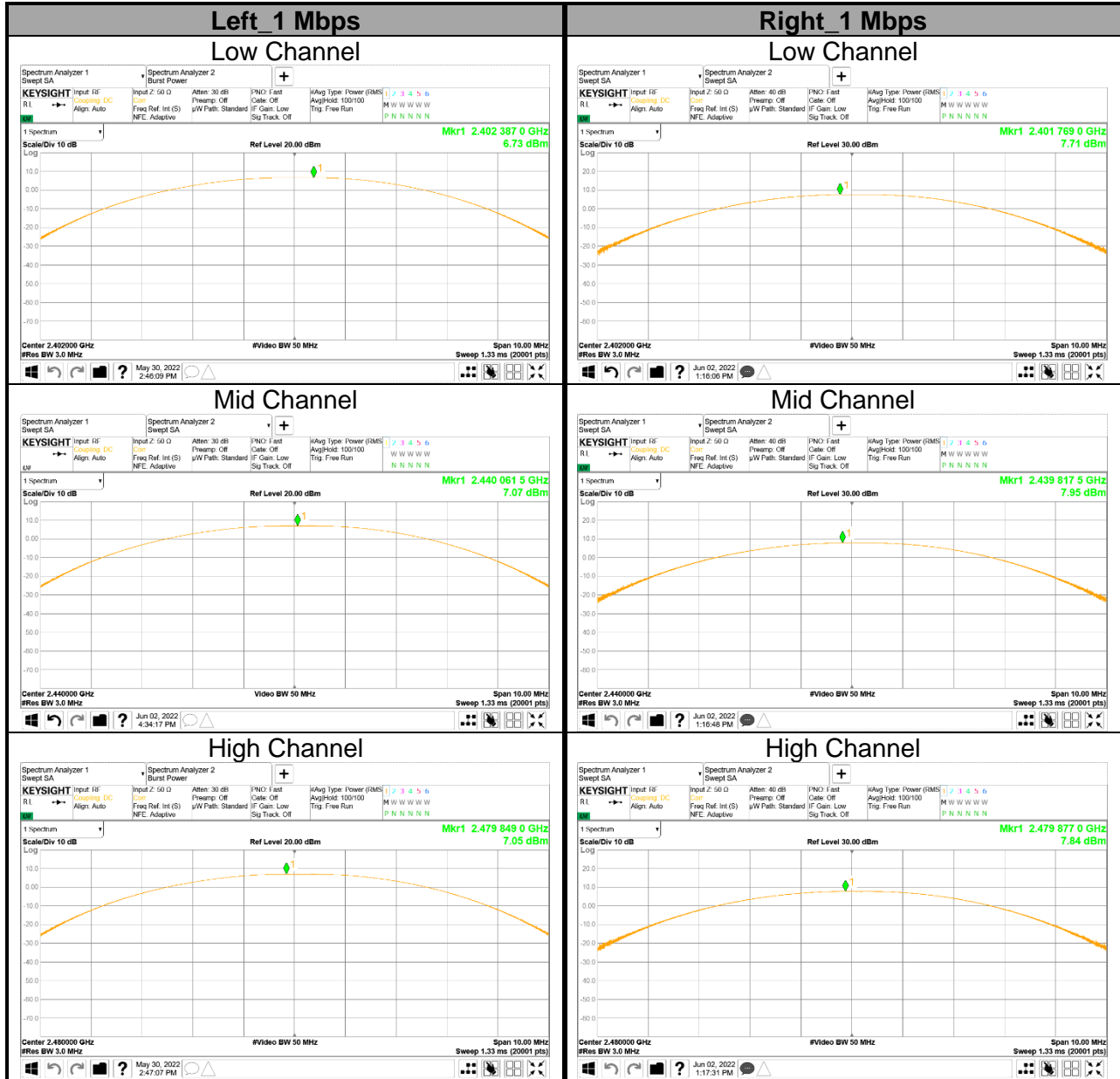
9.3.1. Left_1 Mbps

Channel	Frequency [MHz]	Peak Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	6.73	30.00	-23.27
Mid	2440	7.07	30.00	-22.93
High	2480	7.05	30.00	-22.95
Worst		7.07	30.00	-22.93

9.3.2. Right_1 Mbps

Channel	Frequency [MHz]	Peak Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	7.71	30.00	-22.29
Mid	2440	7.95	30.00	-22.05
High	2480	7.94	30.00	-22.06
Worst		7.95	30.00	-22.05

9.3.3. PEAK POWER PLOTS



9.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Measurements perform using a wideband RF frame average power sensor. The cable assembly insertion loss and duty cycle correction factor were entered as an offset in the power meter to allow for direct reading of power.

RESULTS

9.4.1. Left_1 Mbps

Channel	Frequency [MHz]	AV Power [dBm]	AV Power [mW]
Low	2402	6.435	4.400
Mid	2440	6.845	4.836
High	2480	6.790	4.775

9.4.2. Right_1 Mbps

Channel	Frequency [MHz]	AV Power [dBm]	AV Power [mW]
Low	2402	7.436	5.541
Mid	2440	7.774	5.989
High	2480	7.586	5.735

9.5. 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.

TEST PROCEDURE

ANSI C63.10-2013, Section 11.10.2 Method PKPSD (Peak PSD)

RESULTS

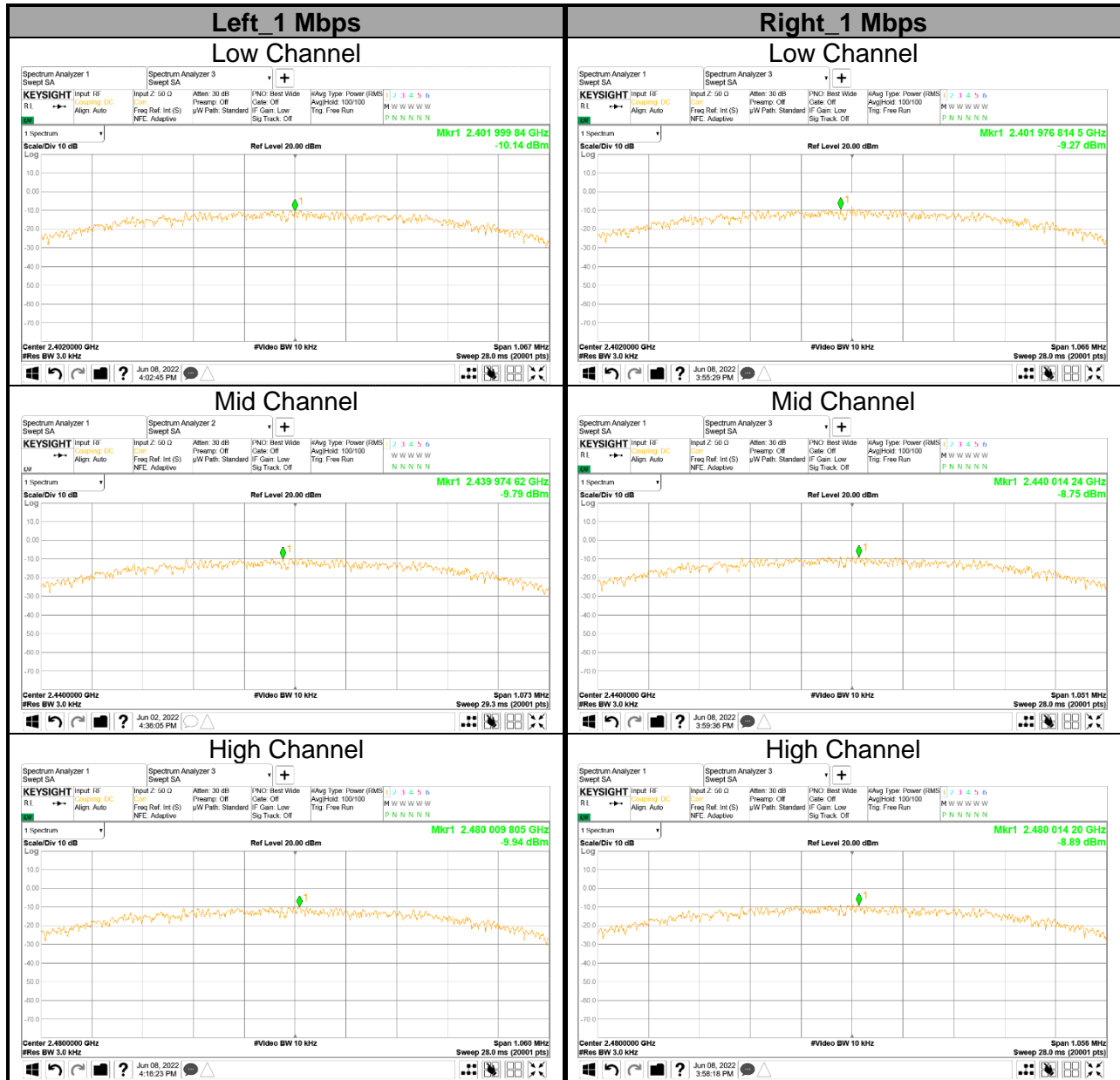
9.5.1. Left_1Mbps

Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2402	-10.14	8.00	-18.14
Mid	2440	-9.79	8.00	-17.79
High	2480	-9.94	8.00	-17.94

9.5.2. Right_1Mbps

Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2402	-9.27	8.00	-17.27
Mid	2440	-8.75	8.00	-16.75
High	2480	-8.89	8.00	-16.89

9.5.3. PSD TEST PLOTS



9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

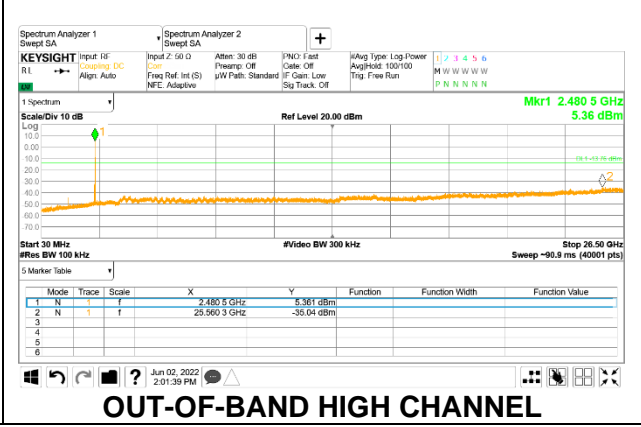
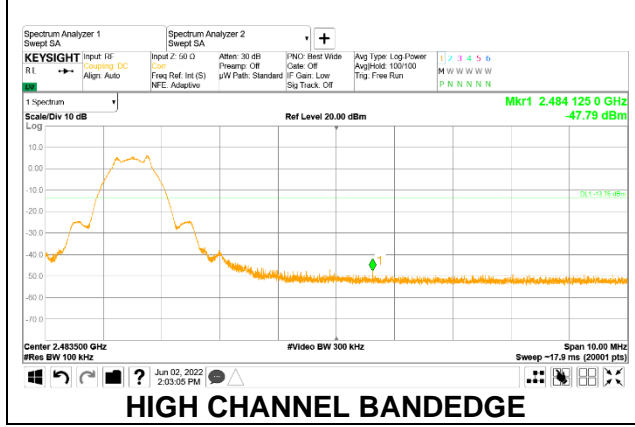
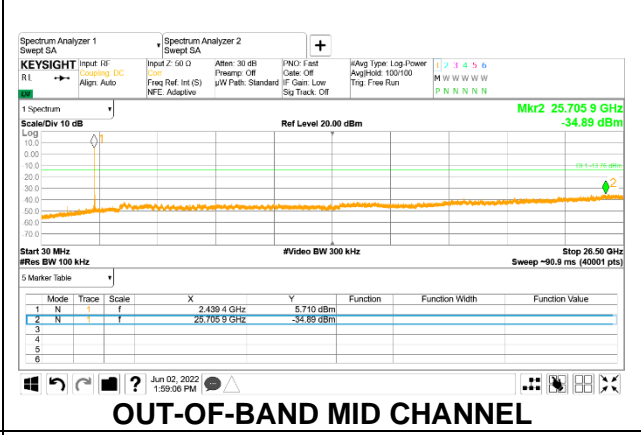
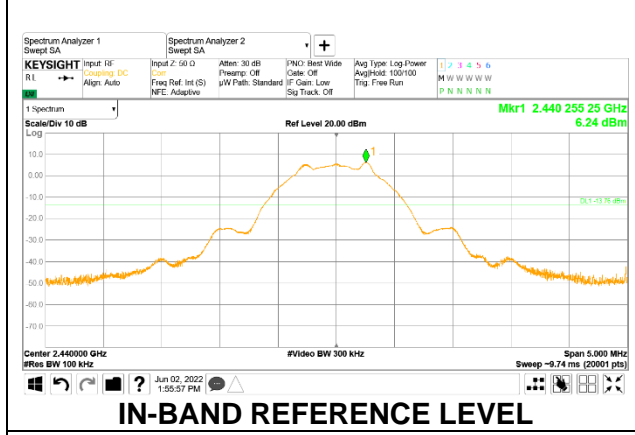
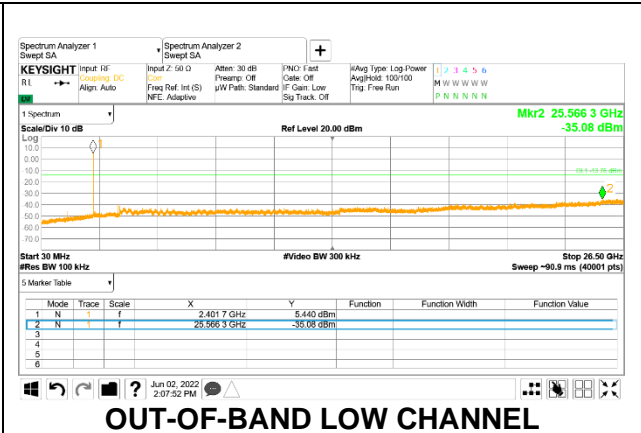
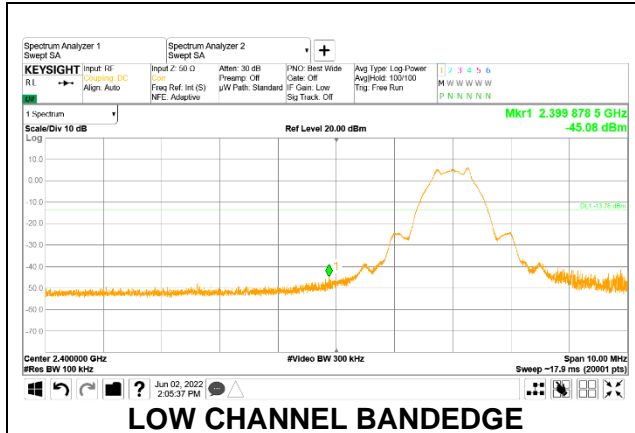
FCC §15.247 (d)

RSS-247 5.5

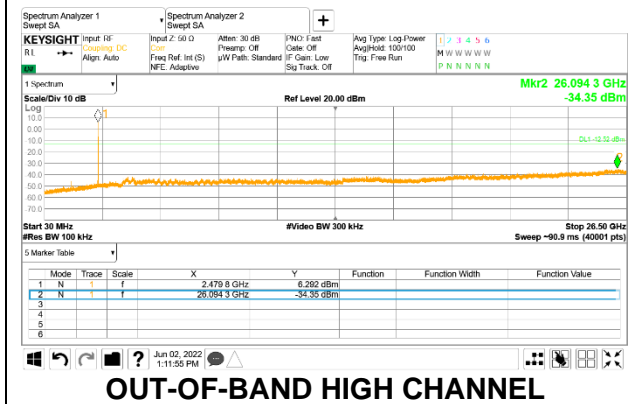
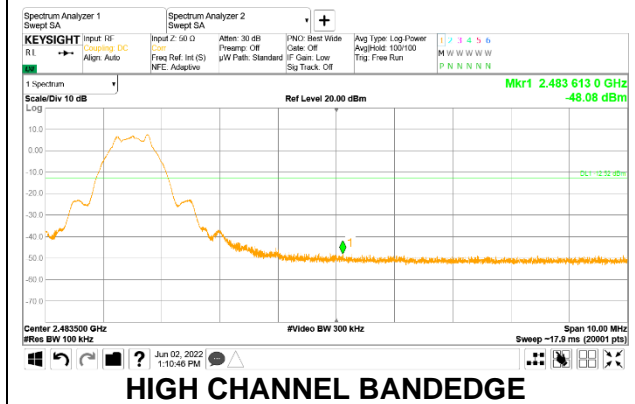
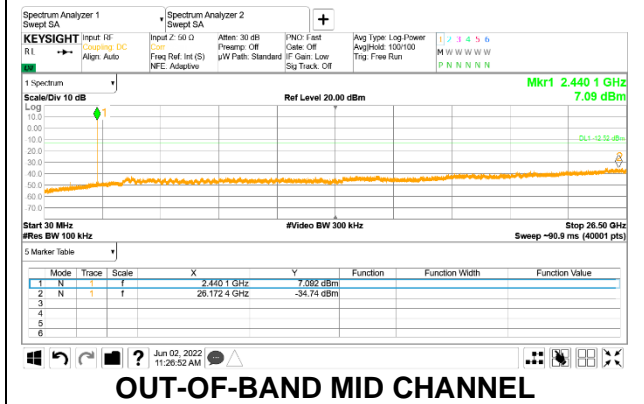
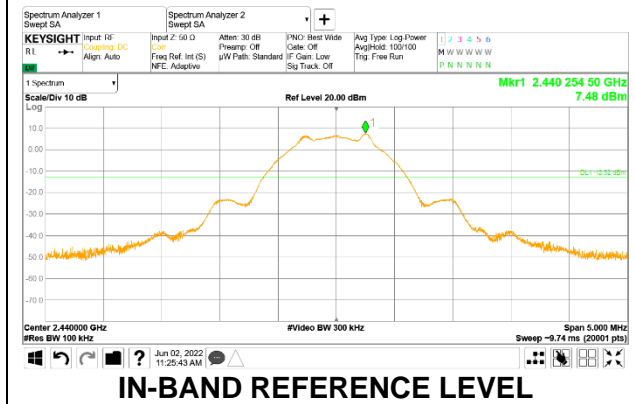
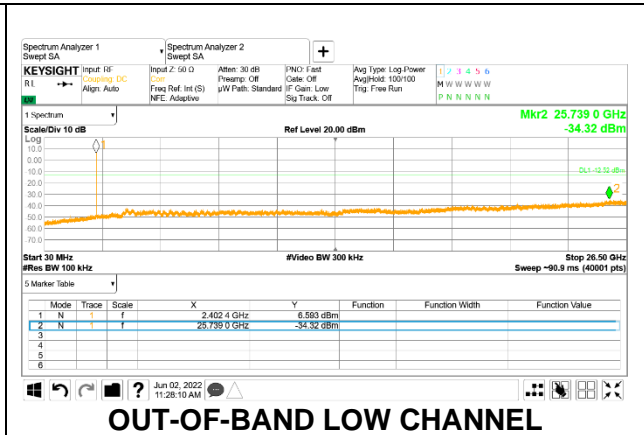
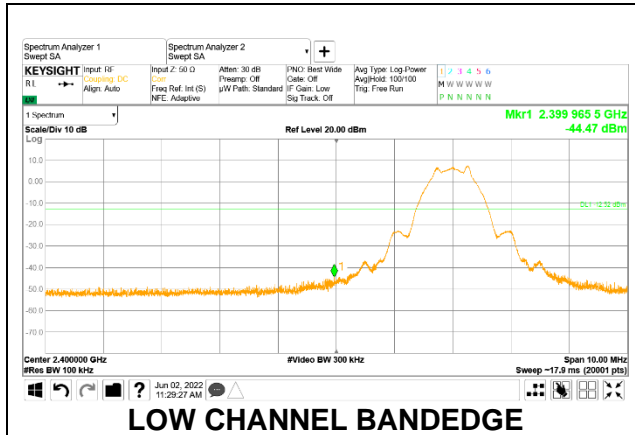
Output power was measured based on the use of a peak measurement.
Therefore, spurious emissions are required to be 20 dBc.

RESULTS

9.6.1. Left_1 Mbps



9.6.2. Right_1 Mbps



10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits ($\mu\text{V}/\text{m}$)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150 cm for 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 measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. (Restricted bandedge, Final detection of spurious harmonic emissions)Duty cycle factor = $10 \log(1/x)$. For this sample: For 1 Mbps, DCF = $10 \log(1/0.8532)=0.69$ dB

Pre-scans to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 kHz for peak measurements.

The spectrum from 1 GHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.
(From 30MHz to 1GHz, test was performed with the EUT set to transmit at the channel with highest output power)

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.

Note : Emission was pre-scanned from 9kHz to 30MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).
Per FCC part 15.31(o), test results were not reported.

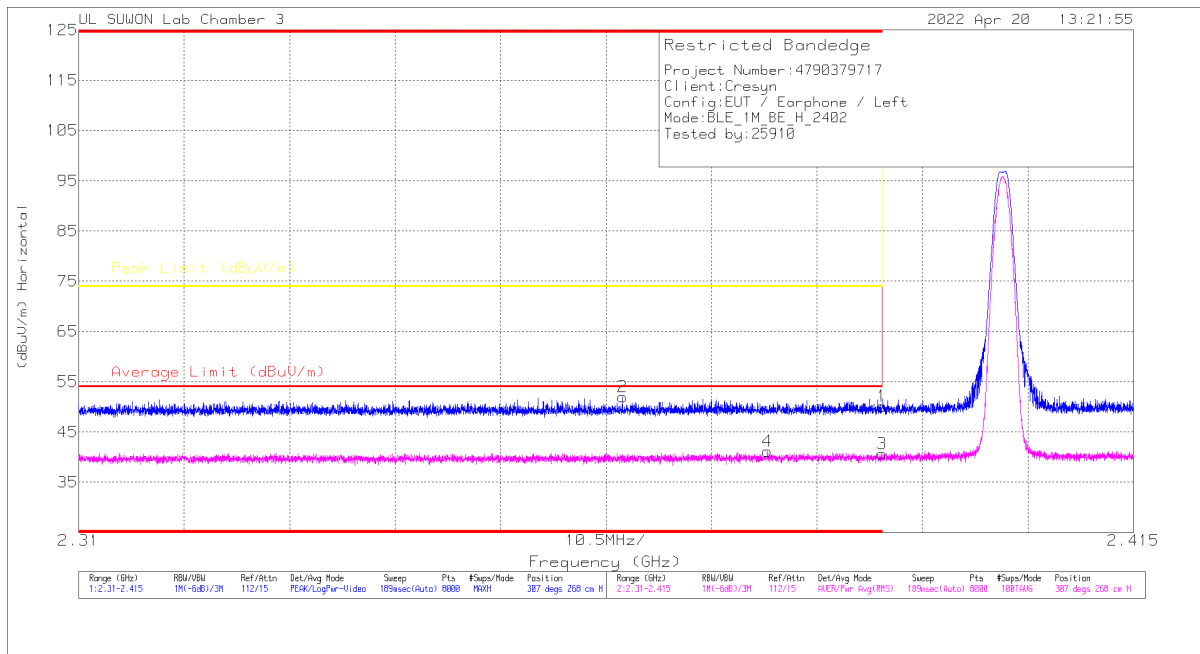
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open field test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. Left_1 Mbps

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT

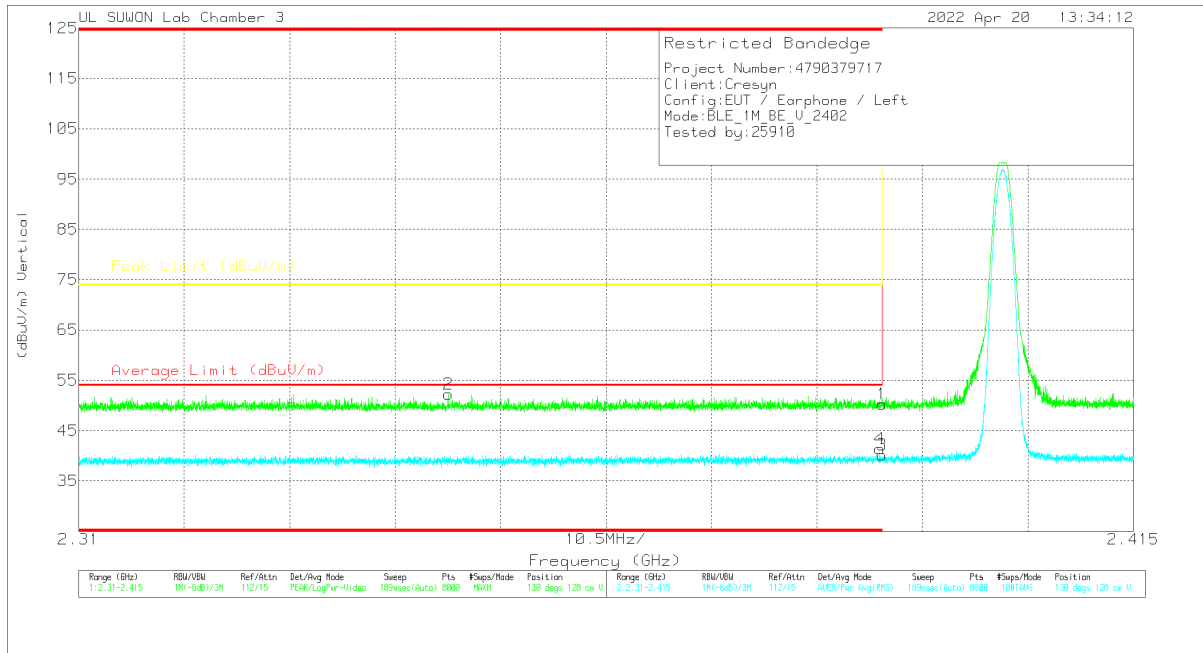


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.30	42.72	PK	32.8	-25.4	0	50.12	-	-	74	-23.88	307	268	H
2	* 2.36415	44.74	PK	32.7	-25.4	0	52.04	-	-	74	-21.96	307	268	H
3	* 2.39	32.52	RMS	32.8	-25.4	.69	40.61	54	-13.39	-	-	307	268	H
4	* 2.37859	33.15	RMS	32.7	-25.4	.69	41.14	54	-12.86	-	-	307	268	H

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

VERTICAL RESULT



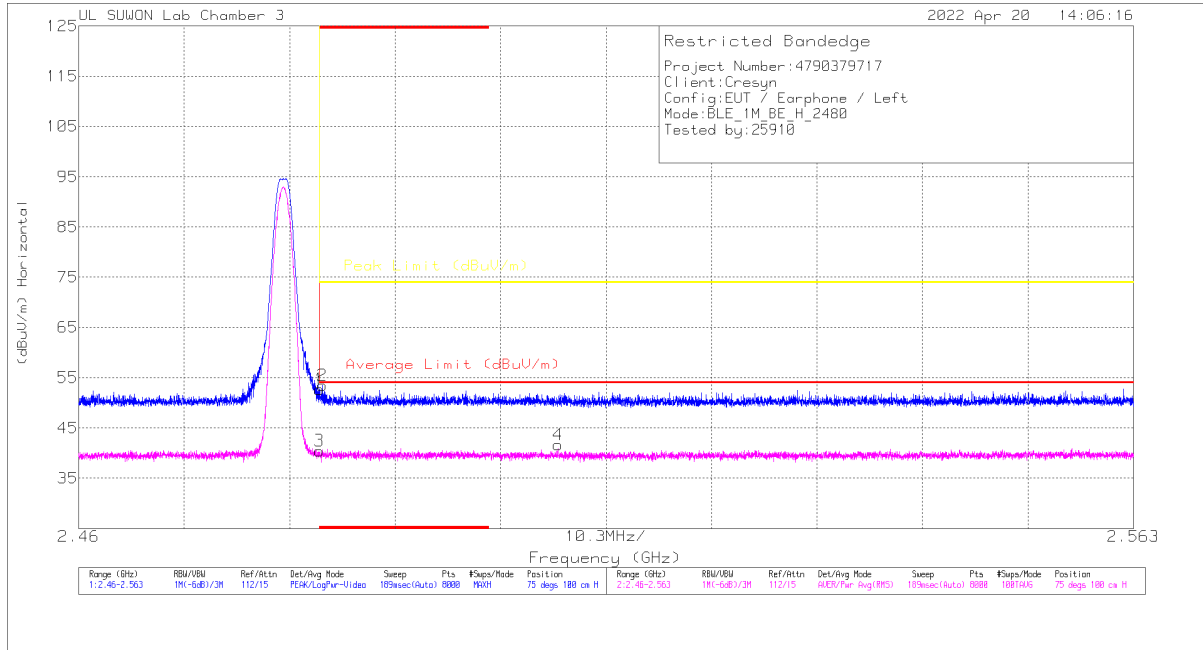
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	10dB_ATT(dB)	DC Cor (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	42.8	PK	32.8	-25.4	0	50.2	-	-	74	-23.8	130	128	V
2	* 2.34682	44.93	PK	32.6	-25.3	0	52.23	-	-	74	-21.77	130	128	V
3	* 2.39	32.02	RMS	32.8	-25.4	69	40.11	54	-13.89	-	-	130	128	V
4	* 2.38976	33.36	RMS	32.8	-25.4	69	41.45	54	-12.55	-	-	130	128	V

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

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT

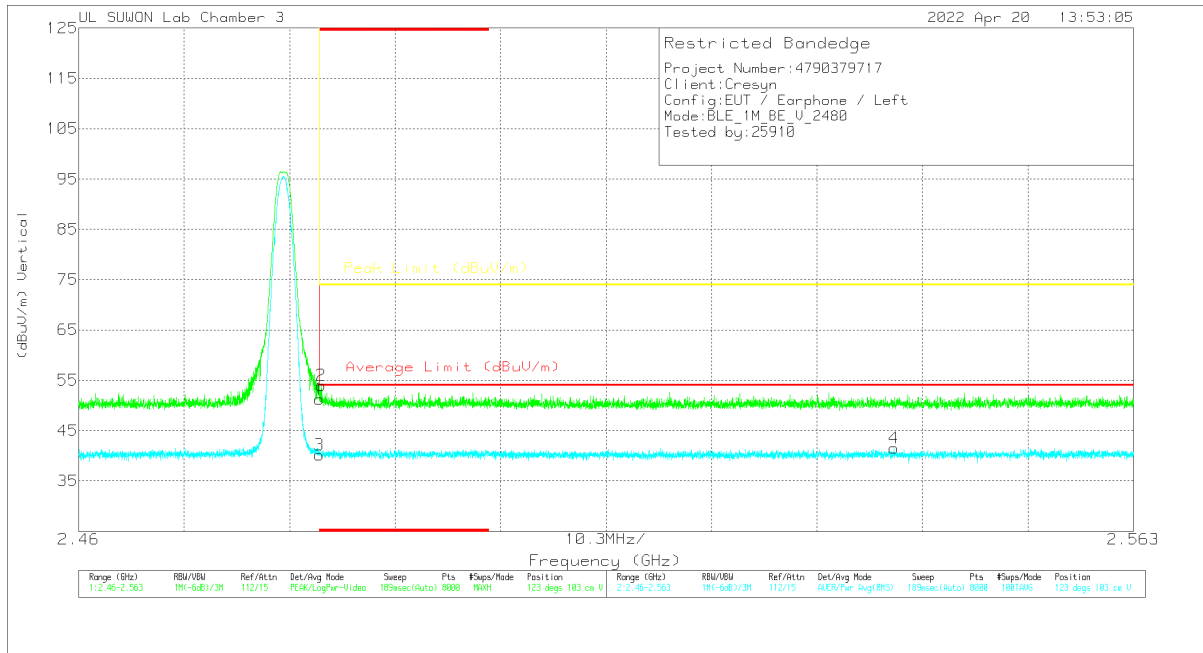


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Pk Margin (dB)	Acimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	45.09	Pk	32.9	-25.3	0	52.69	-	-	74	-21.31	75	100	H
2	* 2.48381	45.88	Pk	32.9	-25.3	0	53.48	-	-	74	-20.52	75	100	H
3	* 2.4835	32.18	RMS	32.9	-25.3	.69	40.47	54	-13.53	-	-	75	100	H
4	2.5068	33.21	RMS	32.9	-25.2	.69	41.6	54	-12.4	-	-	75	100	H

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

VERTICAL RESULT



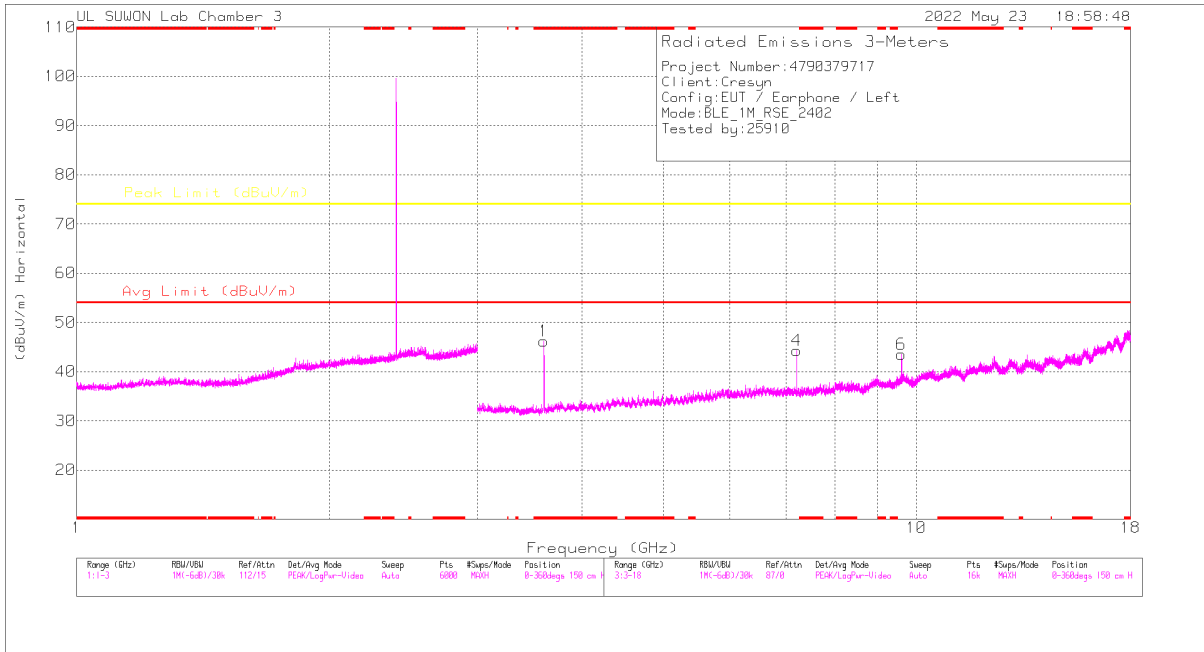
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Acimuh (Degs)	Height (cm)	Polarity
1	* 2.4835	43.68	Pk	32.9	-25.3	0	51.28	-	-	74	-22.72	123	103	V
2	* 2.48368	46.43	Pk	32.9	-25.3	0	54.03	-	-	74	-19.97	123	103	V
3	* 2.4835	31.9	RMS	32.9	-25.3	69	40.19	54	-13.81	-	-	123	103	V
4	2.53964	33.12	RMS	32.9	-25.2	69	41.51	54	-12.49	-	-	123	103	V

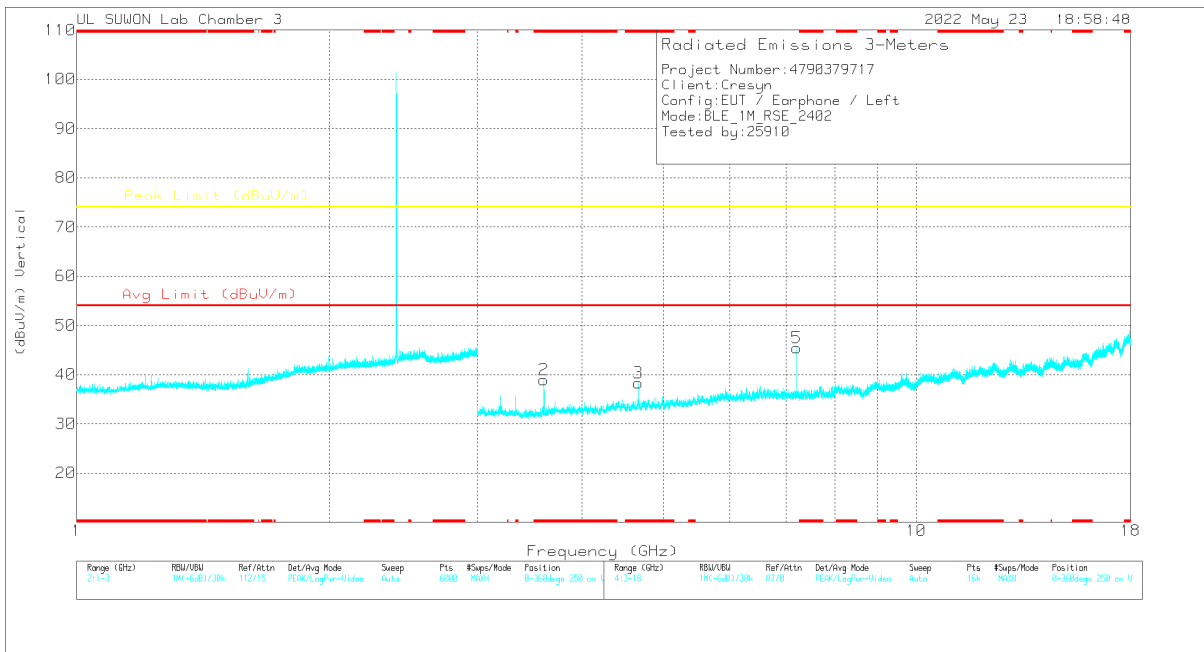
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK - Peak detector
 RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

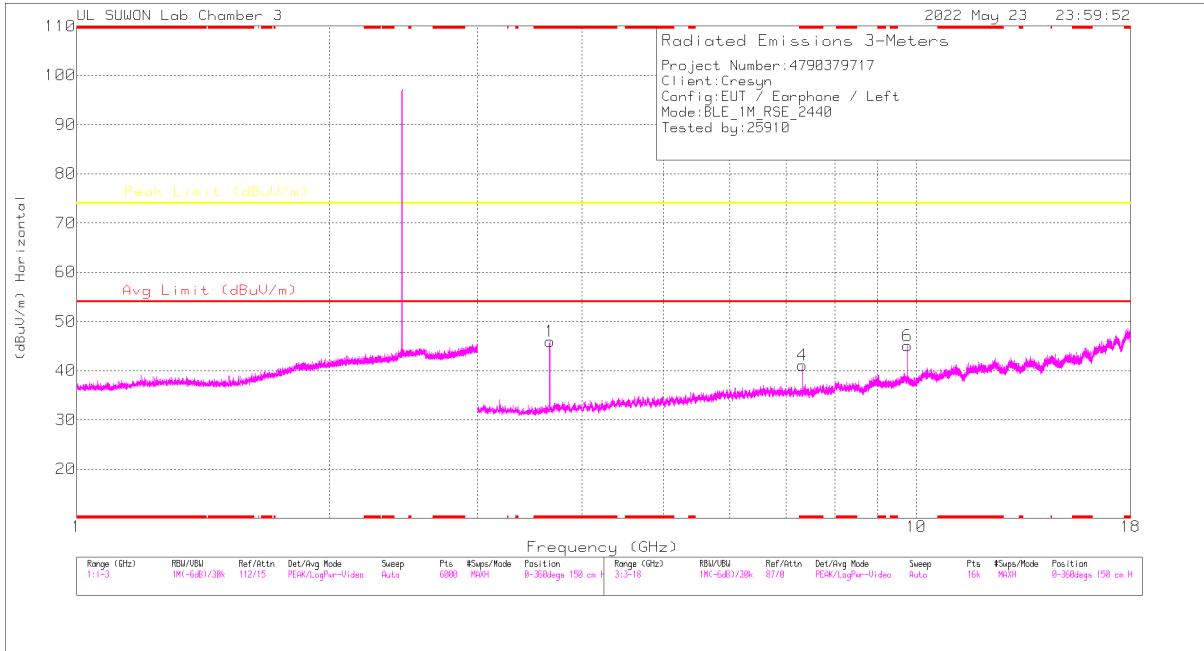
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

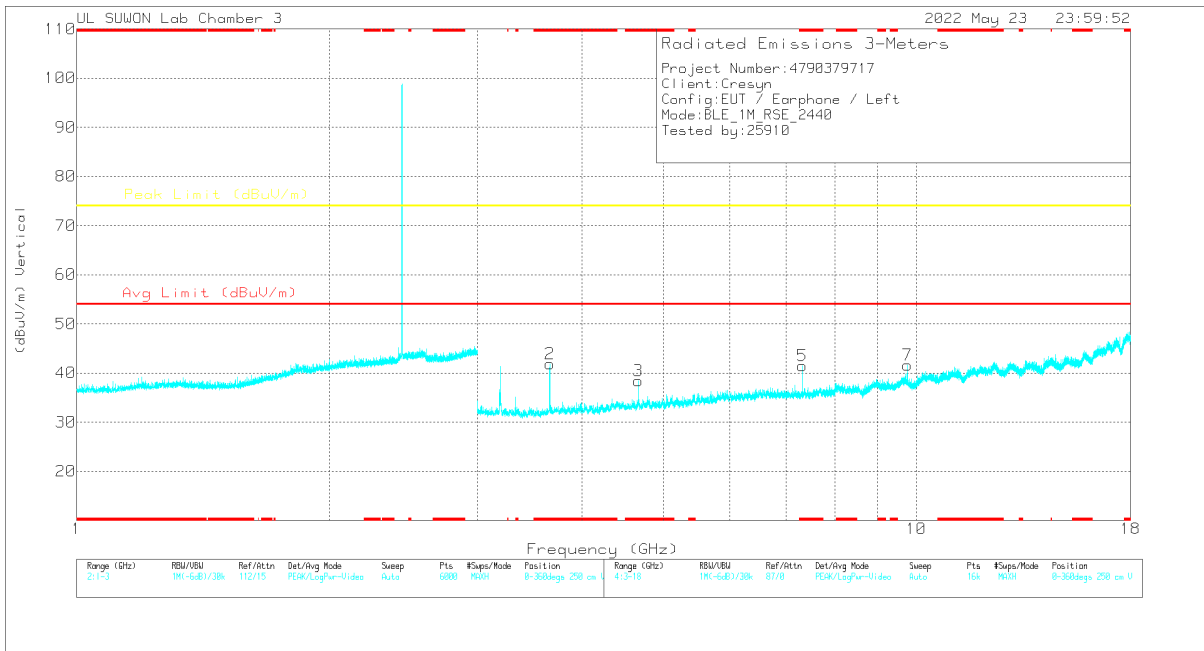
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.60261	48.67	PK2	33.5	-32.7	0	49.47	-	-	74	-24.53	59	114	H
* 3.60285	42.34	MAv1	33.5	-32.7	.69	43.83	54	-10.17	-	-	59	114	H
7.20512	42.58	PK2	36.1	-25.6	0	53.08	-	-	74	-20.92	75	100	H
9.60912	35.56	PK2	37.3	-21.8	0	51.06	-	-	74	-22.94	345	240	H
* 3.60266	45.98	PK2	33.5	-32.7	0	46.78	-	-	74	-27.22	163	383	V
* 3.60307	37.8	MAv1	33.5	-32.7	.69	39.29	54	-14.71	-	-	163	383	V
* 4.66694	41.12	PK2	34.5	-30	0	45.62	-	-	74	-28.38	40	127	V
* 4.66665	31.32	MAv1	34.5	-30	.69	36.51	54	-17.49	-	-	40	127	V
7.20525	41.35	PK2	36.1	-25.6	0	51.85	-	-	74	-22.15	156	100	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



HORIZONTAL



VERTICAL

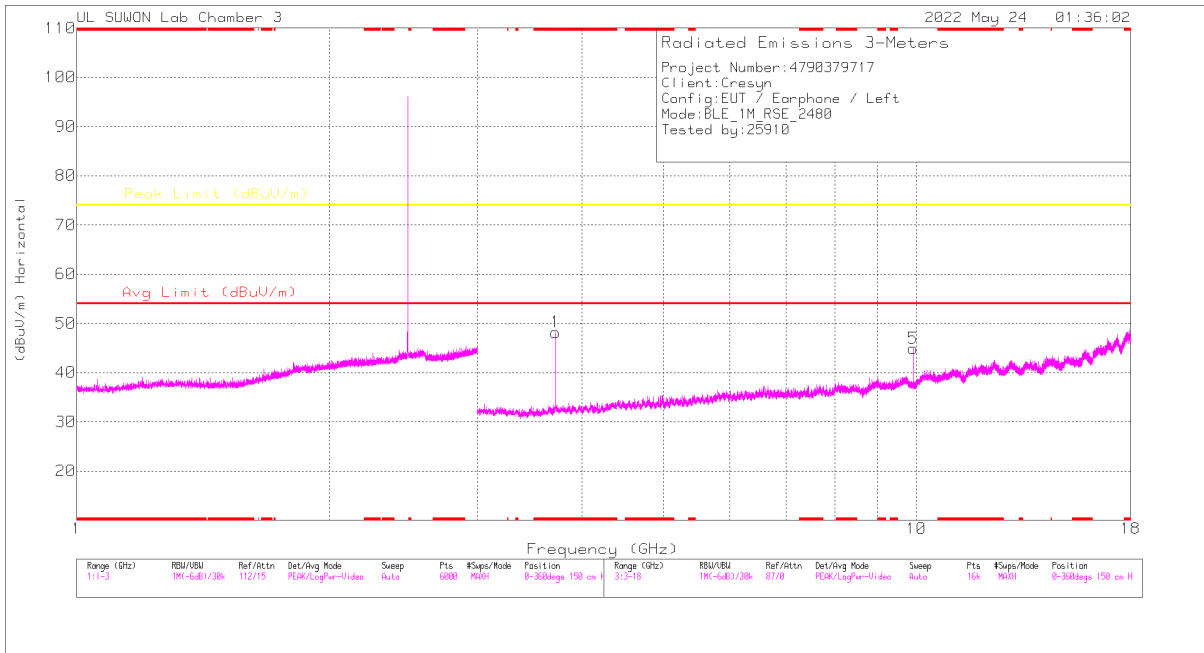
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

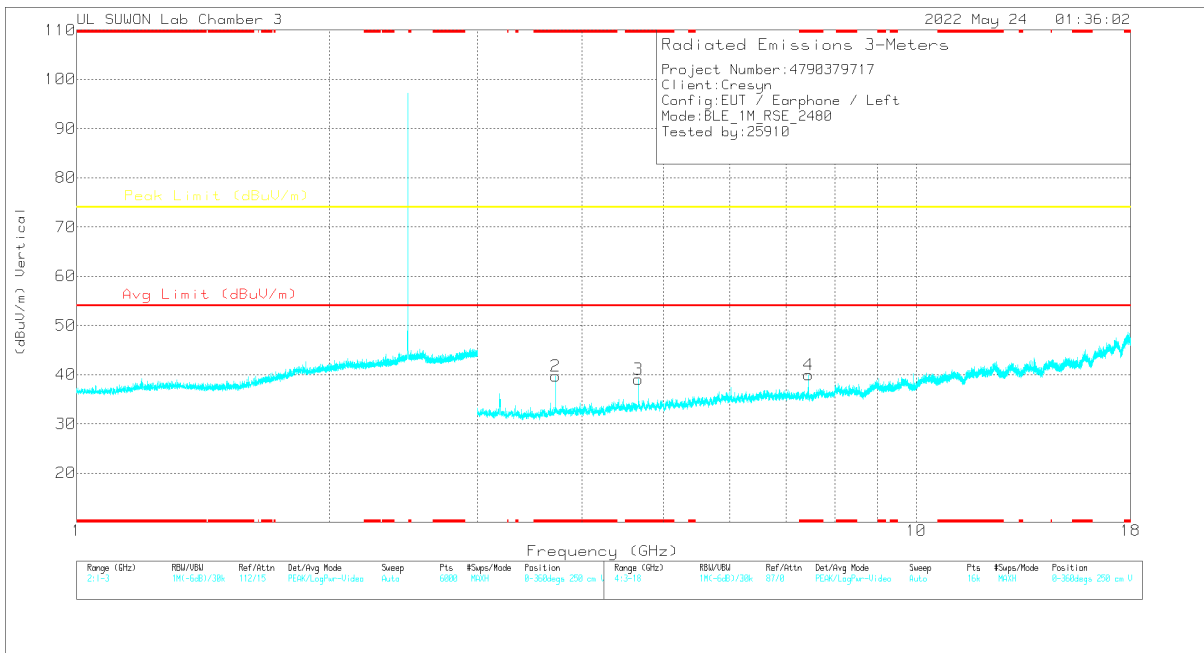
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.66041	49.77	PK2	33.6	-32.1	0	51.27	-	-	74	-22.73	53	119	H
* 3.65976	44.02	MAv1	33.6	-32.1	.69	46.21	54	-7.79	-	-	53	119	H
* 7.31928	39.41	PK2	36	-25.2	0	50.21	-	-	74	-23.79	76	100	H
* 7.32075	30.71	MAv1	36	-25.1	.69	42.3	54	-11.7	-	-	76	100	H
9.759	36.81	PK2	37.5	-21.3	0	53.01	-	-	74	-20.99	342	248	H
* 3.6604	45.52	PK2	33.6	-32.1	0	47.02	-	-	74	-26.98	287	104	V
* 3.65987	38.16	MAv1	33.6	-32.1	.69	40.35	54	-13.65	-	-	287	104	V
* 4.66641	40.93	PK2	34.5	-30	0	45.43	-	-	74	-28.57	276	108	V
* 4.66662	31.08	MAv1	34.5	-30	.69	36.27	54	-17.73	-	-	276	108	V
* 7.32082	39.08	PK2	36	-25.1	0	49.98	-	-	74	-24.02	159	101	V
* 7.32062	30.72	MAv1	36	-25.1	.69	42.31	54	-11.69	-	-	159	101	V
9.76111	33.26	PK2	37.5	-21.3	0	49.46	-	-	74	-24.54	50	285	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



HORIZONTAL



VERTICAL

Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

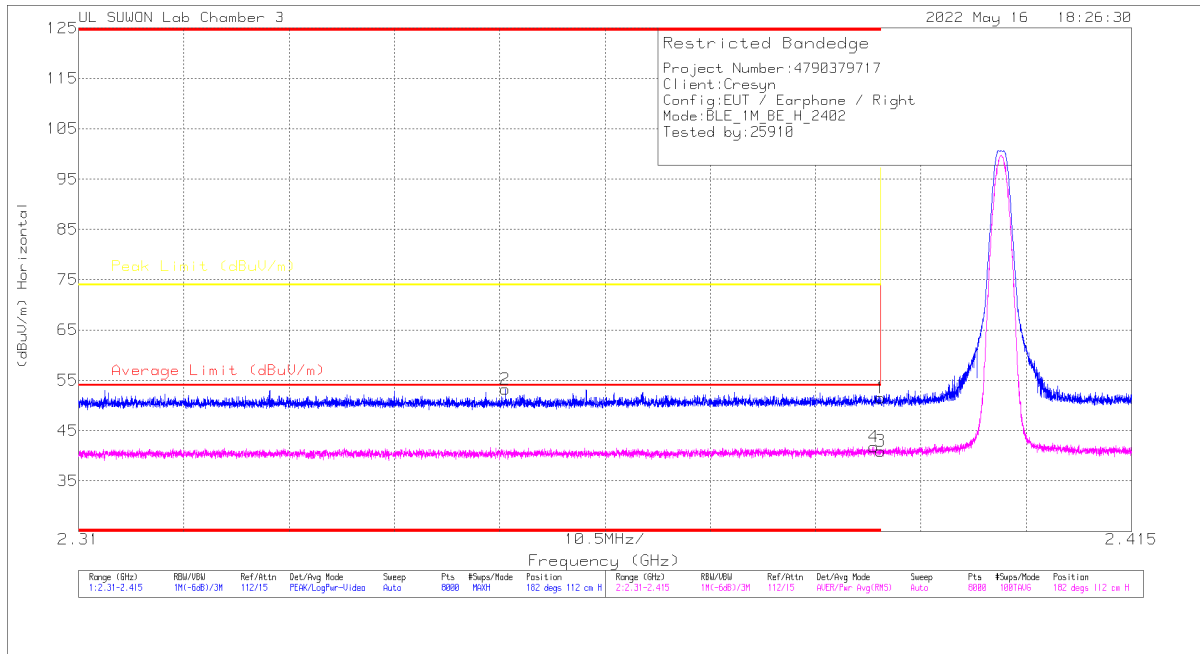
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.72038	49.81	PK2	33.7	-31.4	0	52.11	-	-	74	-21.89	33	108	H
* 3.71985	44.24	MAv1	33.7	-31.4	.69	47.23	54	-6.77	-	-	33	108	H
9.91884	36.36	PK2	37.7	-21.5	0	52.56	-	-	74	-21.44	337	254	H
* 3.72014	46.23	PK2	33.7	-31.4	0	48.53	-	-	74	-25.47	305	100	V
* 3.71977	38.8	MAv1	33.7	-31.4	.69	41.79	54	-12.21	-	-	305	100	V
* 4.6663	40.71	PK2	34.5	-30	0	45.21	-	-	74	-28.79	43	141	V
* 4.66669	31.07	MAv1	34.5	-30	.69	36.26	54	-17.74	-	-	43	141	V
* 7.43955	36.79	PK2	36	-24.8	0	47.99	-	-	74	-26.01	155	105	V
* 7.43936	26.21	MAv1	36	-24.8	.69	38.1	54	-15.9	-	-	155	105	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak
 MAv1 - KDB558074 Option 1 Maximum RMS Average

10.2.2. Right_1 Mbps

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT

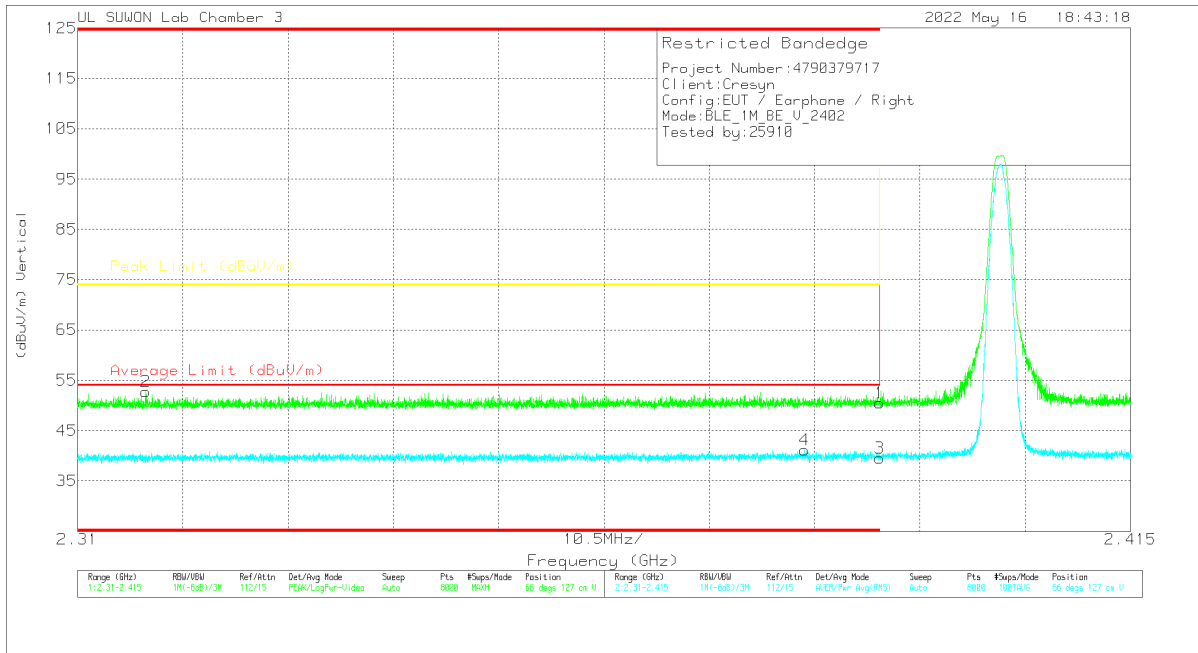


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	10dB_ATT[dB]	DC Cor (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.389	43.55	PK	32.8	-24.8	0	51.55	-	-	74	-22.45	182	112	H
2	* 2.38256	45.54	PK	32.8	-24.9	0	53.24	-	-	74	-20.76	182	112	H
3	* 2.39	32.28	RMS	32.8	-24.8	.69	40.97	54	-13.03	-	-	182	112	H
4	* 2.38927	33.14	RMS	32.8	-24.8	.69	41.83	54	-12.17	-	-	182	112	H

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

VERTICAL RESULT



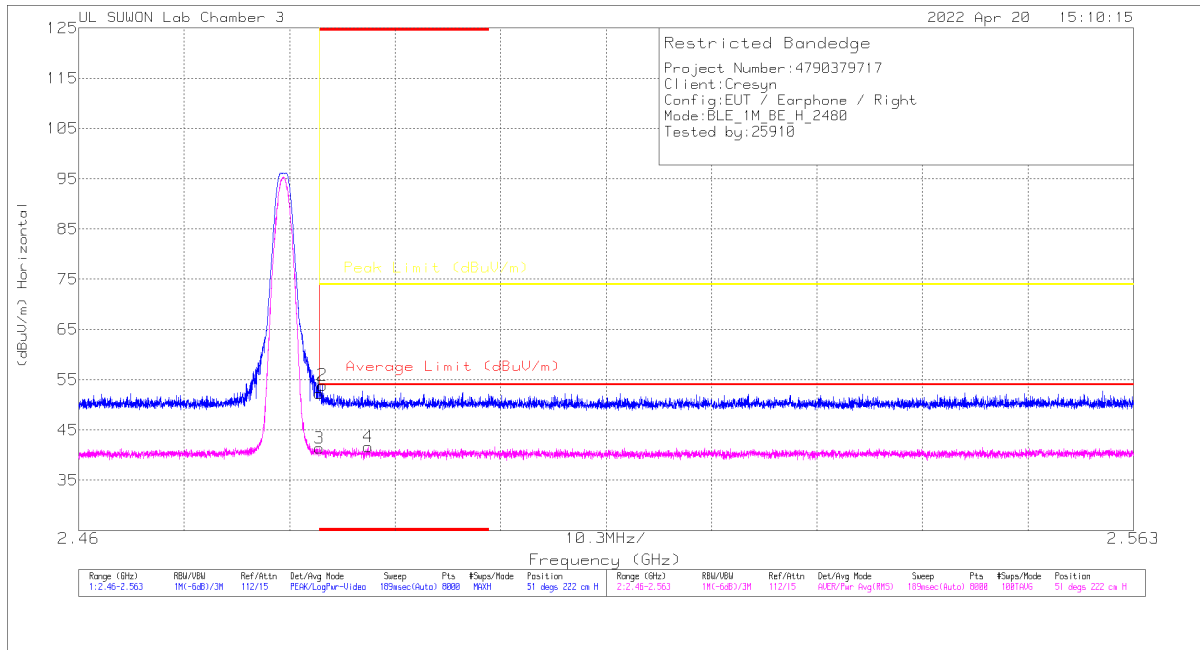
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBu/V)	Det	3117_00218957	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBu/m)	Average Limit (dBu/m)	Margin (dB)	Peak Limit (dBu/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	42.54	Pk	32.8	-24.8	0	50.54	-	-	74	-23.46	66	127	V
2	* 2.31681	45.1	Pk	32.5	-24.9	0	52.7	-	-	74	-21.3	66	127	V
3	* 2.39	31.51	RMS	32.8	-24.8	.69	40.20	54	-13.80	-	-	66	127	V
4	* 2.3825	33.41	RMS	32.7	-24.9	.69	41.90	54	-12.10	-	-	66	127	V

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

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT

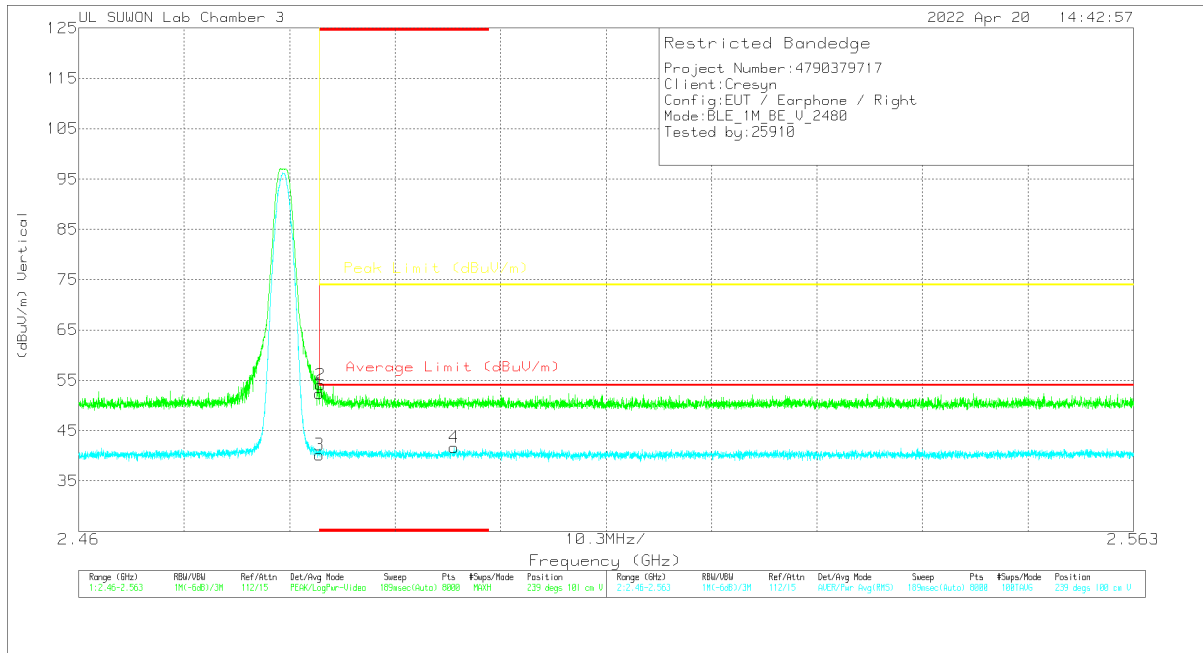


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Pk Margin (dB)	Acimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	44.68	Pk	32.9	-25.3	0	52.28	-	-	74	-21.72	51	222	H
2	* 2.48381	46.33	Pk	32.9	-25.3	0	53.93	-	-	74	-20.07	51	222	H
3	* 2.4835	33.1	RMS	32.9	-25.3	.69	41.39	54	-12.61	-	-	51	222	H
4	* 2.48824	33.3	RMS	32.9	-25.2	.69	41.69	54	-12.31	-	-	51	222	H

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

VERTICAL RESULT



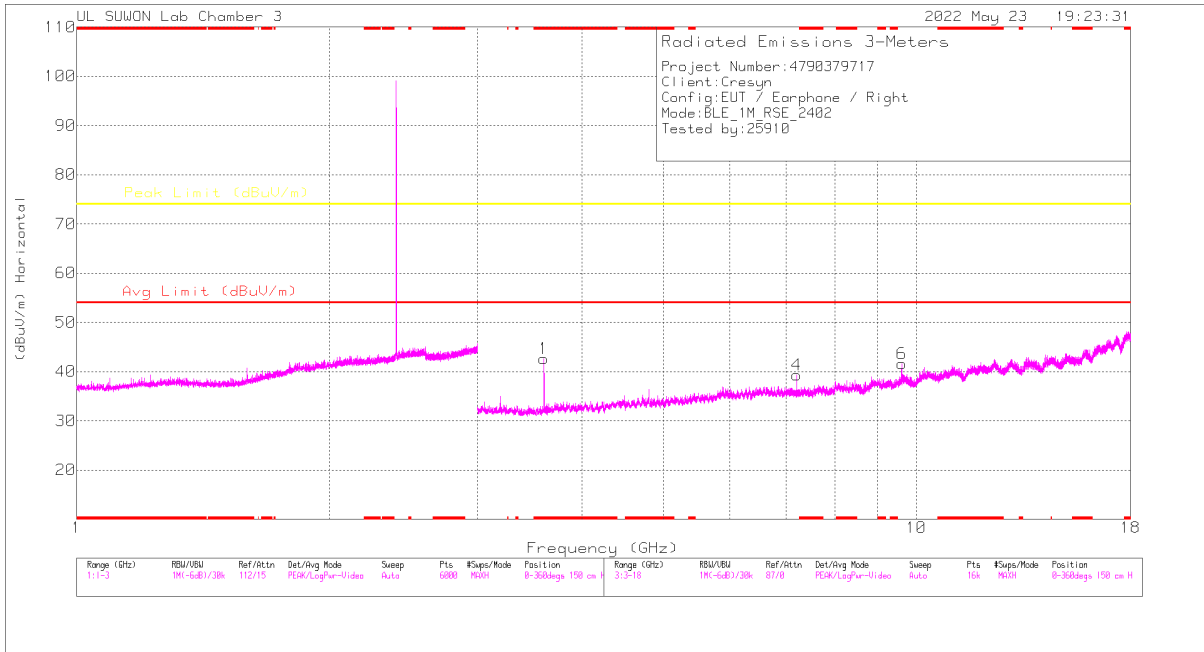
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Acimuh (Degs)	Height (cm)	Polarity
1	* 2.4835	44.8	Pk	32.9	-25.3	0	52.4	-	-	74	-21.6	239	101	V
2	* 2.4836	46.47	Pk	32.9	-25.3	0	54.07	-	-	74	-19.93	239	101	V
3	* 2.4835	31.93	RMS	32.9	-25.3	69	40.22	54	-13.78	-	-	239	100	V
4	* 2.49666	33.23	RMS	32.9	-25.2	69	41.62	54	-12.38	-	-	239	100	V

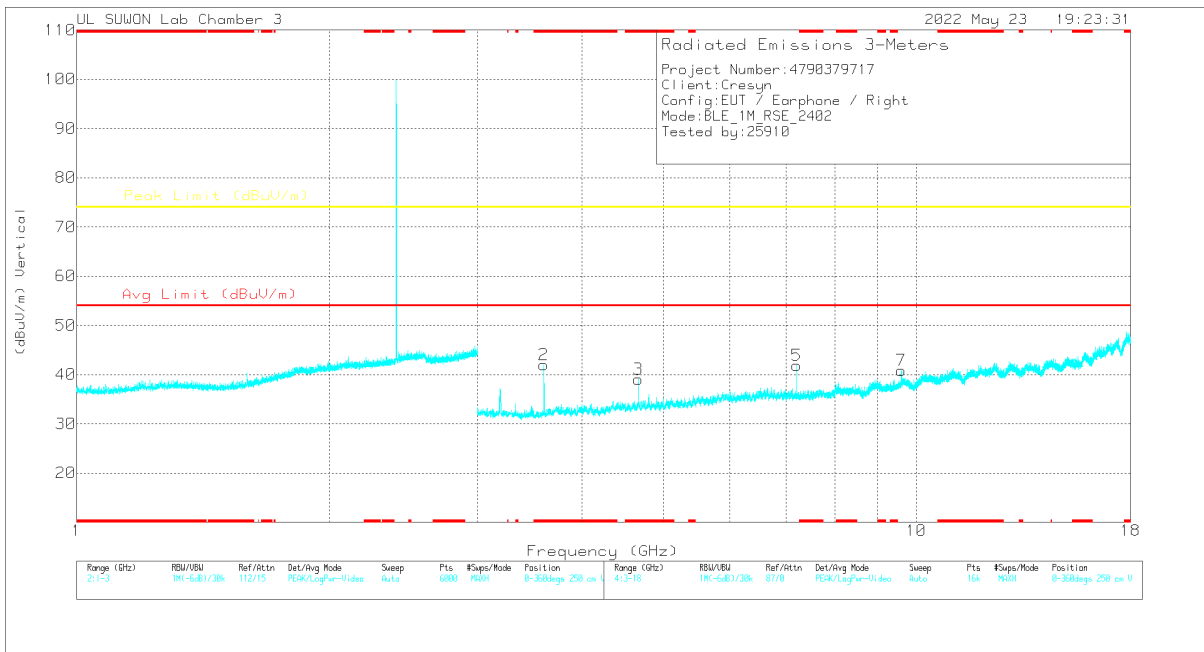
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK - Peak detector
 RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

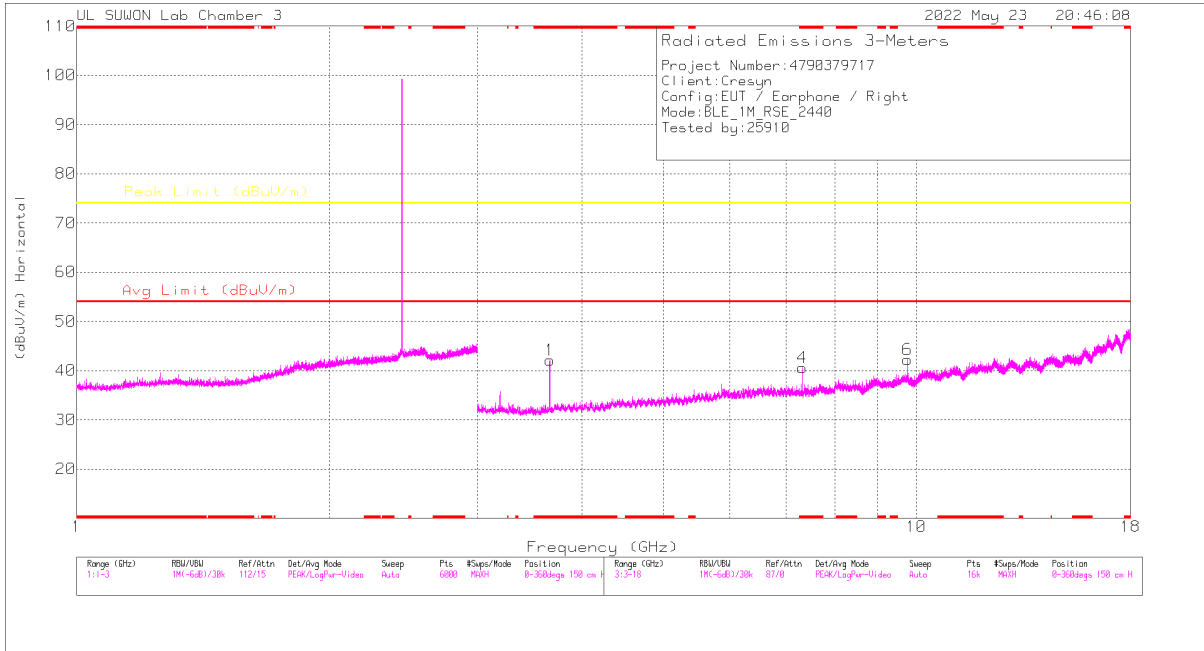
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

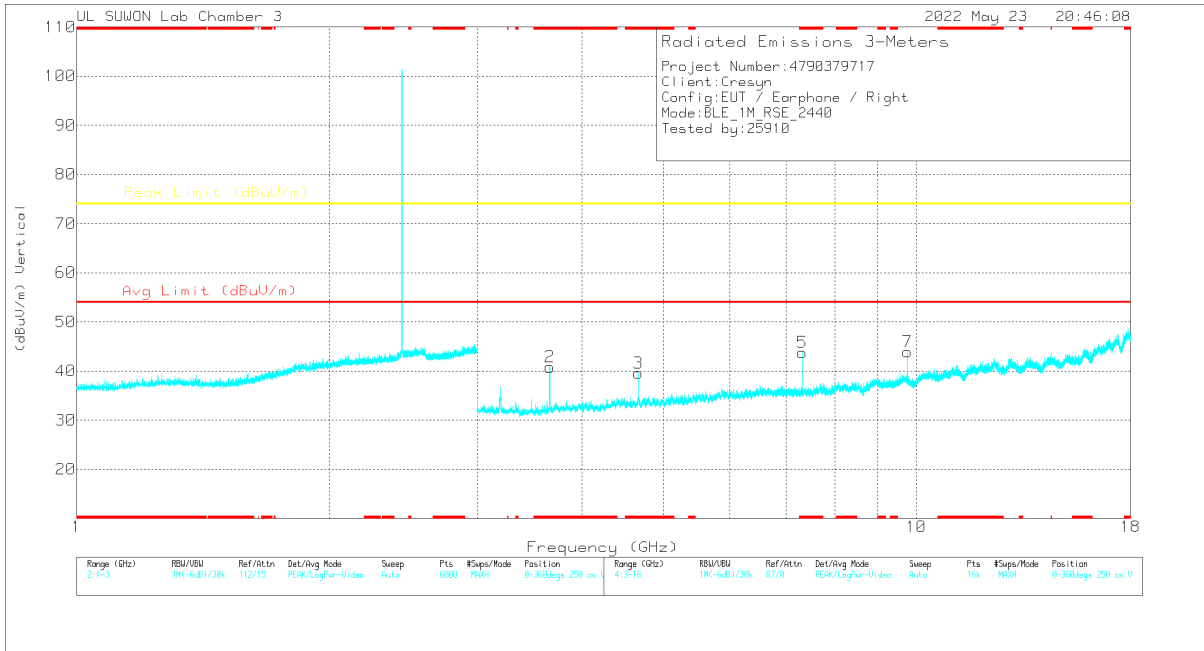
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.60345	47.61	PK2	33.5	-32.7	0	48.41	-	-	74	-25.59	233	105	H
* 3.60293	40.65	MAv1	33.5	-32.7	.69	42.14	54	-11.86	-	-	233	105	H
7.20669	37.78	PK2	36.1	-25.6	0	48.28	-	-	74	-25.72	313	106	H
9.60864	34.74	PK2	37.3	-21.8	0	50.24	-	-	74	-23.76	346	257	H
* 3.60273	46.95	PK2	33.5	-32.7	0	47.75	-	-	74	-26.25	193	104	V
* 3.60317	39.77	MAv1	33.5	-32.7	.69	41.26	54	-12.74	-	-	193	104	V
* 4.66665	42	PK2	34.5	-30	0	46.5	-	-	74	-27.5	100	235	V
* 4.66658	33.32	MAv1	34.5	-30	.69	38.51	54	-15.49	-	-	100	235	V
7.20544	40.08	PK2	36.1	-25.6	0	50.58	-	-	74	-23.42	70	117	V
9.60881	33.87	PK2	37.3	-21.8	0	49.37	-	-	74	-24.63	153	100	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



HORIZONTAL



VERTICAL

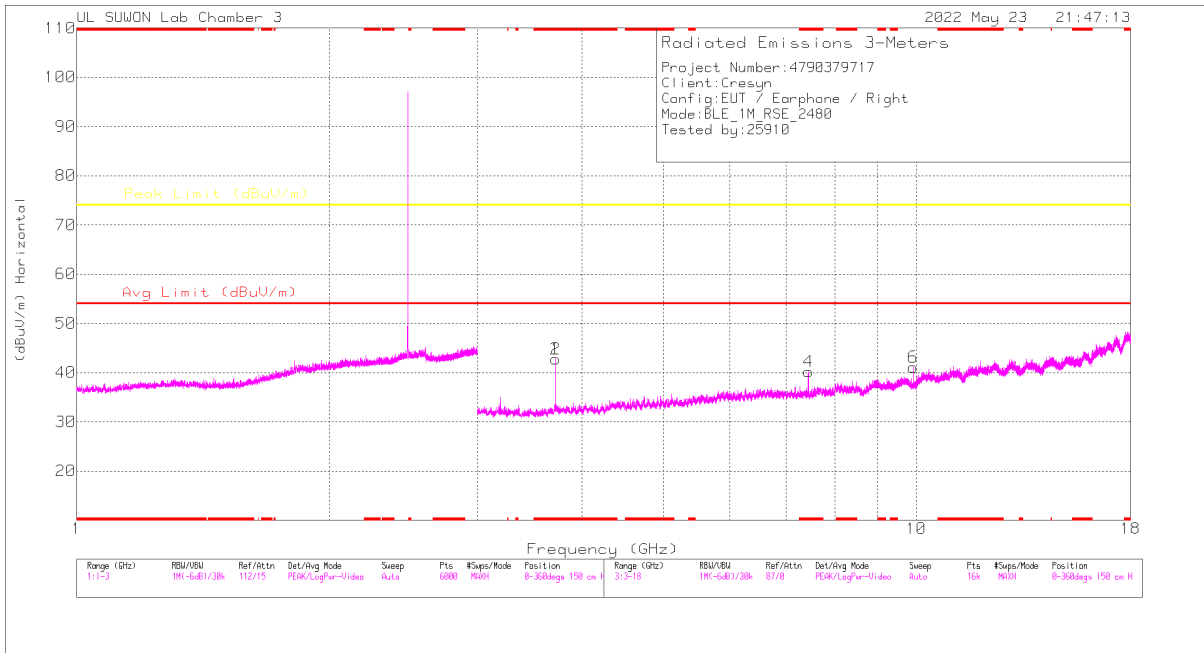
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

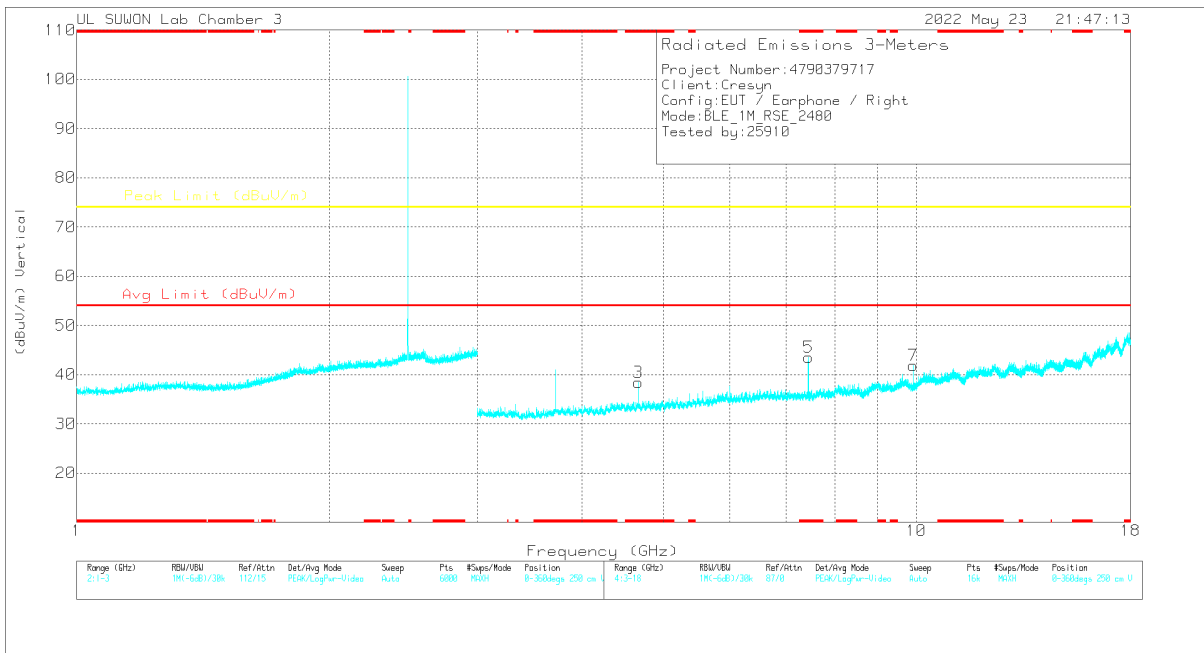
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.66041	47.02	PK2	33.6	-32.1	0	48.52	-	-	74	-25.48	252	148	H
* 3.66012	40.18	MAv1	33.6	-32.1	.69	42.37	54	-11.63	-	-	252	148	H
* 7.31919	38.91	PK2	36	-25.2	0	49.71	-	-	74	-24.29	310	100	H
* 7.31925	30.3	MAv1	36	-25.2	.69	41.79	54	-12.21	-	-	310	100	H
9.76093	35.43	PK2	37.5	-21.3	0	51.63	-	-	74	-22.37	282	100	H
* 3.66046	45.85	PK2	33.6	-32.1	0	47.35	-	-	74	-26.65	177	100	V
* 3.66018	37.58	MAv1	33.6	-32.1	.69	39.77	54	-14.23	-	-	177	100	V
* 4.66684	41.34	PK2	34.5	-30	0	45.84	-	-	74	-28.16	39	173	V
* 4.66658	31.02	MAv1	34.5	-30	.69	36.21	54	-17.79	-	-	39	173	V
* 7.31912	40.62	PK2	36	-25.2	0	51.42	-	-	74	-22.58	68	112	V
* 7.31918	33.18	MAv1	36	-25.2	.69	44.67	54	-9.33	-	-	68	112	V
9.76096	35.01	PK2	37.5	-21.3	0	51.21	-	-	74	-22.79	70	115	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



HORIZONTAL



VERTICAL

Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

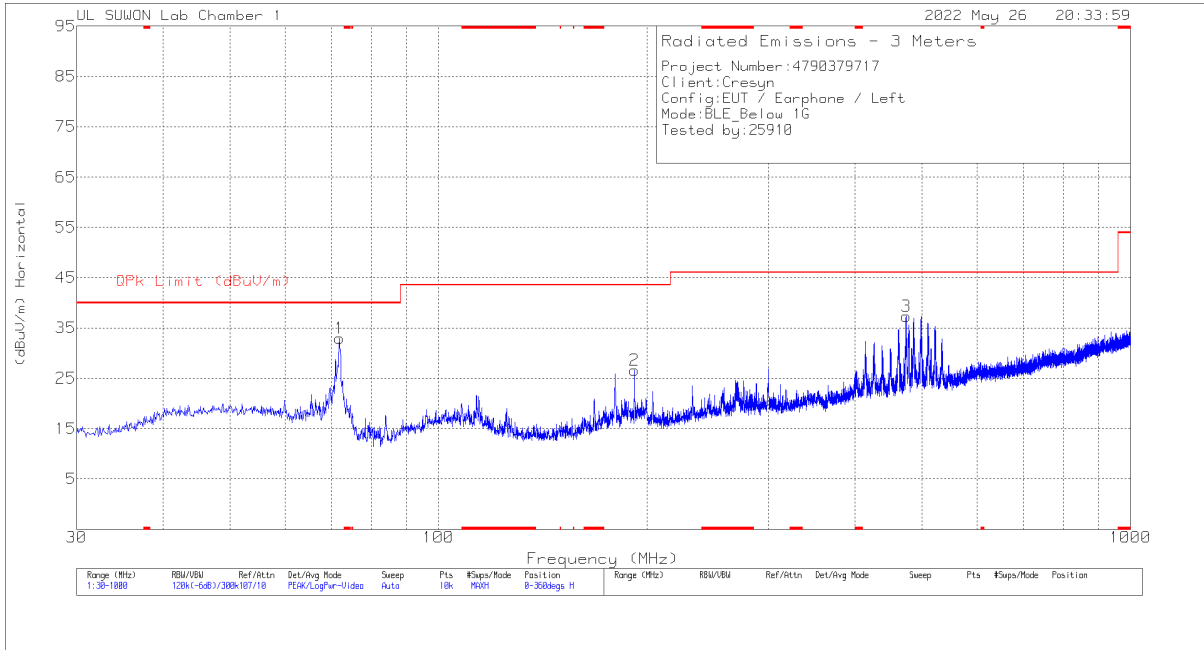
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.72026	46.52	PK2	33.7	-31.4	0	48.82	-	-	74	-25.18	311	103	H
* 3.72	40.08	MAv1	33.7	-31.4	.69	43.07	54	-10.93	-	-	311	103	H
* 3.71954	47.13	PK2	33.7	-31.4	0	49.43	-	-	74	-24.57	253	108	H
* 3.71987	40.48	MAv1	33.7	-31.4	.69	43.47	54	-10.53	-	-	253	108	H
* 7.43934	38.9	PK2	36	-24.8	0	50.1	-	-	74	-23.9	308	100	H
* 7.43942	30.09	MAv1	36	-24.8	.69	41.98	54	-12.02	-	-	308	100	H
9.91888	34.05	PK2	37.7	-21.5	0	50.25	-	-	74	-23.75	8	393	H
* 4.66689	41.73	PK2	34.5	-30	0	46.23	-	-	74	-27.77	273	100	V
* 4.6666	31.01	MAv1	34.5	-30	.69	36.2	54	-17.8	-	-	273	100	V
* 7.43927	40.56	PK2	36	-24.8	0	51.76	-	-	74	-22.24	75	100	V
* 7.43924	32.7	MAv1	36	-24.8	.69	44.59	54	-9.41	-	-	75	100	V
9.91892	34.53	PK2	37.7	-21.5	0	50.73	-	-	74	-23.27	160	107	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak
 MAv1 - KDB558074 Option 1 Maximum RMS Average

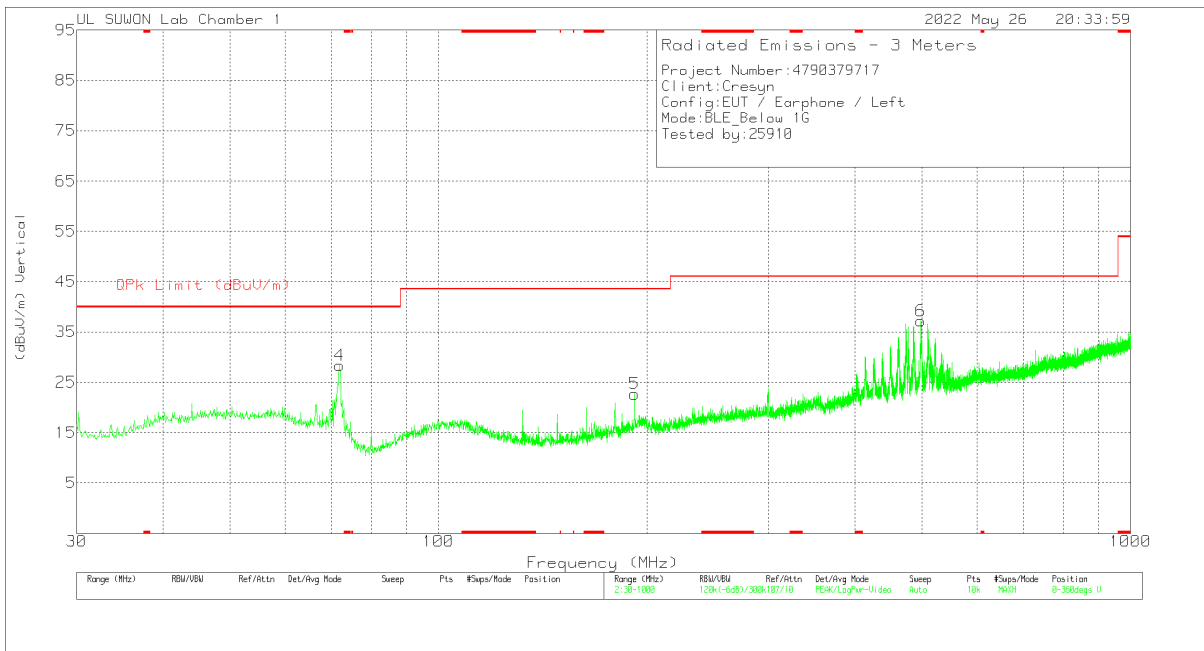
10.3. WORST CASE BELOW 1 GHZ

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

- Left



HORIZONTAL



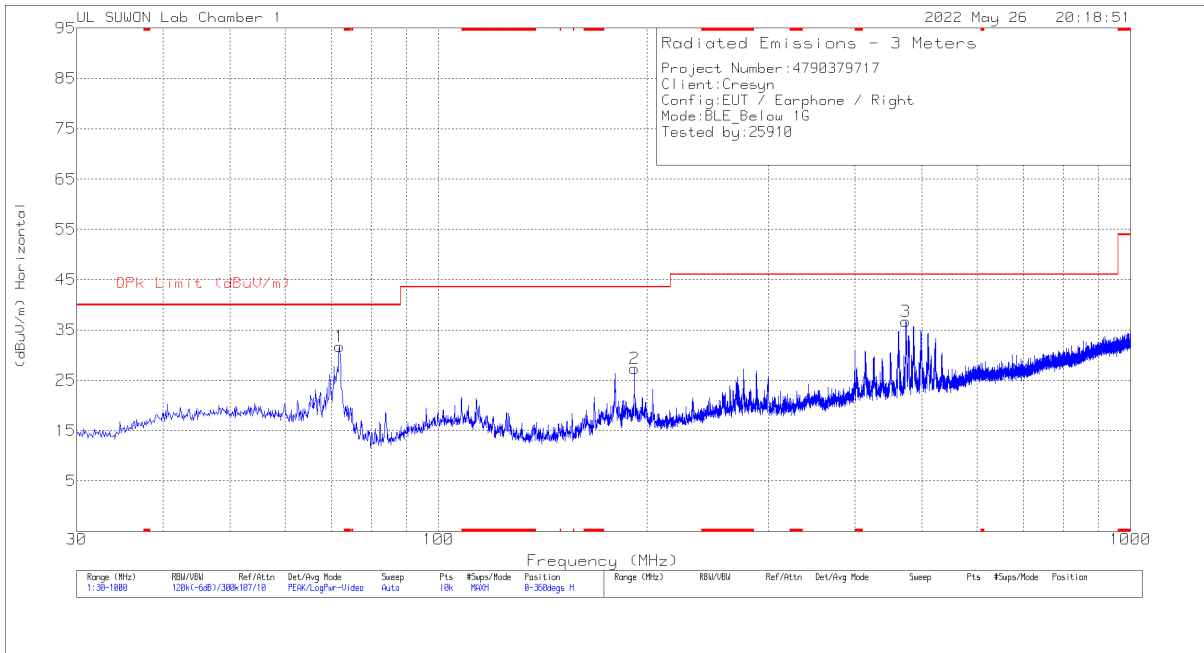
VERTICAL

Below 1GHz Data

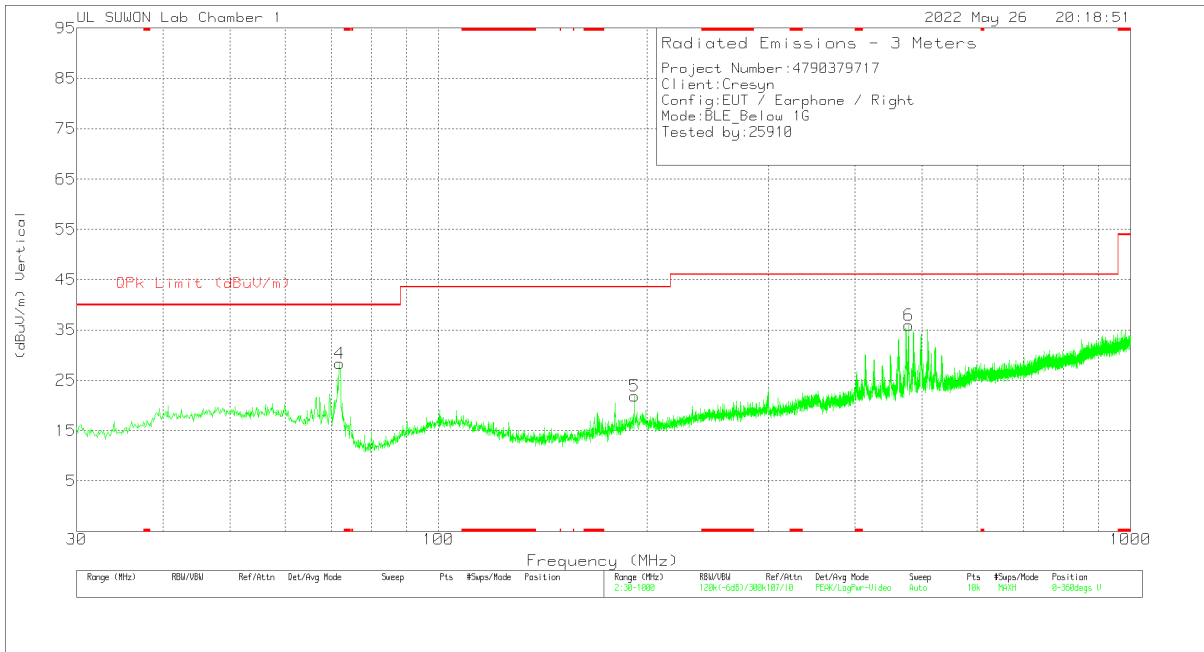
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_750	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	71.904	49.02	Pk	14.6	-30.7	32.92	40	-7.08	0-360	200	H
2	191.99	39.2	Pk	16.8	-29.4	26.6	43.52	-16.92	0-360	100	H
3	474.551	42.55	Pk	22.5	-27.7	37.35	46.02	-8.67	0-360	100	H
4	72.001	44.45	Pk	14.6	-30.7	28.35	40	-11.65	0-360	400	V
5	191.99	35.29	Pk	16.8	-29.4	22.69	43.52	-20.83	0-360	200	V
6	497.443	41.7	Pk	23.1	-27.6	37.2	46.02	-8.82	0-360	200	V

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

- Right



HORIZONTAL



VERTICAL

Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_750	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	71.904	47.8	Pk	14.6	-30.7	31.7	40	-8.3	0-360	300	H
2	191.99	39.91	Pk	16.8	-29.4	27.31	43.52	-16.21	0-360	100	H
3	473.5325	42.02	Pk	22.4	-27.7	36.72	46.02	-9.3	0-360	100	H
4	72.001	44.4	Pk	14.6	-30.7	28.3	40	-11.7	0-360	400	V
5	191.99	34.45	Pk	16.8	-29.4	21.85	43.52	-21.67	0-360	200	V
6	477.752	41.02	Pk	22.6	-27.7	35.92	46.02	-10.1	0-360	200	V

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

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS: N/P

Note. The AC power line test was not performed because the EUT does not operate Bluetooth mode while charging.

END OF TEST REPORT