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FCC RF Test Report

Test Report Number	GLS-21090842-L-FCC IC-WLAN Rev_1.0
FCC ID	MG3-59007000007
IC	2575A-59007000007
Applicant	Universal Electronic Inc.
Applicant Address	201 East Sandpointe Ave., 7th Floor, Santa Ana, CA 92707
Product Name	UE61 Module
Model (s)	UE61V
Date of Receipt	09/08/2021
Date of Test	11/24/2021- 05/17/2022
Report Issue Date	10/28/2022
Test Standards	47 CFR Part 15.247 RSS 247 Issue2, February 2017
Test Result	**PASS**

Issued by:

Vista Compliance Laboratories
1261 Puerta Del Sol, San Clemente, CA 92673 USA
www.vista-compliance.com

Devin Tai (Test Engineer)

David Zhang (Technical Manager)

REVISION HISTORY

Report Number	Version	Description	Issued Date
GLS-21090842-L-FCC-IC-WLAN	01	Initial report	05/18/2022
GLS-21090842-L-FCC IC-WLAN Rev_1.0	1.0	Update Applicant's address	10/28/2022

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DTS (6 dB) Channel Bandwidth	47 CFR Part 15.247 RSS-247 Issue 2, Feb 2017	ANSI C63.10 (2013)	Pass
Occupied Bandwidth	RSS-Gen Issue 5, Mar 2019	RSS-Gen Issue 5, Feb 2021	Pass
Conducted Maximum Output Power	47 CFR Part 15.247 RSS-247 Issue 2, Feb 2017	ANSI C63.10 (2013)	Pass
Power Spectral Density	47 CFR Part 15.247 RSS-247 Issue 2, Feb 2017	ANSI C63.10 (2013)	Pass
Conducted Band-Edge & Unwanted Emissions	47 CFR Part 15.247 RSS-247 Issue 2, Feb 2017	ANSI C63.10 (2013)	Pass
Radiated Emissions & Unwanted Emissions into Restricted Frequency Bands	47 CFR Part 15.247 RSS-247 Issue 2, Feb 2017	ANSI C63.10 (2013)	Pass
AC Power Line Conducted Emissions	47 CFR Part 15.247 RSS-247 Issue 2, Feb 2017	ANSI C63.10 (2013)	Pass

2 General Information

2.1 Applicant

Applicant	Universal Electronic Inc.
Applicant address	201 East Sandpointe Ave., 7th Floor, Santa Ana, CA 92707
Manufacturer	Universal Electronic Inc.
Manufacturer Address	201 East Sandpointe Ave., 7th Floor, Santa Ana, CA 92707

2.2 Product information

Product Name	UE61 Module
Product Description	UE61V
Model Number	N/A
Family Models	N/A
Serial Number	N/A
Frequency Band	BLE: 2402-2480MHz WLAN: 2412-2462MHz
Type of modulation	BLE: GFSK WLAN_2.4G: CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Equipment Class	DTS
Antenna Information	PCB Antenna Antenna Gain: 1.5dBi ±0.5dB
Clock Frequencies	N/A
Input Power	DC 3.3V
Power Adapter Manufacturer/Model	N/A
Power Adapter SN	N/A
Hardware version	N/A
Software version	N/A
Additional Info	N/A

2.3 Test standard and method

Test standard	47 CFR Part 15.247 RSS-247 Issue 2, Feb 2017
Test method	ANSI C63.10-2013 558074 D01 15.247 Meas Guidance v05r02

3 Test Site Information

Lab performing tests	Vista Laboratories, Inc.
Lab Address	1261 Puerta Del Sol, San Clemente, CA 92673 USA
Phone Number	+1 (949) 393-1123
Website	www.vista-compliance.com

Test Condition	Temperature	Humidity	Atmospheric Pressure
RF Testing	23.2°C	57.5%	996 mbar
Radiated Emission Testing	23.2°C	57.5%	996 mbar

4 Modification of EUT / Deviations from Standards

The EUT is an engineering test sample loaded with RF testing firmware specifically designed to support the RF TX/RX measurement in different aspects.

5 Test Configuration and Operation

5.1 EUT Test Configuration

The EUT is mounted onto a development board to support testing. EUT is set to different transmission mode in terms of radio mode bandwidth, power level, test channel, etc.

The following software was used for testing and to monitor EUT performance

Software	Description
EMISoft Vasona	EMC/RF Spurious emission test software used during testing
Realtek_DUT_Selection	Set the module work at wifi mode
UI_mptool	Set the module work at different mode, channel, bandwidth, etc.

Power setting as below

802.11b		**802.11g**	
Channel	Power Setting	Channel	Power Setting
1	102	1	92
6	104	6	92
11	102	11	92
802.11n20		**802.11n40**	
Channel	Power Setting	Channel	Power Setting
1	92	3	92
6	92	6	92
11	88	9	88

5.2 Supporting Equipment

Description	Manufacturer	Model #	Serial #
DC Power supply	RIGOL	DP712	DP7B194900487
USB to TTL Serial Converter Adapter	Songhe	FT232RL	JESSE210825

6 Uncertainty of Measurement

Test item	Measurement Uncertainty (dB)
RF Output Power (Conducted)	±1.2 dB
Power Spectral Density	±0.9 dB
Unwanted Emission (conducted)	±2.6 dB
Occupied Channel Bandwidth	±5 %
Radiated Emission (9KHz-30MHz)	±3.5 dB
Radiated Emission (30MHz-1GHz)	±4.6 dB
Radiated Emission (1-18GHz)	±4.9 dB
Radiated Emission (18-40GHz)	±3.5 dB

7 Test Results

7.1 Antenna Requirement

7.1.1 Requirement

Per § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

7.1.2 Result

Analysis:

- EUT has a PCB trace antenna which is integrated to the main board. And the antenna gain is 1.5±0.5dBi.

Conclusion:

- EUT complies with antenna requirement in § 15.203.

7.2 DTS (6 dB) Bandwidth

7.2.1 Requirement

§ 15.247 (a)(2), RSS-247 §5.2

Systems using digital modulation techniques may operate in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands. The minimum 6 dB bandwidth shall be at least 500 KHz.

7.2.2 Test Setup

7.2.3 Test Procedure

According to section 8.2, option 2, in KDB 558074 D01 DTS Meas Guidance v05r02 and subclause 11.8 of ANSI C63.10-2013:

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW ≥ 3 × RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Use automatic bandwidth measurement capability on instrument to obtain BW result.

7.2.4 Test Result

Mode	Data rate	Frequency (MHz)	Measured Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
802.11b	1Mbps	2412	10.06	0.5	Pass
		2437	10.06	0.5	Pass
		2462	10.07	0.5	Pass
802.11g	6Mbps	2412	16.53	0.5	Pass
		2437	16.53	0.5	Pass
		2462	16.53	0.5	Pass
802.11n20	MCS0	2412	17.68	0.5	Pass
		2437	17.67	0.5	Pass
		2462	17.68	0.5	Pass
802.11n40	MCS0	2422	36.38	0.5	Pass
		2437	36.37	0.5	Pass
		2452	36.37	0.5	Pass

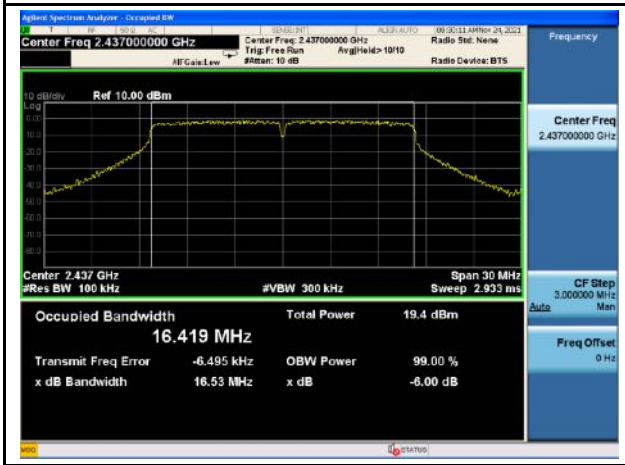
7.2.5 Test Plots

DTS BW_802.11b_Low CH

DTS BW_802.11b_Mid CH

DTS BW_802.11b_High CH

DTS BW_802.11g_Low CH

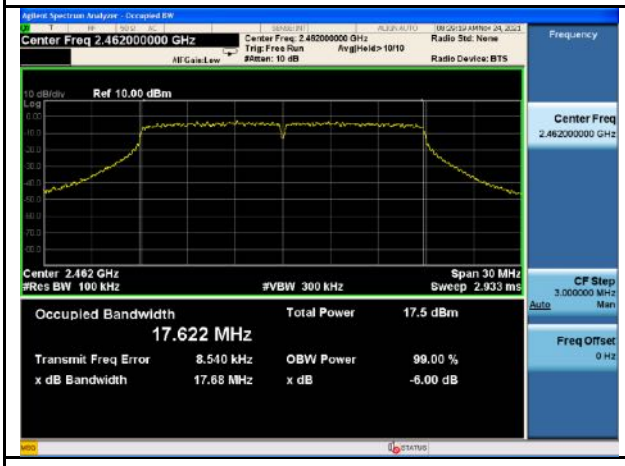


DTS BW_802.11g_Mid CH

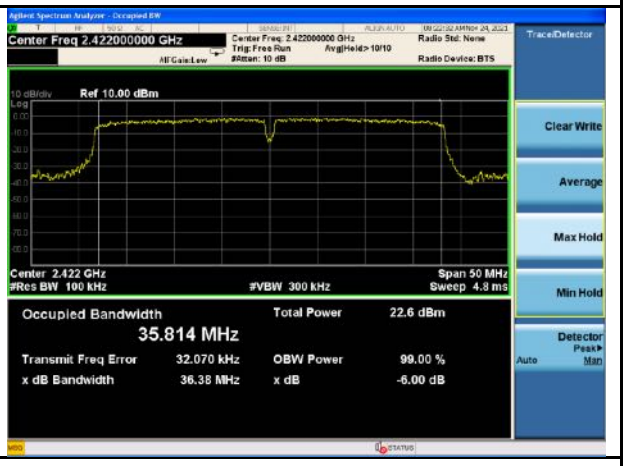
DTS BW_802.11g_High CH

DTS BW_802.11n20_Low CH

DTS BW_802.11 n20_Mid CH

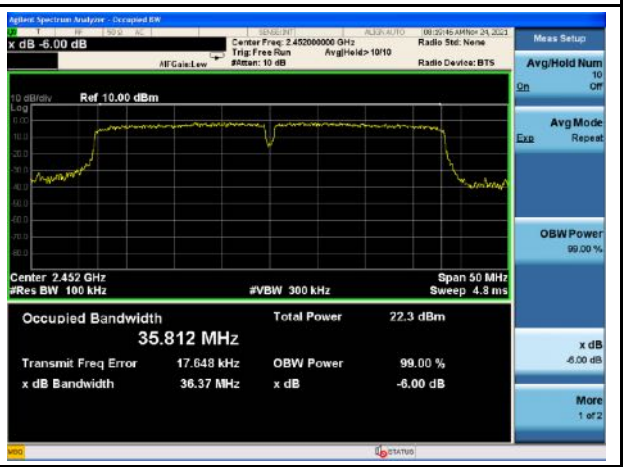


DTS BW_802.11 n20_High CH



DTS BW_802.11 n40_Low CH

DTS BW_802.11n40_Mid CH



DTS BW_802.11n40_High CH

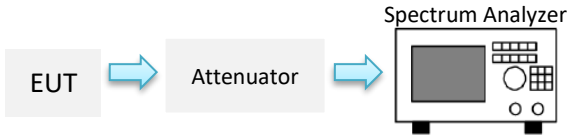
7.3 Occupied Bandwidth (99%)

7.3.1 Requirement

RSS-Gen §6.7

The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

7.3.2 Test Setup



7.3.3 Test Procedure

According to section RSS-Gen §6.7

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW ≥ 3 × RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

1. Set RBW = 1% to 5% of the actual occupied BW.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Span = large enough to capture all products of the modulation process
7. Allow the trace to stabilize.
8. Use automatic bandwidth measurement capability on instrument to obtain BW result.

7.3.4 Test Result

Mode	Data rate	Frequency (MHz)	Measured 99% OBW (MHz)	Limit (MHz)	Result
802.11b	1Mbps	2412	14.535	N/A	N/A
		2437	14.598	N/A	N/A
		2462	14.524	N/A	N/A
802.11g	6Mbps	2412	16.868	N/A	N/A
		2437	16.678	N/A	N/A
		2462	16.687	N/A	N/A
802.11n20	MCS0	2412	17.705	N/A	N/A
		2437	17.718	N/A	N/A
		2462	17.717	N/A	N/A
802.11n40	MCS0	2422	35.792	N/A	N/A
		2437	35.815	N/A	N/A
		2452	35.828	N/A	N/A

7.3.5 Test Plots

99%_802.11b_Low CH

99%_802.11b_Mid CH

99%_802.11b_High CH

99%_802.11g_Low CH

99%_802.11g_Mid CH

99%_802.11g_High CH

99%_802.11n20_Low CH

99%_802.11n20_Mid CH

99%_802.11n20_High CH

99%_802.11n40_Low CH

99%_802.11n40_Mid CH

99%_802.11n40_High CH

7.4 Maximum Output Power

7.4.1 Requirement

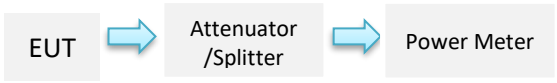
§ 15.247 (b)(3), RSS-247 §5.4

or systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: the maximum output power is 1 Watt.

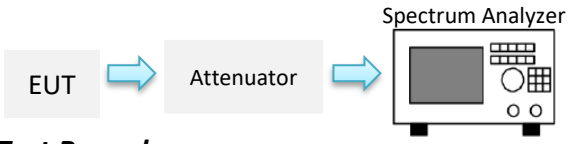
If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

7.4.2 Test Setup

Power Meter



Spectrum Analyzer



7.4.3 Test Procedure

Method 1: Power Meter

Power measurement is according to clause 11.9.1.3 of ANSI C63.10-2013 PKPM1 Peak power meter method or clause 11.9.2.3 AVGPM method.

Method 2: Spectrum Analyzer

1. Set span to at least 1.5 times the OBW.
2. Set RBW = 1-5% of the OBW, not to exceed 1 MHz
3. Set VBW ⩾ 3 x RBW.
4. Number of points in sweep ⩾ 2 × span / RBW
5. Sweep time = auto.
6. Detector = RMS (i.e., power averaging), or sample detector mode.
7. If transmit duty cycle < 98 %, use a sweep trigger with the level set to enable triggering only on full power pulses. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ⩾ 98 %, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run”.
8. Trace average at least 100 traces in power averaging (i.e., RMS) mode.

7.4.4 Test Result

Mode	Data rate	Frequency (MHz)	Measured Output Power (dBm)	Max Output Power (dBm)	Result
802.11b	1Mbps	2412	18.19	30	Pass
		2437	18.97	30	Pass
		2462	18.68	30	Pass
802.11g	6Mbps	2412	16.62	30	Pass
		2437	17.11	30	Pass
		2462	17.18	30	Pass
802.11n20	MCS0	2412	16.48	30	Pass
		2437	16.99	30	Pass
		2462	16.35	30	Pass
802.11n40	MCS0	2422	16.37	30	Pass
		2437	16.96	30	Pass
		2452	16.86	30	Pass

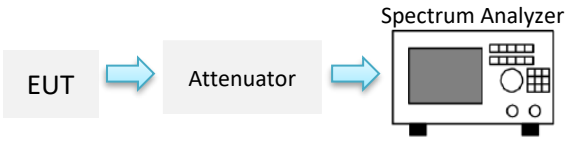
7.5 Power Spectral Density

7.5.1 Requirement

§ 15.247 (e), RSS-247 §5.2

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power is used to determine the power spectral density.

7.5.2 Test Setup



7.5.3 Test Procedure

According to section 8.4 in KDB 558074 D01 DTS Meas Guidance v05r02 and subclause 11.10.2 PKPSD of ANSI C63.10-2013:

1. Set analyser centre frequency to DTS channel centre frequency.
2. Set the span to 1.5 X DTS bandwidth.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

7.5.4 Test Result

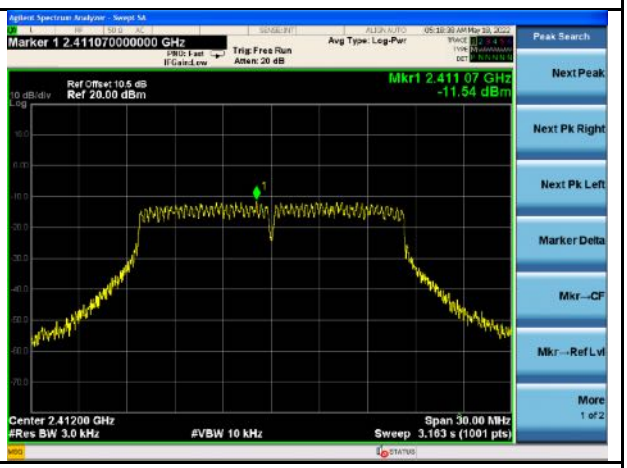
Mode	Data rate	Frequency (MHz)	Measured PSD (dBm/3KHz)	Max PSD Limit (dBm/3KHz)	Result
802.11b	1Mbps	2412	-10.55	8	Pass
		2437	-9.63	8	Pass
		2462	-9.90	8	Pass
802.11g	6Mbps	2412	-11.54	8	Pass
		2437	-10.78	8	Pass
		2462	-11.25	8	Pass
802.11n20	MCS0	2412	-11.16	8	Pass
		2437	-10.74	8	Pass
		2462	-11.45	8	Pass
802.11n40	MCS0	2422	-11.39	8	Pass
		2437	-10.49	8	Pass
		2452	-13.16	8	Pass

7.5.5 Test Plots

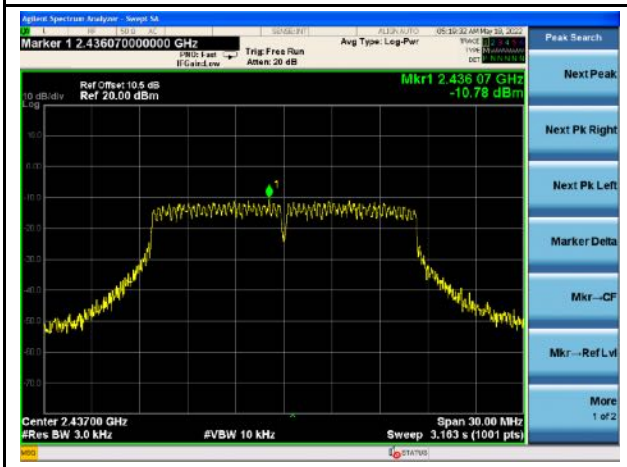
PSD-802.11b-Low CH

PSD-802.11b-Mid CH

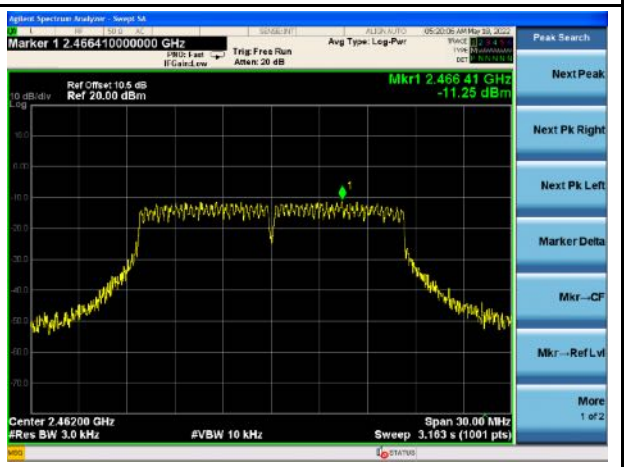
PSD-802.11b-High CH



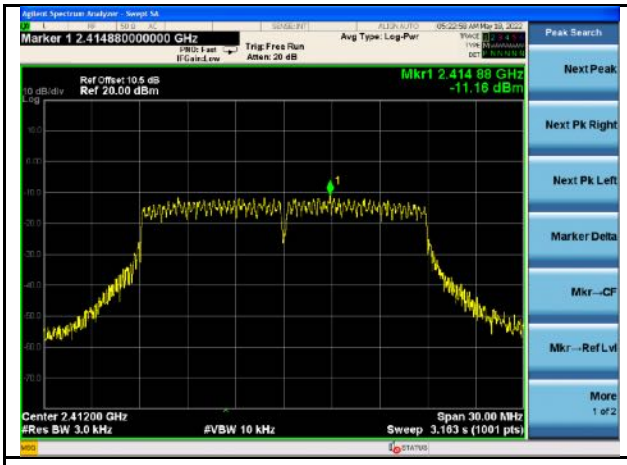
PSD-802.11g-Low CH



PSD-802.11g-Mid CH

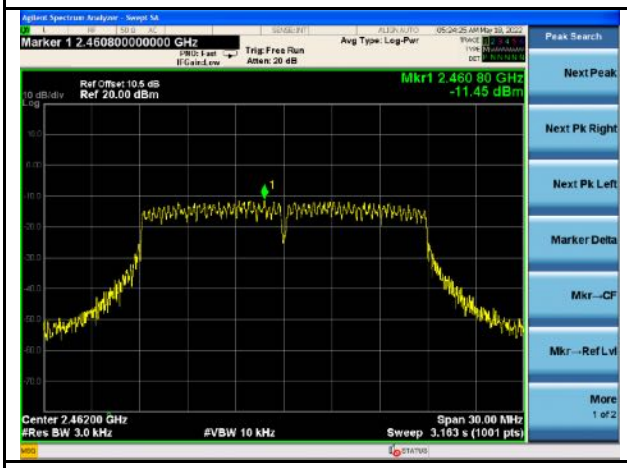


PSD-802.11g-High CH



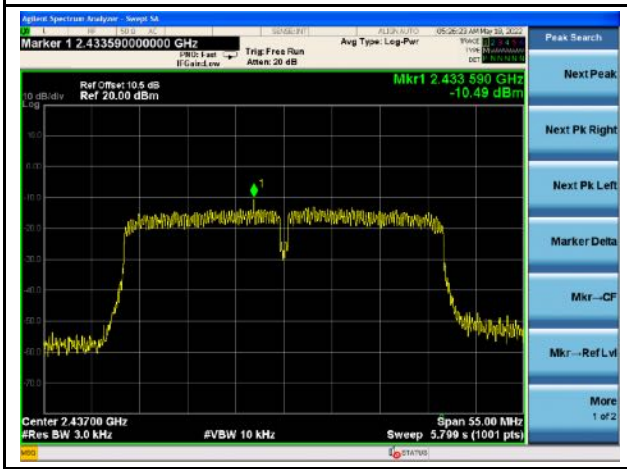
PSD-802.11n20-Low CH

PSD-802.11n20-Mid CH



PSD-802.11n20-High CH

PSD-802.11n40-Low CH



PSD-802.11n40-Mid CH

PSD-802.11n40-High CH

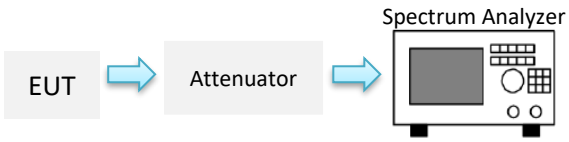
7.6 Conducted Band-Edge & Unwanted Emissions

7.6.1 Requirement

§ 15.247 (d), RSS-247 §5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

7.6.2 Test Setup



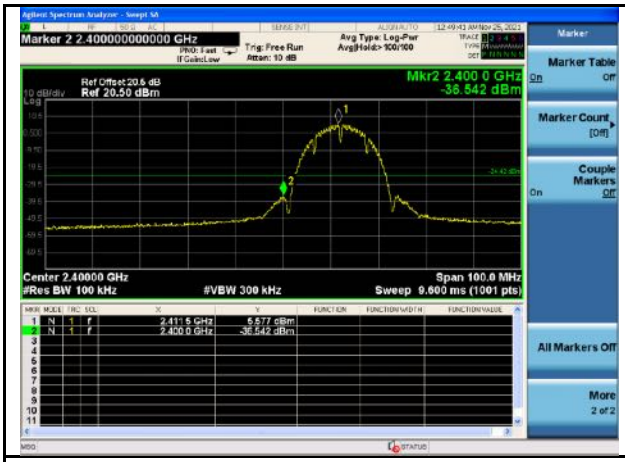
7.6.3 Test Procedure

According to ANSI C63.10-2013 clause 11.13

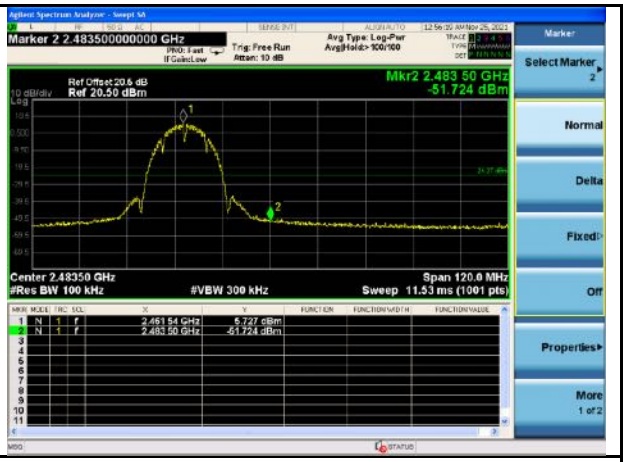
1. The RF output of EUT was connected to the spectrum analyser by RF cable and attenuator. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW=100 KHZ, VBW=300 KHZ, Peak Detector. Unwanted Emissions measured in any 100 khz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 db relative to the maximum in-band peak PSD level in 100 KHZ when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 db instead of 20 db per 15.247(d).
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete and record the results in the test report.

7.6.4 Test Result

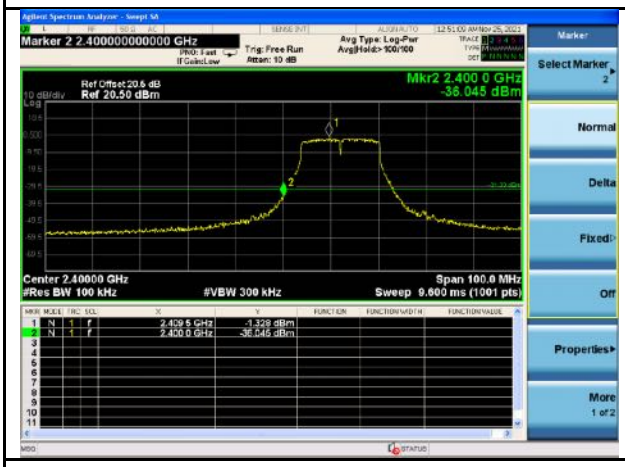
Conducted Band edge



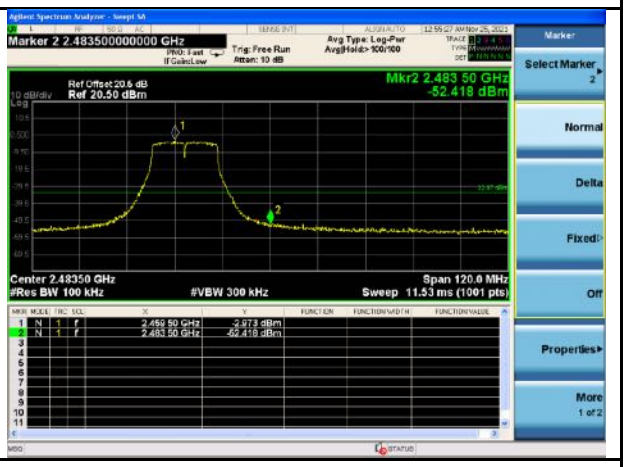
Band Edge-802.11b -Low CH



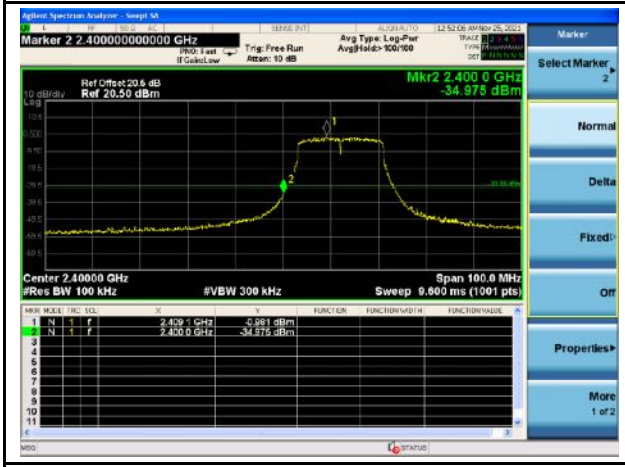
Band Edge-802.11b -High CH



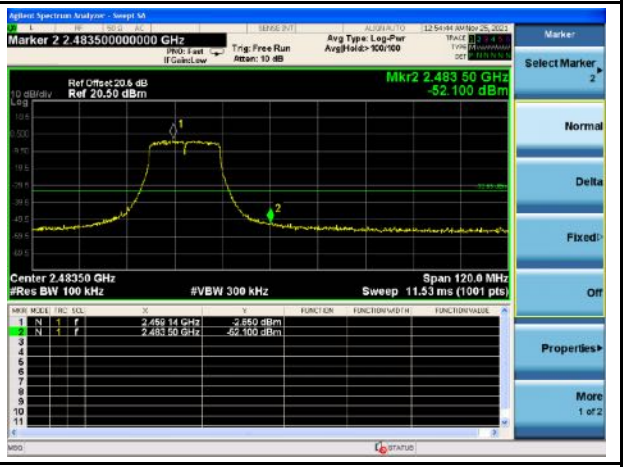
Band Edge-802.11g -Low CH



Band Edge-802.11g -High CH



Band Edge-802.11n20 -Low CH



Band Edge-802.11n20 -High CH

	
Band Edge-802.11n40 -Low CH	**Band Edge-802.11n40 -High CH**

Conducted Spurious emission

CSE-802.11b-Low CH-REF

CSE-802.11b -Low CH

CSE-802.11b-Mid CH-REF

CSE-802.11b -Mid CH

CSE-802.11b-High CH-REF

CSE-802.11b -High CH

CSE-802.11g-Low CH-REF

CSE-802.11g -Low CH

CSE-802.11g-Mid CH-REF

CSE-802.11g -Mid CH

CSE-802.11g-High CH-REF

CSE-802.11g -High CH

CSE-802.11n20-Low CH-REF

CSE-802.11n20 -Low CH

CSE-802.11n20-Mid CH-REF

CSE-802.11n20 -Mid CH

CSE-802.11n20-High CH-REF

CSE-802.11n20 -High CH

CSE-802.11n40-Low CH-REF

CSE-802.11n40 -Low CH

CSE-802.11n40-Mid CH-REF

CSE-802.11n40 -Mid CH

CSE-802.11n40-High CH-REF

CSE-802.11n40 -High CH

7.7 Radiated Band-Edge & Spurious Emissions into Restricted Frequency Bands

7.7.1 Requirement

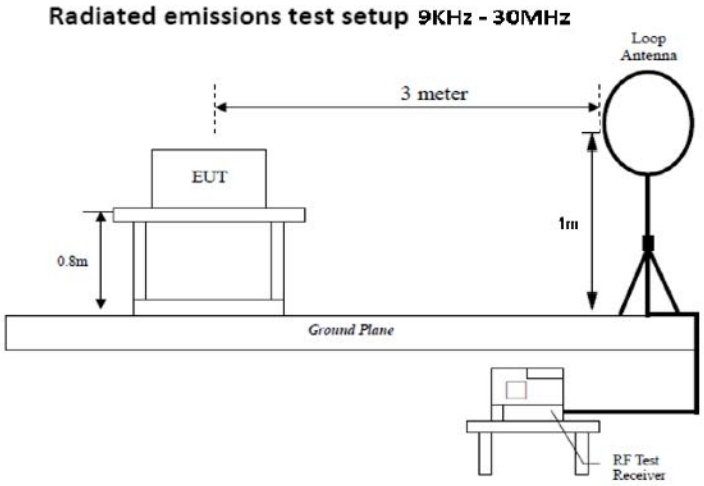
§ 15.247 (d), RSS-247 §5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

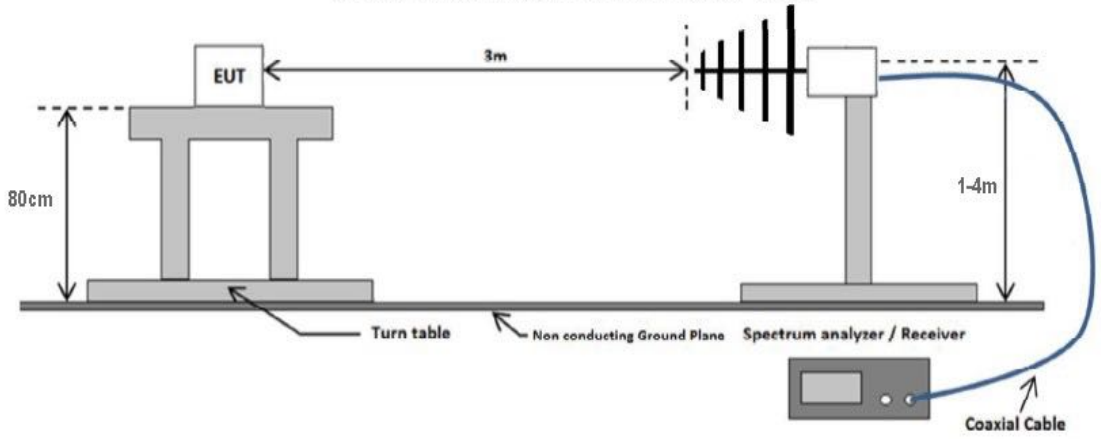
Attenuation below the general limits specified in §15.209(a) and RSS-Gen is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Frequency Range (MHZ)	Field Strength (μV/m)
0.009~0.490	2400/F(KHz)
0.490~1.705	24000/F(KHz)
1.705~30.0	30
30 – 88	100
88 – 216	150
216 960	200
Above 960	500

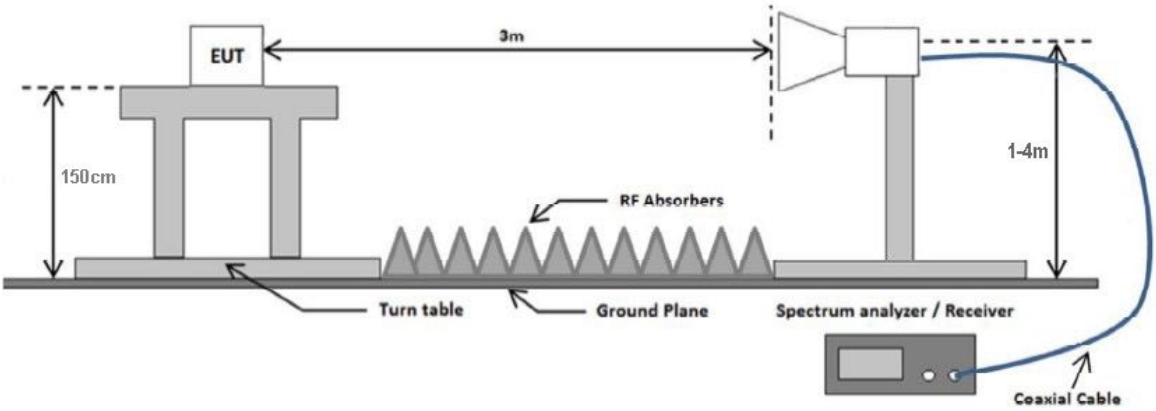
7.7.2 Test Setup



Radiated emissions test setup 30 MHz - 1 GHz



Radiated emissions test setup above 1 GHz



7.7.3 Test Procedure

According to section 8.6 in KDB 558074 D01 DTS Meas Guidance v05r02 and subclause 11.12.2.7 Radiated spurious emission measurements in ANSI C63.10-2013 as well as the procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10 was followed. Boresight antenna mast was used during the scanning to point to EUT to maximize the emission. The process will be repeated in 3 EUT orientations.

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
   a. Vertical or horizontal polarization (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
   b. The EUT was then rotated to the direction that gave the maximum emission.
   c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz for frequency below 150KHz.
4. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 10 kHz for frequency between 150KHz – 30MHz.
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-Peak detection at frequency between 30MHz - 1GHz.
6. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak and average measurement at frequency above 1GHz.
7. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.

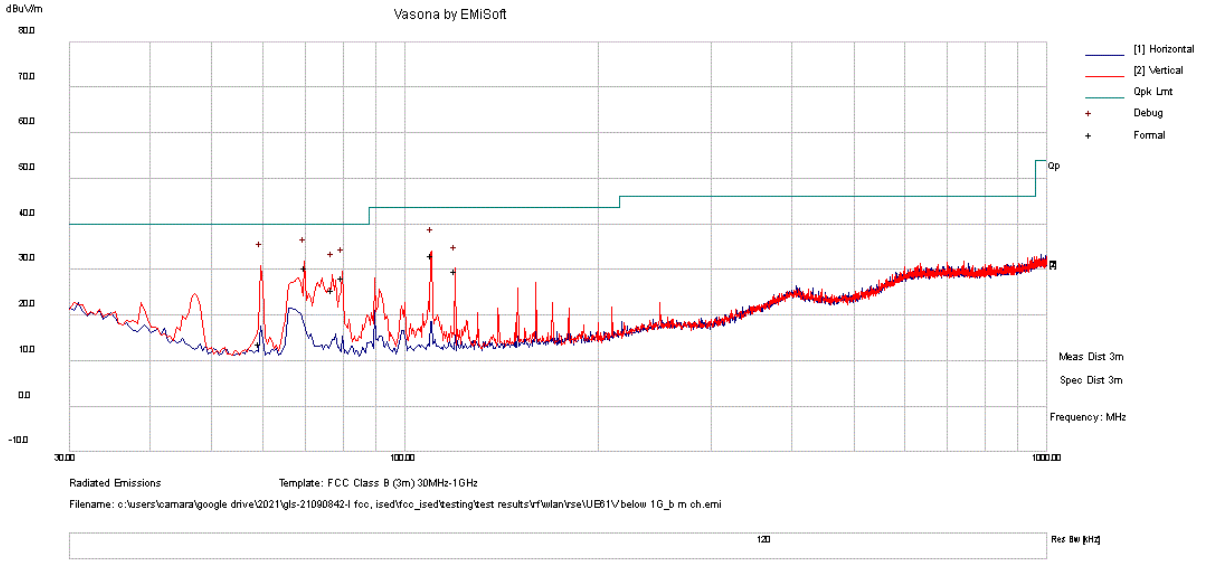
7.7.4 Test Result

Radiated Emission between 9KHz – 30MHz test result

Note: no substantial emission is found other than the noise floor. Different modes have been verified.

RADIATED EMISSIONS BELOW 1 GHZ

Test Standard:	FCC15.247, 15.209, RSS 247	Mode:	802.11b Mode
Frequency Range:	30 MHz - 1 GHz	Test Date:	12/06/2021
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Mid channel	Test Result:	Pass



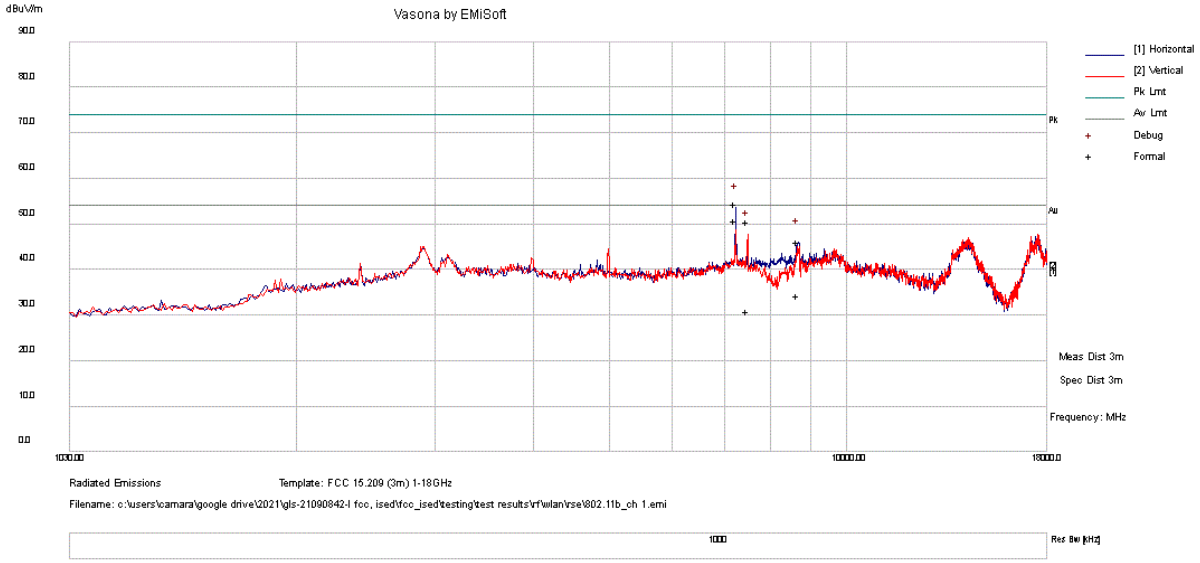
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	69.994	47.3	3.2	-20.1	30.4	Quasi Max	V	102	113	40	-9.6	Pass
2	59.497	31.7	3	-20.7	13.9	Quasi Max	V	249	0	40	-26.1	Pass
3	109.981	48.3	3.7	-18.8	33.3	Quasi Max	V	101	1	43.5	-10.2	Pass
4	79.991	45.2	3.3	-20.3	28.2	Quasi Max	V	102	285	40	-11.8	Pass
5	77.182	42.5	3.3	-20.2	25.6	Quasi Max	V	112	15	40	-14.4	Pass
6	119.974	44.5	3.9	-18.5	29.9	Quasi Max	V	100	327	43.5	-13.6	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	FCC15.247, 15.209, RSS 247	Mode:	802.11b Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	05/16/2022
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Low Channel	Test Result:	Pass



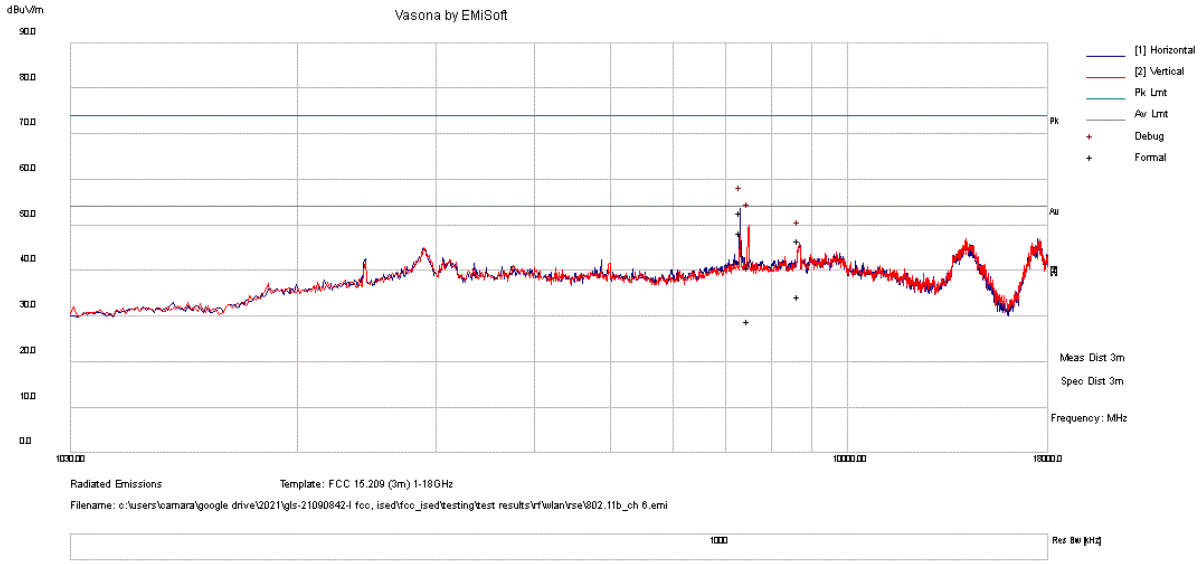
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7235.364	48.2	11.7	-5.5	54.5	Peak Max	H	154	173	74	-19.5	Pass
2	7498.813	44.4	11.9	-5.7	50.6	Peak Max	V	100	146	74	-23.4	Pass
3	8686.845	34.4	17.4	-5.7	46.1	Peak Max	H	159	314	74	-27.9	Pass
4	7235.364	44.7	11.7	-5.5	50.9	Average Max	H	154	173	54	-3.1	Pass
5	7498.813	24.7	11.9	-5.7	30.9	Average Max	V	100	146	54	-23.1	Pass
6	8686.845	22.6	17.4	-5.7	34.3	Average Max	H	159	314	54	-19.7	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	FCC15.247, 15.209, RSS 247	Mode:	802.11b Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	05/16/2022
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Mid Channel	Test Result:	Pass



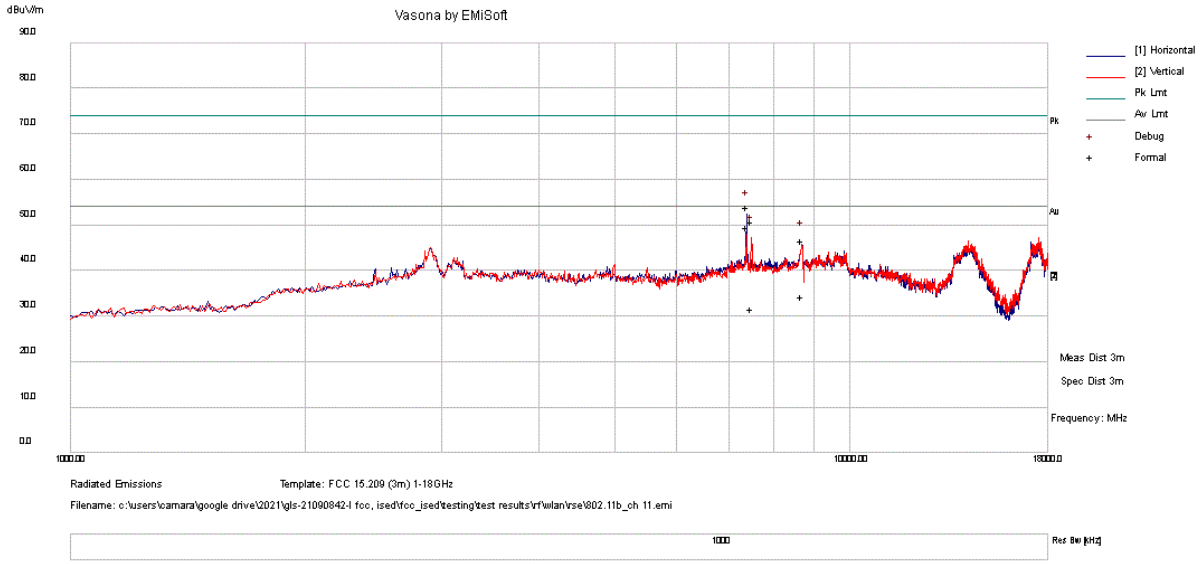
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7310.458	46.5	11.9	-5.5	52.8	Peak Max	H	135	198	74	-21.2	Pass
2	7499.75	34.5	11.9	-5.7	40.7	Peak Max	V	391	155	74	-33.3	Pass
3	8688.855	34.8	17.4	-5.7	46.6	Peak Max	V	400	128	74	-27.4	Pass
4	7310.458	42	11.9	-5.5	48.4	Average Max	H	135	198	54	-5.6	Pass
5	7499.75	22.8	11.9	-5.7	29	Average Max	V	391	155	54	-25	Pass
6	8688.855	22.6	17.4	-5.7	34.4	Average Max	V	400	128	54	-19.6	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	FCC15.247, 15.209, RSS 247	Mode:	802.11b Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	05/16/2022
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	High Channel	Test Result:	Pass



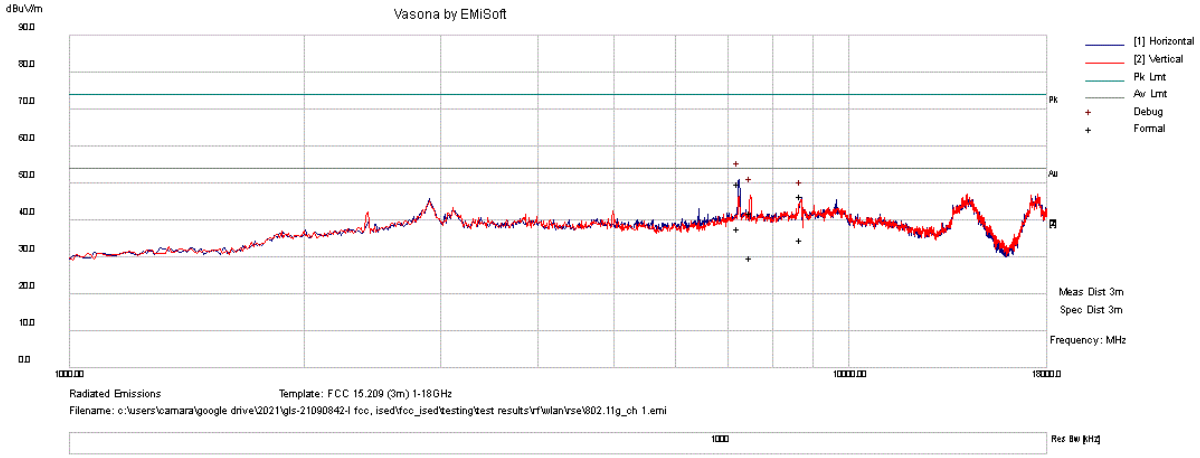
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7387.015	47.6	12	-5.5	54.1	Peak Max	H	152	184	74	-19.9	Pass
2	7493.305	44.7	11.9	-5.7	50.9	Peak Max	V	100	167	74	-23.1	Pass
3	8691.348	34.9	17.6	-5.7	46.7	Peak Max	V	100	351	74	-27.3	Pass
4	7387.015	43	12	-5.5	49.5	Average Max	H	152	184	54	-4.5	Pass
5	7493.305	25.5	11.9	-5.7	31.7	Average Max	V	100	167	54	-22.3	Pass
6	8691.348	22.4	17.6	-5.7	34.3	Average Max	V	100	351	54	-19.7	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	FCC15.247, 15.209, RSS 247	Mode:	802.11g Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	05/16/2022
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Low Channel	Test Result:	Pass



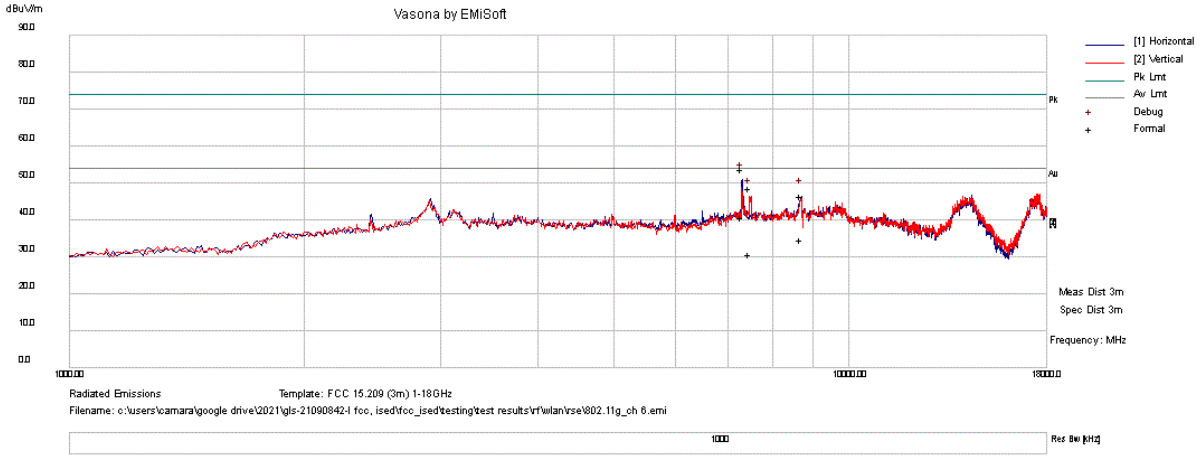
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7236.048	43.5	11.7	-5.5	49.8	Peak Max	H	163	162	74	-24.2	Pass
2	7492.128	35.7	11.9	-5.7	41.9	Peak Max	V	400	6	74	-32.1	Pass
3	8702.323	34.4	17.8	-5.7	46.6	Peak Max	H	144	303	74	-27.4	Pass
4	7236.048	31.4	11.7	-5.5	37.6	Average Max	H	163	162	54	-16.4	Pass
5	7492.128	23.6	11.9	-5.7	29.8	Average Max	V	400	6	54	-24.2	Pass
6	8702.323	22.4	17.8	-5.7	34.5	Average Max	H	144	303	54	-19.5	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	FCC15.247, 15.209, RSS 247	Mode:	802.11g Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	05/16/2022
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Mid Channel	Test Result:	Pass



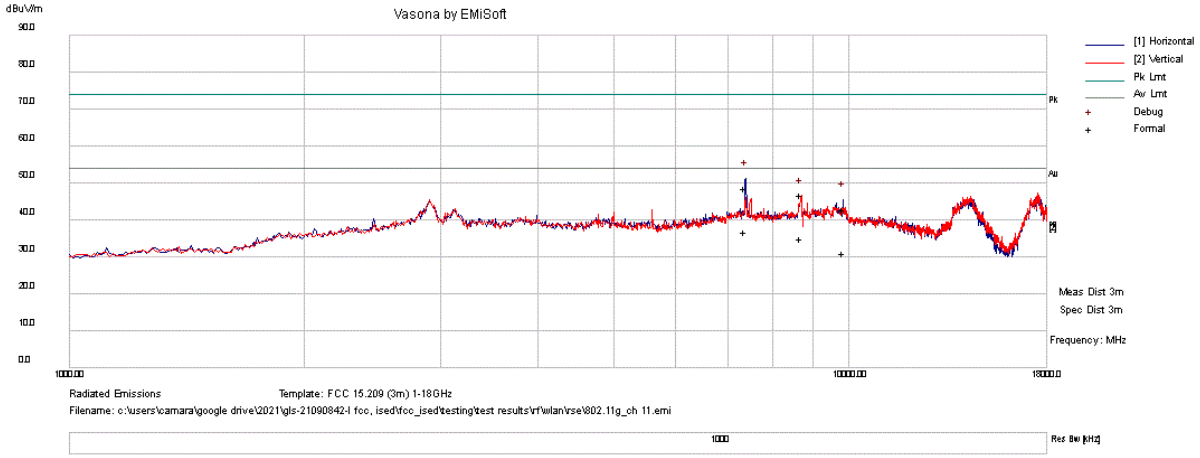
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7310.79	47.3	11.9	-5.5	53.7	Peak Max	H	135	185	74	-20.3	Pass
2	8704.655	34.4	17.7	-5.7	46.4	Peak Max	H	379	0	74	-27.6	Pass
3	7471.948	42.3	11.9	-5.7	48.6	Peak Max	V	151	172	74	-25.5	Pass
4	7310.79	34.4	11.9	-5.5	40.8	Average Max	H	135	185	54	-13.2	Pass
5	8704.655	22.7	17.7	-5.7	34.8	Average Max	H	379	0	54	-19.2	Pass
6	7471.948	24.4	11.9	-5.7	30.6	Average Max	V	151	172	54	-23.4	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	FCC15.247, 15.209, RSS 247	Mode:	802.11g Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	05/16/2022
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	High Channel	Test Result:	Pass



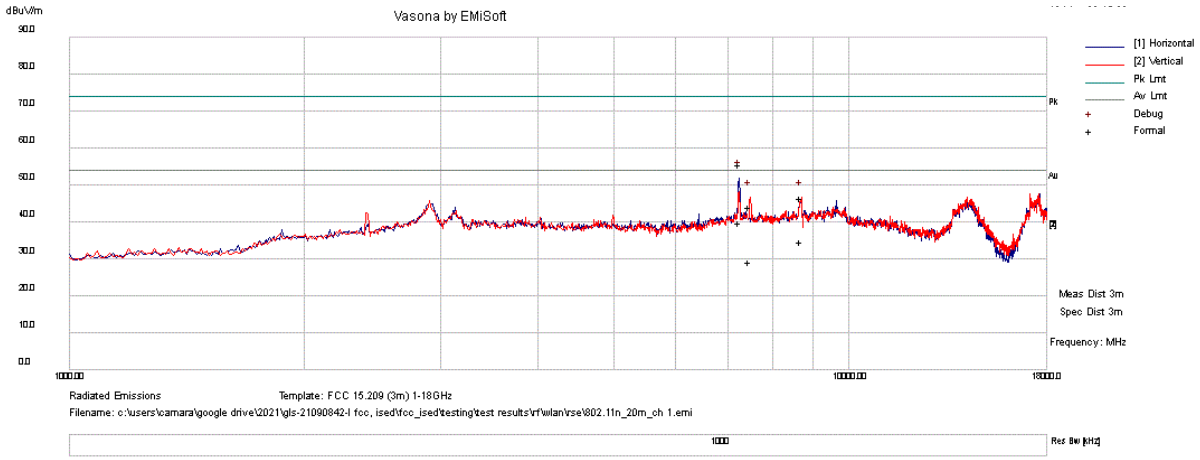
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7384.595	42.3	12	-5.5	48.7	Peak Max	H	251	162	74	-25.3	Pass
2	8701.673	34.7	17.9	-5.7	46.8	Peak Max	V	147	331	74	-27.2	Pass
3	9851.353	33.6	14.3	-5.2	42.7	Peak Max	H	310	0	74	-31.3	Pass
4	7384.595	30.5	12	-5.5	36.9	Average Max	H	251	162	54	-17.1	Pass
5	8701.673	22.6	17.9	-5.7	34.8	Average Max	V	147	331	54	-19.2	Pass
6	9851.353	21.8	14.3	-5.2	30.9	Average Max	H	310	0	54	-23.1	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	FCC15.247, 15.209, RSS 247	Mode:	802.11n20 Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	05/16/2022
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Low Channel	Test Result:	Pass



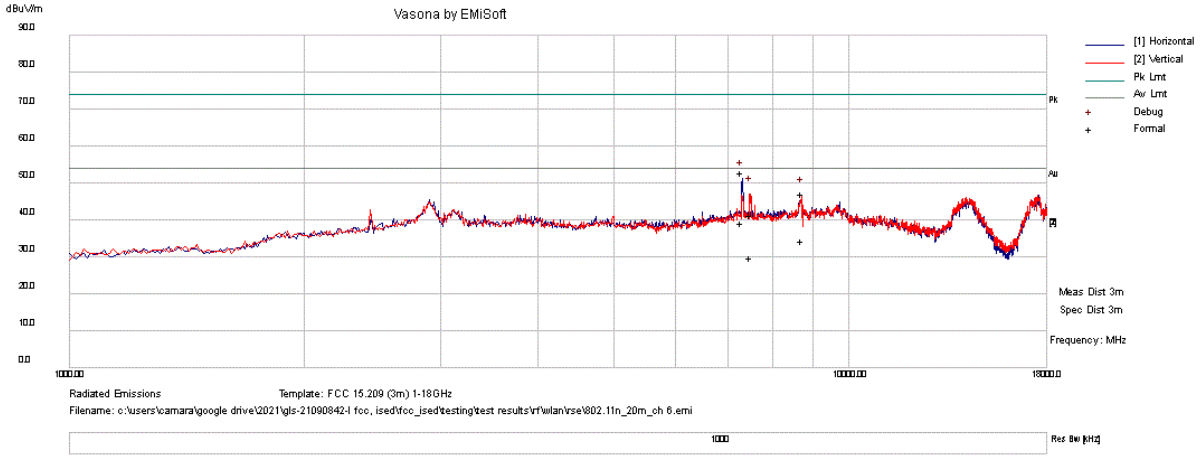
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7245.543	49.2	11.7	-5.5	55.5	Peak Max	H	123	190	74	-18.5	Pass
2	8704.483	34.4	17.8	-5.7	46.4	Peak Max	V	132	116	74	-27.6	Pass
3	7480.47	37.7	11.9	-5.7	43.9	Peak Max	V	254	0	74	-30.1	Pass
4	7245.543	33.6	11.7	-5.5	39.9	Average Max	H	123	190	54	-14.1	Pass
5	8704.483	22.6	17.8	-5.7	34.7	Average Max	V	132	116	54	-19.3	Pass
6	7480.47	23.1	11.9	-5.7	29.4	Average Max	V	254	0	54	-24.6	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	FCC15.247, 15.209, RSS 247	Mode:	802.11n20 Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	05/16/2022
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Mid Channel	Test Result:	Pass



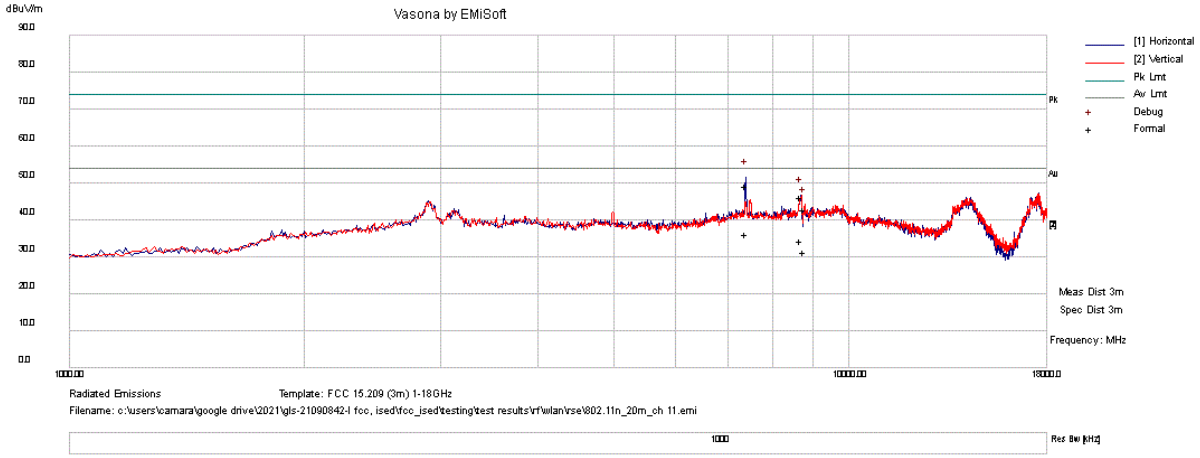
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7310.065	46.5	11.9	-5.5	52.9	Peak Max	H	114	182	74	-21.1	Pass
2	7490.473	35.2	11.9	-5.7	41.4	Peak Max	V	252	32	74	-32.6	Pass
3	8712.623	35.3	17.4	-5.7	47	Peak Max	V	175	216	74	-27	Pass
4	7310.065	32.9	11.9	-5.5	39.3	Average Max	H	114	182	54	-14.7	Pass
5	7490.473	23.7	11.9	-5.7	29.8	Average Max	V	252	32	54	-24.2	Pass
6	8712.623	22.8	17.4	-5.7	34.5	Average Max	V	175	216	54	-19.5	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	FCC15.247, 15.209, RSS 247	Mode:	802.11n20 Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	05/16/2022
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	High Channel	Test Result:	Pass



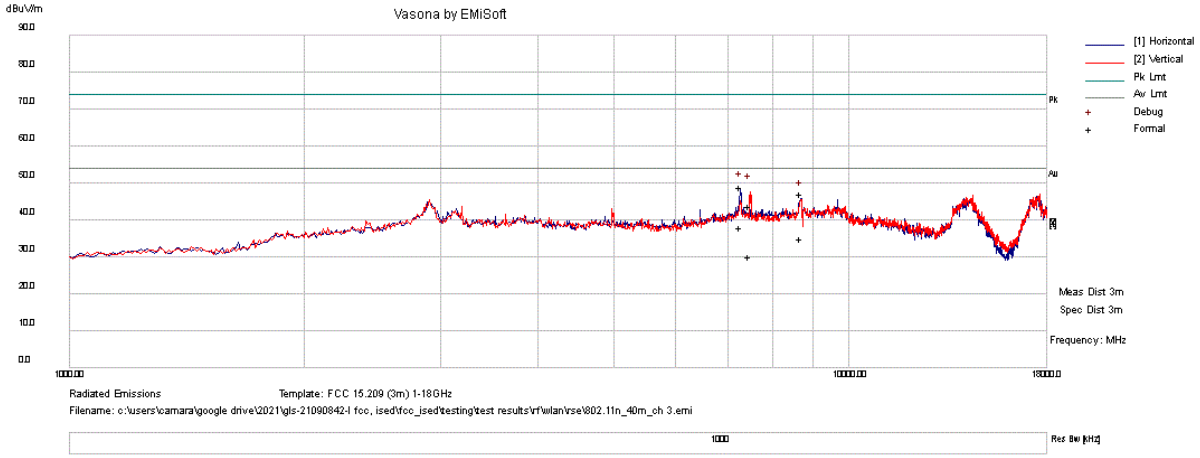
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7385.713	42.7	12	-5.5	49.2	Peak Max	H	234	0	74	-24.8	Pass
2	8693.14	34.1	17.6	-5.7	46	Peak Max	H	303	347	74	-28	Pass
3	8786.465	34.3	14.2	-5.7	42.8	Peak Max	V	222	66	74	-31.2	Pass
4	7385.713	29.8	12	-5.5	36.2	Average Max	H	234	0	54	-17.8	Pass
5	8693.14	22.3	17.6	-5.7	34.3	Average Max	H	303	347	54	-19.7	Pass
6	8786.465	22.8	14.2	-5.7	31.4	Average Max	V	222	66	54	-22.6	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	FCC15.247, 15.209, RSS 247	Mode:	802.11n40 Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	05/16/2022
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Low Channel	Test Result:	Pass



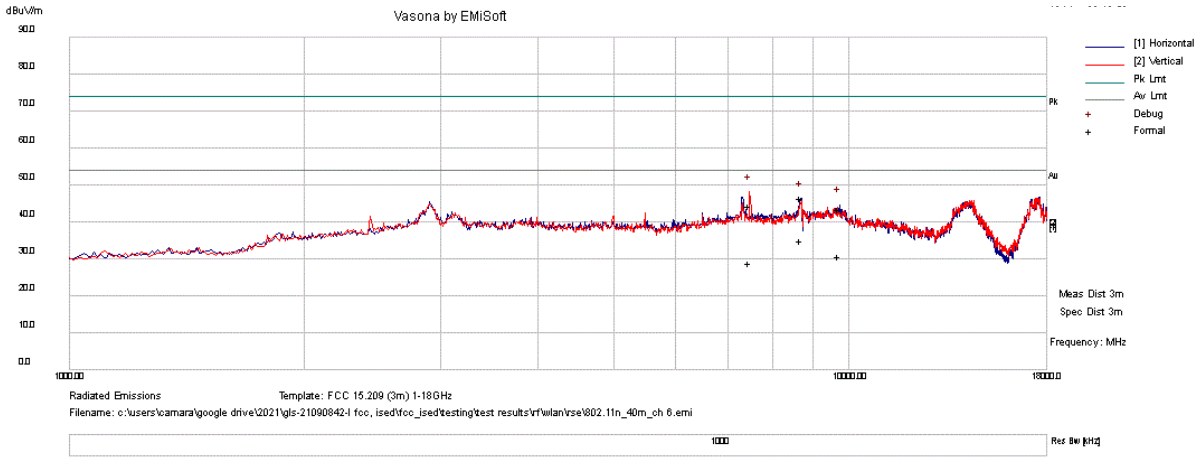
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7269.21	42.5	11.8	-5.5	48.8	Peak Max	H	131	197	74	-25.2	Pass
2	7480.735	37.6	11.9	-5.7	43.9	Peak Max	V	110	29	74	-30.1	Pass
3	8702.803	34.9	17.8	-5.7	47.1	Peak Max	H	313	0	74	-26.9	Pass
4	7269.21	31.8	11.8	-5.5	38.1	Average Max	H	131	197	54	-15.9	Pass
5	7480.735	24	11.9	-5.7	30.2	Average Max	V	110	29	54	-23.8	Pass
6	8702.803	22.7	17.8	-5.7	34.8	Average Max	H	313	0	54	-19.2	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	FCC15.247, 15.209, RSS 247	Mode:	802.11n40 Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	05/16/2022
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Mid Channel	Test Result:	Pass



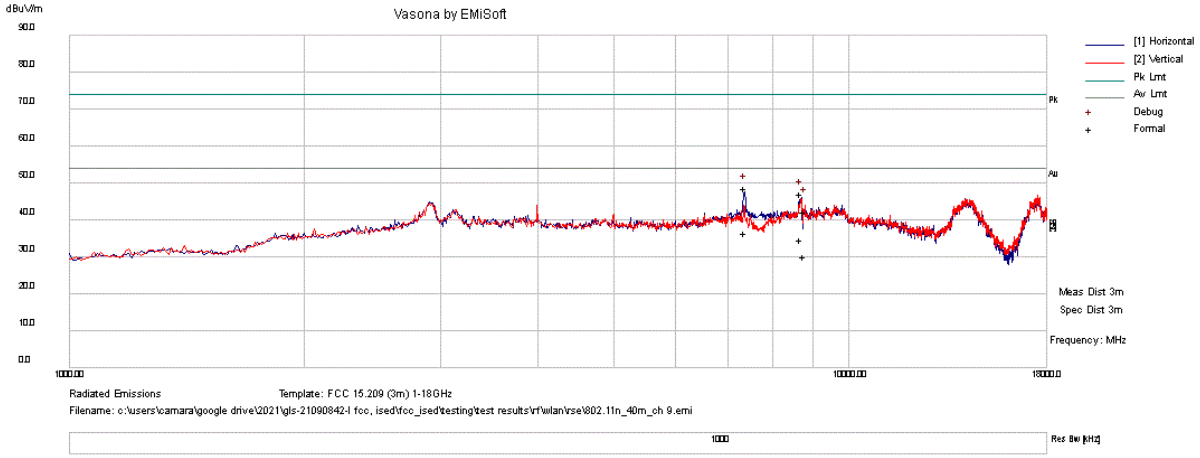
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7471.865	38	11.9	-5.7	44.3	Peak Max	V	199	177	74	-29.7	Pass
2	8702.025	34.3	17.9	-5.7	46.5	Peak Max	H	150	229	74	-27.5	Pass
3	9743.268	34	14.4	-5	43.4	Peak Max	H	162	0	74	-30.6	Pass
4	7471.865	22.8	11.9	-5.7	29	Average Max	V	199	177	54	-25	Pass
5	8702.025	22.7	17.9	-5.7	34.9	Average Max	H	150	229	54	-19.1	Pass
6	9743.268	21.3	14.4	-5	30.7	Average Max	H	162	0	54	-23.3	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	FCC15.247, 15.209, RSS 247	Mode:	802.11n40 Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	05/16/2022
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	High Channel	Test Result:	Pass



No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7373.288	42.2	11.9	-5.5	48.7	Peak Max	H	100	188	74	-25.3	Pass
2	8702.29	35.1	17.8	-5.7	47.2	Peak Max	H	280	0	74	-26.8	Pass
3	8797.74	34.3	13.8	-5.7	42.3	Peak Max	V	365	202	74	-31.7	Pass
4	7373.288	29.9	11.9	-5.5	36.4	Average Max	H	100	188	54	-17.6	Pass
5	8702.29	22.5	17.8	-5.7	34.6	Average Max	H	280	0	54	-19.4	Pass
6	8797.74	22.2	13.8	-5.7	30.2	Average Max	V	365	202	54	-23.8	Pass

Remarks:

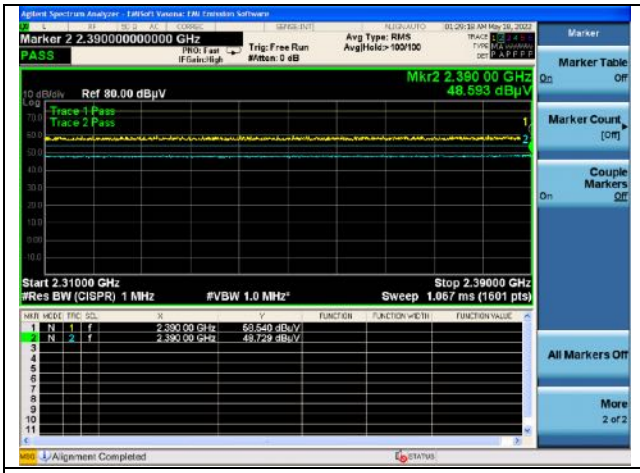
1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Radiated Emission between 18GHz – 40GHz test result

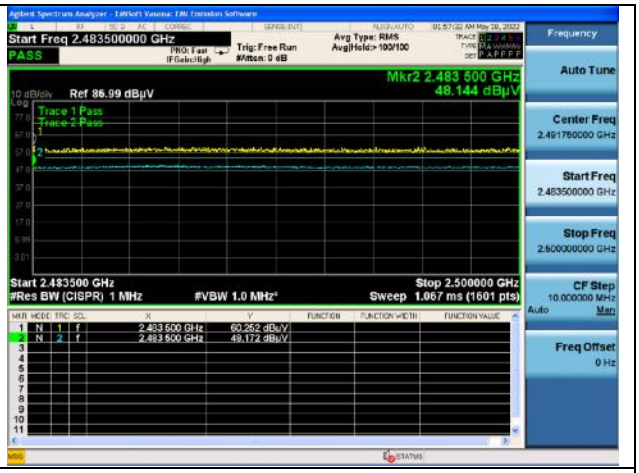
Note: no substantial emission is found other than the noise floor. Different modes have been verified.

Restricted Band Measurement Result

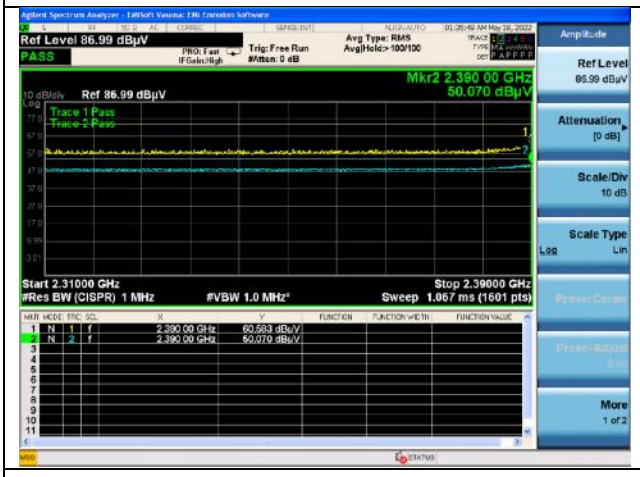
Mode	TX CH (MHz)	Frequency (MHz)	Emission Level (dBuV/m)	Detector Type	Limit (dBuV/m)	Margin (dB)	Result
802.11b	2412	2390	58.54	PK	74	-15.46	Pass
		2390	48.73	AV	54	-5.27	Pass
	2462	2483.5	60.25	PK	74	-13.75	Pass
		2483.5	48.17	AV	54	-5.83	Pass
802.11g	2412	2390	60.58	PK	74	-13.42	Pass
		2390	50.07	AV	54	-3.93	Pass
	2462	2483.5	62.56	PK	74	-11.44	Pass
		2483.5	50.43	AV	54	-3.57	Pass
802.11n	2412	2390	61.33	PK	74	-12.67	Pass
		2390	50.58	AV	54	-3.42	Pass
	2462	2483.5	60.25	PK	74	-13.75	Pass
		2483.5	51.07	AV	54	-2.93	Pass
802.11n40	2422	2390	60.73	PK	74	-13.27	Pass
		2390	51.99	AV	54	-2.01	Pass
	2452	2483.5	61.92	PK	74	-12.08	Pass
		2483.5	52.25	AV	54	-1.75	Pass



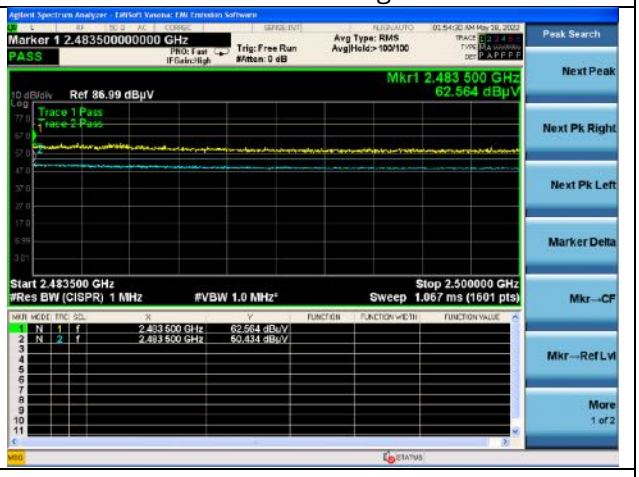
RB– 802.11b - Low CH



RB– 802.11b - High CH

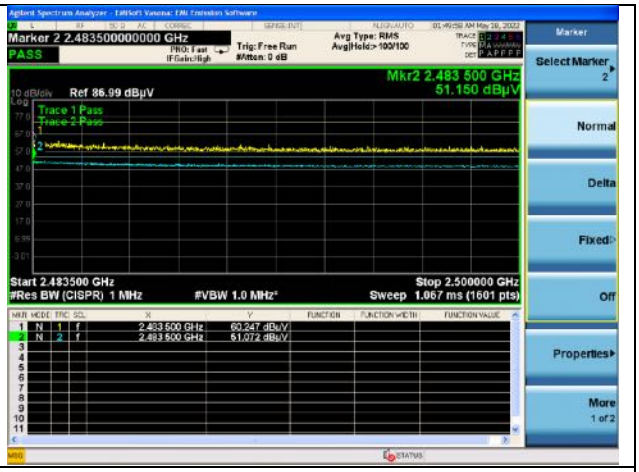


RB– 802.11g - Low CH



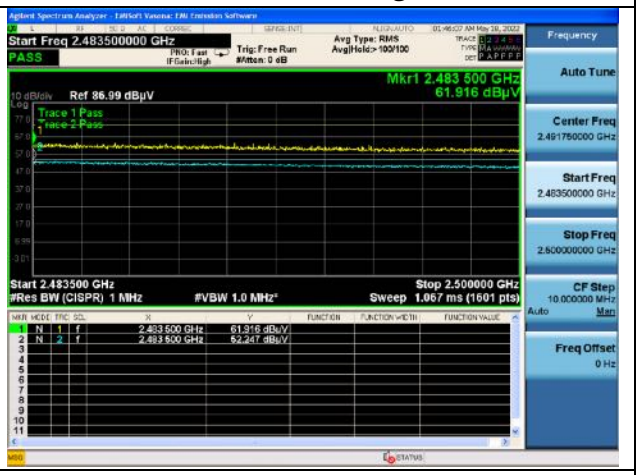
RB– 802.11g - High CH

RB– 802.11n20 - Low CH



RB– 802.11n20 - High CH

RB– 802.11n40 - Low CH



RB– 802.11n40 - High CH

7.8 Conducted Emissions

7.8.1 Requirement

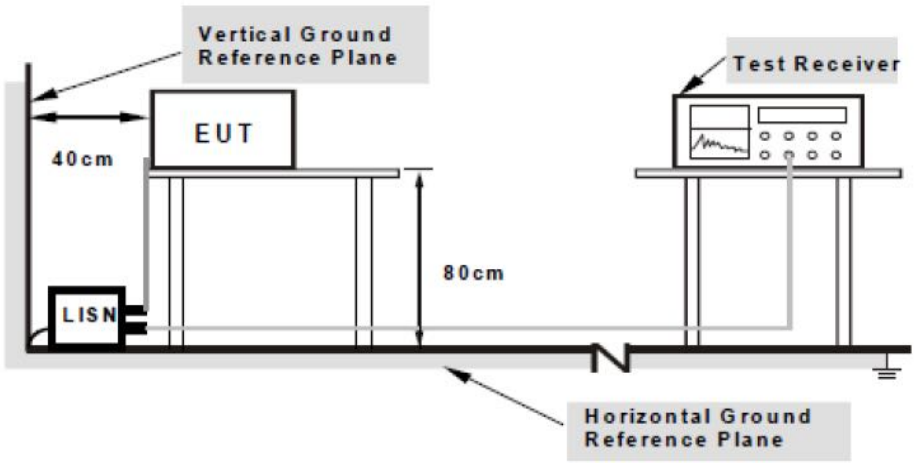
Per § 15.207 (a), RSS Gen 8.8

An intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Limits for Conducted Emissions at the Mains Ports

Section	Frequency ranges (MHz)	Limit (dBuV)	
		QP	Average
Class B devices	0.15 – 0.5	66 – 56	56 – 46
	0.5 – 5	56	46
	5 - 30	60	50
NOTE 1 The lower limit shall apply at the transition frequencies.			

7.8.2 Test setup



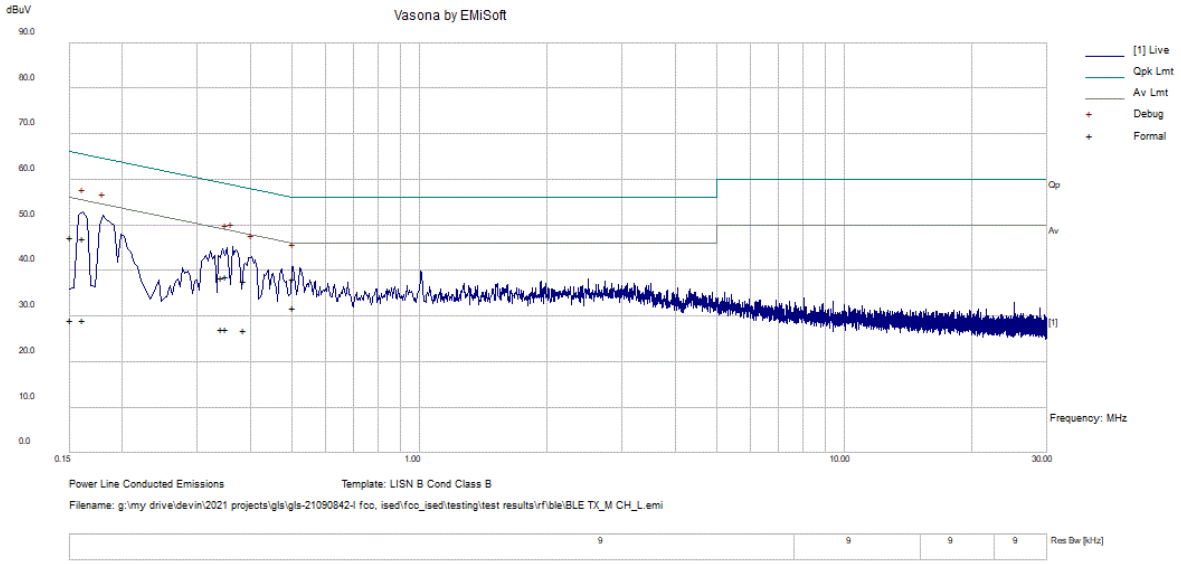
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.

7.8.3 Test Procedure

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.
2. The power supply for the EUT was fed through a 50Ω/50μH EUT LISN, connected to filtered mains.
3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.
4. All other supporting equipment was powered separately from another main supply.
5. The EUT was switched on and allowed to warm up to its normal operating condition.
6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver.
7. High peaks, relative to the limit line, were then selected.
8. The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz. For FCC tests, only Quasi-peak measurements were made; while for CISPR/EN tests, both Quasi-peak and Average measurements were made
9. All possible modes of operation were investigated. Only the worst case emissions were measured and reported. All other emissions were relatively insignificant.

7.8.4 Test Result

Test Standard:	Part 15.207 RSS Gen 8.8	Mode:	WLAN_802.11b_Mid CH
Frequency Range:	0.15-30MHz	Test Date:	12/06/2021
Antenna Type/Polarity:	N/A	Test Personnel:	Devin Tai
Remark:	Line 120VAC, 60Hz	Test Result:	Pass

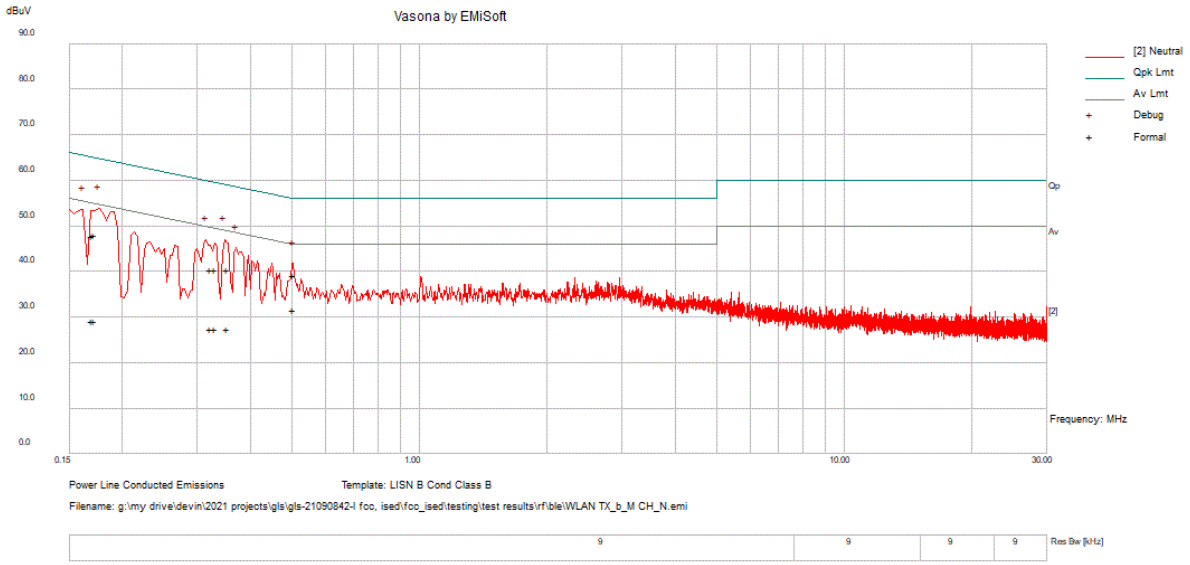


No.	Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Meas. Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
1	0.15	37.2	10.1	0.2	47.5	Quasi Peak	Live	66	-18.5	Pass
2	0.368	28.3	10.1	0.1	38.6	Quasi Peak	Live	58.5	-20	Pass
3	0.327	27.9	10.1	0.1	38.1	Quasi Peak	Live	59.5	-21.4	Pass
4	0.422	25.6	10.1	0.1	35.8	Quasi Peak	Live	57.4	-21.6	Pass
5	1.01	28.6	10.2	0.1	38.9	Quasi Peak	Live	56	-17.1	Pass
6	0.422	25.7	10.1	0.1	35.9	Quasi Peak	Live	57.4	-21.5	Pass
7	0.15	18.8	10.1	0.2	29.1	Average	Live	56	-26.9	Pass
8	0.368	16.9	10.1	0.1	27.2	Average	Live	48.5	-21.4	Pass
9	0.327	17.1	10.1	0.1	27.3	Average	Live	49.5	-22.3	Pass
10	0.422	16.7	10.1	0.1	26.9	Average	Live	47.4	-20.5	Pass
11	1.01	22.6	10.2	0.1	32.9	Average	Live	46	-13.1	Pass
12	0.422	16.7	10.1	0.1	26.9	Average	Live	47.4	-20.5	Pass

REMARKS:

1. The emission levels of other frequencies were very low against the limit.
2. Margin value = Emission level - Limit value
3. Emission Level = Raw Value + Cable loss + Factors Value.

Test Standard:	Part 15.207 RSS Gen 8.8	Mode:	WLAN_802.11b_Mid CH
Frequency Range:	0.15-30MHz	Test Date:	12/06/2021
Antenna Type/Polarity:	N/A	Test Personnel:	Devin Tai
Remark:	Neutral 120VAC, 60Hz	Test Result:	Pass



No.	Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Meas. Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
1	0.171	37.8	10.1	0.2	48	Quasi Peak	Neutral	64.9	-16.9	Pass
2	0.17	37.7	10.1	0.2	48	Quasi Peak	Neutral	65	-17	Pass
3	0.331	30.3	10.1	0.1	40.5	Quasi Peak	Neutral	59.4	-18.9	Pass
4	0.322	30.2	10.1	0.1	40.5	Quasi Peak	Neutral	59.7	-19.2	Pass
5	0.354	30.3	10.1	0.1	40.5	Quasi Peak	Neutral	58.9	-18.3	Pass
6	0.505	29	10.1	0.1	39.2	Quasi Peak	Neutral	56	-16.8	Pass
7	0.171	18.9	10.1	0.2	29.2	Average	Neutral	54.9	-25.7	Pass
8	0.17	18.9	10.1	0.2	29.2	Average	Neutral	55	-25.8	Pass
9	0.331	17.3	10.1	0.1	27.5	Average	Neutral	49.4	-21.9	Pass
10	0.322	17.3	10.1	0.1	27.5	Average	Neutral	49.7	-22.1	Pass
11	0.354	17.2	10.1	0.1	27.4	Average	Neutral	48.9	-21.4	Pass
12	0.505	21.4	10.1	0.1	31.6	Average	Neutral	46	-14.4	Pass

REMARKS:

1. The emission levels of other frequencies were very low against the limit.
2. Margin value = Emission level - Limit value
3. Emission Level = Raw Value + Cable loss + Factors Value.

8 EUT and Test Setup Photos

See FCC exhibits

9 Test Instrument List

Equipment	Manufacturer	Model	Instrument Number	Cal. Date	Cal. Due
Semi-Anechoic Chamber	ETS-Lindgren	10M	VL001	10/18/20	10/18/22
Shielding Control Room	ETS-Lindgren	Series 81	VL006	N/A	N/A
Spectrum Analyzer	Keysight	N9020A	MY50110074	06/17/2021	06/17/2022
EMC Test Receiver	R&S	ESL6	100230	06/14/2021	06/14/2022
LISN (9KHz – 30MHz)	EMCO	3816/2	9705-1066	05/04/2021	05/04/2022
LISN (9KHz – 30MHz)	Com-Power	LI-550C	20140050	01/29/2021	01/29/2022
LISN (9KHz – 30MHz)	Com-Power	LI-550C	20140051	01/29/2021	01/29/2022
Bi-Log Antenna	ETS-Lindgren	3142E	217921	11/15/2021	11/15/2022
Horn Antenna (1-18GHz)	Electro-Metrics	EM-6961	6292	05/14/2021	05/14/2022
Horn Antenna (18-40GHz)	Com-Power	AH-840	101109	06/24/2021	06/24/2022
Preamplifier	RF Bay, Inc.	LPA-10-20	11180621	07/16/2021	07/16/2022
True RMS Multi-meter	UNI-T	UT181A	C173014829	05/05/2021	05/05/2022
Temp / Humidity / Pressure Meter	PCE Instruments	PCE-THB 40	R062028	05/15/2021	05/15/2022
RF Attenuator	Pasternack	PE7005-3	VL061	07/16/2021	07/16/2022
Preamplifier 100KHz - 40GHz	Aeroflex	33711-392-77150-11	064	07/16/2021	07/16/2022
EM Center Control	ETS-Lindgren	7006-001	160136	N/A	N/A
Turn Table	ETS-Lindgren	2181-3.03	VL002	N/A	N/A
Boresight Antenna Tower	ETS-Lindgren	2171B	VL003	N/A	N/A
Loop Antenna (9k-30MHz)	Com-Power	AL-130	121012	05/16/21	05/16/22
RE test cable(below 6GHz)	Vista	RE-6GHz-01	RE-6GHz-01	07/16/2021	07/16/2022
RE test cable (1-18GHz)	PhaseTrack	II-240	RE-18GHz-01	07/16/2021	07/16/2022
RE test cable (>18GHz)	Sucoflex	104	344903/4	07/16/2021	07/16/2022
Pulse limiter	Com-Power	LIT-930A	531727	07/16/2021	07/16/2022
CE test cable #1	FIRST RF	FRF-C-1002-001	CE-6GHz-01	07/16/2021	07/16/2022
CE test cable#2	FIRST RF	FRF-C-1002-001	CE-6GHz-02	07/16/2021	07/16/2022
Vector Signal Generator	Keysight	N5182A	US47080548	06/17/2021	06/17/2022
USB RF Power Sensor	ETS-Lindgren	7002-006	SN 00151268	05/15/2019	05/15/2022
RF Power Amplifier (80-1000MHz)	Ophir	5226FE	1013/1815	N/A	N/A
RF Power Amplifier (700-6000MHz)	Ophir	5293FE	1063/1815	N/A	N/A
Horn Antenna (1-18GHz)	FT-RF	HA-07M18G-NF	180010HA	N/A	N/A

---END---