

RF Test Report

Test Report Number	STA-22121361-LCG-FCC-IC-RF-DTS		
FCC ID IC ID	ZKP-ZOLLALS0001 9702A-ZOLLALS0001		
Applicant	ZOLL Medical Corporation		
Applicant Address	269 Mill Road, Chelmsford, MA 01824-4105		
Product Name	Zenix Monitor/Defibrillator		
Model (s)	Zenix		
Date of Receipt	08/10/2023		
Date of Test	08/18/2023 – 08/29/2023		
Report Issue Date	03/27/2024		
Test Standards	47 CFR Part 15.247 RSS-247 Issue 3, Aug 2023		
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)	
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REVISION HISTORY

Report Number	Version	Description	Issued Date
STA-22121361-LCG-FCC-IC-RF-DTS	01	Initial report	03/27/2024

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1 Test Summary

Test Item	Test Requirement	Test Method	Result
Antenna Requirement	47 CFR Part 15.203	N/A	N/A*
AC Power Line Conducted Emissions	47 CFR Part 15.207 RSS-Gen Issue 5, Feb 2021	ANSI C63.10 (2013) RSS-Gen Issue 5, Feb 2021	N/A*
DTS (6 dB) Channel Bandwidth	47 CFR Part 15.247 RSS-247 Issue 3, Aug 2023	ANSI C63.10 (2013)	N/A*
Occupied Bandwidth	RSS-Gen Issue 5, Feb 2021	RSS-Gen Issue 5, Feb 2021	N/A*
Conducted Maximum Output Power	47 CFR Part 15.247 RSS-247 Issue 3, Aug 2023	ANSI C63.10 (2013)	N/A*
Power Spectral Density	47 CFR Part 15.247 RSS-247 Issue 3, Aug 2023	ANSI C63.10 (2013)	N/A*
Conducted Band-Edge & Unwanted Emissions	47 CFR Part 15.247 RSS-247 Issue 3, Aug 2023	ANSI C63.10 (2013)	N/A*
Radiated Emissions & Unwanted Emissions into Restricted Frequency Bands	47 CFR Part 15.247 RSS-247 Issue 3, Aug 2023	ANSI C63.10 (2013)	Pass

Note: * The EUT is a host product with FCC/ISED certified BT and WLAN single module integrated (Module model: SX-SDMAC). For more test details, please see FCC ID: N6C-SDMAC and ISED ID: 4908A-SDMAC. The current report is an additional evaluation for the host product with the module integrated.

2 General Information

2.1 Applicant

Applicant	ZOLL Medical Corporation
Applicant address	269 Mill Road, Chelmsford, MA 01824-4105
Manufacturer	ZOLL Medical Corporation
Manufacturer Address	269 Mill Road, Chelmsford, MA 01824-4105

2.2 Product information

Product Name	Zenix Monitor/Defibrillator
Model Number	Zenix
Family Models	N/A
Serial Number	ST22E00204
Frequency Band	BT BDR/EDR: 2402-2480MHz BT BLE: 2402-2480MHz WLAN: 2.4GHz/5GHz 11a/b/g/n/ac
Type of modulation	BT BDR/EDR: GFSK, $\pi/4$ DQPSK, 8DPSK BLE: GFSK 802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g: OFDM-CCK (BPSK, QPSK, 16QAM, 64QAM) 802.11a/n/ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Equipment Class	DSS, DTS, U-NII
Antenna Information	2.4/5GHz Flexible Antenna (Model: 1461530100, Brand: molex) Antenna Peak Gain: 2.4G WLAN/BT: 3.0 dBi, 5G WLAN: 4.5 dBi
Clock Frequencies	N/A
Input Power	15Vdc, 8.0A (DC rating for EMS version) 120-240VAC, 50-60Hz, 160VA (AC rating for Hospital version)
Power Adapter Manufacturer/Model	N/A
Power Adapter SN	N/A
Hardware version	N/A
Software version	N/A
Additional Info	ZOLL Zenix has two different hardware versions, the Hospital version, and EMS version. The difference is Hospital version has direct connection to AC power mains; the EMS version has DC connector, which can be connected to a external AC/DC power supply for recharging. This difference is not RF related, therefore there is no impact on RF performance. The EUT used for testing is EMS version.

2.3 Test standard and method

Test standard	47 CFR Part 15.247 RSS-247 Issue 3, Aug 2023
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
Radiated Emission Testing	23.5°C	58.2%	996 mbar

4 Modification of EUT / Deviations from Standards

N/A

5 Test Configuration and Operation

5.1 EUT Test Configuration

The EUT is an engineering test sample loaded with special S/W (includes MyFTM & hcitool) to support the RF TX/RX measurement in different aspects. (S/W version 0.S109.Silex)

The following software was used for testing.

Software	Description
EMISoft Vasona	EMC/RF Spurious emission test software used during testing
Tera Term	To set WLAN 2.4G, BLE into different channel, modulation

5.2 Supporting Equipment

Description	Manufacturer	Model #	Serial #
Wideband radio communication tester	Rohde & Schwarz	CMW500	147508
Laptop	DELL	Latitude E6510	3RZC1M1
Zenix AC-DC external power supply	ZOLL	TR9WG4000A00G3228R6B	880488123-23

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 Radiated Spurious Emissions into Restricted Frequency Bands

7.1.1 Requirement

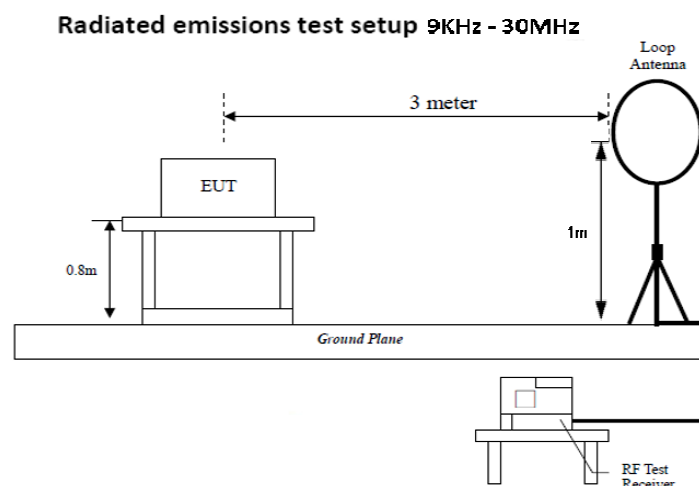
§ 15.247 (d)

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.

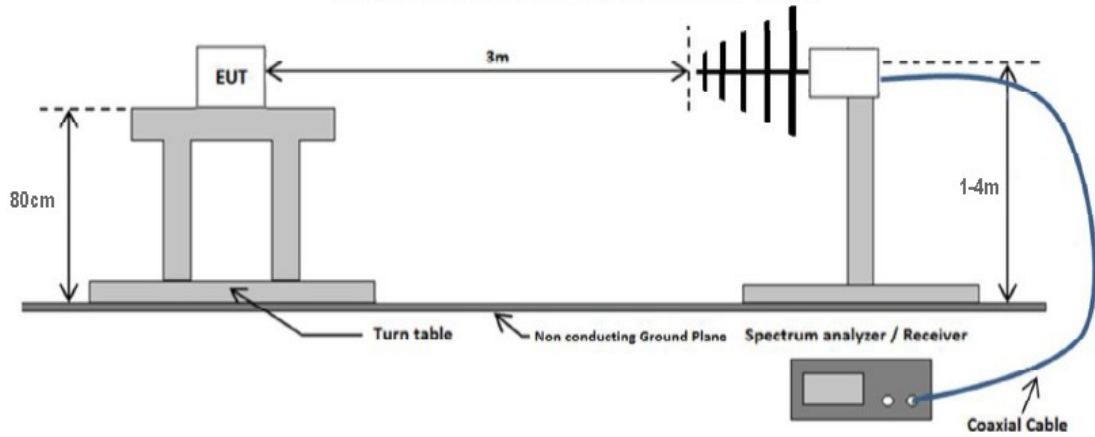
Attenuation below the general limits specified in §15.209(a) and RSS-Gen is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Frequency Range (MHZ)	Field Strength ($\mu\text{V}/\text{m}$)
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

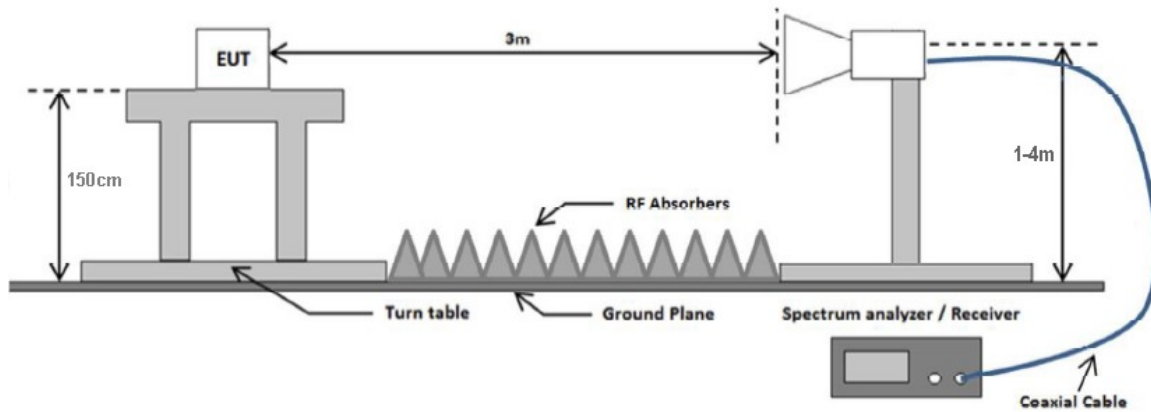
7.1.2 Test Setup



Radiated emissions test setup 30 MHz - 1 GHz



Radiated emissions test setup above 1 GHz



7.1.3 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 300 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.

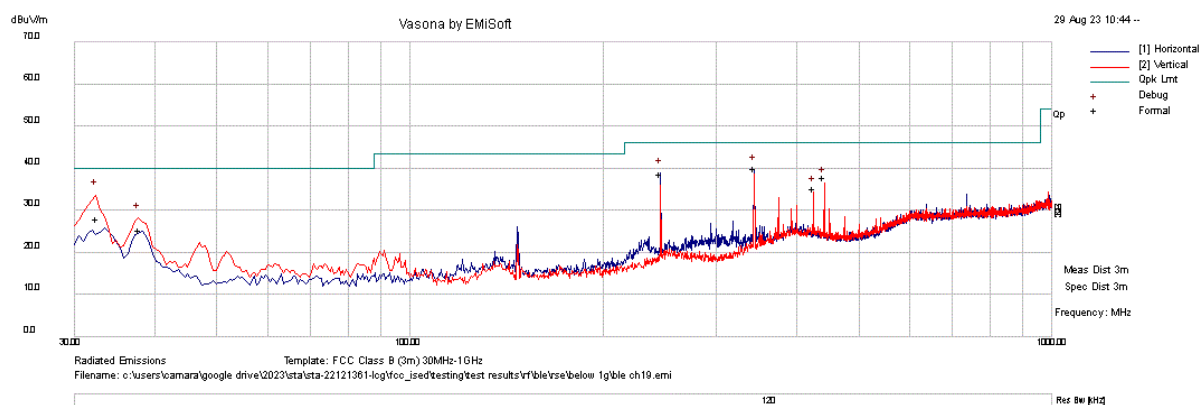
7.1.4 Test Result

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:	FCC 15.247, 15.209, RSS-247	Mode:	BLE Mode
Frequency Range:	30 MHz - 1 GHz	Test Date:	08/29/2023
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Mid channel	Test Result:	Pass



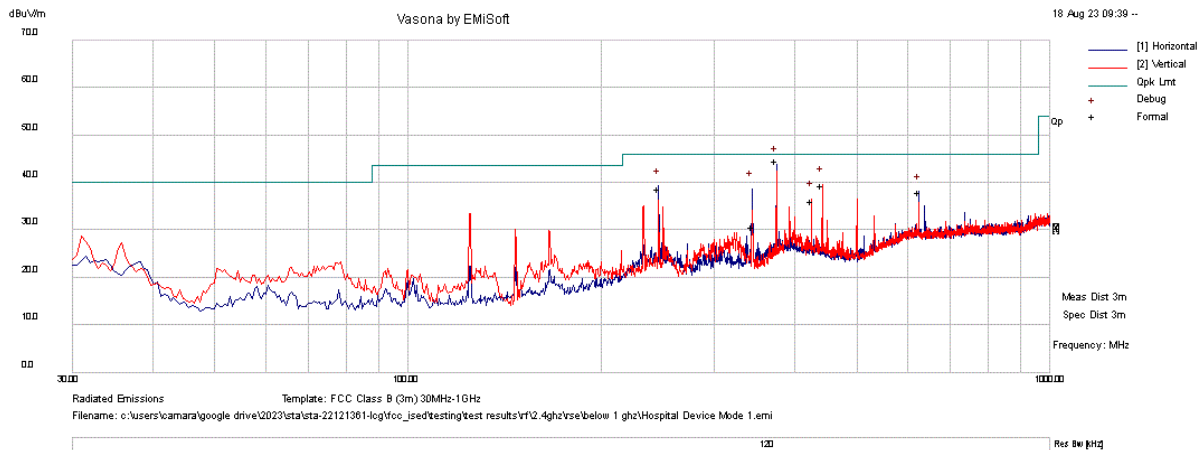
No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	32.489	38.6	2.3	-12.9	28	Quasi Max	V	200	0	40	-12	Pass
2	343.635	45.4	6	-11.4	40	Quasi Max	H	132	0	46	-6	Pass
3	245.455	48.2	5.2	-14.8	38.6	Quasi Max	H	100	202	46	-7.4	Pass
4	441.813	40.7	6.2	-9	37.9	Quasi Max	V	100	152	46	-8.1	Pass
5	424.998	37.6	6.3	-8.6	35.3	Quasi Max	V	103	0	46	-10.7	Pass
6	37.981	38.8	2.5	-16	25.3	Quasi Max	V	101	50	40	-14.7	Pass

Remarks:

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

Report# STA-22121361-LCG-FCC-IC-RF-DTS

Test Standard:	FCC 15.247, 15.209, RSS-247	Mode:	802.11b
Frequency Range:	30 MHz - 1 GHz	Test Date:	08/18/2023
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Mid channel	Test Result:	Pass



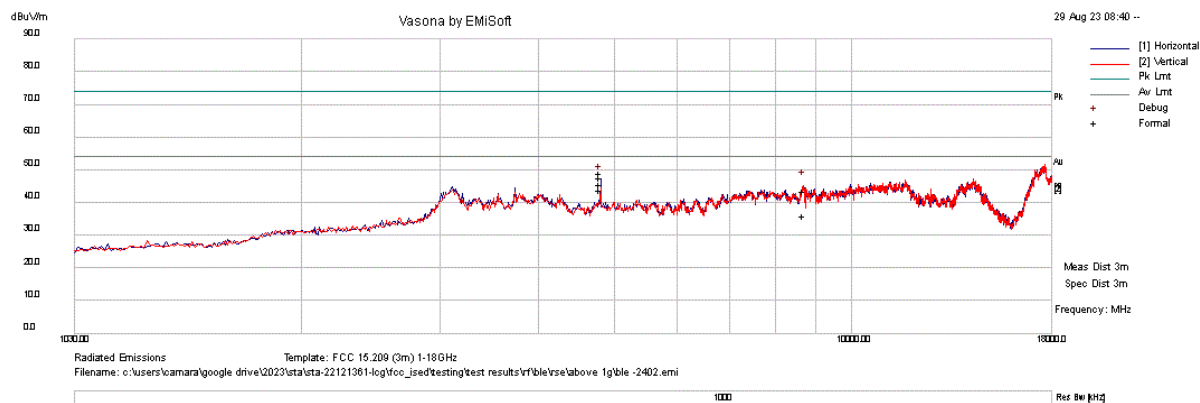
No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	374.997	47.8	6.2	-9.4	44.6	Quasi Max	H	198	347	46	-1.4	Pass
2	441.821	42.2	6.2	-9	39.4	Quasi Max	V	100	0	46	-6.6	Pass
3	245.456	48.4	5.2	-14.8	38.8	Quasi Max	H	100	20	46	-7.2	Pass
4	343.559	36.2	6	-11.4	30.8	Quasi Max	H	205	352	46	-15.2	Pass
5	625.012	35.9	7.2	-5	38.1	Quasi Max	H	100	350	46	-7.9	Pass
6	424.985	38.4	6.3	-8.6	36.1	Quasi Max	V	104	0	46	-9.9	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
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:	FCC 15.247, 15.209, RSS-247	Mode:	BLE Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	08/24/2023-08/29/2023
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Low Channel	Test Result:	Pass



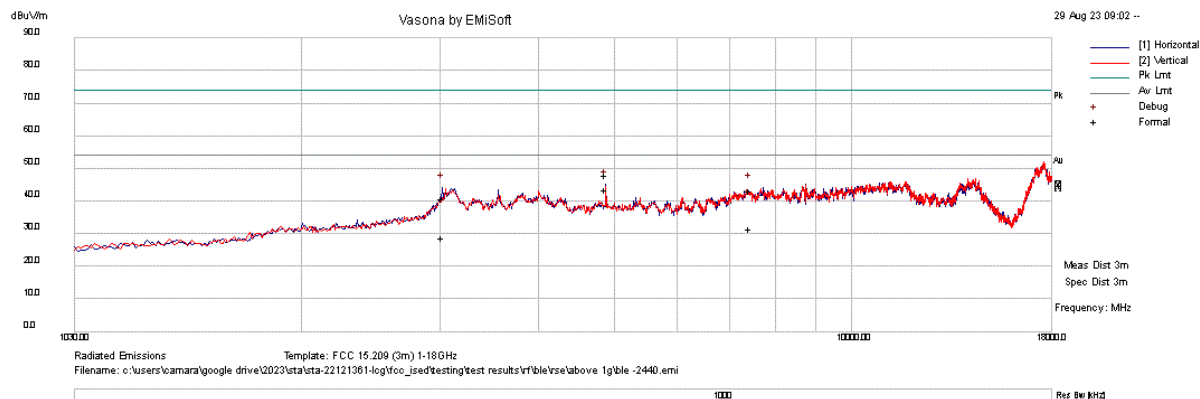
No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	4804.078	44.3	9.1	-4.5	48.9	Peak Max	H	180	198	74	-25.1	Pass
2	4803.9	43.1	9.1	-4.5	47.7	Peak Max	V	227	137	74	-26.3	Pass
3	8697.671	33	16.3	-5.7	43.6	Peak Max	V	122	132	74	-30.4	Pass
4	4804.078	41.1	9.1	-4.5	45.7	Average Max	H	180	198	54	-8.3	Pass
5	4803.9	39.3	9.1	-4.5	43.9	Average Max	V	227	137	54	-10.1	Pass
6	8697.671	25.3	16.3	-5.7	35.9	Average Max	V	122	132	54	-18.1	Pass

Remarks:

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

Report#	STA-22121361-LCG-FCC-IC-RF-DTS
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Test Standard:	FCC 15.247, 15.209, RSS-247	Mode:	BLE Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	08/24/2023-08/29/2023
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Mid Channel	Test Result:	Pass



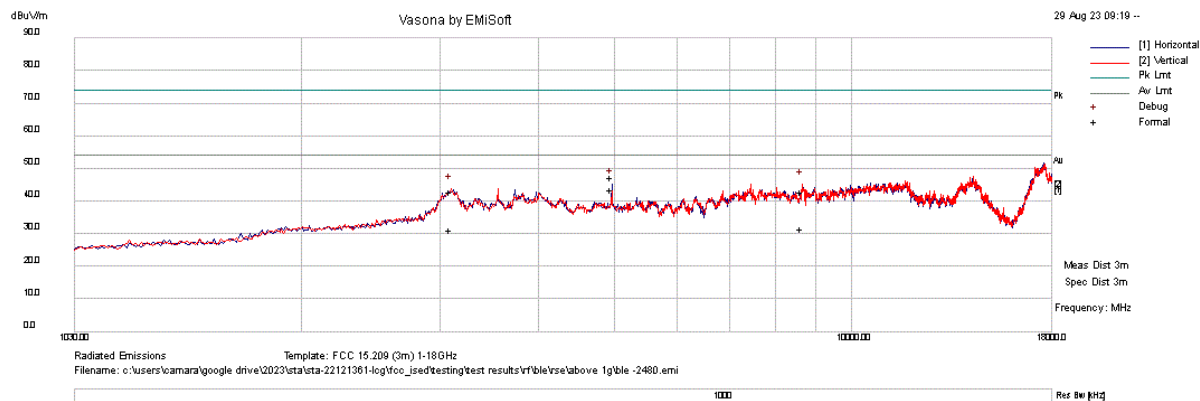
No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	4879.981	44.2	9.3	-5.5	48	Peak Max	H	204	221	74	-26	Pass
2	7440.455	35.7	13.2	-5.6	43.3	Peak Max	V	342	359	74	-30.7	Pass
3	3025.975	30.1	7.6	3.1	40.8	Peak Max	H	366	359	74	-33.2	Pass
4	4879.981	39.8	9.3	-5.5	43.6	Average Max	H	204	221	54	-10.4	Pass
5	7440.455	23.8	13.2	-5.6	31.4	Average Max	V	342	359	54	-22.6	Pass
6	3025.975	18.2	7.6	3.1	28.9	Average Max	H	366	359	54	-25.1	Pass

Remarks:

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

Report#	STA-22121361-LCG-FCC-IC-RF-DTS
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Test Standard:	FCC 15.247, 15.209, RSS-247	Mode:	BLE Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	08/24/2023-08/29/2023
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	High Channel	Test Result:	Pass



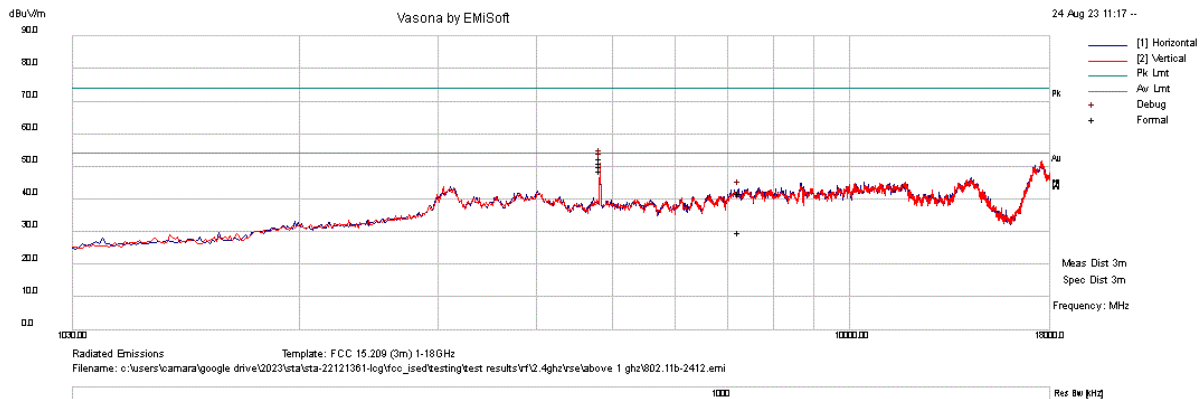
No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	4959.984	44.6	9.5	-6.6	47.5	Peak Max	H	235	227	74	-26.5	Pass
2	8656.099	32.8	15.9	-5.7	43	Peak Max	V	276	260	74	-31	Pass
3	3097.809	35.8	7.7	-0.6	42.9	Peak Max	V	304	323	74	-31.1	Pass
4	4959.984	40.7	9.5	-6.6	43.6	Average Max	H	235	227	54	-10.4	Pass
5	8656.099	21.6	15.9	-5.7	31.8	Average Max	V	276	260	54	-22.2	Pass
6	3097.809	24.3	7.7	-0.6	31.4	Average Max	V	304	323	54	-22.6	Pass

Remarks:

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

Report# STA-22121361-LCG-FCC-IC-RF-DTS

Test Standard:	FCC 15.247, 15.209, RSS-247	Mode:	802.11b Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	08/24/2023-08/29/2023
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Low Channel	Test Result:	Pass



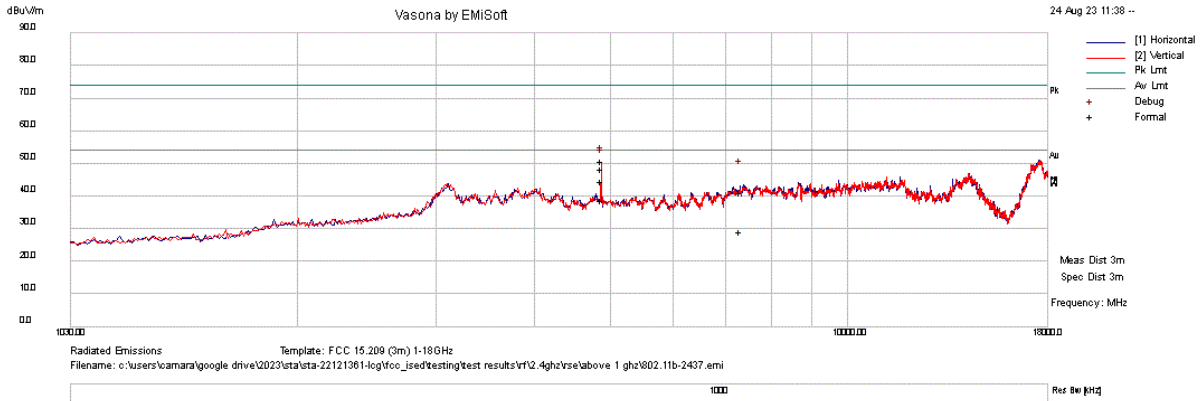
No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	4824.035	48.1	9.2	-4.7	52.6	Peak Max	V	184	0	74	-21.4	Pass
2	4824.03	46.8	9.2	-4.7	51.3	Peak Max	H	116	85	74	-22.7	Pass
3	7257.595	34.7	12.7	-5.5	41.9	Peak Max	H	376	276	74	-32.1	Pass
4	4824.035	45.8	9.2	-4.7	50.3	Average Max	V	184	0	54	-3.7	Pass
5	4824.03	44.2	9.2	-4.7	48.7	Average Max	H	116	85	54	-5.3	Pass
6	7257.595	22.7	12.7	-5.5	29.9	Average Max	H	376	276	54	-24.1	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
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:	FCC 15.247, 15.209, RSS-247	Mode:	802.11b Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	08/24/2023-08/29/2023
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Mid Channel	Test Result:	Pass



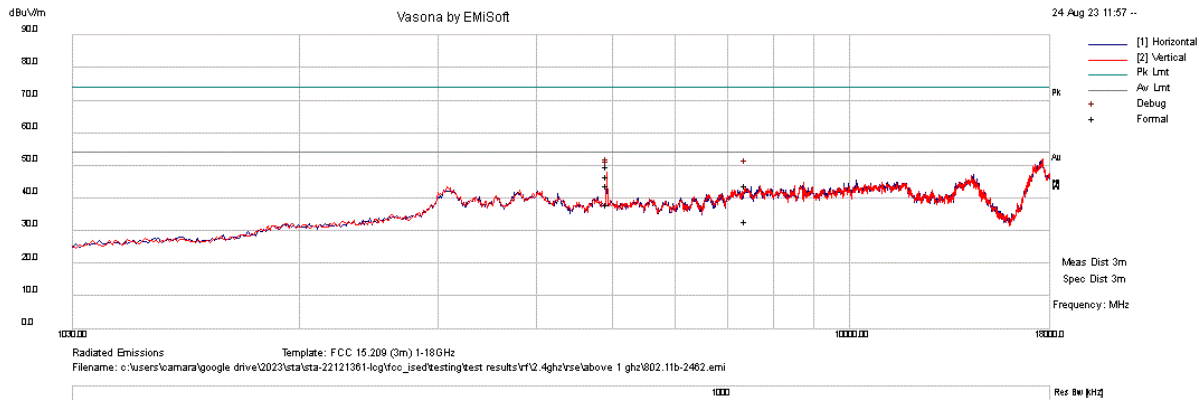
No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	4874.055	40.7	9.3	-5.4	44.6	Peak Max	H	151	0	74	-29.4	Pass
2	4874.1	47	9.3	-5.4	50.9	Peak Max	V	170	0	74	-23.1	Pass
3	7310.123	33.9	12.9	-5.5	41.3	Peak Max	V	102	336	74	-32.7	Pass
4	4874.055	34.9	9.3	-5.4	38.8	Average Max	H	151	0	54	-15.2	Pass
5	4874.1	44.4	9.3	-5.4	48.3	Average Max	V	170	0	54	-5.7	Pass
6	7310.123	21.9	12.9	-5.5	29.3	Average Max	V	102	336	54	-24.7	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
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:	FCC 15.247, 15.209, RSS-247	Mode:	802.11b Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	08/24/2023-08/29/2023
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	High Channel	Test Result:	Pass



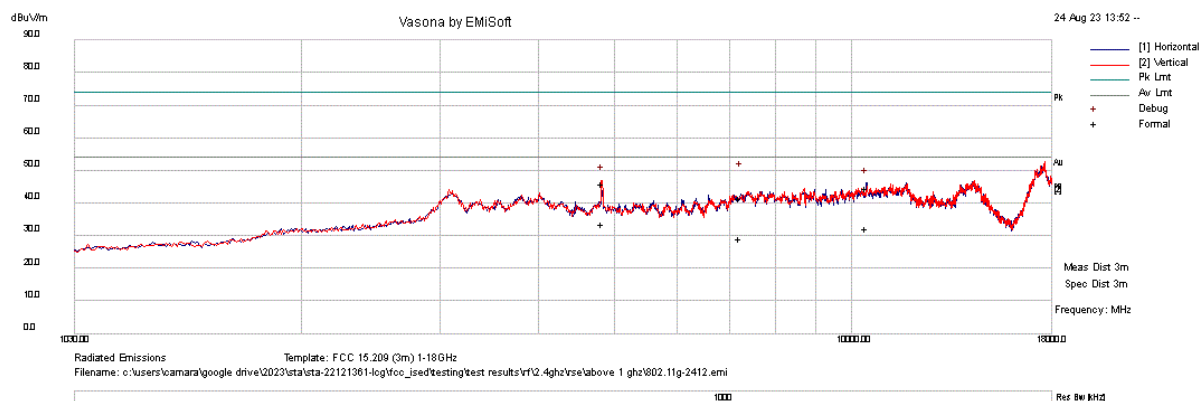
No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	4923.93	46.4	9.4	-6.1	49.7	Peak Max	V	230	131	74	-24.3	Pass
2	7387.648	36.4	13.1	-5.5	44	Peak Max	V	306	24	74	-30	Pass
3	4924.088	40.6	9.4	-6.1	43.9	Peak Max	H	153	108	74	-30.1	Pass
4	4923.93	43.4	9.4	-6.1	46.7	Average Max	V	230	131	54	-7.3	Pass
5	7387.648	25.3	13.1	-5.5	32.9	Average Max	V	306	24	54	-21.1	Pass
6	4924.088	34.8	9.4	-6.1	38.1	Average Max	H	153	108	54	-15.9	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
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:	FCC 15.247, 15.209, RSS-247	Mode:	802.11g Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	08/24/2023-08/29/2023
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Low Channel	Test Result:	Pass



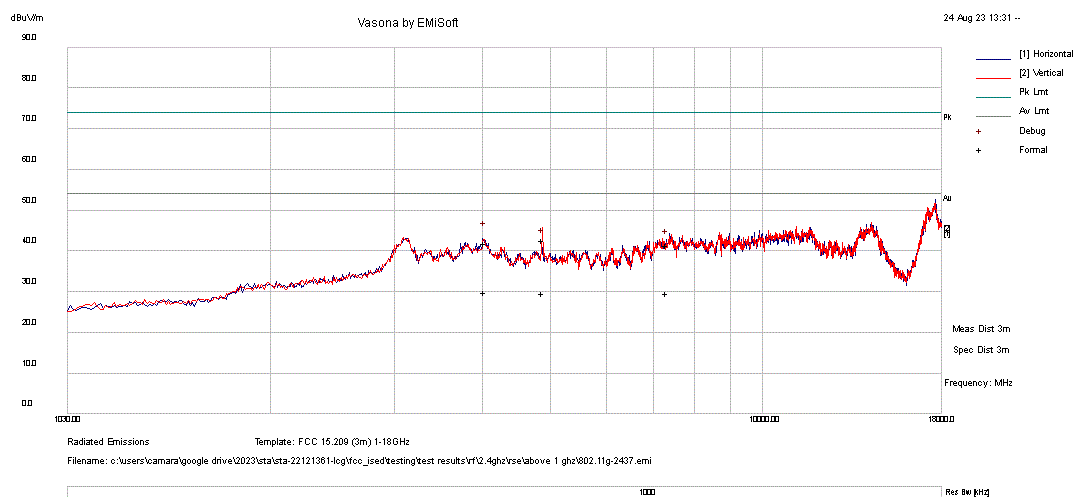
No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7235.34	34.4	12.7	-5.5	41.6	Peak Max	H	343	294	74	-32.4	Pass
2	4824.39	41.6	9.2	-4.7	46.1	Peak Max	V	231	160	74	-27.9	Pass
3	10462.937	32.7	17.1	-5.2	44.6	Peak Max	H	165	164	74	-29.4	Pass
4	7235.34	22.1	12.7	-5.5	29.3	Average Max	H	343	294	54	-24.7	Pass
5	4824.39	29	9.2	-4.7	33.5	Average Max	V	231	160	54	-20.5	Pass
6	10462.937	20.2	17.1	-5.2	32.1	Average Max	H	165	164	54	-21.9	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
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:	FCC 15.247, 15.209, RSS-247	Mode:	802.11g Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	08/24/2023-08/29/2023
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Mid Channel	Test Result:	Pass

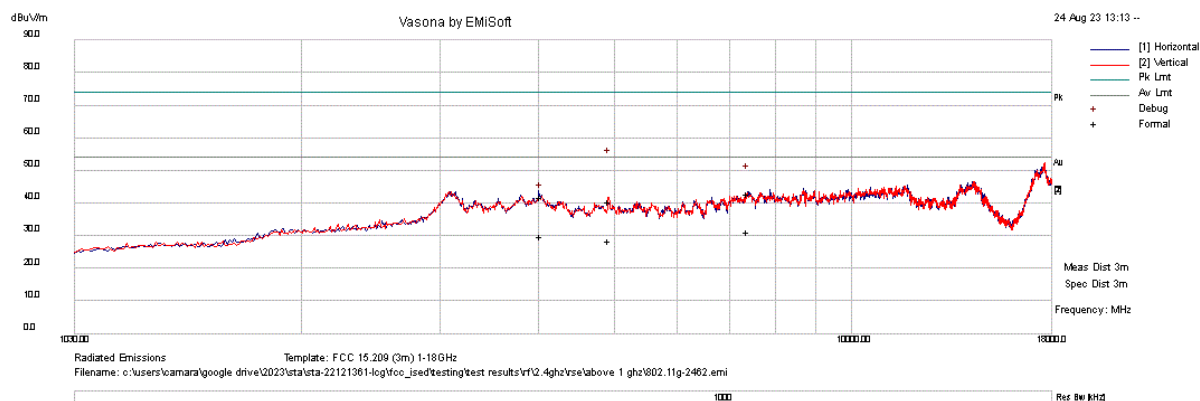


No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	4029.836	27	9.9	5.2	42.1	Peak Max	H	104	0	74	-31.9	Pass
2	4872.143	38.8	9.3	-5.4	42.7	Peak Max	V	104	181	74	-31.3	Pass
3	7312.743	34	12.9	-5.5	41.4	Peak Max	V	405	274	74	-32.6	Pass
4	4029.836	14.9	9.9	5.2	30	Average Max	H	104	0	54	-24	Pass
5	4872.143	25.9	9.3	-5.4	29.8	Average Max	V	104	181	54	-24.2	Pass
6	7312.743	22.2	12.9	-5.5	29.6	Average Max	V	405	274	54	-24.4	Pass

Remarks:

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

Test Standard:	FCC 15.247, 15.209, RSS-247	Mode:	802.11g Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	08/24/2023-08/29/2023
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	High Channel	Test Result:	Pass

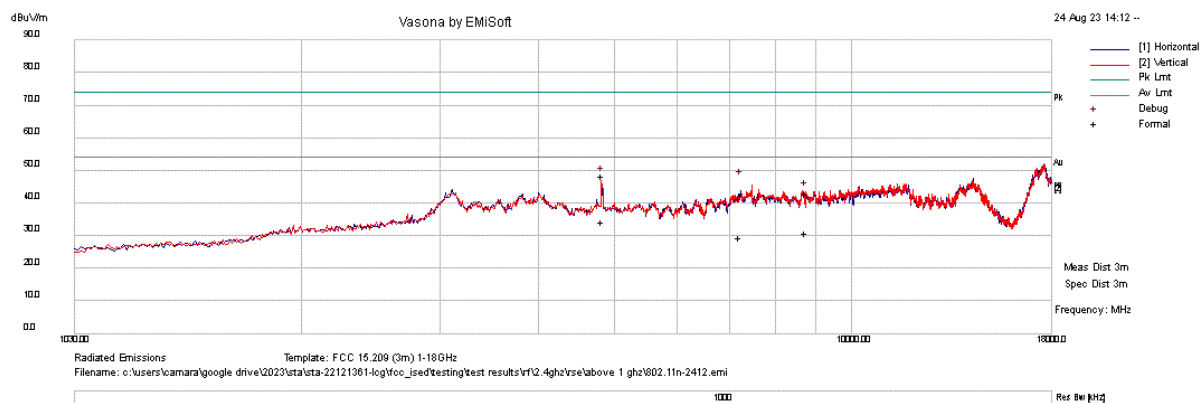


No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	4923.148	37.2	9.4	-6.1	40.5	Peak Max	V	194	0	74	-33.5	Pass
2	7384.128	35.4	13	-5.5	42.9	Peak Max	H	103	0	74	-31.1	Pass
3	4030.406	26.7	9.9	5.2	41.8	Peak Max	H	117	240	74	-32.2	Pass
4	4923.148	25.4	9.4	-6.1	28.7	Average Max	V	194	0	54	-25.3	Pass
5	7384.128	23.8	13	-5.5	31.3	Average Max	H	103	0	54	-22.7	Pass
6	4030.406	14.9	9.9	5.2	30	Average Max	H	117	240	54	-24	Pass

Remarks:

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

Test Standard:	FCC 15.247, 15.209, RSS-247	Mode:	802.11n20 Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	08/24/2023-08/29/2023
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Low Channel	Test Result:	Pass

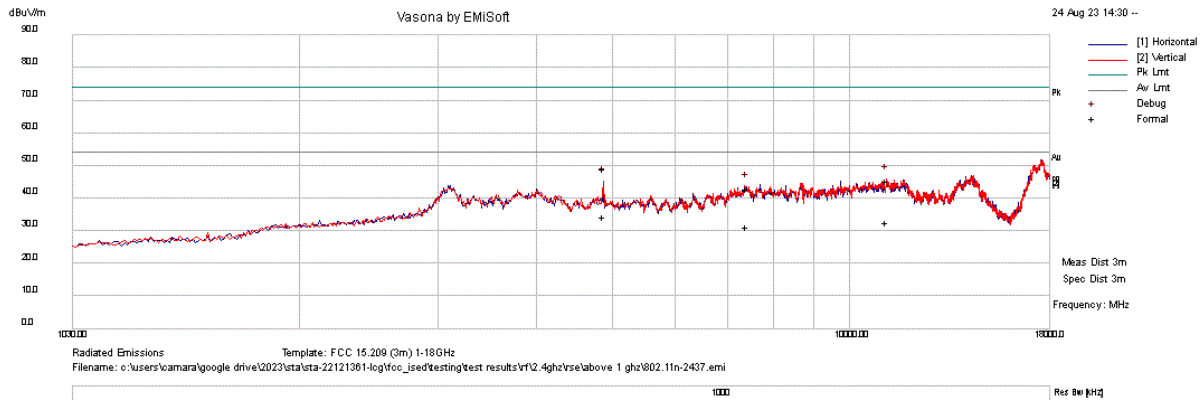


No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	4823.228	43.9	9.2	-4.7	48.4	Peak Max	V	198	174	74	-25.6	Pass
2	7234.073	34.4	12.7	-5.5	41.6	Peak Max	V	218	0	74	-32.4	Pass
3	8752.886	31.8	16.8	-5.7	42.9	Peak Max	V	109	0	74	-31.1	Pass
4	4823.228	29.7	9.2	-4.7	34.2	Average Max	V	198	174	54	-19.8	Pass
5	7234.073	22.3	12.7	-5.5	29.5	Average Max	V	218	0	54	-24.5	Pass
6	8752.886	19.9	16.8	-5.7	31	Average Max	V	109	0	54	-23	Pass

Remarks:

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

Test Standard:	FCC 15.247, 15.209, RSS-247	Mode:	802.11n20 Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	08/24/2023-08/29/2023
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Mid Channel	Test Result:	Pass

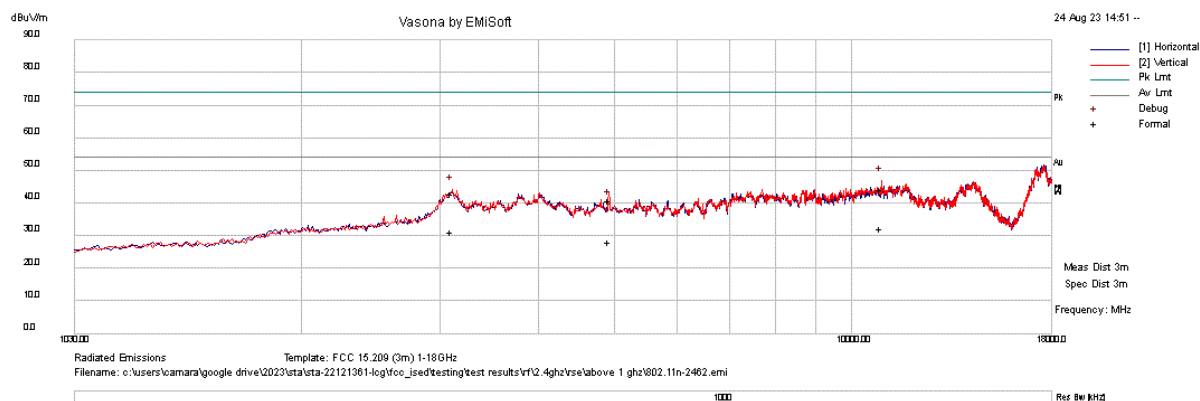


No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	11146.426	32.5	17.4	-4.6	45.3	Peak Max	V	263	290	74	-28.7	Pass
2	4872.125	45	9.3	-5.4	48.9	Peak Max	V	212	148	74	-25.1	Pass
3	7403.678	35.2	13.1	-5.5	42.8	Peak Max	V	266	266	74	-31.2	Pass
4	11146.426	19.8	17.4	-4.6	32.6	Average Max	V	263	290	54	-21.4	Pass
5	4872.125	30.3	9.3	-5.4	34.2	Average Max	V	212	148	54	-19.8	Pass
6	7403.678	23.7	13.1	-5.5	31.3	Average Max	V	266	266	54	-22.7	Pass

Remarks:

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

Test Standard:	FCC 15.247, 15.209, RSS-247	Mode:	802.11n20 Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	08/24/2023-08/29/2023
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	High Channel	Test Result:	Pass

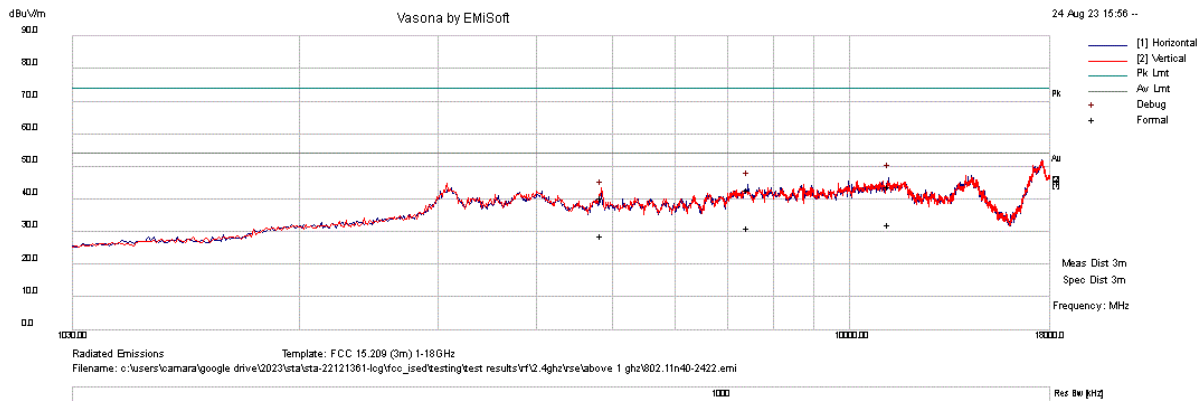


No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	10915.193	32	17.2	-4.8	44.4	Peak Max	V	232	235	74	-29.6	Pass
2	3109.663	36.2	7.7	-1.2	42.7	Peak Max	V	100	224	74	-31.3	Pass
3	4923.12	37.5	9.4	-6.1	40.8	Peak Max	V	100	357	74	-33.2	Pass
4	10915.193	20	17.2	-4.8	32.4	Average Max	V	232	235	54	-21.6	Pass
5	3109.663	24.7	7.7	-1.2	31.2	Average Max	V	100	224	54	-22.8	Pass
6	4923.12	24.9	9.4	-6.1	28.2	Average Max	V	100	357	54	-25.8	Pass

Remarks:

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

Test Standard:	FCC 15.247, 15.209, RSS-247	Mode:	802.11n40 Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	08/24/2023-08/29/2023
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Low Channel	Test Result:	Pass

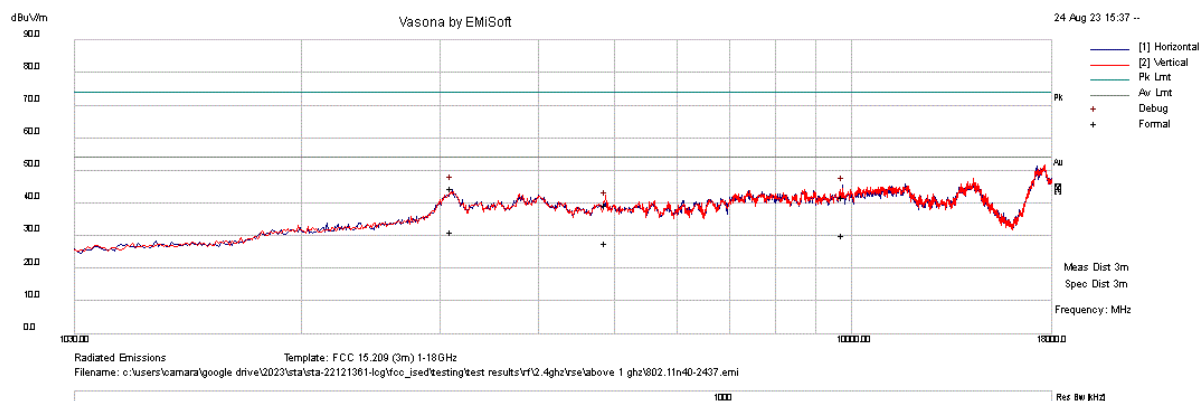


No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	11225.033	31.3	17.5	-4.7	44.1	Peak Max	H	205	15	74	-29.9	Pass
2	7438.138	35.3	13.2	-5.6	42.9	Peak Max	H	263	0	74	-31.1	Pass
3	4843.943	36.3	9.2	-5	40.5	Peak Max	V	128	0	74	-33.5	Pass
4	11225.033	19.5	17.5	-4.7	32.3	Average Max	H	205	15	54	-21.7	Pass
5	7438.138	23.6	13.2	-5.6	31.2	Average Max	H	263	0	54	-22.8	Pass
6	4843.943	24.7	9.2	-5	28.9	Average Max	V	128	0	54	-25.1	Pass

Remarks:

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

Test Standard:	FCC 15.247, 15.209, RSS-247	Mode:	802.11n40 Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	08/24/2023-08/29/2023
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	Mid Channel	Test Result:	Pass

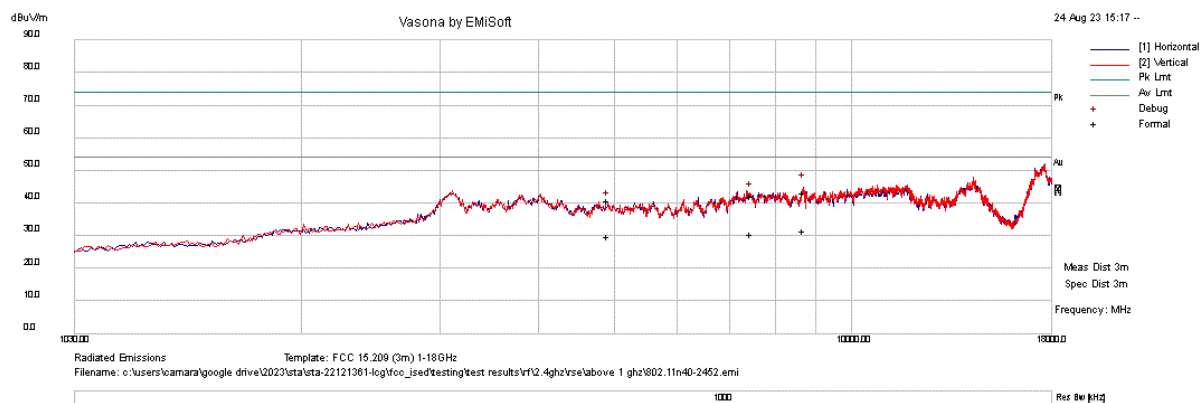


No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	3107.018	37.8	7.7	-1.1	44.4	Peak Max	H	201	214	74	-29.6	Pass
2	9751.036	30.5	16.2	-4.9	41.8	Peak Max	V	170	360	74	-32.2	Pass
3	4875.858	35.5	9.3	-5.4	39.4	Peak Max	V	182	0	74	-34.6	Pass
4	3107.018	24.6	7.7	-1.1	31.2	Average Max	H	201	214	54	-22.8	Pass
5	9751.036	19.1	16.2	-4.9	30.4	Average Max	V	170	360	54	-23.6	Pass
6	4875.858	23.9	9.3	-5.4	27.8	Average Max	V	182	0	54	-26.2	Pass

Remarks:

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

Test Standard:	FCC 15.247, 15.209, RSS-247	Mode:	802.11n40 Mode
Frequency Range:	1 GHz – 18 GHz	Test Date:	08/24/2023-08/29/2023
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	High Channel	Test Result:	Pass



No.	Frequency MHz	Raw dBuV	Cable Loss dB	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8697.741	32.7	16.3	-5.7	43.3	Peak Max	V	123	0	74	-30.7	Pass
2	7457.506	34.6	13.2	-5.6	42.2	Peak Max	V	195	0	74	-31.8	Pass
3	4904.143	37.2	9.3	-5.8	40.7	Peak Max	H	137	0	74	-33.3	Pass
4	8697.741	21.1	16.3	-5.7	31.7	Average Max	V	123	0	54	-22.3	Pass
5	7457.506	23.1	13.2	-5.6	30.7	Average Max	V	195	0	54	-23.3	Pass
6	4904.143	26.2	9.3	-5.8	29.7	Average Max	H	137	0	54	-24.3	Pass

Remarks:

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

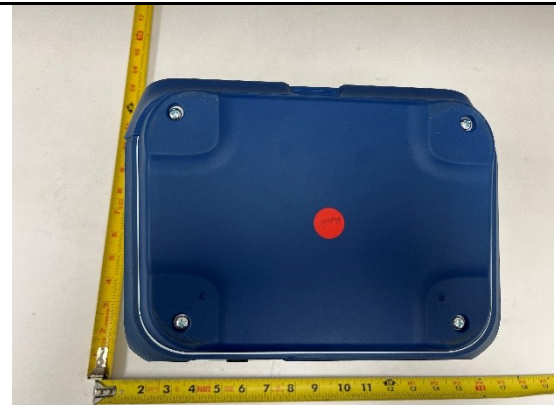
Radiated Emission between 18GHz – 40GHz test result

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

8 EUT and Test Setup Photos



EUT Top View



EUT Bottom View



EUT Front View



EUT Rear View



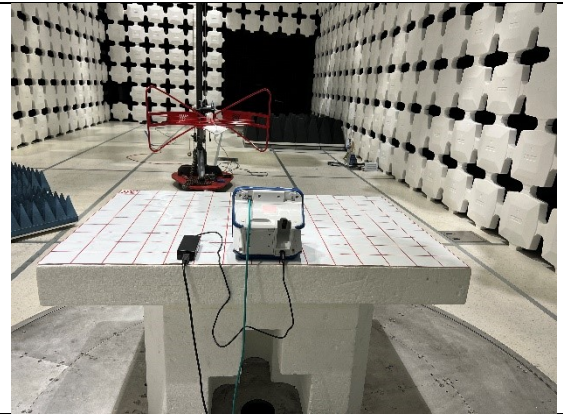
EUT Left View



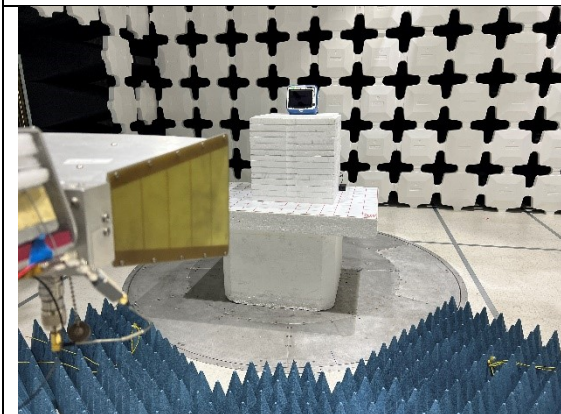
EUT Right View



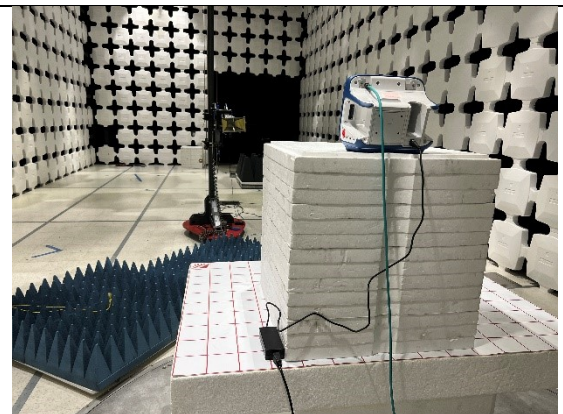
Radiated Emission-Below 1GHz-Front



Radiated Emission-Below 1GHz-Back



Radiated Emission-Above 1GHz-Front



Radiated Emission-Above 1GHz-Back

9 Test Instrument List

Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
10m Semi-Anechoic Chamber	ETS-Lingren	10M	VL001	10/18/2022	10/18/2023
Turn Table	ETS-Lingren	2181-3.03	VL002	N/A	N/A
Boresight Antenna Tower	ETS-Lingren	2171B	VL003	N/A	N/A
MXA Signal Analyzer 20Hz to 26.5GHz	Keysight	N9020A	MY50110074	06/17/2023	06/17/2024
MXG Vector Signal Generator	Keysight	N5182A	US47080548	06/17/2023	06/17/2024
EMI Test Receiver (9KHz to 6 GHz)	Rohde & Schwarz	ESL6	100230	06/24/2023	06/24/2024
BICONILOG ANTENNA (30 MHz to 6 GHz)	ETS-Lingren	3142E	217921	08/15/2023	08/15/2024
Horn Antenna (1-18GHz)	Electro-Metrics	EM-6961	6292	06/09/2023	06/09/2024
Synthesized Signal Generator (10MHz - 40GHz)	Anritsu	68367C A/NV	11625	06/24/2023	06/24/2024
Temperature/Humidity Chamber	Bemco	FBW1.5-100/350	3621-9	06/24/2023	06/24/2024
Power Splitter/Combiner	Mini-Circuits	ZFSC-2-9G+	VL052	N/A	N/A
Power Splitter/Combiner	Mini-Circuits	ZFSC-2-9G+	VL053	N/A	N/A
2 x Attenuator - 10dB (SMA) (DC~18GHz) (2 Watt)	Pasternack	PE7005-10	VL059-1, VL059-2	N/A	N/A
Attenuator - 20dB (SMA) (DC~18GHz) (2 Watt)	Pasternack	PE7005-20	VL060	N/A	N/A
Attenuator - 3dB (SMA) (DC~18GHz) (2 Watt)	Pasternack	PE7005-3	VL061	N/A	N/A
Attenuator - 20dB (N-Type) (DC~6GHz) (50 Watt)	Aeroflex	6N50W-20-048	64671	N/A	N/A
2.4GHz Notch Filter	Micro-Tronics	BRM50702	G332	N/A	N/A
Wideband Radio Communicator	Rohde & Schwarz	CMW500	147508	07/09/2023	07/09/2024
Temp / Humidity / Pressure Meter	PCE Instruments	PCE-THB 40	R062028	05/15/2023	05/15/2024
Broadband RF Power Amplifier 100KHz - 40GHz	Aeroflex	33711-392-77150-11	064	N/A	N/A
2 x Attenuator - 6dB (SMA) (DC~18GHz) (2 Watt)	JFW Industries, Inc	50HF-006 SMA	VL084-1, VL084-2	N/A	N/A
Attenuator - 30dB (SMA) (DC~18GHz) (2 Watt)	JFW Industries, Inc	50HF-030 SMA	VL085	N/A	N/A
Directional coupler	KRYTAR	1850	64023	N/A	N/A

Note:

- 1) This equipment is not for measurement purposes and only requires functional verification. Calibration is not required.

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