



CERTIFICATION TEST REPORT

Report Number. : 4790173298-FR1V2

Applicant : Samsung Electronics Co.,Ltd.
129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do 16677,
Korea

Model : WBA210M

FCC ID : A3LWBA210M
IC : 649E-WBA210M

EUT Description : BLE Transceiver

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

Date Of Issue:
2021-11-18

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	11/15/21	Initial issue	Robby Lee
V2	11/18/21	Updated about the TCB's question	Robby Lee

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Samsung Electronics Co.,Ltd.
EUT DESCRIPTION: BLE Transceiver
MODEL: WBA210M
SERIAL NUMBER: Proto type
DATE TESTED: 2021-11-03 ~ 2021-11-12;

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:

Tested By:



Anthony Kim
Suwon Lab Engineer
UL Korea, Ltd.

Robby Lee
Suwon Lab 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 type="checkbox"/>	Chamber 1
<input checked="" 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. DECISION RULES

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

4.4. 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	3.01 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.26 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.90 dB
Radiated Disturbance, 18 GHz to 40 GHz	5.49 dB

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

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

The EUT is a BLE Transceiver.
This test report addresses the DTS (BLE) operational mode.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range [MHz]	Mode	Power Mode	Output Power [dBm]	Output Power [mW]
2 402 ~ 2 480	1Mbps	Peak	8.310	6.78
		Average	8.130	6.50

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.**

The radio utilizes an internal antennas, with maximum gain of 1.35 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(37 pkt) power is the worst case. All tests were performed in this mode.

Mode	Frequency [MHz]	Conducted Burst Avg [dBm]
1Mbps (37 pkt)	2402	7.966
	2440	8.130
	2480	8.067
1Mbps (255 pkt)	2402	7.841
	2440	8.035
	2480	7.977

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
Data Cable	N/A	N/A	N/A	N/A
Test Jig Board	SAMSUNG	N/A	N/A	N/A

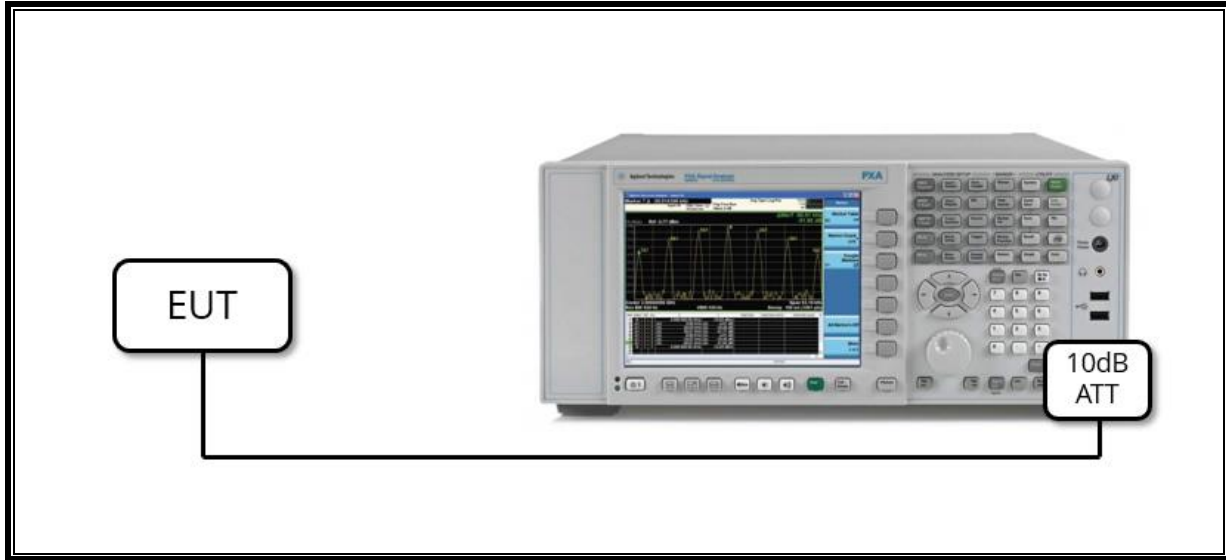
I/O CABLE

I/O Cable List						
Cable No.	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power & Data	1	Flat	Unshielded	0.1 m	N/A
2	DC Power & Data	2	Micro USB	Shielded	1.0 m	N/A

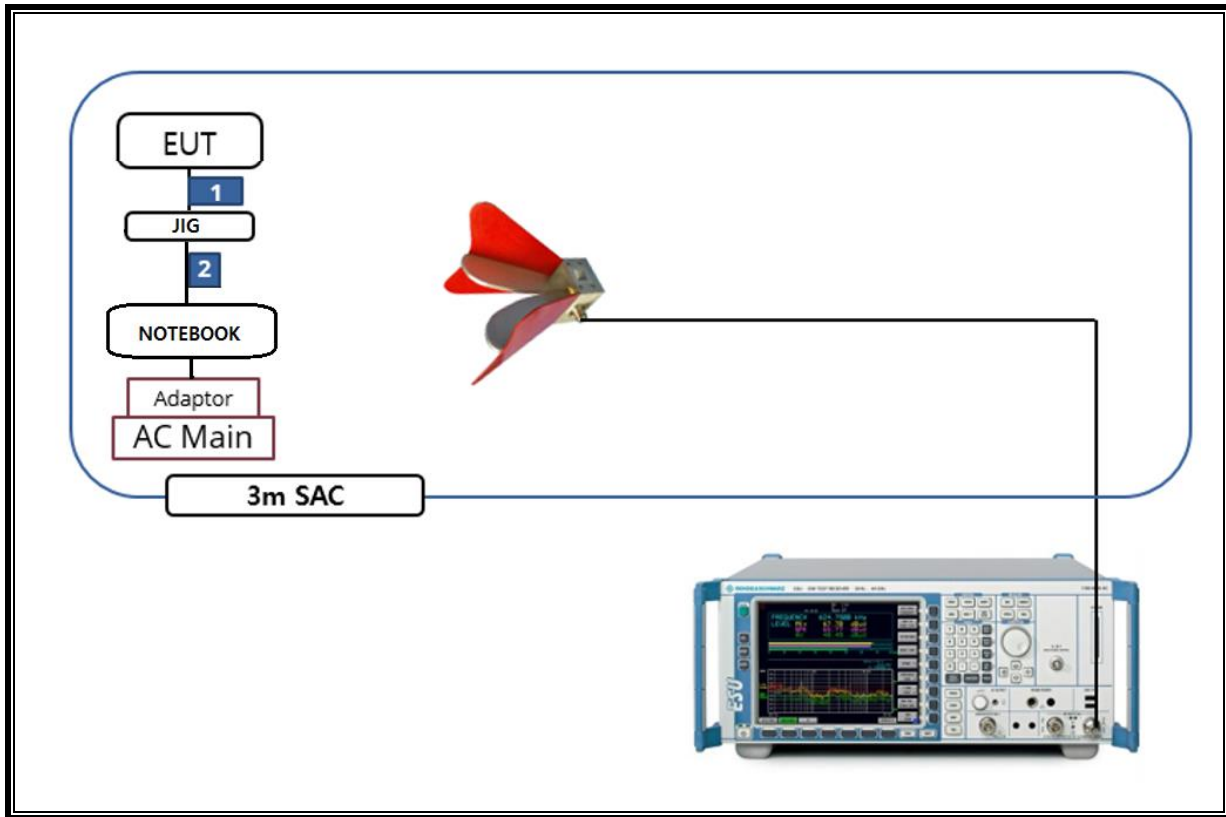
TEST SETUP

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, 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
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2022-08-04
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	2022-08-04
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9030B	MY60070693	2022-01-03
Average Power Sensor	Agilent / HP	U2000	MY54270007	2022-08-04
Average Power Sensor	Agilent / HP	U2000	MY54260010	2022-08-04
Attenuator	PASTERNAK	PE7087-10	A001	2022-08-03
Attenuator	PASTERNAK	PE7087-10	A008	2022-08-03
Attenuator	PASTERNAK	PE7004-10	2	2022-08-02
Attenuator	PASTERNAK	PE7087-10	A009	2022-08-03
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2022-08-02
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2022-08-02
EMI Test Receive, 3 GHz	R&S	ESR3	101832	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
LISN	R&S	ENV-216	101837	2022-08-05
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
15.207(a)	RSS-GEN Clause 7.2&8.8	AC Power Line conducted emissions	Section 11	Power Line conducted	PASS
15.205, 15.209	RSS-GEN Clause 8.9 & 8.10	Radiated Spurious Emission	< 54dBuV/m(Av)	Radiated	PASS

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

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 [37pkt]	0.3902	0.6254	0.6239	62.39	2.05	2.563



1 Mbps(37 pkt)

9.2. 6 dB & 99% BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

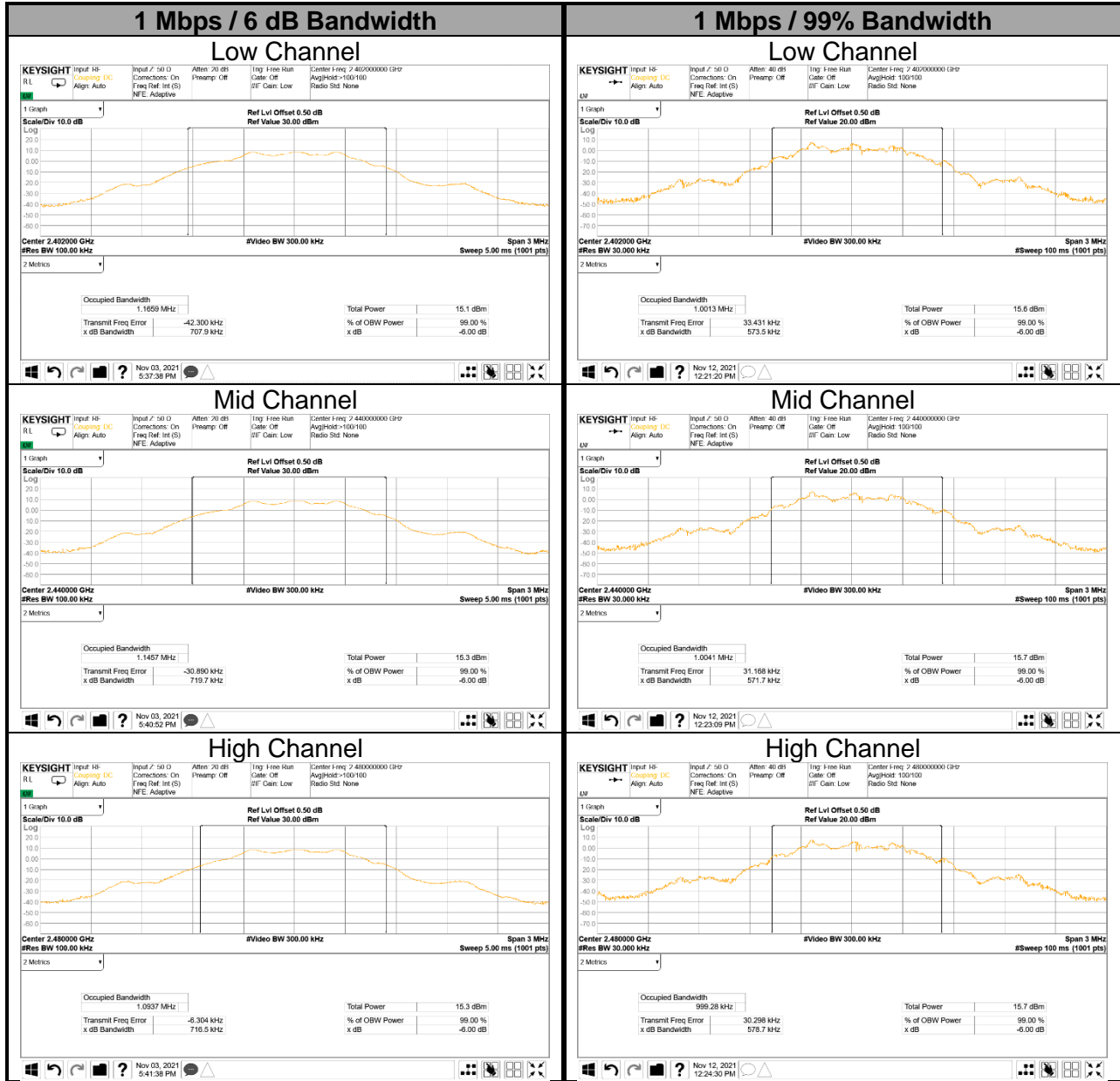
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

9.2.1. 1 Mbps

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]	99% Bandwidth [kHz]
Low	2 402	0.7079	500.0	1001.3
Mid	2 440	0.7197	500.0	1004.1
High	2 480	0.7165	500.0	999.3

9.2.2. 6 dB & 99% BANDWIDTH PLOTS



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

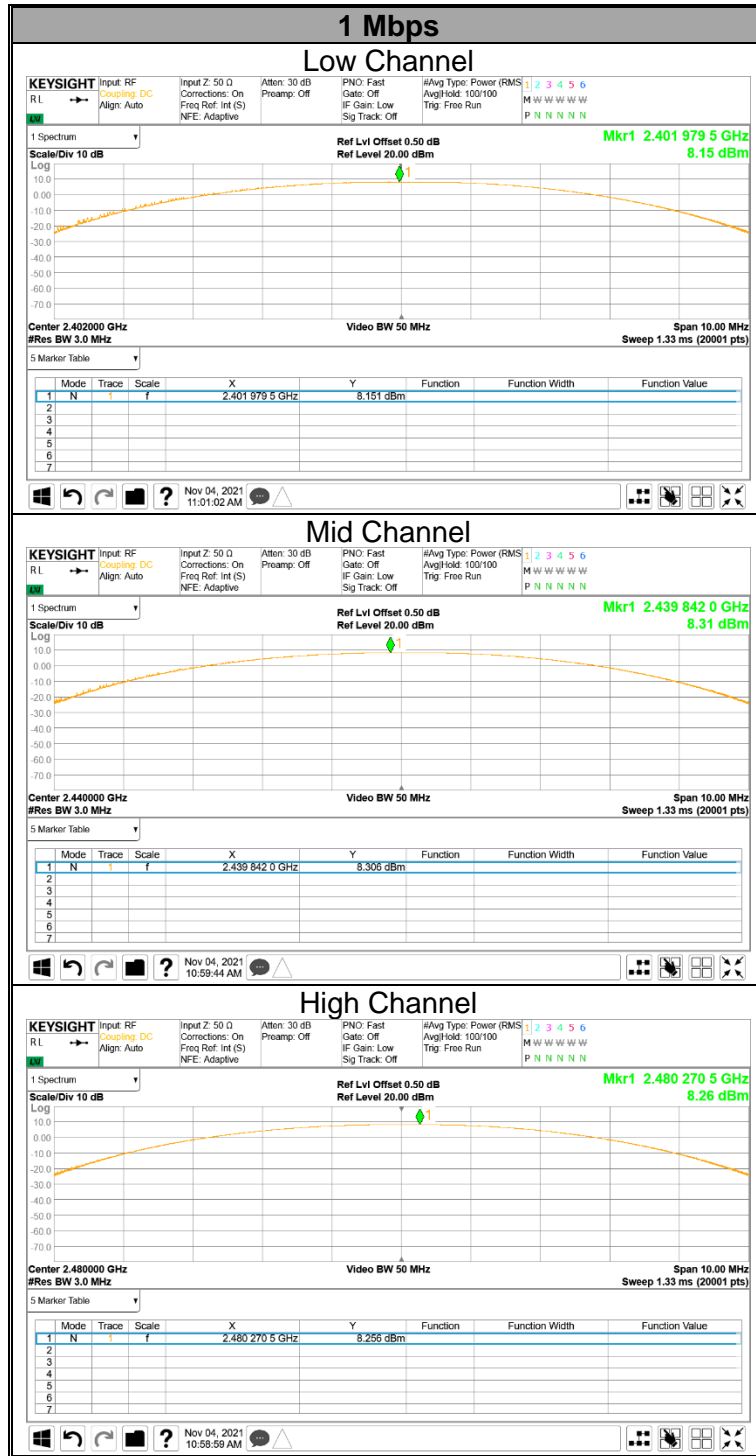
Peak power is measured using ANSI C63.10(2013) under section 11.9.1.1 utilizing spectrum analyzer.

RESULTS

9.3.1. 1 Mbps

Channel	Frequency [MHz]	Peak Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	8.15	30.00	-21.85
Mid	2440	8.31	30.00	-21.69
High	2480	8.26	30.00	-21.74
Worst		8.31	30.00	-21.69

9.3.2. 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. 1 Mbps

Channel	Frequency [MHz]	AV Power [dBm]	AV Power [mW]
Low	2402	7.966	6.261
Mid	2440	8.130	6.501
High	2480	8.067	6.407

9.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

RSS-247 (5.2) (b)

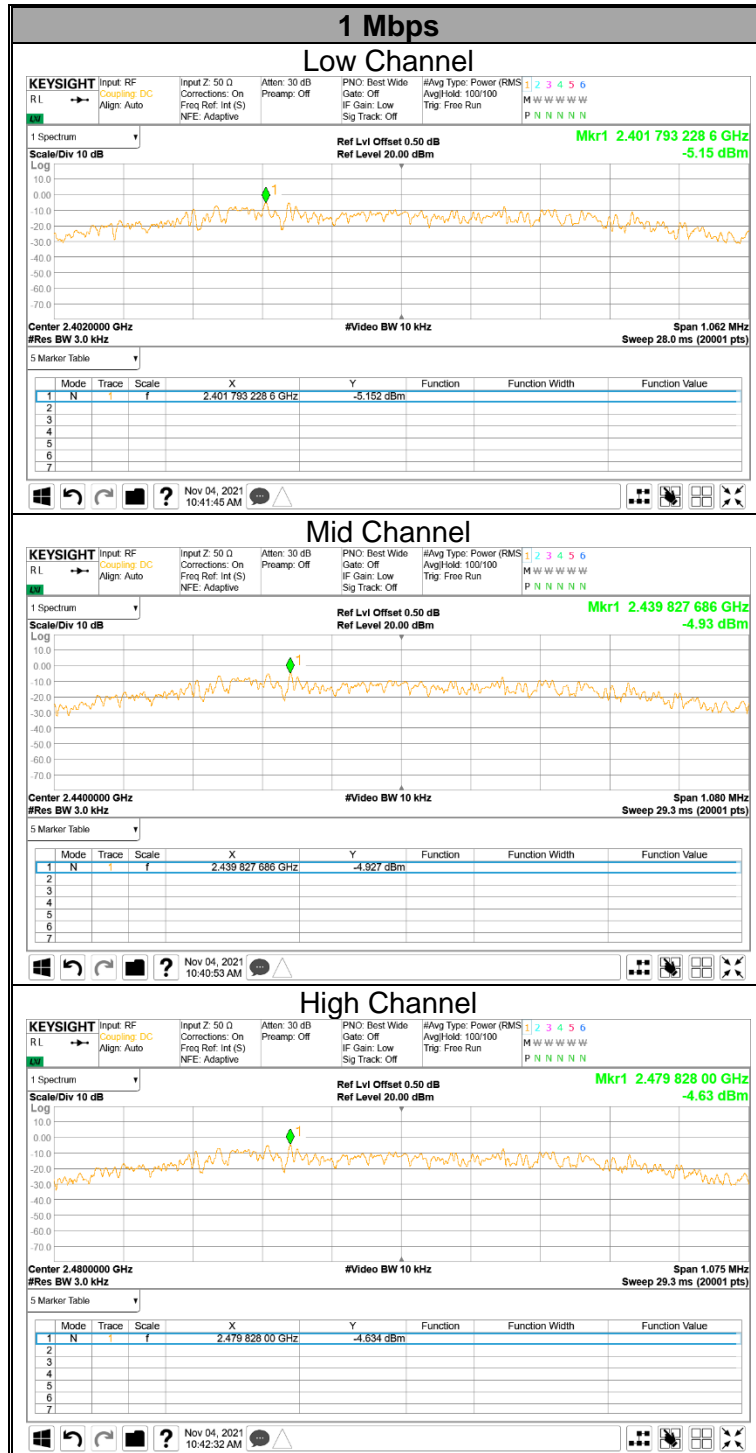
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

9.5.1. 1Mbps

Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2402	-5.15	8.00	-13.15
Mid	2440	-4.93	8.00	-12.93
High	2480	-4.63	8.00	-12.63

9.5.2. PSD TEST PLOTS



9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

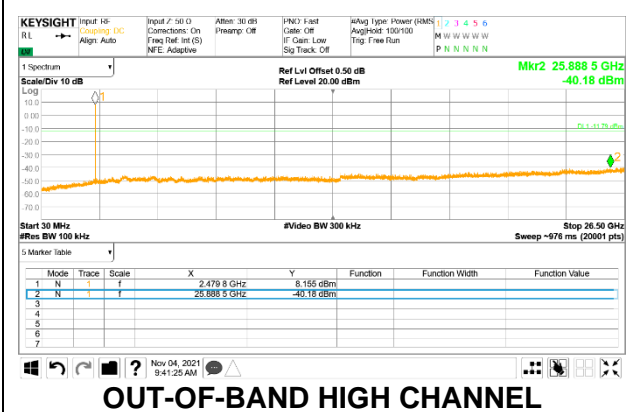
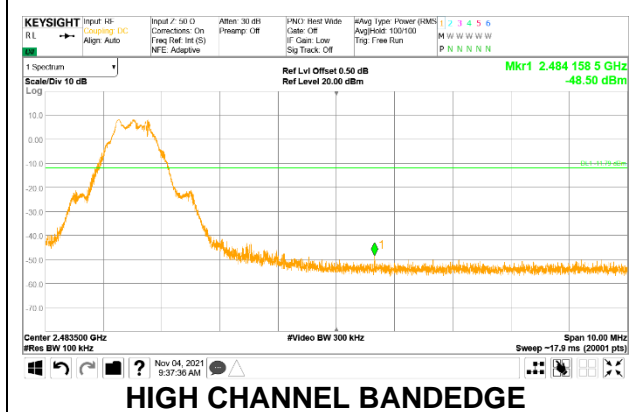
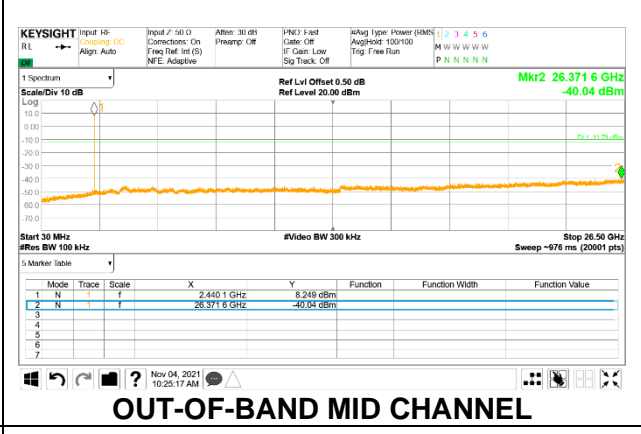
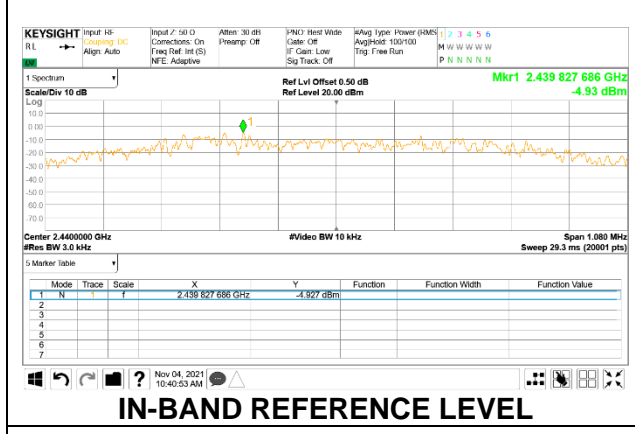
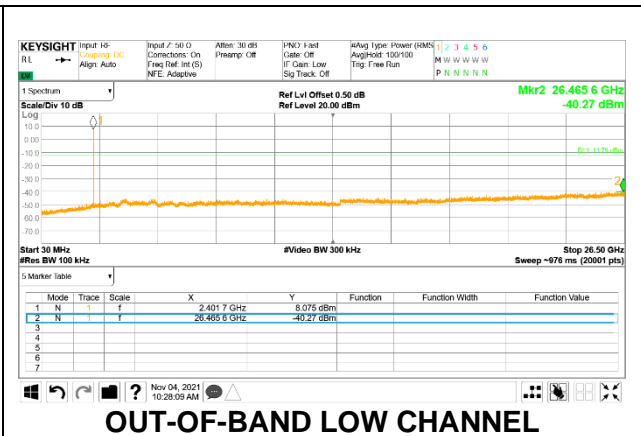
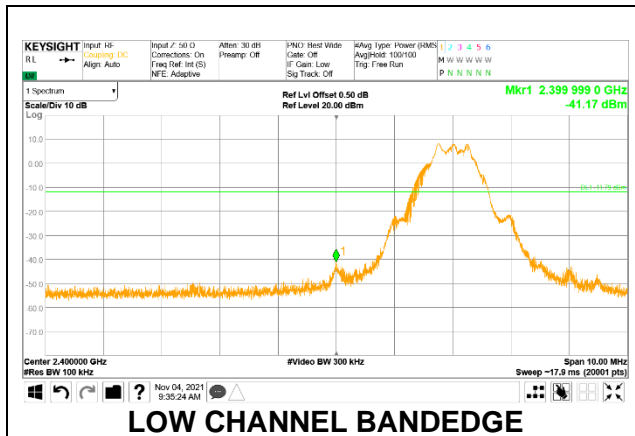
FCC §15.247 (d)

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. 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 = $10 \log(1/0.6239) = 2.05 \text{ dB}$

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.

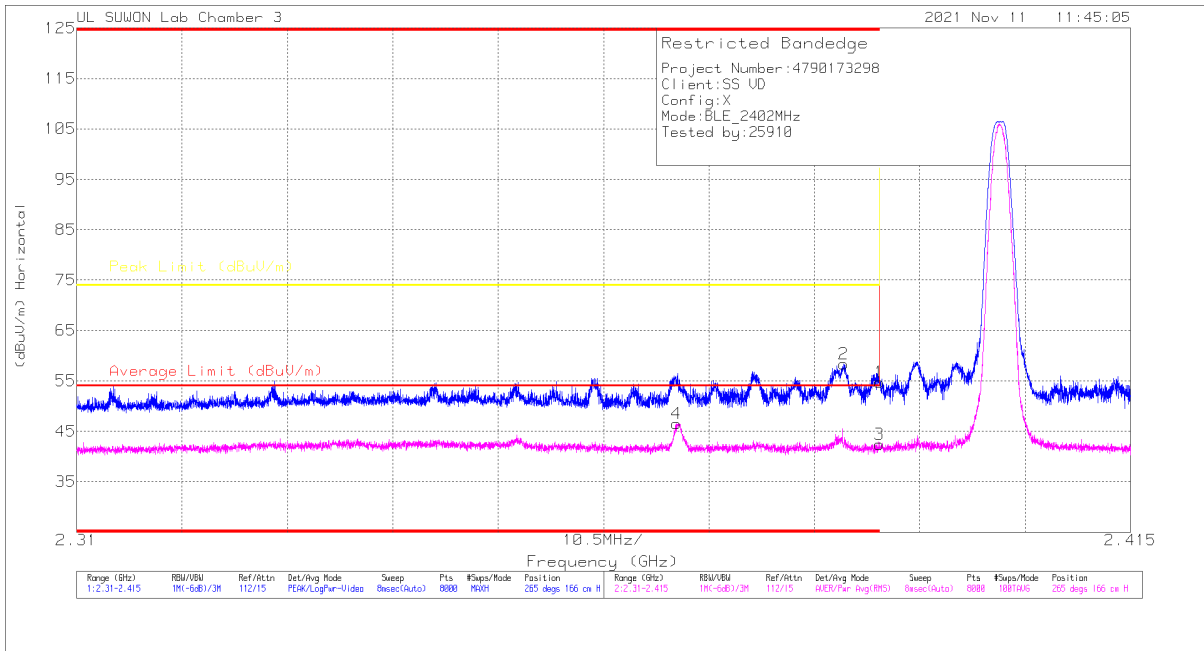
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open field test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field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

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. 1 Mbps

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT

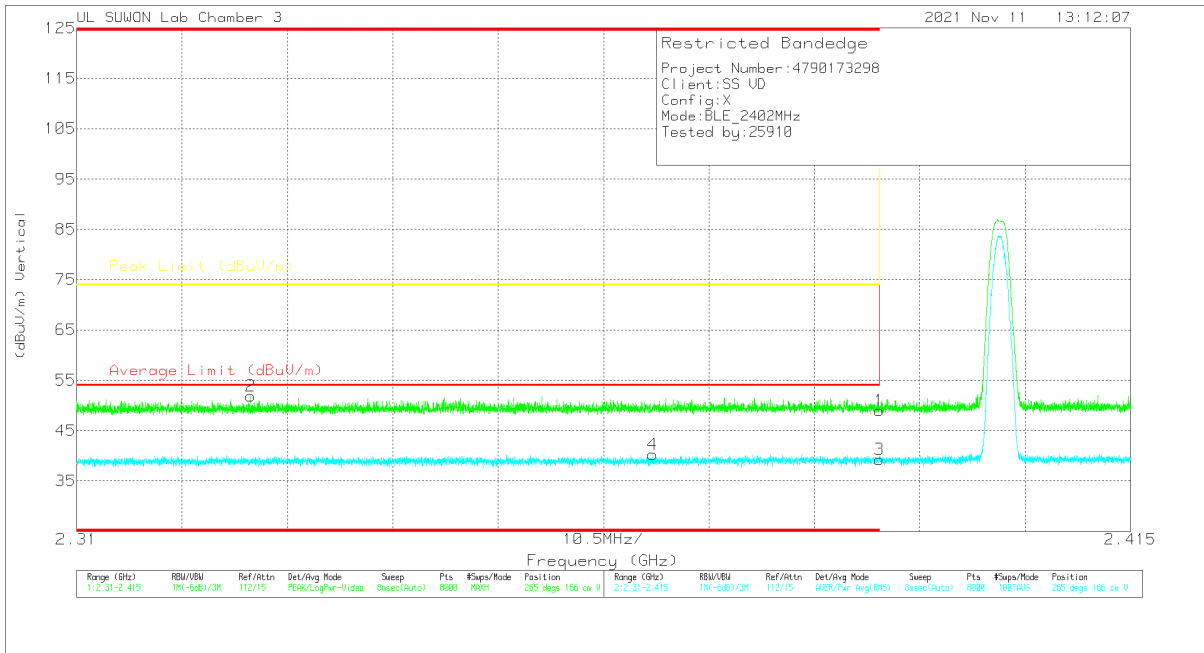


Trace Markers

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	* 2.39	47.31	Pk	32.8	-25.4	0	54.71	-	-	74	-19.29	265	166	H
2	* 2.38645	51.05	Pk	32.7	-25.4	0	58.35	-	-	74	-15.65	265	166	H
3	* 2.39	32.82	RMS	32.8	-25.4	2.05	42.37	54	-11.63	-	-	265	166	H
4	* 2.36979	37.2	RMS	32.7	-25.4	2.05	46.55	54	-7.45	-	-	265	166	H

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

VERTICAL RESULT



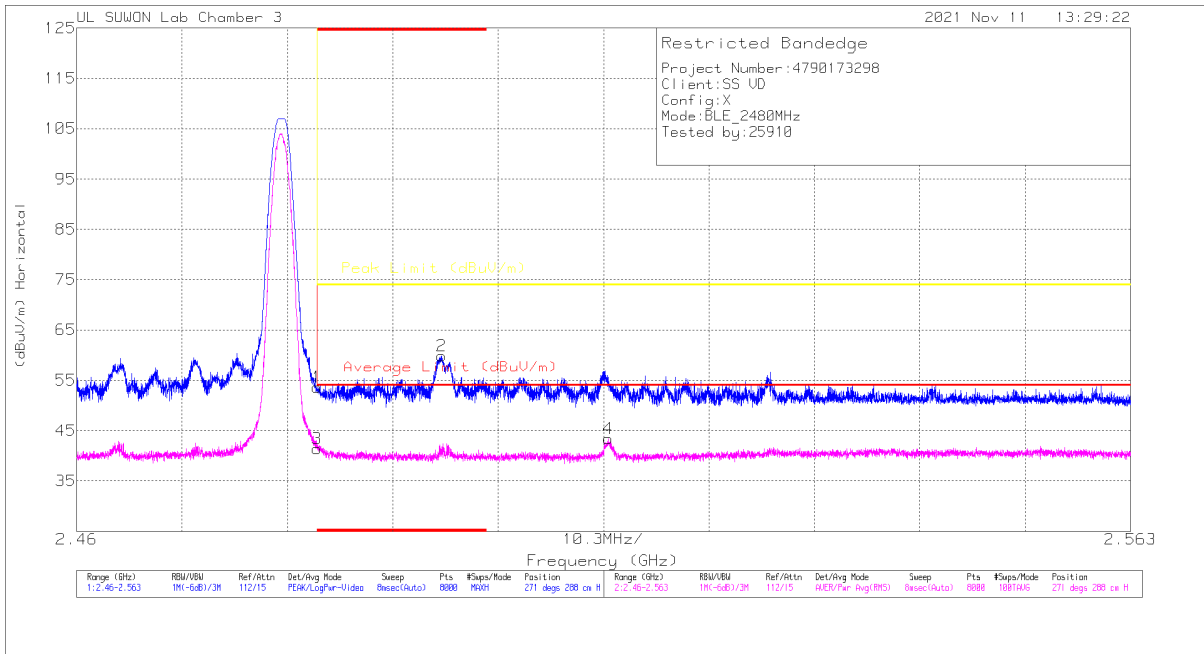
Trace Markers

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)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.64	Pk	32.8	-25.4	0	49.04	-	-	74	-24.96	265	166	V
2	* 2.32734	44.77	Pk	32.5	-25.4	0	51.87	-	-	74	-22.13	265	166	V
3	* 2.39	31.84	RMS	32.8	-25.4	2.05	41.29	54	-12.71	-	-	265	166	V
4	* 2.36739	33.04	RMS	32.7	-25.4	2.05	42.39	54	-11.61	-	-	265	166	V

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

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT

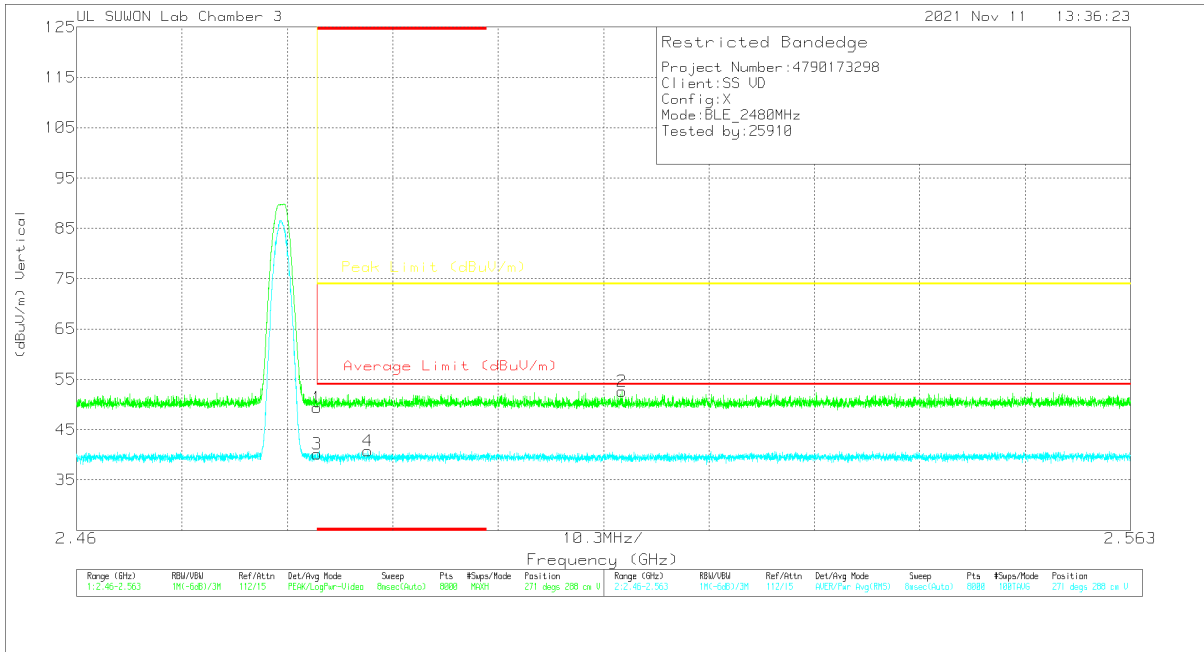


Trace Markers

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)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	45.98	Pk	32.9	-25.3	0	53.58	-	-	74	-20.42	271	288	H
2	* 2.4957	52.27	Pk	32.9	-25.3	0	59.87	-	-	74	-14.13	271	288	H
3	* 2.4835	33.75	RMS	32.9	-25.3	2.05	43.4	54	-10.6	-	-	271	288	H
4	2.51195	35.67	RMS	32.9	-25.2	2.05	45.42	54	-8.58	-	-	271	288	H

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

VERTICAL RESULT



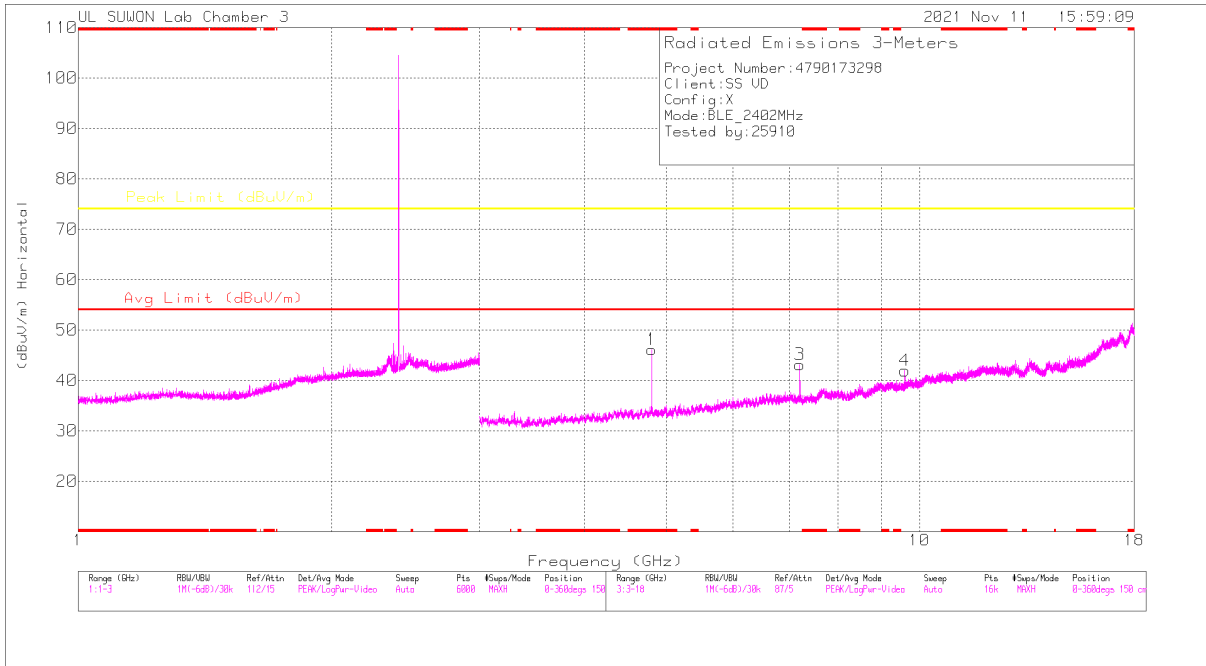
Trace Markers

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)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	41.76	Pk	32.9	-25.3	0	49.36	-	-	74	-24.64	271	288	V
2	2.51331	45.07	Pk	32.9	-25.3	0	52.67	-	-	74	-21.33	271	288	V
3	* 2.4835	32.55	RMS	32.9	-25.3	2.05	42.2	54	-11.8	-	-	271	288	V
4	* 2.48845	33.07	RMS	32.9	-25.2	2.05	42.82	54	-11.18	-	-	271	288	V

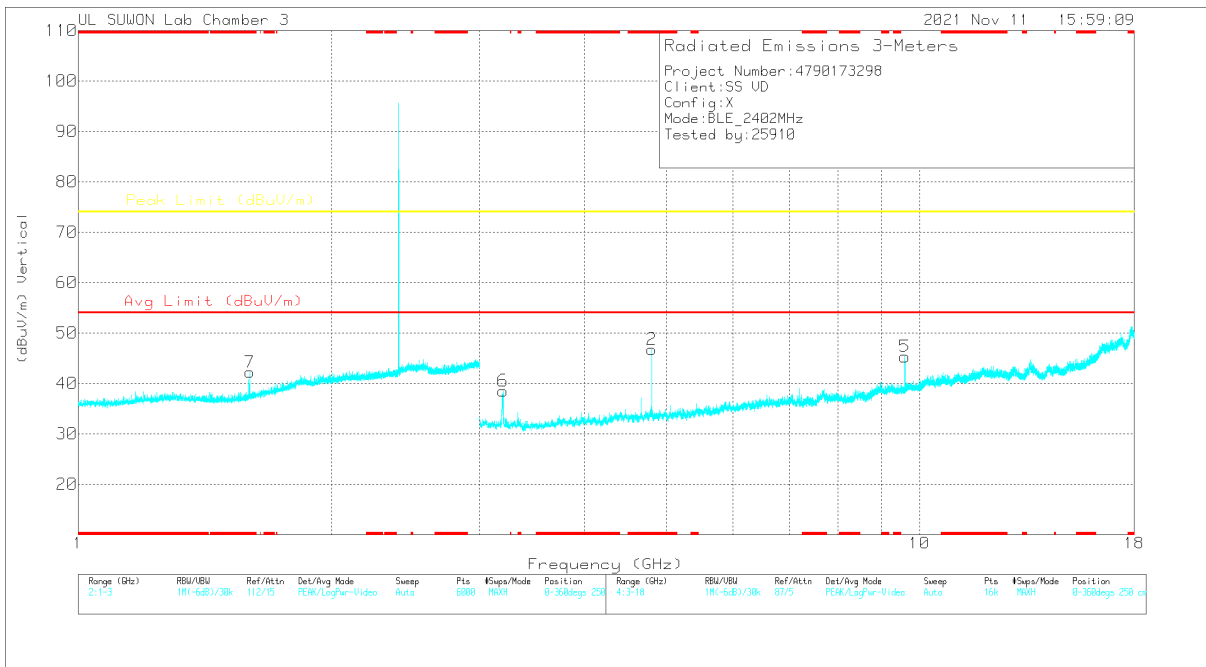
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 RMS - RMS detection

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.

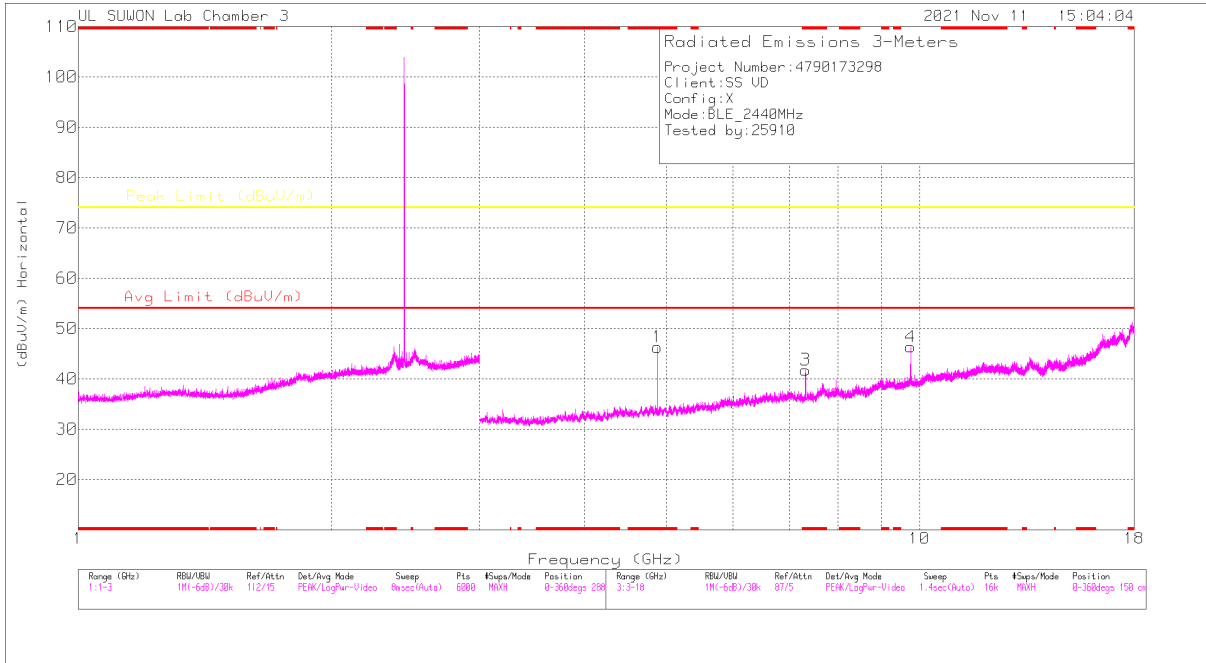
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	10dB_ATT[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
* 1.59796	51.01	PK2	28.9	-26.4	0	53.51	-	-	74	-20.49	155	100	V
* 1.59843	34.82	MAv1	28.9	-26.4	2.05	39.37	54	-14.63	-	-	155	100	V

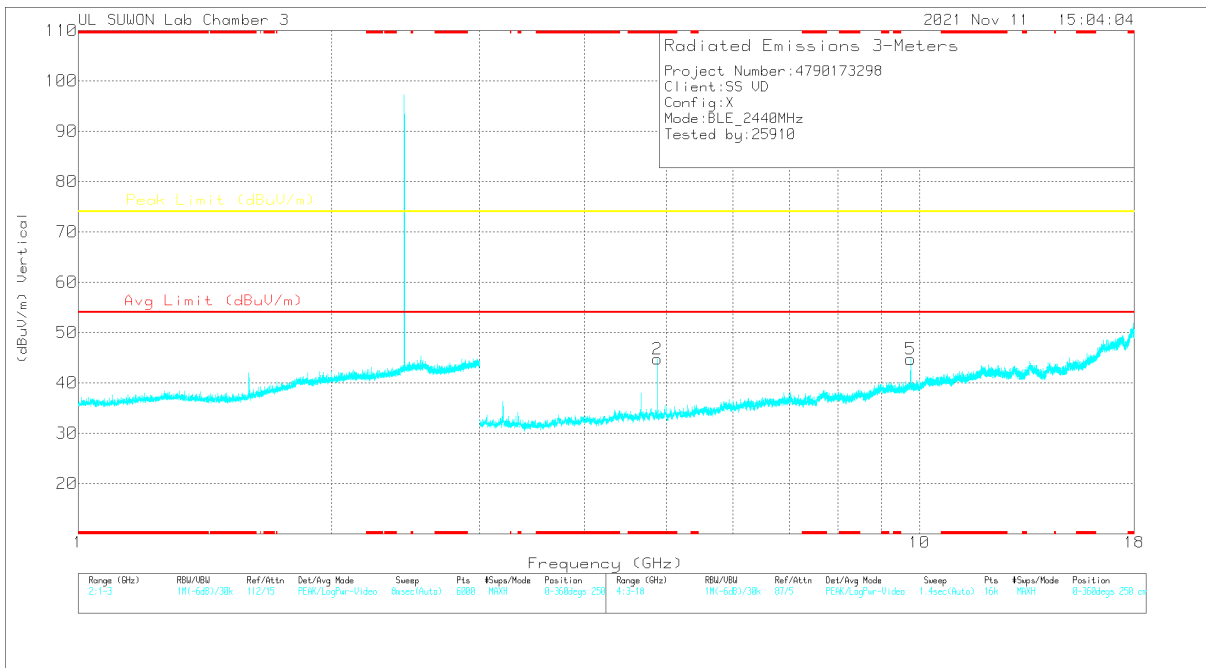
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3.19955	54.52	PK2	33.5	-33.5	0	54.52	-	-	74	-19.48	159	107	V
* 4.80348	48.58	PK2	34.6	-30.4	0	52.78	-	-	74	-21.22	126	101	V
* 4.80352	39.43	MAv1	34.6	-30.4	2.05	45.68	54	-8.32	-	-	107	100	H
* 4.80352	46.87	PK2	34.6	-30.4	0	51.07	-	-	74	-22.93	107	100	H
* 4.80365	42.23	MAv1	34.6	-30.4	2.05	48.48	54	-5.52	-	-	126	101	V
7.20539	41	PK2	36.1	-26.1	0	51	-	-	74	-23	219	102	H
9.60715	37.38	PK2	37.3	-22.1	0	52.58	-	-	74	-21.42	96	100	H
9.6079	37.14	PK2	37.3	-22.1	0	52.34	-	-	74	-21.66	0	111	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

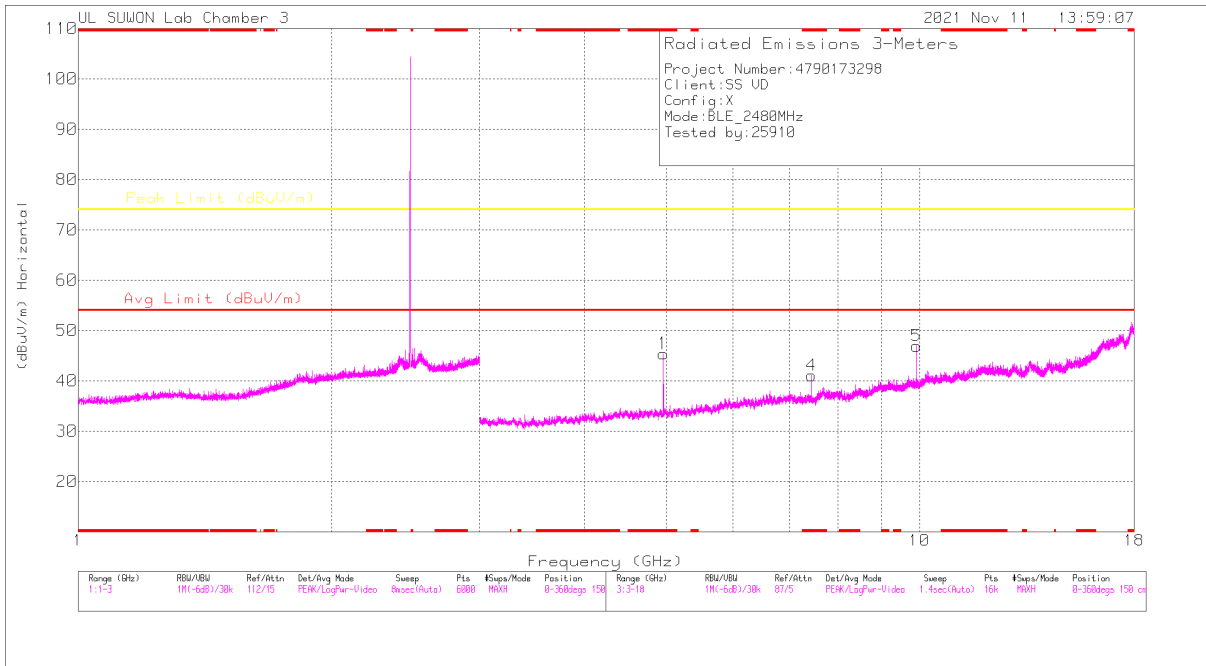
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

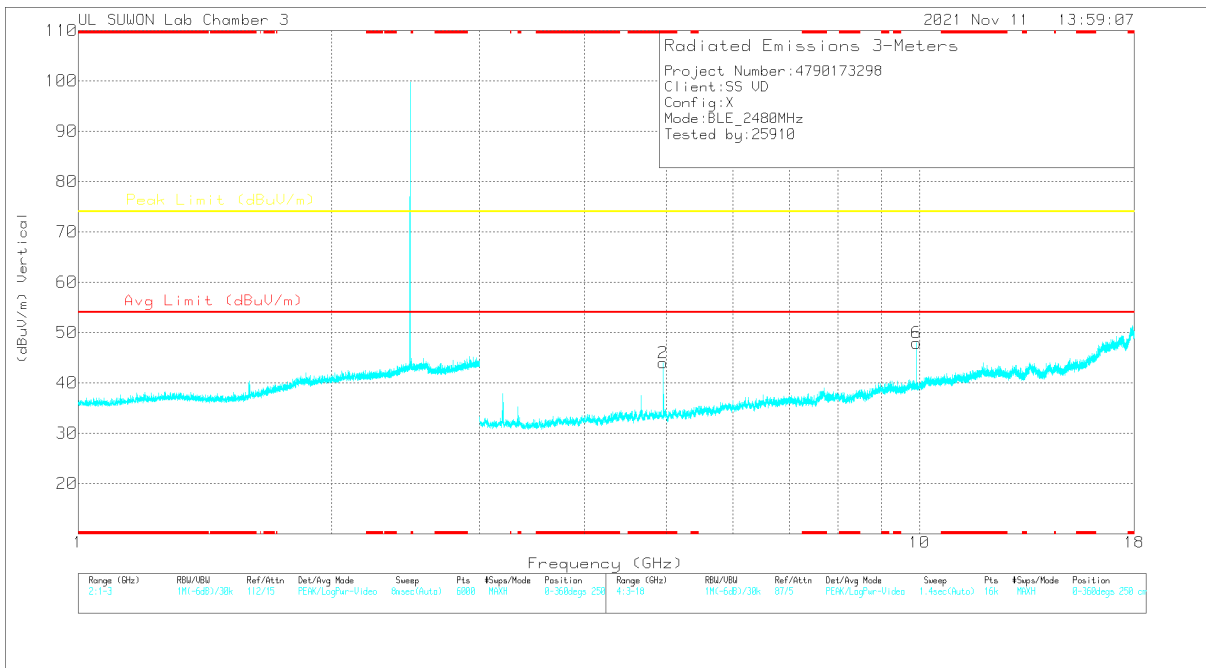
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88052	46.9	PK2	34.7	-31.2	0	50.4	-	-	74	-23.6	108	100	H
* 4.87953	39.68	MAv1	34.7	-31.2	2.05	45.23	54	-8.77	-	-	108	100	H
* 4.87962	48.81	PK2	34.7	-31.2	0	52.31	-	-	74	-21.69	127	100	V
* 4.87968	41.84	MAv1	34.7	-31.2	2.05	47.39	54	-6.61	-	-	127	100	V
* 7.3193	40.15	PK2	36	-25.4	0	50.75	-	-	74	-23.25	218	100	H
* 7.3193	30.46	MAv1	36	-25.4	2.05	43.11	54	-10.89	-	-	218	100	H
9.75908	37.14	PK2	37.5	-21.7	0	52.94	-	-	74	-21.06	99	100	H
9.75908	37.68	PK2	37.5	-21.7	0	53.48	-	-	74	-20.52	104	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak

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.

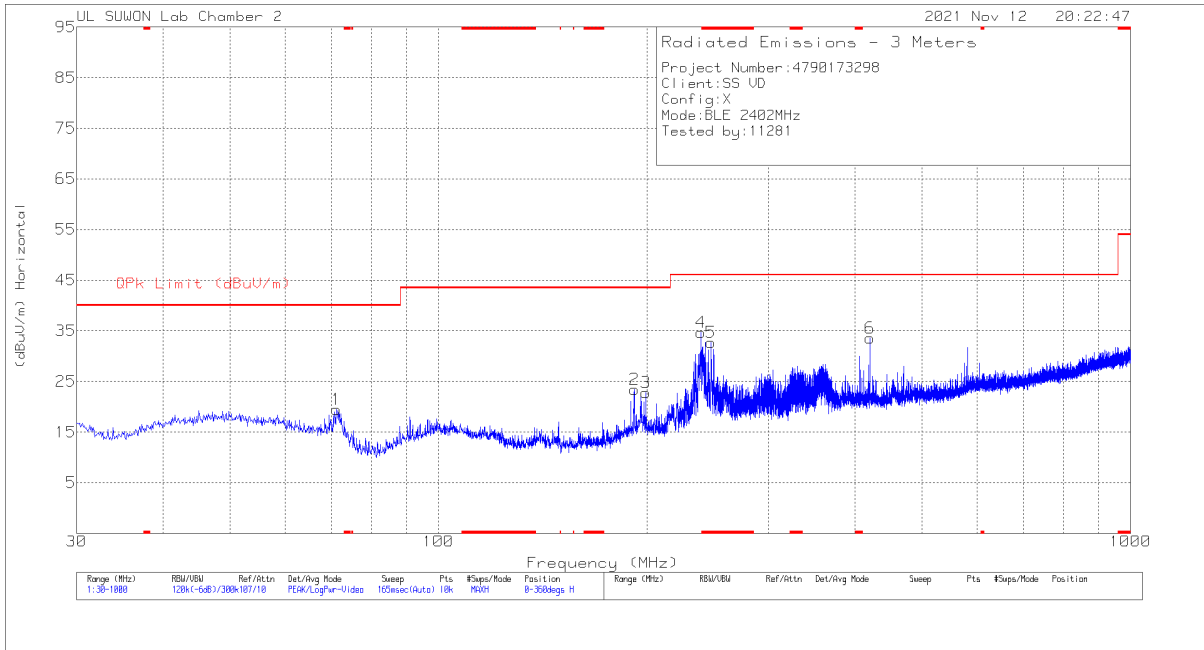
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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
* 4.96051	47.66	PK2	34.7	-30.9	0	51.46	-	-	74	-22.54	125	283	H
* 4.95958	41.08	MAv1	34.7	-30.9	2.05	46.93	54	-7.07	-	-	125	283	H
* 4.9595	44.28	PK2	34.7	-30.9	0	48.08	-	-	74	-25.92	254	253	V
* 4.95961	35.51	MAv1	34.7	-30.9	2.05	41.36	54	-12.64	-	-	254	253	V
* 7.44082	38.22	PK2	36	-25.3	0	48.92	-	-	74	-25.08	213	272	H
* 7.4394	27.86	MAv1	36	-25.3	2.05	40.61	54	-13.39	-	-	213	272	H
9.92	38.88	PK2	37.7	-21.9	0	54.68	-	-	74	-19.32	144	278	H
9.92	37.93	PK2	37.7	-21.9	0	53.73	-	-	74	-20.27	94	114	V

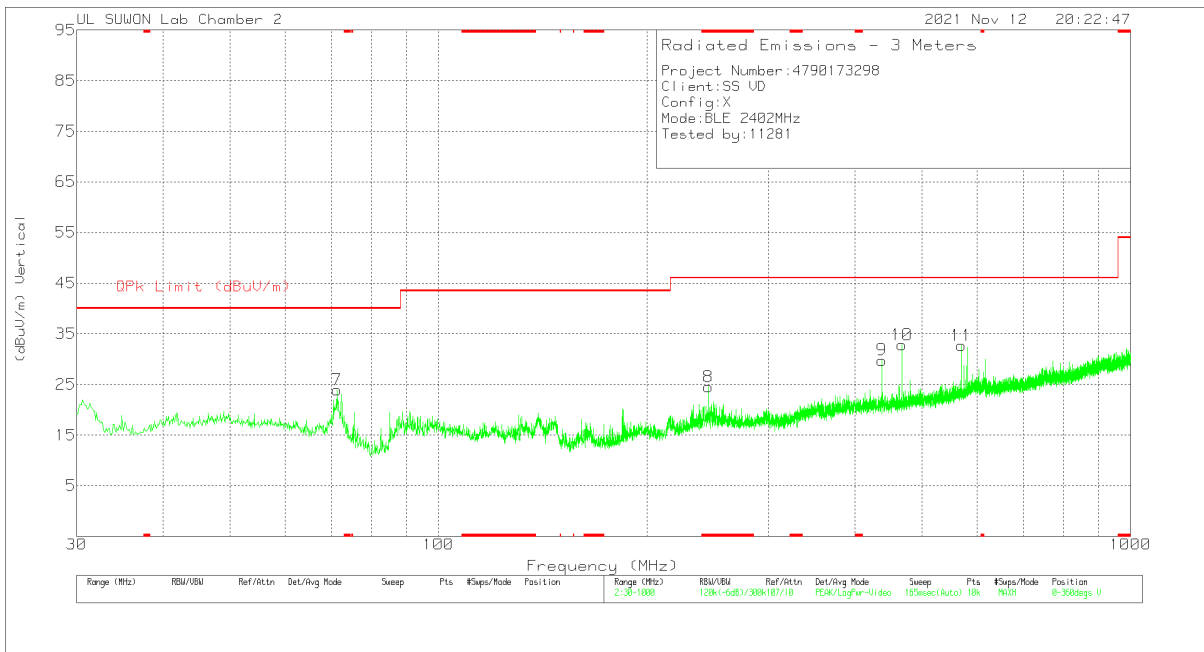
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak

10.3. WORST CASE BELOW 1 GHZ

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



HORIZONTAL



VERTICAL

Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_749	Below 1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	71.225	36.16	Pk	14.8	-31.5	19.46	40	-20.54	0-360	100	H
2	191.99	37.51	Pk	16.7	-30.8	23.41	43.52	-20.11	0-360	100	H
3	199.362	36.26	Pk	17.3	-30.8	22.76	43.52	-20.76	0-360	100	H
4	239.617	47.2	Pk	18.2	-30.7	34.7	46.02	-11.32	0-360	100	H
5	* 247.474	44.73	Pk	18.4	-30.4	32.73	46.02	-13.29	0-360	100	H
6	420.037	41.44	Pk	22	-29.9	33.54	46.02	-12.48	0-360	100	H
7	71.322	40.69	Pk	14.8	-31.6	23.89	40	-16.11	0-360	100	V
8	* 245.437	36.67	Pk	18.4	-30.5	24.57	46.02	-21.45	0-360	200	V
9	437.303	37.49	Pk	22.1	-29.8	29.79	46.02	-16.23	0-360	100	V
10	467.082	40.57	Pk	22.1	-29.8	32.87	46.02	-13.15	0-360	100	V
11	569.805	38.38	Pk	23.9	-29.6	32.68	46.02	-13.34	0-360	100	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

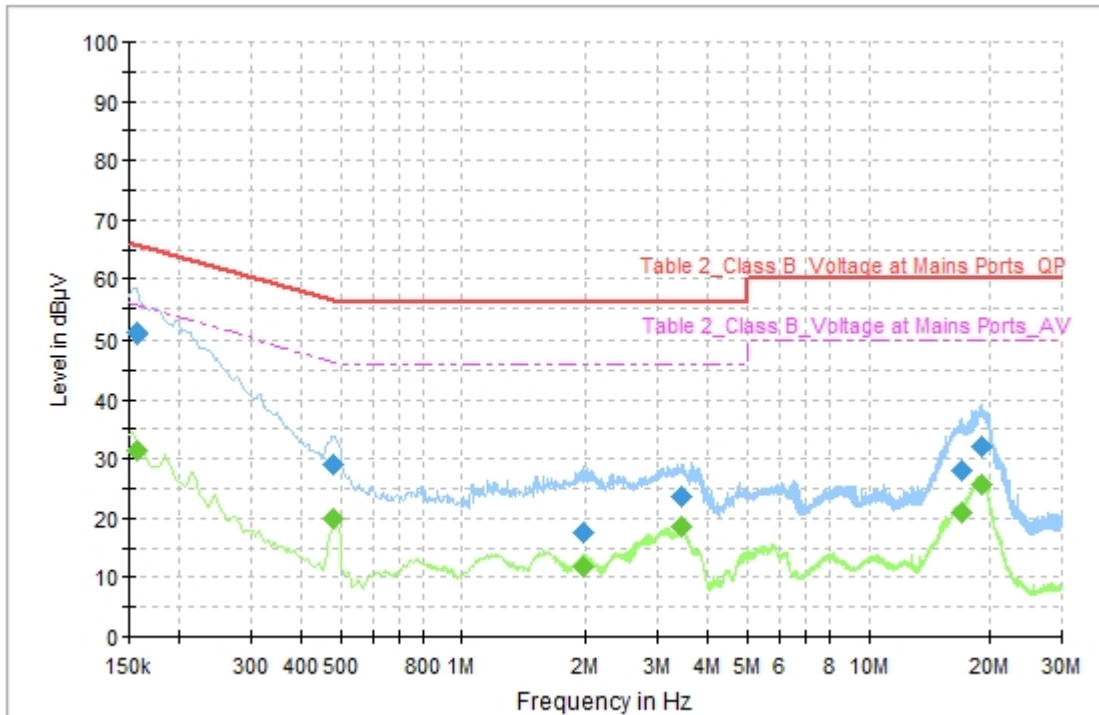
Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

RESULTS

11.1.1. AC Power Line

LINE 1 RESULTS



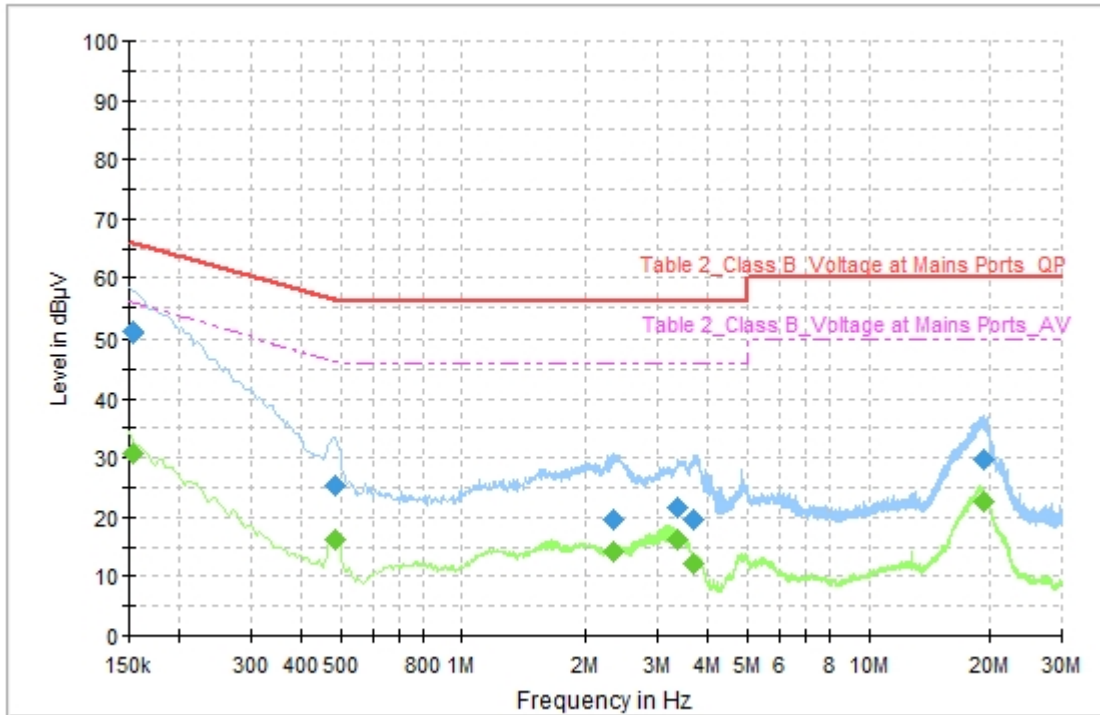
Final Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.157000	51.09	65.62	14.53	L1	ON	9.8
0.479000	29.19	56.36	27.17	L1	ON	9.9
1.962500	17.55	56.00	38.45	L1	ON	9.7
3.440000	23.48	56.00	32.52	L1	ON	9.7
16.958333	28.09	60.00	31.91	L1	ON	10.0
18.933333	32.11	60.00	27.89	L1	ON	10.0

Final Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.157000	31.39	55.62	24.23	L1	ON	9.8
0.479000	19.77	46.36	26.58	L1	ON	9.9
1.962500	11.99	46.00	34.01	L1	ON	9.7
3.440000	18.59	46.00	27.41	L1	ON	9.7
16.958333	20.88	50.00	29.12	L1	ON	10.0
18.933333	25.58	50.00	24.42	L1	ON	10.0

LINE 2 RESULTS



Final Result QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.153500	50.99	65.81	14.81	N	ON	9.7
0.486000	25.37	56.24	30.87	N	ON	9.9
2.341250	19.55	56.00	36.45	N	ON	9.7
3.357500	21.70	56.00	34.30	N	ON	9.7
3.698750	19.56	56.00	36.44	N	ON	9.8
19.129167	29.72	60.00	30.28	N	ON	10.0

Final Result CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.153500	30.76	55.81	25.05	N	ON	9.7
0.486000	16.07	46.24	30.16	N	ON	9.9
2.341250	14.22	46.00	31.78	N	ON	9.7
3.357500	16.10	46.00	29.90	N	ON	9.7
3.698750	12.13	46.00	33.87	N	ON	9.8
19.129167	22.50	50.00	27.50	N	ON	10.0

END OF TEST REPORT