


RF Test Report

Test Report Number	STA-24041661-LC-FCC-IC-RF-DTS
FCC ID	N6C-USBAC
ISED ID	4908A-USBAC
Applicant	Silex technology, Inc.
Applicant Address	2-3-1 Hikaridai, Seika-cho, Kyoto 619-0237, Japan
Product Name	Embedded Wireless Module
Model Number	SX-USBAC
Date of Receipt	04/26/2024
Date of Test	04/30/2024- 05/08/2024
Report Issue Date	05/20/2024
Test Standards	47 CFR Part 15.247 RSS-247 Issue 3, Aug 2023
Test Result	PASS

	<p>Issued by:</p> <p>Vista Compliance Laboratories 1261 Puerta Del Sol, San Clemente, CA 92673 USA www.vista-compliance.com</p>
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<p style="font-size: 2em; font-family: cursive;">Lining</p> <hr style="border: 1px solid black;"/> <p>Lining Li (Test Engineer)</p>	<p style="font-size: 2em; font-family: cursive;">David Zhang</p> <hr style="border: 1px solid black;"/> <p>David Zhang (Technical Manager)</p>
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REVISION HISTORY

Report Number	Version	Description	Issued Date
STA-24041661-LC-FCC-IC-RF-DTS	01	Initial report	05/20/2024

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1 Test Summary

Test Item	Test Requirement	Test Method	Result
Antenna Requirement	47 CFR Part 15.203	N/A	Pass
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: N/A. The EUT is a certified BT and WLAN module, for more test details please see FCC ID: N6C-USBAC and ISED ID: 4908A-USBAC. Current report is additional evaluation due to adding new antenna for C2PC filing.

2 General Information

2.1 Applicant

Applicant	Silex technology,Inc.
Applicant Address	2-3-1 Hikaridai, Seika-cho, Kyoto 619-0237, Japan
Manufacturer	Silex technology,Inc.
Manufacturer Address	2-3-1 Hikaridai, Seika-cho, Kyoto 619-0237, Japan

2.2 Product information

Product Name	Embedded Wireless Module
Model Number	SX-USBAC
Family Models	N/A
Serial Number	N/A
Frequency Band	Bluetooth_Classic: 2402-2480MHz BLE: 2402-2480MHz WLAN 2.4G: 2412-2462MHz WLAN 5G: U-NII-1: 5150-5250MHz, U-NII-2A: 5250-5350MHz U-NII-2C: 5470-5725MHz, U-NII-3: 5725-5850MHz
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	DTS
Antenna Information	Hercules Wi-Fi 6 Permanent Mount Antenna (Part No.: WS.03.B.205151.vj) (omni-directional with cable) Peak Gain: 3.43 dBi for 2 GHz, 5.02 dBi for 5 GHz
Clock Frequencies	N/A
Input Power	3.3VDC
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 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	24.8°C	42.7%	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 measurement in different aspects.

5 Test Configuration and Operation

5.1 EUT Test Configuration

The EUT is mounted onto an i.MX6Q EVK Kit to support testing. EUT is set to different transmission modes 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
Tera Term	Set the module work at WLAN BLE mode
QRCT Application	Set the module into different mode, channel, data rate, etc.

5.2 EUT Power setting

WLAN_2.4G

802.11b			802.11g		
Channel	Frequency (MHz)	Power Setting	Channel	Frequency (MHz)	Power Setting
1	2412	16	1	2412	14.5
6	2437	16.5	6	2437	15.5
11	2462	19	11	2462	13.5
802.11n20			802.11n40		
Channel	Frequency (MHz)	Power Setting	Channel	Frequency (MHz)	Power Setting
1	2412	14	3	2422	11
6	2437	16	6	2437	12.5
11	2462	13.5	9	2452	11.5

BLE

The EUT is set to default maximum setting for testing purpose.

5.3 Supporting Equipment

Description	Manufacturer	Model #	Serial #	Remark
Laptop	Dell	Latitude E6510	6V9S2M1	Send command
i.MX6Q EVK Kit	N/A	N/A	N/A	Test Fixture
AC Adapter	SCEPTRE	ATS030-A050	PS2D-5050APL05	Power to i.MX6Q EVK Kit
Ethernet cable	N/A	N/A	N/A	Communication with Test PC
Micro USB Cable	N/A	N/A	N/A	

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 Summary and 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. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site.

7.1.2 Result

Analysis:

- EUT has u.FL antenna connector which is a unique type that is acceptable for FCC. The added external Hercules Wi-Fi 6 Permanent Mount Antenna, has reversed-SMA connector, which connects to SX-USBAC through a u.FL to RSMA pitable cable.

Conclusion:

- EUT and its antenna meet FCC requirements.

7.2 Radiated Spurious Emissions into Restricted Frequency Bands

7.2.1 Requirement

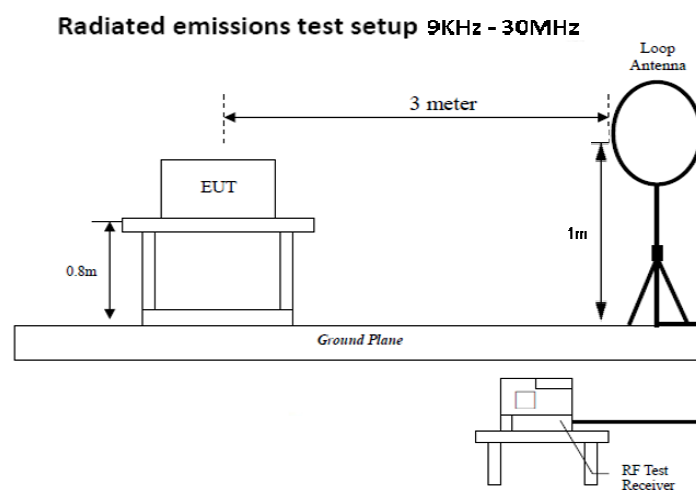
§ 15.247 (d)

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.

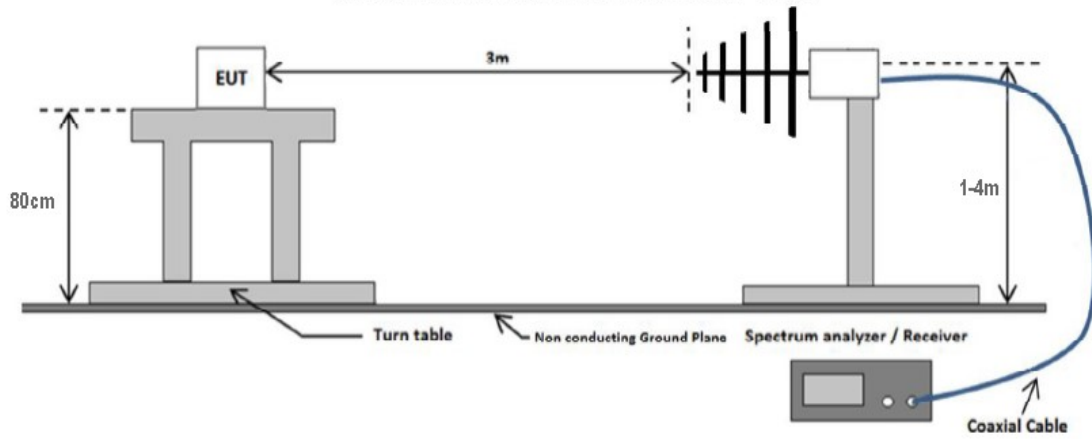
Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

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

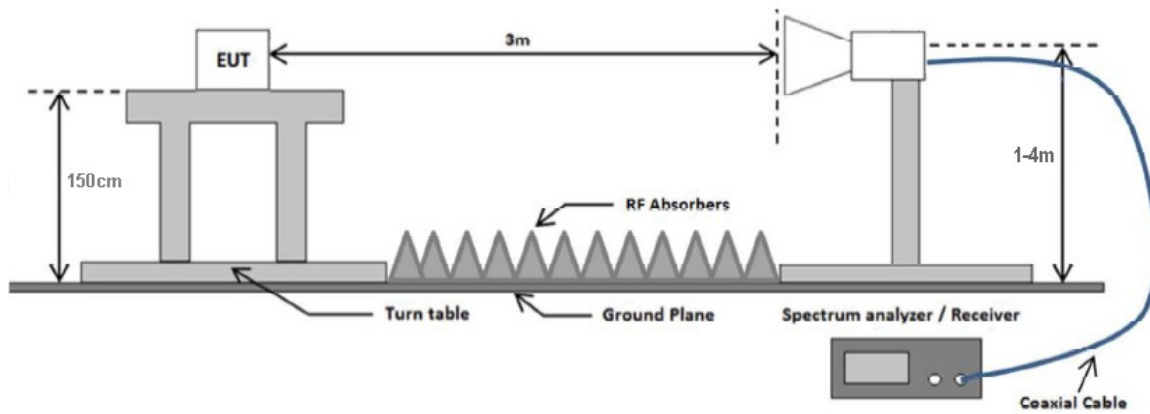
7.2.2 Test Setup



Radiated emissions test setup 30 MHz - 1 GHz



Radiated emissions test setup above 1 GHz



7.2.3 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.

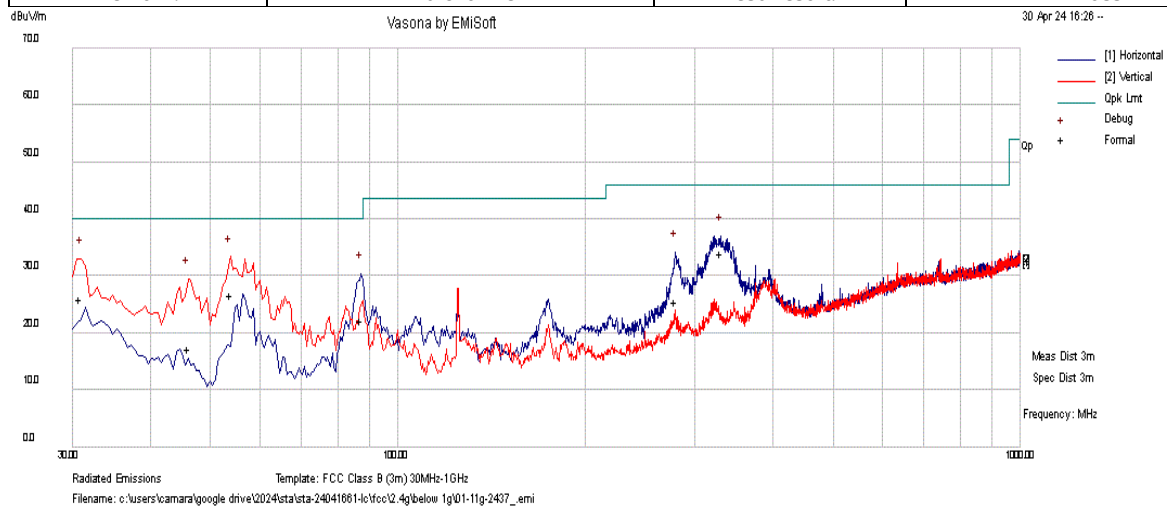
7.2.4 Test Result

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:	15.209, 15.247, RSS-247	Mode:	802.11g Mode
Frequency Range:	30 MHz - 1 GHz	Test Date:	04/30/2024
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Lining
Remark:	Mid channel	Test Result:	Pass

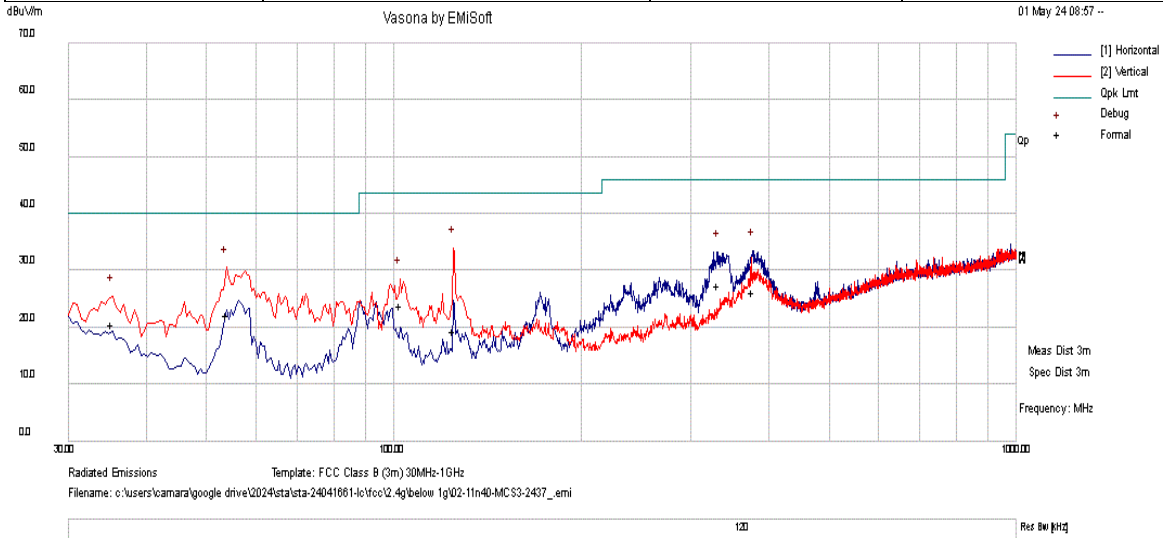


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	53.88	45.76	2.88	-21.91	26.73	Quasi Max	V	107	16	40.00	-13.27	Pass
2	30.91	36.82	2.26	-13.08	26.00	Quasi Max	V	143	350	40.00	-14.00	Pass
3	330.25	41.03	5.91	-13.03	33.91	Quasi Max	H	100	274	46.00	-12.09	Pass
4	87.45	39.99	3.41	-21.11	22.29	Quasi Max	H	186	282	40.00	-17.71	Pass
5	46.11	35.30	2.70	-20.77	17.23	Quasi Max	V	143	166	40.00	-22.77	Pass
6	279.44	34.91	5.51	-14.93	25.49	Quasi Max	H	129	308	46.00	-20.51	Pass

Remarks:

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

Test Standard:	15.209, 15.247, RSS-247	Mode:	802.11n Mode
Frequency Range:	30 MHz - 1 GHz	Test Date:	05/01/2024
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Lining
Remark:	Mid channel	Test Result:	Pass

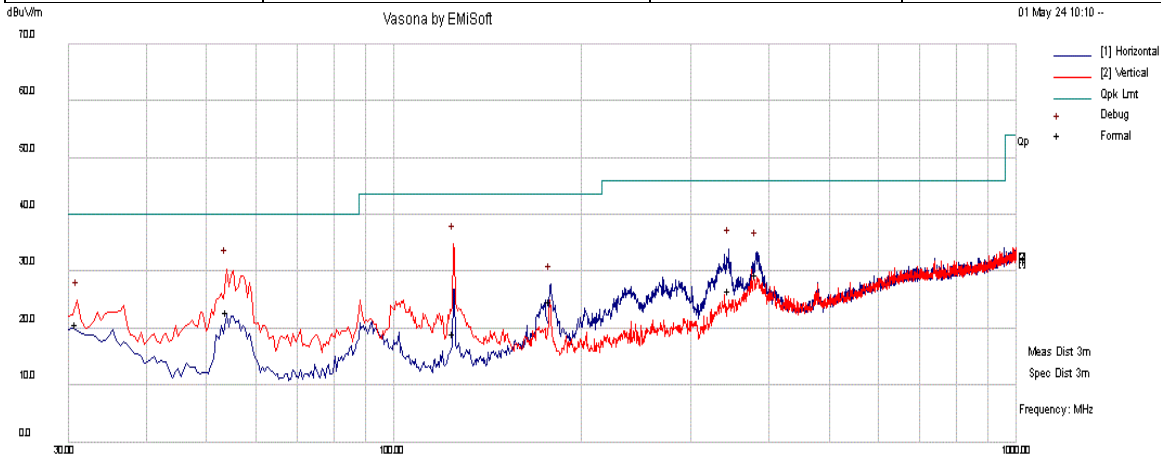


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	124.72	34.57	3.94	-19.18	19.33	Quasi Max	V	120	187	43.50	-24.17	Pass
2	54.01	41.33	2.88	-21.91	22.30	Quasi Max	V	234	76	40.00	-17.70	Pass
3	376.80	30.65	6.23	-10.56	26.32	Quasi Max	H	120	157	46.00	-19.68	Pass
4	331.44	34.38	5.92	-12.97	27.33	Quasi Max	H	100	267	46.00	-18.67	Pass
5	35.25	33.74	2.40	-15.45	20.69	Quasi Max	V	0	199	40.00	-19.31	Pass
6	102.42	40.20	3.60	-19.92	23.88	Quasi Max	V	108	0	43.50	-19.62	Pass

Remarks:

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

Test Standard:	15.209, 15.247, RSS-247	Mode:	BLE Mode
Frequency Range:	30 MHz - 1 GHz	Test Date:	05/01/2024
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Lining
Remark:	Mid channel	Test Result:	Pass



Radiated Emissions
Template: FCC Class B (3m) 30MHz-1GHz
Filename: o:\users\amara\google drive\2024\sta\sta-24041661-lc\rfco\ble\below 1g\01-BLE-2440_emi

120 Res BW [Hz]

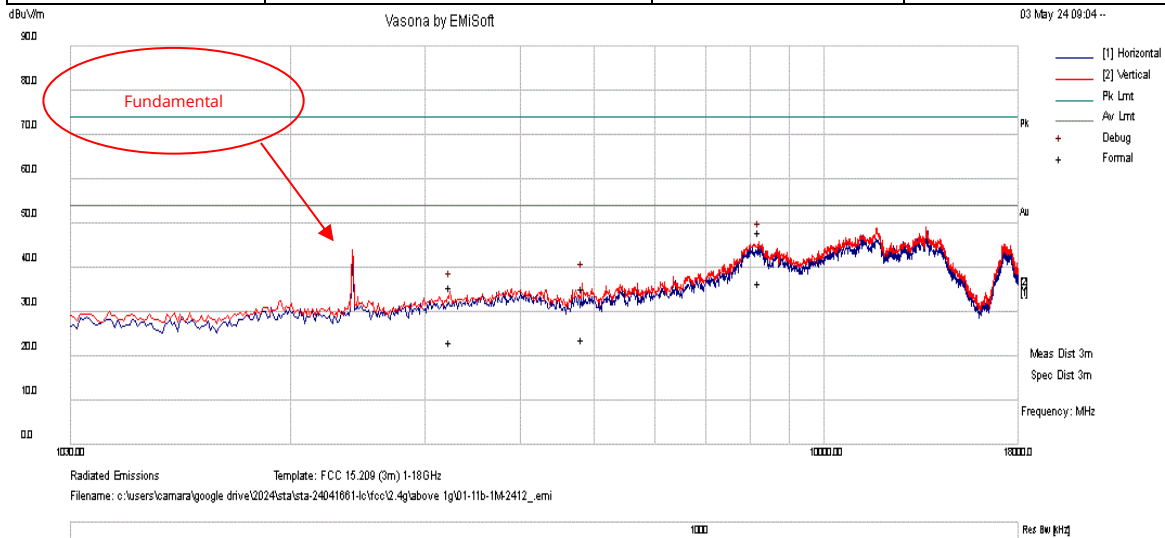
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	124.65	34.44	3.93	-19.18	19.19	Quasi Max	V	0	206	43.50	-24.31	Pass
2	54.01	41.99	2.88	-21.91	22.96	Quasi Max	V	153	0	40.00	-17.04	Pass
3	345.17	33.07	6.02	-12.28	26.81	Quasi Max	H	296	301	46.00	-19.19	Pass
4	382.48	33.48	6.26	-10.26	29.48	Quasi Max	H	100	182	46.00	-16.52	Pass
5	30.94	31.63	2.26	-13.10	20.79	Quasi Max	V	122	260	40.00	-19.21	Pass
6	178.39	38.46	4.54	-18.06	24.94	Quasi Max	H	100	242	43.50	-18.56	Pass

Remarks:

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

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	15.209, 15.247, RSS-247	Mode:	802.11b Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	05/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Lining
Remark:	Low channel	Test Result:	Pass

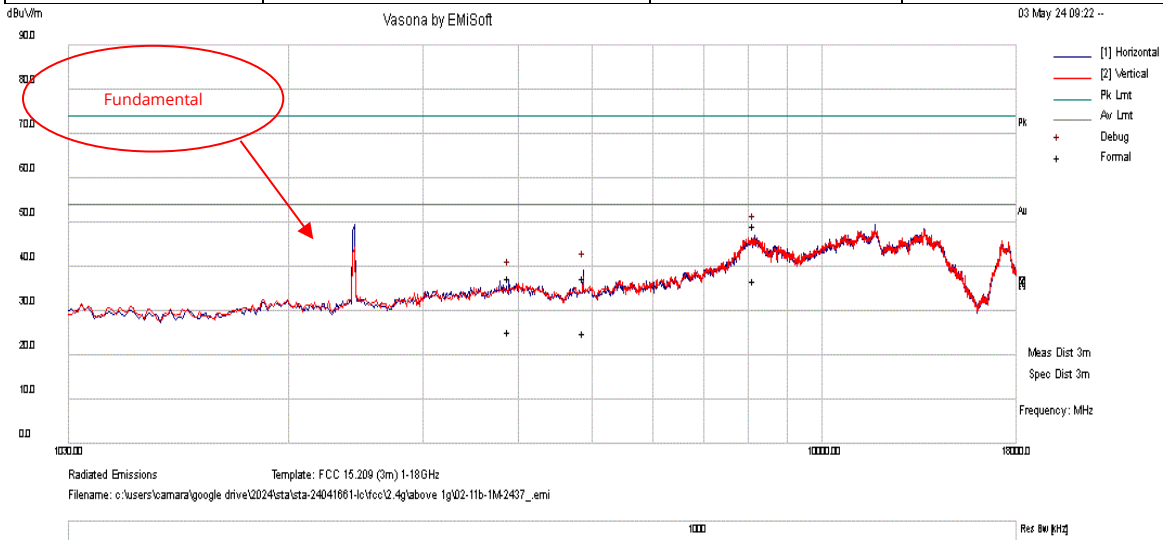


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8233.52	18.35	14.17	15.62	48.14	Peak Max	V	206	96	74.00	-25.86	Pass
2	4825.56	19.99	9.18	6.00	35.17	Peak Max	V	200	83	74.00	-38.83	Pass
3	3237.86	24.43	7.97	3.17	35.57	Peak Max	V	118	0	74.00	-38.43	Pass
4	8233.52	6.74	14.17	15.62	36.53	Average Max	V	206	96	54.00	-17.47	Pass
5	4825.56	8.66	9.18	6.00	23.84	Average Max	V	200	83	54.00	-30.16	Pass
6	3237.86	12.06	7.97	3.17	23.20	Average Max	V	118	0	54.00	-30.80	Pass

Remarks:

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

Test Standard:	15.209, 15.247, RSS-247	Mode:	802.11b Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	05/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Lining
Remark:	Mid channel	Test Result:	Pass



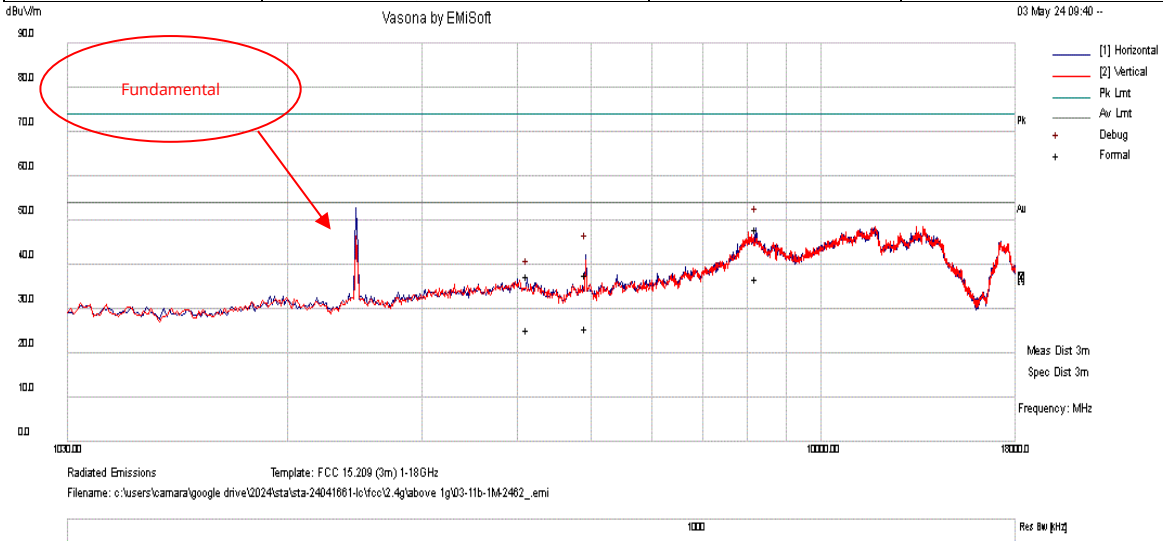
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8157.21	19.34	14.20	15.63	49.17	Peak Max	H	100	0	74.00	-24.83	Pass
2	4871.34	22.15	9.27	5.90	37.32	Peak Max	H	250	212	74.00	-36.68	Pass
3	3896.42	22.27	9.49	5.52	37.28	Peak Max	H	191	130	74.00	-36.72	Pass
4	8157.21	6.91	14.20	15.63	36.74	Average Max	H	100	0	54.00	-17.26	Pass
5	4871.34	9.89	9.27	5.90	25.06	Average Max	H	250	212	54.00	-28.94	Pass
6	3896.42	10.33	9.49	5.52	25.34	Average Max	H	191	130	54.00	-28.66	Pass

Remarks:

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

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Test Standard:	15.209, 15.247, RSS-247	Mode:	802.11b Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	05/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Lining
Remark:	High channel	Test Result:	Pass



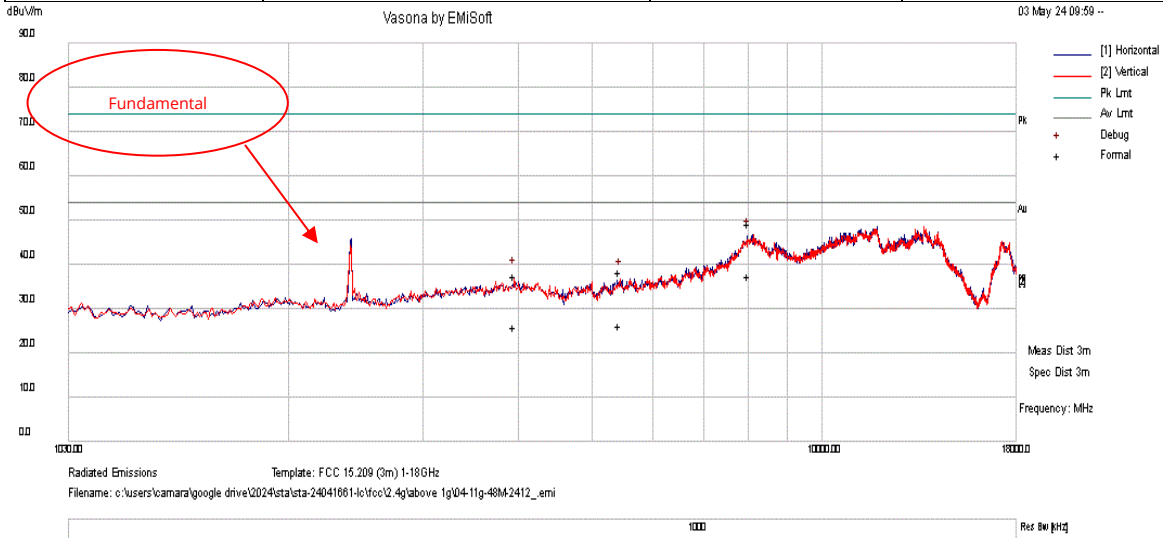
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8222.27	18.32	14.17	15.61	48.10	Peak Max	H	405	0	74.00	-25.90	Pass
2	4923.22	22.73	9.38	5.69	37.80	Peak Max	H	367	118	74.00	-36.20	Pass
3	4128.39	22.60	9.76	4.98	37.34	Peak Max	H	403	0	74.00	-36.66	Pass
4	8222.27	6.89	14.17	15.61	36.67	Average Max	H	405	0	54.00	-17.33	Pass
5	4923.22	10.43	9.38	5.69	25.50	Average Max	H	367	118	54.00	-28.50	Pass
6	4128.39	10.56	9.76	4.98	25.30	Average Max	H	403	0	54.00	-28.70	Pass

Remarks:

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

Report# STA-24041661-LC-FCC-IC-RF-DTS

Test Standard:	15.209, 15.247, RSS-247	Mode:	802.11g Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	05/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Lining
Remark:	Low channel	Test Result:	Pass

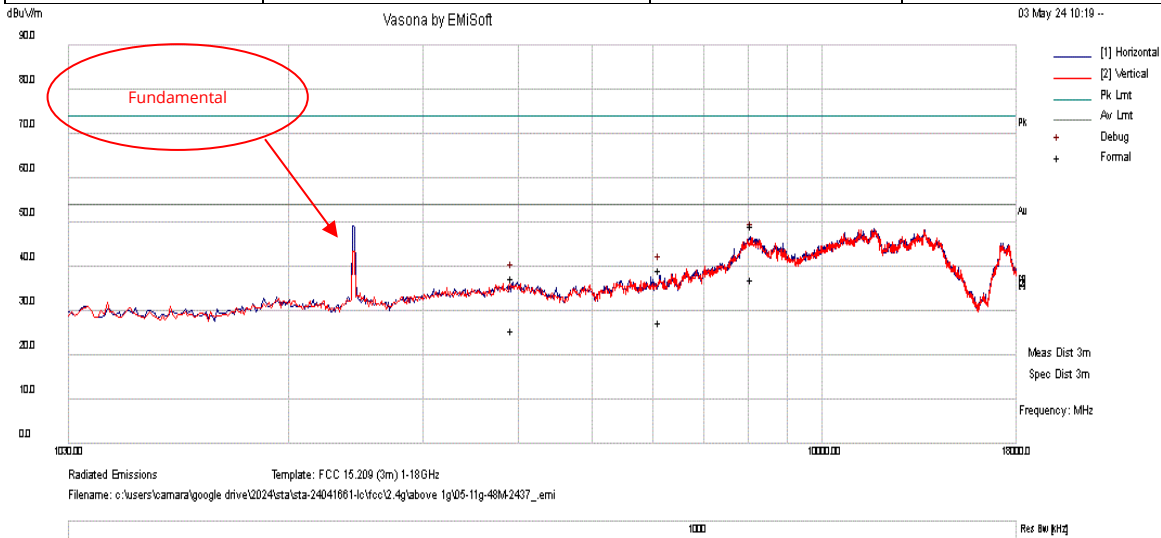


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8009.89	18.94	14.27	15.85	49.06	Peak Max	H	238	244	74.00	-24.94	Pass
2	3957.10	22.17	9.77	5.38	37.32	Peak Max	V	404	323	74.00	-36.68	Pass
3	5443.01	21.63	10.62	6.04	38.29	Peak Max	H	319	0	74.00	-35.71	Pass
4	8009.89	7.22	14.27	15.85	37.34	Average Max	H	238	244	54.00	-16.66	Pass
5	3957.10	10.72	9.77	5.38	25.87	Average Max	V	404	323	54.00	-28.13	Pass
6	5443.01	9.55	10.62	6.04	26.21	Average Max	H	319	0	54.00	-27.79	Pass

Remarks:

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

Test Standard:	15.209, 15.247, RSS-247	Mode:	802.11g Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	05/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Lining
Remark:	Mid channel	Test Result:	Pass



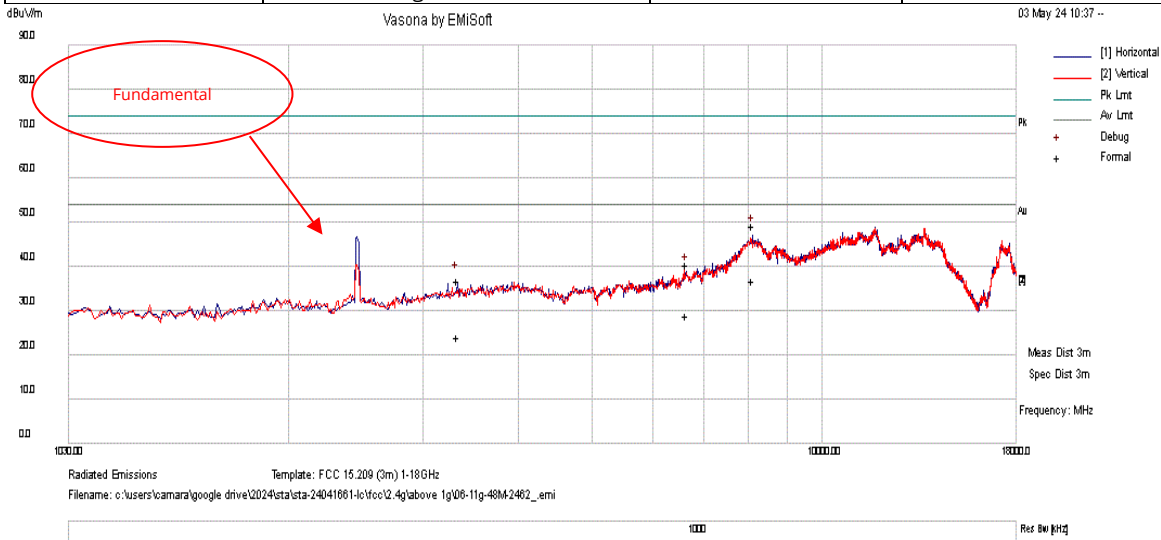
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8089.99	19.21	14.23	15.74	49.18	Peak Max	H	181	288	74.00	-24.82	Pass
2	6133.46	20.75	11.83	6.76	39.34	Peak Max	H	306	262	74.00	-34.66	Pass
3	3934.46	22.32	9.67	5.45	37.44	Peak Max	H	140	100	74.00	-36.56	Pass
4	8089.99	7.00	14.23	15.74	36.97	Average Max	H	181	288	54.00	-17.03	Pass
5	6133.46	8.77	11.83	6.76	27.36	Average Max	H	306	262	54.00	-26.64	Pass
6	3934.46	10.60	9.67	5.45	25.72	Average Max	H	140	100	54.00	-28.28	Pass

Remarks:

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

Report# STA-24041661-LC-FCC-IC-RF-DTS

Test Standard:	15.209, 15.247, RSS-247	Mode:	802.11g Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	05/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Lining
Remark:	High channel	Test Result:	Pass



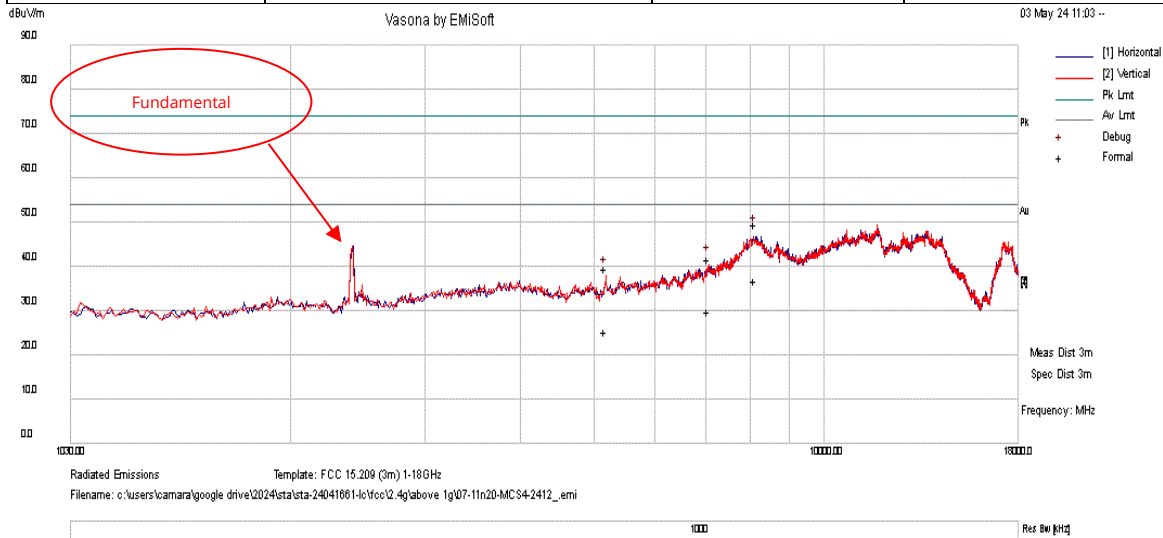
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8115.02	19.25	14.22	15.69	49.16	Peak Max	H	108	90	74.00	-24.84	Pass
2	6650.47	20.53	12.10	7.87	40.50	Peak Max	H	405	124	74.00	-33.50	Pass
3	3332.53	25.06	8.07	3.63	36.76	Peak Max	H	163	331	74.00	-37.24	Pass
4	8115.02	6.72	14.22	15.69	36.63	Average Max	H	108	90	54.00	-17.37	Pass
5	6650.47	8.83	12.10	7.87	28.80	Average Max	H	405	124	54.00	-25.20	Pass
6	3332.53	12.37	8.07	3.63	24.07	Average Max	H	163	331	54.00	-29.93	Pass

Remarks:

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

Report# STA-24041661-LC-FCC-IC-RF-DTS

Test Standard:	15.209, 15.247, RSS-247	Mode:	802.11n Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	05/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Lining
Remark:	Low channel	Test Result:	Pass



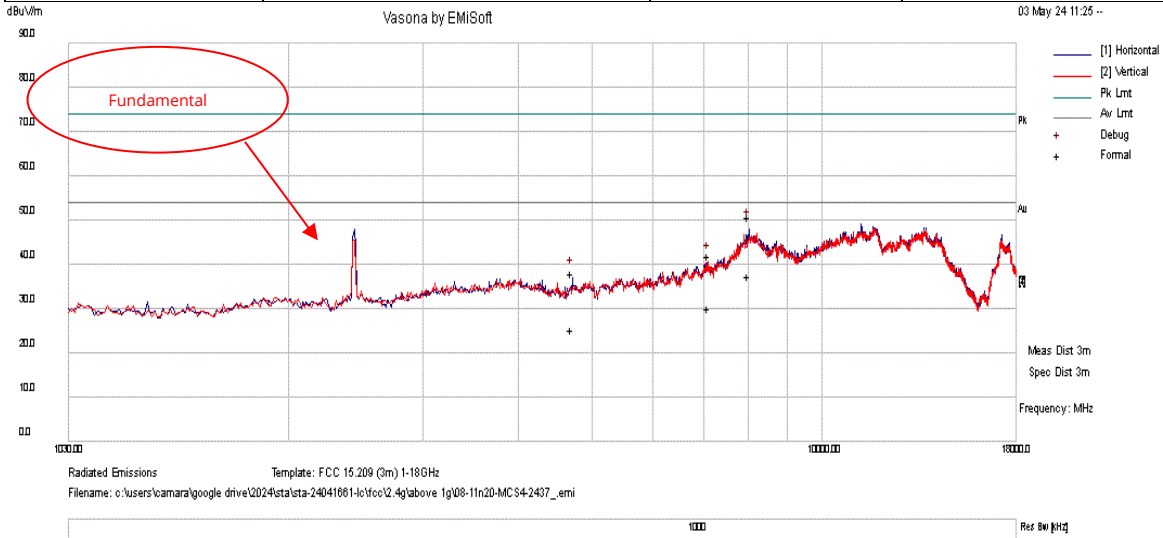
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8134.74	19.68	14.21	15.66	49.55	Peak Max	H	117	0	74.00	-24.45	Pass
2	7067.26	19.92	12.63	9.16	41.71	Peak Max	V	322	164	74.00	-32.29	Pass
3	5180.50	23.58	9.88	6.00	39.46	Peak Max	V	100	136	74.00	-34.54	Pass
4	8134.74	6.98	14.21	15.66	36.85	Average Max	H	117	0	54.00	-17.15	Pass
5	7067.26	8.00	12.63	9.16	29.79	Average Max	V	322	164	54.00	-24.21	Pass
6	5180.50	9.46	9.88	6.00	25.34	Average Max	V	100	136	54.00	-28.66	Pass

Remarks:

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

Report# STA-24041661-LC-FCC-IC-RF-DTS

Test Standard:	15.209, 15.247, RSS-247	Mode:	802.11n Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	05/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Lining
Remark:	Mid channel	Test Result:	Pass

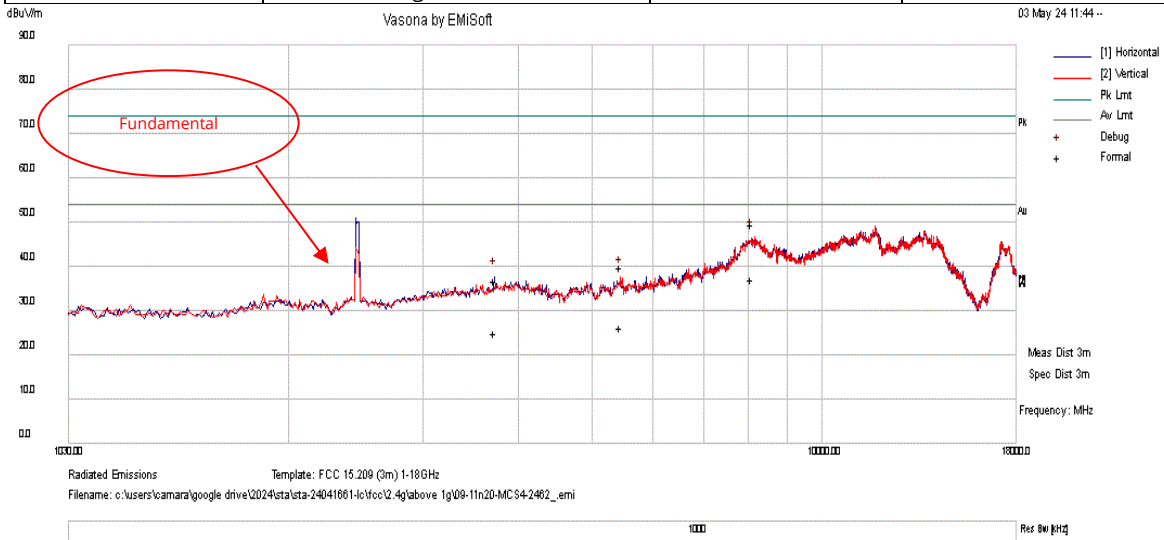


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8030.38	20.75	14.26	15.84	50.85	Peak Max	H	108	295	74.00	-23.15	Pass
2	7110.87	19.95	12.65	9.22	41.82	Peak Max	V	200	0	74.00	-32.18	Pass
3	4710.36	23.30	8.95	5.82	38.07	Peak Max	H	178	228	74.00	-35.93	Pass
4	8030.38	7.29	14.26	15.84	37.39	Average Max	H	108	295	54.00	-16.61	Pass
5	7110.87	8.13	12.65	9.22	30.00	Average Max	V	200	0	54.00	-24.00	Pass
6	4710.36	10.36	8.95	5.82	25.13	Average Max	H	178	228	54.00	-28.87	Pass

Remarks:

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

Test Standard:	15.209, 15.247, RSS-247	Mode:	802.11n Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	05/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Lining
Remark:	High channel	Test Result:	Pass

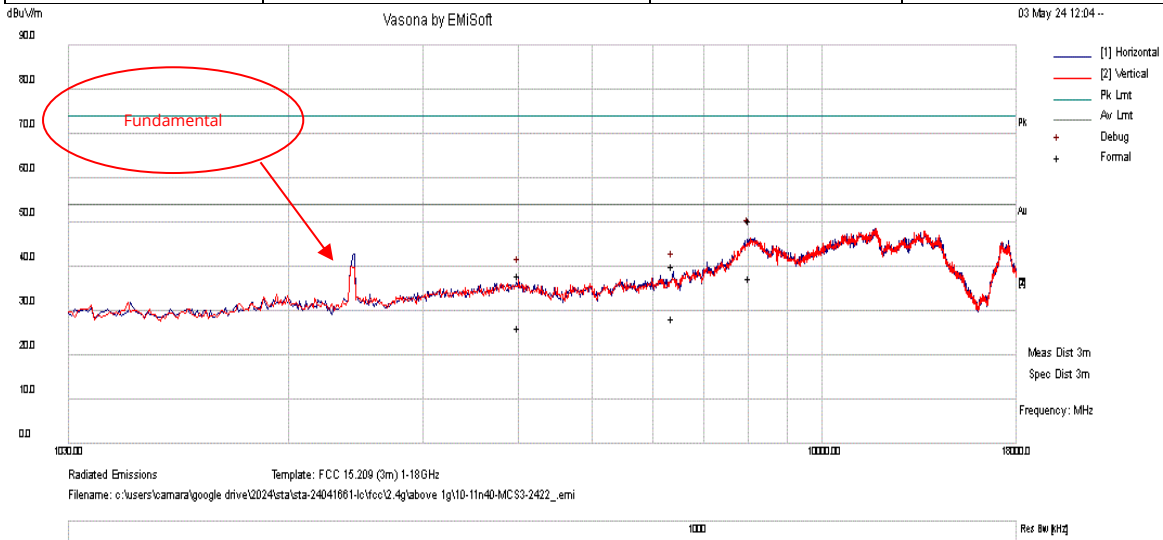


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8092.36	19.48	14.23	15.73	49.44	Peak Max	H	168	98	74.00	-24.56	Pass
2	5453.20	23.07	10.65	6.01	39.73	Peak Max	V	300	241	74.00	-34.27	Pass
3	3725.14	23.26	8.75	4.89	36.90	Peak Max	H	384	127	74.00	-37.10	Pass
4	8092.36	7.16	14.23	15.73	37.12	Average Max	H	168	98	54.00	-16.88	Pass
5	5453.20	9.53	10.65	6.01	26.19	Average Max	V	300	241	54.00	-27.81	Pass
6	3725.14	11.42	8.75	4.89	25.06	Average Max	H	384	127	54.00	-28.94	Pass

Remarks:

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

Test Standard:	15.209, 15.247, RSS-247	Mode:	802.11n40 Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	05/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Lining
Remark:	Low channel	Test Result:	Pass

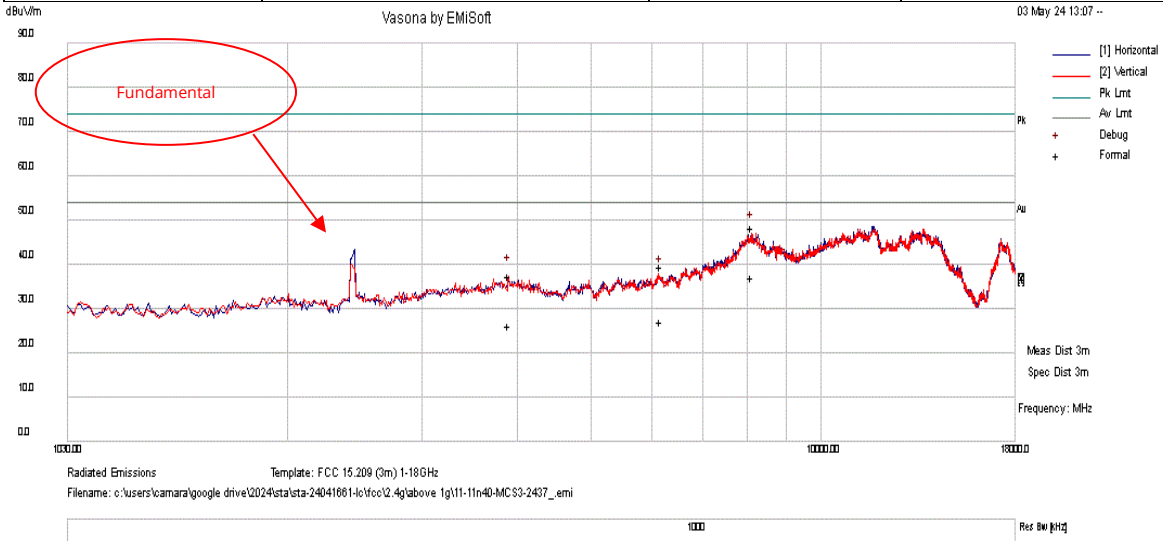


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8035.35	20.21	14.25	15.83	50.29	Peak Max	H	180	199	74.00	-23.71	Pass
2	6388.92	21.26	12.08	6.81	40.15	Peak Max	H	376	60	74.00	-33.85	Pass
3	4010.10	23.01	9.94	5.15	38.10	Peak Max	H	236	96	74.00	-35.90	Pass
4	8035.35	7.22	14.25	15.83	37.30	Average Max	H	180	199	54.00	-16.70	Pass
5	6388.92	9.30	12.08	6.81	28.19	Average Max	H	376	60	54.00	-25.81	Pass
6	4010.10	11.22	9.94	5.15	26.31	Average Max	H	236	96	54.00	-27.69	Pass

Remarks:

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

Test Standard:	15.209, 15.247, RSS-247	Mode:	802.11n40 Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	05/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Lining
Remark:	Mid channel	Test Result:	Pass

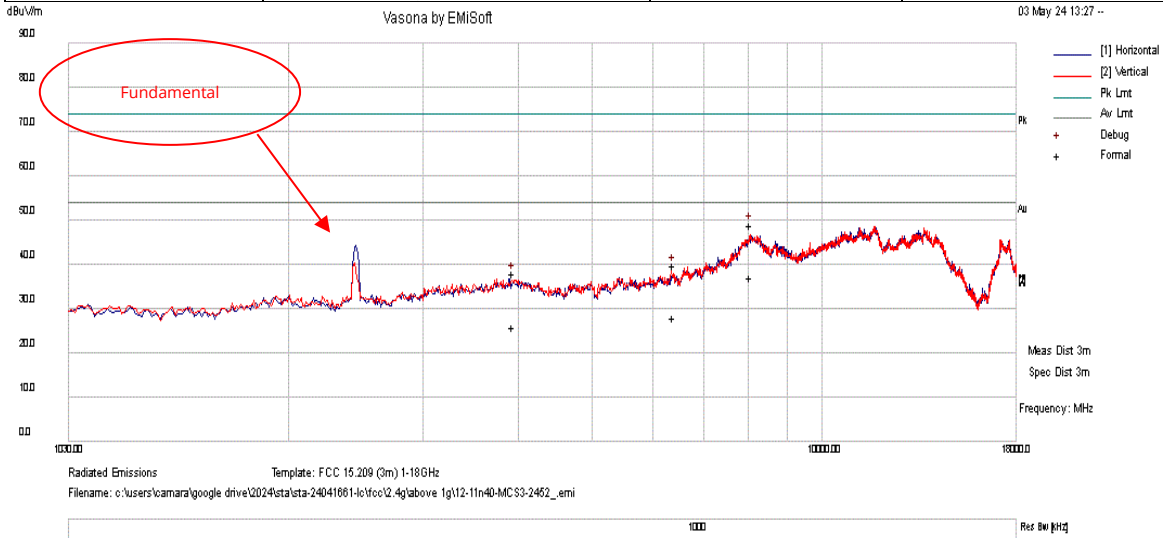


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8126.04	18.39	14.21	15.67	48.27	Peak Max	V	266	124	74.00	-25.73	Pass
2	3905.65	22.45	9.53	5.51	37.49	Peak Max	V	283	59	74.00	-36.51	Pass
3	6164.52	20.82	11.83	6.81	39.46	Peak Max	V	180	0	74.00	-34.54	Pass
4	8126.04	7.05	14.21	15.67	36.93	Average Max	V	266	124	54.00	-17.07	Pass
5	3905.65	11.01	9.53	5.51	26.05	Average Max	V	283	59	54.00	-27.95	Pass
6	6164.52	8.53	11.83	6.81	27.17	Average Max	V	180	0	54.00	-26.83	Pass

Remarks:

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

Test Standard:	15.209, 15.247, RSS-247	Mode:	802.11n40 Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	05/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Lining
Remark:	High channel	Test Result:	Pass



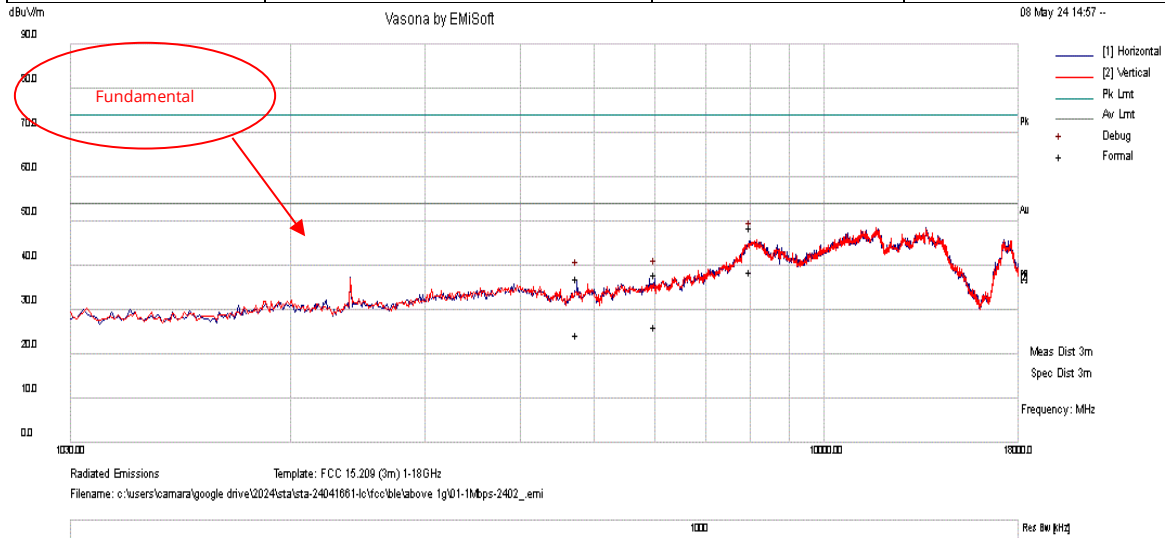
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8074.13	18.95	14.24	15.77	48.96	Peak Max	V	264	60	74.00	-25.04	Pass
2	6392.12	20.89	12.09	6.81	39.79	Peak Max	V	123	71	74.00	-34.21	Pass
3	3942.37	22.82	9.70	5.43	37.95	Peak Max	H	224	0	74.00	-36.05	Pass
4	8074.13	7.05	14.24	15.77	37.06	Average Max	V	264	60	54.00	-16.94	Pass
5	6392.12	9.21	12.09	6.81	28.11	Average Max	V	123	71	54.00	-25.89	Pass
6	3942.37	10.72	9.70	5.43	25.85	Average Max	H	224	0	54.00	-28.15	Pass

Remarks:

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

Report# STA-24041661-LC-FCC-IC-RF-DTS

Test Standard:	15.209, 15.247, RSS-247	Mode:	BLE Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	05/08/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Lining
Remark:	Low Channel	Test Result:	Pass



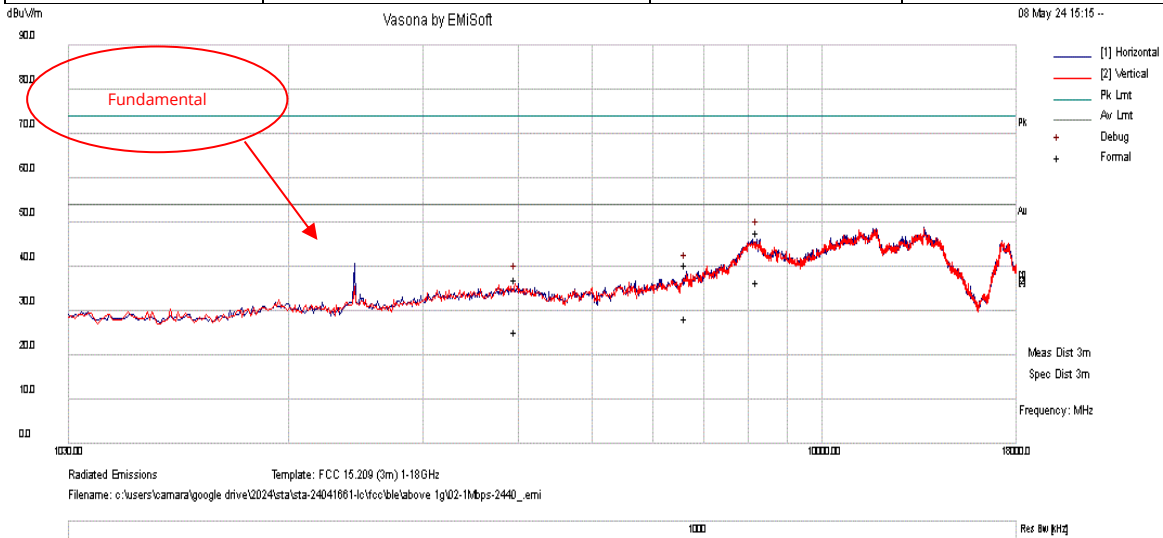
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8009.65	18.63	14.27	15.85	48.75	Peak Max	H	176	329	74.00	-25.25	Pass
2	6006.65	19.90	11.83	6.22	37.95	Peak Max	H	125	0	74.00	-36.05	Pass
3	4754.24	21.99	9.03	5.93	36.95	Peak Max	H	197	214	74.00	-37.05	Pass
4	8009.65	8.45	14.27	15.85	38.57	Average Max	H	176	329	54.00	-15.43	Pass
5	6006.65	8.02	11.83	6.22	26.07	Average Max	H	125	0	54.00	-27.93	Pass
6	4754.24	9.33	9.03	5.93	24.29	Average Max	H	197	214	54.00	-29.71	Pass

Remarks:

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

Report# STA-24041661-LC-FCC-IC-RF-DTS

Test Standard:	15.209, 15.247, RSS-247	Mode:	BLE Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	05/08/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Lining
Remark:	Mid Channel	Test Result:	Pass

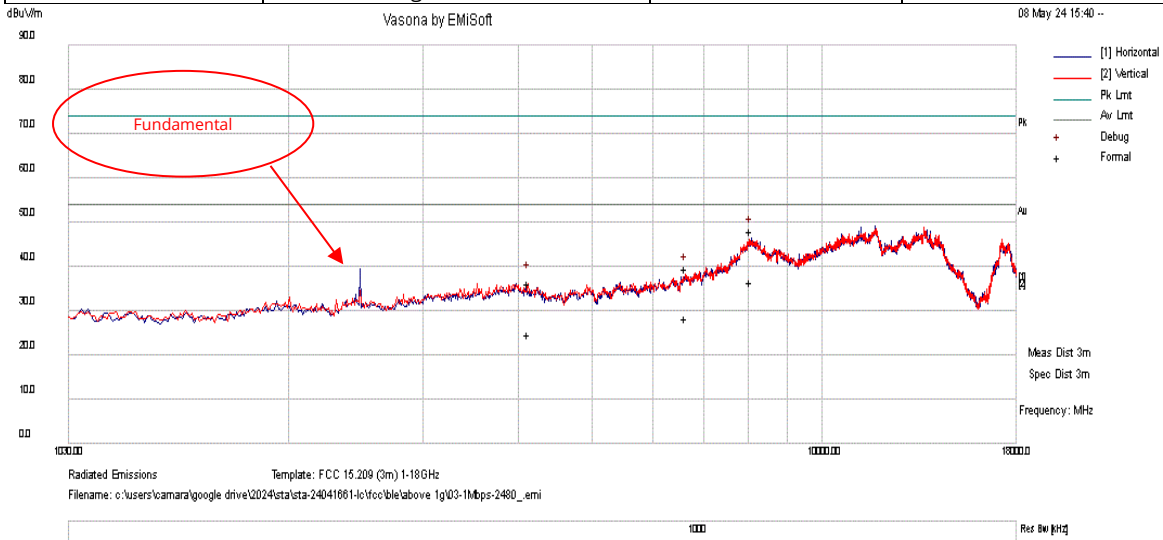


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8231.49	17.91	14.17	15.62	47.70	Peak Max	H	118	190	74.00	-26.30	Pass
2	6642.41	20.34	12.11	7.85	40.30	Peak Max	H	148	324	74.00	-33.70	Pass
3	3969.03	21.82	9.82	5.32	36.96	Peak Max	V	258	24	74.00	-37.04	Pass
4	8231.49	6.72	14.17	15.62	36.51	Average Max	H	118	190	54.00	-17.49	Pass
5	6642.41	8.39	12.11	7.85	28.35	Average Max	H	148	324	54.00	-25.65	Pass
6	3969.03	10.11	9.82	5.32	25.25	Average Max	V	258	24	54.00	-28.75	Pass

Remarks:

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

Test Standard:	15.209, 15.247, RSS-247	Mode:	BLE Mode
Frequency Range:	1 GHz - 18 GHz	Test Date:	05/08/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Lining
Remark:	High Channel	Test Result:	Pass



No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8081.71	18.01	14.23	15.76	48.00	Peak Max	H	198	51	74.00	-26.00	Pass
2	6636.45	19.65	12.12	7.83	39.60	Peak Max	H	254	0	74.00	-34.40	Pass
3	4126.59	21.52	9.76	4.98	36.26	Peak Max	H	194	294	74.00	-37.74	Pass
4	8081.71	6.57	14.23	15.76	36.56	Average Max	H	198	51	54.00	-17.44	Pass
5	6636.45	8.24	12.12	7.83	28.19	Average Max	H	254	0	54.00	-25.81	Pass
6	4126.59	9.84	9.76	4.98	24.58	Average Max	H	194	294	54.00	-29.42	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB) = 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

Refer to FCC exhibit

9 Test Instrument List

Equipment	Manufacturer	Model	Instrument Number	Cal. Date	Cal. Due
Semi-Anechoic Chamber	ETS-Lindgren	10M	VL001	10/18/2022	10/18/2024
Shielding Control Room	ETS-Lindgren	Series 81	VL006	N/A1)	N/A1)
Spectrum Analyzer	Keysight	N9020A	MY50110074	06/09/2023	06/09/2024
EMC Test Receiver	R&S	ESL6	100230	06/07/2023	06/07/2024
LISN (9KHz - 30MHz)	EMCO	3816/2	9705-1066	07/12/2023	07/12/2024
Bi-Log Antenna	ETS-Lindgren	3142E	217921	07/19/2023	07/19/2024
Horn Antenna (1-18GHz)	Electro-Metrics	EM-6961	6292	07/21/2023	07/21/2024
Horn Antenna (18-40GHz)	Com-Power	AH-840	101109	07/21/2023	07/21/2024
Preamplifier	RF Bay, Inc.	LPA-10-20	11180621	07/16/2023	07/16/2024
Temp / Humidity / Pressure Meter	PCE Instruments	PCE-THB 40	R062028	06/07/2023	06/07/2024
RF Attenuator	Pasternack	PE7005-3	VL061	07/16/2023	07/16/2024
Preamplifier 100KHz - 40GHz	Aeroflex	33711-392-77150-11	064	07/16/2023	07/16/2024
EM Center Control	ETS-Lindgren	7006-001	160136	N/A1)	N/A1)
Turn Table	ETS-Lindgren	2181-3.03	VL002	N/A1)	N/A1)
Boresight Antenna Tower	ETS-Lindgren	2171B	VL003	N/A1)	N/A1)
Loop Antenna (9k-30MHz)	Com-Power	AL-130	121012	06/09/2023	06/09/2024
RE test cable (below 6GHz)	Vista	RE-6GHz-01	RE-6GHz-01	07/16/2023	07/16/2024
RE test cable (1-18GHz)	PhaseTrack	II-240	RE-18GHz-01	07/16/2023	07/16/2024
RE test cable (>18GHz)	Sucoflex	104	344903/4	07/16/2023	07/16/2024
Pulse limiter	Com-Power	LIT-930A	531727	07/16/2023	07/16/2024
CE test cable #1	FIRST RF	FRF-C-1002-001	CE-6GHz-01	07/16/2023	07/16/2024
CE test cable#2	FIRST RF	FRF-C-1002-001	CE-6GHz-02	07/16/2023	07/16/2024
USB RF Power Sensor	ETS-Lindgren	7002-006	SN 00151268	06/07/2023	06/07/2024
Agilent Signal Generator	MXG N5182A	N5182A	US47080548	06/07/2023	06/07/2024
Power Splitter/Combiner	Mini-Circuits	ZFSC-2-9G+	VL052	N/A1)	N/A1)
Power Splitter/Combiner	Mini-Circuits	ZFSC-2-9G+	VL053	N/A1)	N/A1)
Power Splitter/Combiner	Mini-Circuits	ZFSC-2-9G+	VL054	N/A1)	N/A1)
Power Splitter/Combiner	Mini-Circuits	ZFSC-2-9G+	VL055	N/A1)	N/A1)

Note:

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

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